State Actuarial Valuation

As of June 30, 2017

Required Contributions for Fiscal Year

July 1, 2018 through June 30, 2019

CalPERS

Table of Contents

Actuarial Certification 1

Highlights and Executive Summary 2
- Introduction 3
- Purpose of Report 3
- Employer Required Contribution Rates 4
- Expected Future Changes 7
- Funded Status of the Plans 8
- Changes Since the Prior Year's Valuation 9
- Subsequent Events 9

Assets 10
- Reconciliation of the Market Value of Assets Over the Prior Fiscal Year 11
- Asset Allocation 12
- CalPERS History of Investment Returns 13

Liabilities and Employer Contributions 14
- Comparison of Current and Prior Year 15
- Development of Accrued and Unfunded Liabilities 20
- Development of Employer Contribution Rates 20
- Schedule of Amortization Bases for the Retirement Program 21
- (Gain) / Loss Analysis 24
- Development of Group Term Life Insurance (GTLI) Contributions 25
- Reconciliation of Employer Contribution Rates 26
- Reconciliation of Employer Contributions 27
- Employer Contribution Rate History 28
- History of Funded Status and Funding Progress 32

Risk Analysis 37
- Projected Rates 38
- Analysis of Future Investment Return Scenarios 38
- Analysis of Discount Rate Sensitivity & Government Code Section 20229 40
- Volatility Ratios 51

Appendix A – Statement of Actuarial Methods and Assumptions A-1

Appendix B – Principal Plan Provisions B-1

Appendix C – Participant Data C-1

Appendix D – Normal Cost Information D-1

Appendix E – Glossary of Actuarial Terms E-1

Actuarial Certification

September 2018

To the best of our knowledge, this report is complete and accurate and contains sufficient information to fully and fairly disclose the actuarial funded condition of the State plans. This valuation is based on the member and financial data as of June 30, 2017 provided by the various CalPERS databases and the benefits under these plans with CalPERS as of the date this report was produced. In our opinion, this valuation has been performed in accordance with generally accepted actuarial principles and in accordance with standards of practice prescribed by the Actuarial Standards Board. The assumptions and methods are internally consistent and reasonable for these plans, as prescribed by the CalPERS Board of Administration according to provisions set forth in California Public Employees' the Retirement Law.

The undersigned are actuaries for CalPERS, who 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.

Kelly Sturm, ASA, MAAA
Supervising Pension Actuary, CalPERS

Paul Tschida, FSA, EA, MAAA
Senior Pension Actuary, CalPERS

Scott Terando, ASA, EA, MAAA, FCA, CFA
Chief Actuary, CalPERS

Highlights and Executive Summary

3 Introduction

3 Purpose of Report

4 Employer Required Contribution Rates

7 Expected Future Changes

8 Funded Status of the Plans

9 Changes Since the Prior Year's Valuation

9 Subsequent Events

Highlights and Executive Summary

Introduction

This is the actuarial valuation report as of June 30, 2017 for the State plans. This actuarial valuation was used to set the 2018-19 required employer contribution rates.

The five plans included in this valuation provide retirement benefits to members employed by the State of California. This includes employees of the California State University system but generally does not include employees of the University of California system. It also does not cover school employees or employees of local governments that have elected to contract with CalPERS.

Purpose of Report

This actuarial valuation was performed by the CalPERS Actuarial Office using data as of June 30, 2017. The purpose of the report is to:

- Set forth the assets and accrued liabilities of the State plans as of June 30, 2017.
- Determine the required employer contribution rates of these plans for the fiscal year July 1, 2018 through June 30, 2019.
- Provide actuarial information as of June 30, 2017 to the CalPERS Board of Administration ("Board") and other interested parties.

The pension funding information presented in this report should not be used in financial reports subject to Governmental Accounting Standards Board (GASB) Statement Number 68 for an Agent Employer Defined Benefit Pension Plan.

The use of this report for any 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 or applicable law.

California Actuarial Advisory Panel Recommendations

This report includes all the basic disclosure elements as described in the *Model Disclosure Elements for Actuarial Valuation Reports* recommended in 2011 by the California Actuarial Advisory Panel (CAAP), except for the following:

- Due to the various employee contribution rates within the majority of State plans, we have shown the total normal cost for the plans and shown the average employee portion as "Employee Contribution." More specific employee normal costs are given in Appendix B.
- The unfunded liability amortization schedule does not give the original base amounts of the various components of the unfunded liabilities in the "Schedule of Amortization Bases".

Additionally, this report includes the following "Enhanced Risk Disclosures" also recommended by the CAAP in the Model Disclosure Elements document:

- A "Deterministic Stress Test," projecting future results under different investment income scenarios.
- A "Sensitivity Analysis," showing the impact on current valuation results using alternate discount rates of 6.0 percent, 7.0 percent and 8.0 percent.

Employer Required Contribution Rates

The actuarially required employer contribution rates for Fiscal Year July 1, 2018 through June 30, 2019 are shown in the table below. For comparison purposes, the corresponding contribution rates for Fiscal Year July 1, 2017 through June 30, 2018 are also provided. The expected contribution amounts that these rates generate are also shown.

	Fiscal Year 2017-18		Fiscal Year 2018-19	
Plan	Expected Employer Contribution	Required Employer Rate[1]	Expected Employer Contribution	Required Employer Rate[1]
State Miscellaneous	$3,397,736,108	28.325%	$3,631,721,124	29.298%
State Industrial	131,131,373	19.527%	134,969,006	19.550%
State Safety	435,662,446	19.402%	466,765,057	20.352%
State Peace Officers & Firefighters	1,462,630,279	42.598%	1,581,049,078	43.724%
California Highway Patrol	447,375,521	52.785%	484,055,746	53.805%
Total State	$5,874,535,727		$6,298,560,011	

(1) Excludes additional contributions pursuant to Government Code Section 20683.2. See "Additional Contributions" section on page 6 for more information about that requirement.

Note that the payroll used to calculate the expected dollar contribution is the payroll used in the valuation incorporating two years of payroll growth using the annual payroll growth assumption on the valuation date (e.g. two years at 2.875 percent for fiscal year 2018-19 contributions). To the extent that payroll in the contribution year is different than the projected payroll, the actual contribution amounts will be different than the expected contributions shown in the table above. State Miscellaneous and State Industrial include both Tier 1 and Tier 2 benefit levels.

The supporting exhibits in this report entitled "Reconciliation of Employer Contribution Rates" on page 26 and "Reconciliation of Employer Contributions" on page 27 provide explanations of the changes in required contribution rates and expected contribution amounts from Fiscal Year 2017-18 to Fiscal Year 2018-19.

Reasons for Change in Employer Contributions for the State Plans

Overall, the required contributions for the State plans have increased by $424 million, which is a 7.2% relative increase in contribution, between Fiscal Year 2017-18 and Fiscal Year 2018-19. This change is mainly driven by the factors listed below.

CalPERS currently employs an amortization and smoothing policy that spreads rate increases or decreases over a 5-year period and amortizes all experience gains and losses over a fixed 30-year period. This means that only one fifth of the total anticipated rate change caused by each gain or loss is realized in the first year, culminating in the full increase in the fifth year. As a result, the progression of these gain or loss amortization bases will affect contribution levels in increasing measure throughout the ramp period. A complete description of the actuarial methods used in the June 30, 2017 valuation is provided in Appendix A.

On December 21, 2016, the Board lowered the discount rate from 7.50 percent to 7.00 percent using a three-year phase-in beginning with the June 30, 2016 actuarial valuations. The employer contributions for Fiscal Year 2018-19 were calculated using a discount rate of 7.25 percent, down from 7.375 percent the prior year. In addition, on December 20, 2017, the Board adopted new actuarial assumptions based on an experience study of CalPERS membership performed every four years. As a result of the study, updates were made to various assumptions including mortality, retirement rates and inflation. The reduction of the inflation assumption will be implemented in two steps in conjunction with the decreases in the discount rate. For the June 30, 2017 valuation, an inflation rate of 2.625 percent was used, down from 2.75 percent the prior year. The impact on required contributions of these assumption changes is approximately $154.3 million, which accounts for the increase in normal cost and year one of the five-year phase-in of the increase in unfunded liability, to be paid over 20 years.

Overall, payroll across the State plans increased by 3.7 percent, as compared to the payroll growth assumption of 3 percent. This led to a contribution increase of $82.5 million. The payroll growth for the year ranges from a 2.1 percent increase for Safety to a 6.1 percent increase for California Highway Patrol.

Employer Required Contribution Rates (Continued)

Senate Bill 84 (SB 84), approved by the Governor on July 10, 2017, directed the State to contribute an additional $6 billion to the State plans during Fiscal Year 2017-18 to pay down the Unfunded Accrued Liability. Payments were made in three equal installments on or around October 31, 2017, January 16, 2018 and April 17, 2018. These payments are in addition to the actuarially required contributions for Fiscal Year 2017-18. SB 84 specified the following allocation among plans:

Plan	Additional Contributions Made During Fiscal 2017-18 Pursuant to SB 84 (in millions)
State Miscellaneous	$3,600
State Industrial	100
State Safety	300
State Peace Officers & Firefighters	1,500
California Highway Patrol	500
Total	$ 6,000

The additional payments served to reduce the required contribution for Fiscal Year 2018-19 by approximately $177.3 million. Note that while the additional payment is included in the calculation of the required contribution for 2018-19, it will not be recognized in the market value of assets or the funded status until the June 30, 2018 valuation. The average funded status across the State plans as of June 30, 2018 is expected to be 3 percent greater than it would have been had the State not contributed the additional $6 billion.

The Public Employees' Pension Reform Act of 2013 (PEPRA) requires lower benefits for new members as defined by PEPRA who are hired after January 1, 2013. The normal cost for all of the plans, before reflecting the discount rate change, is lower due to the enrollment of new hires into the lower benefit level. The number of PEPRA members range between a high of 32 percent of active members for State Safety to a low of 13 percent of active members for California Highway Patrol.

The net return on plan assets for the year ending June 30, 2017 was approximately 11.2 percent, which is greater than the assumed return of 7.375 percent. This led to an experience gain that will be amortized over the next 30 years. This was partially offset by a small net demographic loss.

The table below highlights all major contributors to the change in required contributions.

Reason for Change	Change in Required Contribution (Dollars in Millions)
Change due to normal progression of existing amortization bases	$458.1
Change in assumptions (reduction in discount rate to 7.25% and update to inflation and various demographic assumptions)	154.3
Change due to increase in overall payroll	82.5
Decrease in normal cost due to new hires in lower benefit level	(36.3)
Decrease due to SB 84 additional contributions	(177.3)
First installment of the 5-year phased-in 30-year amortization of the following gains and losses:	
Impact of investment experience	(59.5)
Impact of greater than expected contributions received due to higher than expected payroll	(4.0)
Demographic gains and losses	6.2
Total Change in Required Contributions	$ 424.0

Employer Required Contribution Rates (continued)

Additional Contributions

One of the provisions of pension reform added Government Code Section 20683.2 which changed the contribution rates of many State members effective July 1, 2013, July 1, 2014, and July 1, 2015. Government Code Section 20683.2 also requires that the "savings realized by the state employer as a result of the employee contribution rate increases required by this section shall be allocated to any unfunded liability, subject to appropriation in the annual Budget Act." Under the California Constitution, the Board has "plenary" authority over the actuarial function at CalPERS consistent with the fiduciary duties of a trustee. This includes authority to set employer contribution rates. By statute, the State may pay additional contributions in addition to the actuarially required contribution rates set by the Board and CalPERS will generally accept these payments.

The table below shows the:

- Actuarially required contributions (rates set by the Board based on staff recommendation),
- Additional contributions that the State is to make to offset the savings due to the increased member contributions, and
- Total contributions that the State is to make for each plan.

Plan	Actuarially Required Employer Contribution for 2018-19	Additional Statutory Contribution to Offset Increased Member Contributions	Total Contribution 2018-19
State Miscellaneous	29.298%	0.098%	29.396%
State Industrial	19.550%	0.881%	20.431%
State Safety	20.352%	1.182%	21.534%
State Peace Officers & Firefighters	43.724%	1.647%	45.371%
California Highway Patrol	53.805%	1.319%	55.124%

In all cases, the savings are less than the actual increase in member contributions. This is because the additional member contributions increase the value of the benefit in some circumstances. The obvious example is when the member terminates and takes a refund. A less obvious example is for Tier 2 members where the members are assumed to elect to receive a Tier 1 benefit with an actuarial equivalent reduction to offset the missed Tier 1 contributions. Because the members will make additional contributions, a smaller reduction will apply in the future.

The rates and information shown in the remainder of this report reflect the rates set by the Board at its April 2018 meeting (shown above as the actuarially required employer contribution). The additional contribution pursuant to Government Code Section 20683.2 will be realized in future valuations as actuarial gains.

Expected Future Changes

The table below shows the required and projected employer contribution rates for the next six fiscal years. Projected results reflect the adopted changes to the discount rate described in Appendix A, "Actuarial Assumptions." The projections reflect an 8.6% investment return for Fiscal Year 2017-18 and assume that all other actuarial assumptions will be realized and that no further changes to assumptions, contributions, benefits, or funding will occur during the projection period. The projections reflect the anticipated decrease in normal cost due to new hires entering lower benefit formulas under PEPRA. In the June 30, 2018 valuation, the CalPERS Actuarial Office will transition to a new actuarial valuation system. Actuarial results, such as normal cost and accrued liability, may be slightly higher or lower due to minor differences between the current system and the new system. We do not expect a significant change to projected required contributions.

	New Rate	Projected Future Employer Contribution Rates				
Plan	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24
State Miscellaneous	29.298%	31.2%	31.9%	32.3%	32.2%	32.5%
State Industrial	19.550%	21.0%	21.6%	21.9%	21.6%	21.7%
State Safety	20.352%	21.5%	21.7%	21.7%	21.5%	20.8%
State Peace Officers & Firefighters	43.724%	46.6%	47.8%	48.5%	48.5%	48.8%
California Highway Patrol	53.805%	57.0%	58.5%	59.2%	59.4%	59.9%

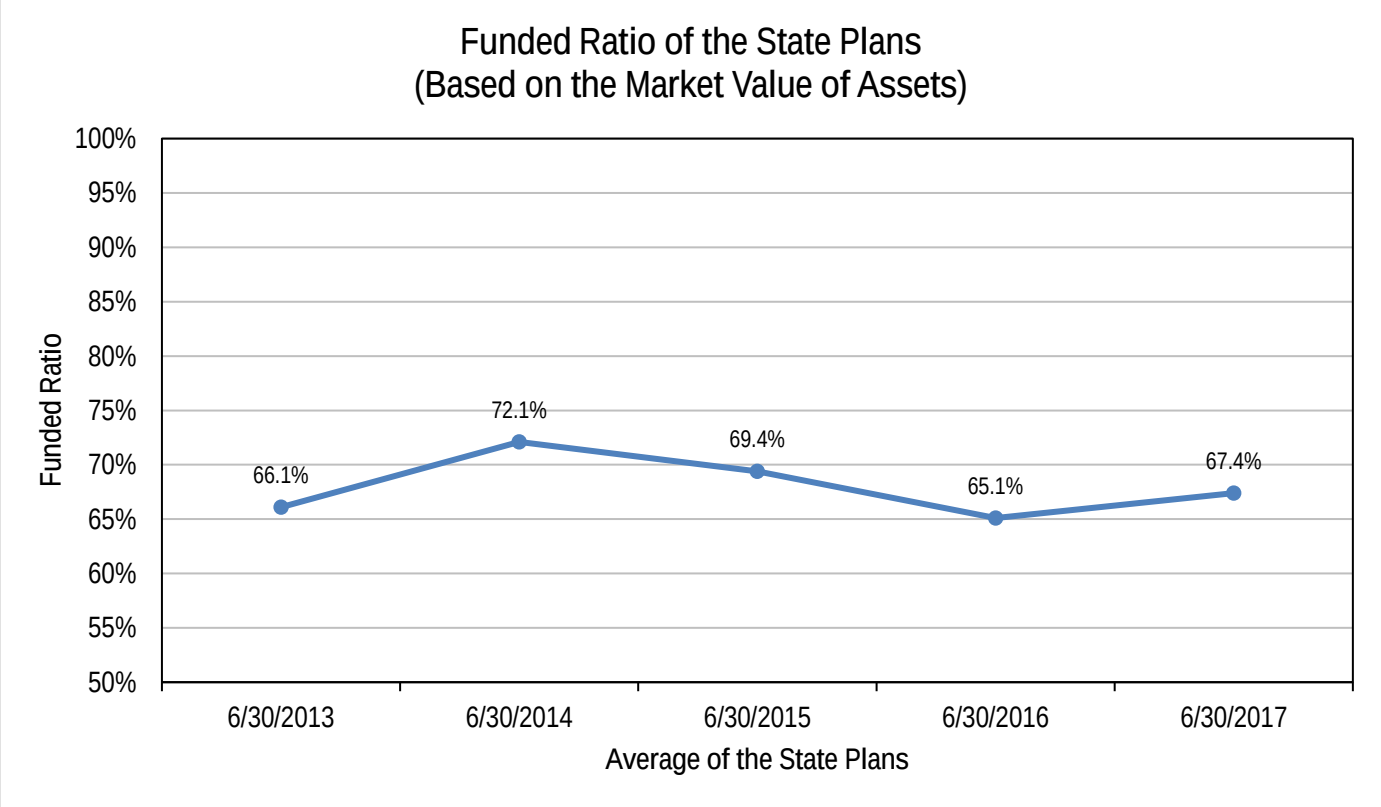
Under the amortization policy in effect for this valuation, changes in the Unfunded Accrued Liability (UAL) due to actuarial gains or losses or changes in actuarial assumptions or methods are amortized using a 5-year ramp up. For more information, please see “Amortization of the Unfunded Actuarial Accrued Liability” under “Actuarial Methods” in Appendix A. This method attempts to mitigate employer cost volatility from year to year by phasing in the impact of unanticipated changes in UAL over a 5-year period. As a result of this methodology, dramatic changes in the required employer contributions in any one year are less likely. However, required contributions can change gradually and significantly over the next five years. In years where there is a large increase in UAL the relatively small amortization payments during the ramp-up period could result in a funded ratio that is projected to decrease initially while the contribution impact of the increase in the UAL is phased in.

Due to the adopted change in the discount rate for the next valuation in combination with the 5-year phase-in ramp, the increases in the required contributions are expected to continue for five years from Fiscal Year 2018-19 through Fiscal Year 2023-24.

A scenario analysis was performed to determine the effects of various investment returns on future employer contribution rates for three years beyond the estimated 2019-20 employer rates shown above. That information is available in the “Risk Analysis” section of this report.

Funded Status of the Plans

The funded status of a pension plan is defined as the ratio of assets to a plan's accrued liabilities. Plans with a lower funded ratio are, all other things being equal, more at risk of not being able to meet their future benefit obligations. From June 30, 2016 to June 30, 2017 the funded status for the State plans, on average, increased by 2.3 percent. This was due mainly to the investment return for 2016-17 being greater than expected, partially offset by the increase in liability due to the change in discount rate assumption. The graph below shows the average funded status for the past five years for the State plans.



The tables below show the funded status of the plans using the market value of assets on June 30, 2017, and for the last five years.

Funded Status and Unfunded Liability on June 30, 2017

Plan	Present Value of Benefits	Entry Age Normal Accrued Liability	Market Value of Assets	Unfunded Liability	Funded Ratio
State Miscellaneous	$122,604,179,567	$106,955,886,517	$72,203,626,225	$34,752,260,292	67.5%
State Industrial	5,197,892,110	4,210,362,730	3,215,014,610	995,348,120	76.4%
State Safety	15,994,713,061	12,204,328,400	9,326,848,277	2,877,480,123	76.4%
State Peace Officers & Firefighters	53,048,435,271	44,618,700,274	29,424,432,350	15,194,267,924	65.9%
California Highway Patrol	14,677,215,022	12,321,822,329	7,417,410,834	4,904,411,495	60.2%
Total for the State	$211,522,435,011	$180,311,100,250	$121,587,332,296	$58,723,767,954	67.4%

Funded Ratio of the Retirement Program (Based on Market Value of Assets)

Plan	June 30, 2013	June 30, 2014	June 30, 2015	June 30, 2016	June 30, 2017
State Miscellaneous	66.5%	72.4%	69.6%	65.0%	67.5%
State Industrial	74.7%	81.7%	78.6%	73.0%	76.4%
State Safety	71.6%	79.2%	76.6%	73.4%	76.4%
State Peace Officers & Firefighters	65.0%	71.0%	68.5%	64.2%	65.9%
California Highway Patrol	58.9%	64.3%	61.6%	58.5%	60.2%
Total for the State	66.1%	72.1%	69.4%	65.1%	67.4%

Changes Since the Prior Year's Valuation

Actuarial Methods and Assumptions

Various assumption changes were recognized in this valuation. On December 21, 2016, the Board lowered the discount rate from 7.50 percent to 7.00 percent using a three-year phase-in beginning with the June 30, 2016 actuarial valuations. The employer contributions for Fiscal Year 2018-19 were calculated using a discount rate of 7.25 percent, down from 7.375 percent the prior year. In addition, on December 20, 2017, the Board adopted new actuarial assumptions based on an experience study of CalPERS membership performed every four years. As a result of the study, updates were made to various assumptions including mortality, retirement rates and inflation. The reduction of the inflation assumption will be implemented in two steps in conjunction with the decreases in the discount rate. An inflation rate of 2.625 percent was used for the June 30, 2017 valuation, down from 2.75 percent the prior year.

A complete description of the actuarial methods and assumptions used in the June 30, 2017 valuation may be found in Appendix A of this report.

Plan Provisions

No changes were made since the prior valuation. Please refer to Appendix B for a summary of the plan provisions used in this valuation.

Risk Mitigation

The Board adopted a Risk Mitigation Policy which is designed to reduce funding risk over time. The policy establishes a mechanism whereby CalPERS investment performance that significantly outperforms the discount rate triggers adjustments to the discount rate, expected investment return and strategic asset allocation targets. A minimum excess investment return of 2 percent above the existing discount rate is necessary to cause a funding risk mitigation event. However, this policy is temporarily suspended. More details on the Risk Mitigation Policy can be found on our website.

Subsequent Events

This actuarial valuation report reflects statutory changes, regulatory changes and Board actions through December 2017. It also reflects the additional $6 billion contributed to the State plans during Fiscal Year 2017-18 to pay down Unfunded Accrued Liability pursuant to Senate Bill 84, as described on page 5 of this report. While the additional payments are included in the calculation of the required contribution for Fiscal Year 2018-19, they will not be recognized in the market value of assets or the funded status until the June 30, 2018 valuation.

On February 14, 2018, the Board adopted a new amortization policy effective with the June 30, 2019 actuarial valuation, first affecting State plan employer contributions for Fiscal Year 2020-21. The new policy will generally accelerate the recognition of new sources of Unfunded Accrued Liability. Since this change is not effective until a future valuation and will not affect any amortization bases already in existence upon implementation, it has no effect on the June 30, 2017 valuation results or Fiscal Year 2018-19 required contributions. The new amortization policy is incorporated in the projected contribution rates shown in the "Analysis of Future Investment Return Scenarios" section of this report.

Assets

11 Reconciliation of the Market Value of Assets Over the Prior Fiscal Year

12 Asset Allocation

13 CalPERS History of Investment Returns

Assets

Reconciliation of the Market Value of Assets Over the Prior Fiscal Year

	State Miscellaneous	State Industrial	State Safety	State Peace Officers and Firefighters	California Highway Patrol
1) Market Value of Assets as of June 30, 2016 Including Receivables for Tier 1 Conversion and Service Buybacks	$66,607,613,590	$2,897,811,466	$8,288,200,886	$26,621,971,404	$6,705,506,460
2) Receivables for Tier 1 Conversion and Service Buybacks as of June 30, 2016	319,665,028	15,072,204	21,334,787	82,985,098	12,571,825
3) Market Value of Assets as of June 30, 2016 [(1) - (2)]	$66,287,948,562	$2,882,739,262	$8,266,866,099	$26,538,986,306	$6,692,934,635
4) Employer Contributions Received in 2016-17	3,094,941,060	123,162,747	433,232,445	1,427,240,240	426,603,439
5) Employee Contributions Received in 2016-17	861,685,084	54,858,204	234,319,721	409,542,791	92,819,827
6) Benefit Payments in 2016-17	(5,544,998,068)	(176,020,923)	(527,181,668)	(1,926,167,171)	(542,143,894)
7) Refunds in 2016-17	(27,708,444)	(1,633,402)	(11,552,992)	(11,859,610)	(1,312,070)
8) Administrative Expense	(88,232,350)	(4,282,173)	(12,264,188)	(39,394,805)	(9,922,745)
9) Transfers In/Out	(2,093,294)	(127,949)	698,181	988,001	663,402
10) Investment Return	7,314,861,958	321,637,027	924,755,062	2,951,068,605	746,513,727
11) Market Value of Assets as of June 30, 2017 [(3) + (4) + (5) + (6) + (7) + (8) + (9) + (10)]	$71,896,404,508	$3,200,332,793	$9,308,872,660	$29,350,404,357	$7,406,156,321
12) Receivables for Tier 1 Conversion and Service Buybacks as of June 30, 2017	307,221,717	14,681,817	17,975,617	74,027,993	11,254,513
13) Market Value of Assets as of June 30, 2017 Including Receivables for Tier 1 Conversion and Service Buybacks	$72,203,626,225	$3,215,014,610	$9,326,848,277	$29,424,432,350	$7,417,410,834

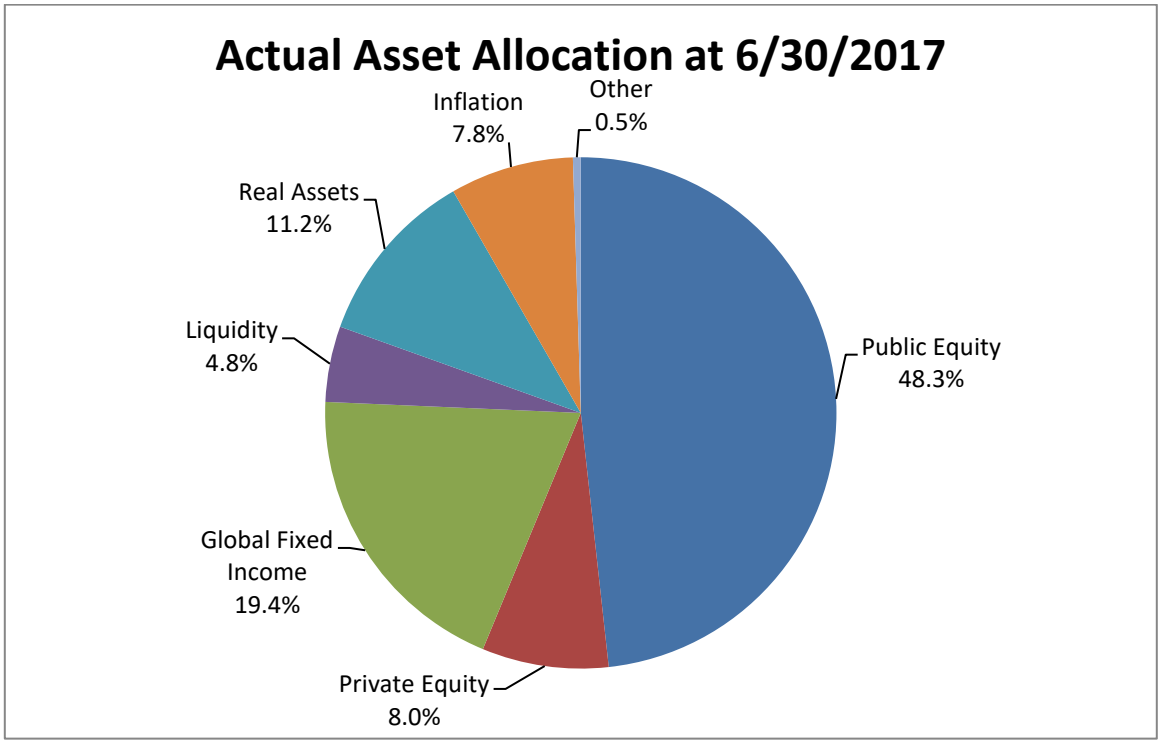
Assets

Asset Allocation

CalPERS adheres to an Asset Allocation Strategy which establishes asset class allocation policy targets and ranges and manages those asset class allocations within their policy ranges. CalPERS Investment Belief No. 6 recognizes that strategic asset allocation is the dominant determinant of portfolio risk and return. On February 19, 2014, the CalPERS Board of Administration adopted changes to the asset allocation as shown in the Policy Target Allocation below expressed as a percentage of total assets. The Board further changed the asset allocation on December 19, 2017 with changes effective July 1, 2018.

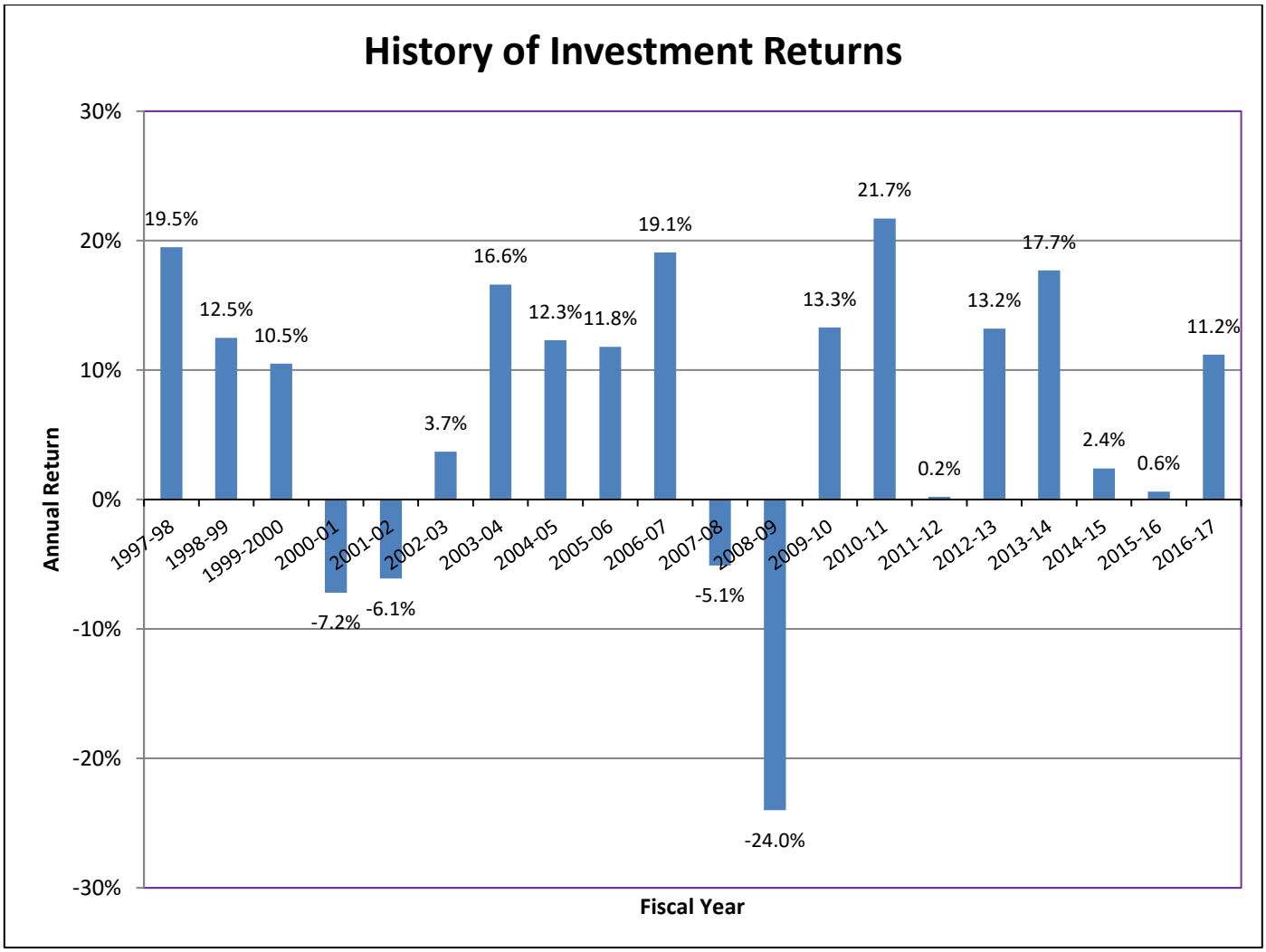
The asset allocation and market value of assets shown below reflect the values of the Public Employees Retirement Fund (PERF) in its entirety as of June 30, 2017. The assets of the State plans are part of the Public Employees Retirement Fund (PERF) and are invested accordingly.

Asset Class	Market Value (Dollars in Billions)	Policy Target Allocation
Public Equity	$156.2	51.0%
Private Equity	25.9	10.0%
Global Fixed Income	62.9	20.0%
Liquidity	15.5	1.0%
Real Assets	36.3	12.0%
Inflation Sensitive Assets	25.3	6.0%
Other	1.6	0.0%
Total Fund	$323.7	100.0%



CalPERS History of Investment Returns

The following is a chart with the 20-year historical annual returns of the Public Employees Retirement Fund for each fiscal year ending on June 30. Beginning in 2002, the figures are reported as gross of fees.



The table below shows historical geometric mean annual returns of the Public Employees' Retirement Fund for various time periods ending on June 30, 2017 (figures are reported as gross of fees). The geometric mean rate of return is the average rate per period compounded over multiple periods. It should be recognized that in any given year the rate of return is volatile. The portfolio has an expected volatility of 11.4 percent per year based on the most recent Asset Liability Modelling study. The volatility is a measure of the risk of the portfolio expressed in the standard deviation of the fund's total return distribution, expressed as a percentage. Consequently, when looking at investment returns, it is more instructive to look at returns over longer time horizons.

History of CalPERS Geometric Rates of Return and Volatilities

	1 Year	5 Year	10 Year	20 Year	30 Year
Geometric Return	11.2%	8.8%	4.3%	6.6%	8.2%
Volatility	—	7.3%	13.4%	11.5%	10.1%

Liabilities and Employer Contributions

15 Comparison of Current and Prior Year

20 Development of Accrued and Unfunded Liabilities

20 Development of Employer Contribution Rates

21 Schedule of Amortization Bases for the Retirement Program

24 (Gain)/Loss Analysis

25 Development of Group Term Life Insurance (GTLI) Contributions

26 Reconciliation of Employer Contribution Rates

27 Reconciliation of Employer Contributions

28 Employer Contribution Rate History

32 History of Funded Status and Funding Progress

Liabilities and Employer Contributions

Comparison of Current and Prior Year

Shown below are the key valuation results for the current valuation compared to corresponding results from the prior valuation.

State Miscellaneous

Participant Information

	June 30, 2016	June 30, 2017
Members Included in the Valuation[1]		
Active Members	170,986	172,365
Transfers from State Miscellaneous	36,786	36,841
Vested Terminations[2]	54,854	58,106
Receiving Payments	186,382	190,693
Total	449,008	458,005
Average Entry Age of Active Members	34.8	34.8
Average Age for Active Members	47.4	47.3
Average Age of Retired Members	71.9	72.0
Average Pay	$66,127	$67,953
Covered Payroll Prior Fiscal Year	$11,306,804,561	$11,712,643,755
Projected Payroll for Contribution Rate	$11,995,388,959	$12,395,802,003

(1) 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 coverage group. This does not result in double counting liabilities.

(2) Includes non-vested terminated participants with employee contributions remaining in the plan.

Funded Status of the Retirement Program

	June 30, 2016	June 30, 2017
Present Value of Benefits	$116,407,430,627	$122,604,179,567
Accrued Liability	102,443,593,272	106,955,886,517
Market Value of Assets	66,607,613,590	72,203,626,225
Unfunded Liability/(Surplus)	35,835,979,682	34,752,260,292
Funded Status	65.0%	67.5%

Employer Contribution

	June 30, 2016	June 30, 2017
Contribution Required in Dollars		
Total Normal Cost	$1,887,174,548	$2,000,308,588
Employee Contribution	809,831,131	841,100,840
Employer Normal Costs	1,077,343,417	1,159,207,749
Amortization of Unfunded Liability	2,317,753,705	2,469,290,467
Group Term Life Benefits	2,638,986	3,222,908
Total	$3,397,736,108	$3,631,721,124
Contribution Required in Dollars (Percent of Payroll)		
Total Normal Cost	15.732%	16.137%
Employee Contribution	6.751%	6.785%
Employer Normal Costs	8.981%	9.352%
Amortization of Unfunded Liability	19.322%	19.920%
Group Term Life Benefits	0.022%	0.026%
Total	28.325%	29.298%

Comparison of Current and Prior Year (continued)

State Industrial

Participant Information

	June 30, 2016	June 30, 2017
Members Included in the Valuation[1]		
Active Members	11,428	11,610
Transfers from State Industrial	8,788	8,823
Vested Terminations[2]	3,319	3,457
Receiving Payments	13,421	14,126
Total	36,956	38,016
Average Entry Age of Active Members	35.9	35.7
Average Age for Active Members	45.3	45.1
Average Age of Retired Members	67.8	68.0
Average Pay	$55,388	$56,186
Covered Payroll Prior Fiscal Year	$632,973,735	$652,319,822
Projected Payroll for Contribution Rate	$671,521,835	$690,367,395

(1) 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 coverage group. This does not result in double counting liabilities.

(2) Includes non-vested terminated participants with employee contributions remaining in the plan.

Funded Status of the Retirement Program

	June 30, 2016	June 30, 2017
Present Value of Benefits	$4,973,444,945	$5,197,892,110
Accrued Liability	3,969,767,411	4,210,362,730
Market Value of Assets	2,897,811,466	3,215,014,610
Unfunded Liability/(Surplus)	1,071,955,945	995,348,120
Funded Status	73.0%	76.4%

Employer Contribution

	June 30, 2016	June 30, 2017
Contribution Required in Dollars		
Total Normal Cost	$122,452,007	$122,084,570
Employee Contribution	52,768,186	54,469,987
Employer Normal Costs	69,683,821	67,614,583
Amortization of Unfunded Liability	61,447,552	67,354,423
Group Term Life Benefits	—	—
Total	$131,131,373	$134,969,006
Contribution Required in Dollars (Percent of Payroll)		
Total Normal Cost	18.235%	17.684%
Employee Contribution	7.858%	7.890%
Employer Normal Costs	10.377%	9.794%
Amortization of Unfunded Liability	9.150%	9.756%
Group Term Life Benefits	0.000%	0.000%
Total	19.527%	19.550%

Comparison of Current and Prior Year (continued)

State Safety

Participant Information

	June 30, 2016	June 30, 2017
Members Included in the Valuation[1]		
Active Members	27,042	27,422
Transfers from State Safety	5,741	5,880
Vested Terminations[2]	6,186	6,730
Receiving Payments	23,680	24,742
Total	62,649	64,774
Average Entry Age of Active Members	38.8	38.7
Average Age for Active Members	46.9	46.9
Average Age of Retired Members	68.2	68.4
Average Pay	$78,268	$79,027
Covered Payroll Prior Fiscal Year	$2,116,513,548	$2,167,067,002
Projected Payroll for Contribution Rate	$2,245,409,223	$2,293,464,571

(1) 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 coverage group. This does not result in double counting liabilities.

(2) Includes non-vested terminated participants with employee contributions remaining in the plan.

Funded Status of the Retirement Program

	June 30, 2016	June 30, 2017
Present Value of Benefits	$14,678,817,876	$15,994,713,061
Accrued Liability	11,288,008,411	12,204,328,400
Market Value of Assets	8,288,200,886	9,326,848,277
Unfunded Liability/(Surplus)	2,999,807,525	2,877,480,123
Funded Status	73.4%	76.4%

Employer Contribution

	June 30, 2016	June 30, 2017
Contribution Required in Dollars		
Total Normal Cost	$491,070,997	$514,722,254
Employee Contribution	234,443,177	239,621,178
Employer Normal Costs	256,627,820	275,101,075
Amortization of Unfunded Liability	178,810,085	191,663,982
Group Term Life Benefits	224,541	—
Total	$435,662,446	$466,765,057
Contribution Required in Dollars (Percent of Payroll)		
Total Normal Cost	21.870%	22.443%
Employee Contribution	10.441%	10.448%
Employer Normal Costs	11.429%	11.995%
Amortization of Unfunded Liability	7.963%	8.357%
Group Term Life Benefits	0.010%	0.000%
Total	19.402%	20.352%

Comparison of Current and Prior Year (continued)

State Peace Officers and Firefighters

Participant Information

	June 30, 2016	June 30, 2017
Members Included in the Valuation[1]		
Active Members	41,184	41,445
Transfers from State POFF	5,916	5,817
Vested Terminations[2]	6,798	7,016
Receiving Payments	36,757	38,250
Total	90,655	92,528
Average Entry Age of Active Members	29.7	29.7
Average Age for Active Members	41.7	41.7
Average Age of Retired Members	63.1	63.6
Average Pay	$78,585	$82,439
Covered Payroll Prior Fiscal Year	$3,236,457,111	$3,416,664,854
Projected Payroll for Contribution Rate	$3,433,557,349	$3,615,947,170

(1) 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 coverage group. This does not result in double counting liabilities.

(2) Includes non-vested terminated participants with employee contributions remaining in the plan.

Funded Status of the Retirement Program

	June 30, 2016	June 30, 2017
Present Value of Benefits	$49,422,292,374	$53,048,435,271
Accrued Liability	41,484,601,481	44,618,700,274
Market Value of Assets	26,621,971,404	29,424,432,350
Unfunded Liability/(Surplus)	14,862,630,077	15,194,267,924
Funded Status	64.2%	65.9%

Employer Contribution

	June 30, 2016	June 30, 2017
Contribution Required in Dollars		
Total Normal Cost	$958,546,205	$1,032,135,960
Employee Contribution	389,056,383	412,651,891
Employer Normal Costs	569,489,822	619,484,069
Amortization of Unfunded Liability	893,140,457	961,565,009
Group Term Life Benefits	—	—
Total	$1,462,630,279	$1,581,049,078
Contribution Required in Dollars (Percent of Payroll)		
Total Normal Cost	27.917%	28.544%
Employee Contribution	11.331%	11.412%
Employer Normal Costs	16.586%	17.132%
Amortization of Unfunded Liability	26.012%	26.592%
Group Term Life Benefits	0.000%	0.000%
Total	42.598%	43.724%

Comparison of Current and Prior Year (continued)

California Highway Patrol

Participant Information

	June 30, 2016	June 30, 2017
Members Included in the Valuation[1]		
Active Members	7,150	7,357
Transfers from State CHP	267	262
Vested Terminations[2]	401	428
Receiving Payments	8,813	8,971
Total	16,631	17,018
Average Entry Age of Active Members	26.9	27.0
Average Age for Active Members	40.8	40.6
Average Age of Retired Members	68.1	68.3
Average Pay	$111,732	$115,546
Covered Payroll Prior Fiscal Year	$798,887,020	$850,071,470
Projected Payroll for Contribution Rate	$847,539,240	$899,653,217

(1) 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 coverage group. This does not result in double counting liabilities.

(2) Includes non-vested terminated participants with employee contributions remaining in the plan.

Funded Status of the Retirement Program

	June 30, 2016	June 30, 2017
Present Value of Benefits	$13,495,219,004	$14,677,215,002
Accrued Liability	11,470,696,987	12,321,822,329
Market Value of Assets	6,705,506,460	7,417,410,834
Unfunded Liability/(Surplus)	4,765,190,527	4,904,411,495
Funded Status	58.5%	60.2%

Employer Contribution

	June 30, 2016	June 30, 2017
Contribution Required in Dollars		
Total Normal Cost	$230,649,329	$253,756,186
Employee Contribution	88,601,752	94,391,615
Employer Normal Costs	142,047,577	159,364,571
Amortization of Unfunded Liability	305,327,944	324,691,175
Group Term Life Benefits	—	—
Total	$447,375,521	$484,055,746
Contribution Required in Dollars (Percent of Payroll)		
Total Normal Cost	27.214%	28.206%
Employee Contribution	10.454%	10.492%
Employer Normal Costs	16.760%	17.714%
Amortization of Unfunded Liability	36.025%	36.091%
Group Term Life Benefits	0.000%	0.000%
Total	52.785%	53.805%

Liabilities and Employer Contributions

Development of Accrued and Unfunded Liabilities

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

	State Miscellaneous	State Industrial	State Safety	State Peace Officers and Firefighters	California Highway Patrol
1) Present Value of Benefits					
a) Actives and Inactives	$59,221,145,064	$3,038,799,101	$9,227,480,258	$25,530,894,852	$7,162,584,808
b) Retired	63,383,034,503	2,159,093,009	6,767,232,803	27,517,540,419	7,514,630,194
c) Total	$122,604,179,567	$5,197,892,110	$15,994,713,061	$53,048,435,271	$14,677,215,002
2) Present Value of Future Employee Contributions	$6,874,773,749	$469,474,448	$1,890,915,565	$3,540,515,329	$892,301,650
3) Present Value of Future Employer Normal Costs	8,773,519,301	518,054,932	1,899,469,096	4,889,219,668	1,463,091,023
4) Accrued Liability [(1c) – (2) – (3)]	106,955,886,517	4,210,362,730	12,204,328,400	44,618,700,274	12,321,822,329
5) Market Value of Assets (MVA)	72,203,626,225	3,215,014,610	9,326,848,277	29,424,432,350	7,417,410,834
6) Unfunded Liability/(Surplus) [(4) – (5)]	$34,752,260,292	$995,348,120	$2,877,480,123	$15,194,267,924	$4,904,411,495
7) Funded Status [(5) / (4e)]	67.5%	76.4%	76.4%	65.9%	60.2%

Development of Employer Contribution Rates

The following table shows the development of the employer contribution rates.

	State Miscellaneous	State Industrial	State Safety	State Peace Officers and Firefighters	California Highway Patrol
Employer Contribution Amount					
Normal Cost	$1,159,207,749	$67,614,583	$275,101,075	$619,484,069	$159,364,571
Payment on the Unfunded Liability	2,469,290,467	67,354,423	191,663,982	961,565,009	324,691,175
Payment for Term Life Benefits[1]	3,222,908	0	0	0	0
Total Employer Contribution Amount	$3,631,721,124	$134,969,006	$466,765,057	$1,581,049,078	$484,055,746
Projected Payroll	$12,395,802,003	$690,367,395	$2,293,464,571	$3,615,947,170	$899,653,217
Employer Contribution (as a percent of payroll)					
Normal Cost	9.352%	9.794%	11.995%	17.132%	17.714%
Payment on the Unfunded Liability	19.920%	9.756%	8.357%	26.592%	36.091%
Payment for Term Life Benefits[1]	0.026%	0.000%	0.000%	0.000%	0.000%
Total Employer Contribution Rate	29.298%	19.550%	20.352%	43.724%	53.805%

(1) Sec. 21600-21605

Schedule of Amortization Bases for the Retirement Program

The schedule below shows the development of the payment on the amortization bases used to determine the employer contribution rates. Each row of the schedule gives a brief description of a base (or portion of the Unfunded Actuarial Liability), the date the base was established, the balance of the base on the valuation date, and the number of years remaining in the amortization period. The schedule also shows the expected payment for the year immediately following the valuation date, the balance on the date a year after the valuation date, and the scheduled payment for Fiscal Year 2018-19. Please refer to Appendix A for an explanation of how amortization periods are determined.

There is a one-year lag between the valuation date and the start of the contribution fiscal year.

- The assets, liabilities, and funded status of the plan are measured as of the valuation date: June 30, 2017.
- The required employer contributions determined by the valuation are for the fiscal year beginning one year after the valuation date: Fiscal Year 2018-19.

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

The Unfunded Accrued Liability (UAL) is used to determine the employer contribution and therefore must be rolled forward one year from the valuation date to the first day of the fiscal year for which the contribution is being determined. The UAL is rolled forward each year by subtracting the expected payment on the UAL for the fiscal year and adjusting for interest. The expected payment on the UAL for a fiscal year is equal to the Expected Employer Contribution for the fiscal year, plus any additional discretionary payments made during the year, minus the Expected Normal Cost for the year. The Employer Contribution for the first fiscal year is determined by the actuarial valuation one year ago. The Normal Cost Rate for the fiscal year is assumed to be the same as the rate determined by the current valuation. Expected dollar amounts are determined by multiplying the rate by the expected payroll for the applicable fiscal year, based on payroll as of the valuation date.

State Miscellaneous

Reason for Base	Date Established	Remaining Amortization Period	Balance on 6/30/2017	Expected Payment in 2017-18	Amount Remaining on 6/30/2018	Scheduled Payment for Fiscal Year 2018-19	Payment as Percentage of Payroll
Assumption Change	6/30/2003	6	$621,512,797	$103,872,249	$559,000,737	$106,802,257	0.862%
Assumption Change	6/30/2009	12	1,973,953,683	199,523,081	1,910,436,079	205,187,942	1.655%
Assumption Change	6/30/2011	14	1,684,537,807	153,218,547	1,647,991,256	157,576,227	1.271%
Assumption Change	6/30/2013	16	5,361,610,722	466,048,487	5,267,680,342	479,314,401	3.867%
Assumption Change	6/30/2016	19	1,565,686,939	1,621,450,068	—	—	0.000%
Assumption Change	6/30/2017	20	889,368,198	921,043,721	—	—	0.000%
Reclass of BU 7 Members	6/30/2005	8	(74,037,540)	(10,009,739)	(69,039,017)	(10,292,806)	(0.083%)
New Rate Stabilization Policies	6/30/2004	7	(148,540,689)	(22,154,757)	(136,366,073)	(22,780,528)	(0.184%)
Actuarial Equivalent Reduction Benefits	6/30/2004	7	206,036,391	30,730,207	189,149,343	31,598,196	0.255%
Benefit Change (SB 1801)	6/30/2003	6	(1,814,112)	(303,189)	(1,631,648)	(311,741)	(0.003%)
(Gain)/Loss Prior to 2009	Various	15	10,332,258,297	897,565,280	10,151,814,275	923,113,727	7.447%
(Gain)/Loss in 2009	6/30/2009	22	1,150,211,845	78,853,014	1,151,940,780	81,108,993	0.654%
(Gain)/Loss in 2010	6/30/2010	23	(44,571,769)	(2,979,896)	(44,717,195)	(3,065,207)	(0.025%)
(Gain)/Loss in 2011	6/30/2011	24	23,463,541	1,532,253	23,577,822	1,576,148	0.013%
(Gain)/Loss	Various	26	313,159,104	19,595,194	315,570,047	20,157,242	0.163%
Payment (Gain)/Loss	Various	26	366,125,318	22,909,431	368,944,037	23,566,540	0.190%
(Gain)/Loss	6/30/2014	27	4,627,017,274	184,231,495	4,771,682,987	252,688,869	2.039%
(Gain)/Loss	6/30/2015	28	3,764,469,124	101,460,194	3,932,319,360	156,561,942	1.263%
(Gain)/Loss	6/30/2016	29	4,628,302,788	1,071,758,272	3,853,924,983	103,868,746	0.838%
(Gain)/Loss	6/30/2017	30	(2,486,489,427)	29,060,544	(2,696,855,467)	(37,380,480)	(0.302%)
Total			$34,752,260,292	$5,867,404,455	$31,195,422,646	$2,469,290,467	19.920%

Schedule of Amortization Bases for the Retirement Program (continued)

State Industrial

Reason for Base	Date Established	Remaining Amortization Period	Balance on 6/30/2017	Expected Payment in 2017-18	Amount Remaining on 6/30/2018	Scheduled Payment for Fiscal Year 2018-19	Payment as Percentage of Payroll
Assumption Change	6/30/2003	6	$66,575,978	$11,126,716	$59,879,734	$11,440,577	1.657%
Assumption Change	6/30/2009	12	65,363,018	6,606,756	63,259,776	6,794,335	0.984%
Assumption Change	6/30/2011	14	61,853,953	5,625,978	60,512,013	5,785,986	0.838%
Assumption Change	6/30/2013	16	165,743,019	14,406,917	162,839,357	14,817,006	2.146%
Assumption Change	6/30/2016	19	68,696,698	71,143,383	—	—	0.000%
Assumption Change	6/30/2017	20	40,861,387	32,046,379	10,636,102	200,445	0.029%
New Rate Stabilization Policies	6/30/2004	7	(5,099,343)	(760,564)	(4,681,393)	(782,046)	(0.113%)
Actuarial Equivalent Reduction Benefits	6/30/2004	7	9,262,277	1,381,463	8,503,127	1,420,483	0.206%
(Gain)/Loss in 2009	6/30/2009	22	39,776,484	2,726,885	39,836,274	2,804,901	0.406%
(Gain)/Loss in 2010	6/30/2010	23	5,445,873	364,090	5,463,641	374,513	0.054%
(Gain)/Loss in 2011	6/30/2011	24	(7,344,038)	(479,592)	(7,379,808)	(493,331)	(0.071%)
(Gain)/Loss	Various	26	96,672,285	6,049,041	97,416,544	6,222,545	0.901%
Payment (Gain)/Loss	Various	26	(1,459,858)	(91,347)	(1,471,097)	(93,967)	(0.014%)
(Gain)/Loss	6/30/2014	27	144,734,183	5,762,804	149,259,360	7,904,167	1.145%
(Gain)/Loss	6/30/2015	28	158,265,178	4,265,572	165,321,909	6,582,151	0.953%
(Gain)/Loss	6/30/2016	29	228,561,942	3,167,988	241,851,865	6,518,251	0.944%
(Gain)/Loss	6/30/2017	30	(142,560,916)	1,555,519	(154,507,502)	(2,141,592)	(0.310%)
Total			$995,348,120	$164,897,989	$896,739,902	$67,354,423	9.756%

State Safety

Reason for Base	Date Established	Remaining Amortization Period	Balance on 6/30/2017	Expected Payment in 2017-18	Amount Remaining on 6/30/2018	Scheduled Payment for Fiscal Year 2018-19	Payment as Percentage of Payroll
Assumption Change	6/30/2003	6	($2,414,050)	($403,456)	($2,171,244)	($414,836)	(0.018%)
Assumption Change	6/30/2009	12	252,717,020	25,544,104	244,585,127	26,269,353	1.145%
Assumption Change	6/30/2011	14	169,662,536	15,431,798	165,981,656	15,870,693	0.692%
Assumption Change	6/30/2013	16	525,166,873	45,649,197	515,966,443	46,948,587	2.047%
Assumption Change	6/30/2016	19	191,000,367	197,802,990	—	—	0.000%
Assumption Change	6/30/2017	20	252,736,648	84,478,309	183,572,986	3,459,560	0.151%
New Rate Stabilization Policies	6/30/2004	7	(5,753,181)	(858,084)	(5,281,642)	(882,321)	(0.038%)
Benefit Change (Arnett)	6/30/2002	5	70,046,836	13,389,315	61,259,046	13,766,412	0.600%
(Gain)/Loss in 2009	6/30/2009	22	149,697,308	10,262,530	149,922,325	10,556,141	0.460%
(Gain)/Loss in 2010	6/30/2010	23	(112,074,810)	(7,492,888)	(112,440,481)	(7,707,401)	(0.336%)
(Gain)/Loss in 2011	6/30/2011	24	(10,212,610)	(666,920)	(10,262,351)	(686,025)	(0.030%)
(Gain)/Loss	Various	26	835,009,038	52,248,727	841,437,589	53,747,372	2.344%
Payment (Gain)/Loss	Various	26	(43,278,294)	(2,708,037)	(43,611,484)	(2,785,712)	(0.121%)
(Gain)/Loss	6/30/2014	27	182,150,233	7,252,579	187,845,240	9,947,518	0.434%
(Gain)/Loss	6/30/2015	28	436,154,183	11,755,253	455,601,435	18,139,383	0.791%
(Gain)/Loss	6/30/2016	29	418,877,218	5,805,856	443,233,180	11,945,763	0.521%
(Gain)/Loss	6/30/2017	30	(432,005,193)	6,162,303	(469,707,347)	(6,510,503)	(0.284%)
Total			$2,877,480,123	$463,653,578	$2,605,930,478	$191,663,982	8.357%

Schedule of Amortization Bases for the Retirement Program (continued)

State Peace Officers and Firefighters

Reason for Base	Date Established	Remaining Amortization Period	Balance on 6/30/2017	Expected Payment in 2017-18	Amount Remaining on 6/30/2018	Scheduled Payment for Fiscal Year 2018-19	Payment as Percentage of Payroll
Assumption Change	6/30/2003	6	$260,765,555	$43,581,250	$234,537,629	$44,810,581	1.239%
Assumption Change	6/30/2009	12	655,471,529	66,253,682	634,379,858	68,134,757	1.884%
Assumption Change	6/30/2011	14	714,239,762	64,964,276	698,744,117	66,811,921	1.848%
Assumption Change	6/30/2013	16	2,463,787,634	214,160,363	2,420,624,390	220,256,366	6.091%
Assumption Change	6/30/2016	19	722,335,882	748,062,423	—	—	0.000%
Assumption Change	6/30/2017	20	839,364,162	726,774,248	147,559,200	2,780,855	0.077%
Benefit Change (SB 65)	6/30/2006	9	240,992,114	29,898,934	227,500,234	30,745,372	0.850%
New Rate Stabilization Policies	6/30/2004	7	(42,553,947)	(6,346,896)	(39,066,162)	(6,526,167)	(0.180%)
Benefit Change (SB 183)	6/30/2004	7	13,886,821	2,071,211	12,748,636	2,129,713	0.059%
(Gain)/Loss in 2009	6/30/2009	22	372,930,083	25,566,300	373,490,651	26,297,750	0.727%
(Gain)/Loss in 2010	6/30/2010	23	44,221,319	2,956,466	44,365,601	3,041,106	0.084%
(Gain)/Loss in 2011	6/30/2011	24	298,241,372	19,476,232	299,693,979	20,034,172	0.554%
(Gain)/Loss	Various	26	4,638,777,494	290,260,591	4,674,490,420	298,586,109	8.257%
Payment (Gain)/Loss	Various	26	(2,568,578)	(160,723)	(2,588,353)	(165,333)	(0.005%)
(Gain)/Loss	6/30/2014	27	1,583,914,236	63,065,874	1,633,436,005	86,500,109	2.392%
(Gain)/Loss	6/30/2015	28	1,507,421,847	40,628,122	1,574,634,807	62,692,742	1.734%
(Gain)/Loss	6/30/2016	29	1,670,188,376	23,149,681	1,767,302,858	47,631,319	1.317%
(Gain)/Loss	6/30/2017	30	(787,147,735)	34,476,193	(879,920,035)	(12,196,365)	(0.337%)
Total			$15,194,267,924	$2,388,838,226	$13,821,933,836	$961,565,009	26.592%

California Highway Patrol

Reason for Base	Date Established	Remaining Amortization Period	Balance on 6/30/2017	Expected Payment in 2017-18	Amount Remaining on 6/30/2018	Scheduled Payment for Fiscal Year 2018-19	Payment as Percentage of Payroll
Assumption Change	6/30/2003	6	$42,830,620	$7,158,200	$38,522,695	$7,360,117	0.818%
Assumption Change	6/30/2009	12	160,238,595	16,196,580	155,082,460	16,656,433	1.851%
Assumption Change	6/30/2011	14	185,202,914	16,845,286	181,184,881	17,324,382	1.926%
Assumption Change	6/30/2013	16	875,972,101	76,142,319	860,625,893	78,309,684	8.704%
Assumption Change	6/30/2016	19	199,475,118	206,579,576	—	—	0.000%
Assumption Change	6/30/2017	20	246,187,956	254,956,127	—	—	0.000%
Benefit Change (AB 2936)	6/30/2008	11	(187,743,339)	(20,171,081)	(180,465,242)	(20,743,254)	(2.306%)
Benefit Change (SB 439)	6/30/2005	8	139,635,316	18,878,438	130,208,068	19,412,303	2.158%
New Rate Stabilization Policies	6/30/2004	7	(14,511,564)	(2,164,391)	(13,322,174)	(2,225,525)	(0.247%)
Benefit Change (SB 1801)	6/30/2003	6	6,785,592	1,134,063	6,103,094	1,166,052	0.130%
Benefit Change (Arnett)	6/30/2002	5	1,301,504	248,780	1,138,222	255,786	0.028%
Benefit Change (AB 2621)	6/30/2001	4	1,635,086	367,623	1,372,913	377,957	0.042%
(Gain)/Loss Prior to 2009	Various	20	1,563,895,714	113,346,628	1,559,894,599	116,585,040	12.959%
(Gain)/Loss in 2009	6/30/2009	22	301,923,306	20,698,415	302,377,140	21,290,596	2.367%
(Gain)/Loss in 2010	6/30/2010	23	100,563,862	6,723,311	100,891,975	6,915,791	0.769%
(Gain)/Loss in 2011	6/30/2011	24	(44,464,375)	(2,903,683)	(44,680,942)	(2,986,866)	(0.332%)
(Gain)/Loss	Various	26	217,327,337	13,598,747	219,000,492	13,988,799	1.555%
Payment (Gain)/Loss	Various	26	(20,931,865)	(1,309,762)	(21,093,015)	(1,347,330)	(0.150%)
(Gain)/Loss	6/30/2014	27	457,620,211	18,220,821	471,927,906	24,991,377	2.778%
(Gain)/Loss	6/30/2015	28	509,652,381	13,736,181	532,376,773	21,196,127	2.356%
(Gain)/Loss	6/30/2016	29	347,867,343	33,981,683	337,895,759	9,106,770	1.012%
(Gain)/Loss	6/30/2017	30	(186,052,316)	12,349,671	(212,330,623)	(2,943,065)	(0.327%)
Total			$4,904,411,495	$804,613,532	$4,426,710,875	$324,691,175	36.091%

Liabilities and Employer Contributions

(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. Deviations between expected and actual experience result in actuarial gains or losses, as shown below.

	State Miscellaneous	State Industrial	State Safety
1) Total (Gain)/Loss for the Year			
a) Unfunded Liability/(Surplus) as of June 30, 2016	$35,835,979,682	$1,071,955,945	$2,999,807,525
b) Expected Payment on Unfunded Liability During 2016-17	2,055,068,939	52,078,800	158,552,051
c) Interest through June 30, 2017 [.07375 x (1a) – ((1.07375)$^{1/2}$ – 1) X (1b)]	2,568,470,777	77,170,504	215,493,194
d) Expected Unfunded Liability as of June 30, 2017 After All Changes [(1a) – (1b) + (1c)]	$36,349,381,520	$1,097,047,649	$3,056,748,668
e) Change Due to Plan Changes	-	-	-
f) Change Due to Assumptions Change	889,368,198	40,861,387	252,736,648
g) Expected Unfunded Liability After All Other Changes [(1d) + (1e) + (1f)]	$37,238,749,718	$1,137,909,036	$3,309,485,316
h) Actual Unfunded Liability as of June 30, 2017	34,752,260,292	995,348,120	2,877,480,123
i) Total (Gain)/Loss for 2016-17 [(1h) – (1g)]	$(2,486,489,426)	$(142,560,916)	$(432,005,193)
2) Contribution (Gain)/Loss for the Year			
a) Expected Contribution for 2016-17	$3,878,422,468	$170,631,743	$635,145,609
b) Actual Contributions for 2016-17	3,956,626,144	178,020,951	667,552,166
c) Contribution (Gain)/Loss for 2016-17 [(2a) – (2b)]	$(78,203,676)	$(7,389,208)	$(32,406,557)
3) Asset (Gain)/Loss for the Year			
a) Market Value of Assets as of June 30, 2016	$66,607,613,590	$2,897,811,466	$8,288,200,886
b) Receivables as of June 30, 2016	(319,665,028)	(15,072,204)	(21,334,787)
c) Receivables as of June 30, 2017	307,221,717	14,681,817	17,975,617
d) Contributions Received During 2016-17	3,956,626,144	178,020,951	667,552,166
e) Benefits and Refunds Paid During 2016-17	(5,572,706,512)	(177,654,325)	(538,734,660)
f) Transfers In/Out 2016-17	(2,093,294)	(127,949)	698,181
g) Expected Interest for 2016-17 [0.07375 x (3a + 3b) + ((1.07375)$^{1/2}$ – 1) x ((3d) + (3e) + (3f))]	4,830,127,431	212,610,665	614,372,315
h) Expected Assets as of June 30, 2017 [(3a) + (3b) + (3c) + (3d) + (3e) + (3f) + (3g)]	69,807,124,048	3,110,270,421	9,028,729,718
i) Actual Market Value of Assets as of June 30, 2017	72,203,626,225	3,215,014,610	9,326,848,277
j) Asset (Gain)/Loss for 2016-17 [3h – 3i]	$(2,396,502,177)	$(104,744,189)	$(298,118,559)
4) Liability (Gain)/Loss for the Year			
a) Total (Gain)/Loss for 2016-17 (1i)	$(2,486,489,426)	$(142,560,916)	$(432,005,193)
b) Contribution (Gain)/Loss for 2016-17 (2c)	(78,203,676)	(7,389,208)	(32,406,557)
c) Asset (Gain)/Loss for 2016-17 (3j)	(2,396,502,177)	(104,744,189)	(298,118,559)
d) Liability (Gain)/Loss for 2016-17 [(4a) – (4b) – (4c)]	$(11,783,573)	$(30,427,519)	$(101,480,077)

Liabilities and Employer Contributions

(Gain)/Loss Analysis (continued)

	State Peace Officers and Firefighters	California Highway Patrol
1) Total (Gain)/Loss for the Year		
a) Unfunded Liability/(Surplus) as of June 30, 2016	$14,862,630,077	$4,765,190,527
b) Expected Payment on Unfunded Liability During 2016-17	788,151,421	262,828,080
c) Interest through June 30, 2017 [.07375 x (1a) – ((1.07375)$^{1/2}$ – 1) X (1b)]	1,067,572,842	341,913,408
d) Expected Unfunded Liability as of June 30, 2017 After All Changes [(1a) – (1b) + (1c)]	$15,142,051,498	$4,844,275,855
e) Change Due to Plan Changes	-	-
f) Change Due to Assumptions Change	839,364,162	246,187,956
g) Expected Unfunded Liability After All Other Changes [(1d) + (1e) + (1f)]	$15,981,415,660	$5,090,463,811
h) Actual Unfunded Liability as of June 30, 2017	15,194,267,924	4,904,411,495
i) Total (Gain)/Loss for 2016-17 [(1h) – (1g)]	$(787,147,736)	$(186,052,316)
2) Contribution (Gain)/Loss for the Year		
a) Expected Contribution for 2016-17	$1,718,078,759	$486,710,096
b) Actual Contributions for 2016-17	1,836,783,031	519,423,266
c) Contribution (Gain)/Loss for 2016-17 [(2a) – (2b)]	$(118,704,272)	$(32,713,170)
3) Asset (Gain)/Loss for the Year		
a) Market Value of Assets as of June 30, 2016	$26,621,971,404	$6,705,506,460
b) Receivables as of June 30, 2016	(82,985,098)	(12,571,825)
c) Receivables as of June 30, 2017	74,027,993	11,254,513
d) Contributions Received During 2016-17	1,836,783,031	519,423,266
e) Benefits and Refunds Paid During 2016-17	(1,938,026,781)	(543,455,964)
f) Transfers In/Out 2016-17	988,001	663,402
g) Expected Interest for 2016-17 [0.07375 x (3a + 3b) + ((1.07375)$^{1/2}$ – 1) x ((3d) + (3e) + (3f))]	1,953,619,068	492,757,515
h) Expected Assets as of June 30, 2017 [(3a) + (3b) + (3c) + (3d) + (3e) + (3f) + (3g)]	28,466,377,618	7,173,577,367
i) Actual Market Value of Assets as of June 30, 2017	29,424,432,350	7,417,410,834
j) Asset (Gain)/Loss for 2016-17 [3h – 3i]	$(958,054,732)	$(243,833,467)
4) Liability (Gain)/Loss for the Year		
a) Total (Gain)/Loss for 2016-17 (1i)	$(787,147,736)	$(186,052,316)
b) Contribution (Gain)/Loss for 2016-17 (2c)	(118,704,272)	(32,713,170)
c) Asset (Gain)/Loss for 2016-17 (3j)	(958,054,732)	(243,833,467)
d) Liability (Gain)/Loss for 2016-17 [(4a) – (4b) – (4c)]	$289,611,267	$90,494,321

Development of Group Term Life Insurance (GTLI) Contributions

	State Miscellaneous	State Industrial	State Safety	State Peace Officers and Firefighters	California Highway Patrol
1) GTLI Market Value of Assets as of June 30, 2016	$7,636,984	$1,299,981	$2,298,433	$2,784,932	$666,262
2) Contributions Received for GTLI During Fiscal Year 2016-17	9,524	77	1,126,534	1,610,660	153,864
3) Benefits Paid for GTLI During Fiscal Year 2016-17	(2,772,299)	(138,532)	(820,628)	(762,447)	(250,631)
4) Investment Return During Fiscal Year 2016-17	803,374	124,723	321,989	360,561	61,013
5) GTLI Market Value of Assets as of June 30, 2017	$5,677,583	$1,286,249	$2,926,328	$3,993,706	$630,508
6) Expected GTLI Benefit Payments for Fiscal Year 2017-18	5,815,430	330,616	1,430,650	1,508,222	315,658
7) Closed Group Projected Payroll for Fiscal Year 2017-18	11,732,700,912	661,197,204	2,169,385,360	3,481,561,785	869,941,018
8) Required GTLI Contribution Rate [(1.5 x (6) - (5), but not less than zero) / (7)]	0.026%	0.000%	0.000%	0.000%	0.000%
9) Projected Payroll for Contributions	$12,395,802,003	$690,367,395	$2,293,464,571	$3,615,947,170	$899,653,217
10) Required GTLI Contribution for Fiscal Year 2018-19[1] [(8) x (9)]	$3,222,909	$0	$0	$0	$0

(1) The Required GTLI Contribution for Miscellaneous Tier 1 and Tier 2 is divided equally between the two groups as a percentage of payroll

Reconciliation of Employer Contribution Rates

Change in Normal Cost Rate from 2017-18 to 2018-19 for the Retirement Program

	State Miscellaneous	State Industrial	State Safety	State Peace Officers and Firefighters	California Highway Patrol
2017-18 Normal Cost Rate	8.981%	10.377%	11.429%	16.586%	16.760%
Effect of Changes in Demographic Results	(0.142%)	(0.227%)	(0.324%)	(0.347%)	(0.257%)
Effect of Change in Assumptions	0.513%	(0.356%)	0.890%	0.893%	1.211%
2018-19 Normal Cost Rate	9.352%	9.794%	11.995%	17.132%	17.714%

Change in Unfunded Liability Amortization Rate from 2017-18 to 2018-19 for the Retirement Program

	State Miscellaneous	State Industrial	State Safety	State Peace Officers and Firefighters	California Highway Patrol
2017-18 Rate to Amortize the Unfunded Liability	19.322%	9.150%	7.963%	26.012%	36.025%
Effect of Progression of Amortization Bases and Change in Payroll	1.596%	1.263%	0.841%	1.586%	1.725%
Effect of (Gain)/Loss	(0.301%)	(0.310%)	(0.284%)	(0.337%)	(0.327%)
Effect of Change in Assumptions	0.175%	0.123%	0.248%	0.515%	0.194%
Effect of SB 84 Additional Contribution	(0.872%)	(0.470%)	(0.412%)	(1.184%)	(1.527%)
2018-19 Rate to Amortize the Unfunded Liability	19.920%	9.756%	8.357%	26.592%	36.091%

Change in Group Term Life Rate from 2017-18 to 2018-19

	State Miscellaneous	State Industrial	State Safety	State Peace Officers and Firefighters	California Highway Patrol
2017-18 Group Term Life Rate	0.022%	0.000%	0.010%	0.000%	0.000%
Effect of Changes in Demographic Results	0.019%	0.000%	(0.010%)	0.000%	0.000%
Effect of Change in Assumptions	(0.015%)	0.000%	0.000%	0.000%	0.000%
2018-19 Group Term Life Rate	0.026%	0.000%	0.000%	0.000%	0.000%

Change in Total Rate from 2017-18 to 2018-19

	State Miscellaneous	State Industrial	State Safety	State Peace Officers and Firefighters	California Highway Patrol
2017-18 Employer Rates	28.325%	19.527%	19.402%	42.598%	52.785%
Effect of Progression of Amortization Bases and Change in Payroll	1.596%	1.263%	0.841%	1.586%	1.725%
Effect of (Gain)/Loss and Changes in Demographic Results	(0.424%)	(0.537%)	(0.618%)	(0.684%)	(0.584%)
Effect of Change in Assumptions	0.673%	(0.233%)	1.138%	1.408%	1.405%
Effect of SB 84 Additional Contribution	(0.872%)	(0.470%)	(0.412%)	(1.184%)	(1.527%)
2018-19 Employer Rates	29.298%	19.550%	20.352%	43.724%	53.805%

Reconciliation of Employer Contributions

Change in Normal Cost Contribution from 2017-18 to 2018-19 for the Retirement Program

	State Miscellaneous	State Industrial	State Safety	State Peace Officers and Firefighters	California Highway Patrol
2017-18 Normal Cost Contribution	$1,077,343,417	$69,683,821	$256,627,820	$569,489,822	$142,047,577
Effect of Change in Payroll	35,961,096	1,955,604	5,492,246	30,251,176	8,734,303
Effect of Change in Demographic Results	(15,018,285)	(1,396,746)	(6,811,520)	(11,119,511)	(1,951,089)
Effect of Change in Assumptions	60,921,521	(2,628,096)	19,792,529	30,862,582	10,533,780
2018-19 Normal Cost Contribution	$1,159,207,749	$67,614,583	$275,101,075	$619,484,069	$159,364,571

Change in Unfunded Liability Amortization Contribution from 2017-18 to 2018-19 for the Retirement Program

	State Miscellaneous	State Industrial	State Safety	State Peace Officers and Firefighters	California Highway Patrol
2017-18 Amortization of the Unfunded Liability	$2,317,753,705	$61,447,552	$178,810,085	$893,140,457	$305,327,944
Effect of Progression of Amortization Bases	281,509,135	10,615,475	23,596,455	107,238,032	35,117,142
Effect of (Gain)/Loss	(37,423,145)	(2,144,037)	(6,517,925)	(12,210,076)	(2,946,340)
Effect of Change in Assumptions	15,516,083	679,452	5,221,765	16,224,042	931,119
Effect of SB 84 Additional Contributions	(108,065,310)	(3,244,019)	(9,446,398)	(42,827,446)	(13,738,690)
2018-19 Amortization of the Unfunded Liability	$2,469,290,467	$67,354,423	$191,663,982	$961,565,009	$324,691,175

Change in Group Term Life Rate from 2017-18 to 2018-19

	State Miscellaneous	State Industrial	State Safety	State Peace Officers and Firefighters	California Highway Patrol
2017-18 Group Term Life Contribution	$2,638,986	$0	$224,541	$0	$0
Effect of Change in Payroll	88,091	0	4,806	0	0
Effect of Changes in Demographic Results	4,208,082	0	(229,347)	0	0
Effect of Change in Assumptions	(3,712,251)	0	0	0	0
2018-19 Group Term Life Contribution	$3,222,908	$0	$0	$0	$0

Change in Total Contribution from 2017-18 to 2018-19

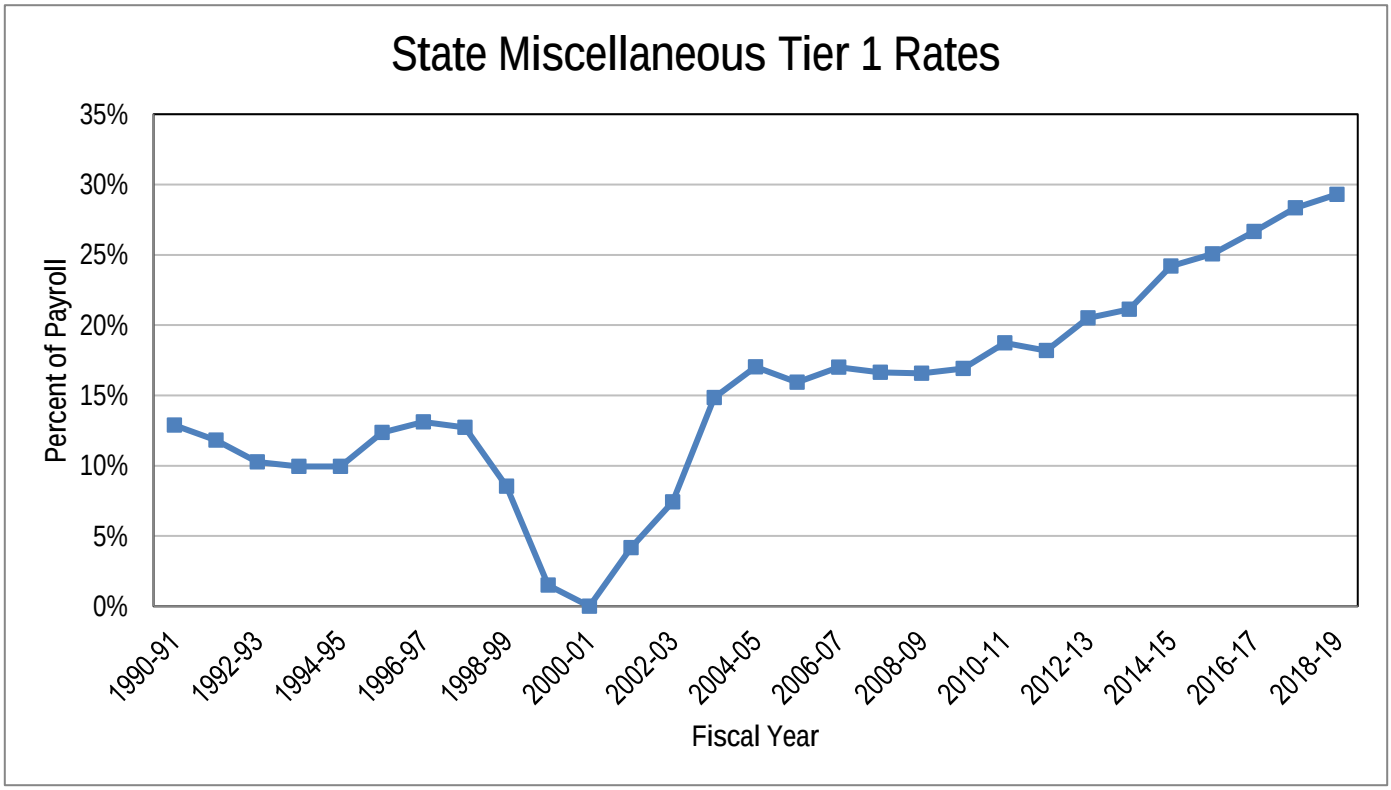
	State Miscellaneous	State Industrial	State Safety	State Peace Officers and Firefighters	California Highway Patrol
2017-18 Employer Contribution	$3,397,736,108	$131,131,373	$435,662,446	$1,462,630,279	$447,375,521
Effect of Change in Payroll and Progression of Amortization Bases	317,558,322	12,571,079	29,093,507	137,489,208	43,851,445
Effect of (Gain)/Loss and Changes in Demographic Results	(48,233,348)	(3,540,783)	(13,558,792)	(23,329,587)	(4,897,429)
Effect of Change in Assumptions	72,725,353	(1,948,644)	25,014,294	47,086,624	11,464,899
Effect of SB 84 Additional Contributions	(108,065,310)	(3,244,019)	(9,446,398)	(42,827,446)	(13,738,690)
2018-19 Employer Contribution	$3,631,721,124	$134,969,006	$466,765,057	$1,581,049,078	$484,055,746

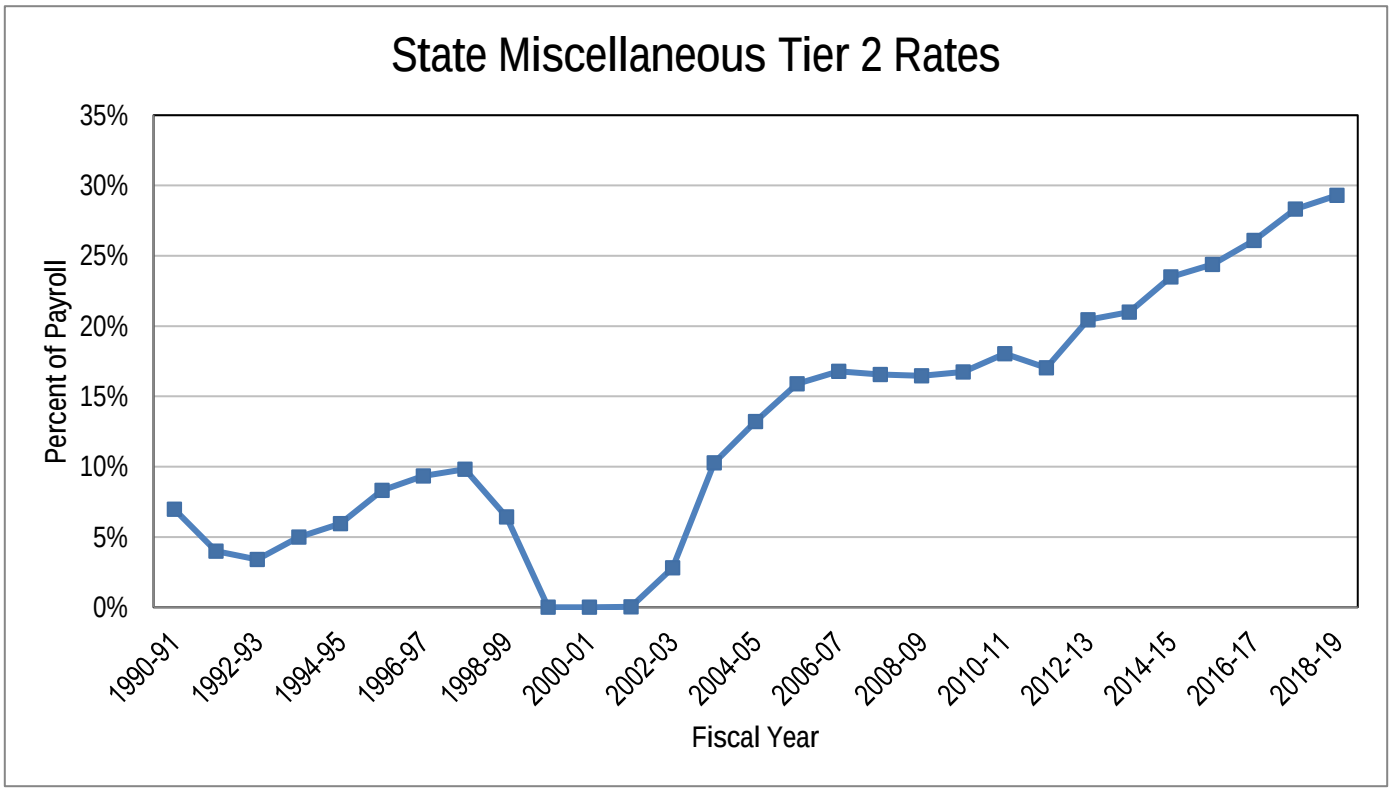
Employer Contribution Rate History

The table below provides a history of the contribution rates for the various State plans. In cases where the contribution rate changed during the course of a fiscal year, the entry shown is the weighted average of the rates effective during the fiscal year.

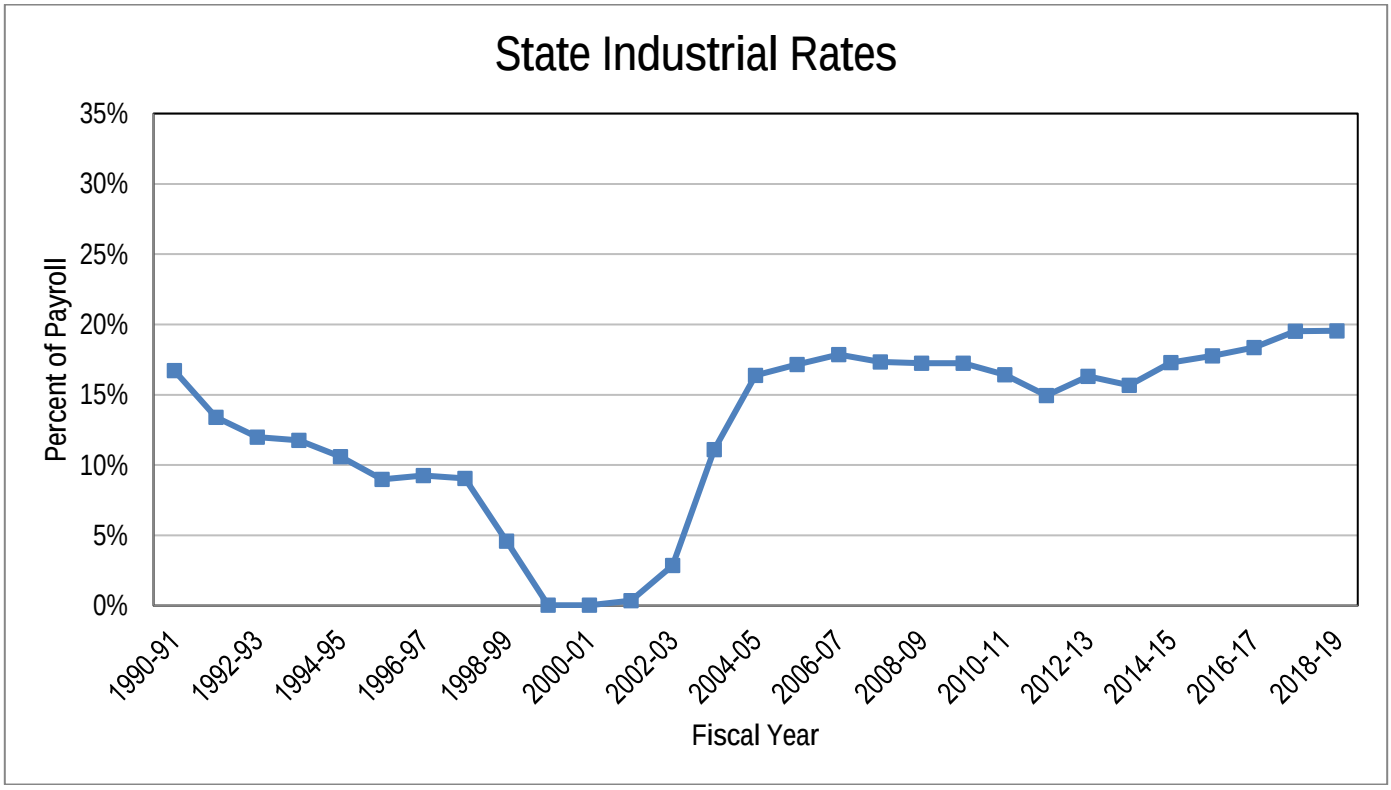
Fiscal Year	State Miscellaneous		State Industrial	State Safety	State Peace Officers and Firefighters	California Highway Patrol
	Tier 1	Tier 2				
2018-19	29.298%	29.298%	19.550%	20.352%	43.724%	53.805%
2017-18	28.325%	28.325%	19.527%	19.402%	42.598%	52.785%
2016-17	26.646%	26.095%	18.365%	18.753%	40.276%	48.719%
2015-16	25.068%	24.389%	17.775%	18.082%	37.338%	45.406%
2014-15	24.198%	23.510%	17.286%	18.156%	35.180%	42.175%
2013-14	21.121%	20.992%	15.682%	17.205%	30.495%	34.616%
2012-13	20.503%	20.457%	16.302%	17.503%	30.297%	33.728%
2011-12	18.175%	17.025%	14.934%	16.428%	27.415%	31.264%
2010-11	18.725%	18.032%	16.433%	18.187%	28.722%	31.291%
2009-10	16.917%	16.737%	17.251%	18.099%	25.848%	28.438%
2008-09	16.574%	16.470%	17.236%	18.411%	26.064%	32.149%
2007-08	16.633%	16.565%	17.345%	18.835%	25.552%	32.212%
2006-07	16.997%	16.778%	17.861%	19.294%	24.505%	31.463%
2005-06	15.942%	15.890%	17.147%	19.026%	23.563%	26.396%
2004-05	17.022%	13.216%	16.386%	20.773%	23.841%	33.434%
2003-04	14.843%	10.265%	11.099%	21.930%	20.325%	32.653%
2002-03	7.413%	2.813%	2.858%	17.055%	13.925%	23.076%
2001-02	4.166%	0.036%	0.350%	12.923%	9.638%	16.897%
2000-01	0.000%	0.000%	0.026%	6.808%	2.729%	13.711%
1999-00	1.491%	0.000%	0.026%	7.487%	0.000%	13.345%
1998-99	8.541%	6.437%	4.583%	9.440%	9.591%	13.541%
1997-98	12.721%	9.822%	9.048%	13.754%	15.270%	15.515%
1996-97	13.106%	9.345%	9.260%	14.656%	15.401%	15.851%
1995-96	12.350%	8.326%	8.981%	14.228%	14.350%	14.778%
1994-95	9.934%	5.947%	10.597%	13.927%	12.817%	15.552%
1993-94	9.939%	5.005%	11.765%	15.485%	15.202%	16.940%
1992-93	10.266%	3.391%	11.995%	15.698%	15.560%	17.074%
1991-92	11.804%	3.986%	13.399%	17.376%	17.386%	21.721%
1990-91	12.878%	6.975%	16.720%	17.916%	15.702%	18.090%
1989-90	13.224%	13.218%	16.783%	17.424%	16.200%	18.318%

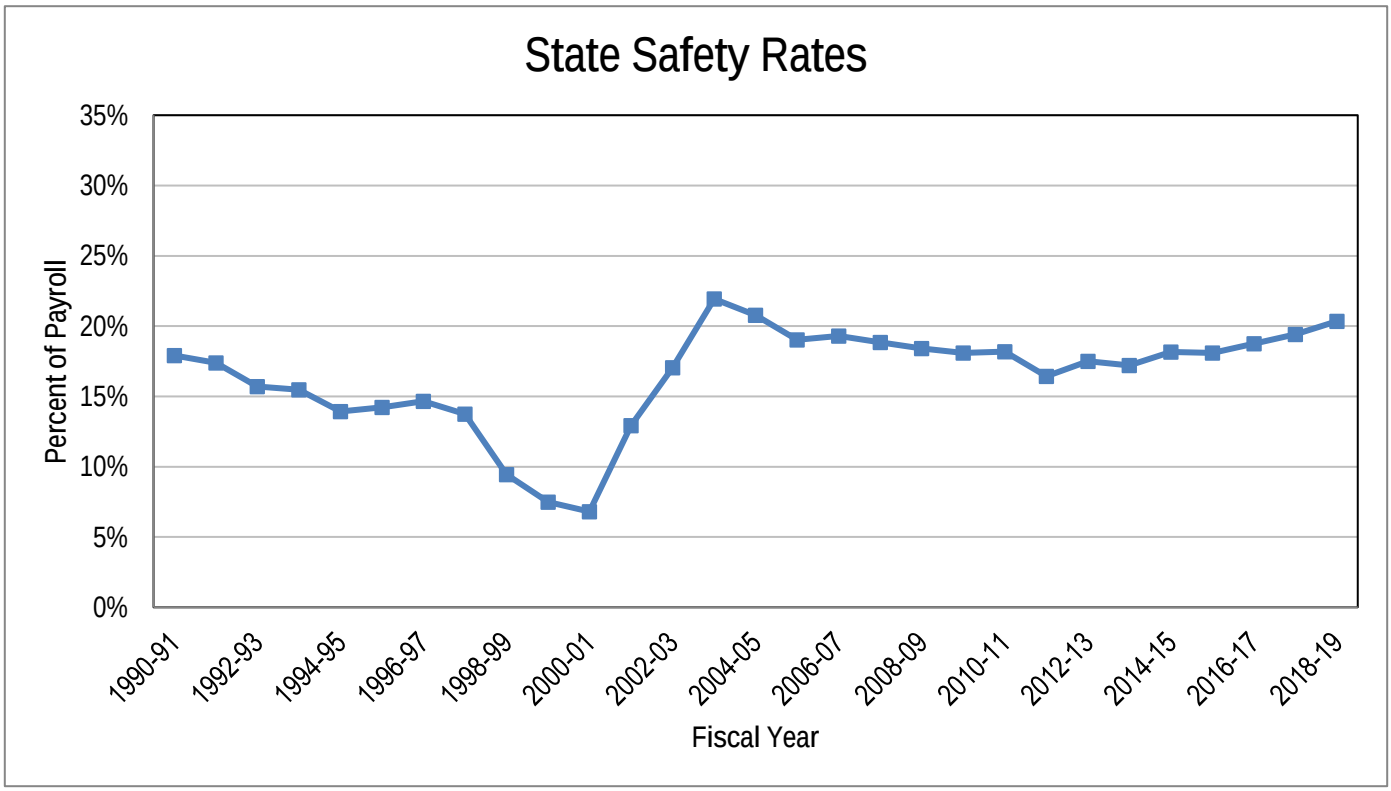
Employer Contribution Rate History (continued)



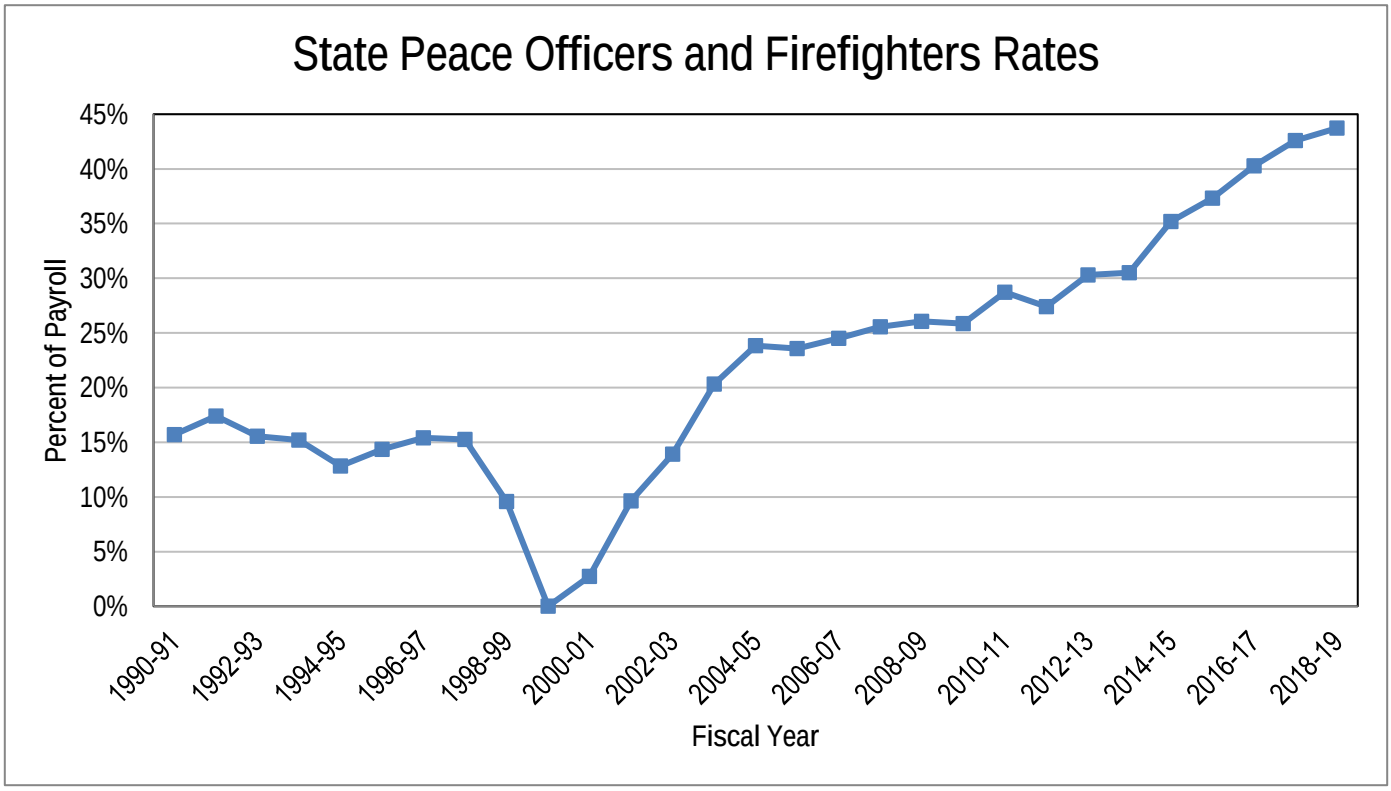


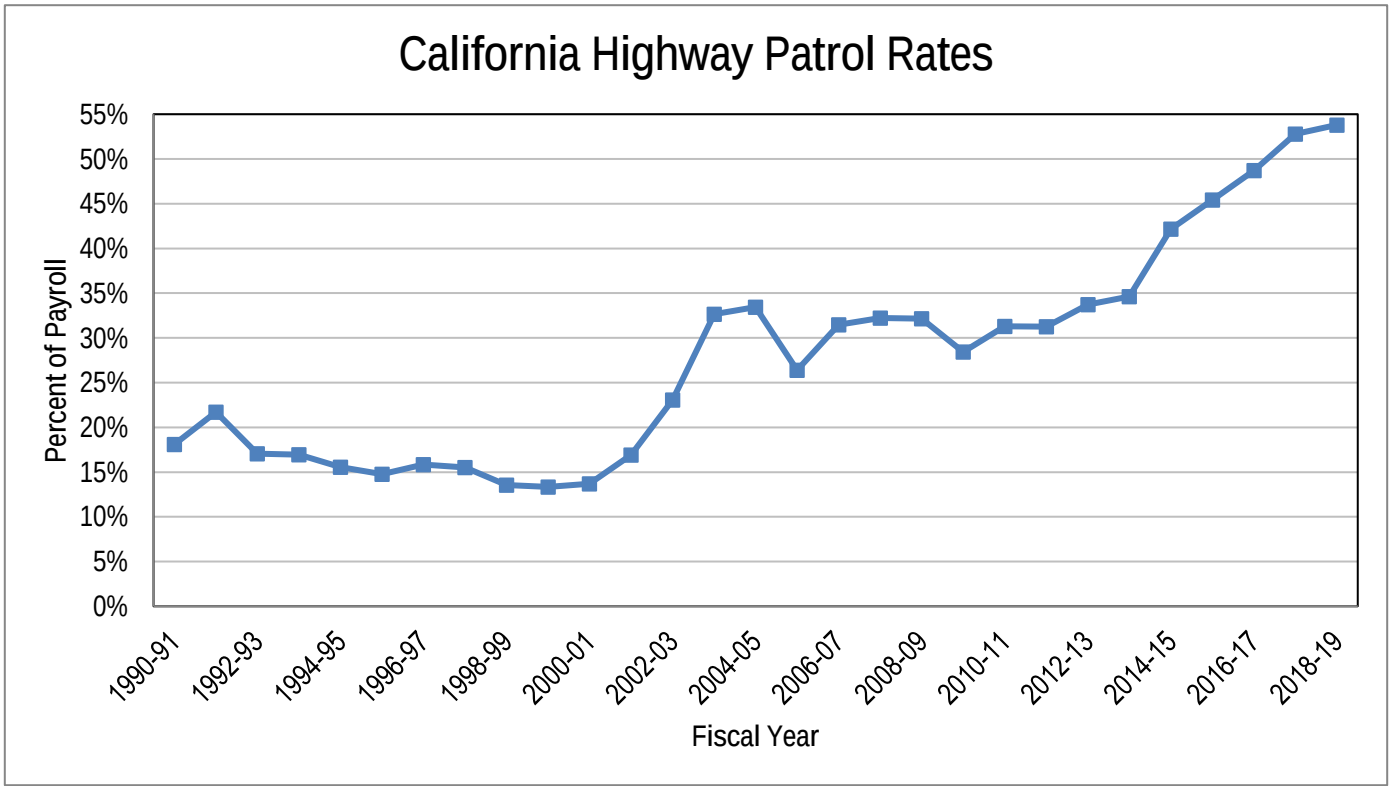
Employer Contribution Rate History (continued)





Employer Contribution Rate History (continued)





Liabilities and Employer Contributions

History of Funded Status and Funding Progress

Shown below is the history of funding progress for the plans. One could view the trend in the ratio of the unfunded liability to covered payroll as a measure of the ability of the employer to address the unfunded liability.

State Miscellaneous (Dollars in Millions)

Valuation Date	Actuarial Accrued Liabilities	Market Value of Assets (MVA)	Funded Status (MVA)	Unfunded Liabilities/(Surplus) (MVA)	Projected Payroll for Contribution	Unfunded/(Surplus) as a % of Payroll
6/30/17	$106,956	$72,204	67.5%	$34,752	$12,396	280.4%
6/30/16	102,444	66,608	65.0%	35,836	11,995	298.7%
6/30/15	97,831	68,080	69.6%	29,751	11,558	257.4%
6/30/14	94,442	68,359	72.4%	26,084	10,854	240.3%
6/30/13	90,277	60,029	66.5%	30,248	10,014	302.1%
6/30/12	83,524	55,371	66.3%	28,152	10,254	274.6%
6/30/11	81,271	57,452	70.7%	23,819	10,426	228.5%
6/30/10	76,980	48,646	63.2%	28,335	10,515	269.5%
6/30/09	74,763	44,094	59.0%	30,669	10,465	293.1%
6/30/08	69,648	59,979	86.1%	9,669	10,241	94.4%
6/30/07	65,342	64,442	98.6%	900	9,530	9.4%
6/30/06	61,299	55,051	89.8%	6,248	8,956	69.8%
6/30/05	58,267	50,231	86.2%	8,036	8,897	90.3%
6/30/04	54,701	45,460	83.1%	9,241	9,079	101.8%
6/30/03	51,559	39,324	76.3%	12,235	9,207	132.9%
6/30/02	48,118	39,530	82.2%	8,588	9,238	93.0%
6/30/01	45,261	43,933	97.1%	1,328	8,816	15.1%
6/30/00	42,386	49,208	116.1%	(6,822)	8,246	(82.7%)
6/30/99	35,771	46,176	129.1%	(10,405)	7,332	(141.9%)
6/30/98	34,169	42,011	122.9%	(7,842)	6,592	(119.0%)
6/30/97	32,557	35,959	110.4%	(3,401)	6,624	(51.4%)
6/30/96	31,742	30,452	95.9%	1,290	6,881	18.8%
6/30/95	29,960	27,088	90.4%	2,872	7,009	41.0%
6/30/94	27,821	24,278	87.3%	3,542	6,827	51.9%
6/30/93	26,162	24,715	94.5%	1,447	6,310	22.9%
6/30/92	24,887	22,979	92.3%	1,908	6,243	30.6%
6/30/91	23,153	22,441	96.9%	711	6,303	11.3%
6/30/90	22,442	16,027	71.4%	6,415	5,816	110.3%
6/30/89	19,972	17,132	85.8%	2,840	5,348	53.1%
6/30/88	18,552	14,534	78.3%	4,017	4,912	81.8%

History of Funded Status and Funding Progress (continued)

State Industrial (Dollars in Millions)

Valuation Date	Actuarial Accrued Liabilities	Market Value of Assets (MVA)	Funded Status (MVA)	Unfunded Liabilities/(Surplus) (MVA)	Projected Payroll for Contribution	Unfunded/(Surplus) as a % of Payroll
6/30/17	$4,210	$3,215	76.4%	$995	$690	144.2%
6/30/16	3,970	2,898	73.0%	1,072	672	159.6%
6/30/15	3,669	2,885	78.6%	785	636	123.3%
6/30/14	3,458	2,825	81.7%	633	581	108.9%
6/30/13	3,236	2,418	74.7%	818	532	153.7%
6/30/12	2,968	2,168	73.0%	800	578	138.4%
6/30/11	2,832	2,180	77.0%	652	616	105.7%
6/30/10	2,614	1,785	68.3%	830	616	134.7%
6/30/09	2,467	1,556	63.1%	912	574	158.9%
6/30/08	2,235	2,034	91.0%	201	522	38.5%
6/30/07	2,044	2,119	103.7%	(76)	440	(17.2%)
6/30/06	1,870	1,776	95.0%	94	381	24.6%
6/30/05	1,754	1,586	90.4%	168	380	44.2%
6/30/04	1,602	1,415	88.3%	187	378	49.5%
6/30/03	1,462	1,201	82.1%	261	381	68.5%
6/30/02	1,295	1,200	92.7%	95	390	24.4%
6/30/01	1,196	1,325	110.8%	(129)	390	(33.1%)
6/30/00	1,079	1,463	135.6%	(384)	379	(101.3%)
6/30/99	880	1,360	154.5%	(480)	344	(139.5%)
6/30/98	790	1,226	155.2%	(436)	297	(147.1%)
6/30/97	741	1,042	140.7%	(302)	285	(106.0%)
6/30/96	721	861	119.4%	(140)	294	(47.7%)
6/30/95	659	751	113.9%	(91)	271	(33.7%)
6/30/94	619	665	107.5%	(46)	235	(19.7%)
6/30/93	597	668	111.8%	(71)	278	(25.4%)
6/30/92	540	610	113.0%	(70)	268	(26.2%)
6/30/91	492	579	117.6%	(87)	256	(33.8%)
6/30/90	460	401	87.2%	59	224	26.2%
6/30/89	386	406	105.0%	(19)	191	(10.1%)
6/30/88	345	347	100.8%	(3)	167	(1.6%)

History of Funded Status and Funding Progress (continued)

State Safety (Dollars in Millions)

Valuation Date	Actuarial Accrued Liabilities	Market Value of Assets (MVA)	Funded Status (MVA)	Unfunded Liabilities/(Surplus) (MVA)	Projected Payroll for Contribution	Unfunded/(Surplus) as a % of Payroll
6/30/17	$12,204	$9,327	76.4%	$2,877	$2,293	125.5%
6/30/16	11,288	8,288	73.4%	3,000	2,245	133.6%
6/30/15	10,255	7,859	76.6%	2,396	2,135	112.2%
6/30/14	9,551	7,562	79.2%	1,990	2,038	97.6%
6/30/13	8,834	6,327	71.6%	2,507	1,881	133.3%
6/30/12	7,827	5,524	70.6%	2,303	1,899	121.3%
6/30/11	7,224	5,390	74.6%	1,835	1,984	92.5%
6/30/10	6,436	4,196	65.2%	2,239	2,004	111.7%
6/30/09	6,006	3,514	58.5%	2,492	2,048	121.7%
6/30/08	5,146	4,365	84.8%	781	1,914	40.8%
6/30/07	4,467	4,342	97.2%	126	1,530	8.2%
6/30/06	3,907	3,486	89.2%	421	1,226	34.3%
6/30/05	3,473	3,000	86.4%	473	1,107	42.7%
6/30/04	3,087	2,509	81.3%	579	889	65.1%
6/30/03	2,788	2,049	73.5%	739	891	82.9%
6/30/02	2,476	1,926	77.8%	551	876	62.9%
6/30/01	2,179	2,000	91.8%	180	850	21.1%
6/30/00	1,865	2,122	113.8%	(257)	759	(33.9%)
6/30/99	1,364	1,927	141.3%	(563)	682	(82.6%)
6/30/98	1,285	1,672	130.1%	(386)	511	(75.7%)
6/30/97	1,086	1,404	129.2%	(318)	414	(76.8%)
6/30/96	947	1,123	118.6%	(176)	474	(37.2%)
6/30/95	914	936	102.5%	(23)	408	(5.5%)
6/30/94	761	762	100.1%	(1)	385	(0.2%)
6/30/93	644	722	112.0%	(77)	265	(29.2%)
6/30/92	602	680	112.8%	(77)	263	(29.4%)
6/30/91	548	637	116.2%	(89)	262	(33.8%)
6/30/90	499	426	85.3%	73	232	31.5%
6/30/89	420	440	104.8%	(20)	185	(11.0%)
6/30/88	370	372	100.7%	(2)	134	(1.9%)

History of Funded Status and Funding Progress (continued)

State Peace Officers and Firefighters (Dollars in Millions)

Valuation Date	Actuarial Accrued Liabilities	Market Value of Assets (MVA)	Funded Status (MVA)	Unfunded Liabilities/(Surplus) (MVA)	Projected Payroll for Contribution	Unfunded/(Surplus) as a % of Payroll
6/30/17	$44,619	$29,424	65.9%	$15,194	$3,616	420.2%
6/30/16	41,485	26,622	64.2%	14,863	3,434	432.9%
6/30/15	39,394	26,973	68.5%	12,420	3,335	372.4%
6/30/14	37,466	26,591	71.0%	10,875	3,206	339.2%
6/30/13	35,271	22,919	65.0%	12,352	3,087	400.1%
6/30/12	31,336	20,526	65.5%	10,810	3,132	345.2%
6/30/11	30,127	20,801	69.0%	9,326	3,393	274.8%
6/30/10	27,712	17,199	62.1%	10,512	3,455	304.3%
6/30/09	26,291	15,083	57.4%	11,208	3,592	312.0%
6/30/08	24,004	19,734	82.2%	4,270	3,589	119.0%
6/30/07	22,250	20,539	92.3%	1,711	3,420	50.0%
6/30/06	19,737	16,973	86.0%	2,764	3,058	90.4%
6/30/05	17,753	14,985	84.4%	2,769	2,860	96.8%
6/30/04	15,668	12,999	83.0%	2,670	2,604	102.5%
6/30/03	14,220	11,038	77.6%	3,182	2,507	126.9%
6/30/02	12,827	10,731	83.7%	2,095	2,407	87.1%
6/30/01	11,949	11,574	96.9%	375	2,304	16.3%
6/30/00	10,720	12,668	118.2%	(1,947)	2,227	(87.4%)
6/30/99	8,091	11,685	144.4%	(3,594)	2,018	(178.1%)
6/30/98	7,016	10,322	147.1%	(3,306)	1,540	(214.6%)
6/30/97	6,495	8,436	129.9%	(1,941)	1,410	(137.7%)
6/30/96	6,129	6,860	111.9%	(731)	1,654	(44.2%)
6/30/95	5,552	5,892	106.1%	(340)	1,592	(21.4%)
6/30/94	4,884	5,032	103.0%	(148)	1,505	(9.8%)
6/30/93	4,476	4,867	108.7%	(392)	1,348	(29.1%)
6/30/92	4,193	4,232	100.9%	(39)	1,332	(2.9%)
6/30/91	3,773	3,854	102.1%	(81)	1,320	(6.1%)
6/30/90	3,440	2,585	75.2%	855	1,151	74.3%
6/30/89	2,665	2,595	97.4%	70	1,002	7.0%
6/30/88	2,323	2,060	88.7%	263	893	29.4%

History of Funded Status and Funding Progress (continued)

California Highway Patrol (Dollars in Millions)

Valuation Date	Actuarial Accrued Liabilities	Market Value of Assets (MVA)	Funded Status (MVA)	Unfunded Liabilities/(Surplus) (MVA)	Projected Payroll for Contribution	Unfunded/(Surplus) as a % of Payroll
6/30/17	$12,322	$7,417	60.2%	$4,904	$900	545.1%
6/30/16	11,471	6,706	58.5%	4,765	848	562.2%
6/30/15	10,942	6,735	61.6%	4,207	852	493.9%
6/30/14	10,329	6,645	64.3%	3,684	801	460.0%
6/30/13	9,775	5,760	58.9%	4,014	767	523.5%
6/30/12	8,659	5,220	60.3%	3,439	773	445.0%
6/30/11	8,193	5,336	65.1%	2,857	780	366.4%
6/30/10	7,704	4,440	57.6%	3,264	767	425.4%
6/30/09	7,300	3,932	53.9%	3,368	734	459.1%
6/30/08	6,609	5,238	79.3%	1,371	675	203.2%
6/30/07	6,249	5,546	88.8%	703	613	114.6%
6/30/06	5,744	4,682	81.5%	1,062	556	191.0%
6/30/05	5,349	4,249	79.4%	1,100	546	201.4%
6/30/04	4,742	3,734	78.7%	1,008	509	198.2%
6/30/03	4,421	3,230	73.1%	1,191	476	250.3%
6/30/02	4,138	3,159	76.3%	979	461	212.3%
6/30/01	3,981	3,466	87.1%	515	455	113.2%
6/30/00	3,635	3,443	94.7%	192	433	44.4%
6/30/99	2,983	3,249	108.9%	(266)	402	(66.1%)
6/30/98	2,756	2,901	105.3%	(145)	367	(39.5%)
6/30/97	2,621	2,912	111.1%	(291)	371	(78.6%)
6/30/96	2,328	2,496	107.2%	(168)	343	(49.0%)
6/30/95	2,134	2,207	103.4%	(73)	302	(24.2%)
6/30/94	1,971	1,968	99.9%	2	288	0.8%
6/30/93	1,773	1,941	109.5%	(168)	279	(60.2%)
6/30/92	1,733	1,956	112.9%	(224)	282	(79.2%)
6/30/91	1,629	1,916	117.6%	(287)	288	(99.7%)
6/30/90	1,613	1,395	86.5%	218	271	80.3%
6/30/89	1,415	1,484	104.9%	(69)	249	(27.6%)
6/30/88	1,291	1,300	100.7%	(9)	226	(4.2%)

Risk Analysis

38 Projected Rates

38 Analysis of Future Investment Return Scenarios

40 Analysis of Discount Rate Sensitivity & Government Code Section 20229

51 Volatility Ratios

Risk Analysis

Projected Rates

The table below shows the required and projected employer contribution rates for the next six fiscal years. Projected results reflect the adopted changes to the discount rate described in Appendix A, "Actuarial Assumptions." The projections reflect an 8.6% investment return for Fiscal Year 2017-18 and assume that all other actuarial assumptions will be realized and that no further changes to assumptions, contributions, benefits, or funding will occur during the projection period. The projections reflect the anticipated decrease in normal cost due to new hires entering lower benefit formulas under PEPRA. In the June 30, 2018 valuation, the CalPERS Actuarial Office will transition to a new actuarial valuation system. Actuarial results, such as normal cost and accrued liability, may be slightly higher or lower due to minor differences between the current system and the new system. We do not expect a significant change to projected required contributions.

	New Rate	Projected Future Employer Contribution Rates				
Plan	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24
State Miscellaneous	29.298%	31.2%	31.9%	32.3%	32.2%	32.5%
State Industrial	19.550%	21.0%	21.6%	21.9%	21.6%	21.7%
State Safety	20.352%	21.5%	21.7%	21.7%	21.5%	20.8%
State Peace Officers & Firefighters	43.724%	46.6%	47.8%	48.5%	48.5%	48.8%
California Highway Patrol	53.805%	57.0%	58.5%	59.2%	59.4%	59.9%

Under the amortization policy in effect for this valuation, changes in the Unfunded Accrued Liability (UAL) due to actuarial gains or losses or changes in actuarial assumptions or methods are amortized using a five-year ramp up. For more information, please see “Amortization of Unfunded Actuarial Accrued Liability” under “Actuarial Methods” in Appendix A. This method attempts to mitigate employer cost volatility from year to year by phasing in the impact of unanticipated changes in UAL over a five-year period. As a result of this methodology, dramatic changes in the required employer contributions in any one year are less likely. However, required contributions can change gradually and significantly over the next five years. In years where there is a large increase in UAL the relatively small amortization payments during the ramp-up period could result in a funded ratio that is projected to decrease initially while the contribution impact of the increase in the UAL is phased in.

Due to the adopted change in the discount rate for the next valuation in combination with the 5-year phase-in ramp, the increases in the required contributions are expected to continue for five years from Fiscal Year 2018-19 through Fiscal Year 2023-24.

Analysis of Future Investment Return Scenarios

Analysis was performed to determine the effects of various future investment returns on required employer contributions. The projections below provide a range of results based on an 8.6 % investment return for Fiscal Year 2017-18 and five investment return scenarios assumed to occur during the three following fiscal years (2018-19, 2019-20, and 2020-21). The projections also assume that all other actuarial assumptions will be realized and that no further changes to assumptions, contributions, benefits, or funding will occur. The projections reflect the anticipated decrease in normal cost due to new hires entering lower benefit formulas under PEPRA. The projected rates also reflect the $6 billion additional contribution the State made in the 2017-18 Fiscal Year.

For fiscal years 2018-19, 2019-20, and 2020-21, each scenario assumes an alternate fixed annual return. The fixed return assumptions for the five scenarios are 1.0 percent, 4.0 percent, 7.0 percent, 9.0 percent and 12.0 percent.

The alternate investment returns were chosen based on stochastic analysis of possible future investment returns over the four-year period ending June 30, 2021. Using the expected returns and volatility of the asset classes in which the funds are invested, 10,000 stochastic outcomes were generated for this period. Annual returns were then selected that approximate the 5th, 25th, 50th, 75th, and 95th percentiles for these outcomes. For example, of all the four-year outcomes generated in the stochastic analysis, approximately 25 percent had an average annual return of 4.0 percent or less.

Analysis of Future Investment Return Scenarios (continued)

Required contributions outside of this range are also possible. In particular, while it is unlikely that investment returns will average less than 1.0 percent or greater than 12.0 percent over this four-year period, the possibility of a single investment return less than 1.0 percent or greater than 12.0 percent in any given year is much greater.

The tables below show the projected contribution rates for 2020-21 through 2022-23 for the various State plans under the five different scenarios.

Estimated: 2020-21 Rates as a % of Payroll

	Investment Scenario				
	1st Scenario	2nd Scenario	3rd Scenario	4th Scenario	5th Scenario
Plan	1.0%	4.0%	7.0%	9.0%	12.0%
State Miscellaneous	32.8%	32.4%	31.9%	31.7%	31.2%
State Industrial	22.3%	21.9%	21.6%	21.4%	21.0%
State Safety	22.3%	22.1%	21.7%	21.5%	21.2%
State Peace Officers & Firefighters	49.0%	48.4%	47.8%	47.4%	46.8%
California Highway Patrol	59.7%	59.1%	58.5%	58.0%	57.4%

Estimated: 2021-22 Rates as a % of Payroll

	Investment Scenario				
	1st Scenario	2nd Scenario	3rd Scenario	4th Scenario	5th Scenario
Plan	1.0%	4.0%	7.0%	9.0%	12.0%
State Miscellaneous	34.8%	33.6%	32.3%	31.4%	30.1%
State Industrial	23.9%	22.9%	21.9%	21.2%	20.1%
State Safety	23.4%	22.7%	21.7%	21.1%	20.2%
State Peace Officers & Firefighters	52.1%	50.3%	48.5%	47.2%	45.4%
California Highway Patrol	62.9%	61.1%	59.2%	57.9%	56.0%

Estimated: 2022-23 Rates as a % of Payroll

	Investment Scenario				
	1st Scenario	2nd Scenario	3rd Scenario	4th Scenario	5th Scenario
Plan	1.0%	4.0%	7.0%	9.0%	12.0%
State Miscellaneous	37.1%	34.7%	32.2%	30.5%	27.9%
State Industrial	25.6%	23.7%	21.6%	20.2%	18.1%
State Safety	24.6%	23.3%	21.5%	20.2%	18.3%
State Peace Officers & Firefighters	55.5%	52.1%	48.5%	46.0%	42.2%
California Highway Patrol	66.6%	63.1%	59.4%	56.8%	52.9%

Given the temporary suspension of the Risk Mitigation Policy during the period over which the discount rate assumption is being phased down to 7.0 percent, the projections above were performed without reflection of any possible impact of this policy.

Analysis of Discount Rate Sensitivity & Government Code Section 20229

The discount rate reflects expectations of what the markets will deliver in the future. It is calculated based on two components: expected price inflation and real rate of return. A change in either component over the long term would necessitate further evaluation of the discount rate.

This section includes an analysis of discount rate sensitivity on employer contribution rates under two different discount rate scenarios. This type of analysis gives the reader a sense of the long-term risk to the employer contribution rates and changes to the funded status on a Market Value of Assets basis.

The first section shows the impact on employer contribution rates using the current discount rate of 7.25 percent as well as alternate discount rates of 6.0 percent, 7.0 percent, and 8.0 percent. The alternate rate of 7.0 percent was selected since the Board has adopted this rate as the final discount rate at the end of the three-year phase-in of the reduction in this assumption. The rates of 6.0 percent and 8.0 percent were selected since they illustrate the impact of a 1 percent increase or decrease to the 7.0 percent assumption. This analysis shows the potential plan impacts if the PERF were to realize investment returns of 6.0 percent, 7.0 percent, or 8.0 percent over the long-term.

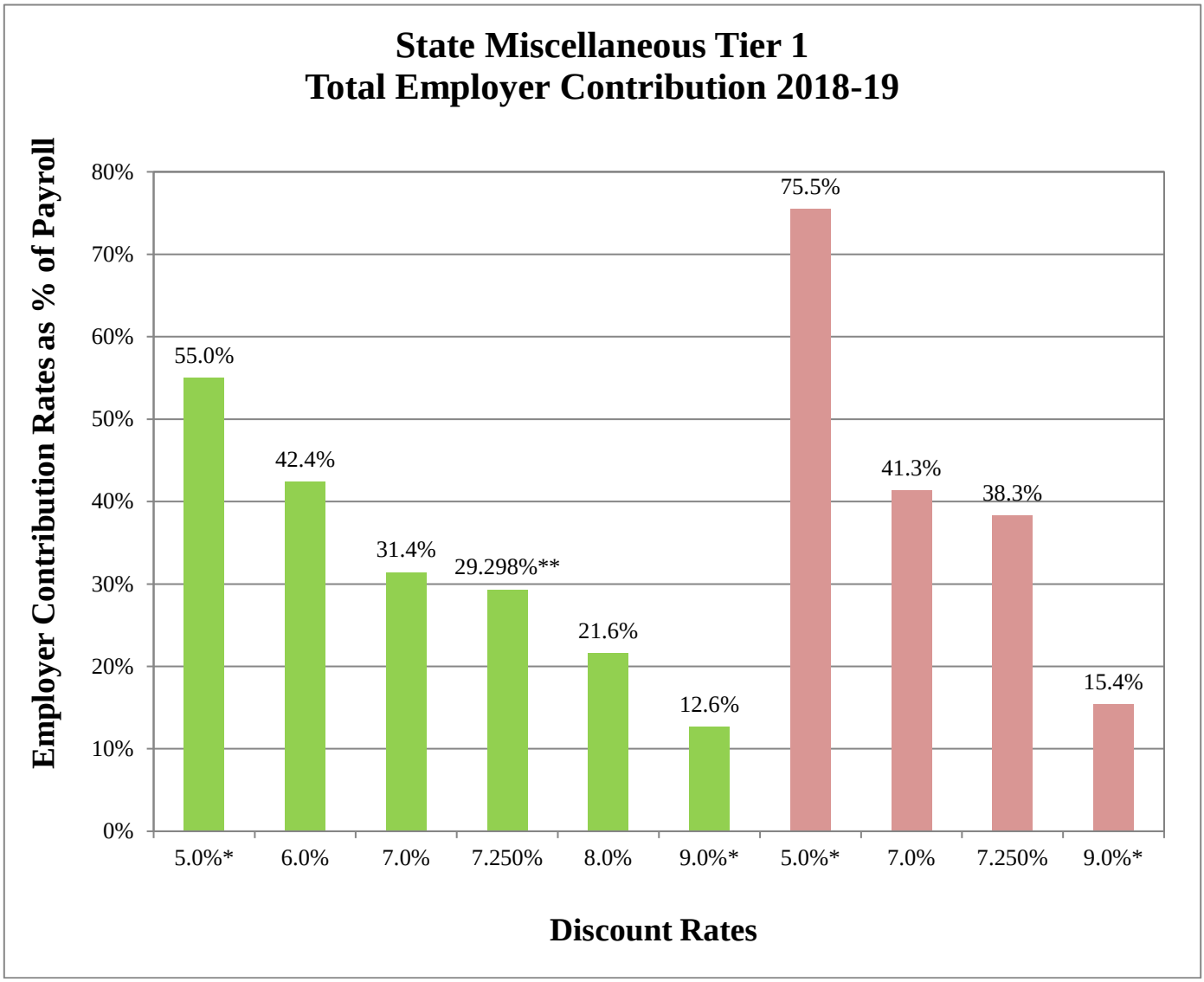
The second section is in response to Government Code section 20229, which requires the Board to provide an annual report with a calculation of the contribution rates and liabilities under specified scenarios, including:

- Investment return and discount rate assumptions that are 2 percentage points above and 2 percentage points below the current investment return and discount rate assumptions set by the Board
- An amortization period equal to the estimated average remaining service periods (EARSP) of the employees covered by the contributions

Results are presented for three different investment return assumptions (5.0 percent, 7.0 percent and 9.0 percent) for all the State plans. For comparison, contribution rates for the current fiscal year have been calculated using both the current amortization method and amortization over the estimated average remaining service periods of the employees covered by the contributions.

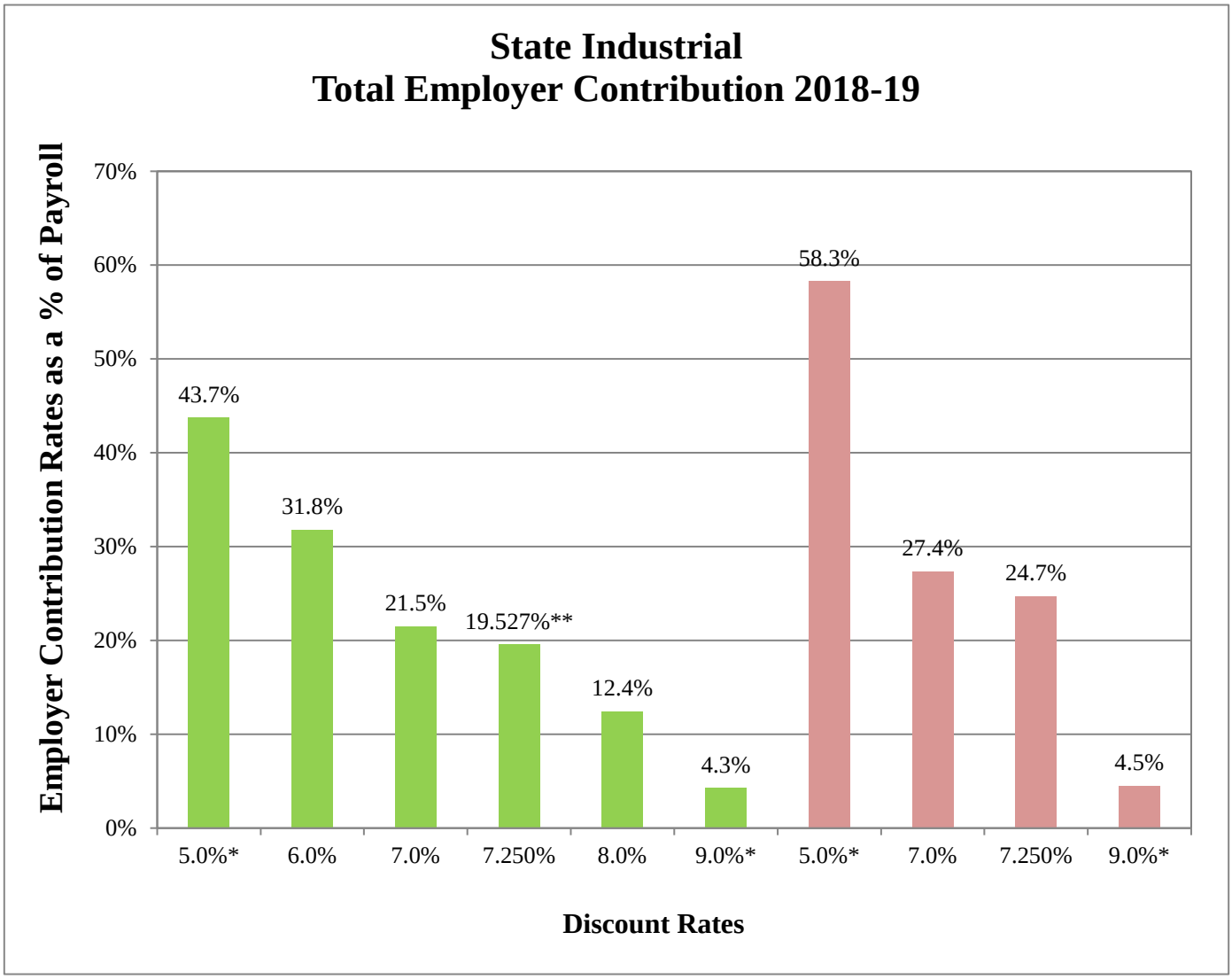
The results of the analysis are presented in three sections. The first section is a graphical representation of the impact on employer rates for both +/- 1 percent change in discount rate and +/- 2 percent change in discount rate due to G.C. 20229 from the ultimate discount rate of 7.0%. The second and third sections are the numeric representations. The reader may use the data points presented in the graph to estimate data points of interest using interpolation.

Analysis of Discount Rate Sensitivity & Government Code Section 20229
(continued)



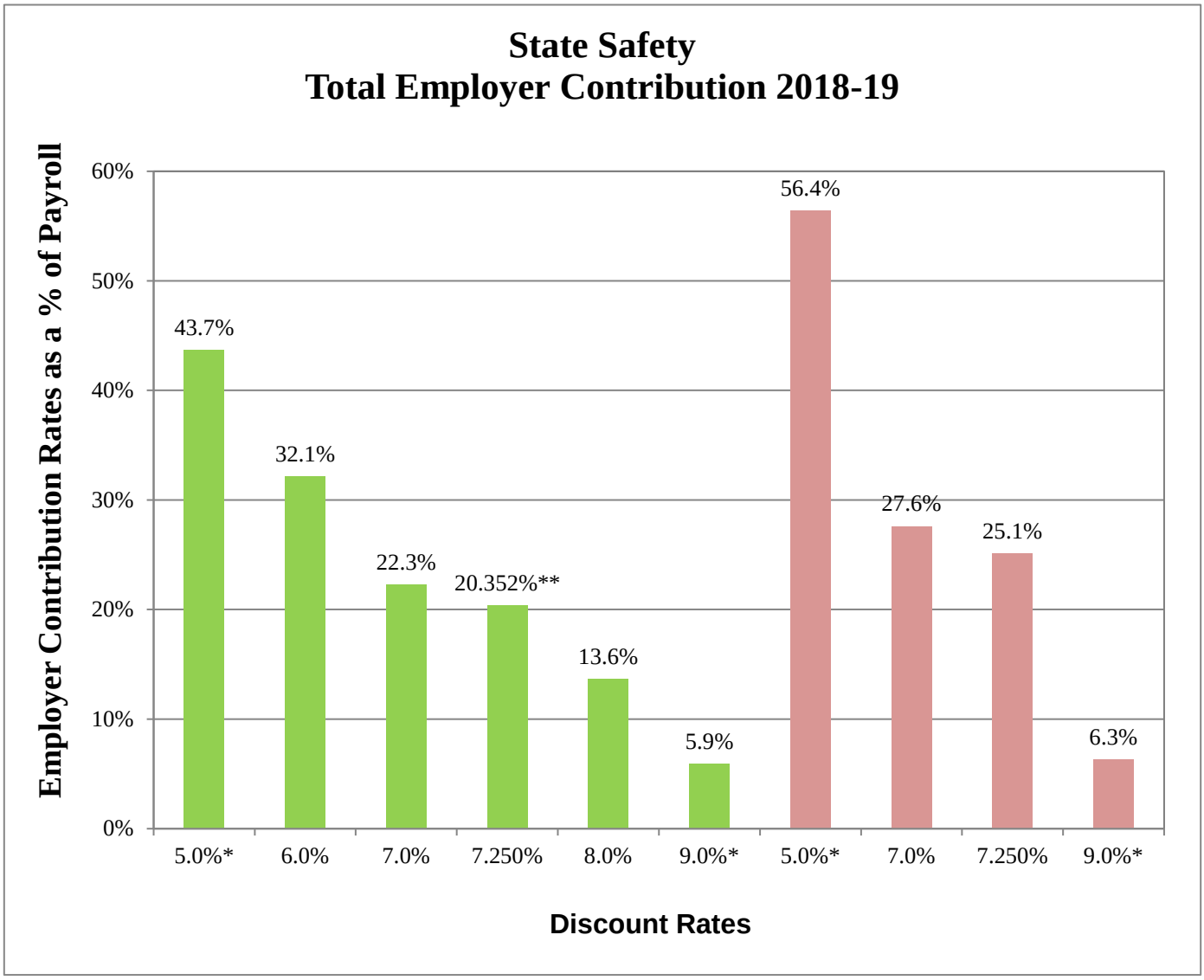
	Analysis of discount rate sensitivity based on current amortization method (varies from 6 to 30 years) or normal cost if in a surplus position
	Analysis of discount rate sensitivity based on amortization of UL over EARSP (11 years)
*	Required by Government Code Section 20229
**	Actuarially required contribution rate for 2018-19 adopted by CalPERS Board

Analysis of Discount Rate Sensitivity & Government Code Section 20229
(continued)



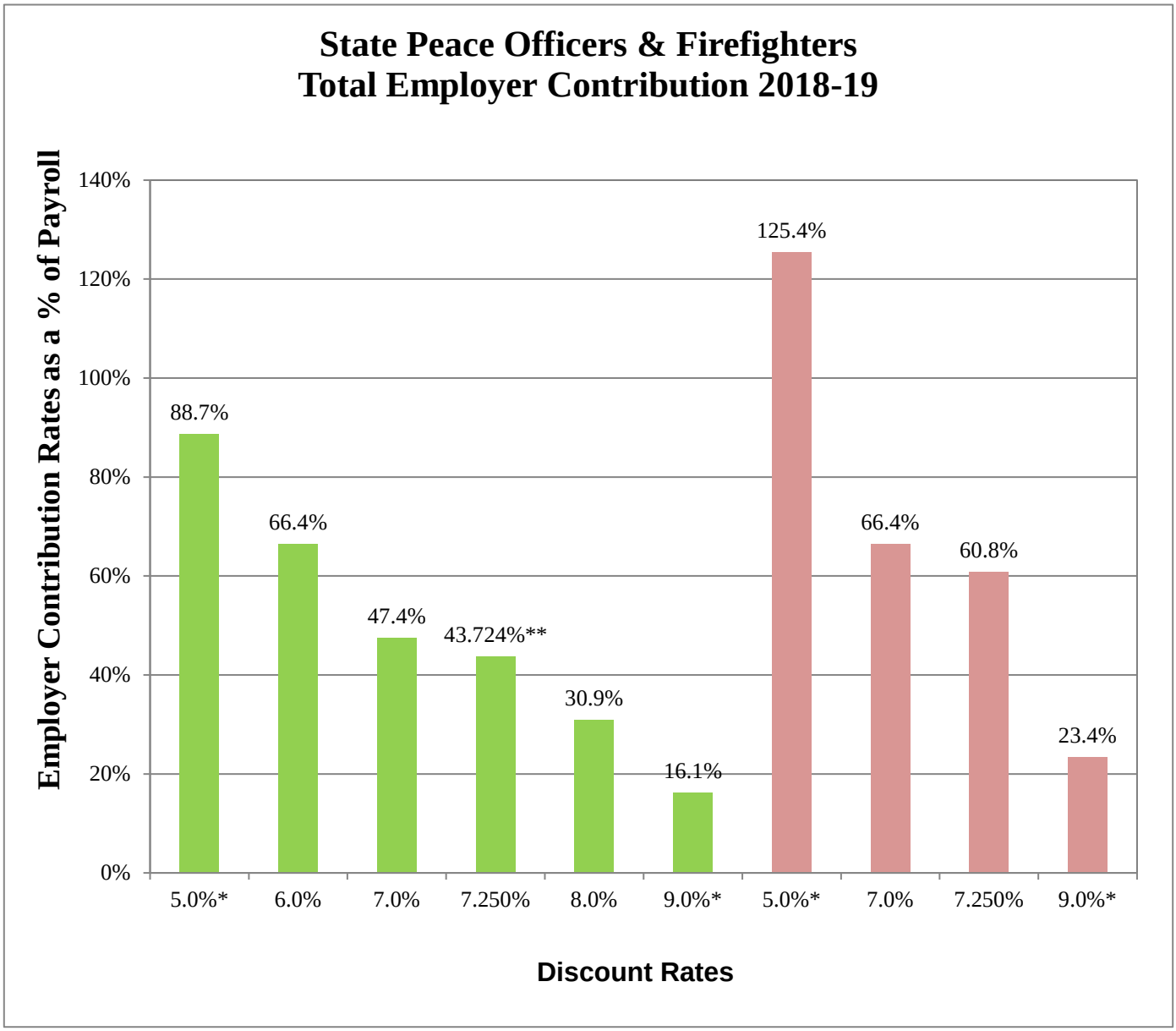
	Analysis of discount rate sensitivity based on current amortization method (varies from 6 to 30 years) or normal cost if in a surplus position
	Analysis of discount rate sensitivity based on amortization of UL over EARSP (11 years)
*	Required by Government Code Section 20229
**	Actuarially required contribution rate for 2018-19 adopted by CalPERS Board

Analysis of Discount Rate Sensitivity & Government Code Section 20229
(continued)



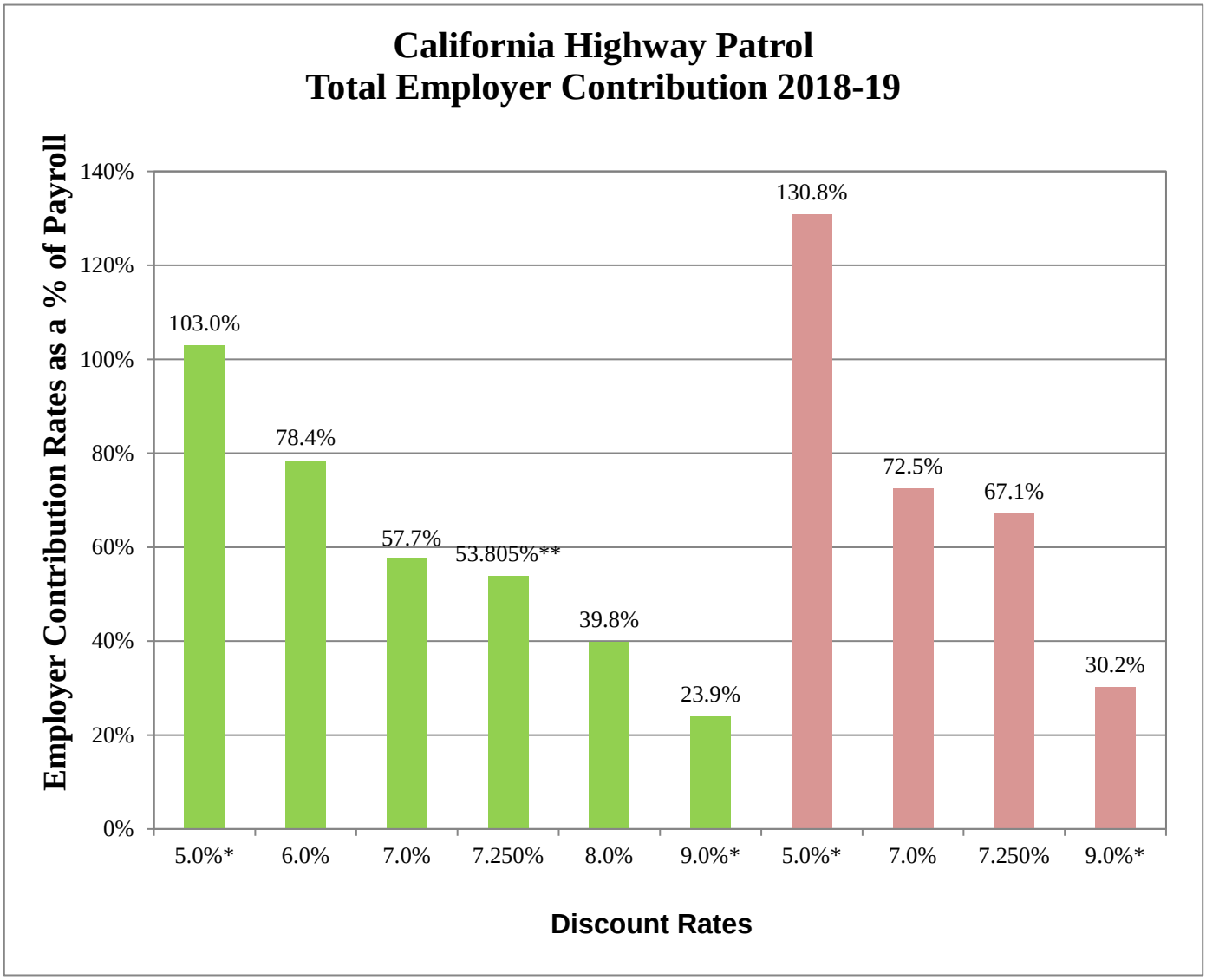
	Analysis of discount rate sensitivity based on current amortization method (varies from 5 to 30 years) or normal cost if in a surplus position
	Analysis of discount rate sensitivity based on amortization of UL over EARSP (11 years)
*	Required by Government Code Section 20229
**	Actuarially required contribution rate for 2018-19 adopted by CalPERS Board

Analysis of Discount Rate Sensitivity & Government Code Section 20229
(continued)



	Analysis of discount rate sensitivity based on current amortization method (varies from 6 to 30 years) or normal cost if in a surplus position
	Analysis of discount rate sensitivity based on amortization of UL over EARSP (11 years)
*	Required by Government Code Section 20229
**	Actuarially required contribution rate for 2018-19 adopted by CalPERS Board

Analysis of Discount Rate Sensitivity & Government Code Section 20229
(continued)



	Analysis of discount rate sensitivity based on current amortization method (varies from 4 to 30 years) or normal cost if in a surplus position
	Analysis of discount rate sensitivity based on amortization of UL over EARSP (13 years)
*	Required by Government Code Section 20229
**	Actuarially required contribution rate for 2018-19 adopted by CalPERS Board

Analysis of Discount Rate Sensitivity & Government Code Section 20229 (continued)

State Miscellaneous

Analysis of Discount Rate Sensitivity (+/- 1% Change in Ultimate Discount Rate)

Sensitivity Analysis							
As of June 30, 2017	Employer Normal Cost	Unfunded Liability Rate	Group Term Life Insurance	Total Employer Rate	Accrued Liability	Unfunded Accrued Liability	Funded Status
7.25% (current discount rate)	9.352%	19.920%	0.026%	29.298%	$106,955,886,517	$34,752,260,292	67.5%
6.0%	14.6%	27.7%	0.0%	42.4%	123,224,744,391	51,021,118,166	58.6%
7.0%	10.1%	21.3%	0.0%	31.4%	109,685,685,932	37,482,059,707	65.8%
8.0%	6.6%	15.0%	0.0%	21.6%	98,354,757,572	26,151,131,347	73.4%

Government Section Code 20229 (+/- 2% Change in Ultimate Discount Rate)

Current Amortization Method							
As of June 30, 2017	Employer Normal Cost	Unfunded Liability Rate	Group Term Life Insurance	Total Employer Rate	Accrued Liability	Unfunded Accrued Liability	Funded Status
7.25% (current discount rate)	9.352%	19.920%	0.026%	29.298%	$106,955,886,517	$34,752,260,292	67.5%
5.0%	20.6%	34.3%	0.0%	55.0%	139,522,511,952	67,318,885,727	51.8%
7.0%	10.1%	21.3%	0.0%	31.4%	109,685,685,932	37,482,059,707	65.8%
9.0%	4.0%	8.6%	0.0%	12.6%	88,798,524,427	16,594,898,202	81.3%

Amortization of Unfunded Accrued Liability over EARSP (11 Years)							
As of June 30, 2017	Employer Normal Cost	Unfunded Liability Rate	Group Term Life Insurance	Total Employer Rate	Accrued Liability	Unfunded Accrued Liability	Funded Status
7.25% (current discount rate)	9.4%	28.9%	0.0%	38.3%	$106,955,886,517	$34,752,260,292	67.5%
5.0%	20.6%	54.9%	0.0%	75.5%	139,522,511,952	67,318,885,727	51.8%
7.0%	10.1%	31.3%	0.0%	41.3%	109,685,685,932	37,482,059,707	65.8%
9.0%	4.0%	11.3%	0.0%	15.4%	88,798,524,427	16,594,898,202	81.3%

- The change in accrued liability due to the change in ultimate discount rate of +/-1% or +/-2% was amortized over 20 years as a level percentage of pay (except for the "Amortization of Unfunded Liability over EARSP").
- In the case of a surplus, rates were calculated to equal the employer normal cost rate. This is based on a provision in the Public Employees' Pension Reform Act of 2013 (PEPRA) that requires a minimum employer contribution rate in combination with employee contributions shall not be less than the normal cost rate.
- Numbers may not add due to rounding.

Analysis of Discount Rate Sensitivity & Government Code Section 20229 (continued)

State Industrial

Analysis of Discount Rate Sensitivity (+/- 1% Change in Ultimate Discount Rate)

Sensitivity Analysis							
As of June 30, 2017	Employer Normal Cost	Unfunded Liability Rate	Group Term Life Insurance	Total Employer Rate	Accrued Liability	Unfunded Accrued Liability	Funded Status
7.25% (current discount rate)	9.794%	9.756%	0.000%	19.550%	$4,210,362,730	$995,348,120	76.4%
6.0%	15.2%	16.6%	0.0%	31.8%	4,929,771,610	1,714,757,000	65.2%
7.0%	10.5%	10.9%	0.0%	21.5%	4,327,732,863	1,112,718,253	74.3%
8.0%	7.0%	5.4%	0.0%	12.4%	3,832,226,529	617,211,919	83.9%

Government Section Code 20229 (+/- 2% Change in Ultimate Discount Rate)

Current Amortization Method							
As of June 30, 2017	Employer Normal Cost	Unfunded Liability Rate	Group Term Life Insurance	Total Employer Rate	Accrued Liability	Unfunded Accrued Liability	Funded Status
7.25% (current discount rate)	9.794%	9.756%	0.000%	19.550%	$4,210,362,730	$995,348,120	76.4%
5.0%	21.2%	22.5%	0.0%	43.7%	5,667,979,222	2,452,964,612	56.7%
7.0%	10.5%	10.9%	0.0%	21.5%	4,327,732,863	1,112,718,253	74.3%
9.0%	4.3%	0.0%	0.0%	4.3%	3,420,746,522	205,731,912	94.0%

Amortization of Unfunded Accrued Liability over EARSP (11 Years)							
As of June 30, 2017	Employer Normal Cost	Unfunded Liability Rate	Group Term Life Insurance	Total Employer Rate	Accrued Liability	Unfunded Accrued Liability	Funded Status
7.25% (current discount rate)	9.8%	14.9%	0.0%	24.7%	$4,210,362,730	$995,348,120	76.4%
5.0%	21.2%	37.1%	0.0%	58.3%	5,667,979,222	2,452,964,612	56.7%
7.0%	10.5%	16.9%	0.0%	27.4%	4,327,732,863	1,112,718,253	74.3%
9.0%	4.3%	0.2%	0.0%	4.5%	3,420,746,522	205,731,912	94.0%

- The change in accrued liability due to the change in ultimate discount rate of +/-1% or +/-2% was amortized over 20 years as a level percentage of pay (except for the "Amortization of Unfunded Liability over EARSP").
- In the case of a surplus, rates were calculated to equal the employer normal cost rate. This is based on a provision in the Public Employees' Pension Reform Act of 2013 (PEPRA) that requires a minimum employer contribution rate in combination with employee contributions shall not be less than the normal cost rate.
- Numbers may not add due to rounding.

Analysis of Discount Rate Sensitivity & Government Code Section 20229 (continued)

State Safety

Analysis of Discount Rate Sensitivity (+/- 1% Change in Ultimate Discount Rate)

Sensitivity Analysis							
As of June 30, 2017	Employer Normal Cost	Unfunded Liability Rate	Group Term Life Insurance	Total Employer Rate	Accrued Liability	Unfunded Accrued Liability	Funded Status
7.25% (current discount rate)	11.995%	8.357%	0.000%	20.352%	$12,204,328,400	$2,877,480,123	76.4%
6.0%	18.0%	14.2%	0.0%	32.1%	14,221,413,269	4,894,564,992	65.6%
7.0%	12.9%	9.4%	0.0%	22.3%	12,541,223,483	3,214,375,206	74.4%
8.0%	8.9%	4.7%	0.0%	13.6%	11,152,154,035	1,825,305,758	83.6%

Government Section Code 20229 (+/- 2% Change in Ultimate Discount Rate)

Current Amortization Method							
As of June 30, 2017	Employer Normal Cost	Unfunded Liability Rate	Group Term Life Insurance	Total Employer Rate	Accrued Liability	Unfunded Accrued Liability	Funded Status
7.25% (current discount rate)	11.995%	8.357%	0.000%	20.352%	$12,204,328,400	$2,877,480,123	76.4%
5.0%	24.5%	19.1%	0.0%	43.7%	16,272,714,440	6,945,866,163	57.3%
7.0%	12.9%	9.4%	0.0%	22.3%	12,541,223,483	3,214,375,206	74.4%
9.0%	5.8%	0.1%	0.0%	5.9%	9,993,537,915	666,689,638	93.3%

Amortization of Unfunded Accrued Liability over EARSP (11 Years)							
As of June 30, 2017	Employer Normal Cost	Unfunded Liability Rate	Group Term Life Insurance	Total Employer Rate	Accrued Liability	Unfunded Accrued Liability	Funded Status
7.25% (current discount rate)	12.0%	13.1%	0.0%	25.1%	$12,204,328,400	$2,877,480,123	76.4%
5.0%	24.5%	31.9%	0.0%	56.4%	16,272,714,440	6,945,866,163	57.3%
7.0%	12.9%	14.8%	0.0%	27.6%	12,541,223,483	3,214,375,206	74.4%
9.0%	5.8%	0.5%	0.0%	6.3%	9,993,537,915	666,689,638	93.3%

- The change in accrued liability due to the change in ultimate discount rate of +/-1% or +/-2% was amortized over 20 years as a level percentage of pay (except for the "Amortization of Unfunded Liability over EARSP").
- In the case of a surplus, rates were calculated to equal the employer normal cost rate. This is based on a provision in the Public Employees' Pension Reform Act of 2013 (PEPRA) that requires a minimum employer contribution rate in combination with employee contributions shall not be less than the normal cost rate.
- Numbers may not add due to rounding.

Analysis of Discount Rate Sensitivity & Government Code Section 20229 (continued)

State Peace Officers and Firefighters

Analysis of Discount Rate Sensitivity (+/- 1% Change in Ultimate Discount Rate)

Sensitivity Analysis							
As of June 30, 2017	Employer Normal Cost	Unfunded Liability Rate	Group Term Life Insurance	Total Employer Rate	Accrued Liability	Unfunded Accrued Liability	Funded Status
7.25% (current discount rate)	17.132%	26.592%	0.000%	43.724%	$44,618,700,274	$15,194,267,924	65.9%
6.0%	26.5%	39.9%	0.0%	66.4%	52,470,861,740	23,046,429,390	56.1%
7.0%	18.4%	29.0%	0.0%	47.4%	45,948,827,270	16,524,394,920	64.0%
8.0%	12.3%	18.5%	0.0%	30.9%	40,615,795,425	11,191,363,075	72.4%

Government Section Code 20229 (+/- 2% Change in Ultimate Discount Rate)

Current Amortization Method							
As of June 30, 2017	Employer Normal Cost	Unfunded Liability Rate	Group Term Life Insurance	Total Employer Rate	Accrued Liability	Unfunded Accrued Liability	Funded Status
7.25% (current discount rate)	17.132%	26.592%	0.000%	43.724%	$44,618,700,274	$15,194,267,924	65.9%
5.0%	37.3%	51.3%	0.0%	88.7%	60,532,046,464	31,107,614,114	48.6%
7.0%	18.4%	29.0%	0.0%	47.4%	45,948,827,270	16,524,394,920	64.0%
9.0%	7.7%	8.4%	0.0%	16.1%	36,208,181,249	6,783,748,899	81.3%

Amortization of Unfunded Accrued Liability over EARSP (11 Years)							
As of June 30, 2017	Employer Normal Cost	Unfunded Liability Rate	Group Term Life Insurance	Total Employer Rate	Accrued Liability	Unfunded Accrued Liability	Funded Status
7.25% (current discount rate)	17.1%	43.7%	0.0%	60.8%	$44,618,700,274	$15,194,267,924	65.9%
5.0%	37.3%	88.1%	0.0%	125.4%	60,532,046,464	31,107,614,114	48.6%
7.0%	18.4%	47.9%	0.0%	66.4%	45,948,827,270	16,524,394,920	64.0%
9.0%	7.7%	15.7%	0.0%	23.4%	36,208,181,249	6,783,748,899	81.3%

- The change in accrued liability due to the change in ultimate discount rate of +/-1% or +/-2% was amortized over 20 years as a level percentage of pay (except for the "Amortization of Unfunded Liability over EARSP").
- In the case of a surplus, rates were calculated to equal the employer normal cost rate. This is based on a provision in the Public Employees' Pension Reform Act of 2013 (PEPRA) that requires a minimum employer contribution rate in combination with employee contributions shall not be less than the normal cost rate.
- Numbers may not add due to rounding.

Analysis of Discount Rate Sensitivity & Government Code Section 20229 (continued)

California Highway Patrol

Analysis of Discount Rate Sensitivity (+/- 1% Change in Ultimate Discount Rate)

Sensitivity Analysis							
As of June 30, 2017	Employer Normal Cost	Unfunded Liability Rate	Group Term Life Insurance	Total Employer Rate	Accrued Liability	Unfunded Accrued Liability	Funded Status
7.25% (current discount rate)	17.714%	36.091%	0.000%	53.805%	$12,321,822,329	$4,904,411,495	60.2%
6.0%	28.0%	50.4%	0.0%	78.4%	14,514,161,290	7,096,750,456	51.1%
7.0%	19.1%	38.6%	0.0%	57.7%	12,689,378,536	5,271,967,702	58.5%
8.0%	12.4%	27.4%	0.0%	39.8%	11,199,119,633	3,781,708,799	66.2%

Government Section Code 20229 (+/- 2% Change in Ultimate Discount Rate)

Current Amortization Method							
As of June 30, 2017	Employer Normal Cost	Unfunded Liability Rate	Group Term Life Insurance	Total Employer Rate	Accrued Liability	Unfunded Accrued Liability	Funded Status
7.25% (current discount rate)	17.714%	36.091%	0.000%	53.805%	$12,321,822,329	$4,904,411,495	60.2%
5.0%	40.0%	63.0%	0.0%	103.0%	16,773,292,954	9,355,882,120	44.2%
7.0%	19.1%	38.6%	0.0%	57.7%	12,689,378,536	5,271,967,702	58.5%
9.0%	7.4%	16.5%	0.0%	23.9%	9,969,278,858	2,551,868,024	74.4%

Amortization of Unfunded Accrued Liability over EARSP (13 Years)							
As of June 30, 2017	Employer Normal Cost	Unfunded Liability Rate	Group Term Life Insurance	Total Employer Rate	Accrued Liability	Unfunded Accrued Liability	Funded Status
7.25% (current discount rate)	17.7%	49.4%	0.0%	67.1%	$12,321,822,329	$4,904,411,495	60.2%
5.0%	40.0%	90.8%	0.0%	130.8%	16,773,292,954	9,355,882,120	44.2%
7.0%	19.1%	53.4%	0.0%	72.5%	12,689,378,536	5,271,967,702	58.5%
9.0%	7.4%	22.8%	0.0%	30.2%	9,969,278,858	2,551,868,024	74.4%

- The change in accrued liability due to the change in ultimate discount rate of +/-1% or +/-2% was amortized over 20 years as a level percentage of pay (except for the "Amortization of Unfunded Liability over EARSP").
- In the case of a surplus, rates were calculated to equal the employer normal cost rate. This is based on a provision in the Public Employees' Pension Reform Act of 2013 (PEPRA) that requires a minimum employer contribution rate in combination with employee contributions shall not be less than the normal cost rate.
- Numbers may not add due to rounding.

Volatility Ratios

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

Asset Volatility Ratio

Plans that have higher asset-to-payroll ratios produce more volatile employer rates due to investment return. For example, a plan with an asset-to-payroll ratio of 8 may experience twice the contribution volatility due to investment return volatility than a plan with an asset-to-payroll ratio of 4. Shown below is the asset volatility ratio, a measure of the plan's current rate volatility. It should be noted that this ratio is a measure of the current situation. It increases over time but generally tends to stabilize as the plan matures.

Liability Volatility Ratio

Plans that have higher liability-to-payroll ratios produce more volatile employer rates due to investment return and changes in liability. For example, a plan with a liability-to-payroll ratio of 8 is expected to have twice the contribution volatility of a plan with a liability-to-payroll ratio of 4. The liability volatility ratio is also included in the table below. It should be noted that this ratio indicates a longer-term potential for contribution volatility and the asset volatility ratio, described above, will tend to move closer to this ratio as the plan matures. Since the liability volatility ratio is a long-term measure, it is shown below at the ultimate discount rate the Board has adopted to determine the contribution requirement in the June 30, 2018 actuarial valuation (7.00 percent).

Rate Volatility

	Market Value of Assets without Receivables	Annual Covered Payroll	Asset Volatility Ratio	Accrued Liability (7.00% Discount Rate)	Liability Volatility Ratio
Plan	(1)	(2)	(1)/(2)	(3)	(3)/(2)
State Miscellaneous	$71,896,404,508	$11,712,643,755	6.1	$109,685,685,932	9.4
State Industrial	3,200,332,793	652,319,822	4.9	4,327,732,863	6.6
State Safety	9,308,872,660	2,167,067,002	4.3	12,541,223,483	5.8
State Peace Officers & Firefighters	29,350,404,357	3,416,664,854	8.6	45,948,827,270	13.4
California Highway Patrol	7,406,156,321	850,071,470	8.7	12,689,378,536	14.9

The above analysis shows that the CHP, POFF and Miscellaneous plans are expected to have more volatile contributions than the Industrial and Safety plans. It also shows that the contribution volatility is expected to increase as the plans become better funded. The contribution volatility would be 35 percent to 71 percent greater if the plans were 100 percent funded at the 7.00 percent discount rate.

Appendices

A-1 Appendix A – Statement of Actuarial Methods and Assumptions

B-1 Appendix B – Principal Plan Provisions

C-1 Appendix C – Participant Data

D-1 Appendix D – Normal Cost Information

E-1 Appendix E – Glossary of Actuarial Terms

Appendix A – Statement of Actuarial Methods and Assumptions

Actuarial Data

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

Actuarial Methods

Actuarial Cost Method

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

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

Amortization of Unfunded Actuarial Accrued Liability

The excess of the total actuarial accrued liability over the market value of plan assets is called the unfunded actuarial accrued liability (UAL). Funding requirements are determined by adding the normal cost and an amortization payment toward the unfunded liability. The unfunded liability is amortized as a "level percent of pay." Commencing with the June 30, 2014 valuation, all new gains or losses are tracked and amortized over a fixed 30-year period with a 5-year ramp up at the beginning and a 5-year ramp down at the end of the amortization period. All changes in liability due to plan amendments (other than golden handshakes), changes in actuarial assumptions, or changes in actuarial methodology are amortized separately over a 20-year period with a 5-year ramp up at the beginning and a 5-year ramp down at the end of the amortization period. Changes in unfunded accrued liability due to a Golden Handshake are amortized over a period of 5 years. A summary of the current policy is provided in the table below:

	Source				
	(Gain)/Loss				
Driver	**Investment**	**Non-investment**	**Assumption/Method Change**	**Benefit Change**	**Golden Handshake**
Amortization Period	30 Years	30 Years	20 Years	20 Years	5 Years
Escalation Rate - Active Plans - Inactive Plans	 2.875% 0%	 2.875% 0%	 2.875% 0%	 2.875% 0%	 2.875% 0%
Ramp Up	5	5	5	0	0
Ramp Down	5	5	5	0	0

Actuarial Methods (continued)

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

Exceptions for Inconsistencies:

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

1) When a positive payment would be required on a negative unfunded actuarial liability (or conversely a negative payment on a positive unfunded actuarial liability); or
2) When there are excess assets, rather than an unfunded liability. In this situation, a 30-year fresh start is used.

It should be noted that the actuary may determine that a fresh start is necessary under other circumstances. In all cases of a fresh start, the period is set by the actuary at what is deemed appropriate; however, the period will not be greater than 30 years.

By State statute for California Highway Patrol only, a portion of the assets in excess of the Entry Age Normal accrued liability can be applied as a direct offset to required employer and employee contributions.

The 1959 Survivor Program valuation is not provided in this report. A separate report for that program is available.

The Term Insurance Method is used for the State Group Term Life Insurance Program. The required contribution for the coming fiscal year is the difference between the reserves for that benefit and one and one-half times the expected benefit payments, but not less than zero.

Purchasing Power Protection Act (PPPA) Method

PPPA benefits are cost-of-living adjustments intended to maintain the individual's current retirement benefit at 75 percent of the original benefit at retirement adjusted for inflation since retirement. The PPPA benefit is paid, if necessary, in addition to any other cost-of-living adjustment provided under the terms of the plan. Prior to January 1, 2001, there was a single PPPA pool covering all CalPERS employers. However, commencing January 1, 2001, separate PPPA pools were established. A pool was set up for all State plans and a separate pool for School employers. The public agencies were removed entirely from PPPA pooling resulting in each public agency plan paying for its own PPPA benefits. The creation of separate pools effectively eliminates the cross subsidization between the State, Schools and public agencies. Because there is a single PPPA pool for all State plans, cross subsidization between State plans still occurs.

For the State plans, the total annual outlay for PPPA benefits is limited by State statute to earnings of up to 1.1 percent of accumulated member contributions. If this annual outlay is insufficient to provide the PPPA benefits in a given fiscal year, the 75 percent maintenance target would be proportionately reduced. Since the inception of the PPPA benefit program, 1.1 percent has proved more than sufficient to provide the 75 percent maintenance. Under the inflation assumption of 2.625 percent compounded annually, the 1.1 percent appears to remain more than sufficient in the foreseeable future.

The actuarial model mimics the PPPA administrative procedure by deriving the employer contribution rate for the plan as the lesser of two separate actuarially computed rates:

1) The rate that results if a full 1.1 percent investment return on the value of each future year's employee assets in the plan is used for that plan's PPPA payments; or
2) The rate that results if the plan pays the full 75 percent purchasing power for itself.

Actuarial Methods (continued)

In this way, those plans for which future PPPA costs equal or exceed a 1.1 percent return on current and future employee assets are charged an employer rate that replaces the 1.1 percent return on employee assets. Those plans that require less than the 1.1 percent return on current and future employee assets to maintain 75 percent purchasing power are charged the rate necessary to maintain the 75 percent purchasing power. It must be noted that nothing is charged in the rates for any cross-subsidization. That is, the model assumes that cross subsidization for PPPA for State plans will remain so small that it can be ignored.

Internal Revenue Code Section 415

The valuation reflects the limitations on benefits imposed by Internal Revenue Code Section 415. The current valuation is based on the IRC 415(b) dollar limit for 2017 of $215,000, up from the 2016 limit of $210,000 used in the prior valuation.

Internal Revenue Code Section 401(a)(17)

The valuation reflects the limitations on pensionable compensation imposed by Internal Revenue Code Section 401(a)(17). The current valuation is based on the IRC 401(a)(17) limit for 2017 of $270,000, up from the 2016 limit of $265,000 used in the prior valuation.

PEPRA Assumptions

The Public Employees' Pension Reform Act of 2013 (PEPRA) mandated new benefit formulas and new member contributions for members hired after January 1, 2013, as defined by PEPRA. Different assumptions for PEPRA members are disclosed below.

Asset Valuation Method

It is the policy of the CalPERS Board of Administration to use professionally accepted amortization methods to eliminate a surplus or an unfunded accrued liability in a manner that maintains benefit security for the members of the System while minimizing substantial variations in required employer contribution rates. On April 17, 2013, the CalPERS Board of Administration approved a recommendation to change the CalPERS amortization and rate smoothing policies. Beginning with the June 30, 2014 valuations for the State plans that set the 2015-16 rates, CalPERS employs a policy that amortizes all gains and losses over a fixed 30-year period. The increase or decrease in the rate is then spread directly over a 5-year period. This method is referred to as "direct rate smoothing." CalPERS no longer uses an actuarial value of assets and only uses the market value of assets. The direct rate smoothing method is equivalent to a method using a 5-year asset smoothing period with no actuarial value of asset corridor and a 25-year amortization period for gains and losses.

Accounts Receivable

In preparing valuations and setting employer contribution rates, the asset figures used include accounts receivable. The CalPERS Actuarial Office assumes that all assets are accruing interest at the actuarially assumed rate. Therefore, the rates depicted assume that all payments have been made and are accruing interest.

Actuarial Assumptions

In 2017, CalPERS completed its most recent asset liability management study incorporating actuarial assumptions and strategic asset allocation. In December 2017, the CalPERS Board of Administration adopted relatively modest changes to the asset allocation that reduced the expected volatility of returns. The adopted asset allocation was expected to have a long-term blended return that continued to support a discount rate assumption of 7.00 percent. The Board also approved several changes to the demographic assumptions that more closely aligned with actual experience. These new actuarial assumptions were first used in this June 30, 2017 valuation to set the Fiscal Year 2018-19 contribution for the state plans.

Actuarial Assumptions (continued)

On December 21, 2016, the CalPERS Board of Administration lowered the discount rate from 7.50 percent to 7.00 percent using a three-year phase-in beginning with the June 30, 2016 actuarial valuations. The minimum employer contributions for Fiscal Year 2018-19 determined in this valuation were calculated using a discount rate of 7.25 percent. Projected employer contributions are calculated assuming that the discount rate will be lowered to 7.0 percent next year as adopted by the Board. The decision to reduce the discount rate was primarily based on reduced capital market assumptions provided by external investment consultants and CalPERS investment staff. The specific decision adopted by the Board reflected recommendations from CalPERS staff and additional input from employer and employee stakeholder groups. Based on the investment allocation adopted by the Board and capital market assumptions, the reduced discount rate schedule provides a more realistic assumption for the long-term investment return of the fund.

Notwithstanding the Board's decision to phase into a 7.0 percent discount rate, subsequent analysis of the expected investment return of CalPERS assets or changes to the investment allocation may result in a change to this discount rate schedule.

For more details and additional rationale for the selection of the actuarial assumptions, please refer to the CalPERS Experience Study and Review of Actuarial Assumptions report from December 2017 that can be found on the CalPERS website under: "Forms and Publications". Click on "View All" and search for Experience Study.

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

Economic Assumptions

Discount Rate

The prescribed discount rate assumption adopted by the Board on December 21, 2016 is 7.25 percent compounded annually (net of investment and administrative expenses) as of June 30, 2017.

The Board also prescribed that the assumed discount rate will reduce to 7.0 percent compounded annually (net of expenses) as of June 30, 2018. This change to the discount rate assumption is not reflected in the determination of required contributions determined in this report for Fiscal Year 2018-19.

Salary Growth

Annual increases vary by entry age and duration of service. A sample of assumed increases is shown below. Wage inflation assumption in the valuation year (2.875% for 2017) is added to these factors for total salary growth.

Annual Percentage Increase

State Miscellaneous Tier 1 & Tier 2

Duration of Service	Entry Age		
	20	30	40
0	6.4%	5.6%	4.4%
3	5.3%	4.4%	3.1%
5	4.3%	3.6%	2.4%
10	2.3%	1.8%	1.2%
15	1.5%	1.2%	0.8%
20	1.0%	0.9%	0.6%
25	0.7%	0.6%	0.4%
30	0.5%	0.4%	0.3%

Economic Assumptions (continued)

State Industrial

Duration of Service	Entry Age		
	20	30	40
0	7.3%	7.0%	6.4%
3	5.1%	4.7%	3.9%
5	4.0%	3.6%	2.8%
10	2.7%	2.2%	1.4%
15	1.8%	1.5%	1.1%
20	1.2%	1.0%	0.8%
25	0.8%	0.7%	0.6%
30	0.5%	0.5%	0.4%

State Safety, POFF and CHP

Duration of Service	State Safety	POFF	CHP
0	5.0%	14.7%	6.8%
3	3.1%	6.7%	4.0%
5	2.1%	4.0%	2.4%
10	0.8%	1.2%	1.0%
15	0.7%	0.5%	1.0%
20	0.6%	1.4%	1.8%
25	0.5%	1.5%	2.0%
30	0.5%	1.0%	1.0%

Overall Payroll Growth

2.875 percent compounded annually (used in projecting the payroll over which the unfunded liability is amortized). For the State Miscellaneous plan, the payroll of Second Tier members is assumed to decrease in accordance with actuarial assumptions based on the assumption that all new entrants will elect the State Miscellaneous First Tier. The payroll of First Tier members is assumed to grow at the rate necessary for the overall payroll of the State Miscellaneous plan to grow annually at a rate of 2.875 percent.

For the June 30, 2018 valuation the payroll growth assumption will be 2.75 percent.

Inflation

2.625 percent compounded annually. For the June 30, 2018 valuation the inflation assumption will be 2.50 percent.

Appendix A - Statement of Actuarial Methods and Assumptions

Demographic 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.

	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 post-retirement mortality rates above include 15 years of projected on-going mortality improvement using 90 percent of Scale MP-2016 published by the Society of Actuaries.

Marital Status

For active members, it is assumed the following are married upon retirement.

Plan	Percent Married
State Miscellaneous	70%
State Industrial	70%
State Safety	70%
State Peace Officer & Firefighters	80%
California Highway Patrol	90%

Age of Spouse

It is assumed that female spouses are 3 years younger than male spouses.

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 State Miscellaneous and Industrial members and age 54 for State Safety, Peace Officer and Firefighter, and California Highway Patrol members.

Miscellaneous Loading Factors

Credit for Unused Sick Leave

Total years of service is increased by 1 percent for those plans with the provision providing Credit for Unused Sick Leave.

Norris Decision (Best Factors)

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

Miscellaneous Assumptions

Tier 2 Members electing Tier 1 benefits

Tier 2 members of both the State Miscellaneous and State Industrial plans have the right to convert their Tier 2 service to Tier 1 service provided they make up the shortfall in their accumulated contributions with interest. In this valuation, we have assumed that all Tier 2 members will elect to convert their Tier 2 service to Tier 1 service.

PLAN SPECIFIC ACTUARIAL ASSUMPTIONS

State Miscellaneous Tier 1

Service Retirement - Classic Members

Rates vary by age and service. See sample rates in the table below.

Attained Age	Years of Service						
	5	10	15	20	25	30	35
50	0.007	0.010	0.014	0.019	0.019	0.022	0.029
52	0.013	0.012	0.013	0.018	0.020	0.023	0.031
54	0.011	0.017	0.020	0.030	0.035	0.039	0.049
56	0.023	0.035	0.043	0.062	0.083	0.106	0.165
58	0.027	0.043	0.047	0.074	0.089	0.121	0.170
60	0.037	0.062	0.075	0.119	0.141	0.175	0.246
62	0.087	0.127	0.152	0.221	0.263	0.310	0.356
65	0.090	0.158	0.175	0.245	0.249	0.301	0.344
70	0.140	0.176	0.184	0.223	0.276	0.299	0.299
75	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Service Retirement - PEPRA Members

Rates vary by age and service. See sample rates in the table below.

Attained Age	Years of Service						
	5	10	15	20	25	30	35
50	0.000	0.000	0.000	0.000	0.000	0.000	0.000
52	0.009	0.008	0.009	0.013	0.014	0.016	0.022
54	0.008	0.012	0.014	0.021	0.025	0.027	0.034
56	0.016	0.025	0.030	0.043	0.058	0.074	0.116
58	0.020	0.032	0.035	0.056	0.067	0.091	0.128
60	0.030	0.050	0.060	0.095	0.113	0.140	0.197
62	0.070	0.102	0.122	0.177	0.210	0.248	0.285
65	0.081	0.142	0.158	0.221	0.224	0.271	0.310
70	0.140	0.176	0.184	0.223	0.276	0.299	0.299
75	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Termination with Refund

Rates vary by entry age and service. See sample rates in the table below.

Duration of Service	Entry Age				
	20	25	30	35	40
0	0.16570	0.16570	0.15120	0.13660	0.12920
1	0.13660	0.13660	0.12160	0.10660	0.09650
2	0.11060	0.11060	0.09650	0.08250	0.07190
3	0.08770	0.08770	0.07600	0.06430	0.05540
4	0.06790	0.06790	0.06000	0.05200	0.04680
5	0.02720	0.02720	0.02230	0.01740	0.01600
10	0.00480	0.00480	0.00430	0.00370	0.00270
15	0.00160	0.00160	0.00120	0.00080	0.00070
20	0.00110	0.00110	0.00080	0.00050	0.00050
25	0.00080	0.00080	0.00060	0.00040	0.00030
30	0.00060	0.00060	0.00040	0.00020	0.00020

PLAN SPECIFIC ACTUARIAL ASSUMPTIONS (continued)

State Miscellaneous Tier 1 (continued)

Termination with Vested Benefits

Rates vary by entry age and service. See sample rates in the table below.

Duration of Service	Entry Age				
	20	25	30	35	40
5	0.04410	0.04410	0.03940	0.03460	0.02890
6	0.03970	0.03970	0.03570	0.03180	0.02610
7	0.03550	0.03550	0.03220	0.02890	0.02330
8	0.03170	0.03170	0.02880	0.02600	0.02060
9	0.02820	0.02820	0.02570	0.02320	0.01800
10	0.02510	0.02510	0.02270	0.02040	0.01560
14	0.01610	0.01610	0.01370	0.01130	0.00850
15	0.01460	0.01460	0.01220	0.00970	0.00740
19	0.01040	0.01040	0.00790	0.00540	0.00430
20	0.00950	0.00950	0.00710	0.00470	0.00380
24	0.00580	0.00580	0.00370	0.00170	0.00130
25	0.00500	0.00500	0.00290	0.00080	0.00070
29	0.00290	0.00290	0.00150	0.00000	0.00000
30	0.00260	0.00260	0.00130	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.

Non-Industrial (Not Job-Related) Death and Disability

Rates vary by age and gender. See sample rates in the table below.

	Non-Industrial Death (Not Job-Related)		Non-Industrial Disability (Not Job-Related)	
Attained Age	Male	Female	Male	Female
20	0.000216	0.000069	0.000190	0.000390
25	0.000289	0.000109	0.000190	0.000390
30	0.000379	0.000155	0.000190	0.000460
35	0.000491	0.000270	0.000360	0.000960
40	0.000637	0.000366	0.001030	0.001860
45	0.000795	0.000543	0.002040	0.003260
50	0.001161	0.000794	0.002740	0.004050
55	0.001717	0.001204	0.002380	0.003100
60	0.002550	0.001657	0.002000	0.002560

PLAN SPECIFIC ACTUARIAL ASSUMPTIONS (continued)

State Miscellaneous Tier 2

Service Retirement - Classic Members

Rates vary by age and service. See sample rates in the table below.

Attained Age	Years of Service						
	5	10	15	20	25	30	35
50	0.007	0.010	0.014	0.019	0.019	0.022	0.029
52	0.013	0.012	0.013	0.018	0.020	0.023	0.031
54	0.011	0.017	0.020	0.030	0.035	0.039	0.049
56	0.023	0.035	0.043	0.062	0.083	0.106	0.165
58	0.027	0.043	0.047	0.074	0.089	0.121	0.170
60	0.037	0.062	0.075	0.119	0.141	0.175	0.246
62	0.087	0.127	0.152	0.221	0.263	0.310	0.356
65	0.090	0.158	0.175	0.245	0.249	0.301	0.344
70	0.140	0.176	0.184	0.223	0.276	0.299	0.299
75	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Service Retirement - PEPRA Members

Rates vary by age and service. See sample rates in the table below.

Attained Age	Years of Service						
	5	10	15	20	25	30	35
50	0.000	0.000	0.000	0.000	0.000	0.000	0.000
52	0.009	0.008	0.009	0.013	0.014	0.016	0.022
54	0.008	0.012	0.014	0.021	0.025	0.027	0.034
56	0.016	0.025	0.030	0.043	0.058	0.074	0.116
58	0.020	0.032	0.035	0.056	0.067	0.091	0.128
60	0.030	0.050	0.060	0.095	0.113	0.140	0.197
62	0.070	0.102	0.122	0.177	0.210	0.248	0.285
65	0.081	0.142	0.158	0.221	0.224	0.271	0.310
70	0.140	0.176	0.184	0.223	0.276	0.299	0.299
75	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Termination with Refund

Rates vary by entry age and service. See sample rates in the table below.

Duration of Service	Entry Age				
	20	25	30	35	40
0	0.1496	0.1433	0.1370	0.1307	0.1244
5	0.1365	0.1302	0.1239	0.1176	0.1113
10	0.1234	0.1172	0.1109	0.1046	0.0983
15	0.1104	0.1041	0.0978	0.0915	0.0852
20	0.0973	0.0910	0.0848	0.0785	0.0722
25	0.0843	0.0780	0.0717	0.0654	0.0591
30	0.0792	0.0729	0.0666	0.0603	0.0540
35	0.0741	0.0678	0.0615	0.0553	0.0490
40	0.0691	0.0628	0.0565	0.0502	0.0439
45	0.0640	0.0577	0.0514	0.0451	0.0388

PLAN SPECIFIC ACTUARIAL ASSUMPTIONS (continued)

State Miscellaneous Tier 2 (continued)

Termination with Vested Deferred Benefits

Rates vary by entry age and service. See sample rates in the table below.

Duration of Service	Entry Age				
	20	25	30	35	40
10	0.0589	0.0526	0.0463	0.0400	0.0000
14	0.0480	0.0417	0.0354	0.0291	—
15	0.0453	0.0390	0.0327	—	—
19	0.0344	0.0281	0.0218	—	—
20	0.0317	0.0254	—	—	—
24	0.0208	0.0145	—	—	—
25	0.0180	—	—	—	—
29	0.0071	—	—	—	—
30	—	—	—	—	—

- 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.

Non-Industrial (Not Job-Related) Death and Disability

Rates vary by age and gender. See sample rates in the table below.

	Non-Industrial Death (Not Job-Related)		Non-Industrial Disability (Not Job-Related)	
Attained Age	Male	Female	Male	Female
20	0.000216	0.000069	0.000190	0.000390
25	0.000289	0.000109	0.000190	0.000390
30	0.000379	0.000155	0.000190	0.000460
35	0.000491	0.000270	0.000360	0.000960
40	0.000637	0.000366	0.001030	0.001860
45	0.000795	0.000543	0.002040	0.003260
50	0.001161	0.000794	0.002740	0.004050
55	0.001717	0.001204	0.002380	0.003100
60	0.002550	0.001657	0.002000	0.002560

PLAN SPECIFIC ACTUARIAL ASSUMPTIONS (continued)

State Industrial

Service Retirement - Classic Members

Rates vary by age and service. See sample rates in the table below.

Attained Age	Years of Service						
	5	10	15	20	25	30	35
50	0.006	0.008	0.013	0.019	0.026	0.029	0.036
52	0.007	0.009	0.015	0.023	0.031	0.034	0.043
54	0.014	0.020	0.030	0.046	0.062	0.069	0.086
56	0.028	0.040	0.062	0.094	0.126	0.140	0.174
58	0.029	0.041	0.064	0.098	0.131	0.145	0.181
60	0.042	0.060	0.093	0.142	0.191	0.211	0.262
62	0.079	0.113	0.176	0.266	0.357	0.398	0.493
65	0.081	0.117	0.182	0.276	0.371	0.413	0.511
70	0.097	0.139	0.217	0.329	0.443	0.493	0.611
75	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Service Retirement - PEPRA Members

Rates vary by age and service. See sample rates in the table below.

Attained Age	Years of Service						
	5	10	15	20	25	30	35
50	0.000	0.000	0.000	0.000	0.000	0.000	0.000
52	0.005	0.006	0.011	0.016	0.022	0.024	0.030
54	0.010	0.014	0.021	0.032	0.043	0.048	0.060
56	0.020	0.028	0.043	0.066	0.088	0.098	0.122
58	0.022	0.031	0.048	0.074	0.098	0.109	0.136
60	0.034	0.048	0.074	0.114	0.153	0.169	0.210
62	0.063	0.090	0.141	0.213	0.286	0.318	0.394
65	0.073	0.105	0.164	0.248	0.334	0.372	0.460
70	0.097	0.139	0.217	0.329	0.443	0.493	0.611
75	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Termination with Refund

Rates vary by service. See sample rates in the table below.

Duration of Service									
0	5	10	15	20	25	30	35	40	45
0.0912	0.0190	0.0029	0.0016	0.0010	0.0006	0.0004	0.0002	0.0001	0.0001

PLAN SPECIFIC ACTUARIAL ASSUMPTIONS (continued)

State Industrial (continued)

Termination with Vested Deferred Benefits

Rates vary by entry age and service. See sample rates in the table below.

Duration of Service	Entry Age				
	20	25	30	35	40
5	0.0496	0.0449	0.0405	0.0356	0.0311
6	0.0470	0.0421	0.0377	0.0328	0.0281
7	0.0442	0.0393	0.0346	0.0297	0.0250
8	0.0414	0.0365	0.0316	0.0267	0.0220
9	0.0384	0.0335	0.0285	0.0234	0.0187
10	0.0353	0.0302	0.0253	0.0201	—
14	0.0311	0.0257	0.0206	0.0152	—
15	0.0302	0.0246	0.0194	—	—
19	0.0248	0.0190	0.0136	—	—
20	0.0232	0.0176	—	—	—
24	0.0173	0.0115	—	—	—
25	0.0159	—	—	—	—
29	0.0091	—	—	—	—
30	—	—	—	—	—

- 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.

Non-Industrial (Not Job-Related) Death

Rates vary by age and gender. See sample rates in the table below.

Non-Industrial (Not Job-Related) Disability, Industrial (Job-Related) Disability & Industrial (Job-Related) Death

Rates vary by age. See sample rates in the table below.

	Non-Industrial Death		Non-Industrial Disability	Industrial Death	Industrial Disability
Attained Age	Male	Female	Male and Female	Male and Female	Male and Female
20	0.000216	0.000069	0.000430	0.000040	0.000150
25	0.000289	0.000109	0.000430	0.000060	0.000150
30	0.000379	0.000155	0.001060	0.000070	0.000150
35	0.000491	0.000270	0.001840	0.000090	0.000290
40	0.000637	0.000366	0.002950	0.000100	0.000290
45	0.000795	0.000543	0.004480	0.000120	0.000440
50	0.001161	0.000794	0.006010	0.000130	0.000440
55	0.001717	0.001204	0.007710	0.000150	0.000580
60	0.002550	0.001657	0.007710	0.000160	0.000580

PLAN SPECIFIC ACTUARIAL ASSUMPTIONS (continued)

State Safety

Service Retirement - Classic Members

Rates vary by age and service. See sample rates in the table below.

Attained Age	Years of Service						
	5	10	15	20	25	30	35
50	0.008	0.013	0.020	0.030	0.032	0.039	0.045
52	0.008	0.017	0.017	0.030	0.030	0.035	0.044
54	0.016	0.023	0.023	0.034	0.041	0.054	0.099
56	0.032	0.039	0.058	0.109	0.138	0.171	0.231
58	0.035	0.047	0.069	0.109	0.132	0.179	0.256
60	0.048	0.056	0.090	0.154	0.158	0.201	0.257
62	0.084	0.095	0.140	0.239	0.253	0.308	0.356
65	0.111	0.138	0.172	0.249	0.257	0.311	0.359
70	0.137	0.167	0.214	0.281	0.309	0.373	0.401
75	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Service Retirement - PEPRA Members

Rates vary by age and service. See sample rates in the table below.

Attained Age	Years of Service						
	5	10	15	20	25	30	35
50	0.007	0.011	0.017	0.026	0.027	0.033	0.038
52	0.007	0.014	0.014	0.026	0.026	0.030	0.037
54	0.012	0.017	0.017	0.026	0.031	0.041	0.074
56	0.024	0.029	0.044	0.082	0.104	0.128	0.173
58	0.028	0.038	0.055	0.087	0.106	0.143	0.205
60	0.043	0.050	0.081	0.139	0.142	0.181	0.231
62	0.067	0.076	0.112	0.191	0.202	0.246	0.285
65	0.100	0.124	0.155	0.224	0.231	0.280	0.323
70	0.137	0.167	0.214	0.281	0.309	0.373	0.401
75	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Termination with Refund

Rates vary by service. See sample rates in the table below.

Duration of Service										
0	1	2	3	4	5	10	15	20	25	30
0.1408	0.1014	0.0723	0.0533	0.0444	0.0155	0.0033	0.0019	0.0011	0.0006	0.0004

Termination with Vested Deferred Benefits

Rates vary by service. See sample rates in the table below.

Duration of Service										
5	6	7	8	9	10	15	20	25	30	35
0.0246	0.0218	0.0194	0.0173	0.0155	0.0141	0.0097	0.0073	0.0050	0.0034	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.

PLAN SPECIFIC ACTUARIAL ASSUMPTIONS (continued)

State Safety (continued)

Non-Industrial (Not Job-Related) Death

Rates vary by age and gender. See sample rates in the table below.

Non-Industrial (Not Job-Related) Disability, Industrial (Job-Related) Disability & Industrial (Job-Related) Death

Rates vary by age. See sample rates in the table below.

	Non-Industrial Death		Non-Industrial Disability	Industrial Death	Industrial Disability
Attained Age	Male	Female	Male and Female	Male and Female	Male and Female
20	0.000216	0.000069	0.000360	0.000040	0.000020
25	0.000289	0.000109	0.000540	0.000060	0.000760
30	0.000379	0.000155	0.000630	0.000070	0.001700
35	0.000491	0.000270	0.000720	0.000090	0.002640
40	0.000637	0.000366	0.000720	0.000100	0.003600
45	0.000795	0.000543	0.001080	0.000120	0.004570
50	0.001161	0.000794	0.002010	0.000130	0.005570
55	0.001717	0.001204	0.002400	0.000150	0.006580
60	0.002550	0.001657	0.003200	0.000160	0.007620

State Peace Officers and Firefighters

Service Retirement - Classic Members

Rates vary by age and service. See sample rates in the table below.

Attained Age	Years of Service						
	5	10	15	20	25	30	35
50	0.012	0.030	0.044	0.109	0.224	0.449	0.467
52	0.012	0.026	0.041	0.096	0.145	0.255	0.257
54	0.021	0.042	0.053	0.118	0.162	0.292	0.306
56	0.031	0.044	0.057	0.135	0.213	0.335	0.345
58	0.020	0.065	0.070	0.158	0.224	0.354	0.354
60	0.035	0.066	0.094	0.179	0.276	0.360	0.367
62	0.067	0.104	0.130	0.221	0.324	0.415	0.440
65	0.065	0.081	0.127	0.231	0.342	0.427	0.453
70	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Service Retirement - PEPRA Members – 2.5% @ 57

Rates vary by age and service. See sample rates in the table below.

Attained Age	Years of Service						
	5	10	15	20	25	30	35
50	0.008	0.021	0.031	0.076	0.157	0.314	0.327
52	0.008	0.018	0.029	0.067	0.102	0.179	0.180
54	0.016	0.032	0.040	0.089	0.122	0.219	0.230
56	0.025	0.035	0.046	0.108	0.170	0.268	0.276
58	0.018	0.059	0.063	0.142	0.202	0.319	0.319
60	0.033	0.063	0.089	0.170	0.262	0.342	0.349
62	0.067	0.104	0.130	0.221	0.324	0.415	0.440
65	0.065	0.081	0.127	0.231	0.342	0.427	0.453
70	1.000	1.000	1.000	1.000	1.000	1.000	1.000

PLAN SPECIFIC ACTUARIAL ASSUMPTIONS (continued)

State Peace Officers and Firefighters (continued)

Service Retirement - PEPRA Members – 2.7% @ 57

Rates vary by age and service. See sample rates in the table below.

Attained Age	Years of Service						
	5	10	15	20	25	30	35
50	0.008	0.021	0.031	0.076	0.157	0.314	0.327
52	0.009	0.020	0.031	0.072	0.109	0.191	0.193
54	0.017	0.034	0.042	0.094	0.130	0.234	0.245
56	0.026	0.037	0.048	0.115	0.181	0.285	0.293
58	0.020	0.065	0.070	0.158	0.224	0.354	0.354
60	0.035	0.066	0.094	0.179	0.276	0.360	0.367
62	0.067	0.104	0.130	0.221	0.324	0.415	0.440
65	0.065	0.081	0.127	0.231	0.342	0.427	0.453
70	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Termination with Refund

Rates vary by service. See sample rates in the table below.

Duration of Service										
0	1	2	3	4	5	10	15	20	25	30
0.1217	0.0779	0.0431	0.0353	0.0275	0.0056	0.0039	0.0025	0.0015	0.0006	0.0003

Termination with Vested Deferred Benefits

Rates vary by service. See sample rates in the table below.

Duration of Service										
5	6	7	8	9	10	15	20	25	30	35
0.0117	0.0115	0.0112	0.0108	0.0103	0.0098	0.0069	0.0049	0.0031	0.0020	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.

Non-Industrial (Not Job-Related) Death

Rates vary by age and gender. See sample rates in the table below.

Non-Industrial (Not Job-Related) Disability, Industrial (Job-Related) Disability & Industrial (Job-Related) Death

Rates vary by age. See sample rates in the table below.

	Non-Industrial Death		Non-Industrial Disability	Industrial Death	Industrial Disability
Attained Age	Male	Female	Male and Female	Male and Female	Male and Female
20	0.000216	0.000069	0.000300	0.000040	0.000390
25	0.000289	0.000109	0.000300	0.000060	0.000870
30	0.000379	0.000155	0.000300	0.000070	0.001670
35	0.000491	0.000270	0.000300	0.000090	0.002890
40	0.000637	0.000366	0.000400	0.000100	0.004640
45	0.000795	0.000543	0.000600	0.000120	0.007060
50	0.001161	0.000794	0.000980	0.000130	0.010270
55	0.001717	0.001204	0.001430	0.000150	0.014420
60	0.002550	0.001657	0.001880	0.000160	0.019660

PLAN SPECIFIC ACTUARIAL ASSUMPTIONS (continued)

California Highway Patrol

Service Retirement - Classic Members

Rates vary by age and service. See sample rates in the table below.

Attained Age	Years of Service						
	5	10	15	20	25	30	35
50	0.038	0.038	0.038	0.049	0.107	0.418	0.453
52	0.027	0.027	0.027	0.027	0.093	0.315	0.383
54	0.038	0.038	0.038	0.038	0.124	0.309	0.404
56	0.051	0.051	0.051	0.084	0.139	0.350	0.380
58	0.049	0.049	0.049	0.049	0.171	0.338	0.350
60	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Service Retirement - PEPRA Members – 2.5% @ 57

Rates vary by age and service. See sample rates in the table below.

Attained Age	Years of Service						
	5	10	15	20	25	30	35
50	0.027	0.027	0.027	0.034	0.075	0.293	0.317
52	0.020	0.020	0.020	0.020	0.070	0.236	0.287
54	0.030	0.030	0.030	0.030	0.099	0.247	0.323
56	0.043	0.043	0.043	0.071	0.118	0.298	0.323
58	0.044	0.044	0.044	0.044	0.154	0.304	0.315
60	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Termination with Refund

Rates vary by service. See sample rates in the table below.

Duration of Service										
0	1	2	3	4	5	10	15	20	25	30
0.1050	0.0243	0.0152	0.0091	0.0054	0.0029	0.0005	0.0003	0.0002	0.0002	0.0002

Termination with Vested Deferred Benefits

Rates vary by service. See sample rates in the table below.

Duration of Service										
5	6	7	8	9	10	15	20	25	30	35
0.0090	0.0084	0.0079	0.0075	0.0071	0.0067	0.0049	0.0034	0.0023	0.0010	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.

PLAN SPECIFIC ACTUARIAL ASSUMPTIONS (continued)

California Highway Patrol (continued)

Non-Industrial (Not Job-Related) Death

Rates vary by age and gender. See sample rates in the table below.

Non-Industrial (Not Job-Related) Disability, Industrial (Job-Related) Disability & Industrial (Job-Related) Death

Rates vary by age. See sample rates in the table below.

	Non-Industrial Death		Non-Industrial Disability	Industrial Death	Industrial Disability
Attained Age	Male	Female	Male and Female	Male and Female	Male and Female
20	0.000216	0.000069	0.000100	0.000040	0.000156
25	0.000289	0.000109	0.000100	0.000060	0.000348
30	0.000379	0.000155	0.000100	0.000070	0.000684
35	0.000491	0.000270	0.000100	0.000090	0.001224
40	0.000637	0.000366	0.000100	0.000100	0.002022
45	0.000795	0.000543	0.000200	0.000120	0.003162
50	0.001161	0.000794	0.000200	0.000130	0.012138
55	0.001717	0.001204	0.000200	0.000150	0.054066
60	0.002550	0.001657	0.000200	0.000160	0.204306

Appendix B – Principal Plan Provisions

State Miscellaneous Tier 1

The following is a summary of the major plan provisions for the most representative group used in calculating the liabilities of this plan. Many of the statements in this summary are general in nature and intended to provide a summary of the complex Public Employees' Retirement Law. The law itself governs in all situations.

RETIREMENT PROGRAM

Service Retirement

Eligibility

A CalPERS Classic and Safety PEPRA members become eligible for Service Retirement upon attainment of age 50 with at least 5 years of credited service (total service across all CalPERS employers, and with certain other Retirement Systems with which CalPERS has reciprocity agreements). PEPRA Miscellaneous members become eligible for Service Retirement upon attainment of age 52 with at least five years of service.

Benefit

The Service Retirement benefit calculated for service earned by this group of employees is a monthly allowance equal to the product of the *benefit factor*, *years of service*, and *final compensation*, where

- The *benefit factor* for this group of employees comes from the **2% at 55** benefit factor table. New Classic members hired on or after January 15, 2011 are subject to the **2% at 60** benefit factor table. New PEPRA members hired on or after January 1, 2013 are subject to the **2% at 62** benefit factor table. The factor depends on the member's age at retirement. Listed below are the factors for retirement at whole year ages:

Retirement Age	2% @ 55 Factor	2% @ 60 Factor	2% @ 62 Factor
50	1.100%	1.092%	N/A
51	1.280%	1.156%	N/A
52	1.460%	1.224%	1.000%
53	1.640%	1.296%	1.100%
54	1.820%	1.376%	1.200%
55	2.000%	1.460%	1.300%
59	2.064%	1.552%	1.400%
57	2.126%	1.650%	1.500%
58	2.188%	1.758%	1.600%
59	2.250%	1.874%	1.700%
60	2.314%	2.000%	1.800%
61	2.376%	2.134%	1.900%
62	2.438%	2.272%	2.000%
63	2.500%	2.418%	2.100%
64	2.500%	2.418%	2.200%
65	2.500%	2.418%	2.300%
66	2.500%	2.418%	2.400%
67 & Up	2.500%	2.418%	2.500%

- 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. Any unused sick leave accumulated at the time of retirement will be converted to credited service at the 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 12 consecutive months' full-time equivalent monthly pay (no matter which CalPERS employer paid this compensation). For some new members hired after July 1, 2006 and for all new members hired on or after January 15, 2011, final compensation is based on the monthly average of the member's highest 36 consecutive months' full-time equivalent monthly pay. PEPRA members have a cap on the annual salary that can be used to calculate final compensation for all new members based on the Social Security Contribution and Benefit Base. For employees who participate in Social Security this cap is $118,775 for 2017 and for those employees who do not participate in Social Security the cap for 2017 is $142,530. Adjustments to the caps are permitted annually based on changes to the CPI for All Urban Consumers.
- Employees may or may not be covered by Social Security. For employees covered by Social Security, the final compensation is offset by $133.33 (or by one third if the final compensation is less than $400). For some PEPRA members, the final compensation is not offset.
- The Service Retirement benefit is not capped.

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 Classic and Safety PEPRA members become eligible to receive the deferred retirement benefit upon satisfying the eligibility requirements for Deferred Status and upon attainment of age 50. PEPRA Miscellaneous members become eligible to receive the deferred retirement benefit upon satisfying the eligibility requirements for Deferred Status and upon attainment of age 52.

Benefit

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

Non-Industrial (Non-Job Related) Disability Retirement

Eligibility

A CalPERS member is eligible for Non-Industrial Disability Retirement if he or she becomes disabled and has at least five years of credited service (total service across all PERS employers, and with certain other Retirement Systems with which PERS 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 working with 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.

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.

Post-Retirement Death Benefit

Lump Sum Payment

Upon the death of a retiree, a one-time lump sum payment of $2,000 will be made to the retiree's designated survivor(s), or to the retiree's estate.

Form of Payment for Retirement Allowance

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.

For retirement allowances with respect to service earned by employment in this group, 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. This additional benefit is often referred to as *post retirement survivor allowance* (PRSA) or simply as *survivor continuance*.

In other words, 25 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.

The remaining 75 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

Group Term Life Insurance

Eligibility

An employee's beneficiary (or estate) will receive the Group Term Life Insurance benefit if the member dies while actively employed. A CalPERS member who is no longer actively employed with **any** CalPERS employer is not eligible for this benefit. This benefit is in addition to other pre-retirement death benefits.

Benefit

The benefit is a lump sum payment of $5,000 plus an additional amount equal to 50 percent of the annual compensation earned by the deceased member during the 12 months immediately preceding the member's death. The additional amount shall not be paid if the member is eligible for service retirement or the Alternate Death Benefit.

For members with less than 20 years of service credit and not age-eligible to retire:

Basic Death Benefit

Eligibility
An employee's beneficiary (or estate) may receive the Basic Death benefit if the member dies while actively employed. A CalPERS member who is no longer actively employed with **any** CalPERS employer is not eligible for this benefit. A member's survivor who is eligible for any other pre-retirement death benefit described below may choose to receive that death benefit instead of this Basic Death benefit.

Benefit
The Basic Death Benefit is a lump sum in the amount of the member's accumulated contributions, where interest is credited at the greater of 6 percent or the prevailing discount rate. In addition, a lump sum in the amount of six months' salary shall be paid only if the member is eligible for service retirement or eligible for the Alternate Death Benefit. 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.

For members with more than 20 years of service credit and not age-eligible to retire:
In addition to the above pre-retirement death benefits, members are eligible for:

Alternate Death Benefit

Eligibility
This benefit may be received in lieu of the lump sum Basic Death Benefit if there is a surviving spouse or minor child of the member. The member must have died before reaching the minimum retirement age and must have been credited with at least 20 years of state service.

Benefit
The Alternate Death Benefit is calculated as though the member were the minimum retirement age and elected an optional form of benefit that provided 100 percent continuance to the member's spouse. If the member did not have a spouse at the time of death, one-half of the formula benefit would be paid to the surviving child. If the benefit is payable to a surviving child, the benefit will be discontinued upon death or the attainment of age 18.

For members who are age-eligible to retire:
In addition to the above pre-retirement death benefits, members are eligible for:

1957 Survivor Benefit

Eligibility
An employee's *eligible survivor(s)* may receive the 1957 Survivor benefit if the member dies while actively employed, has attained at least age 50 for Classic and Safety PEPRA members and age 52 for Miscellaneous PEPRA members, 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 or, if there is no eligible spouse, to the member's unmarried children under age 18. A member's survivor may choose this benefit in lieu of the Basic Death benefit or the Optional Settlement 2W Death 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. There is a guarantee that the total amount paid will at least equal the Basic Death benefit.

Optional Settlement 2W Death 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 for Classic and Safety PEPRA members and age 52 for Miscellaneous PEPRA members, 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 may choose this benefit in lieu of the Basic Death benefit or the 1957 Survivor 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. Upon the death of the surviving spouse, the benefit shall be continued to minor children. There is a guarantee that the total amount paid will at least equal the Basic Death Benefit.

Cost-Of-Living Adjustments

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

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 75 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. The total annual outlay for PPPA is limited to 1.1 percent of accumulated member contributions. If this amount of member contributions were insufficient to provide for PPPA payments, the 75 percent target would be proportionately reduced.

State Miscellaneous Tier 1 (continued)

Employee Contributions

Each employee contributes toward his or her retirement based upon one of the following schedules. The employer may choose to "pick-up" these contributions for the employees.

For employees covered by Social Security, the monthly compensation breakpoint is $513 and the contribution schedule is as follows:

The percent contributed below the monthly compensation breakpoint is 0 percent.

The percent contributed above the monthly compensation breakpoint ranges from 5 percent to 10 percent.

There are a small number of employees not covered by Social Security in this plan. For those employees, the monthly compensation breakpoint is $317 and contributions are as follows:

The percent contributed below the monthly compensation breakpoint is 0 percent.

The percent contributed above the monthly compensation breakpoint is 1 percent greater than those covered by Social Security.

For some new PEPRA members, the monthly compensation breakpoint is $0 and contributions are as follows:

The percent contributed below the monthly compensation breakpoint is 0 percent.

The percent contributed above the monthly compensation breakpoint is 6.50 percent.

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

For these benefits, please refer to the 1959 Survivor Report.

State Miscellaneous Tier 2

The following is a summary of the major plan provisions applicable to State Miscellaneous Tier 2 members. Many of the statements in this summary are general in nature and intended to provide an easily understood summary of the complex Public Employees' Retirement Law. The law itself governs in all situations.

RETIREMENT PROGRAM

Tier 2 Members electing Tier 1 benefits

State Miscellaneous Tier 2 members have the right to convert their Tier 2 service to Tier 1 service provided they make up the shortfall in their accumulated contributions with interest. In this valuation, we have assumed that all State Miscellaneous Tier 2 members will elect to convert their Tier 2 service to Tier 1 service.

Service Retirement

Eligibility

A CalPERS member becomes eligible for Service Retirement upon attainment of age 55 with at least 10 years of credited service (total service across all CalPERS employers, and with certain other Retirement Systems with which CalPERS has reciprocity agreements).

Benefit

The Service Retirement benefit calculated for service earned by this group of employees is a monthly allowance equal to the product of the *benefit factor*, *years of service*, and *final compensation*, where

- The *benefit factor* for Classic employees comes from the **1.25% at 65** Tier 2 benefit factor table. New PEPRA members hired on or after January 1, 2013 are subject to the **1.25% at 67** benefit factor table. The factor depends on the member's age at retirement. Listed below are the factors for retirement at whole year ages:

Retirement Age	1.25% @ 65 Tier 2 Factor	1.25% @ 67 Tier 2 Factor
50	0.500%	N/A
51	0.550%	N/A
52	0.600%	0.650%
53	0.650%	0.690%
54	0.700%	0.730%
55	0.750%	0.770%
59	0.800%	0.810%
57	0.850%	0.850%
58	0.900%	0.890%
59	0.950%	0.930%
60	1.000%	0.970%
61	1.050%	1.010%
62	1.100%	1.050%
63	1.150%	1.090%
64	1.200%	1.130%
65	1.250%	1.170%
66	1.250%	1.210%
67 & Up	1.250%	1.250%

- 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. Any unused sick leave accumulated at the time of retirement will be converted to credited service at the 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 12 consecutive months' full-time equivalent monthly pay (no matter which CalPERS employer paid this compensation). For some new members hired after July 1, 2006 and for all new members hired on or after January 15, 2011, final compensation is based on the monthly average of the member's highest 36 consecutive months' full-time equivalent monthly pay. PEPRA members have a cap on the annual salary that can be used to calculate final compensation for all new members based on the Social Security Contribution and Benefit Base. For employees who participate in Social Security this cap is $118,775 for 2017 and for those employees who do not participate in Social Security the cap for 2017 is $142,530. Adjustments to the caps are permitted annually based on changes to the CPI for All Urban Consumers
- Employees may or may not be covered by Social Security. The final compensation is not offset by a dollar amount.
- The Service Retirement benefit is not capped.

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 10 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 55. Members with five years of service before January 1, 1985, are eligible at 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 10 years of credited service (total service across all PERS employers, and with certain other Retirement Systems with which PERS 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 working with any CalPERS employer at the time of disability in order to be eligible for this benefit. Members with five years of service before January 1, 1985 are also eligible.

Benefit
The Non-Industrial Disability Retirement benefit is a monthly allowance equal to 1.125 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 29.628 years of service; or
- Service is CalPERS credited service plus the additional number of years that the member would have worked until age 65, for members with at least 10 years but not more than 29.628 years of service. The maximum benefit in this case is 33 1/3 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.

Post-Retirement Death Benefit

Lump Sum Payment
Upon the death of a retiree, a one-time lump sum payment of $2,000 will be made to the retiree's designated survivor(s), or to the retiree's estate.

Form of Payment for Retirement Allowance

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.

State Miscellaneous Tier 2 (continued)

For retirement allowances with respect to service earned by employment in this group, 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. This additional benefit is often referred to as *post retirement survivor allowance* (PRSA) or simply as *survivor continuance*.

In other words, 25 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.

The remaining 75 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

Group Term Life Insurance

Eligibility
An employee's beneficiary (or estate) will receive the Group Term Life Insurance benefit if the member dies while actively employed. A CalPERS member who is no longer actively employed with **any** CalPERS employer is not eligible for this benefit. This benefit is in addition to other pre-retirement death benefits.

Benefit
The benefit is a lump sum payment of $5,000 plus an additional amount equal to 50 percent of the annual compensation earned by the deceased member during the 12 months immediately preceding the member's death. The additional amount shall not be paid if the member is eligible for service retirement or the Alternate Death Benefit.

For members with less than 20 years of service credit and not age-eligible to retire:

Basic Death Benefit

Eligibility
An employee's beneficiary (or estate) may receive the Basic Death benefit if the member dies while actively employed. A CalPERS member who is no longer actively employed with **any** CalPERS employer is not eligible for this benefit. A member's survivor who is eligible for any other pre-retirement death benefit described below 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 the greater of 6 percent or the prevailing discount rate. In addition, a lump sum in the amount of six months' salary shall be paid only if the member is eligible for service retirement or eligible for the Alternate Death Benefit. 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.

For members with more than 20 years of service credit and not age-eligible to retire:
In addition to the above pre-retirement death benefits, members are eligible for:

Alternate Death Benefit

Eligibility
This benefit may be received in lieu of the lump sum Basic Death Benefit if there is a surviving spouse or minor child of the member. The member must have died before reaching the minimum retirement age and must have been credited with at least 20 years of state service.

Benefit
The Alternate Death Benefit is calculated as though the member were the minimum retirement age and elected an optional form of benefit that provided 100 percent continuance to the member's spouse. If the member did not have a spouse at the time of death, one-half of the formula benefit would be paid to the surviving child. If the benefit is payable to a surviving child, the benefit will be discontinued upon death or the attainment of age 18.

For members who are age-eligible to retire:
In addition to the above pre-retirement death benefits, members are eligible for:

1957 Survivor Benefit

Eligibility
An employee's *eligible survivor(s)* may receive the 1957 Survivor benefit if the member dies while actively employed and has attained retirement eligibility. 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 or, if there is no eligible spouse, to the member's unmarried children under age 18. A member's survivor may choose this benefit in lieu of the Basic Death benefit or the Optional Settlement 2W Death 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. There is a guarantee that the total amount paid will at least equal the Basic Death benefit.

Optional Settlement 2W Death Benefit

Eligibility
An employee's *eligible survivor* may receive the Optional Settlement 2W Death benefit if the member dies while actively employed and has attained retirement eligibility. 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 may choose this benefit in lieu of the Basic Death benefit or the 1957 Survivor 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. Upon the death of the surviving spouse, the benefit shall be continued to minor children. There is a guarantee that the total amount paid will at least equal the Basic Death Benefit.

Cost-of-Living Adjustments

Beginning the second calendar year after the year of retirement, retirement and survivor allowances will be annually adjusted on a compound basis by 3 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 75 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. The total annual outlay for PPPA is limited to 1.1 percent of accumulated member contributions. If this amount of member contributions were insufficient to provide for PPPA payments, the 75 percent target would be proportionately reduced.

Employee Contributions

Each employee contributes toward his or her retirement based upon one of the following schedules. The employer may choose to "pick-up" these contributions for the employees.

The percent contributed above the monthly compensation breakpoint is 3.75 percent.

The monthly compensation breakpoint is $0.

The percent contributed below the monthly compensation breakpoint is 0 percent.

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

For these benefits, please refer to the 1959 Survivor Report.

State Industrial Tier 1

The following is a summary of the major plan provisions for the most representative group used in calculating the liabilities of the plan. Many of the statements in this summary are general in nature and intended to provide an easily understood summary of the complex Public Employees' Retirement Law. The law itself governs in all situations.

RETIREMENT PROGRAM

Service Retirement

Eligibility

A CalPERS Classic and Safety PEPRA members become 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 five years of service.

State Industrial Tier 1 (continued)

Benefit

The Service Retirement benefit calculated for service earned by this group of employees is a monthly allowance equal to the product of the *benefit factor*, *years of service*, and *final compensation*, where

- The *benefit factor* for this group of employees comes from the **2% at 55** benefit factor table. New Classic members hired on or after January 15, 2011 are subject to the **2% at 60** benefit factor table. New PEPRA members hired on or after January 1, 2013 are subject to the **2% at 62** benefit factor table. The factor depends on the member's age at retirement. Listed below are the factors for retirement at whole year ages:

Retirement Age	2% @ 55 Factor	2% @ 60 Factor	2% @ 62 Factor
50	1.100%	1.092%	N/A
51	1.280%	1.156%	N/A
52	1.460%	1.224%	1.000%
53	1.640%	1.296%	1.100%
54	1.820%	1.376%	1.200%
55	2.000%	1.460%	1.300%
59	2.064%	1.552%	1.400%
57	2.126%	1.650%	1.500%
58	2.188%	1.758%	1.600%
59	2.250%	1.874%	1.700%
60	2.314%	2.000%	1.800%
61	2.376%	2.134%	1.900%
62	2.438%	2.272%	2.000%
63	2.500%	2.418%	2.100%
64	2.500%	2.418%	2.200%
65	2.500%	2.418%	2.300%
66	2.500%	2.418%	2.400%
67 & Up	2.500%	2.418%	2.500%

- 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. Any unused sick leave accumulated at the time of retirement will be converted to credited service at the 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 12 consecutive months' full-time equivalent monthly pay (no matter which CalPERS employer paid this compensation). For some new members hired after July 1, 2006 and for all new members hired on or after January 15, 2011, final compensation is based on the monthly average of the member's highest 36 consecutive months' full-time equivalent monthly pay. PEPRA members have a cap on the annual salary that can be used to calculate final compensation for all new members based on the Social Security Contribution and Benefit Base. For employees who participate in Social Security this cap is $118,775 for 2017 and for those employees who do not participate in Social Security the cap for 2017 is $142,530. Adjustments to the caps are permitted annually based on changes to the CPI for All Urban Consumers.
- Employees may or may not be covered by Social Security. For employees covered by Social Security, the final compensation is offset by $133.33 (or by one third if the final compensation is less than $400). For some PEPRA members, the final compensation is not offset.
- The Service Retirement benefit is not capped.

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 Classic and Safety PEPRA members become eligible to receive the deferred retirement benefit upon satisfying the eligibility requirements for Deferred Status and upon attainment of age 50. PEPRA Miscellaneous members become eligible to receive the deferred retirement benefit upon satisfying the eligibility requirements for Deferred Status and upon attainment of age 52.

Benefit

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

Non-Industrial (Non-Job Related) Disability Retirement

Eligibility

A CalPERS member is eligible for Non-Industrial Disability Retirement if he or she becomes disabled and has at least five years of credited service (total service across all PERS employers, and with certain other Retirement Systems with which PERS 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 working with 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.

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.

State Industrial Tier 1 (continued)

Industrial (Job-Related) Disability Retirement

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 in the next paragraph.

Benefit
The Industrial Disability Retirement benefit is a monthly allowance equal to 50 percent of final compensation. However, 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. 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 or annuitization of the accumulated member contributions with respect to employment in this group.

Post-Retirement Death Benefit

Lump Sum Payment
Upon the death of a retiree, a one-time lump sum payment of $2,000 will be made to the retiree's designated survivor(s), or to the retiree's estate.

Form of Payment for Retirement Allowance

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.

For retirement allowances with respect to service earned by employment in this group, 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. This additional benefit is often referred to as *post retirement survivor allowance* (PRSA) or simply as *survivor continuance*.

In other words, 25 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.

The remaining 75 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*.

State Industrial Tier 1 (continued)

Pre-Retirement Death Benefits

Group Term Life Insurance

Eligibility
An employee's beneficiary (or estate) will receive the Group Term Life Insurance benefit if the member dies while actively employed. A CalPERS member who is no longer actively employed with **any** CalPERS employer is not eligible for this benefit. This benefit is in addition to other pre-retirement death benefits.

Benefit
The benefit is a lump sum payment of $5,000 plus an additional amount equal to 50 percent of the annual compensation earned by the deceased member during the 12 months immediately preceding the member's death. The additional amount shall not be paid if the member is eligible for service retirement or the Alternate Death Benefit.

For members with less than 20 years of service credit and not age-eligible to retire:

Basic Death Benefit

Eligibility
An employee's beneficiary (or estate) may receive the Basic Death benefit if the member dies while actively employed. A CalPERS member who is no longer actively employed with **any** CalPERS employer is not eligible for this benefit. A member's survivor who is eligible for any other pre-retirement death benefit described below 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 the greater of 6 percent or the prevailing discount rate. In addition, a lump sum in the amount of six months' salary shall be paid only if the member is eligible for service retirement or eligible for the Alternate Death Benefit. 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.

Special Death Benefit

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

State Industrial Tier 1 (continued)

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

For members with more than 20 years of service credit and not age-eligible to retire:
In addition to the above pre-retirement death benefits, members are eligible for:

Alternate Death Benefit

Eligibility
This benefit may be received in lieu of the lump sum Basic Death Benefit if there is a surviving spouse or minor child of the member. The member must have died before reaching the minimum retirement age and must have been credited with at least 20 years of state service.

Benefit
The Alternate Death Benefit is calculated as though the member were the minimum retirement age and elected an optional form of benefit that provided 100 percent continuance to the member's spouse. If the member did not have a spouse at the time of death, one-half of the formula benefit would be paid to the surviving child. If the benefit is payable to a surviving child, the benefit will be discontinued upon death or the attainment of age 18.

For members who are age-eligible to retire:
In addition to the above pre-retirement death benefits, members are eligible for:

1957 Survivor Benefit

Eligibility
An employee's *eligible survivor(s)* may receive the 1957 Survivor benefit if the member dies while actively employed, has attained at least age 50 for Classic and Safety PEPRA members and age 52 for Miscellaneous PEPRA members, 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 or, if there is no eligible spouse, to the member's unmarried children under age 18. A member's survivor may choose this benefit in lieu of the Basic Death benefit or the Special Death 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. There is a guarantee that the total amount paid will at least equal the Basic Death benefit.

Optional Settlement 2W Death 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 for Classic and Safety PEPRA members and age 52 for Miscellaneous PEPRA members, 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 may choose this benefit in lieu of the Basic Death benefit or the 1957 Survivor 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. Upon the death of the surviving spouse, the benefit shall be continued to minor children. There is a guarantee that the total amount paid will at least equal the Basic Death Benefit.

Cost-of-Living Adjustments

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

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 75 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. The total annual outlay for PPPA is limited to 1.1 percent of accumulated member contributions. If this amount of member contributions were insufficient to provide for PPPA payments, the 75 percent target would be proportionately reduced.

Employee Contributions

Each employee contributes toward his or her retirement based upon one of the following schedules. The employer may choose to "pick-up" these contributions for the employees.

For employees covered by Social Security, the monthly compensation breakpoint is $513 and the contribution schedule is as follows:

The percent contributed below the monthly compensation breakpoint is 0 percent.

The percent contributed above the monthly compensation breakpoint is ranges from 9 percent to 10 percent.

There are a small number of employees not covered by Social Security in this plan. For those employees, the monthly compensation breakpoint is $317 and contributions are as follows:

The percent contributed below the monthly compensation breakpoint is 0 percent.

The percent contributed above the monthly compensation breakpoint is 1 percent greater than those covered by Social Security.

State Industrial Tier 1 (continued)

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

For these benefits, please refer to the 1959 Survivor Report.

State Industrial Tier 2

The following is a summary of the major plan provisions applicable to State Industrial Tier 2 Members. 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.

RETIREMENT PROGRAM

Tier 2 Members Electing Tier 1 Benefits

State Industrial Tier 2 members have the right to convert their Tier 2 service to Tier 1 service provided that they make up the shortfall in their accumulated contributions with interest. In this valuation, we have assumed that all Stat Industrial Tier 2 members will elect to convert their Tier 2 service to Tier 1 service.

Service Retirement

Eligibility

A CalPERS member becomes eligible for Service Retirement upon attainment of age 55 with at least 10 years of credited service (total service across all CalPERS employers, and with certain other Retirement Systems with which CalPERS has reciprocity agreements). Members with 5 years of service before January 1, 1985 are also eligible.

State Industrial Tier 2 (continued)

Benefit

The Service Retirement benefit calculated for service earned by this group of employees is a monthly allowance equal to the product of the *benefit factor*, *years of service*, and *final compensation*, where

- The benefit factor for Classic employees comes from the **1.25% at 65** Tier 2 benefit factor table. New PEPRA members hired on or after January 1, 2013 are subject to the **1.25% at 67** benefit factor table. The factor depends on the member's age at retirement. Listed below are the factors for retirement at whole year ages:

Retirement Age	1.25% @ 65 Tier 2 Factor	1.25% @ 67 Tier 2 Factor
50	0.500%	N/A
51	0.550%	N/A
52	0.600%	0.650%
53	0.650%	0.690%
54	0.700%	0.730%
55	0.750%	0.770%
59	0.800%	0.810%
57	0.850%	0.850%
58	0.900%	0.890%
59	0.950%	0.930%
60	1.000%	0.970%
61	1.050%	1.010%
62	1.100%	1.050%
63	1.150%	1.090%
64	1.200%	1.130%
65	1.250%	1.170%
66	1.250%	1.210%
67 & Up	1.250%	1.250%

- 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. Any unused sick leave accumulated at the time of retirement will be converted to credited service at the 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 12 consecutive months' full-time equivalent monthly pay (no matter which CalPERS employer paid this compensation). For some new members hired after July 1, 2006 and for all new members hired on or after January 15, 2011, final compensation is based on the monthly average of the member's highest 36 consecutive months' full-time equivalent monthly pay. PEPRA members have a cap on the annual salary that can be used to calculate final compensation for all new members based on the Social Security Contribution and Benefit Base. For employees who participate in Social Security this cap is $118,775 for 2017 and for those employees who do not participate in Social Security the cap for 2017 is $142,530. Adjustments to the caps are permitted annually based on changes to the CPI for All Urban Consumers.
- The employees in this group may or may not be covered by Social Security. The final compensation is not offset by a dollar amount.
- The Service Retirement benefit is not capped.

State Industrial Tier 2 (continued)

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 10 years of credited service (total service across all CalPERS employers, and with certain other Retirement Systems with which CalPERS has reciprocity agreements). Members with five years of service before January 1, 1985 are also eligible.

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 55. Members with five years of service before January 1, 1985 are eligible at 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 10 years of credited service (total service across all PERS employers, and with certain other Retirement Systems with which PERS 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 working with any CalPERS employer at the time of disability in order to be eligible for this benefit. Members with five years of service before January 1, 1985 are also eligible.

Benefit
The Non-Industrial Disability Retirement benefit is a monthly allowance equal to 1.125 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 29.628 years of service; or
- *service* is CalPERS credited service plus the additional number of years that the member would have worked until age 65, for members with at least 10 years but not more than 29.628 years of service. The maximum benefit in this case is 33 1/3 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.

State Industrial Tier 2 (continued)

Industrial (Job-Related) Disability Retirement

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 in the next paragraph.

Benefit
The Industrial Disability Retirement benefit is a monthly allowance equal to 50 percent of final compensation. However, 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. 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 or annuitization of the accumulated member contributions with respect to employment in this group.

Post-Retirement Death Benefit

Lump Sum Payment
Upon the death of a retiree, a one-time lump sum payment of $2,000 will be made to the retiree's designated survivor(s), or to the retiree's estate.

Form of Payment for Retirement Allowance

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.

For retirement allowances with respect to service earned by employment in this group, 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. This additional benefit is often referred to as post retirement survivor allowance (PRSA) or simply as *survivor continuance*.

In other words, 25 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.

The remaining 75 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*.

State Industrial Tier 2 (continued)

Pre-Retirement Death Benefits

Group Term Life Insurance

Eligibility
An employee's beneficiary (or estate) will receive the Group Term Life Insurance benefit if the member dies while actively employed. A CalPERS member who is no longer actively employed with **any** CalPERS employer is not eligible for this benefit. This benefit is in addition to other pre-retirement death benefits.

Benefit
The benefit is a lump sum payment of $5,000 plus an additional amount equal to 50 percent of the annual compensation earned by the deceased member during the 12 months immediately preceding the member's death. The additional amount shall not be paid if the member is eligible for service retirement or the Alternate Death Benefit.

For members with less than 20 years of service credit and not age-eligible to retire:

Basic Death Benefit

Eligibility
An employee's beneficiary (or estate) may receive the Basic Death benefit if the member dies while actively employed. A CalPERS member who is no longer actively employed with **any** CalPERS employer is not eligible for this benefit. A member's survivor who is eligible for any other pre-retirement death benefit described below 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 the greater of 6 percent or the prevailing discount rate. In addition, a lump sum in the amount of six months' salary shall be paid only if the member is eligible for service retirement or eligible for the Alternate Death Benefit. 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.

Special Death Benefit

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

State Industrial Tier 2 (continued)

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

For members with more than 20 years of service credit and not age-eligible to retire:

In addition to the above pre-retirement death benefits, members are eligible for:

Alternate Death Benefit

Eligibility

This benefit may be received in lieu of the lump sum Basic Death Benefit if there is a surviving spouse or minor child of the member. The member must have died before reaching the minimum retirement age and must have been credited with at least 20 years of state service.

Benefit

The Alternate Death Benefit is calculated as though the member were the minimum retirement age and elected an optional form of benefit that provided 100 percent continuance to the member's spouse. If the member did not have a spouse at the time of death, one-half of the formula benefit would be paid to the surviving child. If the benefit is payable to a surviving child, the benefit will be discontinued upon death or the attainment of age 18.

For members who are age-eligible to retire:

In addition to the above pre-retirement death benefits, members are eligible for:

1957 Survivor Benefit

Eligibility

An employee's *eligible survivor(s)* may receive the 1957 Survivor benefit if the member dies while actively employed and has attained retirement eligibility. 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 or, if there is no eligible spouse, to the member's unmarried children under age 18. A member's survivor may choose this benefit in lieu of the Basic Death benefit or the Special Death 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. There is a guarantee that the total amount paid will at least equal the Basic Death benefit.

State Industrial Tier 2 (continued)

Optional Settlement 2W Death Benefit

Eligibility

An employee's *eligible survivor* may receive the Optional Settlement 2W Death benefit if the member dies while actively employed and has attained retirement eligibility. 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 may choose this benefit in lieu of the Basic Death benefit or the 1957 Survivor 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. Upon the death of the surviving spouse, the benefit shall be continued to minor children. There is a guarantee that the total amount paid will at least equal the Basic Death Benefit.

Cost-of-Living Adjustments

Beginning the second calendar year after the year of retirement, retirement and survivor allowances will be annually adjusted on a compound basis by 3 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 75 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. The total annual outlay for PPPA is limited to 1.1 percent of accumulated member contributions. If this amount of member contributions were insufficient to provide for PPPA payments, the 75 percent target would be proportionately reduced.

Employee Contributions

Each employee contributes toward his or her retirement based upon one of the following schedules. The employer may choose to "pick-up" these contributions for the employees.

The percent contributed above the monthly compensation breakpoint is 3.75 percent.

The monthly compensation breakpoint is $0.

The percent contributed below the monthly compensation breakpoint is 0 percent.

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

For these benefits, please refer to the 1959 Survivor Report.

State Safety

The following is a summary of the major plan provisions for the most representative group used in calculating the liabilities of the plan. 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.

RETIREMENT PROGRAM

Service Retirement

Eligibility

A CalPERS Classic and Safety PEPRA members become 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 five years of service.

Benefit

The Service Retirement benefit calculated for service earned by this group of employees is a monthly allowance equal to the product of the *benefit factor*, *years of service*, and *final compensation*, where

- The *benefit factor* for this group of employees comes from the **2.5% at 55** Safety benefit factor table. New Classic members hired on or after January 15, 2011 are subject to either the **2.5% at 60** Safety or the **2% at 55** Safety benefit factor table. New PEPRA members hired on or after January 1, 2013 are subject to the **2% at 57** benefit factor table. The factor depends on the member's age at retirement. Listed below are the factors for retirement at whole year ages:

Retirement Age	2.5% @ 55 Factor	2.5% @ 60 Factor	2% @ 55 Factor	2% @ 57 Factor
50	1.700%	1.426%	1.426%	1.426%
51	1.800%	1.522%	1.522%	1.508%
52	1.900%	1.628%	1.628%	1.590%
53	2.000%	1.742%	1.742%	1.672%
54	2.250%	1.866%	1.866%	1.754%
55	2.500%	2.000%	2.000%	1.836%
59	2.500%	2.100%	2.000%	1.918%
57	2.500%	2.200%	2.000%	2.000%
58	2.500%	2.300%	2.000%	2.000%
59	2.500%	2.400%	2.000%	2.000%
60 & Up	2.500%	2.500%	2.000%	2.000%

- 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. Any unused sick leave accumulated at the time of retirement will be converted to credited service at the 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 12 consecutive months' full-time equivalent monthly pay (no matter which CalPERS employer paid this compensation). For some new members hired after July 1, 2006 and for all new members hired on or after January 15, 2011, final compensation is based on the monthly average of the member's highest 36 consecutive months' full-time equivalent monthly pay. PEPRA members have a cap on the annual salary that can be used to calculate final compensation for all new members based on the Social Security Contribution and Benefit Base. For employees who participate in Social Security this cap is $118,775 for 2017 and for those employees who do not participate in Social Security the cap for 2017 is $142,530. Adjustments to the caps are permitted annually based on changes to the CPI for All Urban Consumers.
- The employees in this group are not covered by Social Security. The final compensation is not offset by a dollar amount.
- The Service Retirement benefit is capped at 80 percent of final compensation.

State Safety (continued)

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 Classic and Safety PEPRA members become eligible to receive the deferred retirement benefit upon satisfying the eligibility requirements for Deferred Status and upon attainment of age 50. PEPRA Miscellaneous members become eligible to receive the deferred retirement benefit upon satisfying the eligibility requirements for Deferred Status and upon attainment of age 52.

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

Non-Industrial (Non-Job Related) Disability Retirement

Eligibility
A CalPERS member is eligible for Non-Industrial Disability Retirement if he or she becomes disabled and has at least five years of credited service (total service across all PERS employers, and with certain other Retirement Systems with which PERS 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 working with 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.

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.

State Safety (continued)

Industrial (Job-Related) Disability Retirement

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 in the next paragraph.

Benefit
The Industrial Disability Retirement benefit is a monthly allowance equal to 50 percent of final compensation. However, 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. 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 or annuitization of the accumulated member contributions with respect to employment in this group.

Post-Retirement Death Benefit

Lump Sum Payment
Upon the death of a retiree, a one-time lump sum payment of $2,000 will be made to the retiree's designated survivor(s), or to the retiree's estate.

Form of Payment for Retirement Allowance

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.

For retirement allowances with respect to service earned by employment in this group, 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*.

In other words, 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.

The remaining 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*.

State Safety (continued)

Pre-Retirement Death Benefits

Group Term Life Insurance

Eligibility
An employee's beneficiary (or estate) will receive the Group Term Life Insurance benefit if the member dies while actively employed. A CalPERS member who is no longer actively employed with **any** CalPERS employer is not eligible for this benefit. This benefit is in addition to other pre-retirement death benefits.

Benefit
The benefit is a lump sum payment of $5,000 plus an additional amount equal to 50 percent of the annual compensation earned by the deceased member during the 12 months immediately preceding the member's death. The additional amount shall not be paid if the member is eligible for service retirement or the Alternate Death Benefit.

For members with less than 20 years of service credit and not age-eligible to retire:

Basic Death Benefit

Eligibility
An employee's beneficiary (or estate) may receive the Basic Death benefit if the member dies while actively employed. A CalPERS member who is no longer actively employed with **any** CalPERS employer is not eligible for this benefit. A member's survivor who is eligible for any other pre-retirement death benefit described below 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 the greater of 6 percent or the prevailing discount rate. In addition, a lump sum in the amount of six months' salary shall be paid only if the member is eligible for service retirement or eligible for the Alternate Death Benefit. 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.

Special Death Benefit

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

State Safety (continued)

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

For members with more than 20 years of service credit and not age-eligible to retire:
In addition to the above pre-retirement death benefits, members are eligible for:

Alternate Death Benefit

Eligibility
This benefit may be received in lieu of the lump sum Basic Death Benefit if there is a surviving spouse or minor child of the member. The member must have died before reaching the minimum retirement age and must have been credited with at least 20 years of state service.

Benefit
The Alternate Death Benefit is calculated as though the member were the minimum retirement age and elected an optional form of benefit that provided 100 percent continuance to the member's spouse. If the member did not have a spouse at the time of death, one-half of the formula benefit would be paid to the surviving child. If the benefit is payable to a surviving child, the benefit will be discontinued upon death or the attainment of age 18.

For members who are age-eligible to retire:
In addition to the above pre-retirement death benefits, members are eligible for:

1957 Survivor Benefit

Eligibility
An employee's *eligible survivor(s)* may receive the 1957 Survivor benefit if the member dies while actively employed, has attained at least age 50 for Classic and Safety PEPRA members and age 52 for Miscellaneous PEPRA members, 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 or, if there is no eligible spouse, to the member's unmarried children under age 18. A member's survivor may choose this benefit in lieu of the Basic Death benefit or the Special Death 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. There is a guarantee that the total amount paid will at least equal the Basic Death benefit.

Optional Settlement 2W Death 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 for Classic and Safety PEPRA members and age 52 for Miscellaneous PEPRA members, 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 may choose this benefit in lieu of the Basic Death benefit or the 1957 Survivor 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. Upon the death of the surviving spouse, the benefit shall be continued to minor children. There is a guarantee that the total amount paid will at least equal the Basic Death Benefit.

Cost-of-Living Adjustments

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

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 75 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. The total annual outlay for PPPA is limited to 1.1 percent of accumulated member contributions. If this amount of member contributions were insufficient to provide for PPPA payments, the 75 percent target would be proportionately reduced.

Employee Contributions

Each employee contributes toward his or her retirement based upon the following schedule. The employer may choose to "pick-up" these contributions for the employees.

The active population is subject to the following schedule:

The percent contributed below the monthly compensation breakpoint is 0 percent.

The monthly compensation breakpoint is $317.

The percent contributed above the monthly compensation breakpoint is 11 percent.

State Safety (continued)

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

For these benefits, please refer to the 1959 Survivor Report.

State Peace Officers and Firefighters

The following is a summary of the major plan provisions for the most representative group used in calculating the liabilities of this plan. 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.

RETIREMENT PROGRAM

Service Retirement

Eligibility

A CalPERS Classic and Safety PEPRA members become 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 five years of service.

Benefit

The Service Retirement benefit calculated for service earned by this group of employees is a monthly allowance equal to the product of the *benefit factor*, *years of service*, and *final compensation*, where

- The *benefit factor* for this group of employees comes from either the **3% at 55** or the **3% at 50** benefit factor table. New Classic members, except firefighters, hired on or after January 15, 2011 are subject to the **2.5% at 55** Safety benefit factor table. New Classic firefighters hired on or after October 31, 2010 are subject to the **3% at 55** benefit factor table. The factor depends on the member's age at retirement. New PEPRA members hired on or after January 1, 2013 are subject to the **2.5% at 57** or **2.7% at 57** benefit factor table. Listed below are the factors for retirement at whole year ages:

Retirement Age	3% @ 50 Factor	3% @ 55 Factor	2.5% @ 55 Factor	2.5% @ 57 Factor	2.7% @ 57 Factor
50	3.000%	2.400%	2.000%	2.000%	2.000%
51	3.000%	2.520%	2.100%	2.071%	2.100%
52	3.000%	2.640%	2.200%	2.143%	2.200%
53	3.000%	2.760%	2.300%	2.214%	2.300%
54	3.000%	2.880%	2.400%	2.286%	2.400%
55	3.000%	3.000%	2.500%	2.357%	2.500%
59	3.000%	3.000%	2.500%	2.429%	2.600%
57 & Up	3.000%	3.000%	2.500%	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. Any unused sick leave accumulated at the time of retirement will be converted to credited service at the 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 12 consecutive months' full-time equivalent monthly pay (no matter which CalPERS employer paid this compensation). For some new members hired after January 1, 2007 and for all new members hired on or after January 15, 2011, final compensation is based on the monthly average of the member's highest 36 consecutive months' full-time equivalent monthly pay. PEPRA members have a cap on the annual salary that can be used to calculate final compensation for all new members based on the Social Security Contribution and Benefit Base. For employees who participate in Social Security this cap is $118,775 for 2017 and for those employees who do not participate in Social Security the cap for 2017 is $142,530. Adjustments to the caps are permitted annually based on changes to the CPI for All Urban Consumers.
- The employees in this group are not covered by Social Security. The final compensation is not offset by a dollar amount.
- The Service Retirement benefit is capped at 90 percent of final compensation.

Vested Deferred Retirement

Eligibility for Deferred Status

A CalPERS member becomes eligible for a deferred vested retirement benefit when he or she leaves employment, keeps his or her contribution account balance on deposit with CalPERS, **and** has earned at least 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 Classic and Safety PEPRA members become eligible to receive the deferred retirement benefit upon satisfying the eligibility requirements for Deferred Status and upon attainment of age 50. PEPRA Miscellaneous members become eligible to receive the deferred retirement benefit upon satisfying the eligibility requirements for Deferred Status and upon attainment of age 52.

Benefit

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

Non-Industrial (Non-Job Related) Disability Retirement

Eligibility

A CalPERS member is eligible for Non-Industrial Disability Retirement if he or she becomes *disabled* and has at least five years of credited service (total service across all PERS employers, and with certain other Retirement Systems with which PERS 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 working with 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.

State Peace Officers and Firefighters (continued)

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

Industrial (Job-Related) Disability Retirement

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 in the next paragraph.

Benefit

The Industrial Disability Retirement benefit is a monthly allowance equal to 50 percent of final compensation. However, 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. 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 or annuitization of the accumulated member contributions with respect to employment in this group.

Post-Retirement Death Benefit

Lump Sum Payment

Upon the death of a retiree, a one-time lump sum payment of $2,000 will be made to the retiree's designated survivor(s), or to the retiree's estate.

Form of Payment for Retirement Allowance

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.

For retirement allowances with respect to service earned by employment in this group, 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*. In other words, 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.

The remaining 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

Group Term Life Insurance

Eligibility
An employee's beneficiary (or estate) will receive the Group Term Life Insurance benefit if the member dies while actively employed. A CalPERS member who is no longer actively employed with **any** CalPERS employer is not eligible for this benefit. This benefit is in addition to other pre-retirement death benefits.

Benefit
The benefit is a lump sum payment of $5,000 plus an additional amount equal to 50 percent of the annual compensation earned by the deceased member during the 12 months immediately preceding the member's death. The additional amount shall not be paid if the member is eligible for service retirement or the Alternate Death Benefit.

For members with less than 20 years of service credit and not age-eligible to retire:

Basic Death Benefit

Eligibility
An employee's beneficiary (or estate) may receive the Basic Death benefit if the member dies while actively employed. A CalPERS member who is no longer actively employed with **any** CalPERS employer is not eligible for this benefit. A member's survivor who is eligible for any other pre-retirement death benefit described below 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 the greater of 6 percent or the prevailing discount rate. In addition, a lump sum in the amount of six months' salary shall be paid only if the member is eligible for service retirement or eligible for the Alternate Death Benefit. 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.

Special Death Benefit

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

State Peace Officers and Firefighters (continued)

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

For members with more than 20 years of service credit and not age-eligible to retire:
In addition to the above pre-retirement death benefits, members are eligible for:

Alternate Death Benefit

Eligibility
This benefit may be received in lieu of the lump sum Basic Death Benefit if there is a surviving spouse or minor child of the member. The member must have died before reaching the minimum retirement age and must have been credited with at least 20 years of state service.

Benefit
The Alternate Death Benefit is calculated as though the member were the minimum retirement age and elected an optional form of benefit that provided 100 percent continuance to the member's spouse. If the member did not have a spouse at the time of death, one-half of the formula benefit would be paid to the surviving child. If the benefit is payable to a surviving child, the benefit will be discontinued upon death or the attainment of age 18.

For members who are age-eligible to retire:
In addition to the above pre-retirement death benefits, members are eligible for:

1957 Survivor Benefit

Eligibility
An employee's *eligible survivor(s)* may receive the 1957 Survivor benefit if the member dies while actively employed, has attained at least age 50 for Classic and Safety PEPRA members and age 52 for Miscellaneous PEPRA members, 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 or, if there is no eligible spouse, to the member's unmarried children under age 18. A member's survivor may choose this benefit in lieu of the Basic Death benefit or the Special Death 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. There is a guarantee that the total amount paid will at least equal the Basic Death benefit.

Optional Settlement 2W Death 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 for Classic and Safety PEPRA members and age 52 for Miscellaneous PEPRA members, 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 may choose this benefit in lieu of the Basic Death benefit or the 1957 Survivor 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. Upon the death of the surviving spouse, the benefit shall be continued to minor children. There is a guarantee that the total amount paid will at least equal the Basic Death Benefit.

Cost-of-Living Adjustments

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

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 75 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. The total annual outlay for PPPA is limited to 1.1 percent of accumulated member contributions. If this amount of member contributions were insufficient to provide for PPPA payments, the 75 percent target would be proportionately reduced.

Employee Contributions

Each employee contributes toward his or her retirement based upon one of the following schedules. The employer may choose to "pick-up" these contributions for the employees.

The active population has a monthly compensation breakpoint ranging from $513 to $863 and is subject to the following schedule:

The percent contributed below the monthly compensation breakpoint is 0 percent.

The percent contributed above the monthly compensation breakpoint is 13 percent.

A small portion of the active population has a monthly compensation breakpoint of $238 and is subject to the following schedule:

The percent contributed below the monthly compensation breakpoint is 0 percent.

The percent contributed above the monthly compensation breakpoint is 8 percent.

State Peace Officers and Firefighters (continued)

For some new PEPRA members, the monthly compensation breakpoint is $0 and contributions are as follows:

The percent contributed below the monthly compensation breakpoint is 0 percent.

The percent contributed above the monthly compensation breakpoint is 11 percent.

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

For these benefits, please refer to the 1959 Survivor Report.

California Highway Patrol

The following is a summary of the major plan provisions used in calculating the liabilities of the plan. 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.

RETIREMENT PROGRAM

Service Retirement

Eligibility

A CalPERS Classic and Safety PEPRA members become 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 five years of service.

Benefit

The Service Retirement benefit calculated for service earned by this group of employees is a monthly allowance equal to the product of the *benefit factor*, *years of service*, and *final compensation*, where

- The *benefit factor* for this group of employees is **3% at 50**. New Classic members hired on or after October 31, 2010 are subject to the **3% at 55** benefit factor table. New PEPRA members hired on or after January 1, 2013 are subject to the **2.7% at 57** benefit factor table.

Retirement Age	3% @ 50 Factor	3% @ 55 Factor	2.7% @ 57 Factor
50	3.000%	2.400%	2.000%
51	3.000%	2.520%	2.100%
52	3.000%	2.640%	2.200%
53	3.000%	2.760%	2.300%
54	3.000%	2.880%	2.400%
55	3.000%	3.000%	2.500%
59	3.000%	3.000%	2.600%
57 & Up	3.000%	3.000%	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 including service at the CHP Academy for graduating members). 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. Any unused sick leave accumulated at the time of retirement will be converted to credited service at the rate of 0.004 years of service for each day of sick leave.

California Highway Patrol (continued)

- The *final compensation* is the monthly average of the member's highest 12 consecutive months' full-time equivalent monthly pay (no matter which CalPERS employer paid this compensation). The *final compensation* for an employee hired on or after October 31, 2010 is the monthly average of the member's highest 36 consecutive months' full-time equivalent monthly pay. PEPRA members have a cap on the annual salary that can be used to calculate final compensation for all new members based on the Social Security Contribution and Benefit Base. For employees who participate in Social Security this cap is $118,775 for 2017 and for those employees who do not participate in Social Security the cap for 2017 is $142,530. Adjustments to the caps are permitted annually based on changes to the CPI for All Urban Consumers.
- The employees in this group are not covered by Social Security. The final compensation is not offset by a dollar amount.
- The Service Retirement benefit is capped at 90 percent of final compensation.

Vested Deferred Retirement

Eligibility for Deferred Status

A CalPERS member becomes eligible for a deferred vested retirement benefit when he or she leaves employment, keeps his or her contribution account balance on deposit with CalPERS, **and** has earned at least 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 Classic and Safety PEPRA members become eligible to receive the deferred retirement benefit upon satisfying the eligibility requirements for Deferred Status and upon attainment of age 50. PEPRA Miscellaneous members become eligible to receive the deferred retirement benefit upon satisfying the eligibility requirements for Deferred Status and upon attainment of age 52.

Benefit

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

Non-Industrial (Non-Job Related) Disability Retirement

Eligibility

A CalPERS member is eligible for Non-Industrial Disability Retirement if he or she becomes *disabled* and has at least five years of credited service (total service across all PERS employers, and with certain other Retirement Systems with which PERS 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 working with 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.

California Highway Patrol (continued)

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

Industrial (Job-Related) Disability Retirement

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 in the next paragraph.

Benefit

The Industrial Disability Retirement benefit is a monthly allowance equal to 50 percent of final compensation. For members who, as a result of a single event, incur serious bodily injury, the benefit provided is equal to the greater of 50 percent of final compensation, or, three percent of final compensation multiplied by the number of years of service credited to the member, plus an annuity purchased with the accumulated additional contributions, if any. However, 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, plus an annuity purchased with the accumulated additional contributions, if any. 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 or annuitization of the accumulated member contributions with respect to employment in this group.

Post-Retirement Death Benefit

Lump Sum Payment

Upon the death of a retiree, a one-time lump sum payment of $2,000 will be made to the retiree's designated survivor(s), or to the retiree's estate.

Form of Payment for Retirement Allowance

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.

For retirement allowances with respect to service earned by employment in this group, 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*.

In other words, 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.

The remaining 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.

California Highway Patrol (continued)

Pre-Retirement Death Benefits

Group Term Life Insurance

Eligibility
An employee's beneficiary (or estate) will receive the Group Term Life Insurance benefit if the member dies while actively employed. A CalPERS member who is no longer actively employed with **any** CalPERS employer is not eligible for this benefit. This benefit is in addition to other pre-retirement death benefits.

Benefit
The benefit is a lump sum payment of $5,000 plus an additional amount equal to 50 percent of the annual compensation earned by the deceased member during the 12 months immediately preceding the member's death. The additional amount shall not be paid if the member is eligible for service retirement or the Alternate Death Benefit.

For members with less than 20 years of service credit and not age-eligible to retire:

Basic Death Benefit

Eligibility
An employee's beneficiary (or estate) may receive the Basic Death benefit if the member dies while actively employed. A CalPERS member who is no longer actively employed with **any** CalPERS employer is not eligible for this benefit. A member's survivor who is eligible for any other pre-retirement death benefit described below 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 the greater of 6 percent or the prevailing discount rate. In addition, a lump sum in the amount of six months' salary shall be paid only if the member is eligible for service retirement or eligible for the Alternate Death Benefit. 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.

Special Death Benefit

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

California Highway Patrol (continued)

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

For members with more than 20 years of service credit and not age-eligible to retire:
In addition to the above pre-retirement death benefits, members are eligible for:

Alternate Death Benefit

Eligibility
This benefit may be received in lieu of the lump sum Basic Death Benefit if there is a surviving spouse or minor child of the member. The member must have died before reaching the minimum retirement age and must have been credited with at least 20 years of state service.

Benefit
The Alternate Death Benefit is calculated as though the member were the minimum retirement age and elected an optional form of benefit that provided 100 percent continuance to the member's spouse. If the member did not have a spouse at the time of death, one-half of the formula benefit would be paid to the surviving child. If the benefit is payable to a surviving child, the benefit will be discontinued upon death or the attainment of age 18.

For members who are age-eligible to retire:
In addition to the above pre-retirement death benefits, members are eligible for:

1957 Survivor Benefit

Eligibility
An employee's *eligible survivor(s)* may receive the 1957 Survivor benefit if the member dies while actively employed, has attained at least age 50 for Classic and Safety PEPRA members and age 52 for Miscellaneous PEPRA members, 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 or, if there is no eligible spouse, to the member's unmarried children under age 18. A member's survivor may choose this benefit in lieu of the Basic Death benefit or the Special Death 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. There is a guarantee that the total amount paid will at least equal the Basic Death benefit.

Optional Settlement 2W Death 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 for Classic and Safety PEPRA members and age 52 for Miscellaneous PEPRA members, 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 may choose this benefit in lieu of the Basic Death benefit or the 1957 Survivor 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. Upon the death of the surviving spouse, the benefit shall be continued to minor children. There is a guarantee that the total amount paid will at least equal the Basic Death Benefit.

Cost-of-Living Adjustments

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

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 75 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. The total annual outlay for PPPA is limited to 1.1 percent of accumulated member contributions. If this amount of member contributions were insufficient to provide for PPPA payments, the 75 percent target would be proportionately reduced.

Employee Contributions

Each employee contributes toward his or her retirement based upon the following schedule. The employer may choose to "pick-up" these contributions for the employees.

The percent contributed below the monthly compensation breakpoint is 0 percent.

The monthly compensation breakpoint is $863.

The percent contributed above the monthly compensation breakpoint is 11.5 percent.

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

For these benefits, please refer to the 1959 Survivor Report.

Appendix C – Participant Data

Source of Participant Information

The data was extracted from various databases within CalPERS and placed in a data warehouse 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

Once the information is extracted from the various computer systems into the data warehouse, update queries are then run against this 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. It is not specific to the State plans.

Checks on the data included:

- 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,
- Comparison 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, such as dates of hire and dates of entry being adjusted to be consistent with the service fields, the date of birth and each other.

Data Statement

The data does not contain information about reciprocal systems and hence salary information for terminated participants covered by reciprocal systems may not be up to date. This situation is not expected to have a material impact on the employer contribution rates since the total present value for all terminated participants represents less than 2 percent of the present value of benefits for all members. We are unaware of any other data issues that would have a material effect on the results of this valuation.

It is our opinion that, after the adjustments noted above, the participant data was sufficient and reliable for the purposes of the valuation.

Reconciliation of Participants

State Miscellaneous Tier 1 – For the Fiscal Year Ending June 30, 2017

	Active	Transfer	Terminated	Receiving	Total
As of June 30, 2016	166,569	27,229	53,247	180,318	427,363
Retirements	(6,136)	(1,043)	(604)	7,783	-
Industrial Disabilities	-	(32)	-	32	-
Non-Industrial Disabilities	(242)	(25)	(30)	297	-
Deaths[1]	(239)	(40)	(528)	(6,148)	(6,955)
New Survivors	n/a	n/a	n/a	1,792	1,792
Non-Vested Terminations[2]	(4,408)	(951)	5,360	(1)	-
Vested Terminations	(848)	(283)	1,133	(2)	-
Refunds of Contributions	(677)	(72)	(790)	-	(1,539)
Transfers	(2,482)	3,263	(746)	(35)	-
Redeposits/Rehires	1,757	(583)	(1,111)	(63)	-
First Year in Status	15,203	738	1,001	483	17,425
Moved from Tier 2	178	526	59	76	839
Data Corrections[3]	(347)	(904)	(419)	(78)	(1,748)
As of June 30, 2017	168,328	27,823	56,572	184,454	437,177

(1) Includes both deaths without survivors and deaths with survivors receiving a benefit
(2) Includes non-vested terminated participants with employee contributions left in the plan.
(3) May include the combining of data records into a single record.

State Miscellaneous Tier 2 – For the Fiscal Year Ending June 30, 2017

	Active	Transfer	Terminated	Receiving	Total
As of June 30, 2016	4,417	9,557	1,607	6,064	21,645
Retirements	(45)	(172)	(75)	292	-
Industrial Disabilities	-	(1)	-	1	-
Non-Industrial Disabilities	(7)	(13)	(4)	24	-
Deaths[1]	(19)	(19)	(54)	(208)	(300)
New Survivors	n/a	n/a	n/a	62	62
Non-Vested Terminations[2]	(31)	(191)	222	-	-
Vested Terminations	(24)	(22)	46	-	-
Refunds of Contributions	(5)	(6)	(38)	-	(49)
Transfers	(228)	395	(161)	(6)	-
Redeposits/Rehires	88	(78)	(10)	-	-
First Year in Status	124	123	85	43	375
Moved from Tier 1	(178)	(526)	(59)	(76)	(839)
Data Corrections[3]	(55)	(29)	(25)	43	(66)
As of June 30, 2017	4,037	9,018	1,534	6,239	20,828

(1) Includes both deaths without survivors and deaths with survivors receiving a benefit
(2) Includes non-vested terminated participants with employee contributions left in the plan.
(3) May include the combining of data records into a single record.

Reconciliation of Participants (continued)

State Industrial – For the Fiscal Year Ending June 30, 2017

	Active	Transfer	Terminated	Receiving	Total
As of June 30, 2016	11,428	8,788	3,319	13,421	36,956
Retirements	(353)	(381)	(39)	773	-
Industrial Disabilities	(5)	(15)	(1)	21	-
Non-Industrial Disabilities	(42)	(23)	(4)	69	-
Deaths[1]	(15)	(14)	(66)	(259)	(354)
New Survivors	n/a	n/a	n/a	87	87
Non-Vested Terminations[2]	(73)	(43)	116	-	-
Vested Terminations	(178)	(104)	282	-	-
Refunds of Contributions	(56)	(20)	(59)	-	(135)
Transfers	(592)	677	(79)	(6)	-
Redeposits/Rehires	187	(133)	(47)	(7)	-
First Year in Status	1,304	59	11	11	1,385
Data Corrections[3]	5	32	24	16	77
As of June 30, 2017	11,610	8,823	3,457	14,126	38,016

(1) Includes both deaths without survivors and deaths with survivors receiving a benefit
(2) Includes non-vested terminated participants with employee contributions left in the plan.
(3) May include the combining of data records into a single record.

State Safety – For the Fiscal Year Ending June 30, 2017

	Active	Transfer	Terminated	Receiving	Total
As of June 30, 2016	27,042	5,741	6,186	23,680	62,649
Retirements	(876)	(225)	(70)	1,171	-
Industrial Disabilities	(157)	(7)	(17)	181	-
Non-Industrial Disabilities	(37)	(19)	(6)	62	-
Deaths[1]	(47)	(12)	(86)	(609)	(754)
New Survivors	n/a	n/a	n/a	220	220
Non-Vested Terminations[2]	(545)	(156)	701	-	-
Vested Terminations	(216)	(33)	249	-	-
Refunds of Contributions	(217)	(22)	(184)	-	(423)
Transfers	(582)	672	(82)	(8)	-
Redeposits/Rehires	316	(165)	(141)	(10)	-
First Year in Status	2,771	107	191	65	3,134
Data Corrections[3]	(30)	(1)	(11)	(10)	(52)
As of June 30, 2017	27,422	5,880	6,730	24,742	64,774

(1) Includes both deaths without survivors and deaths with survivors receiving a benefit
(2) Includes non-vested terminated participants with employee contributions left in the plan.
(3) May include the combining of data records into a single record.

Reconciliation of Participants (continued)

State Peace Officers and Firefighters – For the Fiscal Year Ending June 30, 2017

	Active	Transfer	Terminated	Receiving	Total
As of June 30, 2016	41,184	5,916	6,798	36,757	90,655
	(1,105)	(180)	(83)	1,368	-
Retirements					
Industrial Disabilities	(270)	(25)	(18)	313	-
Non-Industrial Disabilities	(25)	(2)	(3)	30	-
Deaths[1]	(40)	(2)	(83)	(518)	(643)
New Survivors	n/a	n/a	n/a	279	279
Non-Vested Terminations[2]	(472)	(129)	602	(1)	-
Vested Terminations	(220)	(39)	261	(2)	-
Refunds of Contributions	(82)	(10)	(141)	-	(233)
Transfers	(277)	478	(187)	(14)	-
Redeposits/Rehires	346	(92)	(231)	(23)	-
First Year in Status	2,419	63	122	66	2,670
Data Corrections[3]	(13)	(161)	(21)	(5)	(200)
As of June 30, 2017	41,445	5,817	7,016	38,250	92,528

(1) Includes both deaths without survivors and deaths with survivors receiving a benefit
(2) Includes non-vested terminated participants with employee contributions left in the plan.
(3) May include the combining of data records into a single record.

California Highway Patrol – For the Fiscal Year Ending June 30, 2017

	Active	Transfer	Terminated	Receiving	Total
As of June 30, 2016	7,150	267	401	8,813	16,631
Retirements	(181)	(14)	(17)	212	-
Industrial Disabilities	(54)	(1)	-	55	-
Non-Industrial Disabilities	(1)	-	-	1	-
Deaths[1]	(7)	(1)	-	(216)	(224)
New Survivors	n/a	n/a	n/a	105	105
Non-Vested Terminations[2]	(2)	(3)	5	-	-
Vested Terminations	(27)	(5)	32	-	-
Refunds of Contributions	(4)	(1)	(11)	-	(16)
Transfers	(7)	16	(9)	-	-
Redeposits/Rehires	4	-	(2)	(2)	-
First Year in Status	486	4	29	6	525
Data Corrections[3]	-	-	-	(3)	(3)
As of June 30, 2017	7,357	262	428	8,971	17,018

(1) Includes both deaths without survivors and deaths with survivors receiving a benefit
(2) Includes non-vested terminated participants with employee contributions left in the plan.
(3) May include the combining of data records into a single record.

Appendix C - Participant Data

Active Members

Distribution of Active Members by Age and Service

State Miscellaneous Tier 1 – As of June 30, 2017

	Years of Service at Valuation Date							
Attained Age	0 - 4	5 - 9	10 - 14	15 - 19	20-25+	25+	Total	Payroll
15 - 24	2,737	7	0	0	0	0	2,744	$96,742,947
25 - 29	10,614	980	8	0	0	0	11,602	520,954,549
30 - 34	11,809	4,679	889	99	0	0	17,476	981,520,453
35 - 39	9,306	5,269	3,258	1,372	76	0	19,281	1,231,183,743
40 - 44	6,646	4,469	3,749	3,904	643	53	19,464	1,347,903,919
45 - 49	5,913	4,049	4,160	5,515	2,134	1,152	22,923	1,660,077,418
50 - 54	5,030	3,652	3,518	5,470	2,719	4,906	25,295	1,887,755,652
55 - 59	4,306	3,276	3,065	5,142	2,487	6,698	24,974	1,865,534,064
60 - 64	2,510	2,390	2,286	3,328	1,572	4,208	16,294	1,224,869,107
65 and over	1,334	1,425	1,281	1,662	695	1,878	8,275	637,333,252
Total	60,205	30,196	22,214	26,492	10,326	18,895	168,328	$11,453,875,105

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

Distribution of Average Annual Salaries by Age and Service

State Miscellaneous Tier 1 – As of June 30, 2017

	Years of Service at Valuation Date						
Attained Age	0 - 4	5 - 9	10 - 14	15 - 19	20 - 25	25+	Average Salary
15 - 24	$35,234	$43,900	$0	$0	$0	$0	$35,256
25 - 29	43,955	55,088	53,858	0	0	0	44,902
30 - 34	52,973	61,815	66,593	76,074	0	0	56,164
35 - 39	57,727	67,632	70,124	74,604	89,527	0	63,855
40 - 44	58,202	69,655	74,353	79,534	86,660	91,212	69,251
45 - 49	57,982	68,517	74,876	81,129	84,989	86,397	72,420
50 - 54	57,403	66,293	72,547	79,476	86,243	88,150	74,630
55 - 59	55,811	64,609	70,708	78,125	84,609	87,293	74,699
60 - 64	55,878	64,871	69,374	77,657	84,333	90,298	75,173
65 and over	53,657	65,015	73,780	80,949	89,995	96,652	77,019
Average	$53,090	$65,904	$72,178	$79,165	$85,602	$89,071	$68,045

Active Members (continued)

Distribution of Active Members by Age and Service

State Miscellaneous Tier 2 – As of June 30, 2017

	Years of Service at Valuation Date							
Attained Age	0 - 4	5 - 9	10 - 14	15 - 19	20-25+	25+	Total	Payroll
15 - 24	3	0	0	0	0	0	3	$127,780
25 - 29	25	0	0	0	0	0	25	1,353,742
30 - 34	21	14	0	0	0	0	35	2,163,015
35 - 39	23	15	3	55	0	0	96	5,940,172
40 - 44	21	15	34	228	76	6	380	24,594,953
45 - 49	19	36	45	322	280	93	795	51,502,896
50 - 54	14	14	38	322	303	280	971	61,464,354
55 - 59	8	19	23	261	241	312	864	55,397,264
60 - 64	7	9	19	176	152	229	592	37,745,041
65 and over	11	9	8	91	62	95	276	18,479,432
Total	152	131	170	1,455	1,114	1,015	4,037	$258,768,650

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

Distribution of Average Annual Salaries by Age and Service

State Miscellaneous Tier 2 – As of June 30, 2017

	Years of Service at Valuation Date						
Attained Age	0 - 4	5 - 9	10 - 14	15 - 19	20 - 25	25+	Average Salary
15 - 24	$42,593	$0	$0	$0	$0	$0	$42,593
25 - 29	54,150	0	0	0	0	0	54,150
30 - 34	61,904	61,645	0	0	0	0	61,800
35 - 39	68,064	67,234	53,404	58,290	0	0	61,877
40 - 44	60,642	68,435	59,269	65,193	66,457	60,837	64,724
45 - 49	73,749	58,727	64,153	63,413	65,755	67,422	64,784
50 - 54	58,449	73,662	54,897	58,019	64,493	68,946	63,300
55 - 59	58,421	58,547	48,567	61,379	63,113	68,815	64,117
60 - 64	60,518	47,624	49,490	59,918	61,283	70,270	63,759
65 and over	66,155	55,692	59,704	66,043	63,401	71,917	66,954
Average	$62,228	$61,723	$56,961	$61,681	$64,147	$69,295	$64,099

Active Members (continued)

Distribution of Active Members by Age and Service

State Industrial – As of June 30, 2017

Attained Age	Years of Service at Valuation Date						Total	Payroll
	0 - 4	5 - 9	10 - 14	15 - 19	20-25+	25+		
15 - 24	276	1	0	0	0	0	277	$9,350,348
25 - 29	886	86	1	0	0	0	973	39,432,501
30 - 34	981	388	61	2	0	0	1,432	70,345,173
35 - 39	721	469	222	68	0	0	1,480	79,471,372
40 - 44	599	398	252	178	28	0	1,455	85,440,556
45 - 49	556	399	275	238	118	45	1,631	98,448,136
50 - 54	492	403	321	271	170	131	1,788	111,031,589
55 - 59	361	302	281	244	146	138	1,472	89,439,393
60 - 64	182	170	160	119	66	46	743	46,229,232
65 and over	73	98	77	65	28	18	359	23,131,521
Total	5,127	2,714	1,650	1,185	556	378	11,610	$652,319,822

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

Distribution of Average Annual Salaries by Age and Service

State Industrial – As of June 30, 2017

Attained Age	Years of Service at Valuation Date						Average Salary
	0 - 4	5 - 9	10 - 14	15 - 19	20 - 25	25+	
15 - 24	$33,722	$43,028	$0	$0	$0	$0	$33,756
25 - 29	39,719	48,768	47,794	0	0	0	40,527
30 - 34	47,560	52,114	54,134	82,941	0	0	49,124
35 - 39	50,559	56,279	56,710	59,320	0	0	53,697
40 - 44	55,430	59,985	60,935	62,194	69,208	0	58,722
45 - 49	55,756	62,128	61,585	62,252	66,139	68,952	60,361
50 - 54	58,467	63,182	61,405	62,730	65,783	68,010	62,098
55 - 59	55,162	62,488	61,572	57,526	65,520	70,654	60,760
60 - 64	57,604	69,494	57,970	59,860	67,729	66,579	62,220
65 and over	70,265	67,242	56,632	60,962	64,072	71,955	64,433
Average	$49,952	$59,784	$59,927	$60,935	$66,107	$69,101	$56,186

Active Members (continued)

Distribution of Active Members by Age and Service

State Safety – As of June 30, 2017

Attained Age	Years of Service at Valuation Date						Total	Payroll
	0 - 4	5 - 9	10 - 14	15 - 19	20-25+	25+		
15 - 24	367	2	0	0	0	0	369	$15,762,353
25 - 29	1,566	145	4	0	0	0	1,715	99,225,086
30 - 34	2,130	629	181	1	0	0	2,941	197,085,824
35 - 39	1,829	934	556	64	0	0	3,383	244,103,269
40 - 44	1,589	900	862	196	9	0	3,556	285,021,217
45 - 49	1,483	934	997	402	116	13	3,945	325,071,789
50 - 54	1,283	854	1,055	480	241	73	3,986	326,074,061
55 - 59	1,048	804	1,003	511	247	111	3,724	311,052,357
60 - 64	570	561	698	446	158	85	2,518	230,042,625
65 and over	196	304	399	225	103	58	1,285	133,628,422
Total	12,061	6,067	5,755	2,325	874	340	27,422	$2,167,067,002

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

Distribution of Average Annual Salaries by Age and Service

State Safety – As of June 30, 2017

Attained Age	Years of Service at Valuation Date						Average Salary
	0 - 4	5 - 9	10 - 14	15 - 19	20 - 25	25+	
15 - 24	$42,600	$64,156	$0	$0	$0	$0	$42,716
25 - 29	57,201	64,737	65,467	0	0	0	57,857
30 - 34	65,701	71,257	67,735	62,441	0	0	67,013
35 - 39	69,069	77,585	73,312	71,083	0	0	72,156
40 - 44	71,393	90,336	84,795	84,021	79,316	0	80,152
45 - 49	72,932	91,937	84,545	89,334	83,952	84,796	82,401
50 - 54	72,868	89,506	82,907	87,317	85,863	83,228	81,805
55 - 59	75,149	90,866	82,838	88,945	86,280	84,604	83,526
60 - 64	76,222	104,398	91,198	94,810	90,207	92,174	91,359
65 and over	91,872	113,038	102,826	106,387	101,836	100,071	103,991
Average	$68,550	$88,412	$84,432	$90,571	$88,328	$88,847	$79,027

Active Members (continued)

Distribution of Active Members by Age and Service

State Peace Officers and Firefighters – As of June 30, 2017

	Years of Service at Valuation Date							
Attained Age	0 - 4	5 - 9	10 - 14	15 - 19	20-25+	25+	Total	Payroll
15 - 24	1,429	0	0	0	0	0	1,429	$67,700,297
25 - 29	4,151	240	1	0	0	0	4,392	252,915,103
30 - 34	2,755	1,931	861	2	0	0	5,549	396,480,621
35 - 39	1,383	1,786	2,691	736	3	0	6,599	539,356,705
40 - 44	723	1,200	2,181	2,447	566	3	7,120	627,615,408
45 - 49	427	834	1,587	2,027	2,429	427	7,731	724,890,103
50 - 54	266	534	933	1,095	1,346	761	4,935	464,563,751
55 - 59	110	249	532	584	631	415	2,521	235,441,464
60 - 64	51	109	183	224	231	127	925	85,057,569
65 and over	8	29	51	60	48	48	244	22,643,833
Total	11,303	6,912	9,020	7,175	5,254	1,781	41,445	$3,416,664,854

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

Distribution of Average Annual Salaries by Age and Service

State Peace Officers and Firefighters – As of June 30, 2017

	Years of Service at Valuation Date						
Attained Age	0 - 4	5 - 9	10 - 14	15 - 19	20 - 25	25+	Average Salary
15 - 24	$47,376	$0	$0	$0	$0	$0	$47,376
25 - 29	56,727	72,370	73,406	0	0	0	57,585
30 - 34	59,421	81,233	87,965	88,390	0	0	71,451
35 - 39	61,806	82,591	88,260	93,184	93,897	0	81,733
40 - 44	65,250	85,227	88,422	93,295	100,261	93,066	88,148
45 - 49	70,013	87,229	88,909	93,757	100,971	107,356	93,764
50 - 54	76,253	87,954	89,277	92,886	98,785	104,260	94,137
55 - 59	77,089	89,821	88,753	92,951	96,782	101,270	93,392
60 - 64	74,589	88,453	89,248	90,502	97,477	98,348	91,954
65 and over	64,079	87,085	89,630	92,038	95,131	103,044	92,803
Average	$58,613	$83,660	$88,546	$93,225	$99,621	$103,833	$82,439

Active Members (continued)

Distribution of Active Members by Age and Service

California Highway Patrol – As of June 30, 2017

Attained Age	Years of Service at Valuation Date						Total	Payroll
	0 - 4	5 - 9	10 - 14	15 - 19	20-25+	25+		
15 - 24	173	0	0	0	0	0	173	$13,314,009
25 - 29	490	58	0	0	0	0	548	49,634,040
30 - 34	425	582	209	0	0	0	1,216	128,850,200
35 - 39	204	484	495	244	0	0	1,427	160,394,534
40 - 44	43	274	397	646	278	1	1,639	194,956,014
45 - 49	0	29	182	511	621	207	1,550	193,901,213
50 - 54	1	1	19	50	285	303	659	88,402,082
55 - 59	0	0	0	3	28	113	144	20,367,453
60 - 64	0	0	0	0	0	1	1	251,926
65 and over	0	0	0	0	0	0	0	0
Total	1,336	1,428	1,302	1,454	1,212	625	7,357	$850,071,470

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

Distribution of Average Annual Salaries by Age and Service

California Highway Patrol – As of June 30, 2017

Attained Age	Years of Service at Valuation Date						Average Salary
	0 - 4	5 - 9	10 - 14	15 - 19	20 - 25	25+	
15 - 24	$76,960	$0	$0	$0	$0	$0	$76,960
25 - 29	88,001	112,303	0	0	0	0	90,573
30 - 34	92,057	112,770	115,282	0	0	0	105,962
35 - 39	94,952	112,686	115,988	119,141	0	0	112,400
40 - 44	105,315	112,638	115,644	120,015	129,527	115,966	118,948
45 - 49	0	113,655	115,212	118,288	129,661	138,510	125,098
50 - 54	154,029	79,320	116,472	120,023	127,214	144,220	134,146
55 - 59	0	0	0	159,906	131,255	143,474	141,441
60 - 64	0	0	0	0	0	251,926	251,926
65 and over	0	0	0	0	0	0	0
Average	$89,529	$112,692	$115,668	$119,344	$129,092	$142,321	$115,546

Transferred and Terminated Participants

Distribution by Age and Service – Transfers to Other CalPERS Plans

State Miscellaneous Tier 1 – As of June 30, 2017

Attained Age	Years of Service at Valuation Date						Total	Average Salary
	0 - 4	5 - 9	10 - 14	15 - 19	20-25+	25+		
15 - 24	287	0	0	0	0	0	287	$62,135
25 - 29	1,606	53	0	0	0	0	1,659	62,846
30 - 34	2,814	586	41	0	0	0	3,441	69,054
35 - 39	2,875	814	158	21	1	0	3,869	73,159
40 - 44	2,513	810	246	70	7	1	3,647	77,253
45 - 49	2,322	981	354	140	62	12	3,871	79,669
50 - 54	2,160	887	527	278	119	45	4,016	81,810
55 - 59	2,070	765	375	259	139	74	3,682	80,056
60 - 64	1,413	476	198	103	59	41	2,290	79,127
65 and over	705	212	78	43	13	10	1,061	77,796
Total	18,765	5,584	1,977	914	400	183	27,823	$76,194

Distribution by Age and Service – Terminated Participants with Funds on Deposit

State Miscellaneous Tier 1 – As of June 30, 2017

Attained Age	Years of Service at Valuation Date						Total	Average Salary
	0 - 4	5 - 9	10 - 14	15 - 19	20-25+	25+		
15 - 24	664	0	0	0	0	0	664	$29,612
25 - 29	3,509	68	0	0	0	0	3,577	35,750
30 - 34	5,974	593	29	1	0	0	6,597	40,684
35 - 39	7,207	1,186	195	30	1	0	8,619	43,544
40 - 44	6,069	1,393	415	88	12	0	7,977	48,548
45 - 49	5,477	1,611	604	174	62	8	7,936	51,150
50 - 54	4,691	1,553	635	250	87	39	7,255	51,107
55 - 59	4,243	1,162	451	177	62	27	6,122	47,200
60 - 64	3,439	791	239	81	28	17	4,595	45,080
65 and over	2,726	350	109	32	5	8	3,230	42,608
Total	43,999	8,707	2,677	833	257	99	56,572	$45,764

Transferred and Terminated Participants (continued)

Distribution by Age and Service – Transfers to Other CalPERS Plans

State Miscellaneous Tier 2 – As of June 30, 2017

Attained Age	Years of Service at Valuation Date						Total	Average Salary
	0 - 4	5 - 9	10 - 14	15 - 19	20-25+	25+		
15 - 24	0	0	0	0	0	0	0	$0
25 - 29	5	0	0	0	0	0	5	41,132
30 - 34	9	1	0	0	0	0	10	58,498
35 - 39	221	30	10	5	0	0	266	70,905
40 - 44	897	156	63	53	5	0	1,174	77,102
45 - 49	1,358	622	172	93	62	7	2,314	76,983
50 - 54	1,202	589	345	142	99	37	2,414	73,808
55 - 59	814	344	243	128	79	69	1,677	70,934
60 - 64	413	144	119	67	46	42	831	72,195
65 and over	178	59	31	24	16	19	327	71,951
Total	5,097	1,945	983	512	307	174	9,018	$74,180

Distribution by Age and Service – Terminated Participants with Funds on Deposit

State Miscellaneous Tier 2 – As of June 30, 2017

Attained Age	Years of Service at Valuation Date						Total	Average Salary
	0 - 4	5 - 9	10 - 14	15 - 19	20-25+	25+		
15 - 24	0	0	0	0	0	0	0	$0
25 - 29	9	0	0	0	0	0	9	55,686
30 - 34	15	1	1	0	0	0	17	62,915
35 - 39	14	3	7	2	0	0	26	55,139
40 - 44	9	13	44	23	1	0	90	51,834
45 - 49	20	4	170	43	21	2	260	52,007
50 - 54	18	14	267	73	22	3	397	50,725
55 - 59	7	6	231	78	18	4	344	45,222
60 - 64	4	7	152	48	14	3	228	39,553
65 and over	10	15	101	30	5	2	163	35,692
Total	106	63	973	297	81	14	1,534	$46,758

Transferred and Terminated Participants (continued)

Distribution by Age and Service – Transfers to Other CalPERS Plans

State Industrial – As of June 30, 2017

Attained Age	Years of Service at Valuation Date						Total	Average Salary
	0 - 4	5 - 9	10 - 14	15 - 19	20-25+	25+		
15 - 24	26	0	0	0	0	0	26	$37,754
25 - 29	310	18	1	0	0	0	329	50,156
30 - 34	669	130	4	0	0	0	803	59,350
35 - 39	736	197	25	2	0	0	960	66,158
40 - 44	818	224	63	27	4	0	1,136	70,387
45 - 49	1,101	341	136	45	12	2	1,637	72,998
50 - 54	1,126	363	141	62	35	11	1,738	73,900
55 - 59	840	252	100	35	22	13	1,262	72,857
60 - 64	472	134	52	22	10	4	694	71,757
65 and over	176	38	12	9	1	2	238	80,472
Total	6,274	1,697	534	202	84	32	8,823	$69,981

Distribution by Age and Service – Terminated Participants with Funds on Deposit

State Industrial – As of June 30, 2017

Attained Age	Years of Service at Valuation Date						Total	Average Salary
	0 - 4	5 - 9	10 - 14	15 - 19	20-25+	25+		
15 - 24	18	0	0	0	0	0	18	$30,526
25 - 29	156	7	0	0	0	0	163	35,269
30 - 34	260	36	3	0	0	0	299	39,484
35 - 39	308	57	7	0	0	0	372	40,805
40 - 44	336	76	13	9	1	0	435	41,145
45 - 49	449	122	32	16	5	1	625	43,644
50 - 54	392	97	44	11	3	1	548	41,482
55 - 59	315	72	13	4	1	0	405	38,761
60 - 64	222	37	7	4	0	0	270	39,453
65 and over	278	41	1	1	1	0	322	40,009
Total	2,734	545	120	45	11	2	3,457	$40,620

Transferred and Terminated Participants (continued)

Distribution by Age and Service – Transfers to Other CalPERS Plans

State Safety – As of June 30, 2017

Attained Age	Years of Service at Valuation Date						Total	Average Salary
	0 - 4	5 - 9	10 - 14	15 - 19	20-25+	25+		
15 - 24	25	0	0	0	0	0	25	$40,002
25 - 29	190	7	0	0	0	0	197	54,830
30 - 34	438	81	2	0	0	0	521	68,103
35 - 39	582	166	14	0	0	0	762	76,904
40 - 44	652	197	30	3	0	0	882	82,168
45 - 49	670	220	52	12	4	0	958	86,960
50 - 54	659	228	75	30	14	0	1,006	87,054
55 - 59	553	182	50	25	8	1	819	87,930
60 - 64	350	131	35	8	3	2	529	91,244
65 and over	131	33	13	4	0	0	181	95,944
Total	4,250	1,245	271	82	29	3	5,880	$82,804

Distribution by Age and Service – Terminated Participants with Funds on Deposit

State Safety – As of June 30, 2017

Attained Age	Years of Service at Valuation Date						Total	Average Salary
	0 - 4	5 - 9	10 - 14	15 - 19	20-25+	25+		
15 - 24	73	0	0	0	0	0	73	$34,923
25 - 29	306	6	0	0	0	0	312	45,838
30 - 34	637	65	2	0	0	0	704	54,892
35 - 39	750	142	10	0	0	0	902	60,805
40 - 44	753	147	28	4	2	0	934	69,377
45 - 49	859	173	48	12	4	0	1,096	68,054
50 - 54	724	150	39	11	2	0	926	68,565
55 - 59	657	80	18	5	2	0	762	63,308
60 - 64	572	44	12	3	1	1	633	65,811
65 and over	359	24	3	2	0	0	388	65,240
Total	5,690	831	160	37	11	1	6,730	$63,660

Transferred and Terminated Participants (continued)

Distribution by Age and Service – Transfers to Other CalPERS Plans

State Peace Officers and Firefighters – As of June 30, 2017

	Years of Service at Valuation Date							
Attained Age	0 - 4	5 - 9	10 - 14	15 - 19	20-25+	25+	Total	Average Salary
15 - 24	52	0	0	0	0	0	52	$51,997
25 - 29	421	7	0	0	0	0	428	66,343
30 - 34	743	88	6	0	0	0	837	76,931
35 - 39	937	121	21	3	0	0	1,082	87,803
40 - 44	846	118	38	8	1	0	1,011	91,270
45 - 49	877	171	51	15	1	2	1,117	96,650
50 - 54	564	139	42	14	8	3	770	93,388
55 - 59	267	56	18	5	1	3	350	87,627
60 - 64	104	16	5	3	0	0	128	79,711
65 and over	31	7	1	1	2	0	42	81,396
Total	4,842	723	182	49	13	8	5,817	$87,145

Distribution by Age and Service – Terminated Participants with Funds on Deposit

State Peace Officers and Firefighters – As of June 30, 2017

	Years of Service at Valuation Date							
Attained Age	0 - 4	5 - 9	10 - 14	15 - 19	20-25+	25+	Total	Average Salary
15 - 24	222	0	0	0	0	0	222	$39,038
25 - 29	644	3	0	0	0	0	647	37,418
30 - 34	933	107	4	0	0	0	1,044	40,120
35 - 39	1,058	167	33	6	0	0	1,264	41,220
40 - 44	857	148	59	36	9	1	1,110	44,637
45 - 49	815	199	106	62	34	8	1,224	49,787
50 - 54	587	128	32	7	6	1	761	40,005
55 - 59	351	53	19	6	2	0	431	40,320
60 - 64	159	30	10	4	0	1	204	40,607
65 and over	96	6	5	1	1	0	109	40,442
Total	5,722	841	268	122	52	11	7,016	$42,455

Transferred and Terminated Participants (continued)

Distribution by Age and Service – Transfers to Other CalPERS Plans

California Highway Patrol – As of June 30, 2017

Attained Age	Years of Service at Valuation Date						Total	Average Salary
	0 - 4	5 - 9	10 - 14	15 - 19	20-25+	25+		
15 - 24	0	0	0	0	0	0	0	$0
25 - 29	9	0	0	0	0	0	9	66,957
30 - 34	20	3	0	0	0	0	23	74,710
35 - 39	24	2	0	0	0	0	26	89,920
40 - 44	46	17	5	1	1	0	70	94,143
45 - 49	51	9	8	3	0	0	71	100,981
50 - 54	27	4	0	2	0	0	33	84,522
55 - 59	15	6	2	1	0	0	24	86,148
60 - 64	3	2	0	0	0	0	5	79,997
65 and over	1	0	0	0	0	0	1	40,000
Total	196	43	15	7	1	0	262	$90,517

Distribution by Age and Service – Terminated Participants with Funds on Deposit

California Highway Patrol – As of June 30, 2017

Attained Age	Years of Service at Valuation Date						Total	Average Salary
	0 - 4	5 - 9	10 - 14	15 - 19	20-25+	25+		
15 - 24	2	0	0	0	0	0	2	$60,168
25 - 29	16	2	0	0	0	0	18	63,558
30 - 34	24	10	1	0	0	0	35	77,663
35 - 39	31	24	3	1	0	0	59	87,560
40 - 44	53	40	18	3	1	0	115	82,499
45 - 49	49	41	24	8	1	1	124	77,481
50 - 54	28	14	4	0	0	0	46	68,960
55 - 59	7	10	4	0	0	0	21	73,161
60 - 64	7	0	0	0	0	0	7	45,003
65 and over	1	0	0	0	0	0	1	48,285
Total	218	141	54	12	2	1	428	$77,840

Retired Members and Beneficiaries

Number of Retirees and Beneficiaries - by Age and Retirement Type

State Miscellaneous Tier 1 – As of June 30, 2017

Attained Age	Service Retirement	Non-Industrial Disability	Industrial Disability	Non-Industrial Death	Industrial Death	Death After Retirement	Total
Under 30	0	0	0	10	2	203	215
30-34	0	7	5	0	0	131	143
35-39	0	44	13	4	2	213	276
40-44	0	93	26	14	3	191	327
45-49	0	313	63	32	5	331	744
50-54	1,458	802	189	90	11	506	3,056
55-59	9,860	1,580	425	189	17	937	13,008
60-64	23,948	2,051	492	271	9	1,453	28,224
65-69	34,001	2,175	483	355	4	2,292	39,310
70-74	28,363	1,614	306	308	9	3,020	33,620
75-79	18,985	1,104	224	260	8	3,470	24,051
80-84	12,911	623	101	202	6	3,890	17,733
85 and Over	14,938	551	71	273	3	7,911	23,747
Total	144,464	10,957	2,398	2,008	79	24,548	184,454

Counts of members do not include alternate payees receiving benefits while the member is still working. Multiple records may exist for those who have service in more than one coverage group. This does not result in double counting of liabilities.

Annual Allowance Amounts for Retirees and Beneficiaries - by Age and Retirement Type

State Miscellaneous Tier 1 – Annual Amounts Including PPPA Payments – As of June 30, 2017

Attained Age	Service Retirement	Non-Industrial Disability	Industrial Disability	Non-Industrial Death	Industrial Death	Death After Retirement	Total
Under 30	$0	$0	$0	$69,570	$378	$1,594,619	$1,664,567
30-34	0	30,989	924	0	0	1,140,493	1,172,406
35-39	0	407,449	24,166	85,051	118	2,138,979	2,655,763
40-44	0	985,514	38,975	374,530	63,671	2,274,476	3,737,166
45-49	0	3,803,322	187,236	560,072	1,627	4,618,673	9,170,930
50-54	17,915,392	11,823,851	408,603	2,136,707	138,908	7,220,505	39,643,966
55-59	271,739,819	25,091,672	1,831,288	4,564,006	209,912	14,953,493	318,390,190
60-64	800,219,443	33,186,453	2,014,949	6,773,611	7,614	27,523,783	869,725,853
65-69	1,156,237,432	35,129,749	1,922,503	9,859,679	85,731	51,037,189	1,254,272,283
70-74	982,337,800	26,512,492	1,631,096	8,609,998	22,443	75,872,873	1,094,986,702
75-79	666,261,102	18,996,703	1,045,718	7,537,945	9,186	93,939,885	787,790,539
80-84	433,301,238	10,169,199	444,869	5,890,133	9,212	107,423,038	557,237,689
85 and Over	450,713,637	7,820,306	226,287	6,820,974	2,475	193,403,974	658,987,653
Total	$4,778,725,863	$173,957,699	$9,776,614	$53,282,276	$551,275	$583,141,980	$5,599,435,707

Counts of members do not include alternate payees receiving benefits while the member is still working. Multiple records may exist for those who have service in more than one coverage group. This does not result in double counting of liabilities.

Retired Members and Beneficiaries (continued)

Number of Retirees and Beneficiaries - by Years Retired and Retirement Type

State Miscellaneous Tier 1 – As of June 30, 2017

Years Retired	Service Retirement	Non-Industrial Disability	Industrial Disability	Non-Industrial Death	Industrial Death	Death After Retirement	Total
Under 5 Years	37,396	1,723	308	348	3	8,168	47,946
5 - 9	35,307	1,596	286	370	14	5,848	43,421
10 - 14	27,957	1,728	417	304	7	4,205	34,618
15 - 19	18,760	2,141	440	292	13	2,685	24,331
20 - 24	11,675	1,742	404	214	15	1,758	15,808
25 - 29	7,429	965	309	191	7	1,016	9,917
30 and over	5,940	1,062	234	289	20	868	8,413
Total	144,464	10,957	2,398	2,008	79	24,548	184,454

Counts of members do not include alternate payees receiving benefits while the member is still working. Multiple records may exist for those who have service in more than one coverage group. This does not result in double counting of liabilities.

Annual Allowance Amounts for Retirees and Beneficiaries - by Years Retired and Retirement Type

State Miscellaneous Tier 1 – Annual Amounts Including PPPA Payments – As of June 30, 2017

Years Retired	Service Retirement	Non-Industrial Disability	Industrial Disability	Non-Industrial Death	Industrial Death	Death After Retirement	Total
Under 5 Years	$1,252,471,121	$26,545,427	$1,727,666	$8,908,351	$99,576	$218,335,478	$1,508,087,619
5 - 9	1,261,931,942	25,834,311	1,793,646	10,217,782	159,553	144,404,898	1,444,342,132
10 - 14	952,983,729	29,526,467	2,332,711	7,958,705	6,381	97,712,707	1,090,520,700
15 - 19	652,999,575	36,334,892	1,929,540	8,331,611	70,101	60,793,608	760,459,327
20 - 24	343,346,912	28,472,486	1,161,724	6,413,231	199,784	33,658,082	413,252,219
25 - 29	213,398,156	15,114,884	640,226	5,265,969	2,960	17,601,908	252,024,103
30 and over	101,594,428	12,129,232	191,101	6,186,627	12,920	10,635,299	130,749,607
Total	$4,778,725,863	$173,957,699	$9,776,614	$53,282,276	$551,275	$583,141,980	$5,599,435,707

Counts of members do not include alternate payees receiving benefits while the member is still working. Multiple records may exist for those who have service in more than one coverage group. This does not result in double counting of liabilities.

Retired Members and Beneficiaries (continued)

Number of Retirees and Beneficiaries - by Age and Retirement Type

State Miscellaneous Tier 2 – As of June 30, 2017

Attained Age	Service Retirement	Non-Industrial Disability	Industrial Disability	Non-Industrial Death	Industrial Death	Death After Retirement	Total
Under 30	0	0	0	2	0	23	25
30-34	0	0	0	0	0	11	11
35-39	0	2	0	0	0	22	24
40-44	0	12	0	3	0	16	31
45-49	0	69	6	4	0	26	105
50-54	107	151	12	10	0	40	320
55-59	400	221	20	19	0	75	735
60-64	702	335	8	25	0	100	1,170
65-69	965	294	10	30	2	147	1,448
70-74	685	203	8	10	0	141	1,047
75-79	405	101	4	11	0	108	629
80-84	311	34	1	3	0	89	438
85 and Over	174	9	1	0	0	72	256
Total	3,749	1,431	70	117	2	870	6,239

Counts of members do not include alternate payees receiving benefits while the member is still working. Multiple records may exist for those who have service in more than one coverage group. This does not result in double counting of liabilities.

Annual Allowance Amounts for Retirees and Beneficiaries - by Age and Retirement Type

State Miscellaneous Tier 2 – Annual Amounts Including PPPA Payments – As of June 30, 2017

Attained Age	Service Retirement	Non-Industrial Disability	Industrial Disability	Non-Industrial Death	Industrial Death	Death After Retirement	Total
Under 30	$0	$0	$0	$3,402	$0	$100,034	$103,436
30-34	0	0	0	0	0	54,147	54,147
35-39	0	22,393	0	0	0	129,315	151,708
40-44	0	88,764	0	22,672	0	108,620	220,056
45-49	0	757,291	147,524	18,096	0	139,255	1,062,166
50-54	214,354	1,779,844	285,871	38,815	0	414,139	2,733,023
55-59	1,607,002	2,972,539	320,626	167,103	0	700,013	5,767,283
60-64	4,011,464	4,673,851	191,583	227,003	0	1,027,293	10,131,194
65-69	7,211,856	4,788,817	289,454	286,372	54,702	1,593,833	14,225,034
70-74	5,112,493	3,335,230	154,989	138,146	0	1,754,491	10,495,349
75-79	3,751,698	1,873,822	56,598	154,691	0	1,156,073	6,992,882
80-84	3,321,664	617,876	29,039	15,316	0	1,137,818	5,121,713
85 and Over	2,375,110	123,106	36,470	0	0	830,709	3,365,395
Total	$27,605,641	$21,033,533	$1,512,154	$1,071,616	$54,702	$9,145,740	$60,423,386

Counts of members do not include alternate payees receiving benefits while the member is still working. Multiple records may exist for those who have service in more than one coverage group. This does not result in double counting of liabilities.

Retired Members and Beneficiaries (continued)

Number of Retirees and Beneficiaries - by Years Retired and Retirement Type

State Miscellaneous Tier 2 – As of June 30, 2017

Years Retired	Service Retirement	Non-Industrial Disability	Industrial Disability	Non-Industrial Death	Industrial Death	Death After Retirement	Total
Under 5 Years	1,460	210	9	29	0	257	1,965
5 - 9	816	151	5	26	0	198	1,196
10 - 14	345	168	11	30	0	168	722
15 - 19	611	410	28	18	1	138	1,206
20 - 24	378	293	12	9	1	79	772
25 - 29	114	164	5	4	0	28	315
30 and over	25	35	0	1	0	2	63
Total	3,749	1,431	70	117	2	870	6,239

Counts of members do not include alternate payees receiving benefits while the member is still working. Multiple records may exist for those who have service in more than one coverage group. This does not result in double counting of liabilities.

Annual Allowance Amounts for Retirees and Beneficiaries - by Years Retired and Retirement Type

State Miscellaneous Tier 2 – Annual Amounts Including PPPA Payments – As of June 30, 2017

Years Retired	Service Retirement	Non-Industrial Disability	Industrial Disability	Non-Industrial Death	Industrial Death	Death After Retirement	Total
Under 5 Years	$9,668,733	$1,996,913	$70,853	$209,610	$0	$2,092,509	$14,038,618
5-9	5,371,835	1,611,527	74,893	188,221	0	1,726,958	8,973,434
10-14	1,997,806	2,183,573	268,837	241,450	0	1,909,731	6,601,397
15-19	4,649,772	6,149,796	585,503	221,989	37,330	1,770,709	13,415,099
20-24	4,536,205	5,383,906	385,087	153,930	17,372	1,234,895	11,711,395
25-29	1,194,735	3,147,740	126,981	49,610	0	391,232	4,910,298
30 and Over	186,555	560,078	0	6,806	0	19,706	773,145
Total	$27,605,641	$21,033,533	$1,512,154	$1,071,616	$54,702	$9,145,740	$60,423,386

Counts of members do not include alternate payees receiving benefits while the member is still working. Multiple records may exist for those who have service in more than one coverage group. This does not result in double counting of liabilities.

Retired Members and Beneficiaries (continued)

Number of Retirees and Beneficiaries - by Age and Retirement Type

State Industrial – As of June 30, 2017

Attained Age	Service Retirement	Non-Industrial Disability	Industrial Disability	Non-Industrial Death	Industrial Death	Death After Retirement	Total
Under 30	0	0	0	1	0	18	19
30-34	0	3	0	0	0	11	14
35-39	0	9	4	0	0	20	33
40-44	0	20	10	0	0	16	46
45-49	0	91	21	2	0	19	133
50-54	244	179	53	8	0	42	526
55-59	1,319	251	99	15	1	67	1,752
60-64	2,510	286	114	16	1	101	3,028
65-69	2,709	273	92	17	0	156	3,247
70-74	2,040	185	57	18	1	158	2,459
75-79	1,039	93	29	14	2	151	1,328
80-84	573	42	25	9	2	126	777
85 and Over	488	26	6	5	4	235	764
Total	10,922	1,458	510	105	11	1,120	14,126

Counts of members do not include alternate payees receiving benefits while the member is still working. Multiple records may exist for those who have service in more than one coverage group. This does not result in double counting of liabilities.

Annual Allowance Amounts for Retirees and Beneficiaries - by Age and Retirement Type

State Industrial – Annual Amounts Including PPPA Payments – As of June 30, 2017

Attained Age	Service Retirement	Non-Industrial Disability	Industrial Disability	Non-Industrial Death	Industrial Death	Death After Retirement	Total
Under 30	$0	$0	$0	$5,196	$0	$48,782	$53,978
30-34	0	24,138	0	0	0	39,854	63,992
35-39	0	51,804	1,927	0	0	114,661	168,392
40-44	0	144,812	143,735	0	0	218,401	506,948
45-49	0	777,723	96,180	19,200	0	111,558	1,004,661
50-54	1,559,818	1,782,217	189,406	126,359	0	205,320	3,863,120
55-59	16,274,731	2,256,850	569,221	70,961	1,130	468,314	19,641,207
60-64	33,226,360	2,677,737	798,303	205,041	66	759,365	37,666,872
65-69	36,975,501	2,432,127	576,309	109,016	0	1,244,627	41,337,580
70-74	29,399,969	1,818,377	465,636	257,743	18,883	1,329,340	33,289,948
75-79	16,024,283	984,707	171,438	311,464	1,610	1,766,039	19,259,541
80-84	9,092,532	638,401	170,176	247,079	52,749	1,883,703	12,084,640
85 and Over	8,177,739	343,588	81,146	119,643	93,366	3,551,404	12,366,886
Total	$150,730,933	$13,932,481	$3,263,477	$1,471,702	$167,804	$11,741,368	$181,307,765

Counts of members do not include alternate payees receiving benefits while the member is still working. Multiple records may exist for those who have service in more than one coverage group. This does not result in double counting of liabilities.

Retired Members and Beneficiaries (continued)

Number of Retirees and Beneficiaries - by Years Retired and Retirement Type

State Industrial – As of June 30, 2017

Years Retired	Service Retirement	Non-Industrial Disability	Industrial Disability	Non-Industrial Death	Industrial Death	Death After Retirement	Total
Under 5 Years	3,642	370	105	24	1	402	4,544
5 - 9	3,225	259	80	21	0	287	3,872
10 - 14	2,004	269	114	24	1	199	2,611
15 - 19	1,163	298	96	12	1	104	1,674
20 - 24	494	152	58	13	0	71	788
25 - 29	228	77	36	8	0	34	383
30 and over	166	33	21	3	8	23	254
Total	10,922	1,458	510	105	11	1,120	14,126

Counts of members do not include alternate payees receiving benefits while the member is still working. Multiple records may exist for those who have service in more than one coverage group. This does not result in double counting of liabilities.

Annual Allowance Amounts for Retirees and Beneficiaries - by Years Retired and Retirement Type

State Industrial – Annual Amounts Including PPPA Payments – As of June 30, 2017

Years Retired	Service Retirement	Non-Industrial Disability	Industrial Disability	Non-Industrial Death	Industrial Death	Death After Retirement	Total
Under 5 Years	$49,822,963	$3,560,711	$637,557	$343,523	$66	$4,320,511	$58,685,331
5 - 9	46,078,822	2,563,877	633,123	325,032	0	2,770,702	52,371,556
10 - 14	28,158,424	2,577,915	849,337	337,809	1,130	2,333,250	34,257,865
15 - 19	15,747,161	2,848,403	544,099	81,629	79	1,110,471	20,331,842
20 - 24	5,833,146	1,393,208	297,042	211,414	0	603,451	8,338,261
25 - 29	2,891,282	712,248	145,286	144,543	0	311,414	4,204,773
30 and over	2,199,135	276,119	157,033	27,752	166,529	291,569	3,118,137
Total	$150,730,933	$13,932,481	$3,263,477	$1,471,702	$167,804	$11,741,368	$181,307,765

Counts of members do not include alternate payees receiving benefits while the member is still working. Multiple records may exist for those who have service in more than one coverage group. This does not result in double counting of liabilities.

Retired Members and Beneficiaries (continued)

Number of Retirees and Beneficiaries - by Age and Retirement Type

State Safety – As of June 30, 2017

Attained Age	Service Retirement	Non-Industrial Disability	Industrial Disability	Non-Industrial Death	Industrial Death	Death After Retirement	Total
Under 30	0	0	4	2	2	28	36
30-34	0	1	24	0	0	19	44
35-39	0	7	53	0	0	21	81
40-44	0	10	86	1	0	22	119
45-49	0	33	183	4	1	39	260
50-54	302	74	317	19	2	70	784
55-59	1,886	114	568	39	7	149	2,763
60-64	3,516	168	819	57	18	243	4,821
65-69	4,368	186	957	69	12	359	5,951
70-74	3,205	127	666	41	10	444	4,493
75-79	1,693	53	371	30	11	406	2,564
80-84	812	28	185	22	15	385	1,447
85 and Over	567	18	148	13	9	624	1,379
Total	16,349	819	4,381	297	87	2,809	24,742

Counts of members do not include alternate payees receiving benefits while the member is still working. Multiple records may exist for those who have service in more than one coverage group. This does not result in double counting of liabilities.

Annual Allowance Amounts for Retirees and Beneficiaries - by Age and Retirement Type

State Safety – Annual Amounts Including PPPA Payments – As of June 30, 2017

Attained Age	Service Retirement	Non-Industrial Disability	Industrial Disability	Non-Industrial Death	Industrial Death	Death After Retirement	Total
Under 30	$0	$0	$99,562	$25,841	$26,646	$229,627	$381,676
30-34	0	4,004	711,985	0	0	171,219	887,208
35-39	0	95,222	1,441,940	0	0	208,636	1,745,798
40-44	0	101,033	2,464,572	25,671	0	289,641	2,880,917
45-49	0	281,271	5,505,909	92,044	29,146	327,559	6,235,929
50-54	3,987,239	796,394	8,739,870	395,988	75,787	1,070,545	15,065,823
55-59	38,886,564	1,306,012	15,821,882	649,879	268,230	2,130,509	59,063,076
60-64	81,197,579	2,449,396	22,738,067	1,061,257	508,752	4,141,351	112,096,402
65-69	98,421,229	2,711,125	25,701,075	1,117,331	360,630	6,068,118	134,379,508
70-74	71,969,729	1,616,330	17,723,036	773,495	312,299	7,372,816	99,767,705
75-79	37,137,175	955,507	10,228,537	536,074	357,895	6,313,404	55,528,592
80-84	15,759,337	460,746	5,488,867	483,003	406,359	6,161,672	28,759,984
85 and Over	11,556,175	374,050	4,192,788	239,820	253,443	10,095,060	26,711,336
Total	$358,915,027	$11,151,090	$120,858,090	$5,400,403	$2,599,187	$44,580,157	$543,503,954

Counts of members do not include alternate payees receiving benefits while the member is still working. Multiple records may exist for those who have service in more than one coverage group. This does not result in double counting of liabilities.

Retired Members and Beneficiaries (continued)

Number of Retirees and Beneficiaries - by Years Retired and Retirement Type

State Safety – As of June 30, 2017

Years Retired	Service Retirement	Non-Industrial Disability	Industrial Disability	Non-Industrial Death	Industrial Death	Death After Retirement	Total
Under 5 Years	5,548	284	980	72	0	1,059	7,943
5 - 9	5,172	170	737	62	8	688	6,837
10 - 14	3,037	119	780	81	7	427	4,451
15 - 19	1,565	127	620	34	17	273	2,636
20 - 24	547	62	320	18	5	173	1,125
25 - 29	207	29	252	11	6	92	597
30 and over	273	28	692	19	44	97	1,153
Total	16,349	819	4,381	297	87	2,809	24,742

Counts of members do not include alternate payees receiving benefits while the member is still working. Multiple records may exist for those who have service in more than one coverage group. This does not result in double counting of liabilities.

Annual Allowance Amounts for Retirees and Beneficiaries - by Years Retired and Retirement Type

State Safety – Annual Amounts Including PPPA Payments – As of June 30, 2017

Years Retired	Service Retirement	Non-Industrial Disability	Industrial Disability	Non-Industrial Death	Industrial Death	Death After Retirement	Total
Under 5 Years	$138,210,591	$4,968,515	$32,612,408	$1,574,588	$0	$17,992,846	$195,358,948
5 - 9	129,747,793	2,863,107	24,100,386	1,250,542	454,509	11,138,335	169,554,672
10 - 14	53,201,132	1,240,741	20,587,924	1,272,252	175,876	7,030,396	83,508,321
15 - 19	23,095,486	1,137,700	15,516,606	495,594	439,440	3,580,125	44,264,951
20 - 24	6,753,923	486,115	7,512,389	296,480	171,204	2,209,998	17,430,109
25 - 29	2,611,319	203,571	5,136,501	181,381	154,087	1,275,745	9,562,604
30 and over	5,294,783	251,341	15,391,876	329,566	1,204,071	1,352,712	23,824,349
Total	$358,915,027	$11,151,090	$120,858,090	$5,400,403	$2,599,187	$44,580,157	$543,503,954

Counts of members do not include alternate payees receiving benefits while the member is still working. Multiple records may exist for those who have service in more than one coverage group. This does not result in double counting of liabilities.

Retired Members and Beneficiaries (continued)

Number of Retirees and Beneficiaries - by Age and Retirement Type

State Peace Officers and Firefighters – As of June 30, 2017

Attained Age	Service Retirement	Non-Industrial Disability	Industrial Disability	Non-Industrial Death	Industrial Death	Death After Retirement	Total
Under 30	0	0	3	3	3	45	54
30-34	0	2	42	1	1	21	67
35-39	0	11	201	2	3	31	248
40-44	0	14	430	2	11	39	496
45-49	0	49	830	12	11	56	958
50-54	3,173	78	1,467	27	28	112	4,885
55-59	5,327	104	1,892	48	25	223	7,619
60-64	5,384	105	1,695	46	19	374	7,623
65-69	4,879	96	1,512	52	25	470	7,034
70-74	3,230	57	961	38	16	495	4,797
75-79	1,615	26	422	12	9	437	2,521
80-84	742	13	158	11	7	318	1,249
85 and Over	400	4	68	6	0	221	699
Total	24,750	559	9,681	260	158	2,842	38,250

Counts of members do not include alternate payees receiving benefits while the member is still working. Multiple records may exist for those who have service in more than one coverage group. This does not result in double counting of liabilities.

Annual Allowance Amounts for Retirees and Beneficiaries - by Age and Retirement Type

State Peace Officers and Firefighters – Annual Amounts Including PPPA Payments – As of June 30, 2017

Attained Age	Service Retirement	Non-Industrial Disability	Industrial Disability	Non-Industrial Death	Industrial Death	Death After Retirement	Total
Under 30	$0	$0	$50,459	$59,997	$57,187	$582,616	$750,259
30-34	0	14,590	1,419,150	9,965	583	221,977	1,666,265
35-39	0	124,140	6,749,304	78,145	124,719	598,525	7,674,833
40-44	0	198,020	15,109,262	76,917	561,590	916,877	16,862,666
45-49	0	911,698	29,461,045	618,364	471,197	1,461,899	32,924,203
50-54	201,499,897	1,943,309	60,330,312	1,244,124	1,244,670	3,986,246	270,248,558
55-59	334,944,349	2,463,988	77,373,347	2,321,068	1,019,605	8,175,605	426,297,962
60-64	328,282,330	2,831,421	71,791,880	1,765,712	702,226	14,610,722	419,984,291
65-69	282,409,919	2,548,923	66,721,769	2,175,335	923,238	18,815,035	373,594,219
70-74	173,790,770	1,626,654	41,887,180	1,571,229	579,156	19,714,309	239,169,298
75-79	78,656,896	743,306	17,618,597	522,264	322,534	16,975,272	114,838,869
80-84	33,575,416	391,736	6,243,081	332,377	290,162	11,633,936	52,466,708
85 and Over	15,830,973	85,627	2,599,745	254,497	0	7,309,116	26,079,958
Total	$1,448,990,550	$13,883,412	$397,355,131	$11,029,994	$6,296,867	$105,002,135	$1,982,558,089

Counts of members do not include alternate payees receiving benefits while the member is still working. Multiple records may exist for those who have service in more than one coverage group. This does not result in double counting of liabilities.

Retired Members and Beneficiaries (continued)

Number of Retirees and Beneficiaries - by Years Retired and Retirement Type

State Peace Officers and Firefighters – As of June 30, 2017

Years Retired	Service Retirement	Non-Industrial Disability	Industrial Disability	Non-Industrial Death	Industrial Death	Death After Retirement	Total
Under 5 Years	7,848	147	2,059	54	12	1,208	11,328
5 - 9	7,848	106	1,461	47	22	731	10,215
10 - 14	4,762	80	1,802	70	37	449	7,200
15 - 19	2,429	129	1,929	45	34	235	4,801
20 - 24	1,088	68	1,251	26	25	140	2,598
25 - 29	512	26	883	14	10	66	1,511
30 and over	263	3	296	4	18	13	597
Total	24,750	559	9,681	260	158	2,842	38,250

Counts of members do not include alternate payees receiving benefits while the member is still working. Multiple records may exist for those who have service in more than one coverage group. This does not result in double counting of liabilities.

Annual Allowance Amounts for Retirees and Beneficiaries - by Age and Retirement Type

State Peace Officers and Firefighters – Annual Amounts Including PPPA Payments – As of June 30, 2017

Years Retired	Service Retirement	Non-Industrial Disability	Industrial Disability	Non-Industrial Death	Industrial Death	Death After Retirement	Total
Under 5 Years	$455,531,567	$4,210,864	$93,508,971	$2,390,068	$621,522	$49,197,284	$605,460,276
5 - 9	496,021,876	3,176,204	70,123,134	2,233,931	1,029,064	26,618,220	599,202,429
10 - 14	286,449,566	1,980,640	78,760,181	2,997,446	1,438,376	15,413,925	387,040,134
15 - 19	126,997,386	2,703,199	73,397,981	1,649,622	1,231,587	7,740,607	213,720,382
20 - 24	49,037,592	1,289,896	45,510,703	1,102,170	1,053,308	4,075,144	102,068,813
25 - 29	24,682,234	466,899	28,108,264	490,555	372,950	1,661,581	55,782,483
30 and over	10,270,329	55,710	7,945,897	166,202	550,060	295,374	19,283,572
Total	$1,448,990,550	$13,883,412	$397,355,131	$11,029,994	$6,296,867	$105,002,135	$1,982,558,089

Counts of members do not include alternate payees receiving benefits while the member is still working. Multiple records may exist for those who have service in more than one coverage group. This does not result in double counting of liabilities.

Retired Members and Beneficiaries (continued)

Number of Retirees and Beneficiaries - by Age and Retirement Type

California Highway Patrol – As of June 30, 2017

Attained Age	Service Retirement	Non-Industrial Disability	Industrial Disability	Non-Industrial Death	Industrial Death	Death After Retirement	Total
Under 30	0	0	0	0	7	5	12
30-34	0	0	2	0	4	6	12
35-39	0	4	15	0	6	4	29
40-44	0	0	33	0	5	6	44
45-49	0	1	96	2	17	7	123
50-54	494	3	228	4	19	14	762
55-59	906	7	404	5	19	47	1,388
60-64	744	4	446	7	9	72	1,282
65-69	490	7	464	8	12	136	1,117
70-74	586	4	750	6	15	240	1,601
75-79	401	6	603	5	16	251	1,282
80-84	164	2	320	0	16	219	721
85 and Over	135	2	170	3	5	283	598
Total	3,920	40	3,531	40	150	1,290	8,971

Counts of members do not include alternate payees receiving benefits while the member is still working. Multiple records may exist for those who have service in more than one coverage group. This does not result in double counting of liabilities.

Annual Allowance Amounts for Retirees and Beneficiaries - by Age and Retirement Type

California Highway Patrol – Annual Amounts Including PPPA Payments – As of June 30, 2017

Attained Age	Service Retirement	Non-Industrial Disability	Industrial Disability	Non-Industrial Death	Industrial Death	Death After Retirement	Total
Under 30	$0	$0	$0	$0	$241,687	$91,764	$333,451
30-34	0	0	99,121	0	268,763	63,611	431,495
35-39	0	63,980	691,194	0	474,446	68,043	1,297,663
40-44	0	0	1,626,215	0	319,643	25,891	1,971,749
45-49	0	7,527	4,641,105	170,988	1,206,691	97,964	6,124,275
50-54	46,435,724	49,920	14,941,210	212,062	1,297,622	639,079	63,575,617
55-59	86,599,538	188,389	25,942,330	376,093	1,131,065	2,571,669	116,809,084
60-64	67,451,790	70,246	30,412,224	479,721	448,766	3,324,228	102,186,975
65-69	37,189,545	374,817	30,560,772	546,550	319,440	5,499,162	74,490,286
70-74	34,509,938	113,556	43,575,224	307,949	413,014	8,236,575	87,156,256
75-79	19,969,605	136,513	27,253,694	196,546	460,193	8,413,766	56,430,317
80-84	7,152,907	75,474	13,300,107	0	415,065	6,691,165	27,634,718
85 and Over	5,190,370	42,736	6,667,302	69,673	136,398	7,071,311	19,177,790
Total	$304,499,417	$1,123,158	$199,710,498	$2,359,582	$7,132,793	$42,794,228	$557,619,676

Counts of members do not include alternate payees receiving benefits while the member is still working. Multiple records may exist for those who have service in more than one coverage group. This does not result in double counting of liabilities.

Retired Members and Beneficiaries (continued)

Number of Retirees and Beneficiaries - by Years Retired and Retirement Type

California Highway Patrol – As of June 30, 2017

Years Retired	Service Retirement	Non-Industrial Disability	Industrial Disability	Non-Industrial Death	Industrial Death	Death After Retirement	Total
Under 5 Years	1,034	7	286	5	18	412	1,762
5 - 9	1,000	2	318	2	21	309	1,652
10 - 14	673	5	503	7	18	197	1,403
15 - 19	559	6	612	12	9	161	1,359
20 - 24	358	8	555	5	16	81	1,023
25 - 29	142	5	463	2	7	57	676
30 and over	154	7	794	7	61	73	1,096
Total	3,920	40	3,531	40	150	1,290	8,971

Counts of members do not include alternate payees receiving benefits while the member is still working. Multiple records may exist for those who have service in more than one coverage group. This does not result in double counting of liabilities.

Annual Allowance Amounts for Retirees and Beneficiaries - by Age and Retirement Type

California Highway Patrol – Annual Amounts Including PPPA Payments – As of June 30, 2017

Years Retired	Service Retirement	Non-Industrial Disability	Industrial Disability	Non-Industrial Death	Industrial Death	Death After Retirement	Total
Under 5 Years	$97,594,944	$198,077	$24,149,809	$378,968	$1,182,222	$15,910,556	$139,414,576
5 - 9	93,868,117	160,299	28,310,594	163,821	1,389,388	11,776,689	135,668,908
10 - 14	49,381,059	288,566	40,105,531	526,407	1,250,449	5,850,019	97,402,031
15 - 19	34,076,421	113,960	40,158,431	773,093	465,578	4,511,416	80,098,899
20 - 24	17,569,983	168,039	26,741,094	251,992	735,125	1,983,835	47,450,068
25 - 29	6,306,304	104,472	18,464,956	76,955	347,029	1,282,051	26,581,767
30 and over	5,702,589	89,745	21,780,083	188,346	1,763,002	1,479,662	31,003,427
Total	$304,499,417	$1,123,158	$199,710,498	$2,359,582	$7,132,793	$42,794,228	$557,619,676

Counts of members do not include alternate payees receiving benefits while the member is still working. Multiple records may exist for those who have service in more than one coverage group. This does not result in double counting of liabilities.

Retired Members and Beneficiaries (continued)

Number Counts and Benefits - by Year of Retirement – As of June 30, 2017

State Miscellaneous Tier 1

Year Retired	Total Retirement	Total Benefits	Average Benefits
2017[1]	2,701	$78,075,372	$28,906
2016	8,286	275,266,624	33,221
2015	8,481	277,622,301	32,735
2014	8,560	275,813,962	32,221
2013	7,364	221,366,649	30,061
2012	8,214	264,359,271	32,184
2011	8,297	263,719,280	31,785
2010	9,121	319,501,148	35,029
2009	7,980	291,591,997	36,540
2008	6,749	233,883,091	34,654
2007	6,465	208,269,091	32,215
2006	6,225	184,820,129	29,690
2005	7,031	227,436,879	32,348
2004	8,310	286,903,877	34,525
2003	5,754	180,128,391	31,305
2002	5,673	183,716,963	32,384
2001	5,776	209,017,981	36,187
2000	7,674	278,785,314	36,329
1999	2,829	65,201,672	23,048
1998	4,080	107,362,480	26,314
1997	4,102	110,529,779	26,945
1996	3,839	105,941,617	27,596
1995	3,482	98,025,609	28,152
1994	3,434	94,121,730	27,409
1993	2,573	56,282,183	21,874
1992	4,076	120,633,653	29,596
1991	4,405	150,665,772	34,203
1990	2,384	60,129,322	25,222
1989	2,143	46,907,928	21,889
1988 or earlier	18,597	323,355,642	17,388
Total	184,454	$5,599,435,707	$30,357

State Miscellaneous Tier 2

Year Retired	Total Retirement	Total Benefits	Average Benefits
2017[1]	145	$819,274	$5,650
2016	323	1,960,165	6,069
2015	327	2,376,139	7,266
2014	362	2,632,303	7,272
2013	381	2,815,069	7,389
2012	426	3,017,929	7,084
2011	310	2,227,219	7,185
2010	196	1,321,036	6,740
2009	167	1,159,534	6,943
2008	141	1,202,614	8,529
2007	126	1,066,104	8,461
2006	125	837,326	6,699
2005	140	1,151,601	8,226
2004	117	987,077	8,437
2003	127	1,217,509	9,587
2002	151	1,333,250	8,829
2001	198	1,533,382	7,744
2000	237	2,278,448	9,614
1999	261	2,884,318	11,051
1998	341	4,050,432	11,878
1997	320	4,269,978	13,344
1996	261	3,553,565	13,615
1995	206	3,238,065	15,719
1994	140	2,316,779	16,548
1993	126	1,973,416	15,662
1992	124	1,867,055	15,057
1991	127	1,935,562	15,241
1990	67	991,504	14,799
1989	76	1,103,115	14,515
1988 or earlier	191	2,303,618	12,061
Total	6,239	$60,423,386	$9,685

(1) The number for 2017 are for the first 6 months of the calendar year only.

Counts of members do not include alternate payees receiving benefits while the member is still working. Multiple records may exist for those who have service in more than one coverage group. This does not result in double counting of liabilities.

Retired Members and Beneficiaries (continued)

Number Counts and Benefits - by Year of Retirement – As of June 30, 2017 (continued)

State Industrial

Year Retired	Total Retirement	Total Benefits	Average Benefits
2017[1]	285	$3,640,435	$12,773
2016	881	12,146,130	13,787
2015	890	11,450,632	12,866
2014	826	10,431,730	12,629
2013	765	9,222,556	12,056
2012	876	12,154,878	13,875
2011	808	10,154,258	12,567
2010	934	13,546,604	14,504
2009	755	10,590,859	14,028
2008	594	7,938,969	13,365
2007	498	6,586,641	13,226
2006	534	6,490,175	12,154
2005	531	7,437,233	14,006
2004	646	8,689,050	13,451
2003	443	5,296,132	11,955
2002	437	5,487,245	12,557
2001	426	5,910,481	13,874
2000	548	7,553,317	13,783
1999	187	1,725,742	9,229
1998	283	2,647,407	9,355
1997	259	2,699,797	10,424
1996	211	1,936,712	9,179
1995	192	1,971,566	10,269
1994	157	1,601,794	10,203
1993	135	1,268,734	9,398
1992	168	2,461,471	14,652
1991	147	2,208,992	15,027
1990	93	820,433	8,822
1989	97	1,021,458	10,530
1988 or earlier	520	6,216,334	11,954
Total	14,126	$181,307,765	$12,835

State Safety

Year Retired	Total Retirement	Total Benefits	Average Benefits
2017[1]	491	$14,314,807	$29,154
2016	1,449	38,619,298	26,652
2015	1,426	36,809,923	25,813
2014	1,416	34,515,074	24,375
2013	1,348	34,027,998	25,243
2012	1,481	36,649,513	24,746
2011	1,406	35,682,427	25,379
2010	1,589	44,373,039	27,925
2009	1,315	34,582,552	26,299
2008	1,014	23,950,403	23,620
2007	936	19,496,312	20,829
2006	913	16,224,429	17,770
2005	989	18,497,124	18,703
2004	1,019	19,582,835	19,218
2003	763	14,172,805	18,575
2002	727	12,996,262	17,877
2001	682	12,344,273	18,100
2000	811	14,966,437	18,454
1999	370	5,422,049	14,654
1998	393	5,498,143	13,990
1997	348	5,369,501	15,430
1996	309	4,702,579	15,219
1995	238	3,246,528	13,641
1994	251	3,525,121	14,044
1993	170	2,773,104	16,312
1992	230	4,125,473	17,937
1991	206	3,097,973	15,039
1990	136	2,188,196	16,090
1989	136	2,304,468	16,945
1988 or earlier	2,180	39,445,308	18,094
Total	24,742	$543,503,954	$21,967

(1) The number for 2017 are for the first 6 months of the calendar year only.

Counts of members do not include alternate payees receiving benefits while the member is still working. Multiple records may exist for those who have service in more than one coverage group. This does not result in double counting of liabilities.

Retired Members and Beneficiaries (continued)

Number Counts and Benefits - by Year of Retirement – As of June 30, 2017 (continued)

State Peace Officers and Firefighters

Year Retired	Total Retirement	Total Benefits	Average Benefits
2017[1]	600	$31,620,107	$52,700
2016	1,877	101,498,221	54,075
2015	2,115	120,316,871	56,887
2014	2,091	111,687,769	53,414
2013	2,031	106,110,119	52,245
2012	2,369	133,542,113	56,371
2011	2,104	115,127,031	54,718
2010	2,295	136,610,589	59,525
2009	2,074	132,751,728	64,008
2008	1,509	94,024,851	62,309
2007	1,687	107,956,188	63,993
2006	1,947	119,409,647	61,330
2005	1,216	63,746,496	52,423
2004	1,403	69,481,926	49,524
2003	1,192	56,848,621	47,692
2002	1,305	63,440,426	48,613
2001	1,215	57,974,313	47,715
2000	1,613	82,744,273	51,298
1999	603	19,924,782	33,043
1998	695	23,547,851	33,882
1997	728	27,033,849	37,134
1996	658	26,598,010	40,423
1995	581	23,565,088	40,560
1994	510	18,760,927	36,786
1993	494	18,689,280	37,833
1992	605	24,601,600	40,664
1991	574	25,408,190	44,265
1990	321	10,498,094	32,704
1989	348	11,125,003	31,968
1988 or earlier	1,490	47,914,126	32,157
Total	38,250	$1,982,558,089	$51,832

California Highway Patrol

Year Retired	Total Retirement	Total Benefits	Average Benefits
2017[1]	64	$5,647,593	$88,244
2016	277	25,179,368	90,900
2015	305	29,365,788	96,281
2014	241	21,490,529	89,172
2013	244	20,918,421	85,731
2012	303	27,192,703	89,745
2011	311	28,307,807	91,022
2010	333	31,133,511	93,494
2009	298	29,344,486	98,471
2008	237	21,266,773	89,733
2007	238	19,286,924	81,037
2006	283	21,804,480	77,048
2005	315	25,930,286	82,318
2004	251	18,305,063	72,929
2003	178	11,261,129	63,265
2002	260	18,229,623	70,114
2001	296	21,456,054	72,487
2000	421	27,790,034	66,010
1999	142	7,021,782	49,449
1998	192	9,556,070	49,771
1997	238	11,744,063	49,345
1996	261	14,228,691	54,516
1995	228	11,340,585	49,739
1994	188	8,239,275	43,826
1993	234	10,493,783	44,845
1992	181	7,221,926	39,900
1991	200	8,819,256	44,096
1990	123	4,683,299	38,076
1989	171	6,340,368	37,078
1988 or earlier	1,958	54,020,006	27,589
Total	8,971	$557,619,676	$62,158

(1) The number for 2017 are for the first 6 months of the calendar year only.

Counts of members do not include alternate payees receiving benefits while the member is still working. Multiple records may exist for those who have service in more than one coverage group. This does not result in double counting of liabilities.

Appendix D – Normal Cost Information

Normal Cost Chart

The normal cost is determined using the Entry Age Cost method using a 7.25 percent discount rate. Some important features of this method are that the costs are dependent upon a member's entry age in the plan and benefit level of the plan. In general, the lower the entry age the lower the total normal cost. Note that future costs may vary as the entry age of the members change or with changes to actuarial assumptions or methods. FAC means Final Average Compensation.

	State Plans	Total Normal Cost	Employee Contribution[2]	Range of Breakpoints[3]	Average Effective Member Rate[4,5]	Employer Normal Cost
PEPRA	State Miscellaneous (Including CSU) - 2% @ 62	14.6%	6% - 11%	$317 - $513	6.9%	7.7%
	State Miscellaneous - 2nd Tier 2% @ 62[5]	10.7%	3.75%	$0	3.4%	7.3%
	State Industrial - 2% @ 62	15.0%	6% - 11%	$317 - $513	7.8%	7.2%
	State Safety - 2% @ 57	18.8%	11%	$317	10.4%	8.4%
	POFF (90% of current members) - 2.5% @ 57	23.1%	11% - 13%	$238 - $863	10.8%	12.3%
	POFF (10% of current members) - 2.7% @ 57	22.6%	13%	$863	9.9%	12.7%
	CHP - 2.7% @ 57	22.7%	11.5%	$863	10.1%	12.6%
CLASSIC	State Miscellaneous - 2% @ 60 & 3 Year FAC	15.8%	5% - 11%	$317 - $513	6.7%	9.1%
	State Miscellaneous - 2% @ 55[1]	16.7%	5% - 11%	$317 - $513	6.8%	9.9%
	State Miscellaneous - 2nd Tier 2% @ 55[5]	12.3%	3.75%	$0	3.4%	8.9%
	State Industrial - 2% @ 60 & 3 Year FAC	17.0%	5% - 11%	$317 - $513	8.2%	8.8%
	State Industrial - 2% @ 55[1]	18.7%	5% - 11%	$317 - $513	8.1%	10.6%
	State Industrial - 2nd Tier 2% @ 55[5]	14.7%	3.75%	$0	3.3%	11.4%
	State Safety - 2% @ 55 & 3 Year FAC	20.0%	11%	$317	10.4%	9.6%
	State Safety - 2.5% @ 60 & 3 Year FAC	21.6%	11%	$317	10.6%	11.0%
	State Safety - 2.5% @ 55[1]	24.2%	11%	$317	10.5%	13.7%
	State POFF - 2.5% @ 55 & 3 Year FAC	27.4%	8% - 13%	$238 - $863	10.9%	16.5%
	State POFF - 3% @ 55 & 3 Year FAC	29.9%	8% - 13%	$238 - $863	11.0%	18.9%
	State POFF - 3% @ 50[1]	29.7%	8% - 13%	$238 - $863	11.5%	18.2%
	CHP - 3% @ 55 & 3 Year FAC	27.9%	11.5%	$863	10.4%	17.5%
	CHP - 3% @ 50[1]	28.9%	11.5%	$863	10.5%	18.4%
BLENDED	State Miscellaneous	16.137%	3.75% - 11%	$0 - $513	6.8%	9.4%
	State Industrial	17.684%	3.75% - 11%	$0 - $513	7.9%	9.8%
	State Safety	22.443%	11%	$317	10.4%	12.0%
	POFF	28.544%	8% - 13%	$238 - $863	11.4%	17.1%
	CHP	28.206%	11.5%	$863	10.5%	17.7%

(1) Most current employees have benefits based on a final one year compensation period while new hires' benefits are based on a final three compensation period.
(2) Employee contribution rates are based on rates in effect at the valuation date.
(3) Employees only make contributions to the pension plan based on salaries earned above the breakpoint.
(4) The average effective member rate was calculated based on data as of June 30, 2017 and is reflective of the breakpoint and the different contribution rates paid by members within the same plans. For example, a member earning $6,000 a month with an 8 percent contribution rate and a breakpoint of $513 will pay $438.96 and have an effective contribution rate of 7.316 percent of salary. This is calculated as ($6,000-$513) * 8% divided by $6,000.
(5) Reflects the Total Normal cost assuming conversion to Tier 1 benefits for members with Tier 2 service.

Development of PEPRA Member Contribution Rates

PEPRA members are required to contribute at least 50 percent of the total annual normal cost of their pension benefit. As per Government Code Section 7522.30, State employees are excluded from this requirement except for employees of the Legislature, California State University (CSU), and the judicial branch.

It is preferable to determine normal cost using a large active population ongoing so that this rate remains relatively stable. The total PEPRA normal cost will be calculated using all active members within a State plan (including classic members) until the number of members covered under the PEPRA formula meets or exceeds 25 percent of the active population. Once that condition is met, the total PEPRA normal cost will be based on the active PEPRA population in the plan.

Should the total normal cost of the plan change by one percent or more from the base total normal cost established for the plan, the new member rate shall be 50 percent of the new normal cost rounded to the nearest quarter percent.

The table below shows the determination of the Member contribution rates based on 50 percent of the Total Normal Cost for each respective plan on June 30, 2017.

	Basis for Current Rate		Rates Effective July 1, 2018			
Plan	Total Normal Cost	Member Rate	Total Normal Cost	Change	Change Needed	Member Rate
State Miscellaneous – CSU, Legislature and Judicial	13.16%	6.50%	14.61%	1.45%	Yes	7.25%
POFF – CSU, Legislature and Judicial	22.04%	11.00%	22.95%	0.91%	No	11.00%

Development of State Bargaining Unit 16 Member Contribution Rates

Pursuant to Government Code Sections 20683.4 and 20683.5, Members of State Bargaining Unit 16 are required to contribute at least 50 percent of the total annual normal cost of their pension benefit. Should the total normal cost of the category increase by one percent or more from the total normal cost determined as of June 30, 2015, the new member rate shall be 50 percent of the new normal cost rounded to the nearest quarter percent. Subsequently, should the total normal cost of the category change (increase or decrease) by one percent or more from the basis at that time, the new member rate shall be 50 percent of the new normal cost rounded to the nearest quarter percent.

The table below shows the determination of the Member contribution rates based on 50 percent of the Total Normal Cost for each respective plan on June 30, 2017.

	Basis for Current Rate (June 30, 2015)		Rates Effective July 1, 2018			
	Total Normal Cost	Member Rate	Total Normal Cost	Change	Change Needed	Member Rate
State Miscellaneous – BU 16[1]	15.48%	10.0%	16.21%	0.73%	No	10.0%
State Industrial – BU 16[1]	18.02%	10.0%	17.68%	(0.34%)	No	10.0%
State Safety – BU 16	21.73%	11.0%	22.44%	0.71%	No	11.0%

(1) The member rate shown here is for a member who participates in Social Security. Our understanding is that all State Miscellaneous and State Industrial members in Bargaining Unit 16 participate in Social Security. If there are any members of these groups who do not participate in Social Security, the Member Rate is currently 1 percent higher than the rate shown here.

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 cost method, amortization policy and determination of asset value on which funding requirements are based.

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.

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: The assumed long-term rate of return on plan assets. This is the rate at which projected future cash flows are discounted to the valuation date to determine Accrued Liability. This assumption is called “investment return” in earlier CalPERS reports or “actuarial interest rate” in Section 20014 of the California Public Employees’ Retirement Law (PERL).

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.

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. GASB 68 replaced GASB 27 effective the first fiscal year beginning after June 15, 2014.

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, was not a member of another public retirement system prior to that date, and is not subject to reciprocity with another public retirement system.

Normal Cost: The annual cost of service accrual for the upcoming fiscal year for active employees. The normal cost as a percentage of payroll can 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.

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.

Superfunded: A condition existing when a plan's Market Value of Assets exceeds its Present Value of Benefits. Prior to the passage of PEPRA, when this condition existed on a given valuation date for a given plan, employee contributions for the rate year covered by that valuation could be waived.

Unfunded Liability (UAL): When a plan or pool's Market 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.

Actuarial Office
P.O. Box 942709 Sacramento, CA 94229-2709
TTY - (877) 249-7442
(888) 225-7377
FAX (916) 795-2744

Available online at CalPERS Website

California Public Employees' Retirement System
A Component Unit of the State of California