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

**ITEM:** 3.4
(ID # 11607)
**MEETING DATE:**
Tuesday, January 14, 2020

**FROM :** EXECUTIVE OFFICE AND HUMAN RESOURCES :

**SUBJECT:** EXECUTIVE OFFICE AND HUMAN RESOURCES: Pension Advisory Review Committee (PARC) 2020 Annual Report, All Districts. [$0]

**RECOMMENDED MOTION:** That the Board of Supervisors:

1. Receive and file the 2020 PARC Annual Report.
2. Direct staff to report back with any additional recommendations or updates on the County's pensions plans and/or OPEB, including any legislative changes that could be incorporated in the County's Legislative Platform.
3. Direct the PARC to review the annual CalPERS unfunded liability pre-payment for FY20/21 and to have such recommendations presented in conjunction with either the approval of the annual Tax and Revenue Anticipation Note (TRAN) cash flow financing, or with the FY 20/21 budget.

**ACTION:Policy**

Don R. Kent, Assistant CEO-County Finance Officer 1/7/2020

**MINUTES OF THE BOARD OF SUPERVISORS**

On motion of Supervisor Washington, seconded by Supervisor Perez and duly carried by unanimous vote, IT WAS ORDERED that the above matter is approved as recommended and that Supervisor Hewitt meet with the Pension Advisory Review Committee and the Executive Office to bring back recommendations to the Board regarding pension reform.

| | |
|---|---|
| Ayes: | Jeffries, Spiegel, Washington, Perez and Hewitt |
| Nays: | None |
| Absent: | None |
| Date: | January 14, 2020 |
| xc: | EO |

Kecia R. Harper
Clerk of the Board
By: Deputy

| FINANCIAL DATA | Current Fiscal Year: | Next Fiscal Year: | Total Cost: | Ongoing Cost |
|---|---|---|---|---|
| COST | $0 | $0 | $0 | $0 |
| NET COUNTY COST | $0 | $0 | $0 | $0 |
| SOURCE OF FUNDS: N/A | | | Budget Adjustment No | |
| | | | For Fiscal Year: 19/20 | |

**C.E.O. RECOMMENDATION:** Approve

**BACKGROUND:**

**Summary**

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

Board Policy B-25, Pension Management Policy, requires the PARC to file an annual report informing the Board of Supervisors and general public about the status of County pension plans. In addition, PARC reviews the annual CalPERS unfunded liability pre-payment for which the County receives a discount if it pays a lump sum at the beginning of the fiscal year.

A key responsibility of the PARC is to report to the Board and the public on important developments, analyze any proposed changes to benefits, and provide information about projected costs and funding status. This report includes information from the most recent actuarial reports prepared for the County by Bartel Associates, LLC, CalPERS Annual Valuation Reports for both the Miscellaneous and Safety Plans, and AON Actuarial Valuation Reports for Other Post-Employment Benefits (OPEB) and the Part-Time and Temporary Employees Retirement Plan.

Highlights of the report are summarized below.

**Employer Rate Outlook**

The CalPERS employer contribution rates for the Miscellaneous Plan will increase from 21.6% of payroll in FY 19/20 to 24.5% in FY 20/21, and for the Safety Plan, employer contribution rates will increase from 37.3% in FY 19/20 to 43.0% in FY 20/21.

**Funded Status**

The unfunded accrued liability for the period ended June 30, 2018 is $2.416 billion (an increase of $301 million from prior year) for the Miscellaneous Plan, and, $1.089 billion (an increase of $123 million from prior year) for the Safety Plan. The combined total is $3.5 billion (an increase of $424.5 million from prior year). The year over year increase is largely attributable to the reduction in the assumed rate of return from 7.25% to 7%.

The June 30, 2020 projected actuarial funded status, based on the market valuation (excluding the Section 115 Pension Trust) for the Miscellaneous Plan is expected to be 70.2% and, 70.7% for the Safety Plan. Bartel Associates analysis reflects the County to be ranked close to average for its Miscellaneous and Safety plans in terms of its funded percentage compared to other CalPERS participant counties, cities and towns throughout the state. The data is compiled from CalPERS 2018 actuarial valuations across 458 Miscellaneous and 373 Safety agencies.

For FY 18/19, CalPERS reported a preliminary 6.55% net return, which was 0.45 percentage points below the expected return of 7.00%. The CalPERS Board has approved several assumption changes, as noted in the report, which will have a significant effect of increasing the County's contribution rates over the near term. The cumulative effect of these changes pushes out the start of the projected long-term decline in contribution rates until the early 2030's.

**Annual Pre-Payment**

CalPERS over the years has offered pre-payment discounts in excess of 3% in lieu of periodic payments that coincide with payroll disbursements. PARC first recommended seizing this opportunity in 2004 and expects to continue to do so if market conditions for our annual TRAN's borrowing prove to be favorable in funding the pre-payment. The FY 20/21 required payment for the unfunded liability is $229 million.

## Impact on Citizens and Businesses:

An increase in pension costs in turn increases the costs of services that are provided to citizens of the County. Since PARC's inception, recommendations to the Board have resulted in savings that may not have otherwise materialized.

Lisa Brandl

Lisa D Brandl 1/7/2020

# 2020

## Pension Advisory Review Committee

## Annual Report

## January 14, 2020

**Executive Summary**

The County's Pension Advisory Review Committee (PARC) was established in 2003 to guide policy decisions about retirement benefits. The PARC presently consists of members appointed by the Board of Supervisors, including the Treasurer-Tax Collector, County Finance Officer, Human Resources Director, Auditor-Controller, and, a local public safety member department representative (Board Policy B-25).

Per the Board's policy, the key responsibilities of the PARC are:

- Report to the Board and the public on important developments affecting County retirement benefit plans
- Analyze any proposed changes to the benefit system, and
- Provide information about projected costs and funding status

This annual report includes detailed information about the County's two primary defined benefit pension plans, CalPERS Miscellaneous and Safety, from the most recent report prepared by its outside actuarial consultant, John Bartel of Bartel Associates, LLC, dated September 24, 2019, that provides a future outlook regarding the plans' funded status (Attachment 1). Funding status including the deposit of the Pension Obligation Bond (POB) proceeds, and amounts owed on the POB for FY 19/20, are expected to be 70.2% for the Miscellaneous Plan and 70.7% for the Safety Plan (these funding ratios do not include funds held in the Section 115 Trust Pension Trust). The report also includes the most recent CalPERS Valuation Reports for the Miscellaneous and Safety plans (Attachments 2 and 3).

As discussed below, the County (and most other CalPERS agencies) are on the front end of a period of rate increases that are not projected to peak until the early 2030's and then start to decline. Table 1 on page 6 shows both the increases and decreases from last years' projections. The key to realizing that decline and no further increases will be CalPERS' ability to perform close to its target rate. Poor investment performance following the financial crisis significantly increased the County's unfunded liability, driving up the required payments.

The report also addresses other retirement components outside of the County's core pension plans including: a status report on the County's 2005 Pension Obligation Bonds (POB's) issued to reduce its unfunded pension liability with CalPERS, the Liability Management Fund (LMF), the annual prepayment program, the Section 115 Pension Trust, Section 115 Other Post-Employment Benefits (OPEB) Trust, and the Part-Time and Temporary Employees' Retirement Plan.

The County has taken a number of steps over the past decade to improve control over its retirement liabilities. Those include the negotiation of lower rate tiers, asking employees to pay their own member contributions, the creation of the LMF, and, the formation and funding of the Section 115 Pension Trust. In the previous decade the County increased its funding ratio and cut interest cost by issuing POB's. These efforts to identify opportunities to stabilize the pension plans should continue. The prospects for additional pension reform are unclear at this time, but the County should be kept apprised of legislative changes, should there be further action at the state level (e.g. the establishment of other tiers or the incorporation of defined contribution options, etc.).

This pension report is being provided with the intent of addressing as many of the concerns raised by the Board and other stakeholders, as the impact of increasing rates with CalPERS have gone from a future forecast to an impending budgetary reality. It is anticipated that the submission of this report to the Board will be accompanied by a formal verbal presentation and discussion.

In addition, this report provides some background information and funded status (page 14) of the special district plans of the Riverside County Flood Control and Water Conservation District, Riverside County Regional Park and Open-Space District, and the Riverside County Waste Resources Management District.

## Summary of CalPERS Pension Plans

For FY 18/19, CalPERS reported a preliminary 6.55% net return, which is 0.45 percentage points below the expected return of 7.00%. The CalPERS Board has approved several assumption changes including the reduction of the discount rate, and, suspension of the Risk Mitigation Policy until the June 30, 2018 valuation. These changes will have a significant effect of increasing the County's rates over the near term. The cumulative effect of these changes pushes out the start of that projected long-term decline in rates, highlighted in last year's report, until the early 2030's.

Separately, steps taken to achieve pension reform such as establishing Tier II and employees contributing their own member contributions. Finally, the POB issued in 2005 to partially fund the County's unfunded liability is projected to have a net savings of $138.1 million by February 15, 2020.

## Actuarial Changes

Over the last few years, CalPERS' actuarial staff has implemented a number of changes, at the direction of its Board, which will have the effect of increasing rates in the near term. The changes include:

| | Discount Rate | Initial FY Impact | Full Impact |
|---|---|---|---|
| 6/30/16 Valuation | 7.375% | 18/19 | 22/23 |
| 6/30/17 Valuation | 7.250% | 19/20 | 23/24 |
| 6/30/18 Valuation | 7.000% | 20/21 | 24/25 |

**Asset Smoothing** – Asset smoothing will be eliminated over a five-year period. These changes were included in CalPERS' 6/30/13 valuation, with the first impact in the FY 15/16 rates and full impact in FY 19/20. This is the practice of spreading the investment gains and losses over a period in order to minimize year-to-year contribution rate fluctuations.

**Demographic Assumptions** – CalPERS also approved demographic actuarial assumption changes. The most significant change is the anticipation of future mortality improvement. This was included in the 6/30/14 valuation with the first impact in FY 16/17 and full impact in FY 20/21.

**Amortization Policy** – In February 2018, CalPERS adopted changes to the policy effective as of the June 30, 2019 valuation and contributions beginning FY 21/22, reducing the period over which actuarial gains and losses are amortized from 30 years to 20 years. This change applies only to new gains/losses established on or after June 30, 2019. The policy allows existing amortization bases to remain unchanged to minimize budgeting disruptions.

CalPERS rates are adjusted annually for a variety of reasons. The most impactful adjustments are due to investment performance. To the extent that performance deviates from the expected rate, a gain or loss is recognized. These gains or losses form a new "layer" that is added to the existing "bases" that are already embedded in the rate, but still separately identified over and above the normal cost. The County presently has total of 42 bases that are amortized over time (Miscellaneous 22 bases and Safety 20 bases) that range from 11 to 30 years. See attached CalPERS Annual Actuarial Valuation Reports for a complete list of the existing bases.

## Risk Mitigation Policy

In November 2015, CalPERS adopted a Risk Mitigation Policy to address concerns about funding status and performance in response to the volatility and underperformance seen following the 2008 financial crisis. The purpose of the risk mitigation policy is to better align CalPERS investment policy with a more realistic and conservative investment philosophy and asset mix. Changes will be implemented over the course of time and the investment mix will be accompanied by reduction in the long term assumed rate of return, currently at 7%, and moving to below 6% over a twenty-year horizon. The movement in this direction started in 2012 with a decrease in the assumed rate of 7.75%. Components of the Risk Mitigation Policy have been suspended until the June 30, 2018 valuation as part of the discount rate reductions pursuant to a phase-in schedule through FY 19/20. See the table below for funding risk mitigation event thresholds and impacts.

| **Excess Investment Return** | **Reduction in Discount Rate** | **Reduction in Expected Investment Return** |
|---|---|---|
| If the actual investment returns exceed the discount rate by: | Then the discount rate will be reduced by: | And the expected investment return will be reduced by: |
| 2.00% | 0.05% | 0.05% |
| 7.00% | 0.10% | 0.10% |
| 10.00% | 0.15% | 0.15% |
| 13.00% | 0.20% | 0.20% |
| 17.00% | 0.25% | 0.25% |

## Funding Status

The actuarial unfunded accrued liability for the period ended June 30, 2018 is $2.416 billion (an increase of $301 million from prior year) for the Miscellaneous Plan, and, $1.089 billion (an increase of $123 million from prior year) for the Safety Plan. The combined total is $3.5 billion (an increase of $424.5 million from prior year). The year over year increase is largely attributable to the reduction in the assumed rate of return from 7.25% to 7%.

The June 30, 2020 projected actuarial funded status based on the market valuation excluding 115 Pension Trust for:

1. The Miscellaneous Plan, including the deposit of the POB proceeds, with amounts owed on the POB, is expected to be 70.2%. By way of comparison, the last years' ratios were 68.7%, 67.8% and 68.6%.
2. The Safety Plan, including POB proceeds, with amounts owed on the POB, is expected to be 70.7%. By way of comparison, the last years' ratios were 69.4%, 68.8% and 69.4%.

Bartel Associates analysis reflects the County to be ranked close to average for its Miscellaneous and Safety plans in terms of its funded percentage compared to other CalPERS participant counties, cities and towns throughout the state. The data is compiled from CalPERS 2018 actuarial valuations across 458 Miscellaneous and 373 Safety agencies.

**Employer Rate Outlook**

This report provides a one, ten, and 30-year outlook. As discussed below, the County (and most other CalPERS agencies) are on the front end of a long period of rate increases. This year's actuarial report has not produced any surprises versus the last couple of years.

The employer contribution rates for the Miscellaneous Plan will increase from 21.6% of payroll in FY 19/20 to 24.5% in FY 20/21. That will be an increase in employer rate of 2.9%. The asset and assumption changes are partially offset by prior gains. The components for the rate change are as follows:

**Composition of the FY 20/21**
**Miscellaneous Plan Employer Contribution Rates**[1]
**(slide 22 of the Bartel Report)**

| | |
|---|---|
| • 2019/20 Employer Contribution Rate | 21.6% |
| • Payroll < Expected | 0.4% |
| • 6/30/14 Asset Method Change (5th Year) | 0.6% |
| • 6/30/16 Discount Rate Assumption Change (3rd Year) | 0.2% |
| • 6/30/17 Discount Rate Change and Inflation (2nd Year) | 0.2% |
| • 6/30/18 Discount Rate and Inflation (1st Year) | 1.2% |
| • Other (Gains)/Losses | 0.3% |
| **Total FY 20/21 Employer Contribution Rate** | **24.5%** |

Note: [1]Does not include POB debt service.

The Safety Plan employer contribution rates will increase from 37.4% in FY 19/20 to 43.0% in FY 20/21. That will be an increase in the employer rate of 5.6% The components of the rate changes are as follows:

**Composition of the FY 20/21**
**Safety Plan Employer Contribution Rates**[1]
**(slide 44 of the Bartel Report)**

| | |
|---|---|
| • 2019/20 Employer Contribution Rate | 37.4% |
| • Payroll <Expected | 1.5% |
| • Asset Method Change (5th Year) | 1.1% |
| • 6/30/14 Assumption Change (3rd Year) | 0.4% |
| • 6/30/16 Discount Rate Change (2nd Year) | 0.4% |
| • 6/30/17 Discount Rate and Inflation (1st Year) | 2.1% |
| • Other (Gains)/Losses | 0.1% |
| **Total FY 20/21 Employer Contribution Rate** | **43.0%** |

Note: [1]Does not include POB debt service.

The following table compares projected employer contribution rates. As described earlier, CalPERS has made several changes that increased contribution rates. These projections are based on 50th Percentile data from the Bartel Report and the rates include POB debt service.

**Table 1**
**Projected Employer Contribution Rates**
**(From Slides 30 and 52 of the Bartel Report)**

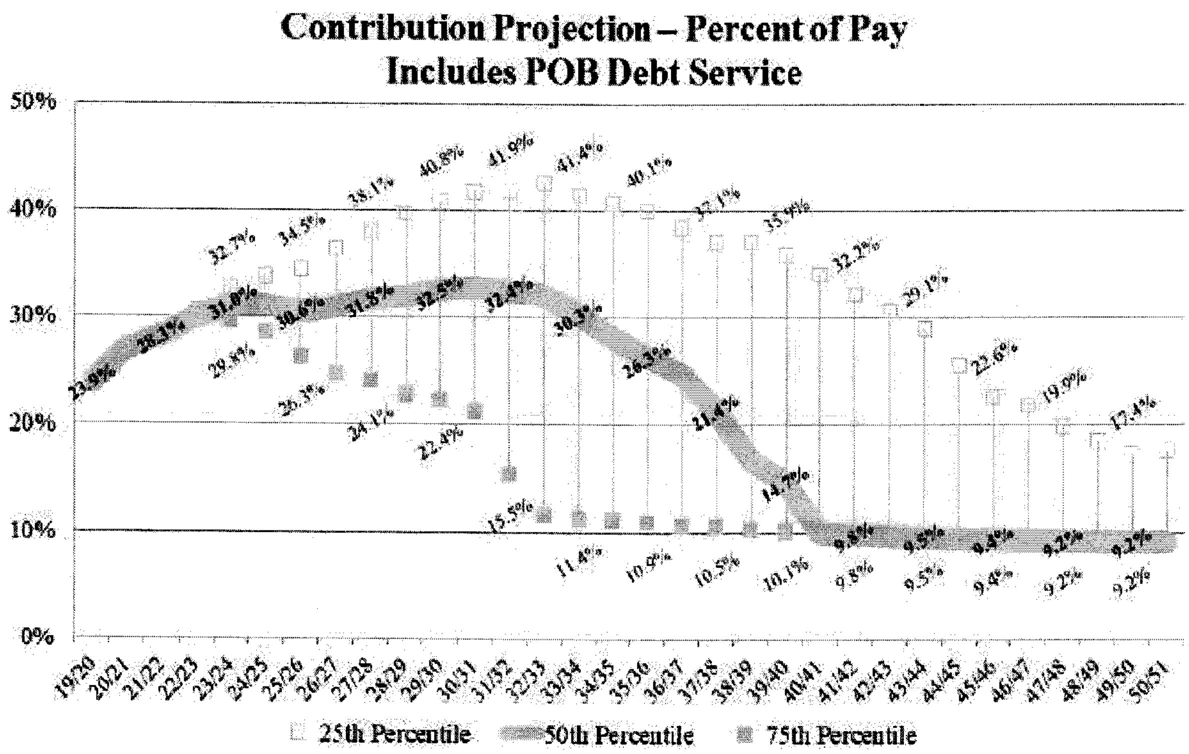
| | Micellaneous Plan | | Safety Plan | |
|---|---|---|---|---|
| **FY** | **Rate[1]** | **Change from prior FY (+/-)** | **Rate[2]** | **Change from prior FY (+/-)** |
| 17/18 | 19.4%[3] | 0.3% | 30.3%[3] | 1.5% |
| 18/19 | 21.2%[3] | 1.8% | 33.7%[3] | 3.4% |
| 19/20 | 23.9%[3] | 2.7% | 39.7%[3] | 6.0% |
| 20/21 | 26.9% | 3.0% | 45.5% | 5.8% |
| 21/22 | 28.3% | 1.4% | 47.8% | 2.3% |
| 22/23 | 30.0% | 1.7% | 50.3% | 2.5% |
| 23/24 | 31.0% | 1.0% | 51.8% | 1.5% |
| 24/25 | 31.1% | 0.1% | 52.5% | 0.7% |
| 25/26 | 30.6% | -0.5% | 52.5% | 0.0% |
| 26/27 | 31.0% | 0.4% | 53.3% | 0.8% |
| 27/28 | 31.8% | 0.8% | 54.6% | 1.3% |
| 28/29 | 32.0% | 0.2% | 54.9% | 0.3% |
| 29/30 | 32.5% | 0.5% | 56.1% | 1.2% |
| 30/31 | 32.8% | 0.3% | 56.4% | 0.3% |

1. Includes POB debt service, which is about 2.5% through 2023/24; 1.6% in 2024/25; and 0.4% thereafter. Miscellaneous POB debt service ends in 2035.
2. Includes POB debt service which is about 2.5% through 2023/24; 1.6% in 2024/25; and 0.4% thereafter. Safety POB debt service ends in 2035.
3. Rates for FY 17/18 through FY 20/21 are actual rates.

## Longer-Term Projections

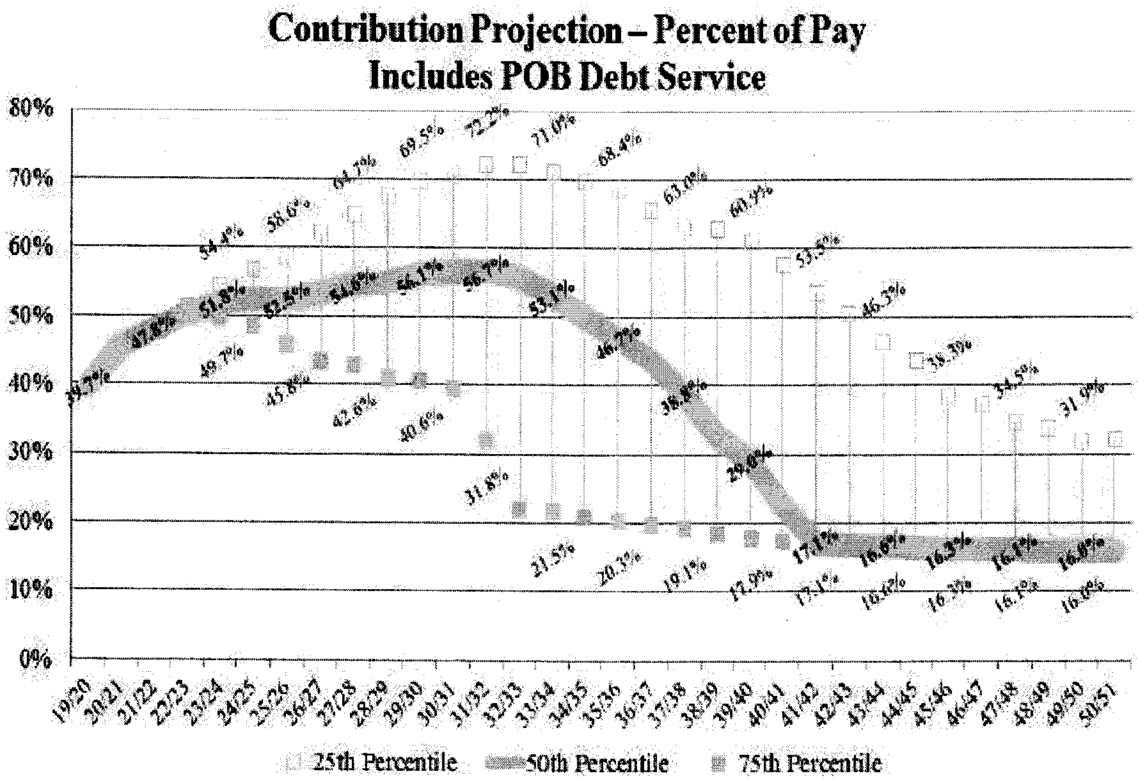
Listed below are two charts that show the projected employer contribution rates over the next thirty years for the County's Miscellaneous and Safety Plans (Table 2A and 2B). Over the next decade, contributions are expected to increase as CalPERS' assumption changes are absorbed and the impact on the discount rate being phased in (as seen in Table 3A and 3B). Once the smoothing is complete and assuming no other changes, the rates should decline over a sustained period. **Note, that even with very poor investment returns, the contribution rates exhibit a long-term decline after a higher peak is reached.** The fact that all scenarios show a decline is due to CalPERS' amortization policy to pay off the unfunded liability over a fixed period. The decline reflects the increasing impact of the changes to the benefit formulas, as more and more of the employee population become subject to the new lower tiers. See table below.

**Table 2A - Employer Contribution Rate Projections – Miscellaneous (slide 30)**



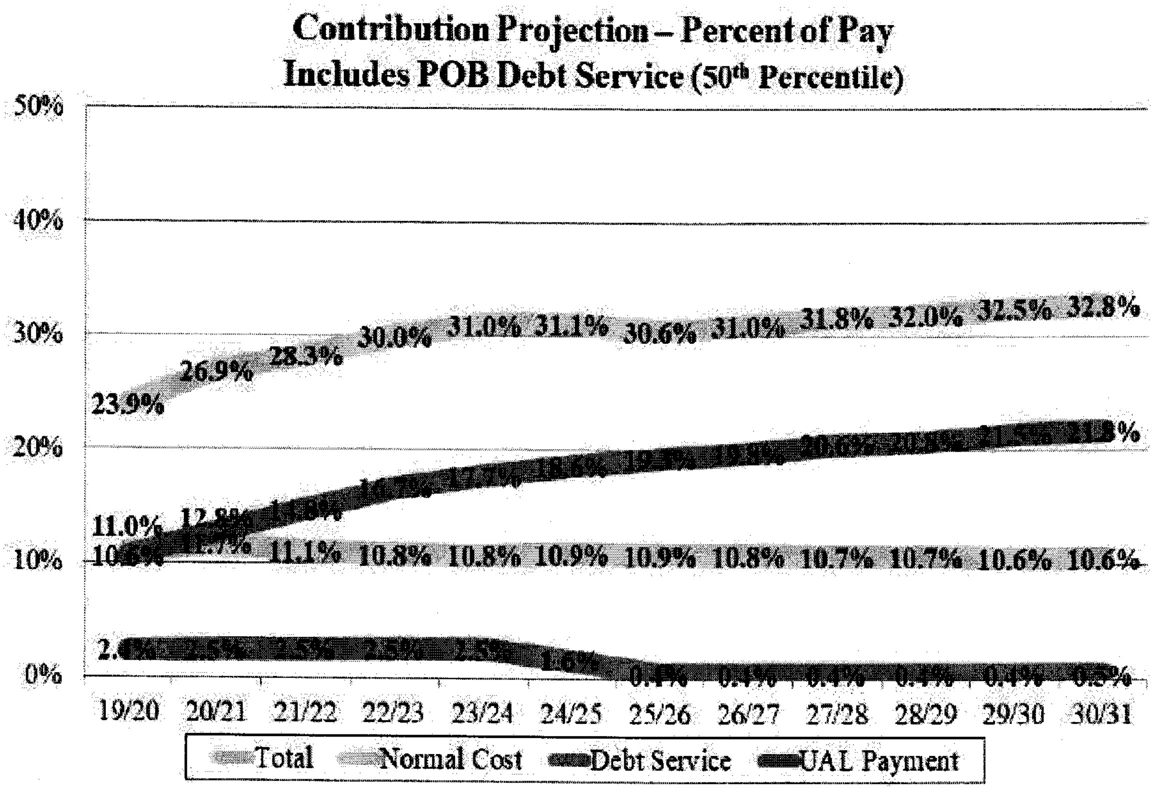

Source: Bartel Associates Report dated September 24, 2019.

**Table 2B - Employer Contribution Rate Projections – Safety (slide 52)**




Source: Bartel Associates Report dated September 24, 2019.

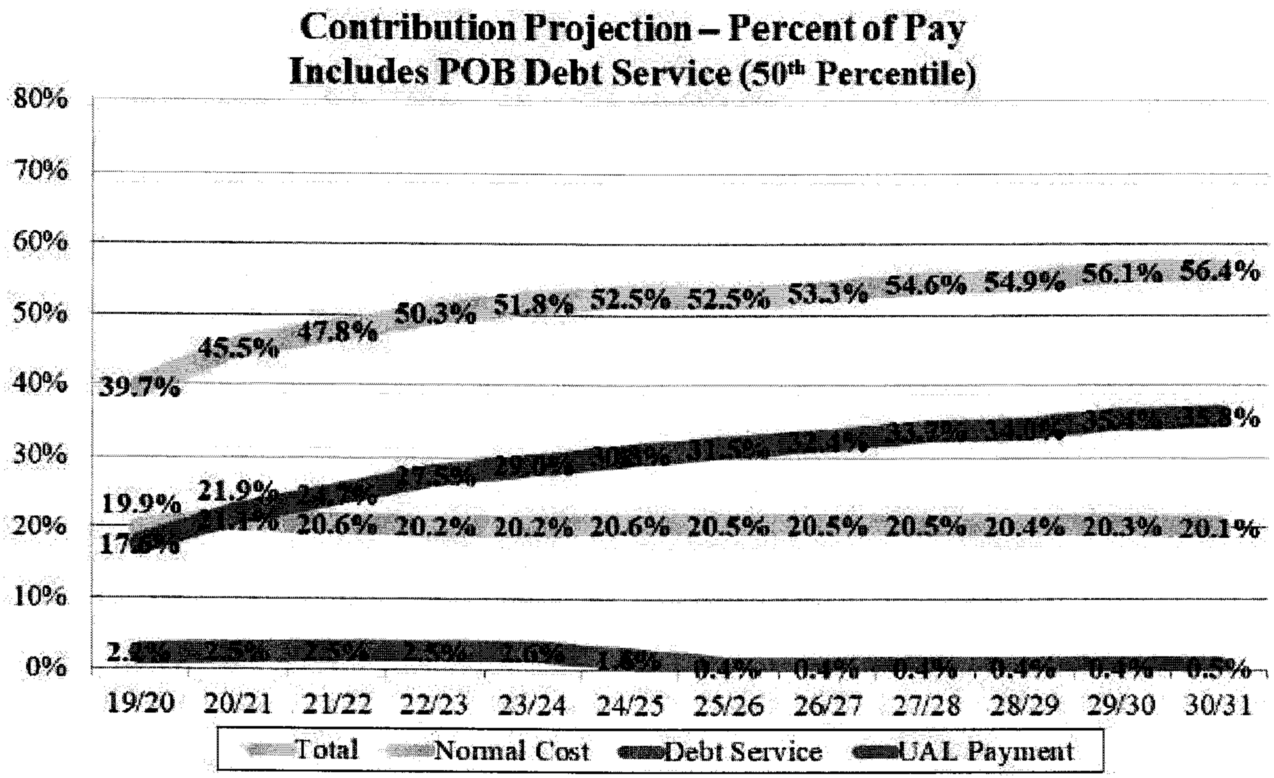
**Table 3A -Employer Contribution Projection Percent of Pay– Miscellaneous (slide 31)**




Source: Bartel Associates Report dated September 24, 2019.

**Note: Normal cost remains relatively flat and the UAL payment continues to move higher.**

**Table 3B - Employer Contribution Projection Percent of Pay– Safety (slide 53)**




Source: Bartel Associates Report dated September 24, 2019.

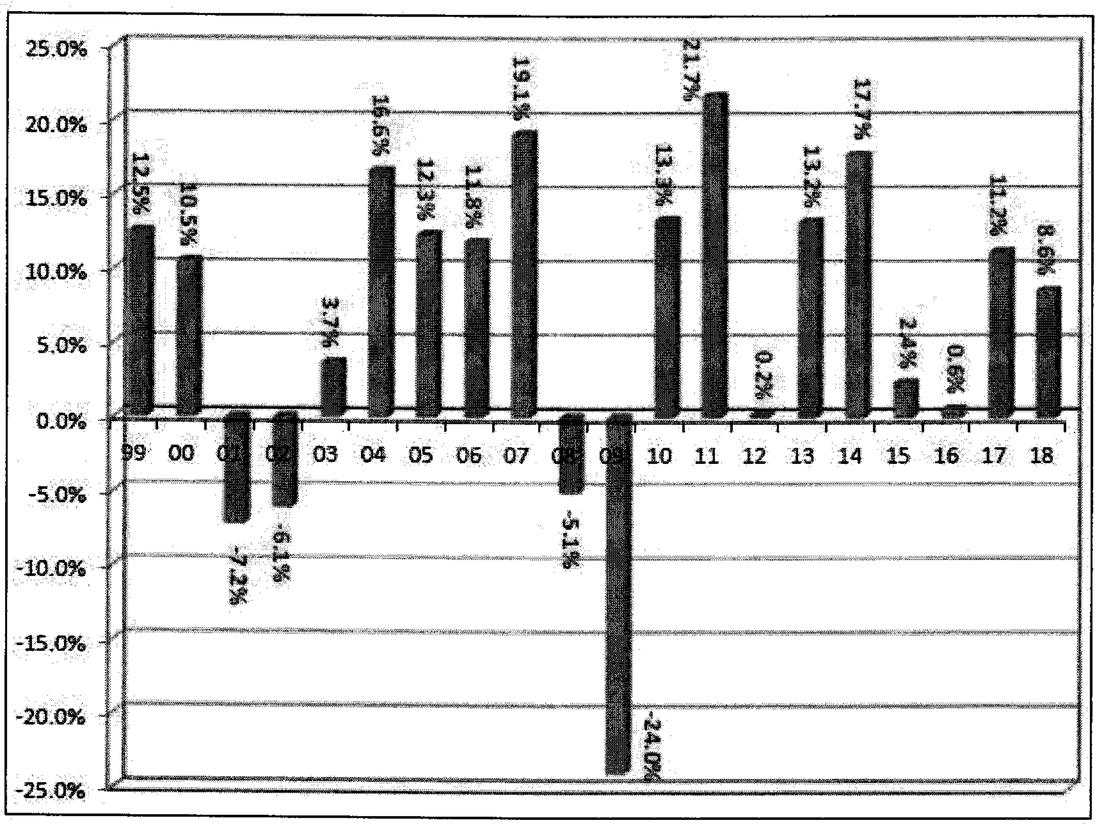
**Note: Normal cost remains relatively flat and the UAL payment continues to move higher.**

## Investment Returns

The primary driver of the rate formula is CalPERS' investment performance. Actuarial and demographic assumptions impact the rate but far less than performance. Poor investment performance following the financial crisis significantly increased the County's unfunded liability, driving up the required payments.

The following Table 4A, illustrates the 20-year historical annual returns for the Public Employees Retirement Fund (PERF) for each fiscal year ending in June 30. Beginning in 2002, the figures are reported as gross of fees.

**Table 4A - CalPERS Investment Returns (update with June 30, 2018 return)**




Source: CalPERS Annual Valuation Report as of June 30, 2018

## Pension Obligation Bonds (POB's)

The County issued $400 million in POB's in 2005 to lock in an all-in borrowing cost of 4.91%, refinancing its prior unfunded liability, which was carrying a 7.5% rate. As discussed earlier, the rate is expected to drop from the current level of 7.00% to 6% over a twenty-year period. At the same time it cut its interest rate to 4.91%, the County converted its repayment schedule from a rolling 30-year amortization to a fixed amortization of 30 and 25 years for the Miscellaneous and Safety Plans respectively, further reducing interest cost. Upon deposit of the bond proceeds with CalPERS, the County's CalPERS rate was reduced and replaced by the lower amount of the bond's debt service.

Bartel's analysis is projecting that as of February 15, 2020, the County will realize $138.1 million in net savings as a result of the sale of the bonds in February 2005 and will have an outstanding balance of $218.8 million. It is worth noting that the bulk of the bonds will be repaid by 2025 as seen in Table 3A and 3B. There will be a reduction of $16.1 million from FY 24/25 to FY 25/26 for the Miscellaneous plan, and for Safety a reduction of $4.5 million for the same period. The POB's have a relatively low break-even rate (4.91%) versus CalPERS' expected return of 7.00%. Even if CalPERS were to earn a rate slightly below the bond rate for the remaining term of the bonds, and well below a new long-term target rate of 6.0%, the County can still expect to show savings.

## Liability Management Fund (LMF)

The LMF was established under the POB documents and incorporated into the Board's Pension Management Policy B-25. A portion of the projected annual savings from the POB issuance is collected from departments for the purpose of reducing long-term pension costs and accelerating the repayment of pension liabilities. These cash flow savings occur annually and independent of the lifecycle savings mentioned above. The amount collected is set aside in the LMF, held by the County's bond trustee, and each year PARC recommends whether the funds should be used to pay down the CalPERS unfunded liability or to pay down the POB's. To date, some of the excess has been sent to CalPERS to reduce the unfunded liability. Last year the excess was recommended to be sent to the Section 115 Pension Trust (discussed below) and will likely be the preferred option going forward.

## Annual Prepayment

CalPERS offered an early payment discount of 3.44% for FY 19/20 in lieu of the periodic payments that coincided with payroll disbursements. PARC first recommended utilizing this approach in 2004. The discount reduces the total required payment; in order to fund the initial payment, the County typically includes the prepayment amount as part of the annual Tax and Revenue Anticipation Note (TRAN) borrowing. An alternative would be to borrow internally by drawing down General Fund cash.

CalPERS changed its prepayment policy in FY 18/19 and now allows only the unfunded liability payment portion to be prepaid. The FY 20/21 required payment for the unfunded liability is $229 million. A final recommendation regarding the FY 20/21 prepayment will be made in conjunction with the FY 20/21 TRAN borrowing.

## Section 115 Pension Trust

The Section 115 Pension Trust was established in 2016 (Board Resolution No. 2016-214) to help the County independently mitigate CalPERS' contribution rate volatility and act as a buffer for budgeting purposes. Assets in the Trust cannot be used for any other purposes except for reimbursing the County for CalPERS contributions, or, for making payments directly to CalPERS to pay down a portion of the unfunded liability. Excess funds from the Liability Management Fund and OPEB disbursements were placed in the Trust to fund the initial deposit. Additionally, funds collected as a result of the difference between CalPERS' multi-year projected payroll, based on actuarial assumptions, and, the County's actual payroll, are restricted and invested in the County Treasurer's Pooled Investment Fund. Funds are then dollar-cost averaged into the Trust. Over time this tool will become more significant as assets accumulate in the account.

The Trust was formed with Public Agency Retirement Services (PARS) managing the assets for the County (PARS is the administrator, HighMark Capital Management is the investment manager, and, US Bank is the trustee). Unlike assets in CalPERS, the funds in the Trust are managed by an investment manager, in a manner consistent with the County's risk profile in a combination of cash, fixed income and equity investments. As of June 30, 2019, the balance in the Trust was $28.7 million, up from last years' report of $11.5 million. The current investment strategy is Moderate Index PLUS (Active) Strategy, with a rate of return for the 12 month period ended June 30, 2019 of 6.61%.

## Pension Reform

Pension reform has become a topic of concern almost immediately following the move to higher benefit formulas across California, including Riverside County, at the beginning of the millennium. After internal discussion, the County took the lead in initiating pension reform with its bargaining units in advance of any action by the state. As a result of collective bargaining, employees of the County agreed to pay their own member contribution and eliminating the Employer Paid Member Contribution (EPMC). Additionally, a new second retirement Tier (Tier II) was implemented with a lower benefit formula, which became effective on August 24, 2012. This tier was added in both the Miscellaneous and Safety units of the County.

The passage of Assembly Bill 340 (AB 340) on September 12, 2012, created the Public Employees' Pension Reform Act (PEPRA) implementing new lower benefit formulas, longer final compensation periods, and new contribution requirements for new employees hired on or after January 1, 2013, who meet the definition of a new member under PEPRA (known as Tier III). Employee contribution rates for Tier III vary based on PEPRA rules. Listed below is Table 5 of the three tiers.

## Pension Reform (continued)

**Table 5**
**Riverside County Pension Tiers**

| County Plan | | Retirement Formula | Employee Contribution | Earliest Retirement Age | Number of Actives | Payroll as of 06/30/2018 | PEPRA Compensation Limits (1) | Final Compensation Period | Effective Date |
|---|---|---|---|---|---|---|---|---|---|
| Tier I | Miscellaneous | 3% at 60 | 8% | 50 | 9,437 | $ 765,774,786 | N/A | 12 months | 7/11/2002 |
| | Safety | 3% at 50 | 9% | 50 | 2,443 | $ 253,038,355 | N/A | 12 months | 6/28/2001 |
| Tier II | Miscellaneous | 2% at 60 | 7% | 50 | 658 | $ 44,360,201 | N/A | 36 months | 8/24/2012 |
| | Safety | 2% at 50 | 9% | 50 | 126 | $ 9,385,242 | N/A | 36 months | 8/24/2012 |
| Tier III - PEPRA | Miscellaneous | 2% at 62 | 7.25% | 52 | 6,022 | $ 323,010,341 | $126,291 | 36 months | 1/1/2013 |
| | Safety | 2.7% at 57 | 12.50% | 50 | 727 | $ 47,290,230 | $151,549 | 36 months | 1/1/2013 |

[1] 2020 Compensation Limits are indexed annually

## Special Districts and Waste Resources

The County's Special Districts participate in what CalPERS refers to as the Risk Pool. The Risk Pool is designed to accommodate smaller employers whose size is not sufficient to develop individual actuarial assumptions. Risk Pool participation occurs if a rate plan has less than 100 active members on any valuation date. Risk pooling is the process of combining assets and liabilities across employers to produce large, risk sharing pools that reduce or eliminate large fluctuations in an employer's retirement contribution rate caused by unexpected demographic events.

The Riverside County Regional Park and Open-Space District has three rate plans and is in the CalPERS Miscellaneous Risk Pool. As of the CalPERS annual valuation report for June 30, 2018, their funded status of Tier I was 74.0% (funded status decreased 1.9 percentage points from 75.9%, prior year); Tier II at 89.9% (funded status decreased 3.9 percentage points from 93.8%, prior year); and the PEPRA Tier III at 89.1% (funded status decreased 3.0 percentage points from 92.1%, prior year).

The Riverside County Flood Control and Water Conservation District's annual valuation report for June 30, 2018, shows a funded status of 63.9%, a decrease of 1.8 percentage points from 65.7%, prior year.

The Riverside County Waste Resources Management District annual valuation report for June 30, 2018, shows a funded status of 70.8%, a decrease of 1.6 percentage points from 72.4%, prior year.

## Other Post-Employment Benefits (OPEB)

GASB 45 modified the reporting requirements for OPEB provided by state and local governments. In summary, GASB 45 dictates that the present value of these benefits should be quantified and reported in the annual valuation report. Such reporting does not trigger a funding requirement.

The County established and funded an OPEB Trust in 2007 to reduce the actual and nominal liability. The County established the trust under a master program established by CalPERS and invests its OPEB assets with the California Public Employers' Retirement Benefit Trust program (CERBT).

Effective January 1, 2011, CalPERS introduced three new investment allocation strategies for CERBT. PARC reviewed the details of the strategies and adopted Strategy 1, an asset allocation strategy most similar to the investment allocation strategy followed by CERBT prior to January 1, 2011, with an expected rate of return of 7.61%. CERBT subsequently lowered its investment strategy expected return to 7.28%.

Effective July 1, 2017, PARC adopted Strategy 2, with an expected rate of return of 6.73%. As of October 2018, the expected rate of return was 7.01%. As of July 1, 2019, the CERBT was funded at 43.5% versus 58.6% from the prior year, July 1, 2018. The rate of return for the period ended June 30, 2019, was 6.86%. The current assets in the CERBT are $45 million. The funding contribution will increase from $4.2 million to $9.0 million in FY 20/21 due to a change in management groups becoming eligible for the CalPERS plans and an update in the future participation assumption.

Per AON's Actuarial Valuation Report dated June 30, 2019, plan liabilities and annual costs are considerably higher than the prior valuation, due to a change to allow management groups to become eligible for CalPERS medical plans, and an update in the future plan participation assumption (i.e., retirees electing coverage), which both result in an increase in liability. More details can be found in Attachment 4, Page iv. The funded ratio without the implicit subsidy as of June 30, 2019 is 81.5%.

Implicit subsidy is defined as the difference between the true cost of coverage and the actual rate paid. Under CalPERS or any other County health plan, participating retirees may receive a benefit prior to age 65 by paying premiums that are developed by blending active and retiree cost. Generally, retirees cost more than actives. As a result, the premium paid by the retirees is less than the true cost of coverage. Staff and PARC will continue to monitor the funded status of the Section 115 OPEB Trust and adjust rates in accordance with the actuarial consultant's recommendation.

## Part-Time and Temporary Employees' Retirement Plan

The County of Riverside established the Part-Time and Temporary Employees' Retirement Plan, April 1, 1999, to provide retirement benefits to eligible employees as a substitute for benefits under Social Security, as allowed under Omnibus Budget Reconciliation Act of 1990 (OBRA '90). The Plan is an IRS Section 401(a) defined benefit plan. As of September 1, 2010, the investments have been managed by a portfolio manager with US Bank in a Balanced Account strategy with an expected rate of return of 6.00%.

The Plan actuary calculates the minimum recommended employer contribution rate through preparation of an actuarial valuation report and the County determines the contribution rates. Participants in the Plan are required to contribute 3.75% of their compensation to the Plan. The Plan's current funded ratio is 76.6%. According to the July 1, 2019 valuation (Attachment 5), the County's current required contribution rate is 4.02%. The rate of return for the period ended June 30, 2019 was 4.66% and had a balance of $43.5 million.

Overall, the plan's net pension liability increased from the prior valuation due to the net result of demographic experience was different than expected, due to fewer terminations than expected, which resulted in a liability loss; termination assumptions were updated to reflect the recent experience, resulting in an increase in liabilities; lump sum conversion rate was decreased from 5.00% to 4.00% to reflect the current bond market conditions, resulting in an increase in liability; assets were lower than expected due to unfavorable investment return on plan assets (4.66% actual compared to 6.0% assumed); and mortality assumptions were updated to reflect the recent public mortality table, resulting in an increase in liabilities.

## Recommendations

1. Receive and file the 2020 PARC Annual Report.
2. Direct staff to report back with any additional recommendations or updates on the County's pension plans, and/or OPEB, including any legislative changes that could be incorporated in the County's Legislative Platform.
3. Direct the PARC to review the annual CalPERS unfunded liability pre-payment for FY 20/21 and to have such recommendations presented in conjunction with either the approval of the annual Tax and Revenue Anticipation Note (TRAN) cash flow financing, or, with the FY 20/21 budget.

## Attachments

1. Bartel Associates CalPERS Actuarial Issues – 6/30/18 Valuation Results September 24, 2019
2. CalPERS - Miscellaneous Plan County of Riverside Annual Valuation Report as of June 30, 2018
3. CalPERS - Safety Plan County of Riverside Annual Valuation Report as of June 30, 2018
4. AON – County of Riverside Actuarial Valuation Report Postretirement Benefits Plan June 30, 2019
5. AON - County of Riverside Actuarial Valuation Report Part-Time and Temporary Employees' Retirement Plan July 1, 2019

**COUNTY OF RIVERSIDE**
**MISCELLANEOUS AND SAFETY PLANS**

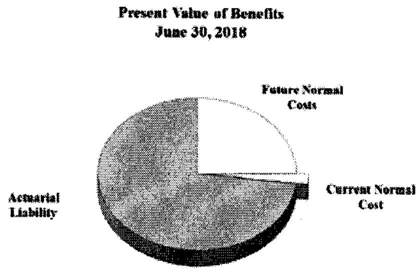
# CalPERS Actuarial Issues – 6/30/18 Valuation

**John Bartel & Mary Beth Redding**
Bianca Lin, Assistant Vice President
Matt Childs, Actuarial Analyst
**Bartel Associates, LLC**

September 24, 2019

## Contents

## DEFINITIONS

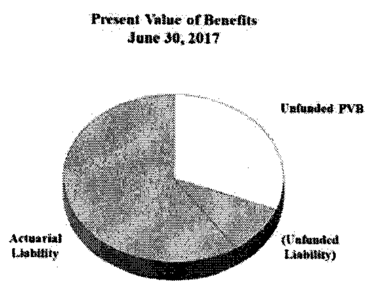


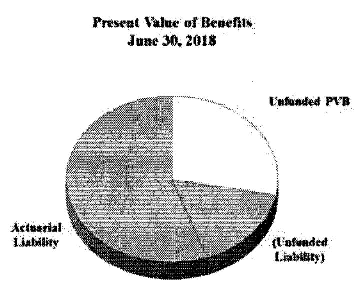

- **PVB - Present Value of all Projected Benefits:**
  - The value now of amounts due to be paid in the future
  - Discounted value (at valuation date - 6/30/18), of all future expected benefit payments based on various (actuarial) assumptions

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



## DEFINITIONS




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

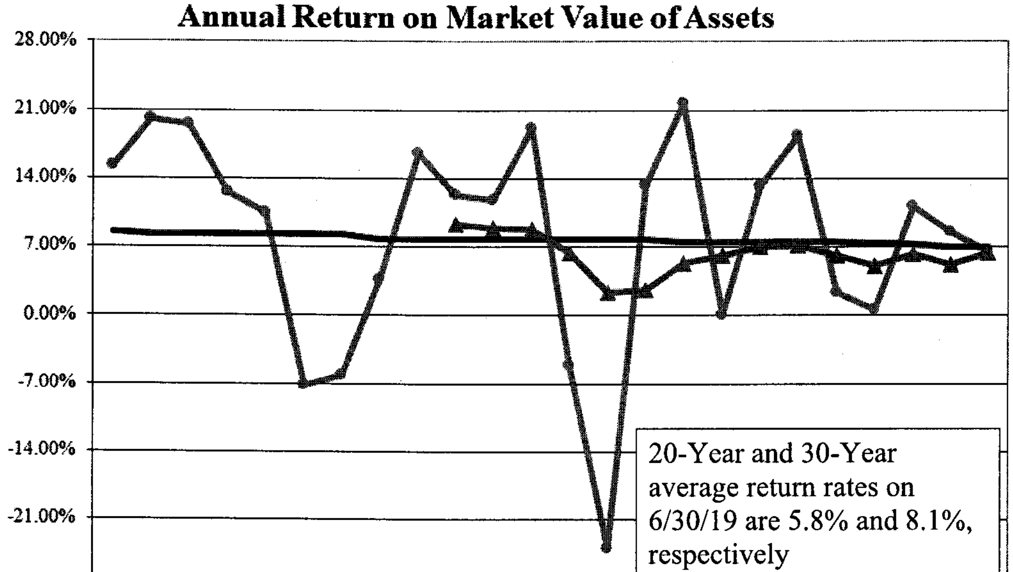
## How We Got Here

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



## How We Got Here – Investment Return

### Annual Return on Market Value of Assets




| | '96 | '97 | '98 | '99 | '00 | '01 | '02 | '03 | '04 | '05 | '06 | '07 | '08 | '09 | '10 | '11 | '12 | '13 | '14 | '15 | '16 | '17 | '18 | '19 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MVA | 15.3 | 20.1 | 19.5 | 12.5 | 10.5 | -7.2% | -6.1% | 3.7% | 16.6 | 12.3 | 11.8 | 19.1 | -5.1% | -24.0 | 13.3 | 21.7 | 0.1% | 13.2 | 18.4 | 2.4% | 0.6% | 11.2 | 8.6% | 6.55 |
| Discount Rate | 8.50 | 8.25 | 8.25 | 8.25 | 8.25 | 8.25 | 8.25 | 7.75 | 7.75 | 7.75 | 7.75 | 7.75 | 7.75 | 7.75 | 7.75 | 7.50 | 7.50 | 7.50 | 7.50 | 7.50 | 7.375 | 7.25 | 7.00 | 7.00 |
| 10-Year Rolling Average | | | | | | | | | | 9.3% | 9.0% | 8.9% | 6.4% | 2.3% | 2.6% | 5.4% | 6.1% | 7.0% | 7.2% | 6.2% | 5.1% | 6.2% | 5.2% | 6.4% |

Above assumes contributions, payments, etc. received evenly throughout year.

## How We Got Here – Old Contribution Policy

- Effective with 2003 valuations:
  - Slow (15 year) recognition of investment losses into funded status
  - Rolling 30 year amortization of all (primarily investment) losses
- Designed to:
  - First smooth rates and
  - Second pay off UAL
- Mitigated contribution volatility



## How We Got Here – Enhanced Benefits

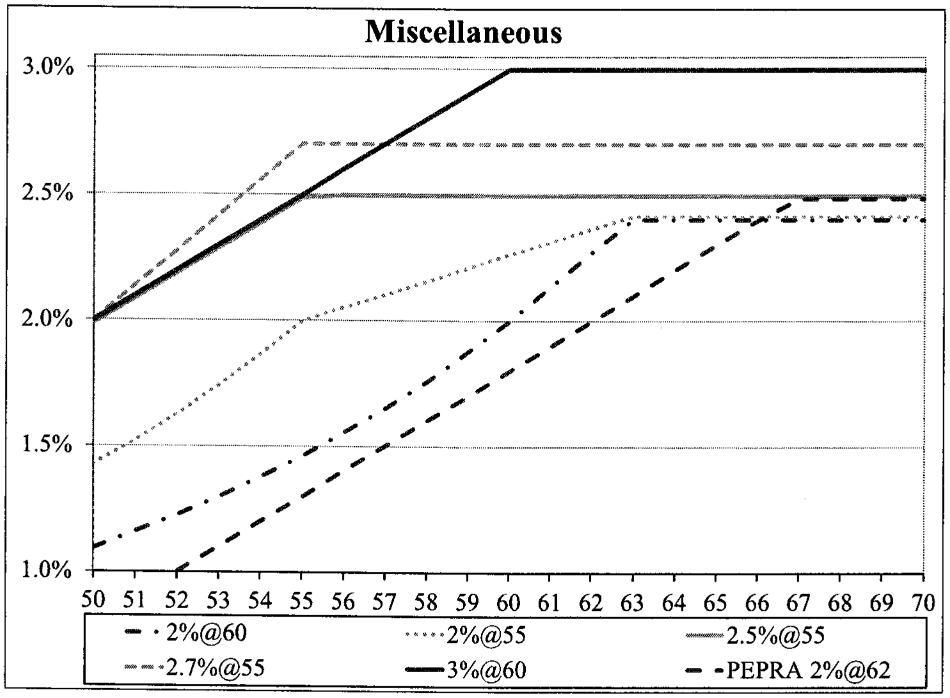
- At CalPERS, Enhanced Benefits implemented using all (future & prior) service
- Typically not negotiated with cost sharing
- County of Riverside

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

  - Note:
    - ☐ FAE1 is highest one year (typically final) average earnings
    - ☐ FAE3 is highest three years (typically final three) average earnings
- PEPRA tier implemented for new employees hired after 1/1/13
  - Employee pays half of total normal cost
  - 2019 Compensation limit
    - ☐ Social Security participants: $124,180
    - ☐ Non-Social Security participants: $149,016

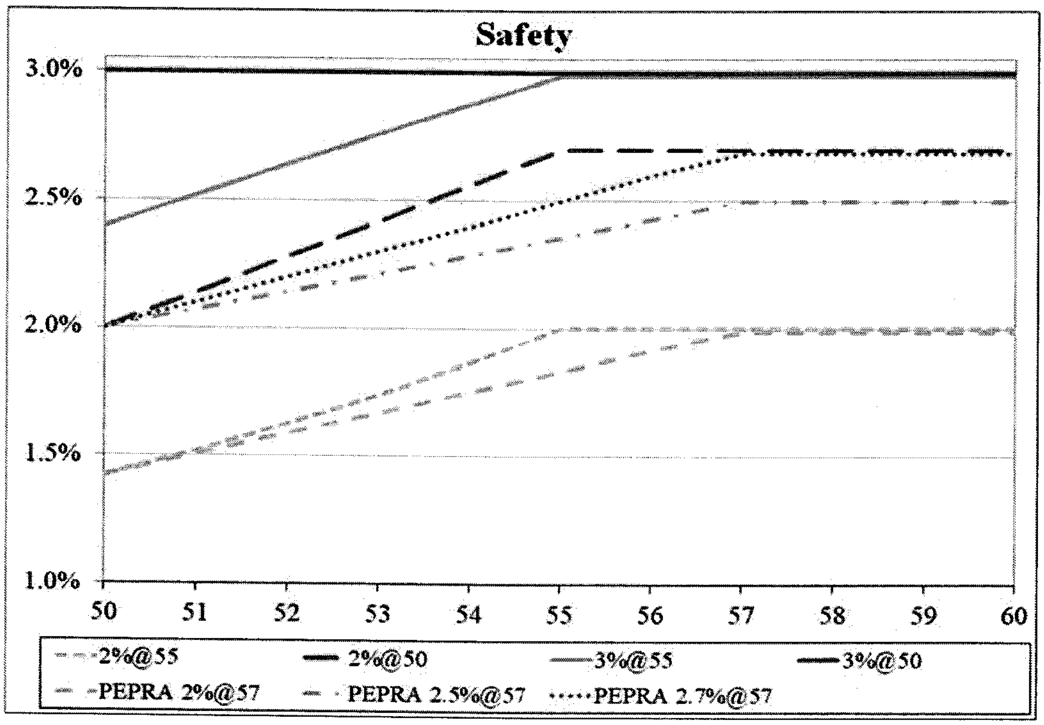
[1] Fire and Peace Officer members are combined in this group

## How We Got Here – Enhanced Benefits






## How We Got Here – Enhanced Benefits



## HOW WE GOT HERE – DEMOGRAPHIC

- Around the State
  - Large retiree liability compared to actives
    - State average: 59% for Miscellaneous, 62% for Safety
  - Declining active population and increasing number of retirees
  - Higher percentage of retiree liability increases contribution volatility

- County of Riverside percentage of liability belonging to retirees:
  - Miscellaneous 47%
  - Safety 54%



## CALPERS CHANGES

- Recent contribution policy changes:
  - No asset smoothing
  - No rolling amortization
  - 5-year ramp up
- February 2018: CalPERS adopted new amortization policy
  - Applies only to newly established amortization bases
    - Fixed dollar amortization rather than % pay
    - Amortize gains/losses over 20 rather than 30 years
    - 5-year ramp up (not down) for investment gains and losses
    - No ramp up/down for other amortization bases
  - Minimizes total interest paid over time and pays off UAL faster
  - Effective June 30, 2019 valuation for 2021/22 contributions
- CalPERS Board changed the discount rate:

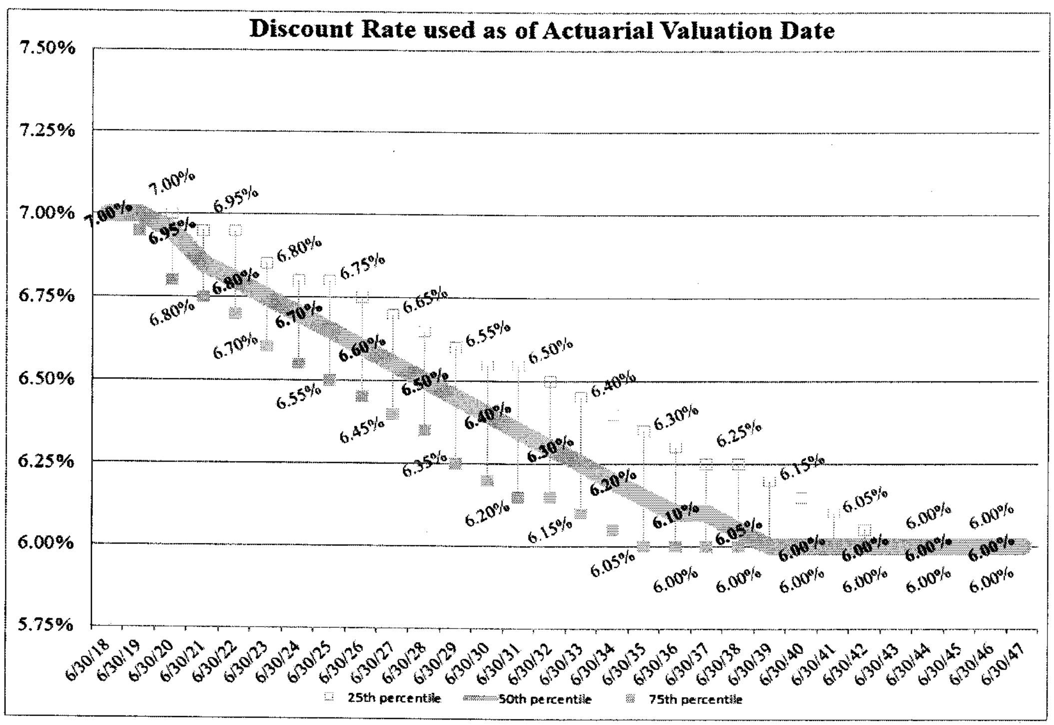
| | Rate | Initial Impact | Full Impact |
|---|---|---|---|
| 6/30/16 valuation | 7.375% | 18/19 | 22/23 |
| 6/30/17 valuation | 7.25% | 19/20 | 23/24 |
| 6/30/18 valuation | 7.00% | 20/21 | 24/25 |

## CALPERS CHANGES

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



## CALPERS CHANGES



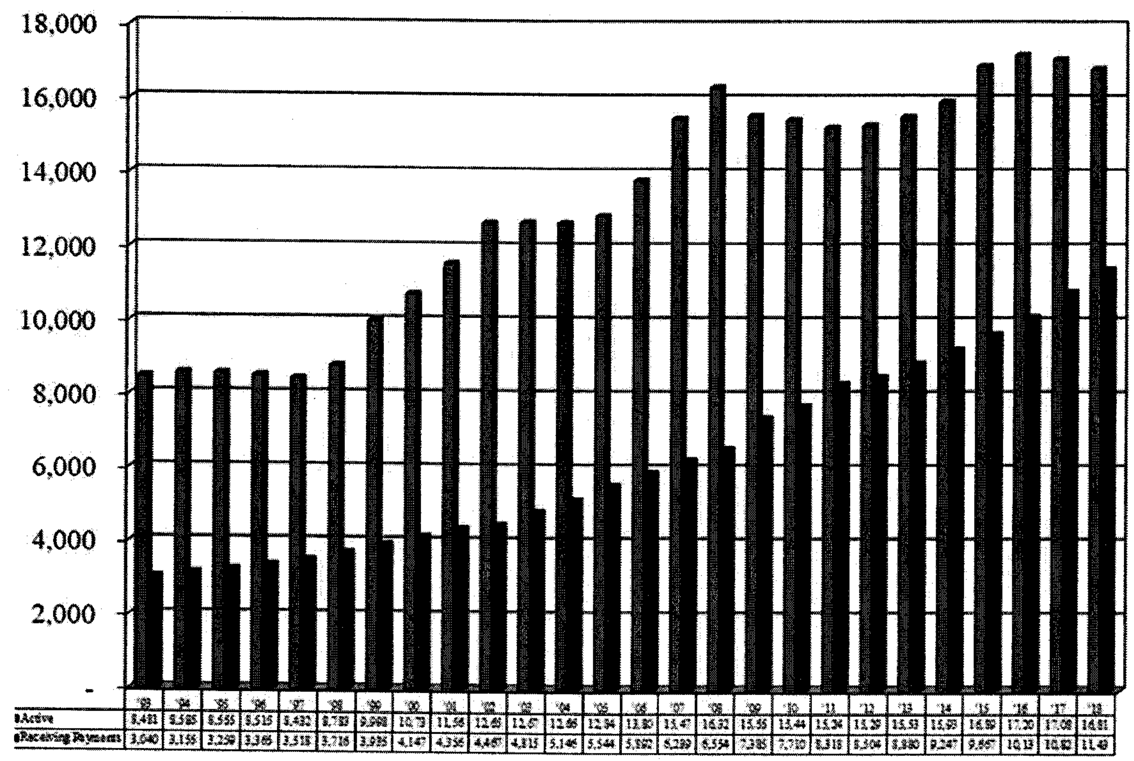
## SUMMARY OF DEMOGRAPHIC INFORMATION - MISCELLANEOUS

| | 1998 | 2008 | 2017 | 2018 |
|---|---|---|---|---|
| **Actives** | | | | |
| ■ Counts | 8,783 | 16,322 | 17,083 | 16,817 |
| ■ Average | | | | |
| • Age | 43 | 43 | 44 | 44 |
| • County Service | 9 | 8 | 10 | 10 |
| • PERSable Wages | $ 34,100 | $ 51,600 | $ 66,100 | $ 66,500 |
| ■ Total PERSable Wages | 299,700,000 | 841,600,000 | 1,128,400,000 | 1,118,700,000 |
| **Inactive Members** | | | | |
| ■ Counts | | | | |
| • Transferred | 1,603 | 3,382 | 3,823 | 3,905 |
| • Separated | 2,008 | 5,667 | 9,229 | 9,554 |
| • Retired | | | | |
| □ Service | | 5,268 | 9,230 | 9,793 |
| □ Disability | | 580 | 643 | 661 |
| □ Beneficiaries | | 706 | 948 | 984 |
| □ Total | 3,716 | 6,554 | 10,821 | 11,438 |
| ■ Average Annual County Provided Benefit for Service Retirees[2] | | 17,600 | 27,000 | 28,400 |

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



## SUMMARY OF DEMOGRAPHIC INFORMATION - MISCELLANEOUS

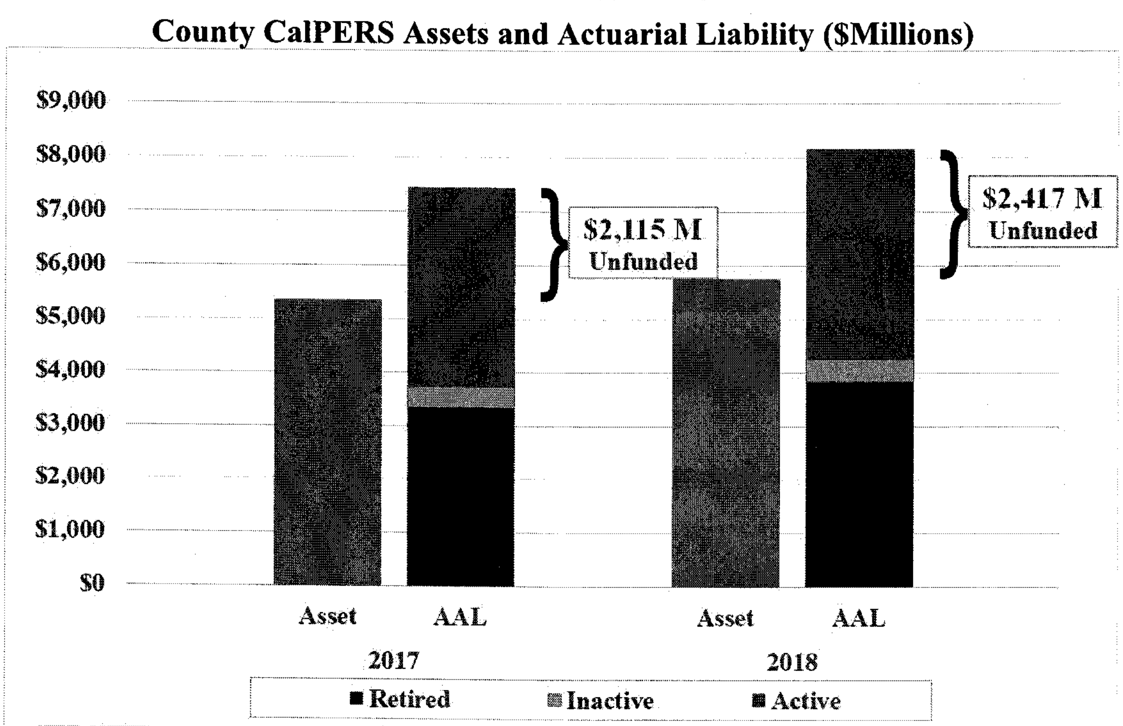


## PLAN FUNDED STATUS - MISCELLANEOUS

| | June 30, 2017 | June 30, 2018 |
|---|---|---|
| ■ **Actuarial Accrued Liability** | | |
| ● Active | $ 3,704,000,000 | $ 3,900,100,000 |
| ● Retiree | 3,350,900,000 | 3,832,800,000 |
| ● Inactive | 386,400,000 | 432,900,000 |
| ● Total | 7,441,300,000 | 8,165,800,000 |
| ■ **Assets** | 5,325,800,000 | 5,748,800,000 |
| ■ **Unfunded Liability** | 2,115,500,000 | 2,417,000,000 |
| ■ **Funded Ratio** | 71.6% | 70.4% |



## PLAN FUNDED STATUS - MISCELLANEOUS



## Discount Rate Sensitivity

### June 30, 2018

| | Discount Rate | | |
|---|---|---|---|
| | 7.00% | 6.50% | 6.00% |
| **AAL** | $ 8,165,800,000 | $ 8,764,200,000 | $ 9,362,500,000 |
| **Assets** | 5,748,800,000 | 5,748,800,000 | 5,748,800,000 |
| **Unfunded Liability** | 2,417,000,000 | 3,015,400,000 | 3,613,700,000 |
| **Funded Ratio** | 70.4% | 65.6% | 61.4% |

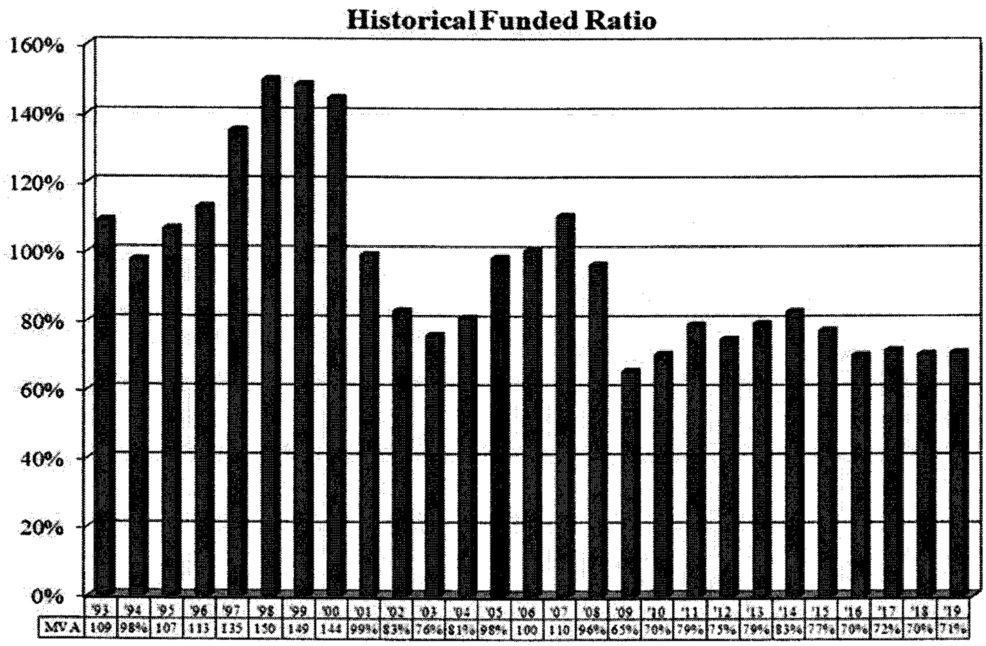




## Unfunded Accrued Liability Changes

| | | |
|---|---|---|
| ■ **Unfunded Accrued Liability on 6/30/17** | | $2,115,500,000 |
| ■ **Expected 6/30/18 Unfunded Accrued Liability** | | 2,208,600,000 |
| ■ **Other Changes** | | |
| • Asset Loss (Gain) (8.6% return for FY 2018) | (57,600,000) | |
| • Assumption Change (DR 7.25% → 7%) | 231,200,000 | |
| • Method Change (Software system) | 61,200,000 | |
| • Contribution & Experience Loss (Gain) | (26,400,000) | |
| • Total | | 208,400,000 |
| ■ **Unfunded Accrued Liability on 6/30/18** | | 2,417,000,000 |
| ■ **Projected Unfunded Accrued Liability on 6/30/19** | | 2,513,000,000 |

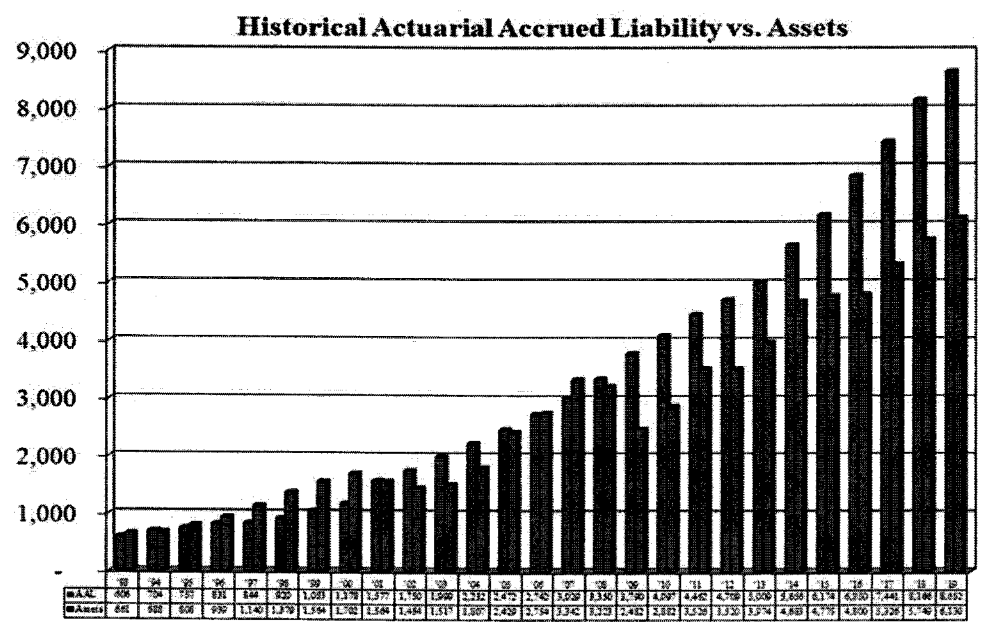
## FUNDED RATIO - MISCELLANEOUS




6/30/19 funded status estimated



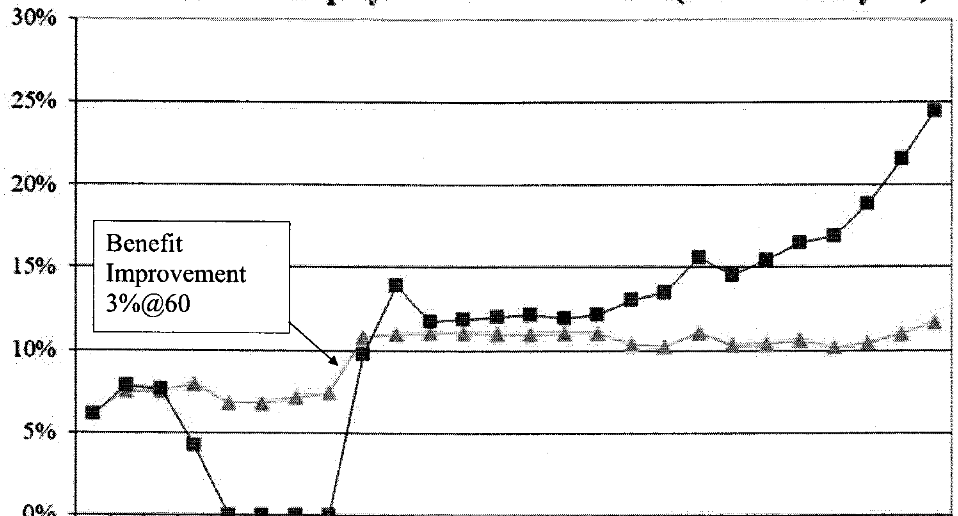
## FUNDED STATUS (MILLIONS) - MISCELLANEOUS




6/30/19 funded status estimated

## CONTRIBUTION RATES - MISCELLANEOUS

### Historical Employer Contribution Rates (Percent of Payroll)




| | FY 96 | FY 97 | FY 98 | FY 99 | FY 00 | FY 01 | FY 02 | FY 03 | FY 04 | FY 05 | FY 06 | FY 07 | FY 08 | FY 09 | FY 10 | FY 11 | FY 12 | FY 13 | FY 14 | FY 15 | FY 16 | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Normal Cost | 6.2 | 7.5 | 7.5 | 8.0 | 6.8 | 6.8 | 7.1 | 7.4 | 10.8 | 11.0 | 11.1 | 11.1 | 11.0 | 11.0 | 11.1 | 11.1 | 10.4 | 10.2 | 11.1 | 10.3 | 10.4 | 10.7 | 10.2 | 10.5 | 11.0 | 11.7 |
| Total Rate | 6.1 | 7.8 | 7.6 | 4.2 | 0.0 | 0.0 | 0.0 | 0.0 | 9.8 | 13.9 | 11.8 | 11.9 | 12.1 | 12.2 | 12.0 | 12.2 | 13.1 | 13.5 | 15.6 | 14.5 | 15.4 | 16.5 | 16.9 | 18.9 | 21.6 | 24.5 |



## CONTRIBUTION RATES - MISCELLANEOUS

| | 6/30/17<br>2019/2020 | 6/30/18<br>2020/2021 |
|---|---|---|
| ■ Total Normal Cost | 18.4% | 19.1% |
| ■ Employee Normal Cost | 7.4% | 7.4% |
| ■ Employer Normal Cost | 11.0% | 11.7% |
| ■ Amortization Payments | 10.6% | 12.8%[3] |
| ■ Total Employer Contribution Rate | 21.6% | 24.5% |

| | |
|---|---|
| ■ 2019/20 Employer Contribution Rate | 21.6% |
| ● Payroll < Expected | 0.4% |
| ● 6/30/14 Assumption Change (5th Year) | 0.6% |
| ● 6/30/16 Discount Rate Change (3rd Year) | 0.2% |
| ● 6/30/17 Discount Rate & Inflation (2nd Year) | 0.2% |
| ● 6/30/18 Discount Rate change (1st Year) | 1.2% |
| ● Other (Gains)/Losses | 0.3% |
| ■ 2020/21 Employer Contribution Rate | 24.5% |

3 Equivalent to 6.1% of UAL. One year 7% interest in the UAL is 14.7% of payroll.

## CONTRIBUTION PROJECTIONS - MISCELLANEOUS

- Market Value Investment Return:
  - June 30, 2019 — 6.7%[4]
  - Future returns based on stochastic analysis using 1,000 trials

| Single Year Returns at[5] | 25th Percentile | 50th Percentile | 75th Percentile |
|---|---|---|---|
| Current Investment Mix | **0.1%** | **7.0%** | **14.8%** |
| Ultimate Investment Mix | **0.8%** | **6.0%** | **11.4%** |

  - Assumes investment returns will, generally be 6.5% (as compared to 7.0%) over the next 9 years and higher beyond that.
- Discount Rate decreases due to Risk Mitigation policy
- No Other: Gains/Losses, Method/Assumption Changes, Benefit Improvements
- Different from CalPERS projection

[4] Gross return based on July 2019 CalPERS press release.
[5] Nth percentile means N percentage of our trials result in returns lower than the indicated rates.



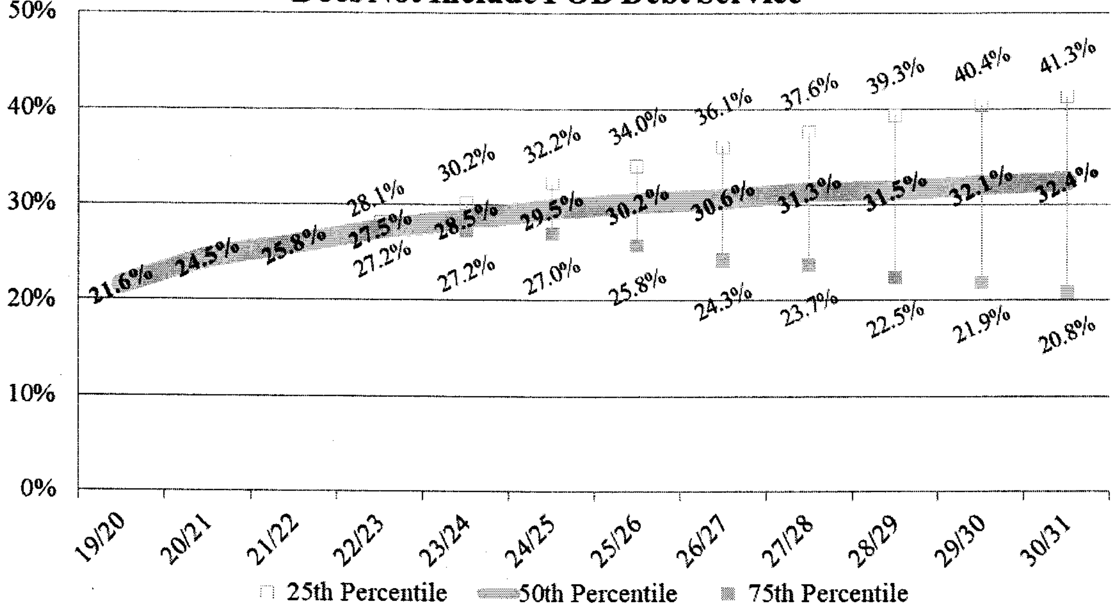
## CONTRIBUTION PROJECTIONS - MISCELLANEOUS

- New hire assumptions:
  - 92.5% of 2019/20 new hires are PEPRA members and 7.5% are Classic members
  - Percentage of PEPRA member future hires to increase from 92.5% to 100% over 3 years
- 6/30/18 employee distribution:

| Benefit Tier | Count | 6/30/18 Payroll |
|---|---|---|
| • 3%@60 FAE1 | 10,137 | $765,774,800 |
| • 2%@60 FAE3 | 658 | 44,360,200 |
| • 2%@62 FAE3 | 6,022 | 323,010,300 |

## Contribution Projections - Miscellaneous

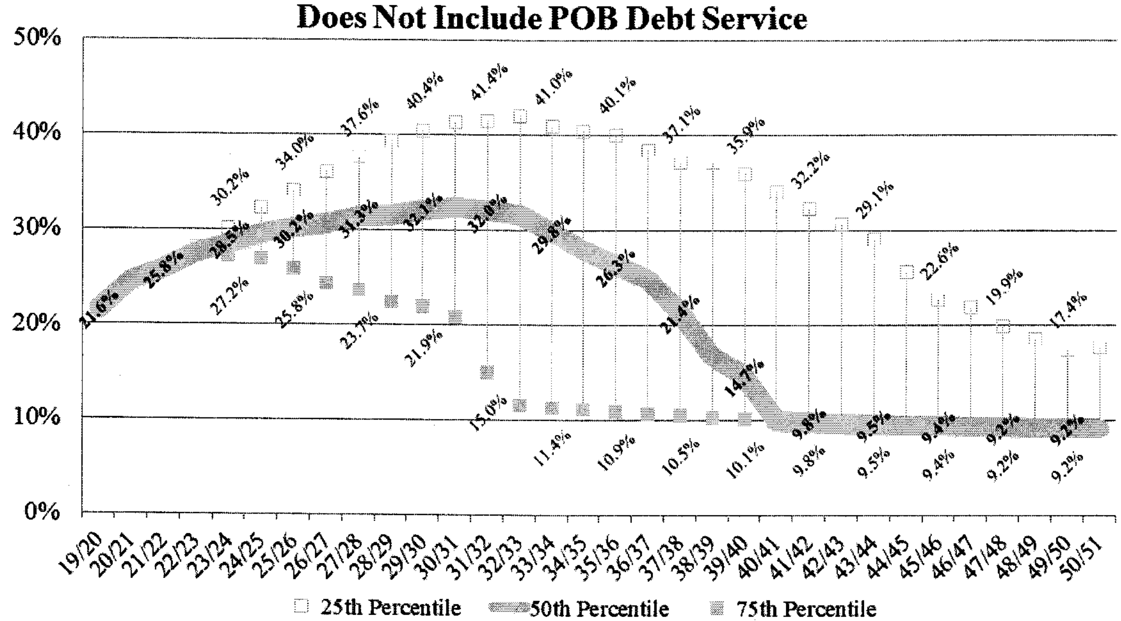
**Contribution Projection – Percent of Pay**
**Does Not Include POB Debt Service**





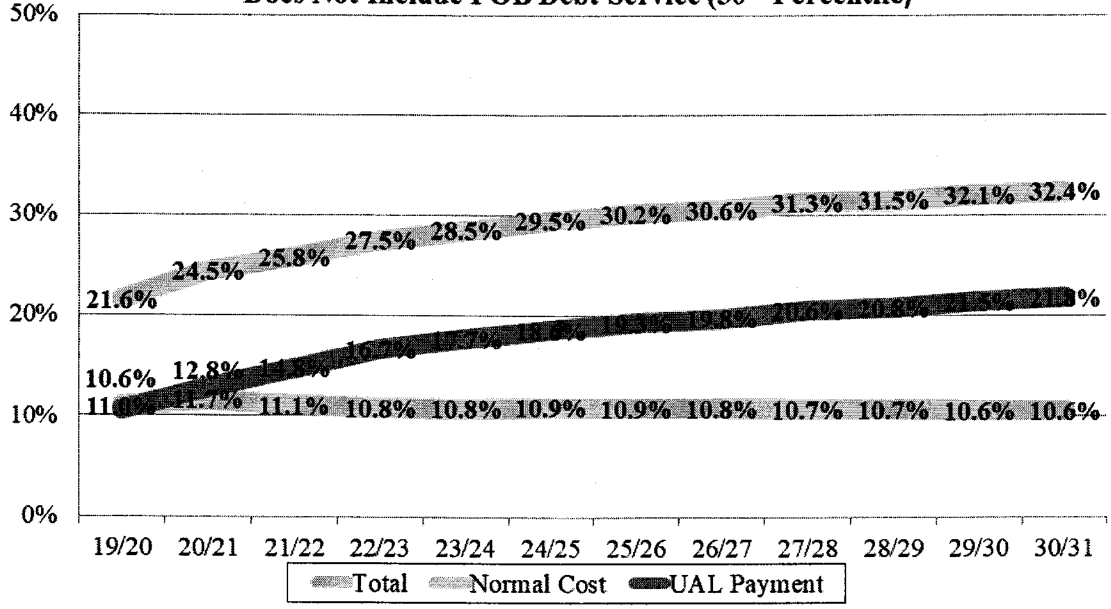

## Contribution Projections - Miscellaneous

**Contribution Projection – Percent of Pay**
**Does Not Include POB Debt Service**



## CONTRIBUTION PROJECTIONS - MISCELLANEOUS

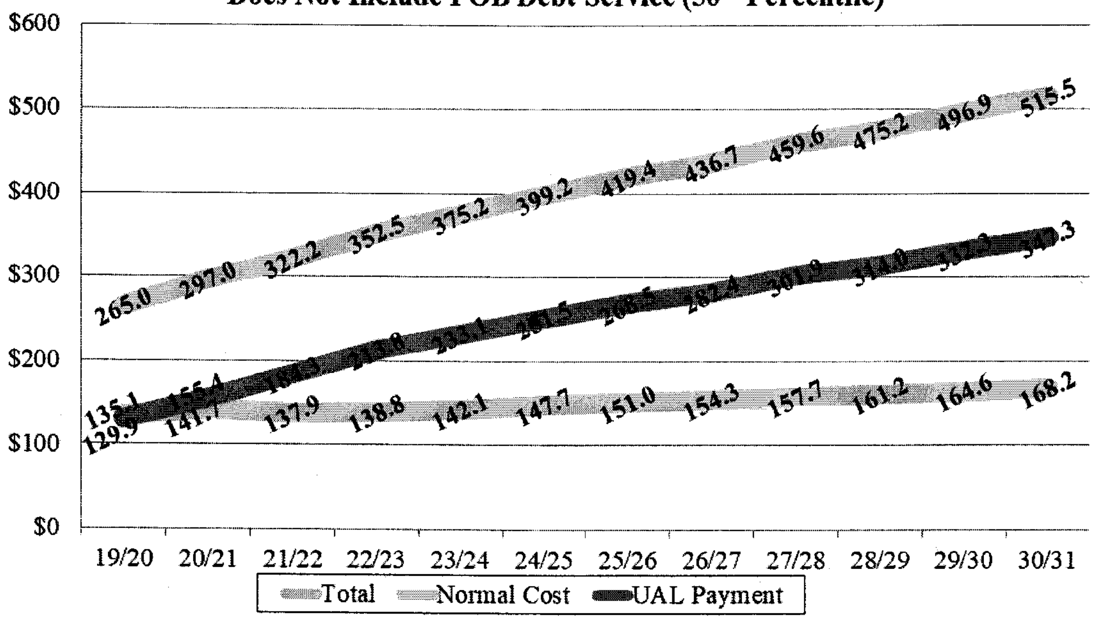
### Contribution Projection – Percent of Pay
Does Not Include POB Debt Service (50th Percentile)





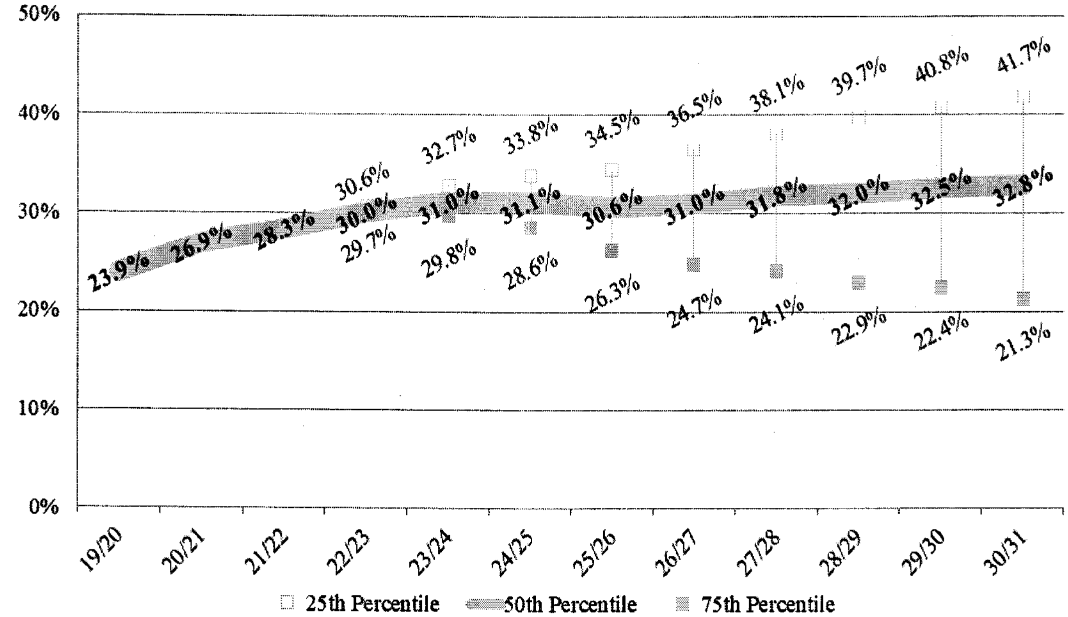

## CONTRIBUTION PROJECTIONS - MISCELLANEOUS

### Contribution Projection - $Millions
Does Not Include POB Debt Service (50th Percentile)



## Contribution Projections - Miscellaneous

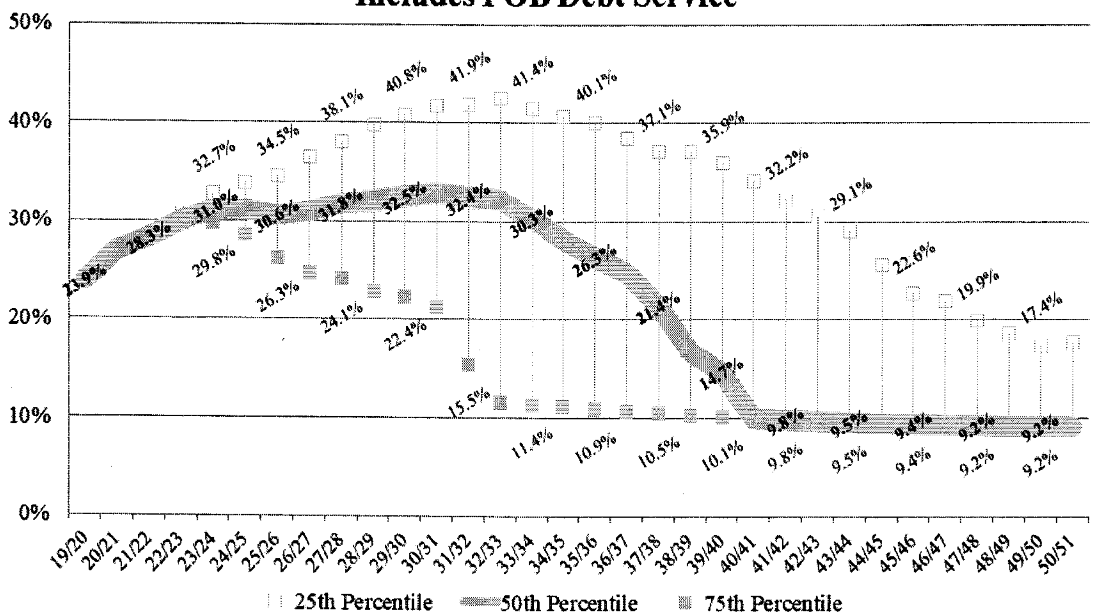
### Contribution Projection – Percent of Pay
### Includes POB Debt Service



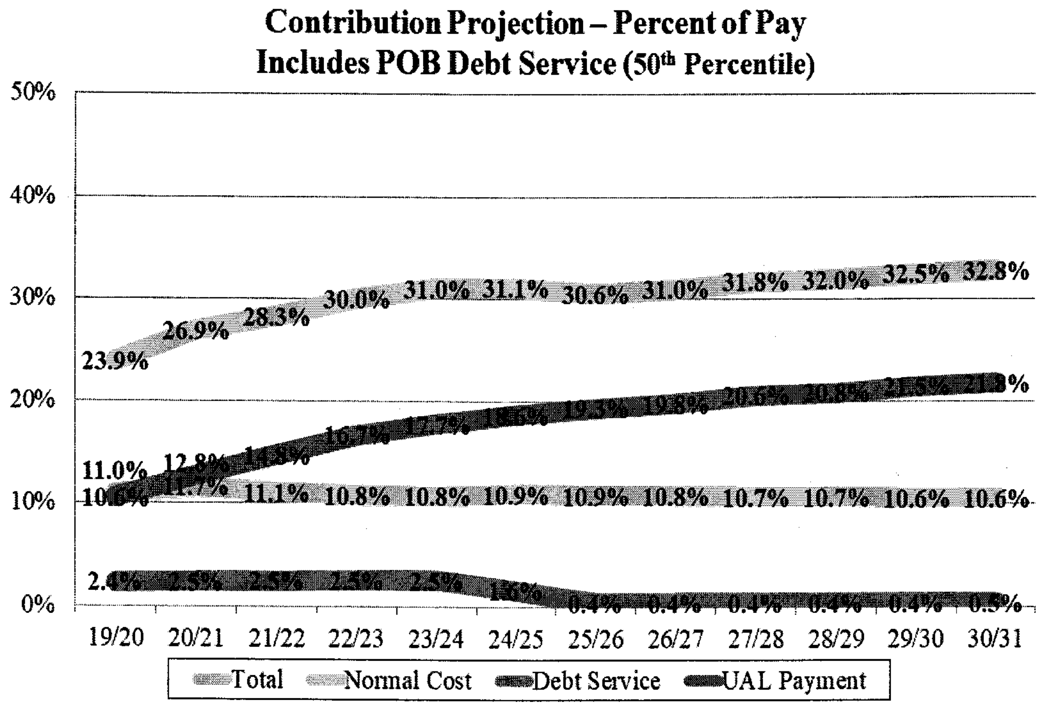



## Contribution Projections - Miscellaneous

### Contribution Projection – Percent of Pay
### Includes POB Debt Service

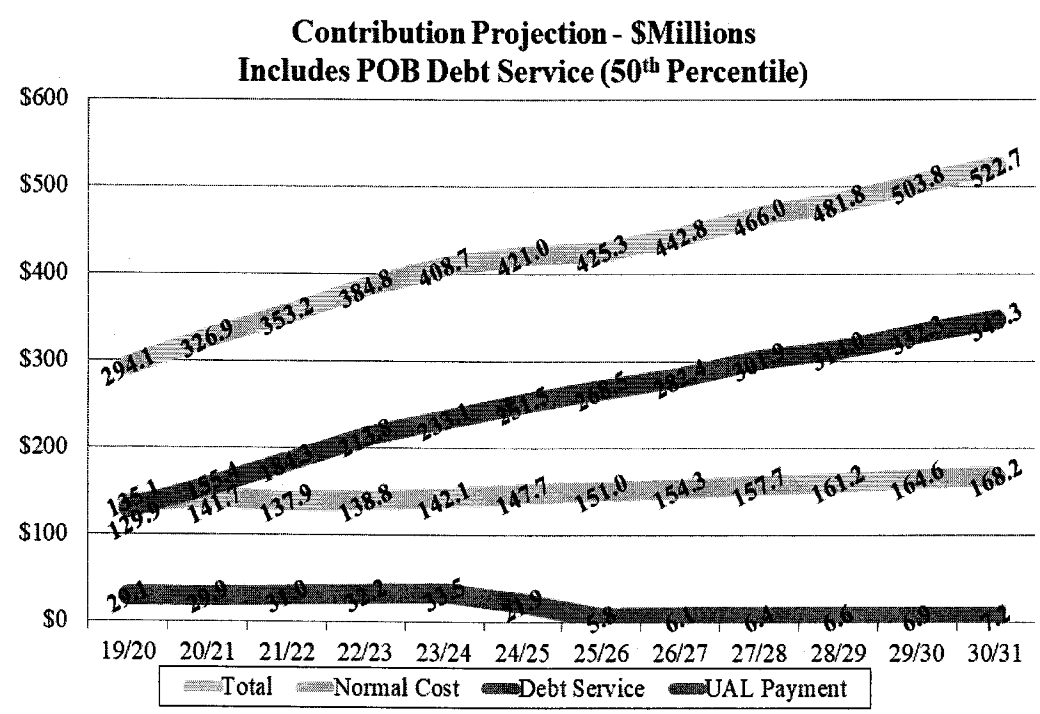


## Contribution Projections - Miscellaneous

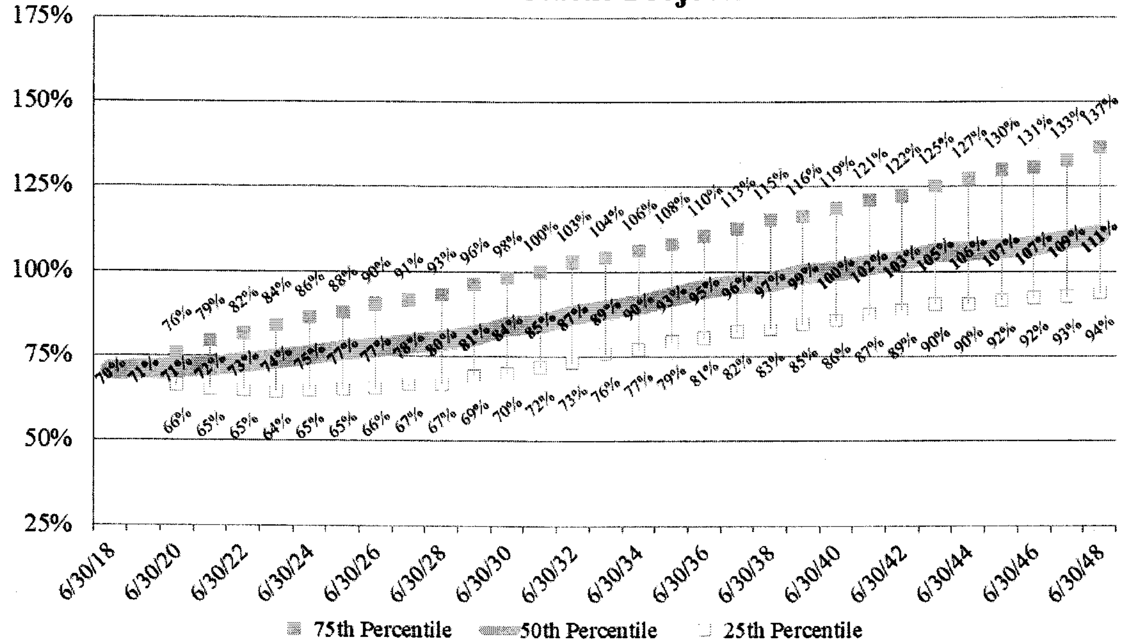





## Contribution Projections - Miscellaneous



## Funded Status Projection





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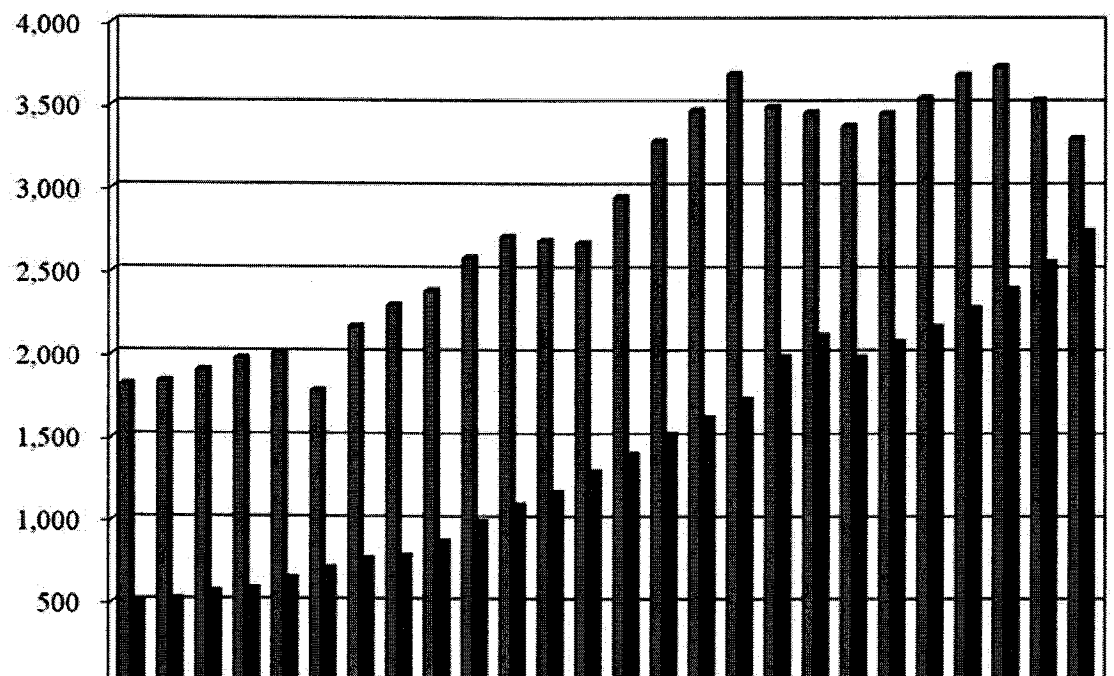
## Summary of Demographic Information - Safety

| | 1998 | 2008 | 2017 | 2018 |
|---|---|---|---|---|
| **Actives** | | | | |
| ■ Counts | 1,782 | 3,467 | 3,527 | 3,296 |
| ■ Average | | | | |
| • Age | 39 | 38 | 40 | 40 |
| • County Service | 9 | 8 | 11 | 11 |
| • PERSable Wages | $ 44,500 | $ 69,400 | $ 93,100 | $ 94,000 |
| ■ Total PERSable Wages | 79,300,000 | 240,700,000 | 328,400,000 | 309,700,000 |
| **Inactive Members** | | | | |
| ■ Counts | | | | |
| • Transferred | 485 | 574 | 625 | 664 |
| • Separated | 269 | 496 | 625 | 649 |
| • Retired | | | | |
| □ Service | | 985 | 1,716 | 1,864 |
| □ Disability | | 498 | 603 | 623 |
| □ Beneficiaries | | 136 | 235 | 252 |
| □ Total | 711 | 1,619 | 2,554 | 2,739 |
| ■ Average Annual County Provided Benefit for Service Retirees[6] | | 34,400 | 56,100 | 59,200 |

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



## Summary of Demographic Information - Safety



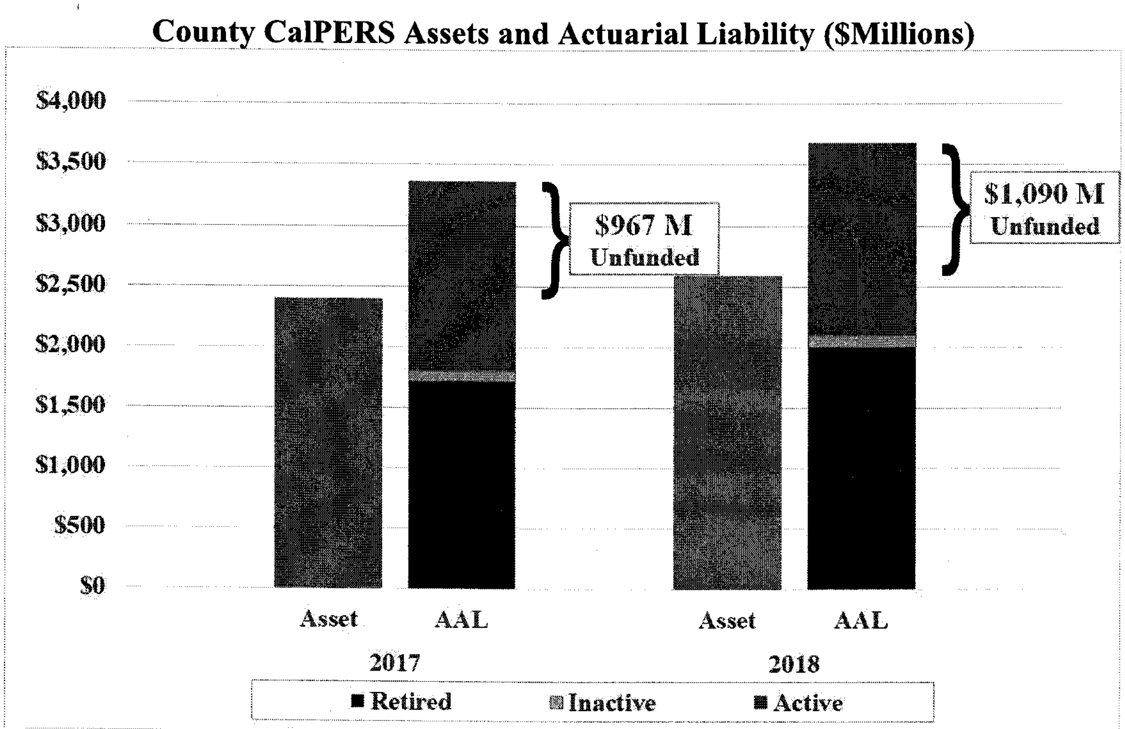

| | '93 | '94 | '95 | '96 | '97 | '98 | '99 | '00 | '01 | '02 | '03 | '04 | '05 | '06 | '07 | '08 | '09 | '10 | '11 | '12 | '13 | '14 | '15 | '16 | '17 | '18 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ■ Active | 1,820 | 1,839 | 1,906 | 1,976 | 2,010 | 1,782 | 2,172 | 2,296 | 2,385 | 2,581 | 2,708 | 2,684 | 2,670 | 2,947 | 3,282 | 3,467 | 3,687 | 3,490 | 3,455 | 3,374 | 3,448 | 3,541 | 3,680 | 3,731 | 3,527 | 3,296 |
| ■ Receiving Payments | 501 | 520 | 567 | 585 | 651 | 711 | 767 | 785 | 872 | 998 | 1,090 | 1,158 | 1,292 | 1,398 | 1,521 | 1,619 | 1,728 | 1,982 | 2,112 | 1,980 | 2,079 | 2,164 | 2,275 | 2,391 | 2,554 | 2,739 |

## PLAN FUNDED STATUS - SAFETY

| | June 30, 2017 | June 30, 2018 |
|---|---|---|
| ■ **Actuarial Accrued Liability** | | |
| ● Active | $ 1,559,400,000 | $ 1,577,500,000 |
| ● Retiree | 1,712,200,000 | 1,996,300,000 |
| ● Inactive | 90,000,000 | 102,800,000 |
| ● Total | 3,361,600,000 | 3,676,600,000 |
| ■ **Assets** | 2,394,900,000 | 2,586,900,000 |
| ■ **Unfunded Liability** | 966,700,000 | 1,089,700,000 |
| ■ **Funded Ratio** | 71.2% | 70.4% |



## PLAN FUNDED STATUS - SAFETY



## Discount Rate Sensitivity

### June 30, 2018

| | Discount Rate | | |
|---|---|---|---|
| | 7.00% | 6.50% | 6.00% |
| **AAL** | $ 3,676,600,000 | $ 3,959,600,000 | $ 4,242,500,000 |
| **Assets** | 2,586,900,000 | 2,586,900,000 | 2,586,900,000 |
| **Unfunded Liability** | 1,089,700,000 | 1,372,700,000 | 1,655,600,000 |
| **Funded Ratio** | 70.4% | 65.3% | 61.0% |

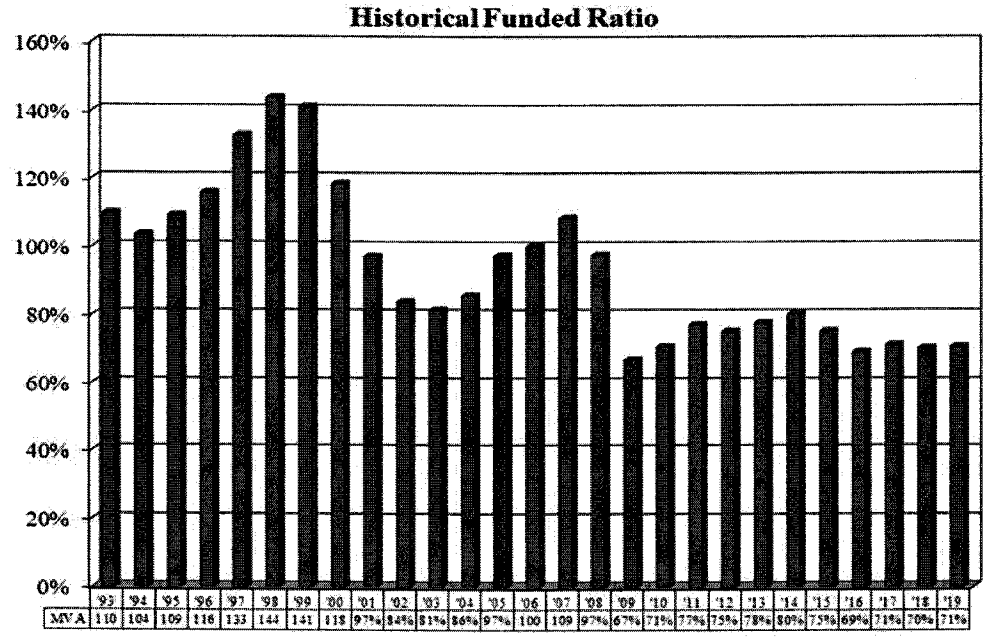




## Unfunded Accrued Liability Changes

| | | |
|---|---|---|
| ■ **Unfunded Accrued Liability on 6/30/17** | | $ 966,700,000 |
| ■ **Expected 6/30/18 Unfunded Accrued Liability** | | 1,008,400,000 |
| ■ **Other Changes** | | |
| • Asset Loss (Gain) (8.6% return for FY 2018) | (26,200,000) | |
| • Assumption Change (DR 7.25% → 7%) | 110,700,000 | |
| • Method Change (Software system) | 17,700,000 | |
| • Contribution & Experience Loss (Gain) | (20,900,000) | |
| • Total | | 81,300,000 |
| ■ **Unfunded Accrued Liability on 6/30/18** | | 1,089,700,000 |
| ■ **Projected Unfunded Accrued Liability on 6/30/19** | | 1,137,700,000 |

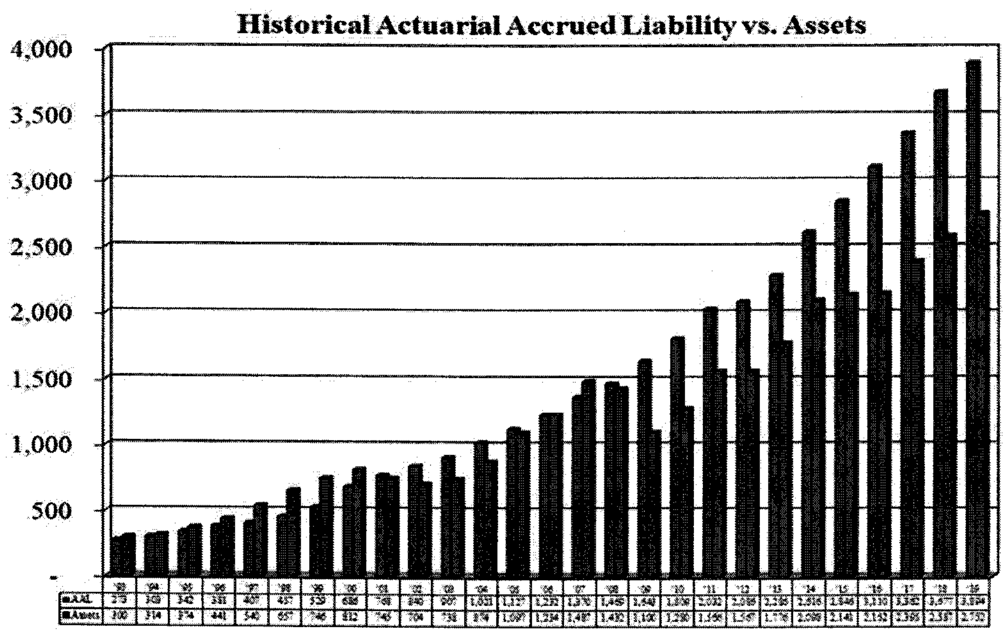
## FUNDED RATIO - SAFETY




6/30/19 funded status estimated



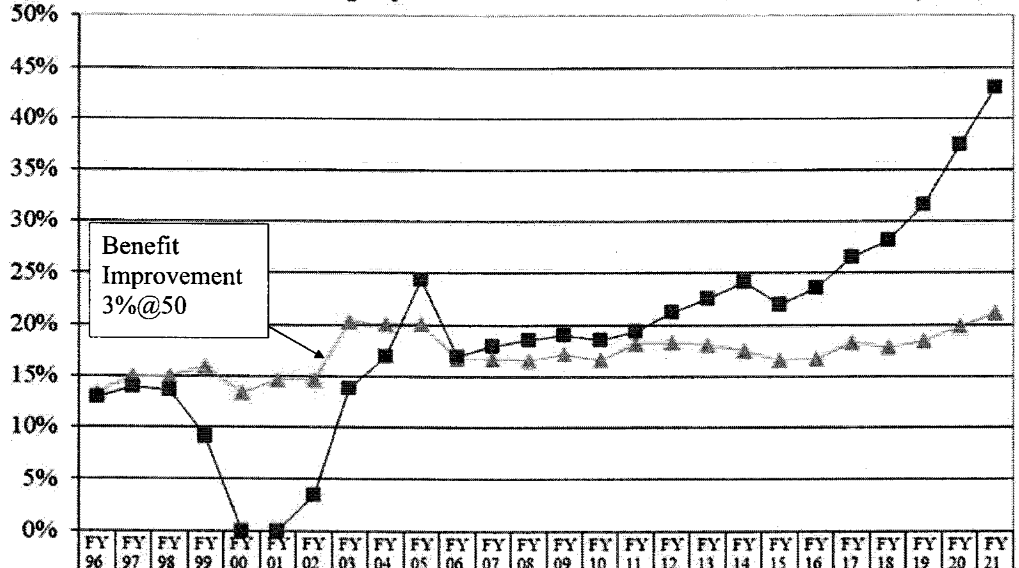
## FUNDED STATUS (MILLIONS) - SAFETY




6/30/19 funded status estimated

## Contribution Rates - Safety

### Historical Employer Contribution Rates (Percent of Payroll)




| | FY 96 | FY 97 | FY 98 | FY 99 | FY 00 | FY 01 | FY 02 | FY 03 | FY 04 | FY 05 | FY 06 | FY 07 | FY 08 | FY 09 | FY 10 | FY 11 | FY 12 | FY 13 | FY 14 | FY 15 | FY 16 | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Normal Cost | 13.4 | 15.0 | 15.0 | 16.0 | 13.4 | 14.7 | 14.7 | 20.3 | 20.1 | 20.1 | 16.7 | 16.7 | 16.6 | 17.2 | 16.6 | 18.2 | 18.4 | 18.1 | 17.5 | 16.6 | 16.7 | 18.3 | 17.9 | 18.5 | 19.9 | 21.1 |
| Total Rate | 13.0 | 14.0 | 13.6 | 9.1 | 0.0 | 0.0 | 3.4 | 13.8 | 17.0 | 24.4 | 17.0 | 18.0 | 18.6 | 19.0 | 18.6 | 19.3 | 21.3 | 22.5 | 24.1 | 21.9 | 23.6 | 26.6 | 28.2 | 31.6 | 37.4 | 43.0 |



## Contribution Rates - Safety

| | 6/30/17 2019/2020 | 6/30/18 2020/2021 |
|---|---|---|
| ■ Total Normal Cost | 29.2% | 30.5% |
| ■ Employee Normal Cost | 9.3% | 9.4% |
| ■ Employer Normal Cost | 19.9% | 21.1% |
| ■ Amortization Payments | 17.6% | 21.9%[7] |
| ■ Total Employer Contribution Rate | 37.4% | 43.0% |

| | |
|---|---|
| ■ 2019/20 Employer Contribution Rate | 37.4% |
| ● Payroll < Expected | 1.5% |
| ● 6/30/14 Assumption Change (5th Year) | 1.1% |
| ● 6/30/16 Discount Rate Change (3rd Year) | 0.4% |
| ● 6/30/17 Discount Rate & Inflation (2nd Year) | 0.4% |
| ● 6/30/18 Discount Rate change (1st Year) | 2.1% |
| ● Other (Gains)/Losses | 0.1% |
| ■ 2020/21 Employer Contribution Rate | 43.0% |

[7] Equivalent to 6.4% of UAL. 7% of UAL equals to 23.8% of payroll

## CONTRIBUTION PROJECTIONS - SAFETY

- Market Value Investment Return:
  - June 30, 2019 — 6.7%[8]
  - Future returns based on stochastic analysis using 1,000 trials

| Single Year Returns at[9] | 25th Percentile | 50th Percentile | 75th Percentile |
|---|---|---|---|
| Current Investment Mix | **0.1%** | **7.0%** | **14.8%** |
| Ultimate Investment Mix | **0.8%** | **6.0%** | **11.4%** |

  - Assumes investment returns will, generally be 6.5% (as compared to 7.0%) over the next 9 years and higher beyond that.
- Discount Rate decreases due to Risk Mitigation policy
- No Other: Gains/Losses, Method/Assumption Changes, Benefit Improvements
- Different from CalPERS projection

[8] Gross return based July 2019 CalPERS press release
[9] Nth percentile means N percentage of our trials result in returns lower than the indicated rates.

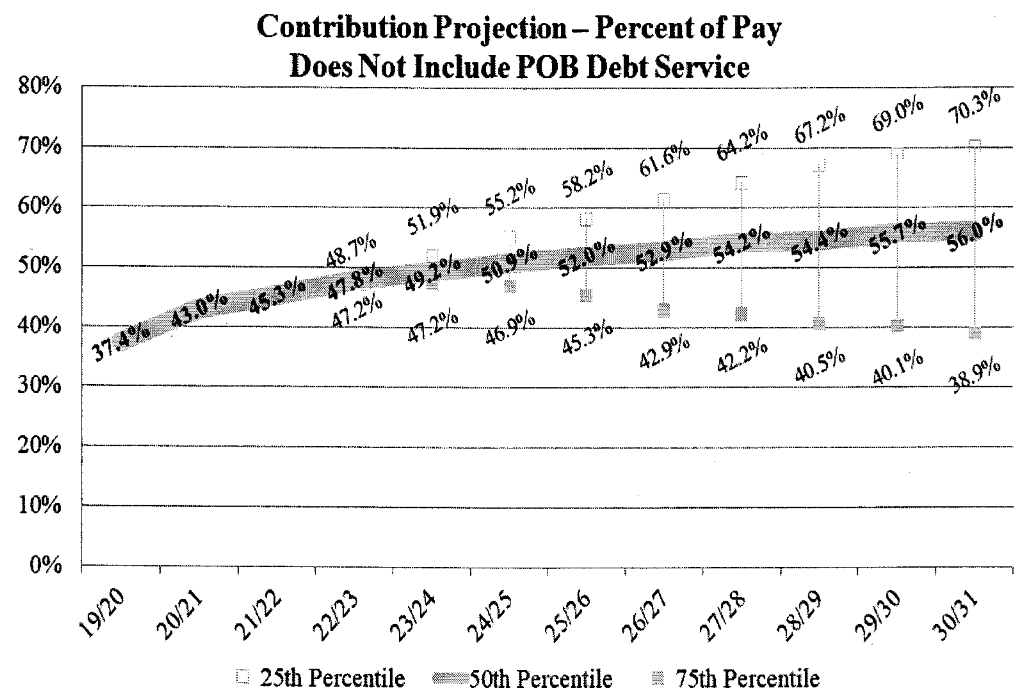


## CONTRIBUTION PROJECTIONS - SAFETY

- New hire assumptions:
  - 92.5% of 2019/20 new hires are PEPRA members and 7.5% are Classic members
  - Percentage of PEPRA member future hires to increase from 92.5% to 100% over 3 years
- 6/30/18 employee distribution:

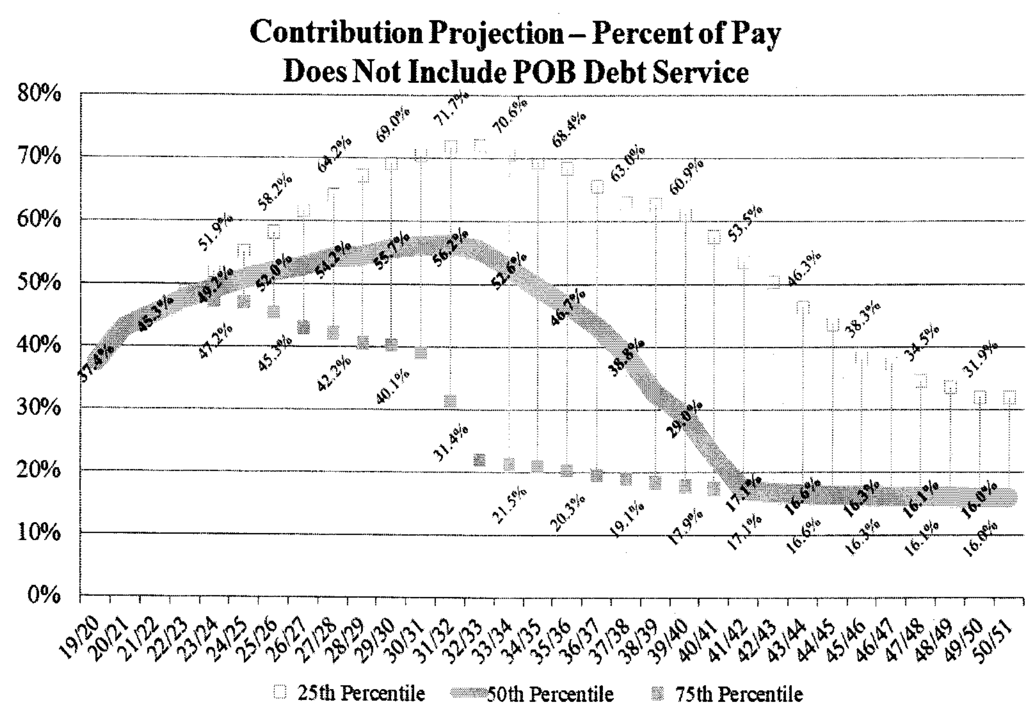
| Benefit Tier | Count | 6/30/18 Payroll |
|---|---|---|
| • 3%@50 FAE1 | 2,443 | $253,038,400 |
| • 2%@50 FAE3 | 126 | 9,385,200 |
| • 2.7%@57 FAE3 | 727 | 47,290,200 |

## Contribution Projections - Safety



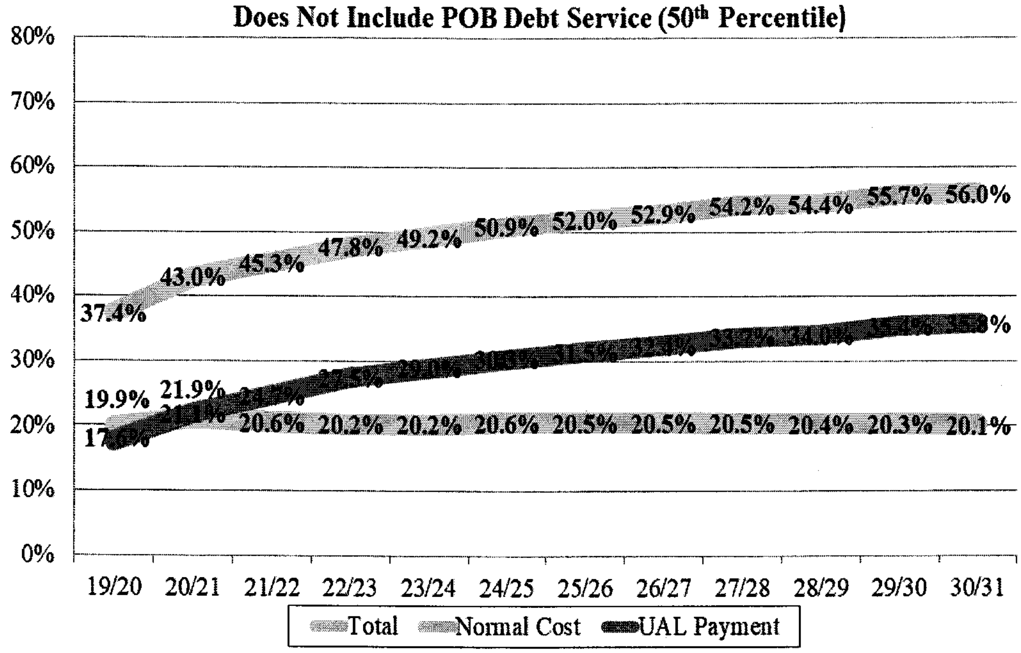



## Contribution Projections - Safety



## CONTRIBUTION PROJECTIONS - SAFETY

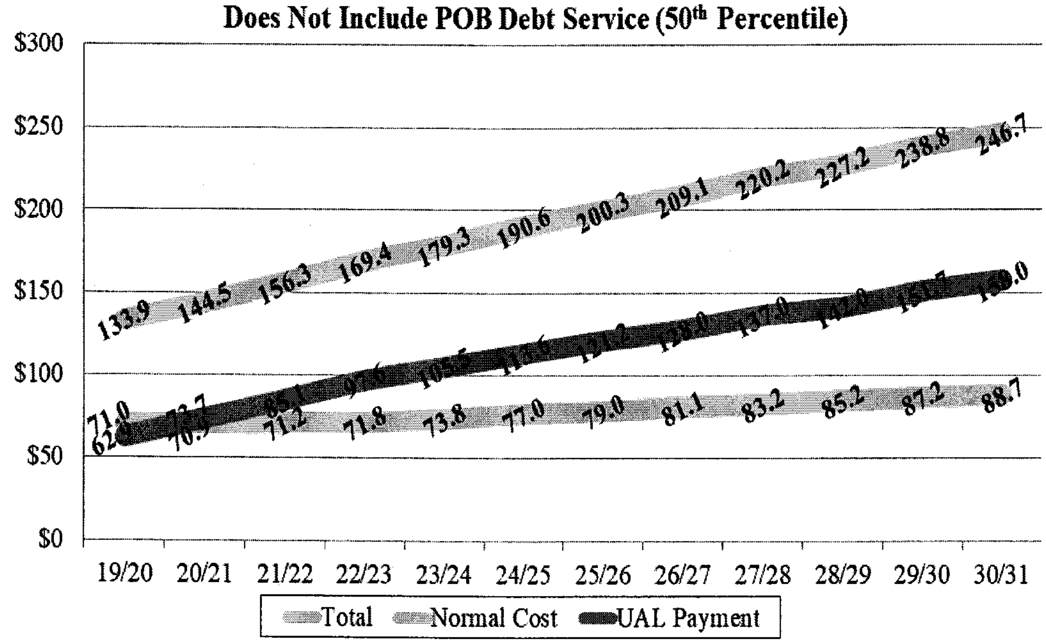
**Contribution Projection – Percent of Pay**
**Does Not Include POB Debt Service (50th Percentile)**



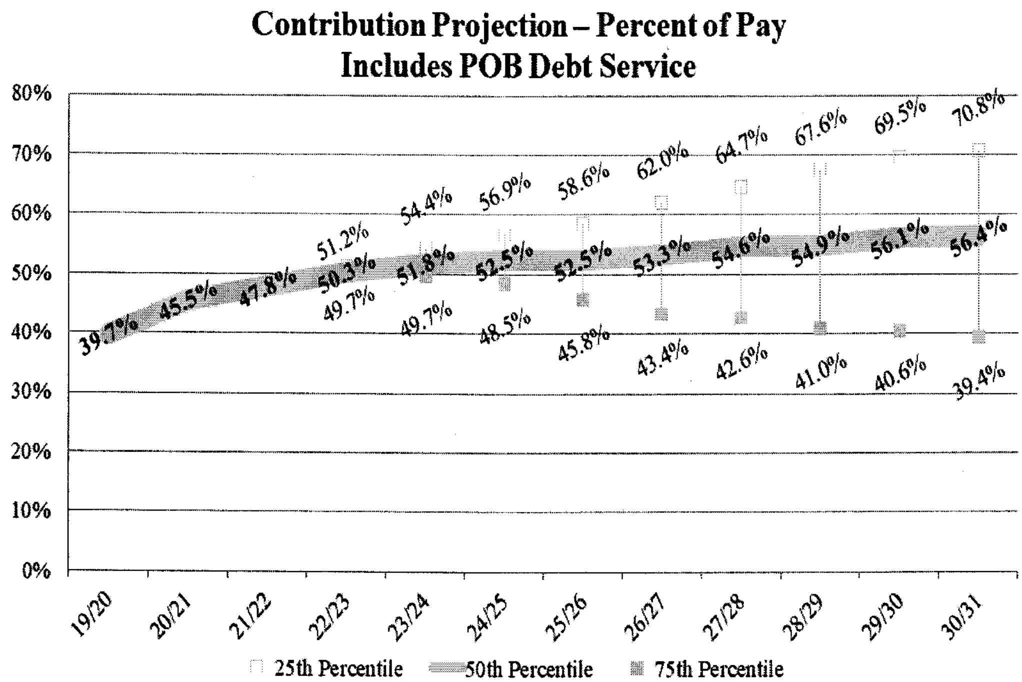



## CONTRIBUTION PROJECTIONS - SAFETY

**Contribution Projection - $Millions**
**Does Not Include POB Debt Service (50th Percentile)**

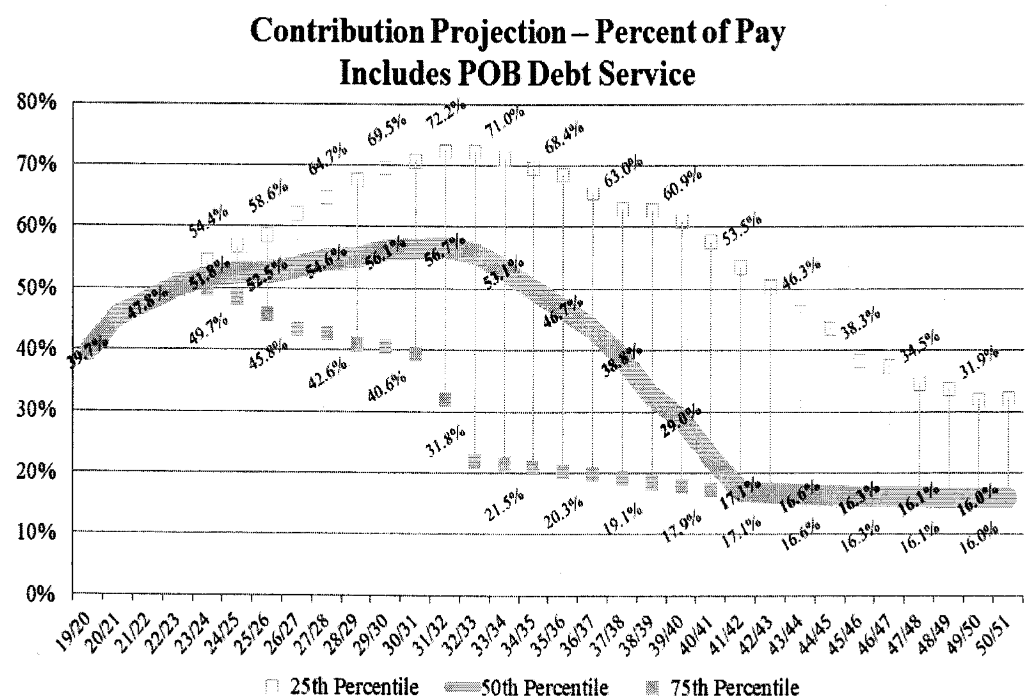


## CONTRIBUTION PROJECTIONS - SAFETY

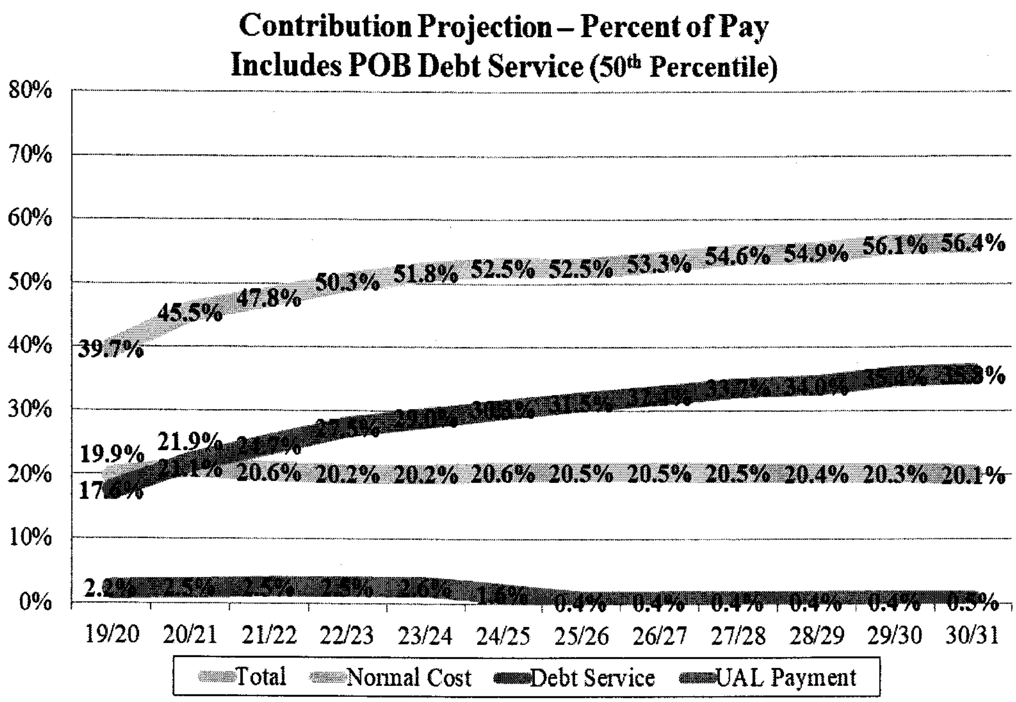





## CONTRIBUTION PROJECTIONS - SAFETY

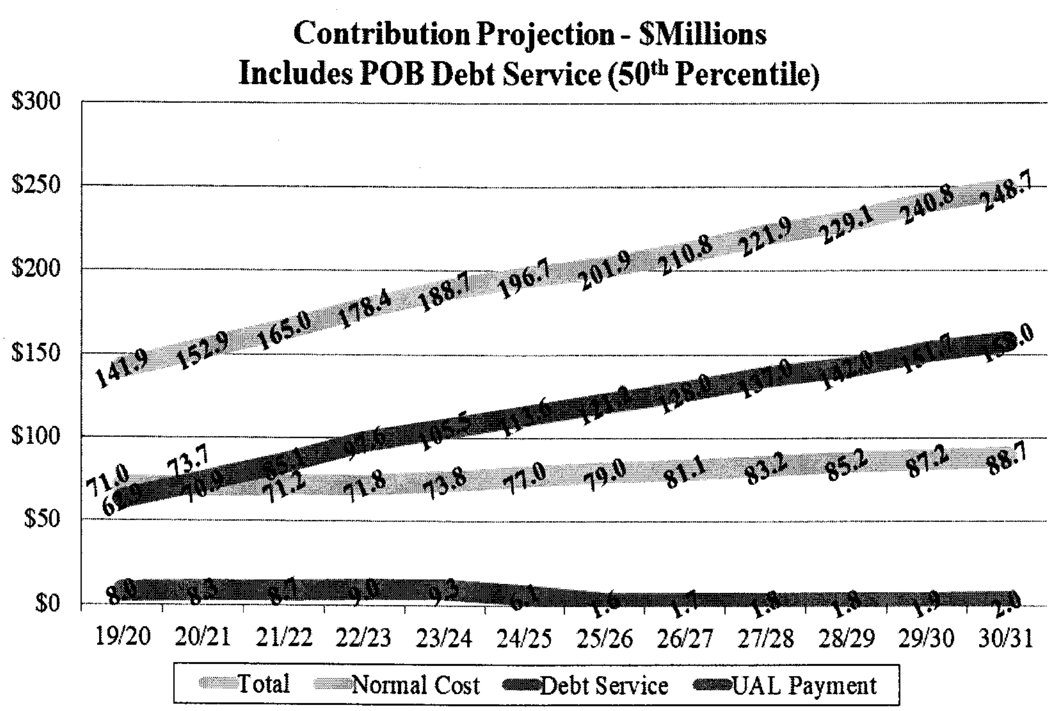


## CONTRIBUTION PROJECTIONS - SAFETY

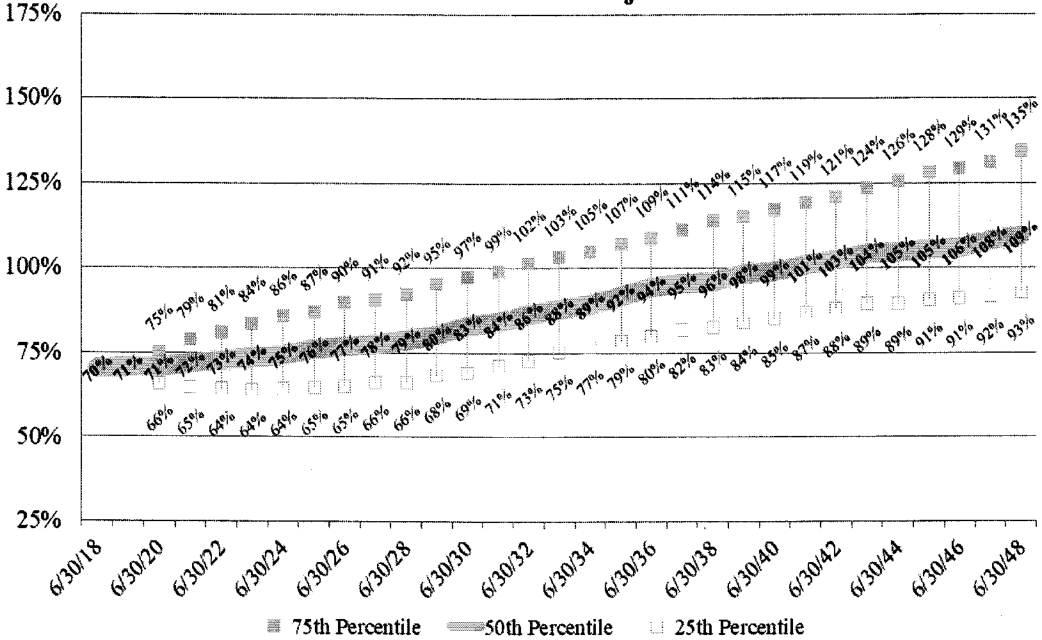





## CONTRIBUTION PROJECTIONS - SAFETY



## Funded Status Projection





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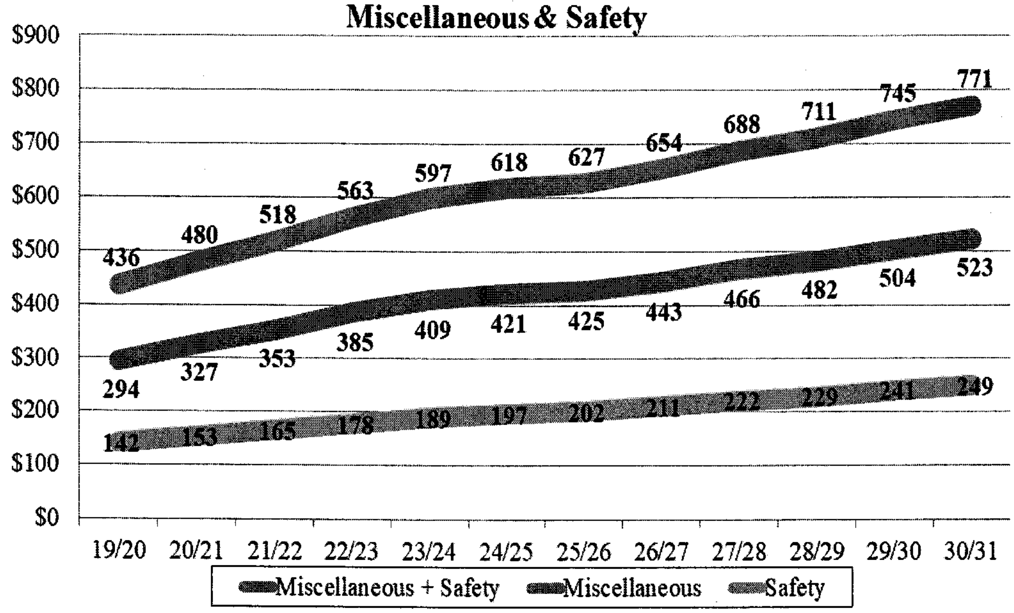
## COMBINED MISCELLANEOUS AND SAFETY

**Contribution Projection - $Millions**
**Includes POB Debt Service**
**Miscellaneous & Safety**






## COMBINED MISCELLANEOUS AND SAFETY

**<u>Funded Status Summary on June 30, 2018</u>**
**(Amounts in $Millions)**

| | Miscellaneous | Safety | Total |
|---|---|---|---|
| ■ AAL | $ 8,166 | $ 3,677 | $ 11,843 |
| ■ Assets | <u>5,749</u> | <u>2,587</u> | <u>8,336</u> |
| ■ Unfunded AAL | 2,417 | 1,090 | 3,507 |
| ■ Funded Ratio | 70.4% | 70.4% | 70.4% |

## Payroll Projections
($000s)

| FY | 19/20 | 20/21 | 21/22 | 22/23 | 23/24 |
|---|---|---|---|---|---|
| Miscellaneous | $1,228,547 | $1,213,566 | $1,246,939 | $1,281,230 | $1,316,464 |
| Safety | 357,547 | 335,974 | 345,214 | 354,707 | 364,461 |
| Total | 1,586,094 | 1,549,540 | 1,592,153 | 1,635,937 | 1,680,925 |

| FY | 24/25 | 25/26 | 26/27 | 27/28 | 28/29 |
|---|---|---|---|---|---|
| Miscellaneous | $1,352,667 | $1,389,865 | $1,428,086 | $1,467,359 | $1,507,711 |
| Safety | 374,484 | 384,782 | 395,364 | 406,236 | 417,408 |
| Total | 1,727,151 | 1,774,647 | 1,823,450 | 1,873,595 | 1,925,119 |

| FY | 29/30 | 30/31 |
|---|---|---|
| Miscellaneous | $1,549,173 | $1,591,775 |
| Safety | 428,887 | 440,681 |
| Total | 1,978,060 | 2,032,456 |





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## LEAVING CALPERS

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



## LEAVING CALPERS

**CalPERS Termination Estimates on June 30, 2018 (Amounts in Millions)**

| Discount Rate | Ongoing Plan 7.00% | Termination Basis 2.5% | Termination Basis 3.25% |
|---|---|---|---|
| **Miscellaneous** | | | |
| Actuarial Accrued Liability | $ 8,166 | $ 13,764 | $ 12,419 |
| Assets | 5,749 | 5,749 | 5,749 |
| Unfunded AAL (UAAL) | 2,417 | 8,015 | 6,670 |
| **Safety** | | | |
| Actuarial Accrued Liability | $ 3,677 | $ 6,447 | $ 5,783 |
| Assets | 2,587 | 2,587 | 2,587 |
| Unfunded AAL (UAAL) | 1,090 | 3,860 | 3,196 |
| **Total** | | | |
| Unfunded AAL (UAAL) | 3,507 | 11,875 | 9,866 |
| Funded Ratio | 70.4% | 41.2% | 45.8% |

## POB PROCEEDS BALANCE (MILLIONS)

| | Safety | Misc. | Total |
|---|---|---|---|
| POB @ **2/16/05** | **$ 85.7** | **$ 311.2** | **$ 396.9** |
| **Balance @ 6/30/19** | **91.8** | **333.2** | **425.0** |
| Earning 7/1/19 - 2/15/20[10] | 4.0 | 14.4 | 18.4 |
| Amortization payment through 2/15/20[11] | (3.8) | (13.7) | (17.5) |
| **Balance @ 2/15/20** | **92.0** | **333.9** | **425.9** |

[10] Based on assumed return from 7/1/19 to 2/15/2020.
[11] Based on a 24 year closed amortization.



## POB OUTSTANDING BALANCE (MILLIONS)

| | Payments | | | |
|---|---|---|---|---|
| | Principal | Interest | Total | Balance |
| 2/17/05 | n/a | n/a | n/a | $400.0 |
| 8/15/05 | n/a | $9.4 | $9.4 | 400.0 |
| . . . . . | | | | |
| 2/15/2019 | $22.5 | 6.6 | 29.1 | 243.9 |
| 8/15/2019 | 0.0 | 6.0 | 6.0 | 243.9 |
| 2/15/2020 | 25.0 | 6.0 | 31.1 | 218.8 |

## ESTIMATED POB SAVINGS (MILLIONS)

- Net Estimated Gains through February 15, 2020:

| | | |
|---|---|---|
| A. | CalPERS Estimated Balance | $ 425.9 |
| B. | Bond Proceeds Balance | 218.8 |
| C. | Cash Flow Savings/(Deficit) [Payments that would have been paid to CalPERS less POB debt service] | (68.9) |
| D. | Net [(A) – (B) + (C)] | 138.1 |

- Net Estimated Gains through February 15, 2020:

| | | |
|---|---|---|
| E. | CalPERS Investment Earnings | $391.4 |
| F. | POB Interest Payments | 250.2 |
| G. | Cost of Issuance | 3.1 |
| H. | Net [(E) – (F) – (G)] | 138.1 |

- Above estimates based on market rate of return.



## NET FUNDED RATIO (MILLIONS)

| | Safety | | | |
|---|---|---|---|---|
| | 6/30/17 | 6/30/18 | Proj. 6/30/19 | Proj. 6/30/20[12] |
| **(1) AAL** | $3,362 | $3,677 | $3,894 | $ 4,121 |
| **(2) MVA** | 2,395 | 2,587 | 2,756 | 2,959 |
| **(3) UAAL [(1) - (2)]** | 967 | 1,090 | 1,138 | 1,162 |
| **(4) Funding Ratio [(2)/(1)]** | 71.2% | 70.4% | 70.8% | 71.8% |
| **(5) POB Balance** | $62 | $58 | $53 | $47 |
| **(6) Net MVA [(2) - (5)]** | 2,333 | 2,529 | 2,703 | 2,912 |
| **(7) Net Funding Ratio [(6)/(1)]** | 69.4% | 68.8% | 69.4% | 70.7% |

12 Projected 6/30/20 MVA based on assumed returns for 2019/20.

## NET FUNDED RATIO (MILLIONS)

| | | Miscellaneous | | | |
|---|---|---|---|---|---|
| | | 6/30/17 | 6/30/18 | Proj. 6/30/19 | Proj. 6/30/20[13] |
| (1) | AAL | $7,441 | $8,166 | $8,652 | $9,161 |
| (2) | MVA | 5,326 | 5,749 | 6,138 | 6,601 |
| (3) | UAAL [(1) - (2)] | 2,115 | 2,417 | 2,514 | 2,560 |
| (4) | Funding Ratio [(2)/(1)] | 71.6% | 70.4% | 70.9% | 72.1% |
| (5) | POB Balance | $225 | $209 | $191 | $172 |
| (6) | Net MVA [(2) - (5)] | 5,101 | 5,540 | 5,947 | 6,429 |
| (7) | Net Funding Ratio [(6)/(1)] | 68.6% | 67.8% | 68.7% | 70.2% |

13 Projected 6/30/20 MVA based on assumed returns for 2019/20.



## NET FUNDED RATIO (MILLIONS)

| | | Total | | | |
|---|---|---|---|---|---|
| | | 6/30/17 | 6/30/18 | Proj. 6/30/19 | Proj. 6/30/20[14] |
| (1) | AAL | $10,803 | $11,843 | $12,546 | $13,282 |
| (2) | MVA | 7,721 | 8,336 | 8,894 | 9,560 |
| (3) | UAAL [(1) - (2)] | 3,082 | 3,507 | 3,652 | 3,722 |
| (4) | Funding Ratio [(2)/(1)] | 71.5% | 70.4% | 70.9% | 72.0% |
| (5) | POB Balance | $287 | $267 | $ 244 | $ 219 |
| (6) | Net MVA [(2) - (5)] | 7,434 | 8,069 | 8,650 | 9,341 |
| (7) | Net Funding Ratio [(6)/(1)] | 68.8% | 68.1% | 68.9% | 70.3% |

14 Projected 6/30/20 MVA based on assumed returns for 2019/20.

## PEPRA COST SHARING

- Target of 50% of total normal cost paid by all employees
- *PEPRA members* must pay greater of 50% of total normal cost or bargained amount if higher
- Employer cannot pay any part of *PEPRA member* required employee contributions
- Employer may impose current employees pay 50% of total normal cost (limited to 8% of pay for Miscellaneous and 12% for Safety) if not agreed through collective bargaining by 1/1/18
- Miscellaneous Plan 2020/21:

| | Classic Members | | New Members |
|---|---|---|---|
| | Tier 1 3%@60 FAE1 | Tier 2 2%@60 FAE3 | PEPRA 2%@62 FAE3 |
| Employer Normal Cost | 13.1% | 10.2% | 7.42% |
| Member Normal Cost | 7.9% | 6.9% | 7.25% |
| Total Normal Cost | 21.0% | 17.1% | 14.67% |
| 50% Target | 10.5% | 8.6% | 7.34% |



## PEPRA COST SHARING

- Safety Plan 2020/21:

| | Classic Members | | New Members |
|---|---|---|---|
| | Tier 1 3%@50 FAE1 | Tier 2 3%@55 FAE3 | PEPRA 2.7%@57 FAE3 |
| Employer Normal Cost | 22.6% | 18.5% | 13.26% |
| Member Normal Cost | 9.0% | 9.0% | 12.50% |
| Total Normal Cost | 31.6% | 27.5% | 25.76% |
| 50% Target | 15.8% | 13.8% | 12.88% |

- PEPRA Member Contributions:

| | 2019/20 | | 2020/21 | | | |
|---|---|---|---|---|---|---|
| Group | Total NC (Basis) | Member Rate | Total Normal Cost | Change | Member Rate | Method |
| Miscellaneous | 12.90% | 6.50% | 14.67% | 1.77% | 7.25% | County Basis |
| Safety | 23.73% | 11.75% | 24.96% | 1.23% | 12.50% | Risk Pool Basis |

## PAYING DOWN THE UNFUNDED LIABILITY & RATE STABILIZATION

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



## WHERE DO YOU GET THE MONEY FROM?

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

## HOW DO YOU USE THE MONEY?

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



## HOW DO YOU USE THE MONEY?

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

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

## How Do You Use the Money?

- Make payments directly to CalPERS (continued):
  - Option #2: Target specific amortization bases:
    - Extra contribution's impact muted by reduced future contributions
      - CalPERS can't track the "would have been" contribution
    - No guaranteed savings
      - Larger asset pool means larger loss (or gain) opportunity
    - Paying off shorter amortization bases: larger contribution savings over shorter period:
      - e.g. 10 year base reduces contribution 11.9¢ for $1
      - Less interest savings vs paying off longer amortization bases
    - Paying off longer amortization bases: smaller contribution savings over longer period:
      - e.g. 25 year base reduces contribution 6.2¢ for $1
      - More interest savings vs paying off shorter amortization bases



## How Do You Use the Money?

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## Irrevocable Supplemental (§115) Pension Trust

- Can only be used to:
  - Reimburse County for CalPERS contributions
  - Make payments directly to CalPERS
- Investments significantly less restricted than County investment funds
  - Fiduciary rules govern Trust investments
  - Usually, designed for long term returns
- Assets don't count for GASB accounting
  - Are considered Employer assets
- Over 100 trusts established, mostly since 2015
  - Trust providers: PARS, PFM, Keenan
  - California Employers' Pension Prefunding Trust (CEPPT) effective July 2019
    - ☐ Strategy 1: Expected Return 5% (48 stocks / 52% bonds)
    - ☐ Strategy 2: Expected Return 4% (22% stocks / 78% bonds)



## Irrevocable Supplemental (§115) Pension Trust

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

## IRREVOCABLE SUPPLEMENTAL (§115) PENSION TRUST

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



## COMPARISON OF OPTIONS

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

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

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

The calculations and projections in this report are based on information contained in the County's June 30, 2018 and earlier CalPERS actuarial valuation reports. We reviewed this information for reasonableness, but do not make any representation on the accuracy of the CalPERS reports.

Future investment returns and volatility are based on Bartel Associates Capital Market model which results in long term returns summarized on pages 23 and 45.

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

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

Respectfully submitted,

Mary Elizabeth Redding

Mary Elizabeth Redding, FSA, MAAA, EA, FCA
Vice President
Bartel Associates, LLC
September 24, 2019

Bianca Lin

Bianca Lin, FSA, EA, FSA, MAAA
Assistant Vice President
Bartel Associates, LLC
September 24, 2019





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CalPERS

**California Public Employees' Retirement System**
**Actuarial Office**
400 Q Street, Sacramento, CA 95811 | Phone: (916) 795-3000 | Fax: (916) 795-2744
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**July 2019**

**Miscellaneous Plan of the County of Riverside (CalPERS ID: 5982690295)**
**Annual Valuation Report as of June 30, 2018**

Dear Employer,

Attached to this letter, you will find the June 30, 2018 actuarial valuation report of your CalPERS pension plan. **Provided in this report is the determination of the minimum required employer contributions for Fiscal Year 2020-21.** In addition, the report also contains important information regarding the current financial status of the plan as well as projections and risk measures to aid in planning for the future.

Actuarial valuations are based on assumptions regarding future plan experience including investment return and payroll growth, eligibility for the types of benefits provided, and longevity among retirees. The CalPERS Board of Administration adopts these assumptions after considering the advice of CalPERS actuarial and investment teams and other professionals. Each actuarial valuation reflects all prior differences between actual and assumed experience and adjusts the contribution rates as needed. This valuation is based on an investment return assumption of 7.0% which was adopted by the board in December 2016. Other assumptions used in this report are those recommended in the CalPERS Experience Study and Review of Actuarial Assumptions report from December 2017.

**Required Contributions**

The exhibit below displays the minimum required employer contributions and the Employee PEPRA Rate for Fiscal Year 2020-21 along with an estimate of the required contribution for Fiscal Year 2021-22. Member contributions other than cost sharing (whether paid by the employer or the employee) are in addition to the results shown below. **The required employer contributions in this report do not reflect any cost sharing arrangement you may have with your employees.**

| Fiscal Year | Employer Normal Cost Rate | Employer Amortization of Unfunded Accrued Liability | Employee PEPRA Rate |
|---|---|---|---|
| 2020-21 | 11.673% | $155,375,654 | 7.25% |
| *Projected Results* | | | |
| *2021-22* | *11.7%* | *$183,614,000* | *TBD* |

The actual investment return for Fiscal Year 2018-19 was not known at the time this report was prepared. The projections above assume the investment return for that year would be 7.00 percent. ***To the extent the actual investment return for Fiscal Year 2018-19 differs from 7.00 percent, the actual contribution requirements for Fiscal Year 2021-22 will differ from those shown above.*** For additional details regarding the assumptions and methods used for these projections please refer to the "Projected Employer Contributions" in the "Highlights and Executive Summary" section. This section also contains projected required contributions through fiscal year 2025-26.

**Changes from previous Year's Valuations**

CalPERS continues to strive to provide comprehensive risk assessments regarding plan funding and sustainability consistent with the Board of Administration's pension and investment beliefs. Your report this year includes new metrics on plan maturity in recognition of the fact that most pension plans at CalPERS are maturing as anticipated. As plans mature, they become much more sensitive to risks than plans that are less mature. The "Risk Analysis" section of your report will help you understand how your plan is affected by investment return volatility and other economic assumptions. We have included plan sensitivity analysis with respect to longevity and inflation to further that discussion and encourage you to review our most recent Annual Review of Funding Levels and Risks report on our website that takes a holistic view of the system.

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

**Upcoming Change for June 30, 2019 Valuations**

The CalPERS Board of Administration has adopted a new amortization policy effective with the June 30, 2019 actuarial valuation. The new policy shortens the period over which actuarial gains and losses are amortized from 30 years to 20 years with the payments computed using a level dollar amount. In addition, the new policy removes the 5-year ramp-up and ramp-down on UAL bases attributable to assumption changes and non-investment gains/losses. The new policy removes the 5-year ramp-down on investment gains/losses. These changes will apply only to new UAL bases established on or after June 30, 2019.

Over the past few years, CalPERS adopted measures to strengthen the long-term future of the system. These measures include lowering the discount rate from 7.5% to 7.0% and shortening the amortization period for future unexpected changes in unfunded liability. While these changes can result in short-term increases to required employer contributions, they are not expected to increase the long-term cost of the plan. We firmly believe these changes were necessary in order to maintain the security of promised benefits and to equitably spread benefit costs over the current and future generations.

We understand that you might have some questions about these results. While we are very interested in discussing these results with your agency, in the interest of allowing us to give every public agency their results, we ask that you wait until after August 1, 2019 to contact us with actuarial questions. If you have other questions, you may call the Customer Contact Center at (888)-CalPERS or (**888-225-7377**).

Sincerely,

SCOTT TERANDO
Chief Actuary

CalPERS

# Actuarial Valuation as of June 30, 2018

# for the Miscellaneous Plan of the County of Riverside

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

## Required Contributions for Fiscal Year July 1, 2020 – June 30, 2021

# Table of Contents

# Actuarial Certification

To the best of our knowledge, this report is complete and accurate and contains sufficient information to disclose, fully and fairly, the funded condition of the Miscellaneous Plan of the County of Riverside. This valuation is based on the member and financial data as of June 30, 2018 provided by the various CalPERS databases and the benefits under this plan with CalPERS as of the date this report was produced. It is our opinion that the valuation has been performed in accordance with generally accepted actuarial principles, in accordance with standards of practice prescribed by the Actuarial Standards Board, and that the assumptions and methods are internally consistent and reasonable for this plan, as prescribed by the CalPERS Board of Administration according to provisions set forth in the California Public Employees' Retirement Law.

The undersigned is an actuary for CalPERS, a member of the American Academy of Actuaries and the Society of Actuaries and meets the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein.

Kurt Schneider

KURT SCHNEIDER, ASA, EA, FCA, MAAA
Senior Pension Actuary, CalPERS

# Highlights and Executive Summary

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

# Introduction

This report presents the results of the June 30, 2018 actuarial valuation of the Miscellaneous Plan of the County of Riverside of the California Public Employees' Retirement System (CalPERS). This actuarial valuation sets the minimum required employer contributions for Fiscal Year 2020-21.

# Purpose of the Report

The actuarial valuation was prepared by the CalPERS Actuarial Office using data as of June 30, 2018. The purpose of the report is to:

- Set forth the assets and accrued liabilities of this plan as of June 30, 2018;
- Determine the minimum required employer contributions for the fiscal year July 1, 2020 through June 30, 2021;
- Provide actuarial information as of June 30, 2018 to the CalPERS Board of Administration and other interested parties.

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

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

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; changes in actuarial policies; 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), with the exception of including the original base amounts of the various components of the unfunded liability in the Schedule of Amortization Bases shown on page 16.

Additionally, this report includes the following "Enhanced Risk Disclosures" also recommended by the CAAP in the Model Disclosure Elements document and consistent with the recommendations of Actuarial Standards of Practice No. 51:

- A "Scenario Test," projecting future results under different investment income returns.
- A "Sensitivity Analysis," showing the impact on current valuation results using alternative discount rates of 6.0 percent and 8.0 percent.
- A "Sensitivity Analysis," showing the impact on current valuation results using a 1.0 percent plus or minus change in the inflation rate.
- A "Sensitivity Analysis," showing the impact on current valuation results assuming rates of mortality are 10 percent lower or 10 percent higher than our current mortality assumptions adopted in 2017. This type of analysis highlights the impact on the plan of improving or worsening mortality over the long-term.
- Plan maturity measures which indicate how sensitive a plan may be to the risks noted above.

# Required Contributions

| **Required Employer Contribution** | | **Fiscal Year 2020-21** |
|---|---|---|
| **Employer Normal Cost Rate** | | **11.673%** |
| ***Plus, Either*** | | |
| **1) Monthly Employer Dollar UAL Payment** | **$** | **12,947,971** |
| ***Or*** | | |
| **2) Annual UAL Prepayment Option*** | **$** | **150,207,314** |
| **Required PEPRA Member Contribution Rate** | | **7.25%** |

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

** Only the UAL portion of the employer contribution can be prepaid* ***(which must be received in full no later than July 31)****. Any prepayment totaling over $5 million requires a 72-hour notice email to FCSD_public_agency_wires@calpers.ca.gov. Plan Normal Cost contributions will be made as part of the payroll reporting process. If there is contractual cost sharing or other change, this amount will change.*

*In accordance with Sections 20537 and 20572 of the Public Employees' Retirement Law, if a contracting agency fails to remit the required contributions when due, interest and penalties may apply.*

*For additional detail regarding the determination of the required contribution for PEPRA members, see Appendix D. Required member contributions for Classic members can be found in Appendix B.*

| | | **Fiscal Year 2019-20** | | **Fiscal Year 2020-21** |
|---|---|---|---|---|
| **Normal Cost Contribution as a Percentage of Payroll** | | | | |
| Total Normal Cost | | 18.460% | | 19.091% |
| Employee Contribution[1] | | 7.462% | | 7.418% |
| Employer Normal Cost[2] | | 10.998% | | 11.673% |
| Projected Annual Payroll for Contribution Year | $ | 1,228,546,672 | $ | 1,213,566,060 |
| **Estimated Employer Contributions Based On Projected Payroll** | | | | |
| Total Normal Cost | $ | 226,789,716 | $ | 231,681,895 |
| Employee Contribution[1] | | 91,674,153 | | 90,022,330 |
| Employer Normal Cost[2] | | 135,115,563 | | 141,659,565 |
| Unfunded Liability Contribution | | 129,905,894 | | 155,375,654 |
| % of Projected Payroll (illustrative only) | | 10.574% | | 12.803% |
| Estimated Total Employer Contribution | $ | 265,021,457 | $ | 297,035,219 |
| % of Projected Payroll (illustrative only) | | 21.572% | | 24.476% |

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

[2] The Employer Normal Cost is a blended rate for all benefit groups in the plan. A breakout of normal cost by benefit group is shown in Appendix D.

# Plan's Funded Status

| | | June 30, 2017 | | June 30, 2018 |
|---|---|---|---|---|
| 1. Present Value of Projected Benefits | $ | 9,101,025,982 | $ | 9,894,050,693 |
| 2. Entry Age Normal Accrued Liability | | 7,441,270,302 | | 8,165,793,889 |
| 3. Market Value of Assets (MVA) | $ | 5,325,794,759 | $ | 5,748,832,217 |
| 4. Unfunded Accrued Liability (UAL) [(2) – (3)] | $ | 2,115,475,543 | $ | 2,416,961,672 |
| 5. Funded Ratio [(3) / (2)] | | 71.6% | | 70.4% |

This measure of funded status is an assessment of the need for future employer contributions based on the selected actuarial cost method used to fund the plan. The UAL is the present value of future employer contributions for service that has already been earned and is in addition to future normal cost contributions for active members. For a measure of funded status that is appropriate for assessing the sufficiency of plan assets to cover estimated termination liabilities, please see "Hypothetical Termination Liability" in the "Risk Analysis" section.

# Projected Employer Contributions

The table below shows the required and projected employer contributions (before cost sharing) for the next six fiscal years. Projected results reflect the adopted changes to the discount rate described in Appendix A, "Actuarial Methods and Assumptions." The projections also assume that all actuarial assumptions will be realized and that no further changes to assumptions, contributions, benefits, or funding will occur during the projection period. The projected normal cost percentages in the projections below do not reflect that the normal cost will decline over time as new employees are hired into PEPRA or other lower cost benefit tiers.

| | **Required Contribution** | **Projected Future Employer Contributions (Assumes 7.00% Return for Fiscal Year 2018-19)** | | | | |
|---|---|---|---|---|---|---|
| **Fiscal Year** | **2020-21** | **2021-22** | **2022-23** | **2023-24** | **2024-25** | **2025-26** |
| **Normal Cost %** | 11.673% | 11.7% | 11.7% | 11.7% | 11.7% | 11.7% |
| **UAL Payment** | 155,375,654 | 183,614,000 | 206,540,000 | 218,850,000 | 230,752,000 | 237,098,000 |
| *Total as a % of Payroll** | *24.5%* | *26.4%* | *27.8%* | *28.3%* | *28.7%* | *28.7%* |
| *Projected Payroll* | *1,213,566,060* | *1,246,939,126* | *1,281,229,952* | *1,316,463,775* | *1,352,666,529* | *1,389,864,859* |

*Illustrative only and based on the projected payroll shown.

Changes in the UAL due to actuarial gains or losses as well as 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 phases in the impact of changes in UAL over a 5-year period and attempts to minimize employer cost volatility from year to year. As a result of this methodology, dramatic changes in the required employer contributions in any one year are less likely. However, required contributions can change gradually and significantly over the next five years. In years 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.

For projected contributions under alternate investment return scenarios, please see the "Future Investment Return Scenarios" in the "Risk Analysis" section.

# Cost

### Actuarial Cost Estimates in General

What is the cost of the pension plan?

Contributions to fund the pension plan are comprised of two components:

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

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

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

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

- Demographic assumptions (which includes mortality rates, retirement rates, employment termination rates and disability rates)
- Economic assumptions (which includes future investment earnings, inflation, salary growth rates)

These assumptions reflect CalPERS best estimate of the future experience of the plan and are long term in nature. We recognize that all the assumptions will not be realized in any given year. For example, the investment earnings at CalPERS have averaged 6.0 percent over the 20 years ending June 30, 2018, yet individual fiscal year returns have ranged from -24.0 percent to +21.7 percent. In addition, CalPERS reviews all the actuarial assumptions on an ongoing basis by conducting in-depth experience studies every four years, with the most recent experience study completed in 2017.

# Changes since the Prior Year's Valuation

**Benefits**

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

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

**Actuarial Methods and Assumptions**

In December of 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 valuation. The minimum employer contributions for Fiscal Year 2020-21 determined in this valuation were calculated using a discount rate of 7.00 percent, payroll growth of 2.75 percent and an inflation rate of 2.50 percent. The projected employer contributions on Page 5 are calculated under the assumption that the discount rate remains at 7.00 percent going forward and that furthermore the realized rate of return on assets for Fiscal Year 2018-19 is 7.00 percent.

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 assumption provides a more realistic assumption for the long-term investment return of the fund.

CalPERS has implemented a new actuarial valuation software system for the June 30, 2018 valuation. With this new system we have refined and improved some of our calculation methodology. Any difference in liability between the old software and new software calculations is captured as a method change line item.

# Subsequent Events

The CalPERS Board of Administration has adopted a new amortization policy effective with the June 30, 2019 actuarial valuation. The new policy shortens the period over which actuarial gains and losses are amortized from 30 years to 20 years with the payments computed using a level dollar amount. In addition, the new policy removes the 5-year ramp-up and ramp-down on UAL bases attributable to assumption changes and non-investment gains/losses. The new policy removes the 5-year ramp-down on investment gains/losses. These changes will apply only to new UAL bases established on or after June 30, 2019.

For inactive employers the new amortization policy imposes a maximum amortization period of 15 years for all unfunded accrued liabilities effective June 30, 2017. Furthermore, the plan actuary has the ability to shorten the amortization period on any valuation date based on the life expectancy of plan members and projected cash flow needs to the plan. The impact of this has been reflected in the current valuation results.

The contribution requirements determined in this actuarial valuation report are based on demographic and financial information as of June 30, 2018. Changes in the value of assets subsequent to that date are not reflected. Investment returns below the assumed rate of return will increase the required contribution, while investment returns above the assumed rate of return will decrease the required contribution.

This actuarial valuation report reflects statutory changes, regulatory changes and CalPERS Board actions through January 2019. Any subsequent changes or actions are not reflected.

# Assets

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

# Reconciliation of the Market Value of Assets

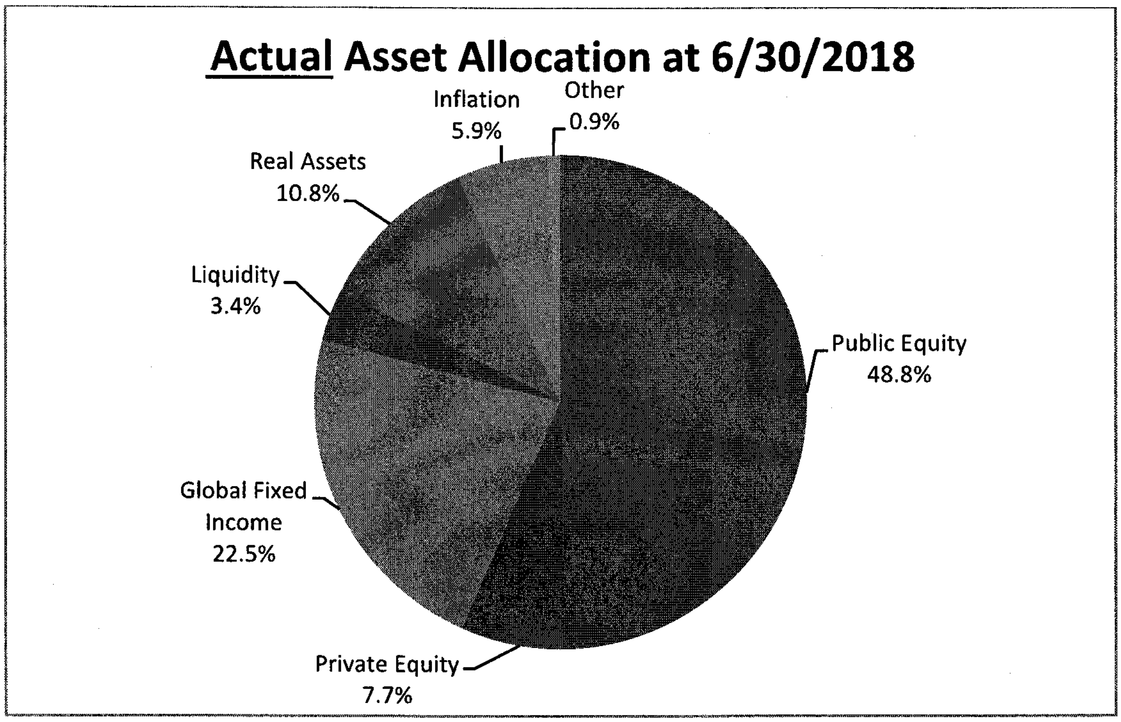
| | | | |
|---|---|---|---|
| 1. | Market Value of Assets as of 6/30/17 including Receivables | $ | 5,325,794,759 |
| 2. | Change in Receivables for Service Buybacks | | (249,195) |
| 3. | Employer Contributions | | 185,966,218 |
| 4. | Employee Contributions | | 84,005,669 |
| 5. | Benefit Payments to Retirees and Beneficiaries | | (283,766,854) |
| 6. | Refunds | | (8,848,748) |
| 7. | Transfers | | 26 |
| 8. | Service Credit Purchase (SCP) Payments and Interest | | 3,928,867 |
| 9. | Miscellaneous Adjustments | | 2 |
| 10. | Net Investment Return | | 442,001,476 |
| 11. | Market Value of Assets as of 6/30/18 including Receivables | $ | 5,748,832,217 |

# 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 December 19, 2017, the CalPERS Board of Administration adopted changes to the current asset allocation as shown in the Policy Target Allocation below expressed as a percentage of total assets.

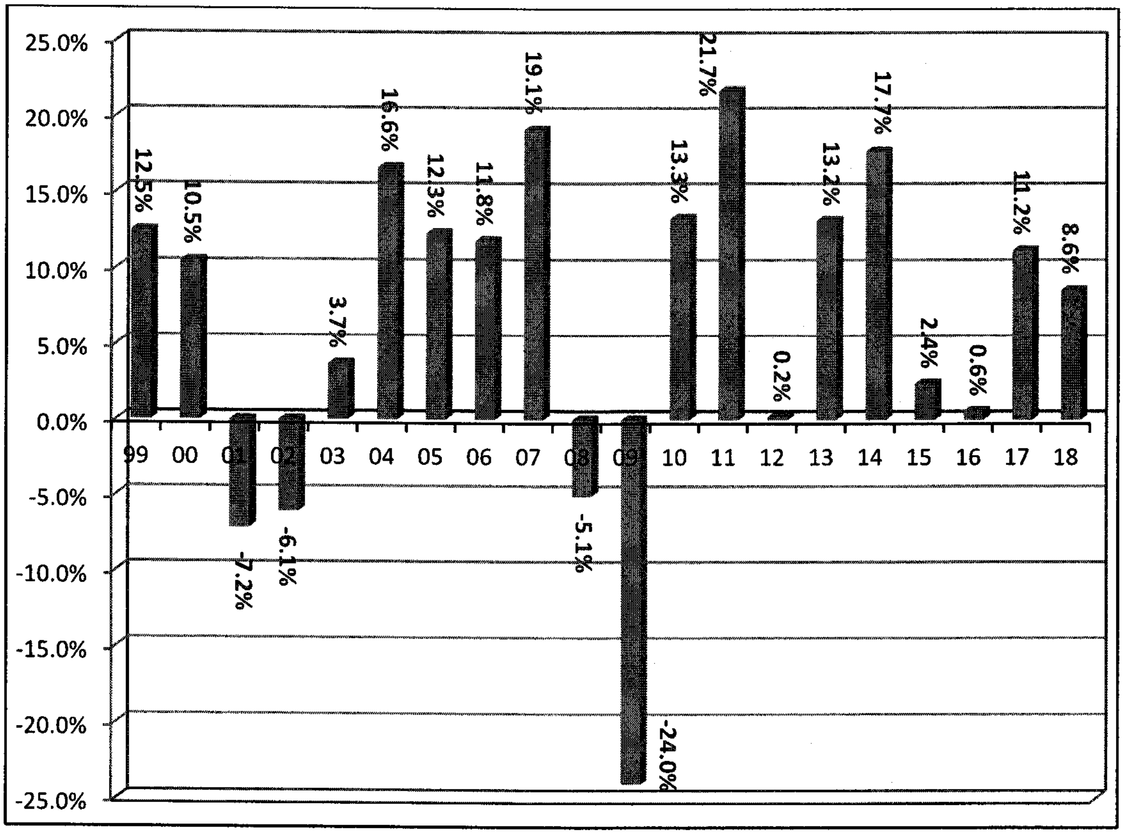
The asset allocation and market value of assets shown below reflect the values of the Public Employees' Retirement Fund (PERF) in its entirety as of June 30, 2018. The assets for County of Riverside Miscellaneous Plan are part of the PERF and are invested accordingly.

| (A) Asset Class | (B) Market Value ($ Billion) | (C) Policy Target Allocation |
|---|---|---|
| Public Equity | 171.8 | 49.0% |
| Private Equity | 27.2 | 8.0% |
| Global Fixed Income | 79.1 | 22.0% |
| Liquidity | 11.8 | 3.0% |
| Real Assets | 38.1 | 12.0% |
| Inflation Sensitive Assets | 20.8 | 6.0% |
| Other | 3.1 | 0.0% |
| **Total Fund** | **$351.9** | **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, 2018 (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 Mean Rates of Return and Volatilities | | | | | |
|---|---|---|---|---|---|
| | **1 year** | **5 year** | **10 year** | **20 year** | **30 year** |
| Geometric Return | 8.6% | 7.9% | 5.7% | 6.0% | 8.3% |
| Volatility | – | 6.9% | 12.9% | 11.1% | 10.1% |

# Liabilities and Contributions

- **Development of Accrued and Unfunded Liabilities**
- **(Gain) / Loss Analysis 06/30/17 - 06/30/18**
- **Schedule of Amortization Bases**
- **Amortization Schedule and Alternatives**
- **Reconciliation of Required Employer Contributions**
- **Employer Contribution History**
- **Funding History**

# Development of Accrued and Unfunded Liabilities

| | | June 30, 2017 | June 30, 2018 |
|---|---|---|---|
| 1. Present Value of Projected Benefits | | | |
| a) Active Members | $ | 5,363,734,898 | 5,628,389,751 |
| b) Transferred Members | | 201,106,979 | 225,232,835 |
| c) Terminated Members | | 185,333,947 | 207,677,521 |
| d) Members and Beneficiaries Receiving Payments | | 3,350,850,158 | 3,832,750,586 |
| e) Total | $ | 9,101,025,982 | 9,894,050,693 |
| 2. Present Value of Future Employer Normal Costs | $ | 949,110,982 | 1,017,274,198 |
| 3. Present Value of Future Employee Contributions | $ | 710,644,698 | 710,982,606 |
| 4. Entry Age Normal Accrued Liability | | | |
| a) Active Members [(1a) - (2) - (3)] | $ | 3,703,979,218 | 3,900,132,947 |
| b) Transferred Members (1b) | | 201,106,979 | 225,232,835 |
| c) Terminated Members (1c) | | 185,333,947 | 207,677,521 |
| d) Members and Beneficiaries Receiving Payments (1d) | | 3,350,850,158 | 3,832,750,586 |
| e) Total | $ | 7,441,270,302 | 8,165,793,889 |
| 5. Market Value of Assets (MVA) | $ | 5,325,794,759 | 5,748,832,217 |
| 6. Unfunded Accrued Liability (UAL) [(4e) - (5)] | $ | 2,115,475,543 | 2,416,961,672 |
| 7. Funded Ratio [(5) / (4e)] | | 71.6% | 70.4% |

# (Gain)/Loss Analysis 6/30/17 – 6/30/18

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

| | | |
|---|---|---|
| **1. Total (Gain)/Loss for the Year** | | |
| a) Unfunded Accrued Liability (UAL) as of 6/30/17 | $ | 2,115,475,543 |
| b) Expected Payment on the UAL during 2017-18 | | 58,214,830 |
| c) Interest through 6/30/18 [.0725 x (1a) - ((1.0725)$^{½}$ - 1) x (1b)] | | 151,298,612 |
| d) Expected UAL before all other changes [(1a) - (1b) + (1c)] | | 2,208,559,325 |
| e) Change due to plan changes | | 0 |
| f) Change due to assumption change | | 231,152,142 |
| g) Change due to method change | | 61,192,868 |
| h) Expected UAL after all other changes [(1d) + (1e) + (1f) + (1g)] | | 2,500,904,335 |
| i) Actual UAL as of 6/30/18 | | 2,416,961,672 |
| j) Total (Gain)/Loss for 2017-18 [(1i) - (1h)] | $ | (83,942,662) |
| **2. Contribution (Gain)/Loss for the Year** | | |
| a) Expected Contribution (Employer and Employee) | $ | 278,533,068 |
| b) Interest on Expected Contributions | | 9,920,167 |
| c) Actual Contributions | | 269,971,886 |
| d) Interest on Actual Contributions | | 9,615,254 |
| e) Expected Contributions with Interest [(2a) + (2b)] | | 288,453,235 |
| f) Actual Contributions with Interest [(2c) + (2d)] | | 279,587,140 |
| g) Contribution (Gain)/Loss [(2e) - (2f)] | $ | 8,866,095 |
| **3. Asset (Gain)/Loss for the Year** | | |
| a) Market Value of Assets as of 6/30/17 | $ | 5,325,794,759 |
| b) Prior Fiscal Year Receivables | | (14,155,947) |
| c) Current Fiscal Year Receivables | | 13,906,752 |
| d) Contributions Received | | 269,971,886 |
| e) Benefits and Refunds Paid | | (292,615,603) |
| f) Transfers, SCP Payments and Interest, and Miscellaneous Adjustments | | 3,928,895 |
| g) Expected Int. [.0725 x (3a + 3b) + ((1.0725)$^{½}$ - 1) x ((3d) + (3e) + (3f))] | | 384,427,271 |
| h) Expected Assets as of 6/30/18 [(3a) + (3b) + (3c) + (3d) + (3e) + (3f) + (3g)] | | 5,691,258,014 |
| i) Market Value of Assets as of 6/30/18 | | 5,748,832,217 |
| j) Asset (Gain)/Loss [(3h) - (3i)] | $ | (57,574,203) |
| **4. Liability (Gain)/Loss for the Year** | | |
| a) Total (Gain)/Loss (1j) | $ | (83,942,662) |
| b) Contribution (Gain)/Loss (2g) | | 8,866,095 |
| c) Asset (Gain)/Loss (3j) | | (57,574,203) |
| d) Liability (Gain)/Loss [(4a) - (4b) - (4c)] | $ | (35,234,554) |

# Schedule of Amortization Bases

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

- The assets, liabilities, and funded status of the plan are measured as of the valuation date: June 30, 2018.
- The required employer contributions determined by the valuation are for the fiscal year beginning two years after the valuation date: Fiscal Year 2020-21.

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

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

# Schedule of Amortization Bases

| Reason for Base | Date Established | Ramp Up/Down 2020-21 | Escalat-ion Rate | Amorti-zation Period | Balance 6/30/18 | Expected Payment 2018-19 | Balance 6/30/19 | Expected Payment 2019-20 | Balance 6/30/20 | Scheduled Payment for 2020-21 |
|---|---|---|---|---|---|---|---|---|---|---|
| FS 30-YEAR AMORTIZATION | 06/30/08 | No Ramp | 2.750% | 20 | $(10,330,534) | $(728,364) | $(10,300,246) | $(748,219) | $(10,247,300) | $(758,043) |
| ASSUMPTION CHANGE | 06/30/09 | No Ramp | 2.750% | 11 | $78,341,261 | $7,928,273 | $75,624,080 | $8,142,315 | $72,495,290 | $8,280,520 |
| SPECIAL (GAIN)/LOSS | 06/30/09 | No Ramp | 2.750% | 21 | $118,118,179 | $8,107,384 | $118,000,108 | $8,328,576 | $117,644,970 | $8,434,601 |
| GOLDEN HANDSHAKE | 06/30/09 | No Ramp | 2.750% | 11 | $30,729,867 | $3,109,916 | $29,664,035 | $3,193,876 | $28,436,747 | $3,248,088 |
| SPECIAL (GAIN)/LOSS | 06/30/10 | No Ramp | 2.750% | 22 | $83,309,093 | $5,576,437 | $83,372,418 | $5,728,702 | $83,282,672 | $5,799,374 |
| GOLDEN HANDSHAKE | 06/30/10 | No Ramp | 2.750% | 12 | $1,099,989 | $105,337 | $1,068,026 | $108,185 | $1,030,881 | $109,973 |
| ASSUMPTION CHANGE | 06/30/11 | No Ramp | 2.750% | 13 | $97,242,245 | $8,855,535 | $94,888,965 | $9,095,235 | $92,123,008 | $9,241,576 |
| GOLDEN HANDSHAKE | 06/30/11 | No Ramp | 2.750% | 13 | $31,066,702 | $2,829,144 | $30,314,882 | $2,905,722 | $29,431,222 | $2,952,475 |
| SPECIAL (GAIN)/LOSS | 06/30/11 | No Ramp | 2.750% | 23 | $(46,092,854) | $(3,013,654) | $(46,202,006) | $(3,096,007) | $(46,233,612) | $(3,133,002) |
| PAYMENT (GAIN)/LOSS | 06/30/12 | No Ramp | 2.750% | 24 | $(70,531,197) | $(4,510,997) | $(70,802,169) | $(4,634,361) | $(70,964,501) | $(4,687,974) |
| (GAIN)/LOSS | 06/30/12 | No Ramp | 2.750% | 24 | $223,384,208 | $14,287,089 | $224,242,423 | $14,677,804 | $224,756,554 | $14,847,604 |
| (GAIN)/LOSS | 06/30/13 | 100% → | 2.750% | 25 | $641,164,110 | $33,996,766 | $650,879,070 | $43,658,994 | $651,279,390 | $44,180,831 |
| ASSUMPTION CHANGE | 06/30/14 | 100% → | 2.750% | 16 | $378,178,470 | $20,805,253 | $383,129,842 | $28,495,007 | $380,473,466 | $36,178,919 |
| (GAIN)/LOSS | 06/30/14 | 100% → | 2.750% | 26 | $(496,572,913) | $(19,795,137) | $(510,856,768) | $(27,117,366) | $(518,566,321) | $(34,291,177) |
| (GAIN)/LOSS | 06/30/15 | 80% ↗ | 2.750% | 27 | $455,889,519 | $12,301,581 | $475,076,931 | $18,959,569 | $488,720,385 | $25,562,072 |
| ASSUMPTION CHANGE | 06/30/16 | 60% ↗ | 2.750% | 18 | $141,047,381 | $2,661,593 | $148,167,524 | $5,468,982 | $152,882,092 | $8,323,642 |
| (GAIN)/LOSS | 06/30/16 | 60% ↗ | 2.750% | 28 | $558,474,555 | $7,749,770 | $589,551,350 | $15,926,622 | $614,345,318 | $24,142,947 |
| ASSUMPTION CHANGE | 06/30/17 | 40% ↗ | 2.750% | 19 | $132,312,586 | $(9,911,968) | $151,827,486 | $2,867,754 | $159,488,983 | $5,815,832 |
| (GAIN)/LOSS | 06/30/17 | 40% ↗ | 2.750% | 29 | $(138,271,342) | $0 | $(147,950,336) | $(2,055,496) | $(156,180,638) | $(4,151,542) |
| METHOD CHANGE | 06/30/18 | 20% ↗ | 2.750% | 20 | $61,192,868 | $494,275 | $64,965,087 | $507,867 | $68,987,301 | $1,286,243 |
| ASSUMPTION CHANGE | 06/30/18 | 20% ↗ | 2.750% | 20 | $231,152,142 | $(9,172,815) | $256,821,226 | $(9,425,068) | $284,548,078 | $5,305,294 |
| (GAIN)/LOSS | 06/30/18 | 20% ↗ | 2.750% | 30 | $(83,942,662) | $0 | $(89,818,648) | $0 | $(96,105,953) | $(1,312,599) |
| **TOTAL** | | | | | **$2,416,961,672** | **$81,675,418** | **$2,501,663,281** | **$120,988,693** | **$2,551,628,032** | **$155,375,654** |

# Amortization Schedule and Alternatives

The amortization schedule on the previous page shows the minimum contributions required according to CalPERS amortization policy. There has been considerable interest from many agencies in paying off these unfunded accrued liabilities sooner and the possible savings in doing so. As a result, we have provided alternate amortization schedules to help analyze the current amortization schedule and illustrate the advantages of accelerating unfunded liability payments.

Shown on the following page are future year amortization payments based on 1) the current amortization schedule reflecting the individual bases and remaining periods shown on the previous page, and 2) alternate "fresh start" amortization schedules using two sample periods that would both result in interest savings relative to the current amortization schedule. Note that the payments under each alternate scenario increase by 2.75 percent per year.

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

- A positive total unfunded liability with a negative total payment,
- A negative total unfunded liability with a positive total payment, or
- Total payments that completely amortize the unfunded liability over a very short period of time

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

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

# Amortization Schedule and Alternatives

| | Current Amortization Schedule | | Alternate Schedules: 20 Year Amortization | | Alternate Schedules: 15 Year Amortization | |
|---|---|---|---|---|---|---|
| **Date** | **Balance** | **Payment** | **Balance** | **Payment** | **Balance** | **Payment** |
| **6/30/2020** | 2,551,628,032 | 155,375,654 | 2,551,628,032 | 188,756,452 | 2,551,628,032 | 230,140,813 |
| **6/30/2021** | 2,569,520,170 | 183,613,689 | 2,534,990,802 | 193,947,254 | 2,492,182,487 | 236,469,685 |
| **6/30/2022** | 2,559,455,106 | 206,540,479 | 2,511,819,558 | 199,280,804 | 2,422,029,116 | 242,972,601 |
| **6/30/2023** | 2,524,969,833 | 218,849,580 | 2,481,509,261 | 204,761,026 | 2,340,238,342 | 249,654,348 |
| **6/30/2024** | 2,475,337,959 | 230,751,961 | 2,443,408,457 | 210,391,954 | 2,245,810,560 | 256,519,842 |
| **6/30/2025** | 2,409,919,932 | 237,097,639 | 2,396,815,919 | 216,177,733 | 2,137,671,111 | 263,574,138 |
| **6/30/2026** | 2,333,358,625 | 243,617,825 | 2,340,977,048 | 222,122,621 | 2,014,664,880 | 270,822,427 |
| **6/30/2027** | 2,244,693,490 | 250,317,316 | 2,275,080,016 | 228,230,993 | 1,875,550,525 | 278,270,044 |
| **6/30/2028** | 2,142,891,786 | 257,201,041 | 2,198,251,642 | 234,507,345 | 1,718,994,291 | 285,922,470 |
| **6/30/2029** | 2,026,843,387 | 264,274,067 | 2,109,552,973 | 240,956,297 | 1,543,563,388 | 293,785,338 |
| **6/30/2030** | 1,895,355,206 | 271,541,606 | 2,007,974,550 | 247,582,595 | 1,347,718,909 | 301,864,435 |
| **6/30/2031** | 1,747,145,249 | 263,471,649 | 1,892,431,340 | 254,391,117 | 1,129,808,234 | 310,165,706 |
| **6/30/2032** | 1,596,908,226 | 260,544,836 | 1,761,757,317 | 261,386,872 | 888,056,909 | 318,695,263 |
| **6/30/2033** | 1,439,182,131 | 240,063,778 | 1,614,699,646 | 268,575,011 | 620,559,948 | 327,459,383 |
| **6/30/2034** | 1,291,600,977 | 232,030,487 | 1,449,912,470 | 275,960,824 | 325,272,525 | 336,464,516 |
| **6/30/2035** | 1,141,998,843 | 219,005,550 | 1,265,950,247 | 283,549,747 | | |
| **6/30/2036** | 995,397,659 | 194,914,663 | 1,061,260,625 | 291,347,365 | | |
| **6/30/2037** | 863,454,201 | 180,808,793 | 834,176,811 | 299,359,417 | | |
| **6/30/2038** | 736,865,926 | 165,779,698 | 582,909,399 | 307,591,801 | | |
| **6/30/2039** | 616,962,688 | 154,432,917 | 305,537,624 | 316,050,576 | | |
| **6/30/2040** | 500,403,424 | 148,643,713 | | | | |
| **6/30/2041** | 381,673,410 | 122,201,185 | | | | |
| **6/30/2042** | 281,984,660 | 111,435,386 | | | | |
| **6/30/2043** | 186,453,927 | 104,728,932 | | | | |
| **6/30/2044** | 91,173,252 | 56,646,665 | | | | |
| **6/30/2045** | 38,959,613 | 29,948,830 | | | | |
| **6/30/2046** | 10,707,475 | 11,075,898 | | | | |
| **6/30/2047** | | | | | | |
| **6/30/2048** | | | | | | |
| **6/30/2049** | | | | | | |
| **Total** | | **5,014,913,837** | | **4,944,927,804** | | **4,202,781,009** |
| **Interest Paid** | | **2,463,285,805** | | **2,393,299,772** | | **1,651,152,977** |
| **Estimated Savings** | | | | **69,986,033** | | **812,132,828** |

# Reconciliation of Required Employer Contributions

**Normal Cost (% of Payroll)**

| | |
|---|---|
| 1. For Period 7/1/19 – 6/30/20 | |
| a) Employer Normal Cost | 10.998% |
| b) Employee Contribution | 7.462% |
| c) Total Normal Cost | 18.460% |
| | |
| 2. Changes since the prior year annual valuation | |
| a) Effect of changes in demographics results | (0.124%) |
| b) Effect of plan changes | 0.000% |
| c) Effect of changes in assumptions | 0.798% |
| d) Effect of method changes | (0.043%) |
| e) Net effect of the changes above [sum of (a) through (d)] | 0.631% |
| | |
| 3. For Period 7/1/20 – 6/30/21 | |
| a) Employer Normal Cost | 11.673% |
| b) Employee Contribution | 7.418% |
| c) Total Normal Cost | 19.091% |
| | |
| Employer Normal Cost Change [(3a) – (1a)] | 0.675% |
| Employee Contribution Change [(3b) – (1b)] | (0.044%) |

**Unfunded Liability Contribution ($)**

| | |
|---|---|
| 1. For Period 7/1/19 – 6/30/20 | 129,905,894 |
| | |
| 2. Changes since the prior year annual valuation | |
| a) Effect of (gain)/loss during prior year[1] | (1,312,599) |
| b) Effect of plan changes | 0 |
| c) Effect of changes in assumptions[2] | 5,305,294 |
| d) Changes to prior year amortization payments[3] | 20,190,822 |
| e) Effect of changes due to Fresh Start | 0 |
| f) Effect of elimination of amortization base | 0 |
| g) Effect of method change[2] | 1,286,243 |
| h) Net effect of the changes above [sum of (a) through (g)] | 25,469,760 |
| | |
| 3. For Period 7/1/20 – 6/30/21 [(1) + (2h)] | 155,375,654 |

The amounts shown for the period 7/1/19 – 6/30/20 may be different if a prepayment of unfunded actuarial liability is made or a plan change became effective after the prior year's actuarial valuation was performed.

[1] The unfunded liability contribution for the (gain)/loss during the year prior to the valuation date is 20 percent of the "full" annual requirement due to the 5-year ramp. Increases to this amount that occur during the ramp period will be included in line d) in future years. This line item also captures the impact of any additional discretionary payment during the fiscal year.

[2] The unfunded liability contribution for the change in assumptions or method is 20 percent of the "full" annual requirement due to the 5-year ramp. Increases to this amount that occur during the ramp period will be included in line d) in future years.

[3] Includes changes due to 5-year ramp, payroll growth assumption, and re-amortization under new discount rate.

# Employer Contribution History

The table below provides a recent history of the required employer contributions for the plan, as determined by the annual actuarial valuation. It does not account for prepayments or benefit changes made during a fiscal year.

| Fiscal Year | Employer Normal Cost | Unfunded Rate | Unfunded Liability Payment ($) |
|---|---|---|---|
| 2013 - 14 | 11.099% | 3.902% | N/A |
| 2014 - 15 | 10.341% | 4.186% | N/A |
| 2015 - 16 | 10.376% | 5.053% | N/A |
| 2016 - 17 | 10.650% | 5.826% | N/A |
| 2017 - 18 | 10.192% | N/A | 73,598,564 |
| 2018 - 19 | 10.458% | N/A | 100,265,926 |
| 2019 - 20 | 10.998% | N/A | 129,905,894 |
| 2020 - 21 | 11.673% | N/A | 155,375,654 |

# Funding History

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

| Valuation Date | Accrued Liability | Market Value of Assets (MVA) | Unfunded Liability | Funded Ratio | Annual Covered Payroll |
|---|---|---|---|---|---|
| 06/30/11 | $ 4,461,553,672 | $ 3,525,640,733 | $ 935,912,939 | 79.0% | $ 812,362,628 |
| 06/30/12 | 4,708,881,750 | 3,520,189,846 | 1,188,691,904 | 74.8% | 836,418,298 |
| 06/30/13 | 5,008,806,968 | 3,974,442,195 | 1,034,364,773 | 79.3% | 856,593,282 |
| 06/30/14 | 5,656,121,103 | 4,682,894,962 | 973,226,141 | 82.8% | 897,506,714 |
| 06/30/15 | 6,174,498,346 | 4,775,099,013 | 1,399,399,333 | 77.3% | 1,000,223,148 |
| 06/30/16 | 6,850,143,825 | 4,799,576,566 | 2,050,567,259 | 70.1% | 1,090,295,411 |
| 06/30/17 | 7,441,270,302 | 5,325,794,759 | 2,115,475,543 | 71.6% | 1,128,397,500 |
| 06/30/18 | 8,165,793,889 | 5,748,832,217 | 2,416,961,672 | 70.4% | 1,118,711,056 |

# Risk Analysis

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

# 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 five investment return scenarios assumed to occur during the next four fiscal years (2018-19, 2019-20, 2020-21 and 2021-22). 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.

For fiscal years 2018-19, 2019-20, 2020-21, and 2021-22 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.

These alternate investment returns were chosen based on stochastic analysis of possible future investment returns over the four-year period ending June 30, 2022. Using the expected returns and volatility of the asset classes in which the funds are invested, we produced five thousand stochastic outcomes for this period based on the recently completed Asset Liability Management process. We then selected annual returns that approximate the 5th, 25th, 50th, 75th, and 95th percentiles for these outcomes. For example, of all the 4-year outcomes generated in the stochastic analysis, approximately 25 percent of them had an average annual return of 4.0 percent or less.

Required contributions outside of this range are also possible. In particular, whereas 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.

| Assumed Annual Return From 2018-19 through 2021-22 | Projected Employer Contributions | | | |
|---|---|---|---|---|
| | 2021-22 | 2022-23 | 2023-24 | 2024-25 |
| **1.0%** | | | | |
| Normal Cost | 11.7% | 11.7% | 11.7% | 11.7% |
| UAL Contribution | $192,231,000 | $232,514,000 | $271,087,000 | $318,386,000 |
| **4.0%** | | | | |
| Normal Cost | 11.7% | 11.7% | 11.7% | 11.7% |
| UAL Contribution | $187,923,000 | $219,656,000 | $245,492,000 | $275,895,000 |
| **7.0%** | | | | |
| Normal Cost | 11.7% | 11.7% | 11.7% | 11.7% |
| UAL Contribution | $183,614,000 | $206,540,000 | $218,850,000 | $230,752,000 |
| **9.0%** | | | | |
| Normal Cost | 11.9% | 12.2% | 12.4% | 12.7% |
| UAL Contribution | $181,446,000 | $200,445,000 | $206,920,000 | $210,640,000 |
| **12.0%** | | | | |
| Normal Cost | 11.9% | 12.2% | 12.4% | 12.7% |
| UAL Contribution | $177,159,000 | $187,033,000 | $178,890,000 | $161,733,000 |

The projected normal cost percentages do not reflect that the normal cost will decline over time as new employees are hired into PEPRA or other lower cost benefit tiers. In addition, the projections above reflect the recent changes to the amortization policy effective with the June 30, 2019 valuation. The projections above do incorporate the impact of the CalPERS risk mitigation policy which reduces the discount when investment returns are above specified trigger points.

# Discount Rate Sensitivity

Shown below are various valuation results as of June 30, 2018 assuming alternate discount rates. Results are shown using the current discount rate of 7.0 percent as well as alternate discount rates of 6.0 percent and 8.0 percent. 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 or 8.0 percent over the long-term.

This type of analysis gives the reader a sense of the long-term risk to required contributions. For a measure of funded status that is appropriate for assessing the sufficiency of plan assets to cover estimated termination liabilities, please see "Hypothetical Termination Liability" at the end of this section.

| Sensitivity Analysis | | | | |
|---|---|---|---|---|
| **As of June 30, 2018** | **Plan's Normal Cost** | **Accrued Liability** | **Unfunded Accrued Liability** | **Funded Status** |
| 7.0% (current discount rate) | 19.091% | $8,165,793,889 | $2,416,961,672 | 70.4% |
| 6.0% | 24.198% | $9,362,493,358 | $3,613,661,141 | 61.4% |
| 8.0% | 15.246% | $7,185,475,866 | $1,436,643,649 | 80.0% |

# Mortality Rate Sensitivity

The following table looks at the change in the June 30, 2018 plan costs and funded ratio under two different longevity scenarios, namely assuming rates of mortality are 10 percent lower or 10 percent higher than our current mortality assumptions adopted in 2017. This type of analysis highlights the impact on the plan of improving or worsening mortality over the long-term.

| As of June 30, 2018 | Current Mortality | 10% Lower Mortality Rates | 10% Higher Mortality Rates |
|---|---|---|---|
| a) Accrued Liability | $8,165,793,889 | $8,319,313,157 | $8,023,930,748 |
| b) Market Value of Assets | $5,748,832,217 | $5,748,832,217 | $5,748,832,217 |
| c) Unfunded Liability (Surplus) [(a)-(b)] | $2,416,961,672 | $2,570,480,940 | $2,275,098,531 |
| d) Funded Status | 70.4% | 69.1% | 71.6% |

A 10 percent increase (decrease) in assumed mortality rates over the long-term would result in approximately a 1.2 percentage point increase (decrease) to the funded ratio.

# Inflation Rate Sensitivity

The following analysis looks at the change in the June 30, 2018 plan costs and funded ratio under two different inflation rate scenarios, namely assuming the inflation rate is 1 percent lower or 1 percent higher than our current valuation inflation rate assumption of 2.50%, while holding the discount rate fixed at 7.0%. This type of analysis highlights the impact on the plan of increased or decreased inflation over the long-term.

| As of June 30, 2018 | Current Inflation Rate | -1% Inflation Rate | +1% Inflation Rate |
|---|---|---|---|
| a) Accrued Liability | $8,165,793,889 | $7,545,935,602 | $8,659,075,431 |
| b) Market Value of Assets | $5,748,832,217 | $5,748,832,217 | $5,748,832,217 |
| c) Unfunded Liability (Surplus) [(a)-(b)] | $2,416,961,672 | $1,797,103,385 | $2,910,243,214 |
| d) Funded Status | 70.4% | 76.2% | 66.4% |

A decrease of 1 percent in the inflation rate assumption (2.50 percent to 1.50 percent) reduces the Accrued Liability by 7.6 percent. However, a 1 percent increase in the inflation rate (2.50 percent to 3.50 percent) increases the Accrued Liability by 6.0 percent.

# Maturity Measures

As pension plans mature they become much more sensitive to risks than plans that are less mature. Understanding plan maturity and how it affects the ability of a pension plan to tolerate risk is important in understanding how the plan is impacted by investment return volatility, other economic variables and changes in longevity or other demographic assumptions. One way to look at the maturity level of CalPERS and its plans is to look at the ratio of a plan's retiree liability to its total liability. A pension plan in its infancy will have a very low ratio of retiree liability to total liability. As the plan matures, the ratio starts increasing. A mature plan will often have a ratio above 60-65 percent. For both CalPERS and other retirement systems in the United States, these ratios have been steadily increasing in recent years.

| Ratio of Retiree Accrued Liability to Total Accrued Liability | June 30, 2017 | June 30, 2018 |
|---|---|---|
| 1. Retiree Accrued Liability | 3,350,850,158 | 3,832,750,586 |
| 2. Total Accrued Liability | 7,441,270,302 | 8,165,793,889 |
| 3. Ratio of Retiree AL to Total AL [(1) / (2)] | 45% | 47% |

Another way to look at the maturity level of CalPERS and its plans is to look at the ratio of actives to retirees. A pension plan in its infancy will have a very high ratio of active to retired members. As the plan matures, and members retire, the ratio starts declining. A mature plan will often have a ratio near or below one. The average support ratio for CalPERS public agency plans is 1.25.

| Support Ratio | June 30, 2017 | June 30, 2018 |
|---|---|---|
| 1. Number of Actives | 17,083 | 16,817 |
| 2. Number of Retirees | 10,821 | 11,438 |
| 3. Support Ratio [(1) / (2)] | 1.58 | 1.47 |

The actuarial calculations supplied in this communication are based on various 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 required employer contributions from one year to the next. Therefore, employer contributions will inevitably fluctuate, especially due to the ups and downs of investment returns.

**Asset Volatility Ratio (AVR)**

Plans that have higher asset-to-payroll ratios experience more volatile employer contributions (as a percentage of payroll) 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 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 (LVR)**

Plans that have higher liability-to-payroll ratios experience more volatile employer contributions (as a percentage of payroll) 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. The asset volatility ratio, described above, will tend to move closer to the liability volatility ratio as the plan matures.

| Contribution Volatility | | June 30, 2017 | | June 30, 2018 |
|---|---|---|---|---|
| 1. Market Value of Assets without Receivables | $ | 5,311,638,812 | $ | 5,734,925,465 |
| 2. Payroll | | 1,128,397,500 | | 1,118,711,056 |
| 3. Asset Volatility Ratio (AVR) [(1) / (2)] | | 4.7 | | 5.1 |
| 4. Accrued Liability | $ | 7,441,270,302 | $ | 8,165,793,889 |
| 5. Liability Volatility Ratio (LVR) [(4) / (2)] | | 6.6 | | 7.3 |

# Hypothetical Termination Liability

The hypothetical termination liability is an estimate of the financial position of the plan had the contract with CalPERS been terminated as of June 30, 2018. The plan liability on a termination basis is calculated differently from the plan's ongoing funding liability. For this hypothetical termination liability calculation, both compensation and service are frozen as of the valuation date and no future pay increases or service accruals are assumed. This measure of funded status is not appropriate for assessing the need for future employer contributions in the case of an ongoing plan, that is, for an employer that continues to provide CalPERS retirement benefits to active employees.

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

The effective termination discount rate will depend on actual market rates of return for risk-free securities on the date of termination. As market discount rates are variable the table below shows a range for the hypothetical termination liability based on the lowest and highest interest rates observed during an approximate 2-year period centered around the valuation date.

| Market Value of Assets (MVA) | Hypothetical Termination Liability[1,2] @ 2.50% | Funded Status | Unfunded Termination Liability @ 2.50% | Hypothetical Termination Liability[1,2] @ 3.25% | Funded Status | Unfunded Termination Liability @ 3.25% |
|---|---|---|---|---|---|---|
| $5,748,832,217 | $13,764,140,365 | 41.8% | $8,015,308,148 | $12,418,629,625 | 46.3% | $6,669,797,408 |

[1] The hypothetical liabilities calculated above include a 5 percent contingency load in accordance with Board policy. Other actuarial assumptions can be found in Appendix A.

[2] The current discount rate assumption used for termination valuations is a weighted average of the 10-year and 30-year U.S. Treasury yields where the weights are based on matching asset and liability durations as of the termination date. The discount rates used in the table are based on 20-year Treasury bonds, rounded to the nearest quarter percentage point, which is a good proxy for most plans. The 20-year Treasury yield was 2.91 percent on June 30, 2018, and was 2.83 percent on January 31, 2019.

In order to terminate the plan, you must first contact our Retirement Services Contract Unit to initiate a Resolution of Intent to Terminate. The completed Resolution will allow the plan actuary to give you a preliminary termination valuation with a more up-to-date estimate of the plan liabilities. CalPERS advises you to consult with the plan actuary before beginning this process.

# Plan's Major Benefit Provisions

# Plan's Major Benefit Options

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

| | Benefit Group | | | | | | |
|---|---|---|---|---|---|---|---|
| **Member Category** | Misc | Misc | Misc | Misc | Misc | Misc | Misc |
| **Demographics** | | | | | | | |
| Actives | No | No | Yes | No | Yes | Yes | Yes |
| Transfers/Separated | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Receiving | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| **Benefit Provision** | | | | | | | |
| Benefit Formula | 2% @ 55 | 2% @ 55 | 3% @ 60 | 2% @ 55 | 3% @ 60 | 2% @ 62 | 2% @ 60 |
| Social Security Coverage | Yes | No | Yes | Yes | Yes | Yes | Yes |
| Full/Modified | Modified | Full | Modified | Modified | Modified | Full | Modified |
| Employee Contribution Rate | | | 8.00% | | 8.00% | 6.50% | 7.00% |
| Final Average Compensation Period | One Year | One Year | One Year | One Year | One Year | Three Year | Three Year |
| Sick Leave Credit | No | No | No | No | No | No | No |
| Non-Industrial Disability | Standard | Standard | Standard | Standard | Standard | Standard | Standard |
| Industrial Disability | No | No | No | No | No | No | No |
| Pre-Retirement Death Benefits | | | | | | | |
| Optional Settlement 2 | No | No | No | No | No | No | No |
| 1959 Survivor Benefit Level | No | Indexed | No | No | No | No | No |
| Special | No | No | No | No | No | No | No |
| Alternate (firefighters) | No | No | No | No | No | No | No |
| Post-Retirement Death Benefits | | | | | | | |
| Lump Sum | $500 | $500 | $500 | $500 | $500 | $500 | $500 |
| Survivor Allowance (PRSA) | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| COLA | 2% | 2% | 2% | 2% | 2% | 2% | 2% |

# Plan's Major Benefit Options

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

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

# Plan's Major Benefit Options

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

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

# Appendices

- **Appendix A – Actuarial Methods and Assumptions**
- **Appendix B – Principal Plan Provisions**
- **Appendix C – Participant Data**
- **Appendix D – Normal Cost by Benefit Group and PEPRA Member Contribution Rates**
- **Appendix E – Glossary of Actuarial Terms**

# Appendix A

# Actuarial Methods and Assumptions

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

# Actuarial Data

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

# Actuarial Methods

### Actuarial Cost Method

The actuarial cost method used is the Entry Age 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 percentage of pay in each year from the member's entry age to their assumed retirement age on the valuation date. The cost allocated to the current fiscal year is called the normal cost.

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

### 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, 2013 valuation, all new gains or losses are amortized over a fixed 30-year period with a 5-year ramp up at the beginning and a 5-year ramp down at the end of the amortization period. All changes in liability due to plan amendments (other than golden handshakes) are amortized over a 20-year period with no ramp. Changes in actuarial assumptions or changes in actuarial methodology are amortized over a 20-year period with a 5-year ramp up at the beginning and a 5-year ramp down at the end of the amortization period. Changes in unfunded accrued liability due to a Golden Handshake will be amortized over a period of five years. 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<br>- Active Plans<br>- Inactive Plans | <br>2.75%<br>0% | <br>2.75%<br>0% | <br>2.75%<br>0% | <br>2.75%<br>0% | <br>2.75%<br>0% |
| Ramp Up | 5 | 5 | 5 | 0 | 0 |
| Ramp Down | 5 | 5 | 5 | 0 | 0 |

The 5-year ramp up means that the payments in the first four years of the amortization period are 20 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:

- 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
- 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.

Exceptions for Inactive Plans:

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

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

**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 contributions. 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, 2013 valuations that set the employer contribution for Fiscal Year 2015-16, 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.

**PEPRA Normal Cost Rate Methodology**

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

Each non-pooled plan is stable with a sufficiently large demographic representation of active employees. 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 non-pooled plan until the number of members covered under the PEPRA formula meets either:

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

Once either of the conditions above is met for a non-pooled plan, the total PEPRA normal cost will be based on the active PEPRA population in the plan.

Accordingly, the total normal cost will be funded equally between employer and employee based on the demographics of the employees of that employer.

# 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.

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 2020-21 determined in this valuation were calculated using a discount rate of 7.00 percent. 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 7.00 percent compounded annually (net of investment and administrative expenses) as of June 30, 2018.

### Termination Liability Discount Rate

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

The hypothetical termination liabilities in this report are calculated using an observed range of market interest rates. This range is based on the lowest and highest 20-year Treasury bond observed during an approximate 2-year period centered around the valuation date. The 20-year Treasury bond has a similar duration to most plan liabilities and serves as a good proxy for the termination discount rate. The 20-year Treasury yield was 2.83 percent on June 30, 2018.

### Salary Growth

Annual increases vary by category, entry age, and duration of service. A sample of assumed increases are shown below. Wage inflation assumption in the valuation year (2.75% for 2018) is added to these factors for total salary growth.

**Public Agency Miscellaneous**

| Duration of Service | (Entry Age 20) | (Entry Age 30) | (Entry Age 40) |
|---|---|---|---|
| 0 | 0.0850 | 0.0775 | 0.0650 |
| 1 | 0.0690 | 0.0635 | 0.0525 |
| 2 | 0.0560 | 0.0510 | 0.0410 |
| 3 | 0.0470 | 0.0425 | 0.0335 |
| 4 | 0.0400 | 0.0355 | 0.0270 |
| 5 | 0.0340 | 0.0295 | 0.0215 |
| 10 | 0.0160 | 0.0135 | 0.0090 |
| 15 | 0.0120 | 0.0100 | 0.0060 |
| 20 | 0.0090 | 0.0075 | 0.0045 |
| 25 | 0.0080 | 0.0065 | 0.0040 |
| 30 | 0.0080 | 0.0065 | 0.0040 |

**Public Agency Fire**

| Duration of Service | (Entry Age 20) | (Entry Age 30) | (Entry Age 40) |
|---|---|---|---|
| 0 | 0.1700 | 0.1700 | 0.1700 |
| 1 | 0.1100 | 0.1100 | 0.1100 |
| 2 | 0.0700 | 0.0700 | 0.0700 |
| 3 | 0.0580 | 0.0580 | 0.0580 |
| 4 | 0.0473 | 0.0473 | 0.0473 |
| 5 | 0.0372 | 0.0372 | 0.0372 |
| 10 | 0.0165 | 0.0165 | 0.0165 |
| 15 | 0.0144 | 0.0144 | 0.0144 |
| 20 | 0.0126 | 0.0126 | 0.0126 |
| 25 | 0.0111 | 0.0111 | 0.0111 |
| 30 | 0.0097 | 0.0097 | 0.0097 |

**Public Agency Police**

| Duration of Service | (Entry Age 20) | (Entry Age 30) | (Entry Age 40) |
|---|---|---|---|
| 0 | 0.1027 | 0.1027 | 0.1027 |
| 1 | 0.0803 | 0.0803 | 0.0803 |
| 2 | 0.0628 | 0.0628 | 0.0628 |
| 3 | 0.0491 | 0.0491 | 0.0491 |
| 4 | 0.0384 | 0.0384 | 0.0384 |
| 5 | 0.0300 | 0.0300 | 0.0300 |
| 10 | 0.0145 | 0.0145 | 0.0145 |
| 15 | 0.0150 | 0.0150 | 0.0150 |
| 20 | 0.0155 | 0.0155 | 0.0155 |
| 25 | 0.0160 | 0.0160 | 0.0160 |
| 30 | 0.0165 | 0.0165 | 0.0165 |

**Salary Growth** (continued)

**Public Agency County Peace Officers**

| Duration of Service | (Entry Age 20) | (Entry Age 30) | (Entry Age 40) |
|---|---|---|---|
| 0 | 0.1320 | 0.1320 | 0.1320 |
| 1 | 0.0960 | 0.0960 | 0.0960 |
| 2 | 0.0657 | 0.0657 | 0.0657 |
| 3 | 0.0525 | 0.0525 | 0.0525 |
| 4 | 0.0419 | 0.0419 | 0.0419 |
| 5 | 0.0335 | 0.0335 | 0.0335 |
| 10 | 0.0170 | 0.0170 | 0.0170 |
| 15 | 0.0150 | 0.0150 | 0.0150 |
| 20 | 0.0150 | 0.0150 | 0.0150 |
| 25 | 0.0175 | 0.0175 | 0.0175 |
| 30 | 0.0200 | 0.0200 | 0.0200 |

**Schools**

| Duration of Service | (Entry Age 20) | (Entry Age 30) | (Entry Age 40) |
|---|---|---|---|
| 0 | 0.0428 | 0.0419 | 0.0380 |
| 1 | 0.0428 | 0.0419 | 0.0380 |
| 2 | 0.0428 | 0.0419 | 0.0380 |
| 3 | 0.0354 | 0.0332 | 0.0280 |
| 4 | 0.0305 | 0.0279 | 0.0224 |
| 5 | 0.0262 | 0.0234 | 0.0180 |
| 10 | 0.0171 | 0.0154 | 0.0112 |
| 15 | 0.0152 | 0.0134 | 0.0098 |
| 20 | 0.0135 | 0.0117 | 0.0086 |
| 25 | 0.0120 | 0.0103 | 0.0076 |
| 30 | 0.0087 | 0.0071 | 0.0048 |

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

**Overall Payroll Growth**

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

**Inflation**

2.50 percent compounded annually.

**Non-valued Potential Additional Liabilities**

The potential liability loss for a cost-of-living increase exceeding the 2.50 percent inflation assumption and any potential liability loss from future member service purchases are not reflected in the valuation.

## ***Miscellaneous Loading Factors***

**Credit for Unused Sick Leave**

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

**Conversion of Employer Paid Member Contributions (EPMC)**

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

**Norris Decision (Best Factors)**

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

**Termination Liability**

The termination liabilities include a 5 percent contingency load. This load is for unforeseen negative experience.

***Demographic Assumptions***

**Pre-Retirement Mortality**

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

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

Miscellaneous plans usually have industrial death rates set to zero unless the agency has specifically contracted for industrial death benefits. If so, each non-industrial death rate shown above will be split into two components; 99 percent will become the non-industrial death rate and 1 percent will become the industrial death rate.

**Post-Retirement Mortality**

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

| | Healthy Recipients | | Non-Industrially Disabled (Not Job-Related) | | Industrially Disabled (Job-Related) | |
|---|---|---|---|---|---|---|
| Age | Male | Female | Male | Female | Male | Female |
| 50 | 0.00372 | 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, a percentage who are married upon retirement is assumed according to member category as shown in the following table.

| Member Category | Percent Married |
|---|---|
| Miscellaneous Member | 70% |
| Local Police | 85% |
| Local Fire | 90% |
| Other Local Safety | 70% |
| School Police | 85% |
| Local County Peace Officers | 75% |

**Age of Spouse**

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

**Terminated Members**

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

**Termination with Refund**

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

**Public Agency Miscellaneous**

| Duration of Service | Entry Age 20 | Entry Age 25 | Entry Age 30 | Entry Age 35 | Entry Age 40 | Entry Age 45 |
|---|---|---|---|---|---|---|
| 0 | 0.1742 | 0.1674 | 0.1606 | 0.1537 | 0.1468 | 0.1400 |
| 1 | 0.1545 | 0.1477 | 0.1409 | 0.1339 | 0.1271 | 0.1203 |
| 2 | 0.1348 | 0.1280 | 0.1212 | 0.1142 | 0.1074 | 0.1006 |
| 3 | 0.1151 | 0.1083 | 0.1015 | 0.0945 | 0.0877 | 0.0809 |
| 4 | 0.0954 | 0.0886 | 0.0818 | 0.0748 | 0.0680 | 0.0612 |
| 5 | 0.0212 | 0.0193 | 0.0174 | 0.0155 | 0.0136 | 0.0116 |
| 10 | 0.0138 | 0.0121 | 0.0104 | 0.0088 | 0.0071 | 0.0055 |
| 15 | 0.0060 | 0.0051 | 0.0042 | 0.0032 | 0.0023 | 0.0014 |
| 20 | 0.0037 | 0.0029 | 0.0021 | 0.0013 | 0.0005 | 0.0001 |
| 25 | 0.0017 | 0.0011 | 0.0005 | 0.0001 | 0.0001 | 0.0001 |
| 30 | 0.0005 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 |
| 35 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 |

**Public Agency Safety**

| Duration of Service | Fire | Police | County Peace Officer |
|---|---|---|---|
| 0 | 0.1298 | 0.1013 | 0.1188 |
| 1 | 0.0674 | 0.0636 | 0.0856 |
| 2 | 0.0320 | 0.0271 | 0.0617 |
| 3 | 0.0237 | 0.0258 | 0.0445 |
| 4 | 0.0087 | 0.0245 | 0.0321 |
| 5 | 0.0052 | 0.0086 | 0.0121 |
| 10 | 0.0005 | 0.0053 | 0.0053 |
| 15 | 0.0004 | 0.0027 | 0.0025 |
| 20 | 0.0003 | 0.0017 | 0.0012 |
| 25 | 0.0002 | 0.0012 | 0.0005 |
| 30 | 0.0002 | 0.0009 | 0.0003 |
| 35 | 0.0001 | 0.0009 | 0.0002 |

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

**Schools**

| Duration of Service | Entry Age 20 | Entry Age 25 | Entry Age 30 | Entry Age 35 | Entry Age 40 | Entry Age 45 |
|---|---|---|---|---|---|---|
| 0 | 0.2107 | 0.2107 | 0.1827 | 0.1546 | 0.1375 | 0.1203 |
| 1 | 0.1807 | 0.1807 | 0.1526 | 0.1246 | 0.1105 | 0.0963 |
| 2 | 0.1526 | 0.1526 | 0.1259 | 0.0992 | 0.0878 | 0.0765 |
| 3 | 0.1266 | 0.1266 | 0.1023 | 0.0780 | 0.0691 | 0.0603 |
| 4 | 0.1026 | 0.1026 | 0.0815 | 0.0605 | 0.0537 | 0.0469 |
| 5 | 0.0808 | 0.0808 | 0.0634 | 0.0461 | 0.0409 | 0.0358 |
| 10 | 0.0202 | 0.0202 | 0.0157 | 0.0112 | 0.0087 | 0.0063 |
| 15 | 0.0107 | 0.0107 | 0.0077 | 0.0048 | 0.0034 | 0.0021 |
| 20 | 0.0056 | 0.0056 | 0.0037 | 0.0017 | 0.0016 | 0.0016 |
| 25 | 0.0026 | 0.0026 | 0.0018 | 0.0009 | 0.0012 | 0.0015 |
| 30 | 0.0013 | 0.0013 | 0.0011 | 0.0009 | 0.0012 | 0.0015 |
| 35 | 0.0008 | 0.0008 | 0.0009 | 0.0009 | 0.0012 | 0.0015 |

**Termination with Vested Benefits**

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

**Public Agency Miscellaneous**

| Duration of Service | Entry Age 20 | Entry Age 25 | Entry Age 30 | Entry Age 35 | Entry Age 40 |
|---|---|---|---|---|---|
| 5 | 0.0422 | 0.0422 | 0.0393 | 0.0364 | 0.0344 |
| 10 | 0.0278 | 0.0278 | 0.0271 | 0.0263 | 0.0215 |
| 15 | 0.0192 | 0.0192 | 0.0174 | 0.0156 | 0.0120 |
| 20 | 0.0139 | 0.0139 | 0.0109 | 0.0079 | 0.0047 |
| 25 | 0.0083 | 0.0083 | 0.0048 | 0.0014 | 0.0007 |
| 30 | 0.0015 | 0.0015 | 0.0007 | 0.0000 | 0.0000 |
| 35 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

**Public Agency Safety**

| Duration of Service | Fire | Police | County Peace Officer |
|---|---|---|---|
| 5 | 0.0094 | 0.0163 | 0.0187 |
| 10 | 0.0064 | 0.0126 | 0.0134 |
| 15 | 0.0048 | 0.0082 | 0.0092 |
| 20 | 0.0038 | 0.0065 | 0.0064 |
| 25 | 0.0026 | 0.0058 | 0.0042 |
| 30 | 0.0014 | 0.0056 | 0.0022 |
| 35 | 0.0000 | 0.0000 | 0.0000 |

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

**Schools**

| Duration of Service | Entry Age 20 | Entry Age 25 | Entry Age 30 | Entry Age 35 | Entry Age 40 |
|---|---|---|---|---|---|
| 5 | 0.0405 | 0.0405 | 0.0346 | 0.0288 | 0.0264 |
| 10 | 0.0324 | 0.0324 | 0.0280 | 0.0235 | 0.0211 |
| 15 | 0.0202 | 0.0202 | 0.0179 | 0.0155 | 0.0126 |
| 20 | 0.0144 | 0.0144 | 0.0114 | 0.0083 | 0.0042 |
| 25 | 0.0091 | 0.0091 | 0.0046 | 0.0000 | 0.0000 |
| 30 | 0.0015 | 0.0015 | 0.0007 | 0.0000 | 0.0000 |
| 35 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

**Non-Industrial (Not Job-Related) Disability**

Rates vary by age and gender for miscellaneous plans. Rates vary by age and category for safety plans.

| | Miscellaneous | | Fire | Police | County Peace Officer | Schools | |
|---|---|---|---|---|---|---|---|
| Age | Male | Female | Male and Female | Male and Female | Male and Female | Male | Female |
| 20 | 0.0002 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 |
| 25 | 0.0002 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 |
| 30 | 0.0002 | 0.0002 | 0.0001 | 0.0002 | 0.0001 | 0.0001 | 0.0002 |
| 35 | 0.0004 | 0.0007 | 0.0001 | 0.0003 | 0.0004 | 0.0005 | 0.0004 |
| 40 | 0.0010 | 0.0014 | 0.0001 | 0.0004 | 0.0007 | 0.0012 | 0.0008 |
| 45 | 0.0015 | 0.0019 | 0.0002 | 0.0005 | 0.0013 | 0.0020 | 0.0017 |
| 50 | 0.0016 | 0.0020 | 0.0005 | 0.0008 | 0.0018 | 0.0026 | 0.0022 |
| 55 | 0.0016 | 0.0015 | 0.0007 | 0.0013 | 0.0010 | 0.0025 | 0.0018 |
| 60 | 0.0015 | 0.0011 | 0.0007 | 0.0020 | 0.0006 | 0.0022 | 0.0011 |

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

**Industrial (Job-Related) Disability**

Rates vary by age and category.

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

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

**Service Retirement**

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

**Public Agency Miscellaneous 1.5% @ 65**

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

**Public Agency Miscellaneous 2% @ 60**

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

**Service Retirement**

**Public Agency Miscellaneous 2% @ 55**

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

**Public Agency Miscellaneous 2.5% @ 55**

| | Duration of Service | | | | | |
|---|---|---|---|---|---|---|
| Age | 5 Years | 10 Years | 15 Years | 20 Years | 25 Years | 30 Years |
| 50 | 0.008 | 0.014 | 0.020 | 0.026 | 0.033 | 0.050 |
| 51 | 0.008 | 0.015 | 0.023 | 0.030 | 0.037 | 0.059 |
| 52 | 0.009 | 0.016 | 0.023 | 0.030 | 0.037 | 0.061 |
| 53 | 0.014 | 0.021 | 0.028 | 0.035 | 0.042 | 0.063 |
| 54 | 0.014 | 0.022 | 0.030 | 0.039 | 0.047 | 0.068 |
| 55 | 0.020 | 0.038 | 0.055 | 0.073 | 0.122 | 0.192 |
| 56 | 0.025 | 0.047 | 0.069 | 0.091 | 0.136 | 0.196 |
| 57 | 0.030 | 0.048 | 0.065 | 0.083 | 0.123 | 0.178 |
| 58 | 0.035 | 0.054 | 0.073 | 0.093 | 0.112 | 0.153 |
| 59 | 0.035 | 0.054 | 0.073 | 0.092 | 0.131 | 0.183 |
| 60 | 0.044 | 0.072 | 0.101 | 0.130 | 0.158 | 0.197 |
| 61 | 0.050 | 0.078 | 0.105 | 0.133 | 0.161 | 0.223 |
| 62 | 0.055 | 0.093 | 0.130 | 0.168 | 0.205 | 0.268 |
| 63 | 0.090 | 0.124 | 0.158 | 0.192 | 0.226 | 0.279 |
| 64 | 0.080 | 0.112 | 0.144 | 0.175 | 0.207 | 0.268 |
| 65 | 0.120 | 0.156 | 0.193 | 0.229 | 0.265 | 0.333 |
| 66 | 0.132 | 0.172 | 0.212 | 0.252 | 0.292 | 0.366 |
| 67 | 0.132 | 0.172 | 0.212 | 0.252 | 0.292 | 0.366 |
| 68 | 0.120 | 0.156 | 0.193 | 0.229 | 0.265 | 0.333 |
| 69 | 0.120 | 0.156 | 0.193 | 0.229 | 0.265 | 0.333 |
| 70 | 0.120 | 0.156 | 0.193 | 0.229 | 0.265 | 0.333 |

## Service Retirement

**Public Agency Miscellaneous 2.7% @ 55**

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

**Public Agency Miscellaneous 3% @ 60**

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

**Service Retirement**

**Public Agency Miscellaneous 2% @ 62**

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

**Service Retirement**

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

| Age | Rate | Age | Rate |
|---|---|---|---|
| 50 | 0.0159 | 56 | 0.1108 |
| 51 | 0.0000 | 57 | 0.0000 |
| 52 | 0.0344 | 58 | 0.0950 |
| 53 | 0.0199 | 59 | 0.0441 |
| 54 | 0.0413 | 60 | 1.00000 |
| 55 | 0.0751 | | |

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

| Age | Rate | Age | Rate |
|---|---|---|---|
| 50 | 0.0255 | 56 | 0.0692 |
| 51 | 0.0000 | 57 | 0.0511 |
| 52 | 0.0164 | 58 | 0.0724 |
| 53 | 0.0272 | 59 | 0.0704 |
| 54 | 0.0095 | 60 | 0.3000 |
| 55 | 0.1667 | | |

**Service Retirement**

**Public Agency Police 2% @ 50**

| Age | Duration of Service | | | | | |
|---|---|---|---|---|---|---|
| | 5 Years | 10 Years | 15 Years | 20 Years | 25 Years | 30 Years |
| 50 | 0.050 | 0.050 | 0.050 | 0.050 | 0.050 | 0.100 |
| 51 | 0.040 | 0.040 | 0.040 | 0.040 | 0.058 | 0.094 |
| 52 | 0.040 | 0.040 | 0.040 | 0.040 | 0.061 | 0.087 |
| 53 | 0.040 | 0.040 | 0.040 | 0.040 | 0.082 | 0.123 |
| 54 | 0.040 | 0.040 | 0.040 | 0.046 | 0.098 | 0.158 |
| 55 | 0.072 | 0.072 | 0.072 | 0.096 | 0.141 | 0.255 |
| 56 | 0.066 | 0.066 | 0.066 | 0.088 | 0.129 | 0.228 |
| 57 | 0.060 | 0.060 | 0.060 | 0.080 | 0.118 | 0.213 |
| 58 | 0.080 | 0.080 | 0.080 | 0.088 | 0.138 | 0.228 |
| 59 | 0.080 | 0.080 | 0.080 | 0.092 | 0.140 | 0.228 |
| 60 | 0.150 | 0.150 | 0.150 | 0.150 | 0.150 | 0.228 |
| 61 | 0.144 | 0.144 | 0.144 | 0.144 | 0.144 | 0.170 |
| 62 | 0.150 | 0.150 | 0.150 | 0.150 | 0.150 | 0.213 |
| 63 | 0.150 | 0.150 | 0.150 | 0.150 | 0.150 | 0.213 |
| 64 | 0.150 | 0.150 | 0.150 | 0.150 | 0.150 | 0.319 |
| 65 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |

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

**Service Retirement**

**Public Agency Fire 2% @ 50**

| Age | Duration of Service | | | | | |
|---|---|---|---|---|---|---|
| | 5 Years | 10 Years | 15 Years | 20 Years | 25 Years | 30 Years |
| 50 | 0.009 | 0.009 | 0.009 | 0.009 | 0.013 | 0.020 |
| 51 | 0.013 | 0.013 | 0.013 | 0.013 | 0.020 | 0.029 |
| 52 | 0.018 | 0.018 | 0.018 | 0.018 | 0.028 | 0.042 |
| 53 | 0.052 | 0.052 | 0.052 | 0.052 | 0.079 | 0.119 |
| 54 | 0.067 | 0.067 | 0.067 | 0.067 | 0.103 | 0.154 |
| 55 | 0.089 | 0.089 | 0.089 | 0.089 | 0.136 | 0.204 |
| 56 | 0.083 | 0.083 | 0.083 | 0.083 | 0.127 | 0.190 |
| 57 | 0.082 | 0.082 | 0.082 | 0.082 | 0.126 | 0.189 |
| 58 | 0.088 | 0.088 | 0.088 | 0.088 | 0.136 | 0.204 |
| 59 | 0.074 | 0.074 | 0.074 | 0.074 | 0.113 | 0.170 |
| 60 | 0.100 | 0.100 | 0.100 | 0.100 | 0.154 | 0.230 |
| 61 | 0.072 | 0.072 | 0.072 | 0.072 | 0.110 | 0.165 |
| 62 | 0.099 | 0.099 | 0.099 | 0.099 | 0.152 | 0.228 |
| 63 | 0.114 | 0.114 | 0.114 | 0.114 | 0.175 | 0.262 |
| 64 | 0.114 | 0.114 | 0.114 | 0.114 | 0.175 | 0.262 |
| 65 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |

**Service Retirement**

**Public Agency Police 3% @ 55**

| | Duration of Service | | | | | |
|---|---|---|---|---|---|---|
| Age | 5 Years | 10 Years | 15 Years | 20 Years | 25 Years | 30 Years |
| 50 | 0.035 | 0.035 | 0.035 | 0.035 | 0.070 | 0.090 |
| 51 | 0.028 | 0.028 | 0.028 | 0.029 | 0.065 | 0.101 |
| 52 | 0.032 | 0.032 | 0.032 | 0.039 | 0.066 | 0.109 |
| 53 | 0.028 | 0.028 | 0.028 | 0.043 | 0.075 | 0.132 |
| 54 | 0.038 | 0.038 | 0.038 | 0.074 | 0.118 | 0.333 |
| 55 | 0.070 | 0.070 | 0.070 | 0.120 | 0.175 | 0.340 |
| 56 | 0.060 | 0.060 | 0.060 | 0.110 | 0.165 | 0.330 |
| 57 | 0.060 | 0.060 | 0.060 | 0.110 | 0.165 | 0.320 |
| 58 | 0.080 | 0.080 | 0.080 | 0.100 | 0.185 | 0.350 |
| 59 | 0.090 | 0.090 | 0.095 | 0.130 | 0.185 | 0.350 |
| 60 | 0.150 | 0.150 | 0.150 | 0.150 | 0.185 | 0.350 |
| 61 | 0.120 | 0.120 | 0.120 | 0.120 | 0.160 | 0.350 |
| 62 | 0.150 | 0.150 | 0.150 | 0.150 | 0.200 | 0.350 |
| 63 | 0.150 | 0.150 | 0.150 | 0.150 | 0.200 | 0.400 |
| 64 | 0.150 | 0.150 | 0.150 | 0.150 | 0.175 | 0.350 |
| 65 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |

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

**Service Retirement**

**Public Agency Fire 3% @ 55**

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

**Service Retirement**

**Public Agency Police 3% @ 50**

| | Duration of Service | | | | | |
|---|---|---|---|---|---|---|
| Age | 5 Years | 10 Years | 15 Years | 20 Years | 25 Years | 30 Years |
| 50 | 0.050 | 0.050 | 0.050 | 0.100 | 0.155 | 0.400 |
| 51 | 0.040 | 0.040 | 0.040 | 0.090 | 0.140 | 0.380 |
| 52 | 0.040 | 0.040 | 0.040 | 0.070 | 0.115 | 0.350 |
| 53 | 0.040 | 0.040 | 0.040 | 0.080 | 0.135 | 0.350 |
| 54 | 0.040 | 0.040 | 0.040 | 0.090 | 0.145 | 0.350 |
| 55 | 0.070 | 0.070 | 0.070 | 0.120 | 0.175 | 0.340 |
| 56 | 0.060 | 0.060 | 0.060 | 0.110 | 0.165 | 0.330 |
| 57 | 0.060 | 0.060 | 0.060 | 0.110 | 0.165 | 0.320 |
| 58 | 0.080 | 0.080 | 0.080 | 0.100 | 0.185 | 0.350 |
| 59 | 0.090 | 0.090 | 0.095 | 0.130 | 0.185 | 0.350 |
| 60 | 0.150 | 0.150 | 0.150 | 0.150 | 0.185 | 0.350 |
| 61 | 0.120 | 0.120 | 0.120 | 0.120 | 0.160 | 0.350 |
| 62 | 0.150 | 0.150 | 0.150 | 0.150 | 0.200 | 0.350 |
| 63 | 0.150 | 0.150 | 0.150 | 0.150 | 0.200 | 0.400 |
| 64 | 0.150 | 0.150 | 0.150 | 0.150 | 0.175 | 0.350 |
| 65 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |

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

**Service Retirement**

**Public Agency Fire 3% @ 50**

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

**Service Retirement**

**Public Agency Police 2% @ 57**

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

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

**Service Retirement**

**Public Agency Fire 2% @ 57**

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

**Service Retirement**

**Public Agency Police 2.5% @ 57**

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

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

**Service Retirement**

**Public Agency Fire 2.5% @ 57**

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

**Service Retirement**

**Public Agency Police 2.7% @ 57**

| Age | Duration of Service | | | | | |
|---|---|---|---|---|---|---|
| | 5 Years | 10 Years | 15 Years | 20 Years | 25 Years | 30 Years |
| 50 | 0.0500 | 0.0500 | 0.0500 | 0.0500 | 0.0500 | 0.1000 |
| 51 | 0.0400 | 0.0400 | 0.0400 | 0.0400 | 0.0575 | 0.0942 |
| 52 | 0.0380 | 0.0380 | 0.0380 | 0.0380 | 0.0580 | 0.0825 |
| 53 | 0.0380 | 0.0380 | 0.0380 | 0.0380 | 0.0774 | 0.1169 |
| 54 | 0.0380 | 0.0380 | 0.0380 | 0.0437 | 0.0931 | 0.1497 |
| 55 | 0.0684 | 0.0684 | 0.0684 | 0.0912 | 0.1340 | 0.2423 |
| 56 | 0.0627 | 0.0627 | 0.0627 | 0.0836 | 0.1228 | 0.2168 |
| 57 | 0.0600 | 0.0600 | 0.0600 | 0.0800 | 0.1175 | 0.2125 |
| 58 | 0.0800 | 0.0800 | 0.0800 | 0.0880 | 0.1375 | 0.2275 |
| 59 | 0.0800 | 0.0800 | 0.0800 | 0.0920 | 0.1400 | 0.2275 |
| 60 | 0.1500 | 0.1500 | 0.1500 | 0.1500 | 0.1500 | 0.2275 |
| 61 | 0.1440 | 0.1440 | 0.1440 | 0.1440 | 0.1440 | 0.1700 |
| 62 | 0.1500 | 0.1500 | 0.1500 | 0.1500 | 0.1500 | 0.2125 |
| 63 | 0.1500 | 0.1500 | 0.1500 | 0.1500 | 0.1500 | 0.2125 |
| 64 | 0.1500 | 0.1500 | 0.1500 | 0.1500 | 0.1500 | 0.3188 |
| 65 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |

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

**Service Retirement**

**Public Agency Fire 2.7% @ 57**

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

**Service Retirement**

**Schools 2% @ 55**

| | Duration of Service | | | | | |
|---|---|---|---|---|---|---|
| Age | 5 Years | 10 Years | 15 Years | 20 Years | 25 Years | 30 Years |
| 50 | 0.004 | 0.007 | 0.011 | 0.012 | 0.013 | 0.015 |
| 51 | 0.004 | 0.008 | 0.011 | 0.014 | 0.016 | 0.017 |
| 52 | 0.005 | 0.010 | 0.014 | 0.016 | 0.018 | 0.021 |
| 53 | 0.006 | 0.012 | 0.016 | 0.020 | 0.022 | 0.025 |
| 54 | 0.008 | 0.017 | 0.023 | 0.027 | 0.031 | 0.034 |
| 55 | 0.021 | 0.042 | 0.058 | 0.069 | 0.077 | 0.086 |
| 56 | 0.019 | 0.037 | 0.053 | 0.062 | 0.069 | 0.078 |
| 57 | 0.019 | 0.038 | 0.054 | 0.064 | 0.071 | 0.079 |
| 58 | 0.022 | 0.045 | 0.062 | 0.074 | 0.082 | 0.092 |
| 59 | 0.025 | 0.049 | 0.069 | 0.082 | 0.090 | 0.101 |
| 60 | 0.033 | 0.066 | 0.092 | 0.109 | 0.121 | 0.135 |
| 61 | 0.037 | 0.072 | 0.101 | 0.119 | 0.133 | 0.149 |
| 62 | 0.066 | 0.131 | 0.184 | 0.218 | 0.242 | 0.271 |
| 63 | 0.064 | 0.126 | 0.178 | 0.209 | 0.233 | 0.261 |
| 64 | 0.059 | 0.117 | 0.163 | 0.193 | 0.215 | 0.240 |
| 65 | 0.080 | 0.158 | 0.221 | 0.261 | 0.291 | 0.326 |
| 66 | 0.081 | 0.160 | 0.224 | 0.265 | 0.296 | 0.330 |
| 67 | 0.070 | 0.139 | 0.194 | 0.229 | 0.255 | 0.286 |
| 68 | 0.063 | 0.124 | 0.173 | 0.205 | 0.228 | 0.255 |
| 69 | 0.066 | 0.130 | 0.183 | 0.216 | 0.241 | 0.270 |
| 70 | 0.071 | 0.140 | 0.196 | 0.231 | 0.258 | 0.289 |

# Miscellaneous

### Internal Revenue Code Section 415

The limitations on benefits imposed by Internal Revenue Code Section 415 are taken into account in this valuation. Each year the impact of any changes in this limitation since the prior valuation is included and amortized as part of the actuarial gain or loss base. This results in lower contributions for those employers contributing to the Replacement Benefit Fund and protects CalPERS from prefunding expected benefits in excess of limits imposed by federal tax law. The Section 415 dollar limit for the 2018 calendar year is $220,000.

### Internal Revenue Code Section 401(a) (17)

The limitations on compensation imposed by Internal Revenue Code Section 401(a) (17) are taken into account in this valuation. Each year, the impact of any changes in the compensation limitation since the prior valuation is included and amortized as part of the actuarial gain or loss base. The compensation limit for classic members for the 2018 calendar year is $275,000.

# Appendix B

## Principal Plan Provisions

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

# Service Retirement

### Eligibility

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

### Benefit

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

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

**Miscellaneous Plan Formulas**

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

**Safety Plan Formulas**

| Retirement Age | ½ at 55 * | 2% at 55 | 2% at 50 | 3% at 55 | 3% at 50 |
|---|---|---|---|---|---|
| 50 | 1.783% | 1.426% | 2.000% | 2.400% | 3.000% |
| 51 | 1.903% | 1.522% | 2.140% | 2.520% | 3.000% |
| 52 | 2.035% | 1.628% | 2.280% | 2.640% | 3.000% |
| 53 | 2.178% | 1.742% | 2.420% | 2.760% | 3.000% |
| 54 | 2.333% | 1.866% | 2.560% | 2.880% | 3.000% |
| 55 & Up | 2.500% | 2.000% | 2.700% | 3.000% | 3.000% |

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

**PEPRA Safety Plan Formulas**

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

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

- The *final compensation* is the monthly average of the member's highest 36 or 12 consecutive months' full-time equivalent monthly pay (no matter which CalPERS employer paid this compensation). The standard benefit is 36 months. Employers had the option of providing a final compensation equal to the highest 12 consecutive months for classic plans only. Final compensation must be defined by the highest 36 consecutive months' pay under the 1.5% at 65 formula. PEPRA members have a cap on the annual salary that can be used to calculate final compensation for all new members based on the Social Security contribution and benefit base. For employees that participate in Social Security this cap is $121,388 for 2018 and for those employees that do not participate in Social Security the cap for 2018 is $145,666. Adjustments to the caps are permitted annually based on changes to the CPI for all urban consumers.

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

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

- The miscellaneous and PEPRA safety service retirement benefit is not capped. The classic Safety service retirement benefit is capped at 90 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 5 years of credited service (total service across all CalPERS employers, and with certain other retirement systems with which CalPERS has reciprocity agreements).

### Eligibility to Start Receiving Benefits

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

### Benefit

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

# Non-Industrial (Non-Job Related) Disability Retirement

### Eligibility

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

### Standard Benefit

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

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

- *Service* is CalPERS credited service plus the additional number of years that the member would have worked until age 60, for members with at least 10 years but not more than 18.518 years of service. The maximum benefit in this case is 33 1/3 percent of final compensation.

**Improved Benefit**

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

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

## Industrial (Job Related) Disability Retirement

All safety members have this benefit. For miscellaneous members, employers have the option of providing this benefit. An employer may choose to provide the increased benefit option or the improved benefit option.

**Eligibility**

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

**Standard Benefit**

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

**Increased Benefit (75 percent of Final Compensation)**

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

**Improved Benefit (50 percent to 90 percent of Final Compensation)**

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

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

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

# Post-Retirement Death Benefit

### Standard Lump Sum Payment

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

### Improved Lump Sum Payment

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

# Form of Payment for Retirement Allowance

### Standard Form of Payment

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

### Improved Form of Payment (Post-Retirement Survivor Allowance)

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

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

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

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

# Pre-Retirement Death Benefits

## Basic Death Benefit

This is a standard benefit.

**Eligibility**

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

**Benefit**

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

## 1957 Survivor Benefit

This is a standard benefit.

**Eligibility**

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

**Benefit**

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

# Optional Settlement 2 Death Benefit

This is an optional benefit.

**Eligibility**

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

**Benefit**

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

# Special Death Benefit

This is a standard benefit for safety members. An employer may elect to provide this benefit for miscellaneous members.

**Eligibility**

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

**Benefit**

The special death benefit is a monthly allowance equal to 50 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 child(ren) under age 22. There is a guarantee that the total amount paid will at least equal the basic death benefit.

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

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

# Alternate Death Benefit for Local Fire Members

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

**Eligibility**

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

**Benefit**

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

# Cost-of-Living Adjustments (COLA)

**Standard Benefit**

Retirement and survivor allowances are adjusted each year in May for cost of living, beginning the second calendar year after the year of retirement. The standard cost-of-living adjustment (COLA) is 2 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 given 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).

**Improved Benefit**

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

# Purchasing Power Protection Allowance (PPPA)

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

# Employee Contributions

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

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

| Benefit Formula | Percent Contributed above the Breakpoint |
|---|---|
| Miscellaneous, 1.5% at 65 | 2% |
| Miscellaneous, 2% at 60 | 7% |
| Miscellaneous, 2% at 55 | 7% |
| Miscellaneous, 2.5% at 55 | 8% |
| Miscellaneous, 2.7% at 55 | 8% |
| Miscellaneous, 3% at 60 | 8% |
| Miscellaneous, 2% at 62 | 50% of the Total Normal Cost |
| Miscellaneous, 1.5% at 65 | 50% of the Total Normal Cost |
| Safety, 1/2 at 55 | Varies by entry age |
| Safety, 2% at 55 | 7% |
| Safety, 2% at 50 | 9% |
| Safety, 3% at 55 | 9% |
| Safety, 3% at 50 | 9% |
| Safety, 2% at 57 | 50% of the Total Normal Cost |
| Safety, 2.5% at 57 | 50% of the Total Normal Cost |
| Safety, 2.7% at 57 | 50% of the Total Normal Cost |

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

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

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

# 1959 Survivor Benefit

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

This benefit is not included in the results presented in this valuation. More information on this benefit is available on the CalPERS website at www.calpers.ca.gov.

# Appendix C

# Participant Data

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

# Summary of Valuation Data

| | | June 30, 2017 | | June 30, 2018 |
|---|---|---|---|---|
| 1. **Active Members** | | | | |
| a) Counts | | 17,083 | | 16,817 |
| b) Average Attained Age | | 44.07 | | 44.21 |
| c) Average Entry Age to Rate Plan | | 34.30 | | 34.28 |
| d) Average Years of Credited Service | | 9.77 | | 9.72 |
| e) Average Annual Covered Pay | $ | 66,054 | $ | 66,523 |
| f) Annual Covered Payroll | | 1,128,397,500 | | 1,118,711,056 |
| g) Projected Annual Payroll for Contribution Year | | 1,228,546,672 | | 1,213,566,060 |
| h) Present Value of Future Payroll | | 9,595,674,875 | | 9,672,105,080 |
| 2. **Transferred Members** | | | | |
| a) Counts | | 3,823 | | 3,905 |
| b) Average Attained Age | | 43.61 | | 43.99 |
| c) Average Years of Credited Service | | 2.51 | | 2.59 |
| d) Average Annual Covered Pay | $ | 83,217 | $ | 84,623 |
| 3. **Terminated Members** | | | | |
| a) Counts | | 9,229 | | 9,554 |
| b) Average Attained Age | | 44.38 | | 44.63 |
| c) Average Years of Credited Service | | 2.20 | | 2.22 |
| d) Average Annual Covered Pay | $ | 44,125 | $ | 44,554 |
| 4. **Retired Members and Beneficiaries** | | | | |
| a) Counts | | 10,821 | | 11,438 |
| b) Average Attained Age | | 68.63 | | 68.70 |
| c) Average Annual Benefits | $ | 24,760 | $ | 26,075 |
| 5. **Active to Retired Ratio** [(1a) / (4a)] | | 1.58 | | 1.47 |

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

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

# Active Members

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

### Distribution of Active Members by Age and Service

| | Years of Service at Valuation Date | | | | | | |
|---|---|---|---|---|---|---|---|
| **Attained Age** | **0-4** | **5-9** | **10-14** | **15-19** | **20-24** | **25+** | **Total** |
| 15-24 | 234 | 4 | 0 | 0 | 0 | 0 | 238 |
| 25-29 | 1281 | 197 | 18 | 0 | 0 | 0 | 1,496 |
| 30-34 | 1287 | 575 | 378 | 4 | 0 | 0 | 2,244 |
| 35-39 | 1001 | 584 | 825 | 205 | 0 | 0 | 2,615 |
| 40-44 | 734 | 403 | 686 | 409 | 111 | 4 | 2,347 |
| 45-49 | 598 | 391 | 679 | 469 | 261 | 90 | 2,488 |
| 50-54 | 466 | 282 | 499 | 394 | 242 | 250 | 2,133 |
| 55-59 | 339 | 252 | 420 | 395 | 193 | 315 | 1,914 |
| 60-64 | 143 | 133 | 281 | 235 | 111 | 105 | 1,008 |
| 65 and over | 64 | 57 | 95 | 62 | 27 | 29 | 334 |
| **All Ages** | **6147** | **2878** | **3881** | **2173** | **945** | **793** | **16,817** |

### Distribution of Average Annual Salaries by Age and Service

| | Years of Service at Valuation Date | | | | | | |
|---|---|---|---|---|---|---|---|
| **Attained Age** | **0-4** | **5-9** | **10-14** | **15-19** | **20-24** | **25+** | **Average** |
| 15-24 | $35,967 | $38,802 | $0 | $0 | $0 | $0 | $36,014 |
| 25-29 | 43,070 | 48,878 | 50,537 | 0 | 0 | 0 | 43,924 |
| 30-34 | 48,316 | 59,646 | 58,606 | 56,302 | 0 | 0 | 52,967 |
| 35-39 | 52,910 | 64,587 | 75,982 | 69,030 | 0 | 0 | 64,061 |
| 40-44 | 58,283 | 73,816 | 79,429 | 78,033 | 76,089 | 89,411 | 71,468 |
| 45-49 | 58,342 | 72,067 | 77,256 | 81,206 | 83,877 | 80,657 | 73,457 |
| 50-54 | 62,374 | 71,435 | 75,837 | 81,037 | 84,413 | 83,732 | 75,172 |
| 55-59 | 59,941 | 72,555 | 74,110 | 75,406 | 83,459 | 88,147 | 74,916 |
| 60-64 | 68,668 | 78,230 | 78,263 | 76,626 | 81,058 | 84,308 | 77,453 |
| 65 and over | 68,341 | 74,046 | 73,742 | 81,121 | 89,816 | 93,046 | 77,104 |
| **All Ages** | **$52,055** | **$66,984** | **$74,893** | **$77,831** | **$82,853** | **$85,582** | **$66,523** |

# Transferred and Terminated Members

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

| | Years of Service at Valuation Date | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Attained Age** | **0-4** | **5-9** | **10-14** | **15-19** | **20-24** | **25+** | **Total** | **Average Salary** |
| 15-24 | 14 | 0 | 0 | 0 | 0 | 0 | 14 | $53,213 |
| 25-29 | 234 | 4 | 0 | 0 | 0 | 0 | 238 | 63,751 |
| 30-34 | 493 | 33 | 10 | 0 | 0 | 0 | 536 | 73,222 |
| 35-39 | 627 | 75 | 21 | 4 | 0 | 0 | 727 | 84,772 |
| 40-44 | 623 | 67 | 23 | 6 | 1 | 0 | 720 | 90,064 |
| 45-49 | 465 | 66 | 16 | 9 | 4 | 0 | 560 | 96,112 |
| 50-54 | 375 | 84 | 31 | 13 | 3 | 2 | 508 | 86,160 |
| 55-59 | 237 | 57 | 21 | 21 | 7 | 1 | 344 | 83,292 |
| 60-64 | 129 | 31 | 19 | 7 | 2 | 0 | 188 | 87,552 |
| 65 and over | 52 | 11 | 3 | 4 | 0 | 0 | 70 | 87,268 |
| **All Ages** | **3249** | **428** | **144** | **64** | **17** | **3** | **3,905** | **84,623** |

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

| | Years of Service at Valuation Date | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Attained Age** | **0-4** | **5-9** | **10-14** | **15-19** | **20-24** | **25+** | **Total** | **Average Salary** |
| 15-24 | 94 | 0 | 0 | 0 | 0 | 0 | 94 | $30,193 |
| 25-29 | 633 | 13 | 0 | 0 | 0 | 0 | 646 | 34,536 |
| 30-34 | 1213 | 120 | 11 | 0 | 0 | 0 | 1,344 | 38,945 |
| 35-39 | 1435 | 179 | 35 | 3 | 0 | 0 | 1,652 | 43,708 |
| 40-44 | 1180 | 179 | 50 | 23 | 3 | 0 | 1,435 | 47,150 |
| 45-49 | 1106 | 180 | 59 | 27 | 5 | 4 | 1,381 | 51,647 |
| 50-54 | 858 | 147 | 54 | 17 | 4 | 6 | 1,086 | 48,407 |
| 55-59 | 760 | 110 | 39 | 14 | 4 | 2 | 929 | 44,152 |
| 60-64 | 566 | 49 | 14 | 2 | 1 | 0 | 632 | 44,951 |
| 65 and over | 331 | 17 | 5 | 2 | 0 | 0 | 355 | 42,222 |
| **All Ages** | **8176** | **994** | **267** | **88** | **17** | **12** | **9,554** | **44,554** |

# Retired Members and Beneficiaries

**Distribution of Retirees and Beneficiaries by Age and Retirement Type***

| Attained Age | Service Retirement | Non-Industrial Disability | Industrial Disability | Non-Industrial Death | Industrial Death | Death After Retirement | Total |
|---|---|---|---|---|---|---|---|
| Under 30 | 0 | 0 | 0 | 0 | 0 | 16 | 16 |
| 30-34 | 0 | 1 | 6 | 0 | 0 | 9 | 16 |
| 35-39 | 0 | 14 | 12 | 0 | 1 | 10 | 37 |
| 40-44 | 0 | 9 | 16 | 1 | 0 | 14 | 40 |
| 45-49 | 0 | 29 | 28 | 2 | 1 | 15 | 75 |
| 50-54 | 346 | 57 | 19 | 1 | 1 | 28 | 452 |
| 55-59 | 1027 | 65 | 30 | 5 | 0 | 45 | 1,172 |
| 60-64 | 2047 | 53 | 23 | 10 | 0 | 83 | 2,216 |
| 65-69 | 2503 | 81 | 33 | 9 | 0 | 124 | 2,750 |
| 70-74 | 1844 | 59 | 24 | 8 | 0 | 132 | 2,067 |
| 75-79 | 1029 | 42 | 9 | 1 | 0 | 134 | 1,215 |
| 80-84 | 536 | 29 | 4 | 3 | 0 | 118 | 690 |
| 85 and Over | 461 | 15 | 3 | 3 | 0 | 210 | 692 |
| **All Ages** | **9793** | **454** | **207** | **43** | **3** | **938** | **11,438** |

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

| Attained Age | Service Retirement | Non-Industrial Disability | Industrial Disability | Non-Industrial Death | Industrial Death | Death After Retirement | Average |
|---|---|---|---|---|---|---|---|
| Under 30 | $0 | $0 | $0 | $0 | $0 | $4,795 | $4,795 |
| 30-34 | 0 | 670 | 240 | 0 | 0 | 2,839 | 1,729 |
| 35-39 | 0 | 12,153 | 195 | 0 | 160 | 3,772 | 5,685 |
| 40-44 | 0 | 11,682 | 326 | 8,703 | 0 | 11,362 | 6,953 |
| 45-49 | 0 | 11,811 | 2,002 | 4,215 | 131 | 12,140 | 7,857 |
| 50-54 | 21,641 | 12,171 | 929 | 7,310 | 891 | 8,039 | 18,656 |
| 55-59 | 29,722 | 12,571 | 1,872 | 15,348 | 0 | 11,280 | 27,288 |
| 60-64 | 33,646 | 12,610 | 2,395 | 7,422 | 0 | 16,088 | 32,043 |
| 65-69 | 30,795 | 12,668 | 2,365 | 17,800 | 0 | 15,367 | 29,182 |
| 70-74 | 28,086 | 14,154 | 2,361 | 12,512 | 0 | 19,810 | 26,801 |
| 75-79 | 24,673 | 12,495 | 1,055 | 34,620 | 0 | 16,859 | 23,224 |
| 80-84 | 18,441 | 12,475 | 1,330 | 5,557 | 0 | 13,644 | 17,214 |
| 85 and Over | 15,981 | 10,567 | 487 | 6,988 | 0 | 11,188 | 14,303 |
| **All Ages** | **$28,428** | **$12,564** | **$1,666** | **$11,813** | **$394** | **$14,167** | **$26,075** |

# Retired Members and Beneficiaries (continued)

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

| Years Retired | Service Retirement | Non-Industrial Disability | Industrial Disability | Non-Industrial Death | Industrial Death | Death After Retirement | Total |
|---|---|---|---|---|---|---|---|
| Under 5 Yrs | 3184 | 74 | 68 | 11 | 0 | 348 | 3,685 |
| 5-9 | 2835 | 74 | 31 | 12 | 1 | 250 | 3,203 |
| 10-14 | 1858 | 64 | 25 | 7 | 1 | 152 | 2,107 |
| 15-19 | 990 | 102 | 29 | 7 | 1 | 96 | 1,225 |
| 20-24 | 511 | 80 | 21 | 2 | 0 | 52 | 666 |
| 25-29 | 254 | 34 | 14 | 2 | 0 | 19 | 323 |
| 30 and Over | 161 | 26 | 19 | 2 | 0 | 21 | 229 |
| **All Years** | **9793** | **454** | **207** | **43** | **3** | **938** | **11,438** |

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

| Years Retired | Service Retirement | Non-Industrial Disability | Industrial Disability | Non-Industrial Death | Industrial Death | Death After Retirement | Average |
|---|---|---|---|---|---|---|---|
| Under 5 Yrs | $33,272 | $13,550 | $1,494 | $8,386 | $0 | $14,689 | $30,460 |
| 5-9 | 29,950 | 12,292 | 2,749 | 17,076 | 891 | 14,736 | 28,034 |
| 10-14 | 27,701 | 14,268 | 2,760 | 7,643 | 160 | 15,747 | 26,055 |
| 15-19 | 23,256 | 14,450 | 1,802 | 12,423 | 131 | 13,487 | 21,169 |
| 20-24 | 16,235 | 9,881 | 900 | 22,268 | 0 | 8,712 | 14,419 |
| 25-29 | 13,740 | 10,591 | 827 | 2,430 | 0 | 9,294 | 12,517 |
| 30 and Over | 7,924 | 9,770 | 333 | 10,473 | 0 | 8,322 | 7,563 |
| **All Years** | **$28,428** | **$12,564** | **$1,666** | **$11,813** | **$394** | **$14,167** | **$26,075** |

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

# Appendix D

## Normal Cost Information by Group

- **Normal Cost by Benefit Group**
- **PEPRA Member Contribution Rates**

# Normal Cost by Benefit Group

The table below displays the Total Normal Cost broken out by benefit group for Fiscal Year 2020-21. The Total Normal Cost is the annual cost of service accrual for the fiscal year for active employees and can be viewed as the long-term contribution rate for the benefits contracted. Generally, the normal cost for a benefit group subject to more generous benefit provisions will exceed the normal cost for a group with less generous benefits. However, based on the characteristics of the members (particularly when the number of actives is small), this may not be the case. Future measurements of the Total Normal Cost for each group may differ significantly from the current values due to such factors as: changes in the demographics of the group, changes in economic and demographic assumptions, changes in plan benefits or applicable law.

| Rate Plan Identifier | Benefit Group Name | Total Normal Cost FY 2020-21 | Number of Actives | Payroll on 6/30/2018 |
|---|---|---|---|---|
| 62 | Miscellaneous First Level | 17.897% | 796 | 68,189,948 |
| 26035 | Miscellaneous PEPRA Level | 14.672% | 6,022 | 323,010,341 |
| 30192 | Miscellaneous Second Level | 21.315% | 9,341 | 697,584,838 |
| 30193 | Miscellaneous Third Level | 17.069% | 658 | 44,360,201 |

Note that if a Benefit Group above has multiple bargaining units, each of which has separately contracted for different benefits such as Employer Paid Member Contributions, then the Normal Cost split does not reflect those differences. Additionally, if a 2nd Level Benefit Group amended to the same benefit formula as a 1st Level Benefit Group their Normal Costs may be dissimilar due to demographic or other population differences. In these situations you should consult with your plan actuary.

# PEPRA Member Contribution Rates

The table below shows the determination of the PEPRA Member contribution rates based on 50 percent of the Total Normal Cost for each respective plan on June 30, 2018. Assembly Bill (AB) 340 created PEPRA that implemented new benefit formulas and a final compensation period as well as new contribution requirements for new employees. In accordance with Section Code 7522.30(b), "new members ... shall have an initial contribution rate of at least 50 percent of the normal cost rate." The normal cost for the plan is dependent on the benefit levels, actuarial assumptions and demographics of the plan particularly the entry age into 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.

| | | Basis for Current Rate | | Rates Effective July 1, 2020 | | | |
|---|---|---|---|---|---|---|---|
| **Rate Plan Identifier** | **Benefit Group Name** | **Total Normal Cost** | **Member Rate** | **Total Normal Cost** | **Change** | **Change Needed** | **Member Rate** |
| 26035 | Miscellaneous PEPRA Level | 12.900% | 6.500% | 14.672% | 1.772% | Yes | 7.250% |

The PEPRA employee contribution rate determined in the table above may not necessarily be 50 percent of the Total Normal Cost by Group based on the PEPRA Normal Cost calculation methodology. Each non-pooled plan is stable with a sufficiently large demographic representation of active employees. 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 non-pooled plan until the number of members covered under the PEPRA formula meets either:

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

Once either of the conditions above is met for a non-pooled plan, the total PEPRA normal cost will be based on the active PEPRA population in the plan.

Accordingly, the total normal cost will be funded equally between employer and employee based on the demographics of the employees of that employer.

# Appendix E

# Glossary of Actuarial Terms

# Glossary of Actuarial Terms

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

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

**Actuarial Methods**
Procedures employed by actuaries to achieve certain funding goals of a pension plan. Actuarial methods include funding method, setting the length of time to fund the Accrued Liability and determining the Value of Assets.

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

**Amortization Bases**
Separate payment schedules for different portions of the Unfunded Liability. The total Unfunded Liability of a Risk Pool or non-pooled 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. Payment periods are determined by Board policy and vary based on the cause of the change.

**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 Assumption**
The actuarial assumption that was called "investment return" in earlier CalPERS reports or "actuarial interest rate" in Section 20014 of the California Public Employees' Retirement Law (PERL).

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

**Entry Age 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 percent means the plan or risk pool has more assets than liabilities and a ratio less than 100 percent 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 replaces 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, and who was not a member of another public retirement system prior to that date, and who is not subject to reciprocity with another public retirement system.

**Normal Cost**

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

**Pension Actuary**

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

**PEPRA**

The California Public Employees' Pension Reform Act of 2013

**Prepayment Contribution**

A payment made by the employer to reduce or eliminate the year's required employer contribution towards the UAL.

**Present Value of Benefits (PVB)**

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

**Unfunded Accrued Liability (UAL)**

When a plan or pool's value of assets is less than its Accrued Liability, the difference is the plan or pool's Unfunded Accrued Liability (or unfunded liability). If the unfunded liability is positive, the plan or pool will have to pay contributions exceeding the Normal Cost.

CalPERS

**California Public Employees' Retirement System**
**Actuarial Office**
400 Q Street, Sacramento, CA 95811 | Phone: (916) 795-3000 | Fax: (916) 795-2744
**888 CalPERS** (or **888**-225-7377) | TTY: (877) 249-7442 | **www.calpers.ca.gov**

**July 2019**

**Safety Plan of the County of Riverside (CalPERS ID: 5982690295)**
**Annual Valuation Report as of June 30, 2018**

Dear Employer,

Attached to this letter, you will find the June 30, 2018 actuarial valuation report of your CalPERS pension plan. **Provided in this report is the determination of the minimum required employer contributions for Fiscal Year 2020-21.** In addition, the report also contains important information regarding the current financial status of the plan as well as projections and risk measures to aid in planning for the future.

Actuarial valuations are based on assumptions regarding future plan experience including investment return and payroll growth, eligibility for the types of benefits provided, and longevity among retirees. The CalPERS Board of Administration adopts these assumptions after considering the advice of CalPERS actuarial and investment teams and other professionals. Each actuarial valuation reflects all prior differences between actual and assumed experience and adjusts the contribution rates as needed. This valuation is based on an investment return assumption of 7.0% which was adopted by the board in December 2016. Other assumptions used in this report are those recommended in the CalPERS Experience Study and Review of Actuarial Assumptions report from December 2017.

### Required Contributions

The exhibit below displays the minimum required employer contributions and the Employee PEPRA Rate for Fiscal Year 2020-21 along with an estimate of the required contribution for Fiscal Year 2021-22. Member contributions other than cost sharing (whether paid by the employer or the employee) are in addition to the results shown below. **The required employer contributions in this report do not reflect any cost sharing arrangement you may have with your employees.**

| Fiscal Year | Employer Normal Cost Rate | Employer Amortization of Unfunded Accrued Liability | Employee PEPRA Rate |
|---|---|---|---|
| 2020-21 | 21.095% | $73,668,397 | 12.50% |
| *Projected Results* | | | |
| *2021-22* | *21.1%* | *$84,858,000* | *TBD* |

The actual investment return for Fiscal Year 2018-19 was not known at the time this report was prepared. The projections above assume the investment return for that year would be 7.00 percent. ***To the extent the actual investment return for Fiscal Year 2018-19 differs from 7.00 percent, the actual contribution requirements for Fiscal Year 2021-22 will differ from those shown above.*** For additional details regarding the assumptions and methods used for these projections please refer to the "Projected Employer Contributions" in the "Highlights and Executive Summary" section. This section also contains projected required contributions through fiscal year 2025-26.

### Changes from previous Year's Valuations

CalPERS continues to strive to provide comprehensive risk assessments regarding plan funding and sustainability consistent with the Board of Administration's pension and investment beliefs. Your report this year includes new metrics on plan maturity in recognition of the fact that most pension plans at CalPERS are maturing as anticipated. As plans mature, they become much more sensitive to risks than plans that are less mature. The "Risk Analysis" section of your report will help you understand how your plan is affected by investment return volatility and other economic assumptions. We have included plan sensitivity analysis with respect to longevity and inflation to further that discussion and encourage you to review our most recent Annual Review of Funding Levels and Risks report on our website that takes a holistic view of the system.

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

**Upcoming Change for June 30, 2019 Valuations**

The CalPERS Board of Administration has adopted a new amortization policy effective with the June 30, 2019 actuarial valuation. The new policy shortens the period over which actuarial gains and losses are amortized from 30 years to 20 years with the payments computed using a level dollar amount. In addition, the new policy removes the 5-year ramp-up and ramp-down on UAL bases attributable to assumption changes and non-investment gains/losses. The new policy removes the 5-year ramp-down on investment gains/losses. These changes will apply only to new UAL bases established on or after June 30, 2019.

Over the past few years, CalPERS adopted measures to strengthen the long-term future of the system. These measures include lowering the discount rate from 7.5% to 7.0% and shortening the amortization period for future unexpected changes in unfunded liability. While these changes can result in short-term increases to required employer contributions, they are not expected to increase the long-term cost of the plan. We firmly believe these changes were necessary in order to maintain the security of promised benefits and to equitably spread benefit costs over the current and future generations.

We understand that you might have some questions about these results. While we are very interested in discussing these results with your agency, in the interest of allowing us to give every public agency their results, we ask that you wait until after August 1, 2019 to contact us with actuarial questions. If you have other questions, you may call the Customer Contact Center at (888)-CalPERS or (**888-225-7377**).

Sincerely,

SCOTT TERANDO
Chief Actuary

CalPERS

# Actuarial Valuation as of June 30, 2018

# for the Safety Plan of the County of Riverside

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

## Required Contributions for Fiscal Year July 1, 2020 – June 30, 2021

# Table of Contents

# Actuarial Certification

To the best of our knowledge, this report is complete and accurate and contains sufficient information to disclose, fully and fairly, the funded condition of the Safety Plan of the County of Riverside. This valuation is based on the member and financial data as of June 30, 2018 provided by the various CalPERS databases and the benefits under this plan with CalPERS as of the date this report was produced. It is our opinion that the valuation has been performed in accordance with generally accepted actuarial principles, in accordance with standards of practice prescribed by the Actuarial Standards Board, and that the assumptions and methods are internally consistent and reasonable for this plan, as prescribed by the CalPERS Board of Administration according to provisions set forth in the California Public Employees' Retirement Law.

The undersigned is an actuary for CalPERS, a member of the American Academy of Actuaries and the Society of Actuaries and meets the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein.

Kurt Schneider

KURT SCHNEIDER, ASA, EA, FCA, MAAA
Senior Pension Actuary, CalPERS

# Highlights and Executive Summary

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

# Introduction

This report presents the results of the June 30, 2018 actuarial valuation of the Safety Plan of the County of Riverside of the California Public Employees' Retirement System (CalPERS). This actuarial valuation sets the minimum required employer contributions for Fiscal Year 2020-21.

# Purpose of the Report

The actuarial valuation was prepared by the CalPERS Actuarial Office using data as of June 30, 2018. The purpose of the report is to:

- Set forth the assets and accrued liabilities of this plan as of June 30, 2018;
- Determine the minimum required employer contributions for the fiscal year July 1, 2020 through June 30, 2021;
- Provide actuarial information as of June 30, 2018 to the CalPERS Board of Administration and other interested parties.

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

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

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; changes in actuarial policies; 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), with the exception of including the original base amounts of the various components of the unfunded liability in the Schedule of Amortization Bases shown on page 16.

Additionally, this report includes the following "Enhanced Risk Disclosures" also recommended by the CAAP in the Model Disclosure Elements document and consistent with the recommendations of Actuarial Standards of Practice No. 51:

- A "Scenario Test," projecting future results under different investment income returns.
- A "Sensitivity Analysis," showing the impact on current valuation results using alternative discount rates of 6.0 percent and 8.0 percent.
- A "Sensitivity Analysis," showing the impact on current valuation results using a 1.0 percent plus or minus change in the inflation rate.
- A "Sensitivity Analysis," showing the impact on current valuation results assuming rates of mortality are 10 percent lower or 10 percent higher than our current mortality assumptions adopted in 2017. This type of analysis highlights the impact on the plan of improving or worsening mortality over the long-term.
- Plan maturity measures which indicate how sensitive a plan may be to the risks noted above.

# Required Contributions

| | | Fiscal Year 2020-21 |
|---|---|---|
| **Required Employer Contribution** | | |
| **Employer Normal Cost Rate** | | **21.095%** |
| ***Plus, Either*** | | |
| **1) Monthly Employer Dollar UAL Payment** | **$** | **6,139,033** |
| ***Or*** | | |
| **2) Annual UAL Prepayment Option*** | **$** | **71,217,927** |
| **Required PEPRA Member Contribution Rate** | | **12.50%** |

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

** Only the UAL portion of the employer contribution can be prepaid **(which must be received in full no later than July 31)**. Any prepayment totaling over $5 million requires a 72-hour notice email to FCSD_public_agency_wires@calpers.ca.gov. Plan Normal Cost contributions will be made as part of the payroll reporting process. If there is contractual cost sharing or other change, this amount will change.*

*In accordance with Sections 20537 and 20572 of the Public Employees' Retirement Law, if a contracting agency fails to remit the required contributions when due, interest and penalties may apply.*

*For additional detail regarding the determination of the required contribution for PEPRA members, see Appendix D. Required member contributions for Classic members can be found in Appendix B.*

| | | Fiscal Year 2019-20 | | Fiscal Year 2020-21 |
|---|---|---|---|---|
| **Normal Cost Contribution as a Percentage of Payroll** | | | | |
| Total Normal Cost | | 29.184% | | 30.527% |
| Employee Contribution[1] | | 9.331% | | 9.432% |
| Employer Normal Cost[2] | | 19.853% | | 21.095% |
| Projected Annual Payroll for Contribution Year | $ | 357,547,257 | $ | 335,974,322 |
| **Estimated Employer Contributions Based On Projected Payroll** | | | | |
| Total Normal Cost | $ | 104,346,591 | $ | 102,562,882 |
| Employee Contribution[1] | | 33,362,735 | | 31,689,098 |
| Employer Normal Cost[2] | | 70,983,856 | | 70,873,784 |
| Unfunded Liability Contribution | | 62,876,977 | | 73,668,397 |
| % of Projected Payroll (illustrative only) | | 17.586% | | 21.927% |
| Estimated Total Employer Contribution | $ | 133,860,833 | $ | 144,542,181 |
| % of Projected Payroll (illustrative only) | | 37.439% | | 43.022% |

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

[2] The Employer Normal Cost is a blended rate for all benefit groups in the plan. A breakout of normal cost by benefit group is shown in Appendix D.

# Plan's Funded Status

| | | June 30, 2017 | | June 30, 2018 |
|---|---|---|---|---|
| 1. Present Value of Projected Benefits | $ | 4,254,972,861 | $ | 4,552,329,305 |
| 2. Entry Age Normal Accrued Liability | | 3,361,565,098 | | 3,676,571,381 |
| 3. Market Value of Assets (MVA) | $ | 2,394,890,161 | $ | 2,586,874,850 |
| 4. Unfunded Accrued Liability (UAL) [(2) – (3)] | $ | 966,674,937 | $ | 1,089,696,531 |
| 5. Funded Ratio [(3) / (2)] | | 71.2% | | 70.4% |

This measure of funded status is an assessment of the need for future employer contributions based on the selected actuarial cost method used to fund the plan. The UAL is the present value of future employer contributions for service that has already been earned and is in addition to future normal cost contributions for active members. For a measure of funded status that is appropriate for assessing the sufficiency of plan assets to cover estimated termination liabilities, please see "Hypothetical Termination Liability" in the "Risk Analysis" section.

# Projected Employer Contributions

The table below shows the required and projected employer contributions (before cost sharing) for the next six fiscal years. Projected results reflect the adopted changes to the discount rate described in Appendix A, "Actuarial Methods and Assumptions." The projections also assume that all actuarial assumptions will be realized and that no further changes to assumptions, contributions, benefits, or funding will occur during the projection period. The projected normal cost percentages in the projections below do not reflect that the normal cost will decline over time as new employees are hired into PEPRA or other lower cost benefit tiers.

| | **Required Contribution** | **Projected Future Employer Contributions (Assumes 7.00% Return for Fiscal Year 2018-19)** | | | | |
|---|---|---|---|---|---|---|
| **Fiscal Year** | **2020-21** | **2021-22** | **2022-23** | **2023-24** | **2024-25** | **2025-26** |
| **Normal Cost %** | 21.095% | 21.1% | 21.1% | 21.1% | 21.1% | 21.1% |
| **UAL Payment** | 73,668,397 | 84,858,000 | 93,786,000 | 98,747,000 | 103,893,000 | 106,750,000 |
| *Total as a % of Payroll** | *43.0%* | *45.7%* | *47.5%* | *48.2%* | *48.8%* | *48.8%* |
| *Projected Payroll* | *335,974,322* | *345,213,616* | *354,706,990* | *364,461,431* | *374,484,121* | *384,782,434* |

*Illustrative only and based on the projected payroll shown.

Changes in the UAL due to actuarial gains or losses as well as 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 phases in the impact of changes in UAL over a 5-year period and attempts to minimize employer cost volatility from year to year. As a result of this methodology, dramatic changes in the required employer contributions in any one year are less likely. However, required contributions can change gradually and significantly over the next five years. In years 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.

For projected contributions under alternate investment return scenarios, please see the "Future Investment Return Scenarios" in the "Risk Analysis" section.

# Cost

### Actuarial Cost Estimates in General

What is the cost of the pension plan?

Contributions to fund the pension plan are comprised of two components:

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

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

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

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

- Demographic assumptions (which includes mortality rates, retirement rates, employment termination rates and disability rates)
- Economic assumptions (which includes future investment earnings, inflation, salary growth rates)

These assumptions reflect CalPERS best estimate of the future experience of the plan and are long term in nature. We recognize that all the assumptions will not be realized in any given year. For example, the investment earnings at CalPERS have averaged 6.0 percent over the 20 years ending June 30, 2018, yet individual fiscal year returns have ranged from -24.0 percent to +21.7 percent. In addition, CalPERS reviews all the actuarial assumptions on an ongoing basis by conducting in-depth experience studies every four years, with the most recent experience study completed in 2017.

# Changes since the Prior Year's Valuation

**Benefits**

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

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

**Actuarial Methods and Assumptions**

In December of 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 valuation. The minimum employer contributions for Fiscal Year 2020-21 determined in this valuation were calculated using a discount rate of 7.00 percent, payroll growth of 2.75 percent and an inflation rate of 2.50 percent. The projected employer contributions on Page 5 are calculated under the assumption that the discount rate remains at 7.00 percent going forward and that furthermore the realized rate of return on assets for Fiscal Year 2018-19 is 7.00 percent.

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 assumption provides a more realistic assumption for the long-term investment return of the fund.

CalPERS has implemented a new actuarial valuation software system for the June 30, 2018 valuation. With this new system we have refined and improved some of our calculation methodology. Any difference in liability between the old software and new software calculations is captured as a method change line item.

# Subsequent Events

The CalPERS Board of Administration has adopted a new amortization policy effective with the June 30, 2019 actuarial valuation. The new policy shortens the period over which actuarial gains and losses are amortized from 30 years to 20 years with the payments computed using a level dollar amount. In addition, the new policy removes the 5-year ramp-up and ramp-down on UAL bases attributable to assumption changes and non-investment gains/losses. The new policy removes the 5-year ramp-down on investment gains/losses. These changes will apply only to new UAL bases established on or after June 30, 2019.

For inactive employers the new amortization policy imposes a maximum amortization period of 15 years for all unfunded accrued liabilities effective June 30, 2017. Furthermore, the plan actuary has the ability to shorten the amortization period on any valuation date based on the life expectancy of plan members and projected cash flow needs to the plan. The impact of this has been reflected in the current valuation results.

The contribution requirements determined in this actuarial valuation report are based on demographic and financial information as of June 30, 2018. Changes in the value of assets subsequent to that date are not reflected. Investment returns below the assumed rate of return will increase the required contribution, while investment returns above the assumed rate of return will decrease the required contribution.

This actuarial valuation report reflects statutory changes, regulatory changes and CalPERS Board actions through January 2019. Any subsequent changes or actions are not reflected.

# Assets

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

# Reconciliation of the Market Value of Assets

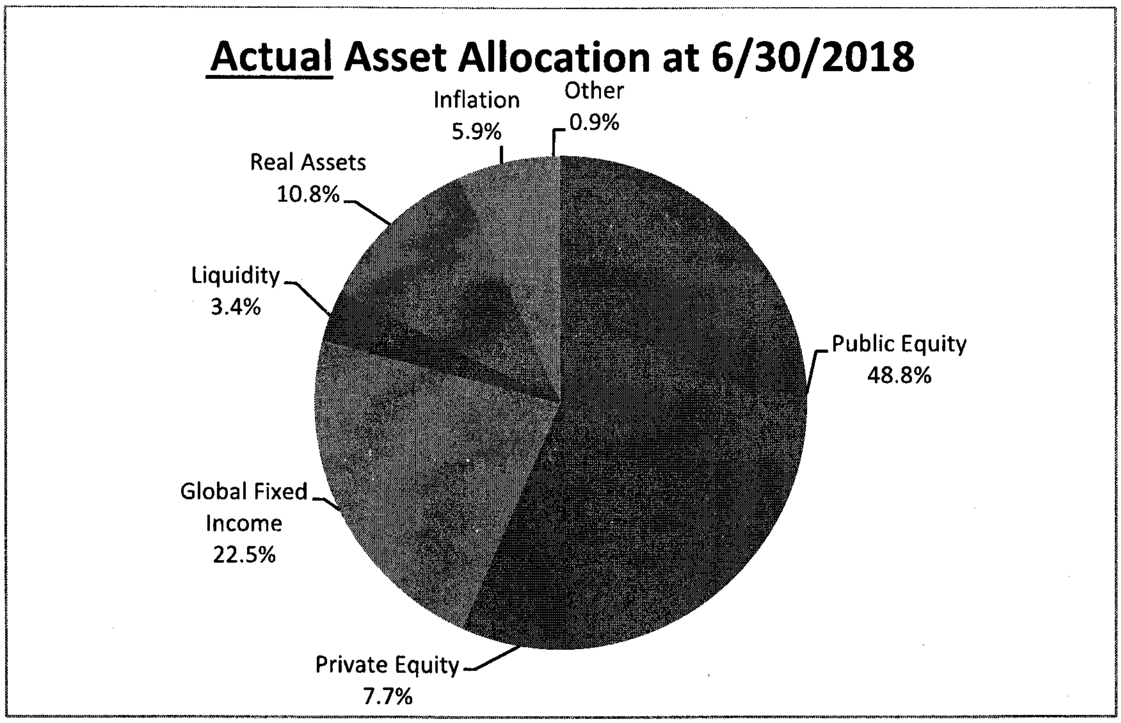
| | | | |
|---|---|---|---|
| 1. | Market Value of Assets as of 6/30/17 including Receivables | $ | 2,394,890,161 |
| 2. | Change in Receivables for Service Buybacks | | (849,896) |
| 3. | Employer Contributions | | 92,282,710 |
| 4. | Employee Contributions | | 29,884,061 |
| 5. | Benefit Payments to Retirees and Beneficiaries | | (128,739,867) |
| 6. | Refunds | | (1,237,531) |
| 7. | Transfers | | (19,334) |
| 8. | Service Credit Purchase (SCP) Payments and Interest | | 1,551,669 |
| 9. | Miscellaneous Adjustments | | 2 |
| 10. | Net Investment Return | | 199,112,874 |
| 11. | Market Value of Assets as of 6/30/18 including Receivables | $ | 2,586,874,850 |

# 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 December 19, 2017, the CalPERS Board of Administration adopted changes to the current asset allocation as shown in the Policy Target Allocation below expressed as a percentage of total assets.

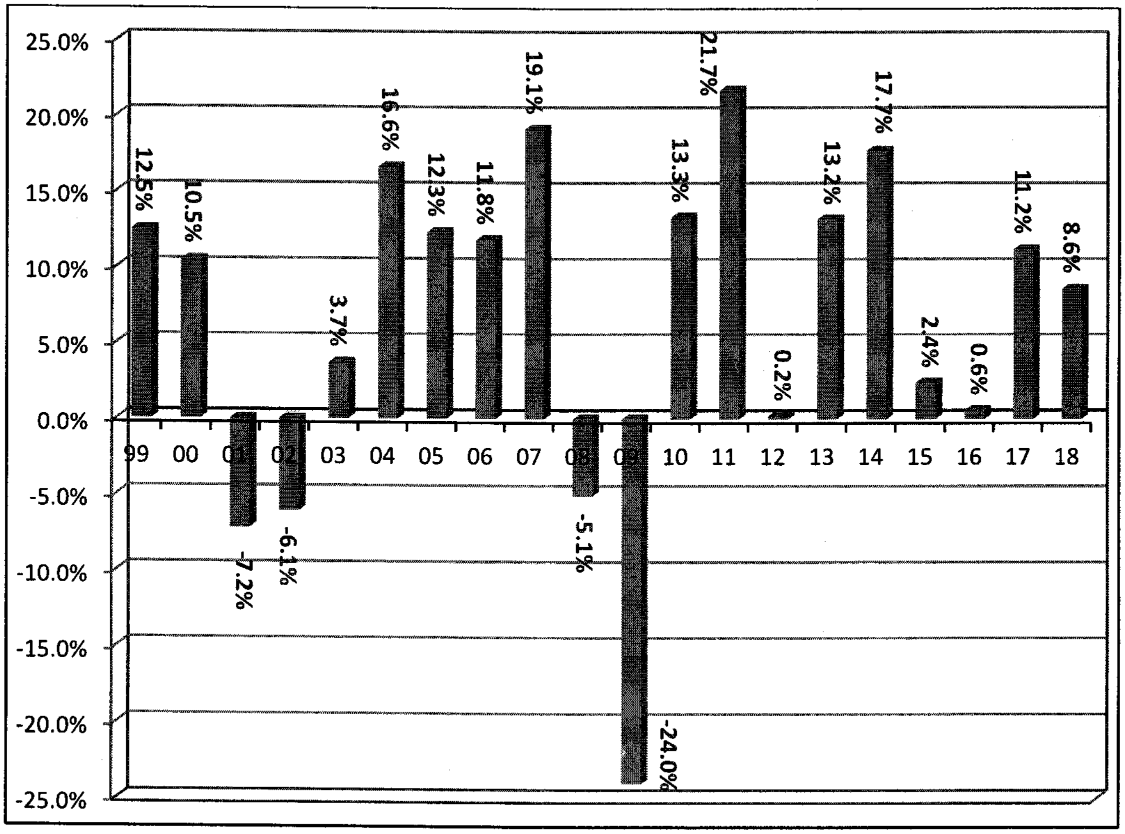
The asset allocation and market value of assets shown below reflect the values of the Public Employees' Retirement Fund (PERF) in its entirety as of June 30, 2018. The assets for County of Riverside Safety Plan are part of the PERF and are invested accordingly.

| (A) Asset Class | (B) Market Value ($ Billion) | (C) Policy Target Allocation |
|---|---|---|
| Public Equity | 171.8 | 49.0% |
| Private Equity | 27.2 | 8.0% |
| Global Fixed Income | 79.1 | 22.0% |
| Liquidity | 11.8 | 3.0% |
| Real Assets | 38.1 | 12.0% |
| Inflation Sensitive Assets | 20.8 | 6.0% |
| Other | 3.1 | 0.0% |
| **Total Fund** | **$351.9** | **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, 2018 (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 Mean Rates of Return and Volatilities | | | | | |
|---|---|---|---|---|---|
| | **1 year** | **5 year** | **10 year** | **20 year** | **30 year** |
| Geometric Return | 8.6% | 7.9% | 5.7% | 6.0% | 8.3% |
| Volatility | – | 6.9% | 12.9% | 11.1% | 10.1% |

## Liabilities and Contributions

- **Development of Accrued and Unfunded Liabilities**
- **(Gain) / Loss Analysis 06/30/17 - 06/30/18**
- **Schedule of Amortization Bases**
- **Amortization Schedule and Alternatives**
- **Reconciliation of Required Employer Contributions**
- **Employer Contribution History**
- **Funding History**

# Development of Accrued and Unfunded Liabilities

| | | June 30, 2017 | June 30, 2018 |
|---|---|---|---|
| 1. Present Value of Projected Benefits | | | |
| a) Active Members | $ | 2,452,722,046 | 2,453,204,950 |
| b) Transferred Members | | 58,002,385 | 67,082,057 |
| c) Terminated Members | | 32,038,568 | 35,749,019 |
| d) Members and Beneficiaries Receiving Payments | | 1,712,209,862 | 1,996,293,279 |
| e) Total | $ | 4,254,972,861 | 4,552,329,305 |
| 2. Present Value of Future Employer Normal Costs | $ | 592,599,090 | 589,070,344 |
| 3. Present Value of Future Employee Contributions | $ | 300,808,673 | 286,687,580 |
| 4. Entry Age Normal Accrued Liability | | | |
| a) Active Members [(1a) - (2) - (3)] | $ | 1,559,314,283 | 1,577,447,026 |
| b) Transferred Members (1b) | | 58,002,385 | 67,082,057 |
| c) Terminated Members (1c) | | 32,038,568 | 35,749,019 |
| d) Members and Beneficiaries Receiving Payments (1d) | | 1,712,209,862 | 1,996,293,279 |
| e) Total | $ | 3,361,565,098 | 3,676,571,381 |
| 5. Market Value of Assets (MVA) | $ | 2,394,890,161 | 2,586,874,850 |
| 6. Unfunded Accrued Liability (UAL) [(4e) - (5)] | $ | 966,674,937 | 1,089,696,531 |
| 7. Funded Ratio [(5) / (4e)] | | 71.2% | 70.4% |

# (Gain)/Loss Analysis 6/30/17 – 6/30/18

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

| | | |
|---|---|---|
| **1. Total (Gain)/Loss for the Year** | | |
| a) Unfunded Accrued Liability (UAL) as of 6/30/17 | $ | 966,674,937 |
| b) Expected Payment on the UAL during 2017-18 | | 27,415,280 |
| c) Interest through 6/30/18 [.0725 x (1a) - ((1.0725)$^{½}$ - 1) x (1b)] | | 69,107,517 |
| d) Expected UAL before all other changes [(1a) - (1b) + (1c)] | | 1,008,367,174 |
| e) Change due to plan changes | | 0 |
| f) Change due to assumption change | | 110,697,660 |
| g) Change due to method change | | 17,663,755 |
| h) Expected UAL after all other changes [(1d) + (1e) + (1f) + (1g)] | | 1,136,728,589 |
| i) Actual UAL as of 6/30/18 | | 1,089,696,531 |
| j) Total (Gain)/Loss for 2017-18 [(1i) - (1h)] | $ | (47,032,058) |
| **2. Contribution (Gain)/Loss for the Year** | | |
| a) Expected Contribution (Employer and Employee) | $ | 127,817,208 |
| b) Interest on Expected Contributions | | 4,552,307 |
| c) Actual Contributions | | 122,166,770 |
| d) Interest on Actual Contributions | | 4,351,062 |
| e) Expected Contributions with Interest [(2a) + (2b)] | | 132,369,515 |
| f) Actual Contributions with Interest [(2c) + (2d)] | | 126,517,832 |
| g) Contribution (Gain)/Loss [(2e) - (2f)] | $ | 5,851,683 |
| **3. Asset (Gain)/Loss for the Year** | | |
| a) Market Value of Assets as of 6/30/17 | $ | 2,394,890,161 |
| b) Prior Fiscal Year Receivables | | (6,148,345) |
| c) Current Fiscal Year Receivables | | 5,298,449 |
| d) Contributions Received | | 122,166,770 |
| e) Benefits and Refunds Paid | | (129,977,398) |
| f) Transfers, SCP Payments and Interest, and Miscellaneous Adjustments | | 1,532,336 |
| g) Expected Int. [.0725 x (3a + 3b) + ((1.0725)$^{½}$ - 1) x ((3d) + (3e) + (3f))] | | 172,960,176 |
| h) Expected Assets as of 6/30/18 [(3a) + (3b) + (3c) + (3d) + (3e) + (3f) + (3g)] | | 2,560,722,150 |
| i) Market Value of Assets as of 6/30/18 | | 2,586,874,850 |
| j) Asset (Gain)/Loss [(3h) - (3i)] | $ | (26,152,700) |
| **4. Liability (Gain)/Loss for the Year** | | |
| a) Total (Gain)/Loss (1j) | $ | (47,032,058) |
| b) Contribution (Gain)/Loss (2g) | | 5,851,683 |
| c) Asset (Gain)/Loss (3j) | | (26,152,700) |
| d) Liability (Gain)/Loss [(4a) - (4b) - (4c)] | $ | (26,731,040) |

# Schedule of Amortization Bases

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

- The assets, liabilities, and funded status of the plan are measured as of the valuation date: June 30, 2018.
- The required employer contributions determined by the valuation are for the fiscal year beginning two years after the valuation date: Fiscal Year 2020-21.

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

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

# Schedule of Amortization Bases

| Reason for Base | Date Established | Ramp Up/Down 2020-21 | Escalat-ion Rate | Amorti-zation Period | Balance 6/30/18 | Expected Payment 2018-19 | Balance 6/30/19 | Expected Payment 2019-20 | Balance 6/30/20 | Scheduled Payment for 2020-21 |
|---|---|---|---|---|---|---|---|---|---|---|
| FRESH START | 06/30/08 | No Ramp | 2.750% | 20 | $(5,112,870) | $(360,488) | $(5,097,879) | $(370,314) | $(5,071,674) | $(375,177) |
| ASSUMPTION CHANGE | 06/30/09 | No Ramp | 2.750% | 11 | $18,699,390 | $1,892,411 | $18,050,822 | $1,943,501 | $17,304,007 | $1,976,490 |
| SPECIAL (GAIN)/LOSS | 06/30/09 | No Ramp | 2.750% | 21 | $72,597,933 | $4,982,970 | $72,525,364 | $5,118,919 | $72,307,088 | $5,184,084 |
| GOLDEN HANDSHAKE | 06/30/10 | No Ramp | 2.750% | 12 | $12,035,349 | $1,152,531 | $11,685,636 | $1,183,688 | $11,279,214 | $1,203,256 |
| SPECIAL (GAIN)/LOSS | 06/30/10 | No Ramp | 2.750% | 22 | $57,796,351 | $3,868,698 | $57,840,283 | $3,974,333 | $57,778,021 | $4,023,362 |
| ASSUMPTION CHANGE | 06/30/11 | No Ramp | 2.750% | 13 | $43,259,638 | $3,939,515 | $42,212,747 | $4,046,149 | $40,982,270 | $4,111,251 |
| SPECIAL (GAIN)/LOSS | 06/30/11 | No Ramp | 2.750% | 23 | $63,273,970 | $4,136,994 | $63,423,809 | $4,250,044 | $63,467,195 | $4,300,829 |
| PAYMENT (GAIN)/LOSS | 06/30/12 | No Ramp | 2.750% | 24 | $(36,286,555) | $(2,320,796) | $(36,425,963) | $(2,384,264) | $(36,509,479) | $(2,411,846) |
| (GAIN)/LOSS | 06/30/12 | No Ramp | 2.750% | 24 | $(5,179,068) | $(331,240) | $(5,198,966) | $(340,299) | $(5,210,885) | $(344,235) |
| (GAIN)/LOSS | 06/30/13 | 100% → | 2.750% | 25 | $374,958,119 | $19,881,592 | $380,639,509 | $25,532,144 | $380,873,619 | $25,837,318 |
| ASSUMPTION CHANGE | 06/30/14 | 100% → | 2.750% | 16 | $203,827,470 | $11,213,441 | $206,496,119 | $15,358,001 | $205,064,408 | $19,499,411 |
| (GAIN)/LOSS | 06/30/14 | 100% → | 2.750% | 26 | $(208,341,700) | $(8,305,231) | $(214,334,621) | $(11,377,339) | $(217,569,234) | $(14,387,176) |
| (GAIN)/LOSS | 06/30/15 | 80% ↗ | 2.750% | 27 | $190,630,272 | $5,143,908 | $198,653,491 | $7,927,946 | $204,358,505 | $10,688,784 |
| ASSUMPTION CHANGE | 06/30/16 | 60% ↗ | 2.750% | 18 | $67,522,654 | $1,274,165 | $70,931,233 | $2,618,129 | $73,188,206 | $3,984,721 |
| (GAIN)/LOSS | 06/30/16 | 60% ↗ | 2.750% | 28 | $188,919,045 | $2,621,568 | $199,431,607 | $5,387,608 | $207,818,835 | $8,167,002 |
| ASSUMPTION CHANGE | 06/30/17 | 40% ↗ | 2.750% | 19 | $65,180,760 | $(5,619,965) | $75,556,750 | $1,427,118 | $79,369,500 | $2,894,242 |
| (GAIN)/LOSS | 06/30/17 | 40% ↗ | 2.750% | 29 | $(95,413,584) | $0 | $(102,092,535) | $(1,418,387) | $(107,771,821) | $(2,864,755) |
| METHOD CHANGE | 06/30/18 | 20% ↗ | 2.750% | 20 | $17,663,755 | $(105,016) | $19,008,847 | $(107,904) | $20,451,083 | $381,303 |
| ASSUMPTION CHANGE | 06/30/18 | 20% ↗ | 2.750% | 20 | $110,697,660 | $(4,251,566) | $122,844,350 | $(4,368,484) | $135,962,249 | $2,534,966 |
| (GAIN)/LOSS | 06/30/18 | 20% ↗ | 2.750% | 30 | $(47,032,058) | $0 | $(50,324,302) | $0 | $(53,847,003) | $(735,433) |
| **TOTAL** | | | | | **$1,089,696,531** | **$38,813,491** | **$1,125,826,300** | **$58,400,589** | **$1,144,224,104** | **$73,668,397** |

# Amortization Schedule and Alternatives

The amortization schedule on the previous page shows the minimum contributions required according to CalPERS amortization policy. There has been considerable interest from many agencies in paying off these unfunded accrued liabilities sooner and the possible savings in doing so. As a result, we have provided alternate amortization schedules to help analyze the current amortization schedule and illustrate the advantages of accelerating unfunded liability payments.

Shown on the following page are future year amortization payments based on 1) the current amortization schedule reflecting the individual bases and remaining periods shown on the previous page, and 2) alternate "fresh start" amortization schedules using two sample periods that would both result in interest savings relative to the current amortization schedule. Note that the payments under each alternate scenario increase by 2.75 percent per year.

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

- A positive total unfunded liability with a negative total payment,
- A negative total unfunded liability with a positive total payment, or
- Total payments that completely amortize the unfunded liability over a very short period of time

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

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

# Amortization Schedule and Alternatives

| | Current Amortization Schedule | | Alternate Schedules: 15 Year Amortization | | Alternate Schedules: 10 Year Amortization | |
|---|---|---|---|---|---|---|
| **Date** | **Balance** | **Payment** | **Balance** | **Payment** | **Balance** | **Payment** |
| **6/30/2020** | 1,144,224,104 | 73,668,397 | 1,144,224,104 | 103,201,823 | 1,144,224,104 | 141,082,452 |
| **6/30/2021** | 1,148,116,610 | 84,857,878 | 1,117,566,995 | 106,039,873 | 1,078,382,968 | 144,962,219 |
| **6/30/2022** | 1,140,707,099 | 93,785,886 | 1,086,108,187 | 108,955,970 | 1,003,919,690 | 148,948,681 |
| **6/30/2023** | 1,123,543,720 | 98,746,738 | 1,049,430,828 | 111,952,259 | 920,120,355 | 153,044,769 |
| **6/30/2024** | 1,100,047,359 | 103,893,080 | 1,007,086,669 | 115,030,946 | 826,218,040 | 157,253,500 |
| **6/30/2025** | 1,069,582,838 | 106,750,139 | 958,593,800 | 118,194,297 | 721,389,017 | 161,577,972 |
| **6/30/2026** | 1,034,030,434 | 109,685,766 | 903,434,234 | 121,444,640 | 604,748,695 | 166,021,366 |
| **6/30/2027** | 992,952,726 | 112,702,128 | 841,051,318 | 124,784,368 | 475,347,267 | 170,586,953 |
| **6/30/2028** | 945,879,429 | 115,801,434 | 770,846,956 | 128,215,938 | 332,165,059 | 175,278,095 |
| **6/30/2029** | 892,305,054 | 118,985,974 | 692,178,646 | 131,741,876 | 174,107,542 | 180,098,242 |
| **6/30/2030** | 831,686,356 | 122,258,090 | 604,356,294 | 135,364,778 | | |
| **6/30/2031** | 763,439,652 | 122,956,430 | 506,638,820 | 139,087,309 | | |
| **6/30/2032** | 689,693,308 | 119,270,991 | 398,230,505 | 142,912,210 | | |
| **6/30/2033** | 614,596,967 | 111,152,178 | 278,277,101 | 146,842,296 | | |
| **6/30/2034** | 542,642,048 | 106,565,381 | 145,861,646 | 150,880,459 | | |
| **6/30/2035** | 470,394,905 | 99,468,383 | | | | |
| **6/30/2036** | 400,431,653 | 87,399,176 | | | | |
| **6/30/2037** | 338,055,459 | 80,775,977 | | | | |
| **6/30/2038** | 278,164,019 | 73,722,407 | | | | |
| **6/30/2039** | 221,376,450 | 68,443,788 | | | | |
| **6/30/2040** | 166,073,997 | 65,954,225 | | | | |
| **6/30/2041** | 109,475,597 | 49,469,119 | | | | |
| **6/30/2042** | 65,967,634 | 39,362,172 | | | | |
| **6/30/2043** | 29,868,822 | 23,156,969 | | | | |
| **6/30/2044** | 8,005,885 | 8,281,352 | | | | |
| **6/30/2045** | | | | | | |
| **6/30/2046** | | | | | | |
| **6/30/2047** | | | | | | |
| **6/30/2048** | | | | | | |
| **6/30/2049** | | | | | | |
| **Total** | | **2,197,114,058** | | **1,884,649,042** | | **1,598,854,249** |
| **Interest Paid** | | **1,052,889,954** | | **740,424,938** | | **454,630,145** |
| **Estimated Savings** | | | | **312,465,016** | | **598,259,809** |

# Reconciliation of Required Employer Contributions

**Normal Cost (% of Payroll)**

| | |
|---|---|
| 1. For Period 7/1/19 – 6/30/20 | |
| a) Employer Normal Cost | 19.853% |
| b) Employee Contribution | 9.331% |
| c) Total Normal Cost | 29.184% |
| | |
| 2. Changes since the prior year annual valuation | |
| a) Effect of changes in demographics results | (0.026%) |
| b) Effect of plan changes | 0.000% |
| c) Effect of changes in assumptions | 1.336% |
| d) Effect of method changes | 0.033% |
| e) Net effect of the changes above [sum of (a) through (d)] | 1.343% |
| | |
| 3. For Period 7/1/20 – 6/30/21 | |
| a) Employer Normal Cost | 21.095% |
| b) Employee Contribution | 9.432% |
| c) Total Normal Cost | 30.527% |
| | |
| Employer Normal Cost Change [(3a) – (1a)] | 1.242% |
| Employee Contribution Change [(3b) – (1b)] | 0.101% |

**Unfunded Liability Contribution ($)**

| | |
|---|---|
| 1. For Period 7/1/19 – 6/30/20 | 62,876,977 |
| | |
| 2. Changes since the prior year annual valuation | |
| a) Effect of (gain)/loss during prior year[1] | (735,433) |
| b) Effect of plan changes | 0 |
| c) Effect of changes in assumptions[2] | 2,534,966 |
| d) Changes to prior year amortization payments[3] | 8,610,584 |
| e) Effect of changes due to Fresh Start | 0 |
| f) Effect of elimination of amortization base | 0 |
| g) Effect of method change[2] | 381,303 |
| h) Net effect of the changes above [sum of (a) through (g)] | 10,791,420 |
| | |
| 3. For Period 7/1/20 – 6/30/21 [(1) + (2h)] | 73,668,397 |

The amounts shown for the period 7/1/19 – 6/30/20 may be different if a prepayment of unfunded actuarial liability is made or a plan change became effective after the prior year's actuarial valuation was performed.

[1] The unfunded liability contribution for the (gain)/loss during the year prior to the valuation date is 20 percent of the "full" annual requirement due to the 5-year ramp. Increases to this amount that occur during the ramp period will be included in line d) in future years. This line item also captures the impact of any additional discretionary payment during the fiscal year.

[2] The unfunded liability contribution for the change in assumptions or method is 20 percent of the "full" annual requirement due to the 5-year ramp. Increases to this amount that occur during the ramp period will be included in line d) in future years.

[3] Includes changes due to 5-year ramp, payroll growth assumption, and re-amortization under new discount rate.

# Employer Contribution History

The table below provides a recent history of the required employer contributions for the plan, as determined by the annual actuarial valuation. It does not account for prepayments or benefit changes made during a fiscal year.

| Fiscal Year | Employer Normal Cost | Unfunded Rate | Unfunded Liability Payment ($) |
|---|---|---|---|
| 2013 - 14 | 17.504% | 5.864% | N/A |
| 2014 - 15 | 16.564% | 5.335% | N/A |
| 2015 - 16 | 16.729% | 6.856% | N/A |
| 2016 - 17 | 18.321% | 8.249% | N/A |
| 2017 - 18 | 17.912% | N/A | 35,778,888 |
| 2018 - 19 | 18.464% | N/A | 48,790,038 |
| 2019 - 20 | 19.853% | N/A | 62,876,977 |
| 2020 - 21 | 21.095% | N/A | 73,668,397 |

# Funding History

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

| Valuation Date | Accrued Liability | Market Value of Assets (MVA) | Unfunded Liability | Funded Ratio | Annual Covered Payroll |
|---|---|---|---|---|---|
| 06/30/11 | $ 2,032,001,280 | $ 1,565,799,198 | $ 466,202,082 | 77.1% | $ 273,169,605 |
| 06/30/12 | 2,086,406,405 | 1,567,404,726 | 519,001,679 | 75.1% | 261,703,717 |
| 06/30/13 | 2,285,586,497 | 1,776,122,369 | 509,464,128 | 77.7% | 271,367,032 |
| 06/30/14 | 2,615,686,777 | 2,098,296,808 | 517,389,969 | 80.2% | 295,171,068 |
| 06/30/15 | 2,846,014,858 | 2,140,637,485 | 705,377,373 | 75.2% | 319,499,129 |
| 06/30/16 | 3,110,254,402 | 2,151,981,845 | 958,272,557 | 69.2% | 338,809,025 |
| 06/30/17 | 3,361,565,098 | 2,394,890,161 | 966,674,937 | 71.2% | 328,400,573 |
| 06/30/18 | 3,676,571,381 | 2,586,874,850 | 1,089,696,531 | 70.4% | 309,713,827 |

# Risk Analysis

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

# 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 five investment return scenarios assumed to occur during the next four fiscal years (2018-19, 2019-20, 2020-21 and 2021-22). 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.

For fiscal years 2018-19, 2019-20, 2020-21, and 2021-22 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.

These alternate investment returns were chosen based on stochastic analysis of possible future investment returns over the four-year period ending June 30, 2022. Using the expected returns and volatility of the asset classes in which the funds are invested, we produced five thousand stochastic outcomes for this period based on the recently completed Asset Liability Management process. We then selected annual returns that approximate the 5$^{th}$, 25$^{th}$, 50$^{th}$, 75$^{th}$, and 95$^{th}$ percentiles for these outcomes. For example, of all the 4-year outcomes generated in the stochastic analysis, approximately 25 percent of them had an average annual return of 4.0 percent or less.

Required contributions outside of this range are also possible. In particular, whereas 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.

| **Assumed Annual Return From 2018-19 through 2021-22** | **Projected Employer Contributions** | | | |
|---|---|---|---|---|
| | **2021-22** | **2022-23** | **2023-24** | **2024-25** |
| **1.0%** | | | | |
| Normal Cost | 21.1% | 21.1% | 21.1% | 21.1% |
| UAL Contribution | $88,738,000 | $105,486,000 | $122,288,000 | $143,403,000 |
| **4.0%** | | | | |
| Normal Cost | 21.1% | 21.1% | 21.1% | 21.1% |
| UAL Contribution | $86,798,000 | $99,694,000 | $110,753,000 | $124,245,000 |
| **7.0%** | | | | |
| Normal Cost | 21.1% | 21.1% | 21.1% | 21.1% |
| UAL Contribution | $84,858,000 | $93,786,000 | $98,747,000 | $103,893,000 |
| **9.0%** | | | | |
| Normal Cost | 21.5% | 21.9% | 22.4% | 22.8% |
| UAL Contribution | $83,910,000 | $91,153,000 | $93,609,000 | $95,229,000 |
| **12.0%** | | | | |
| Normal Cost | 21.5% | 21.9% | 22.4% | 22.8% |
| UAL Contribution | $81,980,000 | $85,112,000 | $80,978,000 | $73,181,000 |

The projected normal cost percentages do not reflect that the normal cost will decline over time as new employees are hired into PEPRA or other lower cost benefit tiers. In addition, the projections above reflect the recent changes to the amortization policy effective with the June 30, 2019 valuation. The projections above do incorporate the impact of the CalPERS risk mitigation policy which reduces the discount when investment returns are above specified trigger points.

# Discount Rate Sensitivity

Shown below are various valuation results as of June 30, 2018 assuming alternate discount rates. Results are shown using the current discount rate of 7.0 percent as well as alternate discount rates of 6.0 percent and 8.0 percent. 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 or 8.0 percent over the long-term.

This type of analysis gives the reader a sense of the long-term risk to required contributions. For a measure of funded status that is appropriate for assessing the sufficiency of plan assets to cover estimated termination liabilities, please see "Hypothetical Termination Liability" at the end of this section.

| Sensitivity Analysis | | | | |
|---|---|---|---|---|
| **As of June 30, 2018** | **Plan's Normal Cost** | **Accrued Liability** | **Unfunded Accrued Liability** | **Funded Status** |
| 7.0% (current discount rate) | 30.527% | $3,676,571,381 | $1,089,696,531 | 70.4% |
| 6.0% | 38.990% | $4,242,541,677 | $1,655,666,827 | 61.0% |
| 8.0% | 24.167% | $3,217,915,920 | $631,041,070 | 80.4% |

# Mortality Rate Sensitivity

The following table looks at the change in the June 30, 2018 plan costs and funded ratio under two different longevity scenarios, namely assuming rates of mortality are 10 percent lower or 10 percent higher than our current mortality assumptions adopted in 2017. This type of analysis highlights the impact on the plan of improving or worsening mortality over the long-term.

| As of June 30, 2018 | Current Mortality | 10% Lower Mortality Rates | 10% Higher Mortality Rates |
|---|---|---|---|
| a) Accrued Liability | $3,676,571,381 | $3,730,674,454 | $3,626,246,220 |
| b) Market Value of Assets | $2,586,874,850 | $2,586,874,850 | $2,586,874,850 |
| c) Unfunded Liability (Surplus) [(a)-(b)] | $1,089,696,531 | $1,143,799,604 | $1,039,371,370 |
| d) Funded Status | 70.4% | 69.3% | 71.3% |

A 10 percent increase (decrease) in assumed mortality rates over the long-term would result in approximately a 0.9 percentage point increase (decrease) to the funded ratio.

# Inflation Rate Sensitivity

The following analysis looks at the change in the June 30, 2018 plan costs and funded ratio under two different inflation rate scenarios, namely assuming the inflation rate is 1 percent lower or 1 percent higher than our current valuation inflation rate assumption of 2.50%, while holding the discount rate fixed at 7.0%. This type of analysis highlights the impact on the plan of increased or decreased inflation over the long-term.

| As of June 30, 2018 | Current Inflation Rate | -1% Inflation Rate | +1% Inflation Rate |
|---|---|---|---|
| a) Accrued Liability | $3,676,571,381 | $3,394,474,079 | $3,926,413,024 |
| b) Market Value of Assets | $2,586,874,850 | $2,586,874,850 | $2,586,874,850 |
| c) Unfunded Liability (Surplus) [(a)-(b)] | $1,089,696,531 | $807,599,229 | $1,339,538,174 |
| d) Funded Status | 70.4% | 76.2% | 65.9% |

A decrease of 1 percent in the inflation rate assumption (2.50 percent to 1.50 percent) reduces the Accrued Liability by 7.7 percent. However, a 1 percent increase in the inflation rate (2.50 percent to 3.50 percent) increases the Accrued Liability by 6.8 percent.

# Maturity Measures

As pension plans mature they become much more sensitive to risks than plans that are less mature. Understanding plan maturity and how it affects the ability of a pension plan to tolerate risk is important in understanding how the plan is impacted by investment return volatility, other economic variables and changes in longevity or other demographic assumptions. One way to look at the maturity level of CalPERS and its plans is to look at the ratio of a plan's retiree liability to its total liability. A pension plan in its infancy will have a very low ratio of retiree liability to total liability. As the plan matures, the ratio starts increasing. A mature plan will often have a ratio above 60-65 percent. For both CalPERS and other retirement systems in the United States, these ratios have been steadily increasing in recent years.

| **Ratio of Retiree Accrued Liability to Total Accrued Liability** | **June 30, 2017** | **June 30, 2018** |
|---|---|---|
| 1. Retiree Accrued Liability | 1,712,209,862 | 1,996,293,279 |
| 2. Total Accrued Liability | 3,361,565,098 | 3,676,571,381 |
| 3. Ratio of Retiree AL to Total AL [(1) / (2)] | 51% | 54% |

Another way to look at the maturity level of CalPERS and its plans is to look at the ratio of actives to retirees. A pension plan in its infancy will have a very high ratio of active to retired members. As the plan matures, and members retire, the ratio starts declining. A mature plan will often have a ratio near or below one. The average support ratio for CalPERS public agency plans is 1.25.

| **Support Ratio** | **June 30, 2017** | **June 30, 2018** |
|---|---|---|
| 1. Number of Actives | 3,527 | 3,296 |
| 2. Number of Retirees | 2,554 | 2,739 |
| 3. Support Ratio [(1) / (2)] | 1.38 | 1.20 |

The actuarial calculations supplied in this communication are based on various 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 required employer contributions from one year to the next. Therefore, employer contributions will inevitably fluctuate, especially due to the ups and downs of investment returns.

### Asset Volatility Ratio (AVR)

Plans that have higher asset-to-payroll ratios experience more volatile employer contributions (as a percentage of payroll) 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 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 (LVR)

Plans that have higher liability-to-payroll ratios experience more volatile employer contributions (as a percentage of payroll) 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. The asset volatility ratio, described above, will tend to move closer to the liability volatility ratio as the plan matures.

| **Contribution Volatility** | **June 30, 2017** | **June 30, 2018** |
|---|---|---|

| | | | | |
|---|---|---|---|---|
| 1. Market Value of Assets without Receivables | $ | 2,388,741,816 | $ | 2,581,576,401 |
| 2. Payroll | | 328,400,573 | | 309,713,827 |
| 3. Asset Volatility Ratio (AVR) [(1) / (2)] | | 7.3 | | 8.3 |
| 4. Accrued Liability | $ | 3,361,565,098 | $ | 3,676,571,381 |
| 5. Liability Volatility Ratio (LVR) [(4) / (2)] | | 10.2 | | 11.9 |

# Hypothetical Termination Liability

The hypothetical termination liability is an estimate of the financial position of the plan had the contract with CalPERS been terminated as of June 30, 2018. The plan liability on a termination basis is calculated differently from the plan's ongoing funding liability. For this hypothetical termination liability calculation, both compensation and service are frozen as of the valuation date and no future pay increases or service accruals are assumed. This measure of funded status is not appropriate for assessing the need for future employer contributions in the case of an ongoing plan, that is, for an employer that continues to provide CalPERS retirement benefits to active employees.

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

The effective termination discount rate will depend on actual market rates of return for risk-free securities on the date of termination. As market discount rates are variable the table below shows a range for the hypothetical termination liability based on the lowest and highest interest rates observed during an approximate 2-year period centered around the valuation date.

| Market Value of Assets (MVA) | Hypothetical Termination Liability[1,2] @ 2.50% | Funded Status | Unfunded Termination Liability @ 2.50% | Hypothetical Termination Liability[1,2] @ 3.25% | Funded Status | Unfunded Termination Liability @ 3.25% |
|---|---|---|---|---|---|---|
| $2,586,874,850 | $6,446,686,351 | 40.1% | $3,859,811,501 | $5,783,243,838 | 44.7% | $3,196,368,988 |

[1] The hypothetical liabilities calculated above include a 5 percent contingency load in accordance with Board policy. Other actuarial assumptions can be found in Appendix A.

[2] The current discount rate assumption used for termination valuations is a weighted average of the 10-year and 30-year U.S. Treasury yields where the weights are based on matching asset and liability durations as of the termination date. The discount rates used in the table are based on 20-year Treasury bonds, rounded to the nearest quarter percentage point, which is a good proxy for most plans. The 20-year Treasury yield was 2.91 percent on June 30, 2018, and was 2.83 percent on January 31, 2019.

In order to terminate the plan, you must first contact our Retirement Services Contract Unit to initiate a Resolution of Intent to Terminate. The completed Resolution will allow the plan actuary to give you a preliminary termination valuation with a more up-to-date estimate of the plan liabilities. CalPERS advises you to consult with the plan actuary before beginning this process.

# Plan's Major Benefit Provisions

# Plan's Major Benefit Options

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

| | Benefit Group | | | | | | |
|---|---|---|---|---|---|---|---|
| **Member Category** | Peace | Fire | Peace | Peace | Peace | Peace | Fire |
| **Demographics** | | | | | | | |
| Actives | Yes | No | No | Yes | Yes | Yes | No |
| Transfers/Separated | Yes | Yes | No | Yes | Yes | Yes | No |
| Receiving | Yes | Yes | Yes | Yes | No | Yes | Yes |
| **Benefit Provision** | | | | | | | |
| Benefit Formula | 3% @ 50 | 3% @ 50 | 2% @ 50 | 3% @ 50 | 2.7% @ 57 | 2% @ 50 | 2% @ 50 |
| Social Security Coverage | No | No | No | No | No | No | No |
| Full/Modified | Full | Full | Full | Full | Full | Full | Full |
| Employee Contribution Rate | 9.00% | 9.00% | 9.00% | 9.00% | 11.75% | 9.00% | 9.00% |
| Final Average Compensation Period | One Year | Three Year | One Year | One Year | Three Year | Three Year | Three Year |
| Sick Leave Credit | No | No | No | No | No | No | No |
| Non-Industrial Disability | Standard | Standard | Standard | Standard | Standard | Standard | Standard |
| Industrial Disability | Standard | Standard | Standard | Standard | Standard | Standard | Standard |
| Pre-Retirement Death Benefits | | | | | | | |
| Optional Settlement 2 | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 1959 Survivor Benefit Level | Indexed | Indexed | Indexed | Indexed | Indexed | Indexed | Indexed |
| Special | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Alternate (firefighters) | No | No | No | No | No | No | No |
| Post-Retirement Death Benefits | | | | | | | |
| Lump Sum | $500 | $500 | $500 | $500 | $500 | $500 | $500 |
| Survivor Allowance (PRSA) | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| COLA | 2% | 2% | 2% | 2% | 2% | 2% | 2% |

# Plan's Major Benefit Options

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

| | Benefit Group | | |
|---|---|---|---|
| **Member Category** | Peace | Peace | |
| **Demographics** | | | |
| Actives | No | No | |
| Transfers/Separated | No | No | |
| Receiving | Yes | Yes | |
| **Benefit Provision** | | | |
| Benefit Formula | 1/2 @ 55 | 2% @ 50 | |
| Social Security Coverage | No | No | |
| Full/Modified | Full | Full | |
| Employee Contribution Rate | N/A | 9.00% | |
| Final Average Compensation Period | Three Year | Three Year | |
| Sick Leave Credit | No | No | |
| Non-Industrial Disability | Standard | Standard | |
| Industrial Disability | Standard | Standard | |
| Pre-Retirement Death Benefits | | | |
| Optional Settlement 2 | No | No | |
| 1959 Survivor Benefit Level | Indexed | Indexed | |
| Special | Yes | Yes | |
| Alternate (firefighters) | No | No | |
| Post-Retirement Death Benefits | | | |
| Lump Sum | $500 | $500 | |
| Survivor Allowance (PRSA) | Yes | Yes | |
| COLA | 2% | 2% | |

# Appendices

- **Appendix A – Actuarial Methods and Assumptions**
- **Appendix B – Principal Plan Provisions**
- **Appendix C – Participant Data**
- **Appendix D – Normal Cost by Benefit Group and PEPRA Member Contribution Rates**
- **Appendix E – Glossary of Actuarial Terms**

# Appendix A

# Actuarial Methods and Assumptions

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

# Actuarial Data

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

# Actuarial Methods

### Actuarial Cost Method

The actuarial cost method used is the Entry Age 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 percentage of pay in each year from the member's entry age to their assumed retirement age on the valuation date. The cost allocated to the current fiscal year is called the normal cost.

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

### 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, 2013 valuation, all new gains or losses are amortized over a fixed 30-year period with a 5-year ramp up at the beginning and a 5-year ramp down at the end of the amortization period. All changes in liability due to plan amendments (other than golden handshakes) are amortized over a 20-year period with no ramp. Changes in actuarial assumptions or changes in actuarial methodology are amortized over a 20-year period with a 5-year ramp up at the beginning and a 5-year ramp down at the end of the amortization period. Changes in unfunded accrued liability due to a Golden Handshake will be amortized over a period of five years. 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<br>- Active Plans<br>- Inactive Plans | <br>2.75%<br>0% | <br>2.75%<br>0% | <br>2.75%<br>0% | <br>2.75%<br>0% | <br>2.75%<br>0% |
| Ramp Up | 5 | 5 | 5 | 0 | 0 |

| | | | | | |
|---|---|---|---|---|---|
| Ramp Down | 5 | 5 | 5 | 0 | 0 |

The 5-year ramp up means that the payments in the first four years of the amortization period are 20 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:

- 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
- 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.

Exceptions for Inactive Plans:

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

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

**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 contributions. 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, 2013 valuations that set the employer contribution for Fiscal Year 2015-16, 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.

**PEPRA Normal Cost Rate Methodology**

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

Each non-pooled plan is stable with a sufficiently large demographic representation of active employees. 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 non-pooled plan until the number of members covered under the PEPRA formula meets either:

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

Once either of the conditions above is met for a non-pooled plan, the total PEPRA normal cost will be based on the active PEPRA population in the plan.

Accordingly, the total normal cost will be funded equally between employer and employee based on the demographics of the employees of that employer.

# 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.

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 2020-21 determined in this valuation were calculated using a discount rate of 7.00 percent. 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 7.00 percent compounded annually (net of investment and administrative expenses) as of June 30, 2018.

**Termination Liability Discount Rate**

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

The hypothetical termination liabilities in this report are calculated using an observed range of market interest rates. This range is based on the lowest and highest 20-year Treasury bond observed during an approximate 2-year period centered around the valuation date. The 20-year Treasury bond has a similar duration to most plan liabilities and serves as a good proxy for the termination discount rate. The 20-year Treasury yield was 2.83 percent on June 30, 2018.

**Salary Growth**

Annual increases vary by category, entry age, and duration of service. A sample of assumed increases are shown below. Wage inflation assumption in the valuation year (2.75% for 2018) is added to these factors for total salary growth.

**Public Agency Miscellaneous**

| Duration of Service | (Entry Age 20) | (Entry Age 30) | (Entry Age 40) |
|---|---|---|---|
| 0 | 0.0850 | 0.0775 | 0.0650 |
| 1 | 0.0690 | 0.0635 | 0.0525 |
| 2 | 0.0560 | 0.0510 | 0.0410 |
| 3 | 0.0470 | 0.0425 | 0.0335 |
| 4 | 0.0400 | 0.0355 | 0.0270 |
| 5 | 0.0340 | 0.0295 | 0.0215 |
| 10 | 0.0160 | 0.0135 | 0.0090 |
| 15 | 0.0120 | 0.0100 | 0.0060 |
| 20 | 0.0090 | 0.0075 | 0.0045 |
| 25 | 0.0080 | 0.0065 | 0.0040 |
| 30 | 0.0080 | 0.0065 | 0.0040 |

**Public Agency Fire**

| Duration of Service | (Entry Age 20) | (Entry Age 30) | (Entry Age 40) |
|---|---|---|---|
| 0 | 0.1700 | 0.1700 | 0.1700 |
| 1 | 0.1100 | 0.1100 | 0.1100 |
| 2 | 0.0700 | 0.0700 | 0.0700 |
| 3 | 0.0580 | 0.0580 | 0.0580 |
| 4 | 0.0473 | 0.0473 | 0.0473 |
| 5 | 0.0372 | 0.0372 | 0.0372 |
| 10 | 0.0165 | 0.0165 | 0.0165 |
| 15 | 0.0144 | 0.0144 | 0.0144 |
| 20 | 0.0126 | 0.0126 | 0.0126 |
| 25 | 0.0111 | 0.0111 | 0.0111 |
| 30 | 0.0097 | 0.0097 | 0.0097 |

**Public Agency Police**

| Duration of Service | (Entry Age 20) | (Entry Age 30) | (Entry Age 40) |
|---|---|---|---|
| 0 | 0.1027 | 0.1027 | 0.1027 |
| 1 | 0.0803 | 0.0803 | 0.0803 |
| 2 | 0.0628 | 0.0628 | 0.0628 |
| 3 | 0.0491 | 0.0491 | 0.0491 |
| 4 | 0.0384 | 0.0384 | 0.0384 |
| 5 | 0.0300 | 0.0300 | 0.0300 |
| 10 | 0.0145 | 0.0145 | 0.0145 |
| 15 | 0.0150 | 0.0150 | 0.0150 |
| 20 | 0.0155 | 0.0155 | 0.0155 |
| 25 | 0.0160 | 0.0160 | 0.0160 |
| 30 | 0.0165 | 0.0165 | 0.0165 |

**Salary Growth** (continued)

**Public Agency County Peace Officers**

| Duration of Service | (Entry Age 20) | (Entry Age 30) | (Entry Age 40) |
|---|---|---|---|
| 0 | 0.1320 | 0.1320 | 0.1320 |
| 1 | 0.0960 | 0.0960 | 0.0960 |
| 2 | 0.0657 | 0.0657 | 0.0657 |
| 3 | 0.0525 | 0.0525 | 0.0525 |
| 4 | 0.0419 | 0.0419 | 0.0419 |
| 5 | 0.0335 | 0.0335 | 0.0335 |
| 10 | 0.0170 | 0.0170 | 0.0170 |
| 15 | 0.0150 | 0.0150 | 0.0150 |
| 20 | 0.0150 | 0.0150 | 0.0150 |
| 25 | 0.0175 | 0.0175 | 0.0175 |
| 30 | 0.0200 | 0.0200 | 0.0200 |

**Schools**

| Duration of Service | (Entry Age 20) | (Entry Age 30) | (Entry Age 40) |
|---|---|---|---|
| 0 | 0.0428 | 0.0419 | 0.0380 |
| 1 | 0.0428 | 0.0419 | 0.0380 |
| 2 | 0.0428 | 0.0419 | 0.0380 |
| 3 | 0.0354 | 0.0332 | 0.0280 |
| 4 | 0.0305 | 0.0279 | 0.0224 |
| 5 | 0.0262 | 0.0234 | 0.0180 |
| 10 | 0.0171 | 0.0154 | 0.0112 |
| 15 | 0.0152 | 0.0134 | 0.0098 |
| 20 | 0.0135 | 0.0117 | 0.0086 |
| 25 | 0.0120 | 0.0103 | 0.0076 |
| 30 | 0.0087 | 0.0071 | 0.0048 |

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

**Overall Payroll Growth**

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

**Inflation**

2.50 percent compounded annually.

**Non-valued Potential Additional Liabilities**

The potential liability loss for a cost-of-living increase exceeding the 2.50 percent inflation assumption and any potential liability loss from future member service purchases are not reflected in the valuation.

***Miscellaneous Loading Factors***

**Credit for Unused Sick Leave**

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

### Conversion of Employer Paid Member Contributions (EPMC)

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

### Norris Decision (Best Factors)

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

### Termination Liability

The termination liabilities include a 5 percent contingency load. This load is for unforeseen negative experience.

## *Demographic Assumptions*

### Pre-Retirement Mortality

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

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

Miscellaneous plans usually have industrial death rates set to zero unless the agency has specifically contracted for industrial death benefits. If so, each non-industrial death rate shown above will be split into two components; 99 percent will become the non-industrial death rate and 1 percent will become the industrial death rate.

**Post-Retirement Mortality**

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

| | Healthy Recipients | | Non-Industrially Disabled (Not Job-Related) | | Industrially Disabled (Job-Related) | |
|---|---|---|---|---|---|---|
| Age | Male | Female | Male | Female | Male | Female |
| 50 | 0.00372 | 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, a percentage who are married upon retirement is assumed according to member category as shown in the following table.

| Member Category | Percent Married |
|---|---|
| Miscellaneous Member | 70% |
| Local Police | 85% |
| Local Fire | 90% |
| Other Local Safety | 70% |
| School Police | 85% |
| Local County Peace Officers | 75% |

**Age of Spouse**

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

**Terminated Members**

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

**Termination with Refund**

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

**Public Agency Miscellaneous**

| Duration of Service | Entry Age 20 | Entry Age 25 | Entry Age 30 | Entry Age 35 | Entry Age 40 | Entry Age 45 |
|---|---|---|---|---|---|---|
| 0 | 0.1742 | 0.1674 | 0.1606 | 0.1537 | 0.1468 | 0.1400 |
| 1 | 0.1545 | 0.1477 | 0.1409 | 0.1339 | 0.1271 | 0.1203 |
| 2 | 0.1348 | 0.1280 | 0.1212 | 0.1142 | 0.1074 | 0.1006 |
| 3 | 0.1151 | 0.1083 | 0.1015 | 0.0945 | 0.0877 | 0.0809 |
| 4 | 0.0954 | 0.0886 | 0.0818 | 0.0748 | 0.0680 | 0.0612 |
| 5 | 0.0212 | 0.0193 | 0.0174 | 0.0155 | 0.0136 | 0.0116 |
| 10 | 0.0138 | 0.0121 | 0.0104 | 0.0088 | 0.0071 | 0.0055 |
| 15 | 0.0060 | 0.0051 | 0.0042 | 0.0032 | 0.0023 | 0.0014 |
| 20 | 0.0037 | 0.0029 | 0.0021 | 0.0013 | 0.0005 | 0.0001 |
| 25 | 0.0017 | 0.0011 | 0.0005 | 0.0001 | 0.0001 | 0.0001 |
| 30 | 0.0005 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 |
| 35 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 |

**Public Agency Safety**

| Duration of Service | Fire | Police | County Peace Officer |
|---|---|---|---|
| 0 | 0.1298 | 0.1013 | 0.1188 |
| 1 | 0.0674 | 0.0636 | 0.0856 |
| 2 | 0.0320 | 0.0271 | 0.0617 |
| 3 | 0.0237 | 0.0258 | 0.0445 |
| 4 | 0.0087 | 0.0245 | 0.0321 |
| 5 | 0.0052 | 0.0086 | 0.0121 |
| 10 | 0.0005 | 0.0053 | 0.0053 |
| 15 | 0.0004 | 0.0027 | 0.0025 |
| 20 | 0.0003 | 0.0017 | 0.0012 |
| 25 | 0.0002 | 0.0012 | 0.0005 |
| 30 | 0.0002 | 0.0009 | 0.0003 |
| 35 | 0.0001 | 0.0009 | 0.0002 |

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

**Schools**

| Duration of Service | Entry Age 20 | Entry Age 25 | Entry Age 30 | Entry Age 35 | Entry Age 40 | Entry Age 45 |
|---|---|---|---|---|---|---|
| 0 | 0.2107 | 0.2107 | 0.1827 | 0.1546 | 0.1375 | 0.1203 |
| 1 | 0.1807 | 0.1807 | 0.1526 | 0.1246 | 0.1105 | 0.0963 |
| 2 | 0.1526 | 0.1526 | 0.1259 | 0.0992 | 0.0878 | 0.0765 |
| 3 | 0.1266 | 0.1266 | 0.1023 | 0.0780 | 0.0691 | 0.0603 |
| 4 | 0.1026 | 0.1026 | 0.0815 | 0.0605 | 0.0537 | 0.0469 |
| 5 | 0.0808 | 0.0808 | 0.0634 | 0.0461 | 0.0409 | 0.0358 |
| 10 | 0.0202 | 0.0202 | 0.0157 | 0.0112 | 0.0087 | 0.0063 |
| 15 | 0.0107 | 0.0107 | 0.0077 | 0.0048 | 0.0034 | 0.0021 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 20 | 0.0056 | 0.0056 | 0.0037 | 0.0017 | 0.0016 | 0.0016 |
| 25 | 0.0026 | 0.0026 | 0.0018 | 0.0009 | 0.0012 | 0.0015 |
| 30 | 0.0013 | 0.0013 | 0.0011 | 0.0009 | 0.0012 | 0.0015 |
| 35 | 0.0008 | 0.0008 | 0.0009 | 0.0009 | 0.0012 | 0.0015 |

**Termination with Vested Benefits**

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

**Public Agency Miscellaneous**

| Duration of Service | Entry Age 20 | Entry Age 25 | Entry Age 30 | Entry Age 35 | Entry Age 40 |
|---|---|---|---|---|---|
| 5 | 0.0422 | 0.0422 | 0.0393 | 0.0364 | 0.0344 |
| 10 | 0.0278 | 0.0278 | 0.0271 | 0.0263 | 0.0215 |
| 15 | 0.0192 | 0.0192 | 0.0174 | 0.0156 | 0.0120 |
| 20 | 0.0139 | 0.0139 | 0.0109 | 0.0079 | 0.0047 |
| 25 | 0.0083 | 0.0083 | 0.0048 | 0.0014 | 0.0007 |
| 30 | 0.0015 | 0.0015 | 0.0007 | 0.0000 | 0.0000 |
| 35 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

**Public Agency Safety**

| Duration of Service | Fire | Police | County Peace Officer |
|---|---|---|---|
| 5 | 0.0094 | 0.0163 | 0.0187 |
| 10 | 0.0064 | 0.0126 | 0.0134 |
| 15 | 0.0048 | 0.0082 | 0.0092 |
| 20 | 0.0038 | 0.0065 | 0.0064 |
| 25 | 0.0026 | 0.0058 | 0.0042 |
| 30 | 0.0014 | 0.0056 | 0.0022 |
| 35 | 0.0000 | 0.0000 | 0.0000 |

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

**Schools**

| Duration of Service | Entry Age 20 | Entry Age 25 | Entry Age 30 | Entry Age 35 | Entry Age 40 |
|---|---|---|---|---|---|
| 5 | 0.0405 | 0.0405 | 0.0346 | 0.0288 | 0.0264 |
| 10 | 0.0324 | 0.0324 | 0.0280 | 0.0235 | 0.0211 |
| 15 | 0.0202 | 0.0202 | 0.0179 | 0.0155 | 0.0126 |
| 20 | 0.0144 | 0.0144 | 0.0114 | 0.0083 | 0.0042 |
| 25 | 0.0091 | 0.0091 | 0.0046 | 0.0000 | 0.0000 |
| 30 | 0.0015 | 0.0015 | 0.0007 | 0.0000 | 0.0000 |
| 35 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

**Non-Industrial (Not Job-Related) Disability**

Rates vary by age and gender for miscellaneous plans. Rates vary by age and category for safety plans.

| | Miscellaneous | | Fire | Police | County Peace Officer | Schools | |
|---|---|---|---|---|---|---|---|
| Age | Male | Female | Male and Female | Male and Female | Male and Female | Male | Female |
| 20 | 0.0002 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 |
| 25 | 0.0002 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 |
| 30 | 0.0002 | 0.0002 | 0.0001 | 0.0002 | 0.0001 | 0.0001 | 0.0002 |
| 35 | 0.0004 | 0.0007 | 0.0001 | 0.0003 | 0.0004 | 0.0005 | 0.0004 |
| 40 | 0.0010 | 0.0014 | 0.0001 | 0.0004 | 0.0007 | 0.0012 | 0.0008 |
| 45 | 0.0015 | 0.0019 | 0.0002 | 0.0005 | 0.0013 | 0.0020 | 0.0017 |
| 50 | 0.0016 | 0.0020 | 0.0005 | 0.0008 | 0.0018 | 0.0026 | 0.0022 |
| 55 | 0.0016 | 0.0015 | 0.0007 | 0.0013 | 0.0010 | 0.0025 | 0.0018 |
| 60 | 0.0015 | 0.0011 | 0.0007 | 0.0020 | 0.0006 | 0.0022 | 0.0011 |

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

**Industrial (Job-Related) Disability**

Rates vary by age and category.

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

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

**Service Retirement**

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

**Public Agency Miscellaneous 1.5% @ 65**

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

**Public Agency Miscellaneous 2% @ 60**

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

| | | | | | | |
|---|---|---|---|---|---|---|
| 67 | 0.140 | 0.178 | 0.215 | 0.264 | 0.321 | 0.377 |
| 68 | 0.112 | 0.142 | 0.172 | 0.211 | 0.257 | 0.302 |
| 69 | 0.112 | 0.142 | 0.172 | 0.211 | 0.257 | 0.302 |
| 70 | 0.140 | 0.178 | 0.215 | 0.264 | 0.321 | 0.377 |

**Service Retirement**

**Public Agency Miscellaneous 2% @ 55**

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

**Public Agency Miscellaneous 2.5% @ 55**

| | Duration of Service | | | | | |
|---|---|---|---|---|---|---|
| Age | 5 Years | 10 Years | 15 Years | 20 Years | 25 Years | 30 Years |
| 50 | 0.008 | 0.014 | 0.020 | 0.026 | 0.033 | 0.050 |
| 51 | 0.008 | 0.015 | 0.023 | 0.030 | 0.037 | 0.059 |
| 52 | 0.009 | 0.016 | 0.023 | 0.030 | 0.037 | 0.061 |
| 53 | 0.014 | 0.021 | 0.028 | 0.035 | 0.042 | 0.063 |
| 54 | 0.014 | 0.022 | 0.030 | 0.039 | 0.047 | 0.068 |
| 55 | 0.020 | 0.038 | 0.055 | 0.073 | 0.122 | 0.192 |
| 56 | 0.025 | 0.047 | 0.069 | 0.091 | 0.136 | 0.196 |
| 57 | 0.030 | 0.048 | 0.065 | 0.083 | 0.123 | 0.178 |
| 58 | 0.035 | 0.054 | 0.073 | 0.093 | 0.112 | 0.153 |
| 59 | 0.035 | 0.054 | 0.073 | 0.092 | 0.131 | 0.183 |
| 60 | 0.044 | 0.072 | 0.101 | 0.130 | 0.158 | 0.197 |
| 61 | 0.050 | 0.078 | 0.105 | 0.133 | 0.161 | 0.223 |
| 62 | 0.055 | 0.093 | 0.130 | 0.168 | 0.205 | 0.268 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 63 | 0.090 | 0.124 | 0.158 | 0.192 | 0.226 | 0.279 |
| 64 | 0.080 | 0.112 | 0.144 | 0.175 | 0.207 | 0.268 |
| 65 | 0.120 | 0.156 | 0.193 | 0.229 | 0.265 | 0.333 |
| 66 | 0.132 | 0.172 | 0.212 | 0.252 | 0.292 | 0.366 |
| 67 | 0.132 | 0.172 | 0.212 | 0.252 | 0.292 | 0.366 |
| 68 | 0.120 | 0.156 | 0.193 | 0.229 | 0.265 | 0.333 |
| 69 | 0.120 | 0.156 | 0.193 | 0.229 | 0.265 | 0.333 |
| 70 | 0.120 | 0.156 | 0.193 | 0.229 | 0.265 | 0.333 |

**Service Retirement**

**Public Agency Miscellaneous 2.7% @ 55**

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

**Public Agency Miscellaneous 3% @ 60**

| | Duration of Service | | | | | |
|---|---|---|---|---|---|---|
| Age | 5 Years | 10 Years | 15 Years | 20 Years | 25 Years | 30 Years |
| 50 | 0.013 | 0.019 | 0.026 | 0.042 | 0.038 | 0.064 |
| 51 | 0.035 | 0.037 | 0.039 | 0.052 | 0.047 | 0.062 |
| 52 | 0.023 | 0.030 | 0.038 | 0.055 | 0.051 | 0.056 |
| 53 | 0.025 | 0.032 | 0.040 | 0.057 | 0.056 | 0.066 |
| 54 | 0.035 | 0.042 | 0.050 | 0.067 | 0.066 | 0.076 |
| 55 | 0.040 | 0.052 | 0.064 | 0.085 | 0.095 | 0.120 |
| 56 | 0.043 | 0.056 | 0.070 | 0.094 | 0.102 | 0.150 |
| 57 | 0.045 | 0.060 | 0.074 | 0.099 | 0.109 | 0.131 |
| 58 | 0.053 | 0.056 | 0.059 | 0.099 | 0.126 | 0.185 |
| 59 | 0.050 | 0.068 | 0.085 | 0.113 | 0.144 | 0.202 |
| 60 | 0.089 | 0.106 | 0.123 | 0.180 | 0.226 | 0.316 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 61 | 0.100 | 0.117 | 0.133 | 0.212 | 0.230 | 0.298 |
| 62 | 0.130 | 0.155 | 0.180 | 0.248 | 0.282 | 0.335 |
| 63 | 0.120 | 0.163 | 0.206 | 0.270 | 0.268 | 0.352 |
| 64 | 0.150 | 0.150 | 0.150 | 0.215 | 0.277 | 0.300 |
| 65 | 0.200 | 0.242 | 0.283 | 0.330 | 0.300 | 0.342 |
| 66 | 0.220 | 0.264 | 0.308 | 0.352 | 0.379 | 0.394 |
| 67 | 0.250 | 0.279 | 0.309 | 0.338 | 0.371 | 0.406 |
| 68 | 0.170 | 0.196 | 0.223 | 0.249 | 0.290 | 0.340 |
| 69 | 0.220 | 0.261 | 0.302 | 0.344 | 0.378 | 0.408 |
| 70 | 0.220 | 0.255 | 0.291 | 0.326 | 0.358 | 0.388 |

**Service Retirement**

**Public Agency Miscellaneous 2% @ 62**

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

**Service Retirement**

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

| Age | Rate | Age | Rate |
|---|---|---|---|
| 50 | 0.0159 | 56 | 0.1108 |
| 51 | 0.0000 | 57 | 0.0000 |
| 52 | 0.0344 | 58 | 0.0950 |
| 53 | 0.0199 | 59 | 0.0441 |
| 54 | 0.0413 | 60 | 1.00000 |

| | |
|---|---|
| 55 | 0.0751 |

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

| Age | Rate | Age | Rate |
|---|---|---|---|
| 50 | 0.0255 | 56 | 0.0692 |
| 51 | 0.0000 | 57 | 0.0511 |
| 52 | 0.0164 | 58 | 0.0724 |
| 53 | 0.0272 | 59 | 0.0704 |
| 54 | 0.0095 | 60 | 0.3000 |
| 55 | 0.1667 | | |

**Service Retirement**

**Public Agency Police 2% @ 50**

| | Duration of Service | | | | | |
|---|---|---|---|---|---|---|
| Age | 5 Years | 10 Years | 15 Years | 20 Years | 25 Years | 30 Years |
| 50 | 0.050 | 0.050 | 0.050 | 0.050 | 0.050 | 0.100 |
| 51 | 0.040 | 0.040 | 0.040 | 0.040 | 0.058 | 0.094 |
| 52 | 0.040 | 0.040 | 0.040 | 0.040 | 0.061 | 0.087 |
| 53 | 0.040 | 0.040 | 0.040 | 0.040 | 0.082 | 0.123 |
| 54 | 0.040 | 0.040 | 0.040 | 0.046 | 0.098 | 0.158 |
| 55 | 0.072 | 0.072 | 0.072 | 0.096 | 0.141 | 0.255 |
| 56 | 0.066 | 0.066 | 0.066 | 0.088 | 0.129 | 0.228 |
| 57 | 0.060 | 0.060 | 0.060 | 0.080 | 0.118 | 0.213 |
| 58 | 0.080 | 0.080 | 0.080 | 0.088 | 0.138 | 0.228 |
| 59 | 0.080 | 0.080 | 0.080 | 0.092 | 0.140 | 0.228 |
| 60 | 0.150 | 0.150 | 0.150 | 0.150 | 0.150 | 0.228 |
| 61 | 0.144 | 0.144 | 0.144 | 0.144 | 0.144 | 0.170 |
| 62 | 0.150 | 0.150 | 0.150 | 0.150 | 0.150 | 0.213 |
| 63 | 0.150 | 0.150 | 0.150 | 0.150 | 0.150 | 0.213 |
| 64 | 0.150 | 0.150 | 0.150 | 0.150 | 0.150 | 0.319 |
| 65 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |

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

**Service Retirement**

**Public Agency Fire 2% @ 50**

| | Duration of Service | | | | | |
|---|---|---|---|---|---|---|
| Age | 5 Years | 10 Years | 15 Years | 20 Years | 25 Years | 30 Years |
| 50 | 0.009 | 0.009 | 0.009 | 0.009 | 0.013 | 0.020 |
| 51 | 0.013 | 0.013 | 0.013 | 0.013 | 0.020 | 0.029 |
| 52 | 0.018 | 0.018 | 0.018 | 0.018 | 0.028 | 0.042 |
| 53 | 0.052 | 0.052 | 0.052 | 0.052 | 0.079 | 0.119 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 54 | 0.067 | 0.067 | 0.067 | 0.067 | 0.103 | 0.154 |
| 55 | 0.089 | 0.089 | 0.089 | 0.089 | 0.136 | 0.204 |
| 56 | 0.083 | 0.083 | 0.083 | 0.083 | 0.127 | 0.190 |
| 57 | 0.082 | 0.082 | 0.082 | 0.082 | 0.126 | 0.189 |
| 58 | 0.088 | 0.088 | 0.088 | 0.088 | 0.136 | 0.204 |
| 59 | 0.074 | 0.074 | 0.074 | 0.074 | 0.113 | 0.170 |
| 60 | 0.100 | 0.100 | 0.100 | 0.100 | 0.154 | 0.230 |
| 61 | 0.072 | 0.072 | 0.072 | 0.072 | 0.110 | 0.165 |
| 62 | 0.099 | 0.099 | 0.099 | 0.099 | 0.152 | 0.228 |
| 63 | 0.114 | 0.114 | 0.114 | 0.114 | 0.175 | 0.262 |
| 64 | 0.114 | 0.114 | 0.114 | 0.114 | 0.175 | 0.262 |
| 65 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |

**Service Retirement**

**Public Agency Police 3% @ 55**

| | Duration of Service | | | | | |
|---|---|---|---|---|---|---|
| Age | 5 Years | 10 Years | 15 Years | 20 Years | 25 Years | 30 Years |
| 50 | 0.035 | 0.035 | 0.035 | 0.035 | 0.070 | 0.090 |
| 51 | 0.028 | 0.028 | 0.028 | 0.029 | 0.065 | 0.101 |
| 52 | 0.032 | 0.032 | 0.032 | 0.039 | 0.066 | 0.109 |
| 53 | 0.028 | 0.028 | 0.028 | 0.043 | 0.075 | 0.132 |
| 54 | 0.038 | 0.038 | 0.038 | 0.074 | 0.118 | 0.333 |
| 55 | 0.070 | 0.070 | 0.070 | 0.120 | 0.175 | 0.340 |
| 56 | 0.060 | 0.060 | 0.060 | 0.110 | 0.165 | 0.330 |
| 57 | 0.060 | 0.060 | 0.060 | 0.110 | 0.165 | 0.320 |
| 58 | 0.080 | 0.080 | 0.080 | 0.100 | 0.185 | 0.350 |
| 59 | 0.090 | 0.090 | 0.095 | 0.130 | 0.185 | 0.350 |
| 60 | 0.150 | 0.150 | 0.150 | 0.150 | 0.185 | 0.350 |
| 61 | 0.120 | 0.120 | 0.120 | 0.120 | 0.160 | 0.350 |
| 62 | 0.150 | 0.150 | 0.150 | 0.150 | 0.200 | 0.350 |
| 63 | 0.150 | 0.150 | 0.150 | 0.150 | 0.200 | 0.400 |
| 64 | 0.150 | 0.150 | 0.150 | 0.150 | 0.175 | 0.350 |
| 65 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |

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

**Service Retirement**

**Public Agency Fire 3% @ 55**

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

**Service Retirement**

**Public Agency Police 3% @ 50**

| Age | Duration of Service 5 Years | 10 Years | 15 Years | 20 Years | 25 Years | 30 Years |
|---|---|---|---|---|---|---|
| 50 | 0.050 | 0.050 | 0.050 | 0.100 | 0.155 | 0.400 |
| 51 | 0.040 | 0.040 | 0.040 | 0.090 | 0.140 | 0.380 |
| 52 | 0.040 | 0.040 | 0.040 | 0.070 | 0.115 | 0.350 |
| 53 | 0.040 | 0.040 | 0.040 | 0.080 | 0.135 | 0.350 |
| 54 | 0.040 | 0.040 | 0.040 | 0.090 | 0.145 | 0.350 |
| 55 | 0.070 | 0.070 | 0.070 | 0.120 | 0.175 | 0.340 |
| 56 | 0.060 | 0.060 | 0.060 | 0.110 | 0.165 | 0.330 |
| 57 | 0.060 | 0.060 | 0.060 | 0.110 | 0.165 | 0.320 |
| 58 | 0.080 | 0.080 | 0.080 | 0.100 | 0.185 | 0.350 |
| 59 | 0.090 | 0.090 | 0.095 | 0.130 | 0.185 | 0.350 |
| 60 | 0.150 | 0.150 | 0.150 | 0.150 | 0.185 | 0.350 |
| 61 | 0.120 | 0.120 | 0.120 | 0.120 | 0.160 | 0.350 |
| 62 | 0.150 | 0.150 | 0.150 | 0.150 | 0.200 | 0.350 |
| 63 | 0.150 | 0.150 | 0.150 | 0.150 | 0.200 | 0.400 |
| 64 | 0.150 | 0.150 | 0.150 | 0.150 | 0.175 | 0.350 |
| 65 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |

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

**Service Retirement**

**Public Agency Fire 3% @ 50**

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

**Service Retirement**

**Public Agency Police 2% @ 57**

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

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

**Service Retirement**

**Public Agency Fire 2% @ 57**

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

**Service Retirement**

**Public Agency Police 2.5% @ 57**

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

| | | | | | | |
|---|---|---|---|---|---|---|
| 64 | 0.135 | 0.135 | 0.135 | 0.135 | 0.135 | 0.287 |
| 65 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |

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

**Service Retirement**

**Public Agency Fire 2.5% @ 57**

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

**Service Retirement**

**Public Agency Police 2.7% @ 57**

| | Duration of Service | | | | | |
|---|---|---|---|---|---|---|
| Age | 5 Years | 10 Years | 15 Years | 20 Years | 25 Years | 30 Years |
| 50 | 0.0500 | 0.0500 | 0.0500 | 0.0500 | 0.0500 | 0.1000 |
| 51 | 0.0400 | 0.0400 | 0.0400 | 0.0400 | 0.0575 | 0.0942 |
| 52 | 0.0380 | 0.0380 | 0.0380 | 0.0380 | 0.0580 | 0.0825 |
| 53 | 0.0380 | 0.0380 | 0.0380 | 0.0380 | 0.0774 | 0.1169 |
| 54 | 0.0380 | 0.0380 | 0.0380 | 0.0437 | 0.0931 | 0.1497 |
| 55 | 0.0684 | 0.0684 | 0.0684 | 0.0912 | 0.1340 | 0.2423 |
| 56 | 0.0627 | 0.0627 | 0.0627 | 0.0836 | 0.1228 | 0.2168 |
| 57 | 0.0600 | 0.0600 | 0.0600 | 0.0800 | 0.1175 | 0.2125 |
| 58 | 0.0800 | 0.0800 | 0.0800 | 0.0880 | 0.1375 | 0.2275 |
| 59 | 0.0800 | 0.0800 | 0.0800 | 0.0920 | 0.1400 | 0.2275 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 60 | 0.1500 | 0.1500 | 0.1500 | 0.1500 | 0.1500 | 0.2275 |
| 61 | 0.1440 | 0.1440 | 0.1440 | 0.1440 | 0.1440 | 0.1700 |
| 62 | 0.1500 | 0.1500 | 0.1500 | 0.1500 | 0.1500 | 0.2125 |
| 63 | 0.1500 | 0.1500 | 0.1500 | 0.1500 | 0.1500 | 0.2125 |
| 64 | 0.1500 | 0.1500 | 0.1500 | 0.1500 | 0.1500 | 0.3188 |
| 65 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |

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

**Service Retirement**

**Public Agency Fire 2.7% @ 57**

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

**Service Retirement**

**Schools 2% @ 55**

| | Duration of Service | | | | | |
|---|---|---|---|---|---|---|
| Age | 5 Years | 10 Years | 15 Years | 20 Years | 25 Years | 30 Years |
| 50 | 0.004 | 0.007 | 0.011 | 0.012 | 0.013 | 0.015 |
| 51 | 0.004 | 0.008 | 0.011 | 0.014 | 0.016 | 0.017 |
| 52 | 0.005 | 0.010 | 0.014 | 0.016 | 0.018 | 0.021 |
| 53 | 0.006 | 0.012 | 0.016 | 0.020 | 0.022 | 0.025 |
| 54 | 0.008 | 0.017 | 0.023 | 0.027 | 0.031 | 0.034 |
| 55 | 0.021 | 0.042 | 0.058 | 0.069 | 0.077 | 0.086 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 56 | 0.019 | 0.037 | 0.053 | 0.062 | 0.069 | 0.078 |
| 57 | 0.019 | 0.038 | 0.054 | 0.064 | 0.071 | 0.079 |
| 58 | 0.022 | 0.045 | 0.062 | 0.074 | 0.082 | 0.092 |
| 59 | 0.025 | 0.049 | 0.069 | 0.082 | 0.090 | 0.101 |
| 60 | 0.033 | 0.066 | 0.092 | 0.109 | 0.121 | 0.135 |
| 61 | 0.037 | 0.072 | 0.101 | 0.119 | 0.133 | 0.149 |
| 62 | 0.066 | 0.131 | 0.184 | 0.218 | 0.242 | 0.271 |
| 63 | 0.064 | 0.126 | 0.178 | 0.209 | 0.233 | 0.261 |
| 64 | 0.059 | 0.117 | 0.163 | 0.193 | 0.215 | 0.240 |
| 65 | 0.080 | 0.158 | 0.221 | 0.261 | 0.291 | 0.326 |
| 66 | 0.081 | 0.160 | 0.224 | 0.265 | 0.296 | 0.330 |
| 67 | 0.070 | 0.139 | 0.194 | 0.229 | 0.255 | 0.286 |
| 68 | 0.063 | 0.124 | 0.173 | 0.205 | 0.228 | 0.255 |
| 69 | 0.066 | 0.130 | 0.183 | 0.216 | 0.241 | 0.270 |
| 70 | 0.071 | 0.140 | 0.196 | 0.231 | 0.258 | 0.289 |

# Miscellaneous

### Internal Revenue Code Section 415

The limitations on benefits imposed by Internal Revenue Code Section 415 are taken into account in this valuation. Each year the impact of any changes in this limitation since the prior valuation is included and amortized as part of the actuarial gain or loss base. This results in lower contributions for those employers contributing to the Replacement Benefit Fund and protects CalPERS from prefunding expected benefits in excess of limits imposed by federal tax law. The Section 415 dollar limit for the 2018 calendar year is $220,000.

### Internal Revenue Code Section 401(a) (17)

The limitations on compensation imposed by Internal Revenue Code Section 401(a) (17) are taken into account in this valuation. Each year, the impact of any changes in the compensation limitation since the prior valuation is included and amortized as part of the actuarial gain or loss base. The compensation limit for classic members for the 2018 calendar year is $275,000.

# Appendix B

## Principal Plan Provisions

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

# Service Retirement

### Eligibility

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

### Benefit

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

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

**Miscellaneous Plan Formulas**

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

## Safety Plan Formulas

| Retirement Age | ½ at 55 * | 2% at 55 | 2% at 50 | 3% at 55 | 3% at 50 |
|---|---|---|---|---|---|
| 50 | 1.783% | 1.426% | 2.000% | 2.400% | 3.000% |
| 51 | 1.903% | 1.522% | 2.140% | 2.520% | 3.000% |
| 52 | 2.035% | 1.628% | 2.280% | 2.640% | 3.000% |
| 53 | 2.178% | 1.742% | 2.420% | 2.760% | 3.000% |
| 54 | 2.333% | 1.866% | 2.560% | 2.880% | 3.000% |
| 55 & Up | 2.500% | 2.000% | 2.700% | 3.000% | 3.000% |

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

## PEPRA Safety Plan Formulas

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

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

- The *final compensation* is the monthly average of the member's highest 36 or 12 consecutive months' full-time equivalent monthly pay (no matter which CalPERS employer paid this compensation). The standard benefit is 36 months. Employers had the option of providing a final compensation equal to the highest 12 consecutive months for classic plans only. Final compensation must be defined by the highest 36 consecutive months' pay under the 1.5% at 65 formula. PEPRA members have a cap on the annual salary that can be used to calculate final compensation for all new members based on the Social Security contribution and benefit base. For employees that participate in Social Security this cap is $121,388 for 2018 and for those employees that do not participate in Social Security the cap for 2018 is $145,666. Adjustments to the caps are permitted annually based on changes to the CPI for all urban consumers.

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

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

- The miscellaneous and PEPRA safety service retirement benefit is not capped. The classic Safety service retirement benefit is capped at 90 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 5 years of credited service (total service across all CalPERS employers, and with certain other retirement systems with which CalPERS has reciprocity agreements).

### Eligibility to Start Receiving Benefits

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

### Benefit

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

# Non-Industrial (Non-Job Related) Disability Retirement

### Eligibility

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

### Standard Benefit

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

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

- *Service* is CalPERS credited service plus the additional number of years that the member would have worked until age 60, for members with at least 10 years but not more than 18.518 years of service. The maximum benefit in this case is 33 1/3 percent of final compensation.

### Improved Benefit

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

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

## Industrial (Job Related) Disability Retirement

All safety members have this benefit. For miscellaneous members, employers have the option of providing this benefit. An employer may choose to provide the increased benefit option or the improved benefit option.

### Eligibility

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

### Standard Benefit

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

### Increased Benefit (75 percent of Final Compensation)

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

### Improved Benefit (50 percent to 90 percent of Final Compensation)

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

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

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

# Post-Retirement Death Benefit

### Standard Lump Sum Payment

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

### Improved Lump Sum Payment

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

# Form of Payment for Retirement Allowance

### Standard Form of Payment

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

### Improved Form of Payment (Post-Retirement Survivor Allowance)

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

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

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

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

# Pre-Retirement Death Benefits

## Basic Death Benefit

This is a standard benefit.

### Eligibility

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

### Benefit

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

## 1957 Survivor Benefit

This is a standard benefit.

### Eligibility

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

### Benefit

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

# Optional Settlement 2 Death Benefit

This is an optional benefit.

**Eligibility**

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

**Benefit**

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

# Special Death Benefit

This is a standard benefit for safety members. An employer may elect to provide this benefit for miscellaneous members.

**Eligibility**

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

**Benefit**

The special death benefit is a monthly allowance equal to 50 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 child(ren) under age 22. There is a guarantee that the total amount paid will at least equal the basic death benefit.

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

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

# Alternate Death Benefit for Local Fire Members

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

### Eligibility

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

### Benefit

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

# Cost-of-Living Adjustments (COLA)

### Standard Benefit

Retirement and survivor allowances are adjusted each year in May for cost of living, beginning the second calendar year after the year of retirement. The standard cost-of-living adjustment (COLA) is 2 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 given 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).

### Improved Benefit

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

# Purchasing Power Protection Allowance (PPPA)

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

# Employee Contributions

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

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

| Benefit Formula | Percent Contributed above the Breakpoint |
|---|---|
| Miscellaneous, 1.5% at 65 | 2% |
| Miscellaneous, 2% at 60 | 7% |
| Miscellaneous, 2% at 55 | 7% |
| Miscellaneous, 2.5% at 55 | 8% |
| Miscellaneous, 2.7% at 55 | 8% |
| Miscellaneous, 3% at 60 | 8% |
| Miscellaneous, 2% at 62 | 50% of the Total Normal Cost |
| Miscellaneous, 1.5% at 65 | 50% of the Total Normal Cost |
| Safety, 1/2 at 55 | Varies by entry age |
| Safety, 2% at 55 | 7% |
| Safety, 2% at 50 | 9% |
| Safety, 3% at 55 | 9% |
| Safety, 3% at 50 | 9% |
| Safety, 2% at 57 | 50% of the Total Normal Cost |
| Safety, 2.5% at 57 | 50% of the Total Normal Cost |
| Safety, 2.7% at 57 | 50% of the Total Normal Cost |

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

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

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

# 1959 Survivor Benefit

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

This benefit is not included in the results presented in this valuation. More information on this benefit is available on the CalPERS website at www.calpers.ca.gov.

# Appendix C

# Participant Data

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

# Summary of Valuation Data

| | | June 30, 2017 | | June 30, 2018 |
|---|---|---|---|---|
| 1. **Active Members** | | | | |
| a) Counts | | 3,527 | | 3,296 |
| b) Average Attained Age | | 39.81 | | 40.25 |
| c) Average Entry Age to Rate Plan | | 28.55 | | 28.66 |
| d) Average Years of Credited Service | | 11.26 | | 11.63 |
| e) Average Annual Covered Pay | $ | 93,110 | $ | 93,967 |
| f) Annual Covered Payroll | | 328,400,573 | | 309,713,827 |
| g) Projected Annual Payroll for Contribution Year | | 357,547,257 | | 335,974,322 |
| h) Present Value of Future Payroll | | 3,168,939,598 | | 2,973,850,922 |
| 2. **Transferred Members** | | | | |
| a) Counts | | 625 | | 664 |
| b) Average Attained Age | | 41.18 | | 40.58 |
| c) Average Years of Credited Service | | 3.31 | | 3.54 |
| d) Average Annual Covered Pay | $ | 86,432 | $ | 87,939 |
| 3. **Terminated Members** | | | | |
| a) Counts | | 625 | | 649 |
| b) Average Attained Age | | 41.69 | | 41.97 |
| c) Average Years of Credited Service | | 3.25 | | 3.37 |
| d) Average Annual Covered Pay | $ | 51,591 | $ | 52,806 |
| 4. **Retired Members and Beneficiaries** | | | | |
| a) Counts | | 2,554 | | 2,739 |
| b) Average Attained Age | | 63.25 | | 63.24 |
| c) Average Annual Benefits | $ | 47,357 | $ | 49,981 |
| 5. **Active to Retired Ratio** [(1a) / (4a)] | | 1.38 | | 1.20 |

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

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

# Active Members

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

### Distribution of Active Members by Age and Service

| | Years of Service at Valuation Date | | | | | | |
|---|---|---|---|---|---|---|---|
| **Attained Age** | **0-4** | **5-9** | **10-14** | **15-19** | **20-24** | **25+** | **Total** |
| 15-24 | 65 | 4 | 0 | 0 | 0 | 0 | 69 |
| 25-29 | 275 | 82 | 16 | 0 | 0 | 0 | 373 |
| 30-34 | 206 | 199 | 165 | 6 | 0 | 0 | 576 |
| 35-39 | 90 | 133 | 326 | 72 | 0 | 0 | 621 |
| 40-44 | 35 | 90 | 229 | 244 | 50 | 0 | 648 |
| 45-49 | 18 | 42 | 131 | 196 | 127 | 41 | 555 |
| 50-54 | 21 | 22 | 70 | 67 | 51 | 56 | 287 |
| 55-59 | 10 | 10 | 28 | 31 | 18 | 19 | 116 |
| 60-64 | 1 | 6 | 14 | 13 | 5 | 4 | 43 |
| 65 and over | 0 | 1 | 0 | 3 | 0 | 4 | 8 |
| **All Ages** | **721** | **589** | **979** | **632** | **251** | **124** | **3,296** |

### Distribution of Average Annual Salaries by Age and Service

| | Years of Service at Valuation Date | | | | | | |
|---|---|---|---|---|---|---|---|
| **Attained Age** | **0-4** | **5-9** | **10-14** | **15-19** | **20-24** | **25+** | **Average** |
| 15-24 | $53,517 | $72,234 | $0 | $0 | $0 | $0 | $54,602 |
| 25-29 | 62,266 | 73,520 | 83,116 | 0 | 0 | 0 | 65,634 |
| 30-34 | 67,350 | 79,622 | 90,622 | 98,071 | 0 | 0 | 78,576 |
| 35-39 | 67,064 | 85,298 | 98,833 | 105,182 | 0 | 0 | 92,066 |
| 40-44 | 77,284 | 89,762 | 98,679 | 105,570 | 122,989 | 0 | 100,756 |
| 45-49 | 70,953 | 86,299 | 106,374 | 109,514 | 131,511 | 148,003 | 113,642 |
| 50-54 | 79,839 | 79,260 | 108,986 | 102,821 | 131,015 | 145,467 | 114,168 |
| 55-59 | 100,865 | 83,473 | 101,581 | 93,626 | 124,306 | 143,198 | 108,175 |
| 60-64 | 100,842 | 109,800 | 101,565 | 78,282 | 125,438 | 159,687 | 103,841 |
| 65 and over | 0 | 66,295 | 0 | 82,832 | 0 | 144,007 | 111,352 |
| **All Ages** | **$65,575** | **$82,366** | **$99,009** | **$105,131** | **$129,075** | **$146,369** | **$93,967** |

# Transferred and Terminated Members

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

| | Years of Service at Valuation Date | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Attained Age** | **0-4** | **5-9** | **10-14** | **15-19** | **20-24** | **25+** | **Total** | **Average Salary** |
| 15-24 | 4 | 0 | 0 | 0 | 0 | 0 | 4 | $72,709 |
| 25-29 | 82 | 2 | 0 | 0 | 0 | 0 | 84 | 74,413 |
| 30-34 | 103 | 23 | 3 | 0 | 0 | 0 | 129 | 83,931 |
| 35-39 | 86 | 24 | 9 | 2 | 0 | 0 | 121 | 87,503 |
| 40-44 | 83 | 20 | 4 | 3 | 0 | 0 | 110 | 92,635 |
| 45-49 | 89 | 14 | 6 | 6 | 0 | 0 | 115 | 97,319 |
| 50-54 | 42 | 9 | 6 | 2 | 1 | 0 | 60 | 95,372 |
| 55-59 | 23 | 4 | 3 | 0 | 0 | 0 | 30 | 83,938 |
| 60-64 | 5 | 1 | 0 | 0 | 0 | 0 | 6 | 83,455 |
| 65 and over | 5 | 0 | 0 | 0 | 0 | 0 | 5 | 62,451 |
| **All Ages** | **522** | **97** | **31** | **13** | **1** | **0** | **664** | **87,939** |

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

| | Years of Service at Valuation Date | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Attained Age** | **0-4** | **5-9** | **10-14** | **15-19** | **20-24** | **25+** | **Total** | **Average Salary** |
| 15-24 | 6 | 0 | 0 | 0 | 0 | 0 | 6 | $48,172 |
| 25-29 | 56 | 2 | 1 | 0 | 0 | 0 | 59 | 46,780 |
| 30-34 | 82 | 20 | 2 | 0 | 0 | 0 | 104 | 53,648 |
| 35-39 | 100 | 33 | 9 | 0 | 0 | 0 | 142 | 55,718 |
| 40-44 | 66 | 15 | 11 | 4 | 0 | 0 | 96 | 51,200 |
| 45-49 | 61 | 26 | 7 | 8 | 4 | 1 | 107 | 63,022 |
| 50-54 | 51 | 9 | 4 | 0 | 0 | 0 | 64 | 47,005 |
| 55-59 | 35 | 4 | 3 | 0 | 0 | 0 | 42 | 43,343 |
| 60-64 | 19 | 2 | 0 | 0 | 0 | 0 | 21 | 46,186 |
| 65 and over | 7 | 0 | 0 | 1 | 0 | 0 | 8 | 34,160 |
| **All Ages** | **483** | **111** | **37** | **13** | **4** | **1** | **649** | **52,806** |

# Retired Members and Beneficiaries

**Distribution of Retirees and Beneficiaries by Age and Retirement Type***

| Attained Age | Service Retirement | Non-Industrial Disability | Industrial Disability | Non-Industrial Death | Industrial Death | Death After Retirement | Total |
|---|---|---|---|---|---|---|---|
| Under 30 | 0 | 0 | 0 | 0 | 1 | 9 | 10 |
| 30-34 | 0 | 2 | 7 | 0 | 0 | 3 | 12 |
| 35-39 | 0 | 1 | 20 | 0 | 1 | 2 | 24 |
| 40-44 | 0 | 4 | 24 | 0 | 0 | 1 | 29 |
| 45-49 | 0 | 9 | 54 | 0 | 1 | 3 | 67 |
| 50-54 | 316 | 6 | 64 | 1 | 5 | 15 | 407 |
| 55-59 | 369 | 3 | 84 | 0 | 5 | 15 | 476 |
| 60-64 | 462 | 5 | 98 | 4 | 6 | 21 | 596 |
| 65-69 | 323 | 4 | 95 | 2 | 2 | 33 | 459 |
| 70-74 | 232 | 2 | 67 | 2 | 1 | 39 | 343 |
| 75-79 | 93 | 1 | 44 | 2 | 1 | 24 | 165 |
| 80-84 | 41 | 0 | 18 | 0 | 1 | 21 | 81 |
| 85 and Over | 28 | 0 | 11 | 0 | 0 | 31 | 70 |
| **All Ages** | **1864** | **37** | **586** | **11** | **24** | **217** | **2,739** |

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

| Attained Age | Service Retirement | Non-Industrial Disability | Industrial Disability | Non-Industrial Death | Industrial Death | Death After Retirement | Average |
|---|---|---|---|---|---|---|---|
| Under 30 | $0 | $0 | $0 | $0 | $7,142 | $15,498 | $14,662 |
| 30-34 | 0 | 17,919 | 29,380 | 0 | 0 | 12,754 | 23,313 |
| 35-39 | 0 | 8,621 | 25,785 | 0 | 57,134 | 24,177 | 26,242 |
| 40-44 | 0 | 9,542 | 31,399 | 0 | 0 | 19,961 | 27,990 |
| 45-49 | 0 | 17,418 | 31,309 | 0 | 47,659 | 29,391 | 29,601 |
| 50-54 | 75,207 | 18,873 | 33,763 | 7,821 | 44,276 | 32,786 | 65,750 |
| 55-59 | 63,288 | 16,180 | 33,729 | 0 | 48,482 | 38,872 | 56,850 |
| 60-64 | 56,605 | 15,214 | 30,562 | 28,516 | 44,161 | 30,806 | 50,753 |
| 65-69 | 56,046 | 7,230 | 28,992 | 35,119 | 34,755 | 37,554 | 48,508 |
| 70-74 | 52,572 | 18,510 | 31,071 | 37,188 | 22,868 | 27,302 | 45,124 |
| 75-79 | 45,216 | 23,891 | 34,083 | 33,959 | 27,034 | 28,753 | 39,477 |
| 80-84 | 40,337 | 0 | 26,484 | 0 | 36,146 | 27,826 | 33,963 |
| 85 and Over | 31,992 | 0 | 30,631 | 0 | 0 | 23,801 | 28,151 |
| **All Ages** | **$59,187** | **$15,326** | **$31,235** | **$30,402** | **$41,510** | **$29,366** | **$49,981** |

# Retired Members and Beneficiaries (continued)

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

| Years Retired | Service Retirement | Non-Industrial Disability | Industrial Disability | Non-Industrial Death | Industrial Death | Death After Retirement | Total |
|---|---|---|---|---|---|---|---|
| Under 5 Yrs | 616 | 10 | 101 | 2 | 1 | 89 | 819 |
| 5-9 | 558 | 11 | 79 | 2 | 1 | 60 | 711 |
| 10-14 | 378 | 3 | 56 | 3 | 3 | 27 | 470 |
| 15-19 | 192 | 6 | 92 | 3 | 6 | 20 | 319 |
| 20-24 | 80 | 5 | 89 | 0 | 4 | 12 | 190 |
| 25-29 | 28 | 2 | 64 | 1 | 4 | 5 | 104 |
| 30 and Over | 12 | 0 | 105 | 0 | 5 | 4 | 126 |
| **All Years** | **1864** | **37** | **586** | **11** | **24** | **217** | **2,739** |

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

| Years Retired | Service Retirement | Non-Industrial Disability | Industrial Disability | Non-Industrial Death | Industrial Death | Death After Retirement | Average |
|---|---|---|---|---|---|---|---|
| Under 5 Yrs | $64,802 | $17,924 | $40,819 | $35,133 | $52,846 | $31,916 | $57,611 |
| 5-9 | 63,446 | 14,686 | 29,473 | 50,646 | 62,637 | 31,012 | 56,143 |
| 10-14 | 53,264 | 12,458 | 40,347 | 18,891 | 22,441 | 28,980 | 49,653 |
| 15-19 | 51,626 | 14,671 | 33,645 | 28,482 | 47,409 | 22,901 | 43,648 |
| 20-24 | 42,415 | 12,716 | 30,084 | 0 | 49,542 | 22,256 | 34,734 |
| 25-29 | 40,242 | 18,644 | 25,390 | 20,742 | 44,124 | 28,070 | 30,064 |
| 30 and Over | 36,459 | 0 | 20,911 | 0 | 30,865 | 5,794 | 22,307 |
| **All Years** | **$59,187** | **$15,326** | **$31,235** | **$30,402** | **$41,510** | **$29,366** | **$49,981** |

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

# Appendix D

## Normal Cost Information by Group

- **Normal Cost by Benefit Group**
- **PEPRA Member Contribution Rates**

# Normal Cost by Benefit Group

The table below displays the Total Normal Cost broken out by benefit group for Fiscal Year 2020-21. The Total Normal Cost is the annual cost of service accrual for the fiscal year for active employees and can be viewed as the long-term contribution rate for the benefits contracted. Generally, the normal cost for a benefit group subject to more generous benefit provisions will exceed the normal cost for a group with less generous benefits. However, based on the characteristics of the members (particularly when the number of actives is small), this may not be the case. Future measurements of the Total Normal Cost for each group may differ significantly from the current values due to such factors as: changes in the demographics of the group, changes in economic and demographic assumptions, changes in plan benefits or applicable law.

| Rate Plan Identifier | Benefit Group Name | Total Normal Cost FY 2020-21 | Number of Actives | Payroll on 6/30/2018 |
|---|---|---|---|---|
| 63 | Safety County Peace Officer First Level | 31.567% | 2,443 | 253,038,355 |
| 25051 | Safety County Peace Officer PEPRA Level | 25.756% | 727 | 47,290,230 |
| 30194 | Safety Fire First Level | N/A | 0 | N/A |
| 30195 | Safety County Peace Officer Second Level | 27.489% | 126 | 9,385,242 |

Note that if a Benefit Group above has multiple bargaining units, each of which has separately contracted for different benefits such as Employer Paid Member Contributions, then the Normal Cost split does not reflect those differences. Additionally, if a 2nd Level Benefit Group amended to the same benefit formula as a 1st Level Benefit Group their Normal Costs may be dissimilar due to demographic or other population differences. In these situations you should consult with your plan actuary.

# PEPRA Member Contribution Rates

The table below shows the determination of the PEPRA Member contribution rates based on 50 percent of the Total Normal Cost for each respective plan on June 30, 2018. Assembly Bill (AB) 340 created PEPRA that implemented new benefit formulas and a final compensation period as well as new contribution requirements for new employees. In accordance with Section Code 7522.30(b), "new members ... shall have an initial contribution rate of at least 50 percent of the normal cost rate." The normal cost for the plan is dependent on the benefit levels, actuarial assumptions and demographics of the plan particularly the entry age into 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.

| | | Basis for Current Rate | | Rates Effective July 1, 2020 | | | |
|---|---|---|---|---|---|---|---|
| **Rate Plan Identifier** | **Benefit Group Name** | **Total Normal Cost** | **Member Rate** | **Total Normal Cost** | **Change** | **Change Needed** | **Member Rate** |
| 25051 | Safety County Peace Officer PEPRA Level | 23.731% | 11.750% | 24.961% | 1.230% | Yes | 12.500% |

The PEPRA employee contribution rate determined in the table above may not necessarily be 50 percent of the Total Normal Cost by Group based on the PEPRA Normal Cost calculation methodology. Each non-pooled plan is stable with a sufficiently large demographic representation of active employees. 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 non-pooled plan until the number of members covered under the PEPRA formula meets either:

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

Once either of the conditions above is met for a non-pooled plan, the total PEPRA normal cost will be based on the active PEPRA population in the plan.

Accordingly, the total normal cost will be funded equally between employer and employee based on the demographics of the employees of that employer.

# Appendix E

## Glossary of Actuarial Terms

# Glossary of Actuarial Terms

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

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

**Actuarial Methods**
Procedures employed by actuaries to achieve certain funding goals of a pension plan. Actuarial methods include funding method, setting the length of time to fund the Accrued Liability and determining the Value of Assets.

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

**Amortization Bases**
Separate payment schedules for different portions of the Unfunded Liability. The total Unfunded Liability of a Risk Pool or non-pooled 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. Payment periods are determined by Board policy and vary based on the cause of the change.

**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 Assumption**
The actuarial assumption that was called "investment return" in earlier CalPERS reports or "actuarial interest rate" in Section 20014 of the California Public Employees' Retirement Law (PERL).

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

**Entry Age 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 percent means the plan or risk pool has more assets than liabilities and a ratio less than 100 percent 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 replaces 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, and who was not a member of another public retirement system prior to that date, and who is not subject to reciprocity with another public retirement system.

**Normal Cost**

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

**Pension Actuary**

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

**PEPRA**

The California Public Employees' Pension Reform Act of 2013

**Prepayment Contribution**

A payment made by the employer to reduce or eliminate the year's required employer contribution towards the UAL.

**Present Value of Benefits (PVB)**

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

**Unfunded Accrued Liability (UAL)**

When a plan or pool's value of assets is less than its Accrued Liability, the difference is the plan or pool's Unfunded Accrued Liability (or unfunded liability). If the unfunded liability is positive, the plan or pool will have to pay contributions exceeding the Normal Cost.

Proprietary & Confidential

DRAFT
11/22/2019

# Actuarial Valuation Report

County of Riverside

County of Riverside Postretirement Benefits Plan

As of June 30, 2019

AON
Empower Results®

# Executive Summary

## Background

The County of Riverside provides retiree medical benefits for eligible retirees enrolled in County sponsored plans. The benefits are provided in the form of:

- Monthly County contributions toward the retiree's premium,
- Access to CalPERS health plan coverage at subsidized premium levels, and
- $25 per month to the RSA Trust for RSA law enforcement retirees.

*County Contributions*

The County of Riverside makes contributions to eligible retirees for their medical plan premiums when the retiree enrolls in a County sponsored health plan. The current monthly amount paid by the County ranges from $25 – $256, depending on the retiree's bargaining unit at retirement. The County provided amounts are detailed in the Summary of Principal Plan Provisions and outlined as follows:

- **CalPERS Health Benefits program retirees** (Law Enforcement Management, Deputy District Attorneys Association (Deputy DAs), RSA Public Safety members, Confidential, Law Enforcement Executive Staff, Management, and Unrepresented) are eligible for the greater of the stated Public Employees' Medical and Hospital Care Act (PEMHCA) amounts and the bargaining unit's negotiated amount. The PEMHCA monthly amounts are $136.00 and $139.00 in 2019 and 2020, respectively, and increase annually thereafter by Medical CPI. These are the only groups that have inflation-indexed benefits.
- **All other retirees** are eligible for their bargaining unit negotiated amount (i.e., $25). These amounts do not increase in future years to account for inflation.

  Note: The County contributes $25.00 per month to the RSA Benefit Trust for RSA Law Enforcement retirees, and this cost is included in Plan liabilities.

As described above, the majority of participants are eligible to receive benefits that are fixed at current levels. Retirees receiving the PEMHCA benefits are eligible for inflation-indexed benefits. The long-term benefit under PEMHCA could be more than 10 times greater than certain fixed benefit amounts in 17 years, as illustrated in Appendix A.

*Implicit Subsidy*

Under CalPERS health plans, retirees receive benefits prior to age 65 by paying premiums that are developed by blending active and retiree costs. Since retirees are older and generally cost more than actives, the premium paid by the retiree is less than the "true cost" of coverage for retirees. For example, under the Blue Shield Access Plus, the estimated "true cost" for an age 60 retiree is $1,187.23 per month, while the required premium is only $813.17 per month in 2020. Subsidization can also occur for post 65 benefits due to demographic differences between the County retirees and the CalPERS population used to develop premiums. This implicit subsidy is considered an employer obligation under the Actuarial Standards of Practice (ASOP) No. 6 requirements (see below) and is included in this valuation.

## ASOP 6

The Actuarial Standards Board (ASB) amended Actuarial Standards of Practice (ASOP) No. 6 – Measuring Retiree Group Benefit Obligations, effective for measurement dates after March 31, 2015. This amendment requires plans to recognize certain additional healthcare costs (i.e. implicit subsidy) for pooled health plans. Since CalPERS plans are considered pooled health plans, the implicit subsidy is reflected in this actuarial valuation.

## GASB 75

In June 2015, GASB released Statement 75, which is effective for the FYE June 30, 2018. This July 1, 2019 valuation is based on census data provided as of July 1, 2019 for the purpose of providing GASB 75 financial statement information, including final expense for FYE June 30, 2020.

The measurement date for results shown in this valuation report is June 30, 2019.

It is important to note that only current active and retired participants are valued in this actuarial study. Future new entrants or any projected growth in the County's employee population are not considered.

## Summary of Results

### Liabilities

There are a few terms to understand related to the Plan's liabilities. The Present Value of Benefits (PVB) represents the actuarial present value of all future benefits expected to be paid to current employees and retirees. The Actuarial Accrued Liability (AAL) is the portion of the PVB attributable to past service. The Normal Cost is the portion of the PVB that is allocated to the current plan year for active employees.

Each liability is a present value calculated by using a selected discount rate. Results in this report are shown using a 7.01% discount rate. The table below summarizes the liability results as of July 1, 2019:

| | |
|---|---|
| Present Value of Benefits (PVB) | $127,878,481 |
| Actuarial Accrued Liability (AAL) | $103,122,741 |
| Normal Cost | $2,966,332 |

### Discount Rate

The discount rate can have a considerable impact on the magnitude of the liabilities, with lower discount rates resulting in higher liabilities. GASB 75 prescribes the discount rate methodology to be used. Based on the County's current funding policy, projected cash flows, and the assumed asset return, the plan assets are not projected to be depleted, and the discount rate for GASB disclosures can be based entirely on the assumed asset return. For funding purposes, the discount rate is based on the assumed asset return of 7.01%.

### Plan Participation

A detailed review of plan participation experience over the year ending June 30, 2019 and prior 6 years revealed a higher proportion of retire eligible participants electing postretirement medical coverage compared to prior experience. As a result, the participation rate assumption was increased in recognition of this recent experience.

## Development of Funding Contribution

The funding contribution is developed on a projected basis using prior year valuation results. For example, the funding contribution for Fiscal Year Ending (FYE) 2020 is $4,254,133 and was developed based on the 2018 valuation.

This valuation develops the funding contribution for FYE 2021, which is $9,061,596 and is based on a projection of the normal cost, amortization of the 2017 initial Unfunded Actuarial Accrued Liability (UAAL) over the period ending June 30, 2037, and amortization of the subsequent unanticipated changes in liability (i.e., actuarial gains / losses and changes in assumptions) over 15-year periods and unanticipated changes in assets over 5-year periods.

The table below shows the contributions for Safety and Miscellaneous for FYE 2020, 2021 and an estimate for FYE 2022.

| | 2019-2020 | 2020-2021 | 2021-2022[1] |
|---|---|---|---|
| Contribution for Safety | $2,530,651 | $3,569,137 | $3,667,288 |
| Contribution for Miscellaneous | 1,723,482 | 5,492,459 | 5,643,502 |
| **Total Funding Contribution** | **$4,254,133** | **$9,061,596** | **$9,310,790** |

The large increase in the funding contribution for FYE 2021 is primarily due to a change in management groups to become eligible for CalPERS plans and an update in the future plan participation assumption, as further discussed elsewhere in this executive summary, which was updated in the July 1, 2019 funding valuation to reflect more recent experience.

## GASB 75 Expense

The OPEB expense for FYE June 30, 2020 is $8,675,880 and is developed using the valuation results in this report, including a Valuation Date of July 1, 2019, Measurement Period of July 1, 2018 to June 30, 2019, and a Measurement Date of June 30, 2019. The large increase in the expense for FYE 2020 is primarily due to a change in management groups to become eligible for CalPERS plans and an update in the future plan participation assumption. Additional increases due to those factors will also be reflected in the expense for FYE 2021.

[1] Estimated assuming funding policy discussed in the report.

## Comparison to Prior Valuation

The following table compares certain results to the prior valuation:

| | July 1, 2018 | July 1, 2019 |
|---|---|---|
| Discount Rate | 6.73% | 7.01% |
| Present Value of Benefits (PVB) | $81,250,990 | $127,878,481 |
| Actuarial Accrued Liability (AAL) | 68,391,694 | 103,122,741 |
| Normal Cost | $1,433,883 | $2,966,332 |
| Market Value of Assets | 40,110,224 | 44,911,158 |
| **Funding Contribution** | | |
| Smoothed Value of Assets | 39,544,183 | 44,500,184 |
| Unfunded AAL | 28,847,511 | 58,622,557 |
| Funded Status | 57.8% | 43.2% |
| Funding Contribution for FYE 2020 / 2021 | $4,254,133 | $9,061,596 |
| % of pay | 0.30% | 0.63% |
| **GASB 75 Accounting** | | |
| Net OPEB Liability | $28,281,470 | $58,211,583 |
| Plan Fiduciary Net Position as a percentage of the OPEB Liability | 58.6% | 43.6% |
| GASB Annual Expense for FYE 2019 / 2020 | $4,222,794 | $8,675,880 |

Plan liabilities and annual costs are considerably higher than the prior valuation, primarily due to 1) a change to allow management groups to become eligible for CalPERS plans and 2) an update in the future plan participation assumption (i.e., retirees electing coverage), which both result in an increase in liability.

After consideration of the items above, the unfunded AAL and costs are lower than expected based on a projection from the prior valuation, as a net result of the following factors:

- Discount rate increased from 6.73% to 7.01% due to the change in the CERBT expected return on assets, resulting in a decrease in liabilities.
- Mortality assumptions were updated to reflect the Pub-2010 headcount-weighted tables for General employees of all income levels, with generational future improvement scale MP-2019, resulting in a decrease in liabilities.
- Future healthcare premiums are lower than previously assumed, resulting in a decrease in liabilities.
- Census experience was different than assumed. The past year's plan participation election experience was higher than assumed, resulting in an actuarial loss.
- Investment return on assets was slightly higher than expected, resulting in a small asset gain.

It should be noted that employee groups from Special Districts (Waste, Parks, Flood and RCA) and active Court members were not included in the valuation results presented in this report.

# Projected Funding Status

## 80% Funded Status

The County requested a review of maintaining an 80% funded status for the OPEB Plan. The valuation shows the plan is and projects to continue to be under 80% funded as of June 30, 2020, as shown below:

| | |
|---|---|
| Projected Actuarial Accrued Liability (AAL), 6/30/2020 | $109,179,505 |
| 80% of Projected AAL | 87,343,604 |
| Projected Smoothed Value of Assets, 6/30/2020 | 50,783,290 |
| Shortfall for 80% funding, 6/30/2020 | 36,560,314 |
| Shortfall with interest to middle of year | 37,820,050 |
| Amortization already included in ADC, middle of year | 5,908,669 |
| Remaining 80% shortfall to fund | $ 31,911,382 |

The table below summarizes the estimated additional annual contribution projected to attain a funded status of 80% at various future dates.

| 80% Target Funding Date | Additional Annual Payment to Fund Shortfall | Total FYE 2021 Contribution to Fund 80% by Target Date[1] | Total FYE 2021 Contribution (as % of pay)[1] |
|---|---|---|---|
| 6/30/2021 | $31,911,382 | $40,972,977 | 2.85% |
| 6/30/2022 | 13,305,805 | 22,367,400 | 1.56% |
| 6/30/2023 | 7,053,949 | 16,115,544 | 1.12% |
| 6/30/2024 | 3,890,288 | 12,951,883 | 0.90% |
| 6/30/2025 | 1,961,729 | 11,023,324 | 0.77% |
| 6/30/2026 | 650,584 | 9,712,179 | 0.68% |
| 6/30/2027 | 0 | 9,061,595 | 0.63% |

[1]Includes current FYE 2021 contribution of $9,061,595.

## County Contributions Only (excluding implicit subsidy)

In consideration of only funding explicit plan costs for County paid contributions, the County requested a review of maintaining an 80% funded status for the OPEB Plan excluding the implicit subsidy liability. The valuation shows the plan is over 80% funded for such County Contribution liability as of June 30, 2020.

| | |
|---|---|
| Projected Actuarial Accrued Liability (AAL), 6/30/2020 | $62,332,823 |
| 80% of Projected AAL | 49,866,258 |
| Projected Smoothed Value of Assets, 6/30/2020 | 50,783,290 |
| Shortfall (excess) for 80% funding, 6/30/2020 | (917,031) |
| Shortfall (excess) with interest to middle of year | (948,629) |
| Projected Funded Status | 81.5% |

Note: The breakdown of results between Safety and Miscellaneous funded status may vary from above.

# Effect of Asset Allocation Strategy Selection and the Discount Rate Impact

CalPERS offers three asset allocation strategies for selection by employers who contract to pre-fund their future OPEB costs through CERBT.

The asset allocation and associated expected asset return, and thus the assumed discount rate, have a considerable impact on valuation results and the magnitude of liabilities. CalPERS periodically reviews the expected asset returns and the rates used in this valuation are based on CalPERS revised guidance adopted in October 2018. The following table summarizes financial characteristics of the three strategies:

| | Strategy 1 | Strategy 2 | Strategy 3 |
|---|---|---|---|
| Expected 20 Year Return / Discount Rate | 7.59% | 7.01% | 6.22% |
| Standard Deviation of Expected Returns | 11.83% | 9.24% | 7.28% |

All three asset allocation strategies invest to some extent in each of the five asset classes (Global Equity, Domestic Fixed Income, U.S. Inflation Linked Bonds, Global Public Real Estate and Commodities). The portion of assets allocated to each asset class varies among the strategies, and thus, the long term expected rate of return and level of risk of each asset allocation is different for each strategy.

Effective July 1, 2017, the County switched from Asset Strategy 1 to Asset Strategy 2, although it should continue to monitor the return versus risk balance and maintain an asset allocation strategy appropriate for the County's funding and overall financial policies.

In order to understand the impact of strategy selection, we compared valuation results under each Asset Allocation Strategy:

| | Asset Allocation Strategy 1 7.59% | Asset Allocation Strategy 2 7.01% | Asset Allocation Strategy 3 6.22% |
|---|---|---|---|
| **Liabilities** | | | |
| Present Value of Benefits (PVB) | $116,423,077 | $127,878,481 | $146,603,462 |
| Actuarial Accrued Liability (AAL) | $95,605,880 | 103,122,741 | $114,976,694 |
| Normal Cost | $2,597,188 | $2,966,332 | $3,578,265 |

Under GASB 75, the expected return will be considered along with the municipal bond index to determine a blended discount rate.

* * *

The following report shows the details of results by participant status and benefits provided, based on a 7.01% discount rate.

# Table of Contents

# Actuarial Valuation Certificate

This report documents the results of the July 1, 2019 actuarial valuation for the County of Riverside Postretirement Medical Benefits. The information provided in this report is intended strictly for documenting:

- Disclosure items under Governmental Accounting Standards Board (GASB) Statement 75 for Fiscal year ending June 30, 2020.

Determinations for purposes other than the financial accounting requirements may be significantly different from the results in this report. Thus, the use of this report for purposes other than those expressed here may not be appropriate.

This valuation has been conducted in accordance with generally accepted actuarial principles and practices, including the applicable Actuarial Standards of Practice as issued by the Actuarial Standards Board. In addition, the valuation results are based on our understanding of the financial accounting and reporting requirements under U.S. Generally Accepted Accounting Principles as set forth in Government Accounting Standards Board Statement 75 (GASB 75) including any guidance or interpretations provided by the Company and/or its audit partners prior to the issuance of this report. The information in this report is not intended to supersede or supplant the advice and interpretations of the County of Riverside's auditors. Additional disclosures may be required under GASB 74.

Future actuarial measurements may differ significantly from the current measurements presented in this report due (but not limited to) to such factors as the following:

- Plan experience differing from that anticipated by the economic or demographic assumptions;
- Changes in actuarial methods or in economic or demographic assumptions;
- Increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period); and
- Changes in plan provisions or applicable law.

Due to the limited scope of our assignment, we did not perform an analysis of the potential range of such future measurements.

Funded status measurements shown in this report are determined based on various measures of plan assets and liabilities. For entity and plan disclosure and reporting purposes, funded status is determined using plan assets measured at market value. Plan liabilities are measured based on the interest rates and other assumptions summarized in the Actuarial Assumptions and Methods section of this report.

These funded status measurements may not be appropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations, and funded status measurements for County of Riverside and plan disclosure and reporting purposes may not be appropriate for assessing the need for or the amount of future contributions. In conducting the valuation, we have relied on personnel, plan design, health care claim cost, and asset information supplied by County of Riverside as of the valuation date. While we cannot verify the accuracy of all the information, the supplied information was reviewed for consistency and reasonableness. As a result of this review, we have no reason to doubt the substantial accuracy or completeness of the information and believe that it has produced appropriate results.

The actuarial assumptions and methods used in this valuation are described in the Actuarial Assumptions and Methods section of this report. County of Riverside selected the economic and demographic assumptions and prescribed them for use for purposes of compliance with GASB 75. Aon provided guidance with respect to these assumptions, and it is our belief that the assumptions represent reasonable expectations of anticipated plan experience.

The undersigned are familiar with the near-term and long-term aspects of OPEB valuations and collectively meet the Qualification Standards of the American Academy of Actuaries necessary to render the actuarial opinions contained herein. The information provided in this report is dependent upon various factors as documented throughout this report, which may be subject to change. Each section of this report is considered to be an integral part of the actuarial opinions.

To our knowledge, no colleague of Aon providing services to County of Riverside has any material direct or indirect financial interest in County of Riverside. Thus, we believe there is no relationship existing that might affect our capacity to prepare and certify this actuarial report for County of Riverside.

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Aon
707 Wilshire Boulevard
Suite 2600
Los Angeles, CA 90017

November 21, 2019

# Plan Liabilities

The liabilities shown in this exhibit were calculated using a 7.01% discount rate.

The **Present Value of Benefits (PVB)** represents the actuarial present value of all benefits ever to be paid to current employees and retirees. The PVB is as follows:

| | Safety Employees | Miscellaneous Employees | Total |
|---|---|---|---|
| **PVB** | | | |
| *County Contribution* | | | |
| Retirees | $14,692,064 | $17,682,997 | $32,375,061 |
| Actives | $16,493,650 | $23,288,630 | $39,782,280 |
| Subtotal | $31,185,714 | $40,971,627 | $72,157,341 |
| *Implicit Subsidy* | | | |
| Retirees | $10,970,932 | $5,615,916 | $16,586,848 |
| Actives | $18,188,597 | $20,945,695 | $39,134,292 |
| Subtotal | $29,159,529 | $26,561,611 | $55,721,140 |
| *All Benefits* | | | |
| Retirees | $25,662,996 | $23,298,913 | $48,961,909 |
| Actives | $34,682,247 | $44,234,325 | $78,916,572 |
| **Total PVB** | **$60,345,243** | **$67,533,238** | **$127,878,481** |
| Number of Retirees as of 7/1/2019 | 864 | 1,418 | 2,282 |
| Number of Actives as of 7/1/2019 | 3,316 | 15,594 | 18,910 |
| PVB Per Retiree | $29,703 | $16,431 | $21,456 |
| PVB Per Active | $10,459 | $2,837 | $4,173 |

The **Actuarial Accrued Liability (AAL)** is a portion of the PVB attributable to past service. For retirees and fully eligible active employees, the AAL is equal to the PVB. For other active employees, the AAL is the portion of the PVB deemed to be accrued to date. The **Normal Cost** is the portion of the PVB that is allocated to the current plan year for only active employees.

The AAL in this report is based on the Entry Age Normal cost method and has been developed by spreading costs as a level percentage of payrolls.

| | **Safety Employees** | **Miscellaneous Employees** | **Total** |
|---|---|---|---|
| **AAL** | | | |
| *County Contribution* | | | |
| Retirees | $14,692,064 | $17,682,997 | $32,375,061 |
| Actives | $11,253,153 | $15,731,359 | $26,984,512 |
| Subtotal | $25,945,217 | $33,414,356 | $59,359,573 |
| *Implicit Subsidy* | | | |
| Retirees | $10,970,932 | $5,615,916 | $16,586,848 |
| Actives | $12,968,049 | $14,208,271 | $27,176,320 |
| Subtotal | $23,938,981 | $19,824,187 | $43,763,168 |
| *All Benefits* | | | |
| Retirees | $25,662,996 | $23,298,913 | $48,961,909 |
| Actives | $24,221,202 | $29,939,630 | $54,160,832 |
| **Total AAL** | **$49,884,198** | **$53,238,543** | **$103,122,741** |
| Number of Retirees as of 7/1/2019 | 864 | 1,418 | 2,282 |
| Number of Actives as of 7/1/2019 | 3,316 | 15,594 | 18,910 |
| AAL Per Retiree | $29,703 | $16,431 | $21,456 |
| AAL Per Active | $7,304 | $1,920 | $2,864 |
| **Normal Cost** | | | |
| County Contribution | $586,023 | $1,004,831 | $1,590,854 |
| Implicit Subsidy | $558,904 | $816,574 | $1,375,478 |
| **Total Normal Cost** | **$1,144,927** | **$1,821,405** | **$2,966,332** |
| Normal Cost per Active | $345 | $117 | $157 |

# Plan Assets

The County of Riverside participates in CalPERS' CERBT trust fund. The following table shows the development of assets since the prior valuation.

| **Reconciliation of Plan Assets** | **July 1, 2018 to June 30, 2019** |
|---|---|
| Market Value of Assets, Beginning of Year | $40,110,224 |
| Contributions | |
| Retiree Premiums | $2,657,087 |
| Reimbursement from CERBT | $0 |
| Implicit Subsidy | $843,600 |
| Pre-Funding | $2,000,000 |
| Total Contributions | $5,500,687 |
| Investment Earnings | $2,820,756 |
| Administrative Expense | ($19,822) |
| Benefit Payments | |
| Retiree Premiums | ($2,657,087) |
| Implicit Subsidy | ($843,600) |
| Total Benefit Payments | ($3,500,687) |
| Market Value of Assets at Valuation Date | $44,911,158 |
| Return on Assets | 6.86% |
| | |
| **Development of (Gain)/Loss** | |
| Expected Investment Earnings (assumed 6.73%) | $2,764,966 |
| Actual Investment Earnings | $2,820,756 |
| (Gain)/Loss on Assets | ($55,790) |
| | |
| **Smoothed Value of Assets at Valuation Date** | |
| Market Value of Assets at Valuation Date | $44,911,158 |
| Unrecognized (Gain)/Loss[1] | ($410,794) |
| Preliminary Smoothed Value of Assets at Valuation Date | $44,500,184 |
| Lower Corridor (80% of Market Value) | $35,928,926 |
| Upper Corridor (120% of Market Value) | $53,893,390 |
| **Smoothed Value of Assets** | $44,500,184 |

[1]Schedule of the Current and Prior Asset (Gain)/Losses as of June 30, 2019

| Date Established | Original (Gain)/Loss | Years Remaining As of 6/30/2019 | Amount recognized | Total Amount Unrecognized |
|---|---|---|---|---|
| 6/30/2017 | ($1,163,768) | 2 | ($698,261) | ($465,507) |
| 6/30/2018 | $165,275 | 3 | $66,110 | $99,165 |
| 6/30/2019 | ($55,790) | 4 | ($11,158) | ($44,632) |
| Total | | | ($643,309) | ($410,974) |

# Development of Funding Contribution

Effective July 1, 2017, the County's funding policy is to contribute a level percentage of pay based on the sum of:

a) Normal Cost with interest, plus
b) Amortization of July 1, 2017 Unfunded Actuarial Accrued Liability (UAAL) over the period ending June 30, 2037, plus
c) Amortization of subsequent unanticipated liability changes (i.e., actuarial gains / losses and changes in assumptions) over 15-year period, plus
d) Amortization of subsequent unanticipated asset changes (i.e., unexpected gains / losses on assets) over 5-year period.

Amortization amounts are calculated based on the discount rate and payroll increase assumption appropriate for the valuation date.

The following table shows the development of the funding contribution as a level percentage of pay, assuming middle of year payment, for FYE June 30, 2021:

| | Safety | Miscellaneous | Total |
|---|---|---|---|
| **Funding Contribution, FYE June 30, 2021** | | | |
| Normal Cost, plus interest | $1,216,947 | $1,935,980 | $3,152,927 |
| Amortization of UAAL, plus interest[1] | 2,352,190 | 3,556,479 | 5,908,669 |
| Funding Contribution | $3,569,137 | $5,492,459 | $9,061,596 |
| % of Pay | | | 0.63% |

The following table shows the development of the liability gain / loss as of June 30, 2019

| | Safety | Miscellaneous | Total |
|---|---|---|---|
| Liability as of June 30, 2018 | $42,011,062 | $26,380,632 | $68,391,694 |
| Service Cost | 887,820 | 546,063 | 1,433,883 |
| Interest on Liability | 2,808,158 | 1,775,223 | 4,583,381 |
| Plan Change | - | - | - |
| Assumption Changes | **4,003,956** | **25,681,653** | **29,685,609** |
| Benefit Payments | (2,384,647) | (1,116,040) | (3,500,687) |
| Expected Liability as of June 30, 2019 | 47,326,349 | 53,267,531 | 100,593,880 |
| Actual Liability as of June 30, 2019 | 49,884,198 | 53,238,543 | 103,122,741 |
| Liability (Gain)/Loss | **$2,557,849** | **$28,988** | **$2,528,861** |

The following table shows the development of the asset gain / loss as of June 30, 2019

| | Safety | Miscellaneous | Total |
|---|---|---|---|
| Market Value of Assets (MVA) as of June 30, 2018 | $24,638,564 | $15,471,660 | $40,110,224 |
| Total Contributions | 3,272,187 | 2,228,500 | 5,500,687 |
| Investment Earnings | 1,721,198 | 1,099,558 | 2,820,756 |
| Administrative Expense | (12,176) | (7,646) | (19,822) |
| Benefit Payments | (2,384,647) | (1,116,040) | (3,500,687) |
| Expected MVA as of June 30, 2019 | 27,235,126 | 17,676,032 | 44,911,158 |
| Expected Investment Earnings | 1,687,152 | 1,077,814 | 2,764,966 |
| Asset (Gain)/Loss | **($34,046)** | **($21,744)** | **($55,790)** |

[1] Amortization allocation shown on next page

## Amortization Schedule

The following table shows the amortization of Unfunded Actuarial Accrued Liability as of July 1, 2020. Amortization of bases is first recognized in the fiscal year subsequent to the date established.

| Date Established | Type of Base | Original Period | Remaining Period as of June 30, 2020 | Original Balance | Balance Remaining as of June 30, 2020 | Total Amortization Recognized in FYE June 30, 2021 | Safety Amortization Recognized in FYE June 30, 2021[1] | Miscellaneous Amortization Recognized in FYE June 30, 2021[1] |
|---|---|---|---|---|---|---|---|---|
| 6/30/2017 | 7/1/2017 UAAL[2] | 20 | 17 | $ 16,073,266 | $ 15,395,133 | $ 1,228,877 | $ 754,664 | $ 474,013 |
| 6/30/2018 | Liability (Gain)/Loss | 15 | 14 | 4,062,300 | 4,165,843 | 382,335 | 234,857 | 147,477 |
| 6/30/2018 | Assets (Gain)Loss | 5 | 4 | 165,275 | 147,141 | 39,056 | 23,991 | 15,065 |
| 6/30/2018 | Assumptions | 15 | 14 | 11,336,502 | 11,625,450 | 1,066,966 | 655,407 | 411,559 |
| 6/30/2019 | Liability (Gain)/Loss | 15 | 15 | 2,528,861 | 2,706,134 | 236,095 | 238,802 | (2,706) |
| 6/30/2019 | Assets (Gain)Loss | 5 | 5 | (55,790) | (59,701) | (12,929) | (7,890) | (5,039) |
| 6/30/2019 | Assumptions | 15 | 15 | 29,685,609 | 31,766,570 | 2,771,458 | 373,811 | 2,397,647 |
| | Total Charges | | | $ 63,796,023 | $ 65,746,571 | $ 5,711,858 | $ 2,273,842 | $ 3,438,017 |

[1] Amortization allocation by classification is based on proportionate share of AAL prior to 7/1/2018 and estimated safety/miscellaneous gain/loss since 7/1/2018.
[2] Includes Asset (Gain)/Loss as of 6/30/2017

# Projected Benefit Payments

The following table shows the estimated projected net County benefit payments based on the current plan provisions, current plan participants, and the valuation assumptions used in this report. The County Contributions would be equivalent to funding the liabilities on a pay-as-you-go basis.

| Fiscal Year Ending June 30 | Safety | | Miscellaneous | | Total |
|---|---|---|---|---|---|
| | County Contribution | Implicit Subsidy | County Contribution | Implicit Subsidy | |
| 2020 | $961,918 | $838,565 | $1,780,691 | $494,431 | $4,075,606 |
| 2021 | $1,022,694 | $921,715 | $1,886,626 | $585,709 | $4,416,744 |
| 2022 | $1,097,080 | $1,009,807 | $1,997,068 | $691,767 | $4,795,721 |
| 2023 | $1,176,331 | $1,117,000 | $2,109,501 | $842,207 | $5,245,039 |
| 2024 | $1,262,460 | $1,287,540 | $2,213,259 | $991,499 | $5,754,757 |
| 2025 | $1,355,880 | $1,386,227 | $2,316,470 | $1,154,646 | $6,213,224 |
| 2026 | $1,459,655 | $1,480,404 | $2,417,777 | $1,318,103 | $6,675,938 |
| 2027 | $1,567,202 | $1,662,984 | $2,513,929 | $1,453,357 | $7,197,471 |
| 2028 | $1,680,121 | $1,878,203 | $2,606,165 | $1,582,069 | $7,746,558 |
| 2029 | $1,799,834 | $2,035,055 | $2,697,665 | $1,761,901 | $8,294,454 |
| 2030 | $1,918,831 | $2,185,153 | $2,779,582 | $1,952,177 | $8,835,743 |
| 2031 | $2,041,926 | $2,422,085 | $2,856,566 | $2,131,026 | $9,451,603 |
| 2032 | $2,166,450 | $2,478,534 | $2,926,219 | $2,352,820 | $9,924,024 |
| 2033 | $2,289,994 | $2,637,683 | $2,987,695 | $2,440,231 | $10,355,604 |
| 2034 | $2,410,355 | $2,657,335 | $3,040,419 | $2,634,318 | $10,742,426 |
| 2035 | $2,531,011 | $2,706,673 | $3,082,603 | $2,714,518 | $11,034,805 |
| 2036 | $2,653,071 | $2,822,632 | $3,116,379 | $2,772,062 | $11,364,144 |
| 2037 | $2,770,464 | $2,787,789 | $3,241,779 | $2,942,950 | $11,742,980 |
| 2038 | $2,882,613 | $2,875,633 | $3,367,938 | $2,849,141 | $11,975,326 |
| 2039 | $2,989,538 | $2,860,581 | $3,488,408 | $3,041,244 | $12,379,770 |
| 2040 | $3,091,263 | $2,958,912 | $3,601,985 | $3,184,475 | $12,836,635 |
| 2041 | $3,190,757 | $2,955,078 | $3,707,753 | $3,166,355 | $13,019,942 |
| 2042 | $3,289,583 | $2,894,651 | $3,805,400 | $3,167,001 | $13,156,635 |
| 2043 | $3,386,147 | $2,978,222 | $3,893,937 | $3,075,727 | $13,334,033 |
| 2044 | $3,482,780 | $3,011,298 | $3,972,085 | $3,016,076 | $13,482,239 |
| 2045 | $3,575,313 | $2,974,402 | $4,040,128 | $2,888,453 | $13,478,295 |
| 2046 | $3,665,996 | $3,059,064 | $4,099,649 | $2,753,515 | $13,578,224 |
| 2047 | $3,752,511 | $3,157,485 | $4,150,187 | $2,669,799 | $13,729,982 |
| 2048 | $3,834,038 | $3,104,994 | $4,192,276 | $2,576,441 | $13,707,749 |
| 2049 | $4,006,642 | $3,142,622 | $4,265,325 | $2,470,998 | $13,885,588 |

# GASB 75 Reporting and Disclosure Information for Fiscal Year Ending June 30, 2020

## Calculation Details

The following table illustrates the Net OPEB Liability under GASB 75.

| | Fiscal Year Ending 6/30/2019 | Fiscal Year Ending 6/30/2020 |
|---|---|---|
| (1) OPEB Liability | | |
| (a) Retired Participants and Beneficiaries Receiving Payment | $ 43,328,382 | $ 48,961,909 |
| (b) Active Participants | 25,063,312 | 54,160,832 |
| (c) Total | $ 68,391,694 | $ 103,122,741 |
| (2) Plan Fiduciary Net Position | 40,110,224 | 44,911,158 |
| (3) Net OPEB Liability | $ 28,281,470 | $ 58,211,583 |
| (4) Plan Fiduciary Net Position as a Percentage of the Total OPEB Liability | 58.65% | 43.55% |
| (5) Deferred Outflow of Resources for Contributions Made After Measurement Date | $ 5,500,687 | TBD |

## Expense

The following table illustrates the OPEB expense under GASB 75.

| | Fiscal Year Ending 6/30/2019 | Fiscal Year Ending 6/30/2020 |
|---|---|---|
| (1) Service Cost | $ 882,148 | $ 1,433,883 |
| (2) Interest Cost | 3,446,096 | 4,583,381 |
| (3) Expected Investment Return | (2,508,170) | (2,764,966) |
| (4) Employee Contributions | 0 | 0 |
| (5) Administrative Expense | 18,325 | 19,822 |
| (6) Plan Changes | 0 | 0 |
| (7) Amortization of Unrecognized | | |
| (a) Liability (Gain)/Loss | 1,046,521 | 1,284,419 |
| (b) Asset (Gain)/Loss | (199,699) | (210,857) |
| (c) Assumption Change (Gain)/Loss | 1,537,573 | 4,330,198 |
| (8) Total Expense | $ 4,222,794 | $ 8,675,880 |

Shown below are details regarding the calculation of Service, Interest Cost and Expected Investment Return components of the Expense.

| | Fiscal Year Ending 6/30/2019 | Fiscal Year Ending 6/30/2020 |
|---|---|---|
| (1) Development of Service Cost: | | |
| (a) Normal Cost at Beginning of Measurement Period | $ 882,148 | $ 1,433,883 |
| (2) Development of Interest Cost: | | |
| (a) Total OPEB Liability at Beginning of Measurement Period | $ 51,927,906 | $ 68,391,694 |
| (b) Normal Cost at Beginning of Measurement Period | 882,148 | 1,433,883 |
| (c) Actual Benefit Payments | (3,263,258) | (3,500,687) |
| (d) Discount Rate | 6.73% | 6.73% |
| (e) Interest Cost | $ 3,446,096 | $ 4,583,381 |
| (3) Development of Expected Investment Return: | | |
| (a) Plan Fiduciary Net Position at Beginning of Measurement Period | $ 36,785,654 | $ 40,110,224 |
| (b) Actual Contributions—Employer | 4,263,258 | 5,500,687 |
| (c) Actual Contributions—Employee | 0 | 0 |
| (d) Actual Benefit Payments | (3,263,258) | (3,500,687) |
| (e) Administrative Expenses | (18,325) | (19,822) |
| (f) Other | 0 | 0 |
| (g) Expected Return on Assets | 6.73% | 6.73% |
| (h) Expected Return | $ 2,508,170 | $ 2,764,966 |

## Reconciliation of Net OPEB Liability

Shown below are details regarding the Total OPEB Liability, Plan Fiduciary Net Position, and Net OPEB Liability for the Measurement Period from June 30, 2018 to June 30, 2019:

| | Increase (Decrease) | | |
|---|---|---|---|
| | **Total OPEB Liability (a)** | **Plan Fiduciary Net Position (b)** | **Net OPEB Liability (c) = (a) – (b)** |
| Balance Recognized at 6/30/2019 (Based on 6/30/2018 Measurement Date) | $ 68,391,694 | $ 40,110,224 | $ 28,281,470 |
| Changes Recognized for the Fiscal Year: | | | |
| Service Cost | $ 1,433,883 | N/A | $ 1,433,883 |
| Interest on the Total OPEB Liability | 4,583,381 | N/A | 4,583,381 |
| Changes of Benefit Terms | 0 | N/A | 0 |
| Differences Between Expected and Actual Experience | 2,528,861 | N/A | 2,528,861 |
| Changes of Assumptions | 29,685,609 | N/A | 29,685,609 |
| Benefit Payments | (3,500,687) | (3,500,687) | 0 |
| Contributions From the Employer | N/A | 5,500,687 | (5,500,687) |
| Contributions From the Employee | N/A | 0 | 0 |
| Net Investment Income | N/A | 2,820,756 | (2,820,756) |
| Administrative Expense | N/A | (19,822) | 19,822 |
| Net Changes | $ 34,731,047 | $ 4,800,934 | $ 29,930,113 |
| Balance Recognized at 6/30/2020 (Based on 6/30/2019 Measurement Date) | $ 103,122,741 | $ 44,911,158 | $ 58,211,583 |

## Liability (Gain)/Loss

The following table illustrates the liability gain/loss under GASB 75.

| | | Fiscal Year Ending 6/30/2019 | Fiscal Year Ending 6/30/2020 |
|---|---|---|---|
| (1) | OPEB Liability at Beginning of Measurement Period | $ 51,927,906 | $ 68,391,694 |
| (2) | Service Cost | 882,148 | 1,433,883 |
| (3) | Interest on the Total OPEB Liability | 3,446,096 | 4,583,381 |
| (4) | Changes of Benefit Terms | 0 | 0 |
| (5) | Changes of Assumptions | 11,336,502 | 29,685,609 |
| (6) | Benefit Payments | (3,263,258) | (3,500,687) |
| (7) | Expected OPEB Liability at End of Measurement Period | $ 64,329,394 | $ 100,593,880 |
| (8) | Actual OPEB Liability at End of Measurement Period | 68,391,694 | 103,122,741 |
| (9) | OPEB Liability (Gain)/Loss | $ 4,062,300 | $ 2,528,861 |
| (10) | Average Future Working Life Expectancy | 9.45 | 10.63 |
| (11) | OPEB Liability (Gain)/Loss Amortization | $ 429,873 | $ 237,898 |

## Asset (Gain)/Loss

The following table illustrates the asset gain/loss under GASB 75.

| | | Fiscal Year Ending 6/30/2019 | Fiscal Year Ending 6/30/2020 |
|---|---|---|---|
| (1) | OPEB Asset at Beginning of Measurement Period | $ 36,785,654 | $ 40,110,224 |
| (2) | Contributions—Employer | 4,263,258 | 5,500,687 |
| (3) | Contributions—Employee | 0 | 0 |
| (4) | Expected Investment Income | 2,508,170 | 2,764,966 |
| (5) | Benefit Payments | (3,263,258) | (3,500,687) |
| (6) | Administrative Expense | (18,325) | (19,822) |
| (7) | Other | 0 | 0 |
| (8) | Expected OPEB Asset at End of Measurement Period | $ 40,275,499 | $ 44,855,368 |
| (9) | Actual OPEB Asset at End of Measurement Period | 40,110,224 | 44,911,158 |
| (10) | OPEB Asset (Gain)/Loss | $ 165,275 | $ (55,790) |
| (11) | Amortization Factor | 5.00 | 5.00 |
| (12) | OPEB Asset (Gain)/Loss Amortization | $ 33,055 | $ (11,158) |

## Deferred Outflows/Inflows

The following table illustrates the Deferred Inflows and Outflows as of June 30, 2020 under GASB 75.

| | Deferred Outflows | Deferred Inflows |
|---|---|---|
| (1) Difference Between Actual and Expected Experience | $ 9,458,562 | $ 0 |
| (2) Net Difference Between Expected and Actual Earnings on OPEB Plan Investments | 0 | 410,973 |
| (3) Assumption Changes | 38,003,203 | 0 |
| (4) Sub Total | $ 47,461,765 | $ 410,973 |
| (5) Contributions Made in Fiscal Year Ending 6/30/2020 After Measurement Date | TBD | N/A |
| (6) Total | $ TBD | $ 410,973 |

## Amortization of Deferred Inflows/Outflows

The table below lists the amortization bases included in the deferred inflows/outflows as of June 30, 2020.

| Date | | Period | | Balance | | Annual |
|---|---|---|---|---|---|---|
| Established | Type of Base | Original | Remaining | Original | Remaining | Payment |
| 6/30/2019 | Liability (Gain)/Loss | 10.63 | 9.63 | $2,528,861 | $2,290,963 | 237,898 |
| 6/30/2019 | Asset (Gain)/Loss | 5.00 | 4.00 | (55,790) | (44,632) | (11,158) |
| 6/30/2019 | Assumptions | 10.63 | 9.63 | 29,685,609 | 26,892,984 | 2,792,625 |
| 6/30/2018 | Liability (Gain)/Loss | 9.45 | 7.45 | 4,062,300 | 3,202,554 | 429,873 |
| 6/30/2018 | Asset (Gain)/Loss | 5.00 | 3.00 | 165,275 | 99,165 | 33,055 |
| 6/30/2018 | Assumptions | 9.45 | 7.45 | 11,336,502 | 8,937,242 | 1,199,630 |
| 6/30/2017 | Liability (Gain)/Loss | 9.43 | 6.43 | 5,814,989 | 3,965,045 | 616,648 |
| 6/30/2017 | Asset (Gain)/Loss | 5.00 | 2.00 | (1,163,768) | (465,506) | (232,754) |
| 6/30/2017 | Assumptions | 9.43 | 6.43 | 3,186,806 | 2,172,977 | 337,943 |
| | Total Charges | | | | 47,050,792 | 5,403,760 |

Amounts Recognized in the deferred outflows of resources and deferred inflows of resources related to OPEB will be recognized in the OPEB expense as follows:

**Year End June 30:**

| | |
|---|---|
| 2021 | $ 5,403,760 |
| 2022 | $ 5,403,762 |
| 2023 | $ 5,636,514 |
| 2024 | $ 5,603,459 |
| 2025 | $ 5,614,617 |
| Total Thereafter | $ 19,388,680 |

# Plan Fiduciary Net Position Projection

The following table illustrates the projection of the fiduciary net position for use in the calculation of the discount rate as of June 30, 2020.

*($ in thousands)*

| **Year Ending June 30**[2] | **Beginning Fiduciary Net Position (a)** | **Total Contributions (b)** | **Benefit Payments (c)** | **Administrative Expenses (d)** | **Investment Earnings (e)** | **Ending Fiduciary Net Position**[1] **(f)** |
|---|---|---|---|---|---|---|
| 2020 | $44,911 | $5,587 | $4,076 | $20 | $3,203 | $49,606 |
| 2021 | 49,606 | 7,416 | 4,417 | 21 | 3,584 | 56,168 |
| 2022 | 56,168 | 10,474 | 4,796 | 22 | 4,139 | 65,963 |
| 2023 | 65,963 | 10,765 | 5,245 | 23 | 4,820 | 76,281 |
| 2024 | 76,281 | 11,136 | 5,755 | 24 | 5,538 | 87,177 |
| 2025 | 87,177 | 11,026 | 6,213 | 24 | 6,283 | 98,247 |
| 2026 | 98,247 | 11,335 | 6,676 | 25 | 7,054 | 109,934 |
| 2027 | 109,934 | 11,692 | 7,197 | 27 | 7,867 | 122,269 |
| 2028 | 122,269 | 12,082 | 7,747 | 28 | 8,727 | 135,303 |
| 2029 | 135,303 | 12,457 | 8,294 | 29 | 9,635 | 149,071 |
| 2030 | 149,071 | 12,856 | 8,836 | 30 | 10,595 | 163,657 |
| 2031 | 163,657 | 13,335 | 9,452 | 31 | 11,613 | 179,122 |
| 2032 | 179,122 | 13,682 | 9,924 | 32 | 12,693 | 195,541 |
| 2033 | 212,997 | 14,004 | 10,356 | 33 | 13,840 | 212,997 |
| 2034 | 212,997 | 14,300 | 10,742 | 35 | 15,061 | 231,581 |
| 2035 | 231,581 | 12,909 | 11,035 | 36 | 16,305 | 249,725 |
| 2036 | 249,725 | 8,628 | 11,364 | 37 | 17,415 | 264,368 |
| 2037 | 264,368 | 8,705 | 11,743 | 38 | 18,431 | 279,723 |
| 2038 | 279,723 | 6,699 | 11,975 | 39 | 19,429 | 293,837 |
| 2039 | 293,837 | 6,777 | 12,380 | 40 | 20,408 | 308,602 |
| 2040 | 308,602 | 6,927 | 12,837 | 41 | 21,432 | 324,084 |
| 2041 | 324,084 | 6,822 | 13,020 | 42 | 22,507 | 340,351 |
| 2042 | 340,351 | 6,682 | 13,157 | 42 | 23,638 | 357,473 |
| 2043 | 357,473 | 6,597 | 13,334 | 43 | 24,829 | 375,522 |
| 2044 | 375,522 | 6,494 | 13,482 | 43 | 26,086 | 394,576 |
| 2045 | 394,576 | 6,262 | 13,478 | 44 | 27,413 | 414,730 |
| 2046 | 414,730 | 6,147 | 13,578 | 44 | 28,819 | 436,073 |
| 2047 | 436,073 | 6,101 | 13,730 | 44 | 30,308 | 458,708 |
| 2048 | 458,708 | 5,897 | 13,708 | 45 | 31,888 | 482,741 |
| 2049 | 482,741 | 5,886 | 13,852 | 45 | 33,568 | 508,298 |

[1] (f)=(a) + (b) – (c) – (d) + (e)
[2] Years later than 2049 were omitted from this table.

## Plan Fiduciary Net Position

The last year in which projected benefit payments are due from the Plan is 2127.

The Plan's projected fiduciary net position is not projected to reach $0.

As such, the Plan's fiduciary net position was projected to be available to make all projected future benefit payments for current Plan members. In other words, there is no projected "depletion date" when projected benefits are not covered by projected assets. Therefore, the long-term expected rate of return on Plan investments of 7.01% per annum was applied to all periods of projected benefit payments to determine the total OPEB liability as of June 30, 2020.

In projecting the Plan's fiduciary net position, the following assumptions were made:

1. Interest rate for discounting was 7.01% per annum.

2. Projected total contributions are employer contributions to the unfunded actuarial accrued liability and normal cost (including administrative expenses). Contributions are assumed to be paid mid-year.

3. Assumed contributions are based on the County of Riverside continuing to follow the current funding policy of normal cost plus 20-year closed period amortization of the 2017 unfunded liability and amortization of subsequent unanticipated changes in actuarial accrued liability over the 15-year period from date established and 5-years for any unexpected asset gains/losses.

4. The County has a history of contributing more than the Actuarially Determined Contribution (ADC). We have not recognized contributions in excess of the ADC in the above projection. Allowance for any such contributions would not result in a different discount rate.

5. Projected benefit payments have been determined in accordance with Paragraphs 30-35 of GASB Statement No. 75, and are based on the closed group of active, retired members and beneficiaries as of June 30, 2020. Benefit payments are assumed to be paid mid-year.

6. Administrative expenses are $19,000 for 2020 and are projected with 2.50% inflation. Expenses are assumed to be paid mid-year.

7. Projected investment earnings are based on the assumed investment rate of return of 7.01% per annum. The first year's earnings have been adjusted to account for the actual return through June 30, 2020

## Discount Rate Sensitivity

The following table illustrates the impact of discount rate sensitivity on the Net OPEB Liability for fiscal year ending June 30, 2019:

| | 1% Decrease (5.73%) | Current Rate (6.73%) | 1% Increase (7.73%) |
|---|---|---|---|
| (1) Total OPEB Liability | $ 78,363,553 | $ 68,391,694 | $ 60,355,873 |
| (2) Plan Fiduciary Net Position | 40,110,224 | 40,110,224 | 40,110,224 |
| (3) Net OPEB Liability | $ 38,253,329 | $ 28,281,470 | $ 20,245,649 |

The following table illustrates the impact of discount rate sensitivity on the Net OPEB Liability for fiscal year ending June 30, 2020:

| | 1% Decrease (6.01%) | Current Rate (7.01%) | 1% Increase (8.01%) |
|---|---|---|---|
| (1) Total OPEB Liability | $ 118,489,910 | $ 103,122,741 | $ 90,695,514 |
| (2) Plan Fiduciary Net Position | 44,911,158 | 44,911,158 | 44,911,158 |
| (3) Net OPEB Liability | $ 73,578,752 | $ 58,211,583 | $ 45,784,356 |

## Healthcare Cost Trend Sensitivity

The following table illustrates the impact of healthcare cost trend sensitivity on the Net OPEB Liability for fiscal year ending June 30, 2019:

| | 1% Decrease | Trend Rate | 1% Increase |
|---|---|---|---|
| (1) Total OPEB Liability | $ 61,908,833 | $ 68,391,694 | $ 76,685,021 |
| (2) Plan Fiduciary Net Position | 40,110,224 | 40,110,224 | 40,110,224 |
| (3) Net OPEB Liability | $ 21,798,609 | $ 28,281,470 | $ 36,574,797 |

The following table illustrates the impact of healthcare cost trend sensitivity on the Net OPEB Liability for fiscal year ending June 30, 2020:

| | 1% Decrease | Trend Rate | 1% Increase |
|---|---|---|---|
| (1) Total OPEB Liability | $ 89,964,433 | $ 103,122,741 | $ 119,711,402 |
| (2) Plan Fiduciary Net Position | 44,911,158 | 44,911,158 | 44,911,158 |
| (3) Net OPEB Liability | $ 45,053,275 | $ 58,211,583 | $ 74,800,244 |

# Disclosure—Changes in the Net OPEB Liability and Related Ratios

## Changes in the Net OPEB Liability and Related Ratios[1]

| | Fiscal Year Ending 2019 | Fiscal Year Ending 2020 |
|---|---|---|
| **Total OPEB Liability** | | |
| Service Cost | $ 882,148 | $ 1,433,883 |
| Interest Cost | 3,446,096 | 4,583,381 |
| Changes of Benefit Terms | 0 | 0 |
| Differences Between Expected and Actual Experiences | 4,062,300 | 2,528,861 |
| Changes of Assumptions | 11,336,502 | 29,685,609 |
| Benefit Payments | (3,263,258) | (3,500,687) |
| **Net Change in Total OPEB Liability** | $ 16,463,788 | $ 34,731,047 |
| **Total OPEB Liability (Beginning)** | 51,927,906 | 68,391,694 |
| **Total OPEB Liability (Ending)** | $ 68,391,694 | $ 103,122,741 |
| **Plan Fiduciary Net Position** | | |
| Contributions—Employer | $ 4,263,258 | $ 5,500,687 |
| Contributions—Member | 0 | 0 |
| Net Investment Income | 2,342,895 | 2,820,756 |
| Benefit Payments | (3,263,258) | (3,500,687) |
| Administrative Expense | (18,325) | (19,822) |
| Other | 0 | 0 |
| **Net Change in Plan Fiduciary Net Position** | $ 3,324,570 | $ 4,800,934 |
| **Plan Fiduciary Net Position (Beginning)** | 36,785,654 | 40,110,224 |
| **Plan Fiduciary Net Position (Ending)** | $ 40,110,224 | $ 44,911,158 |
| **Net OPEB Liability (Ending)** | $ 28,281,470 | $ 58,211,583 |
| **Net Position as a Percentage of OPEB Liability** | 58.65% | 43.55% |
| **Covered-Employee Payroll** | $ 1,374,752,875 | $ 1,399,892,784 |
| **Net OPEB Liability as a Percentage of Payroll** | 2.06% | 4.16% |

[1] GASB 75 was effective first for employer fiscal years beginning after June 15, 2017.

Disclosure—Contribution Schedule

## Contributions

| | Fiscal Year Ending 2019 | Fiscal Year Ending 2020 |
|---|---|---|
| Actuarially Determined Contribution | $2,141,196 | $4,254,133[1] |
| Contributions Made in Relation to the Actuarially Determined Contribution | 5,500,687 | TBD |
| Contribution Deficiency (Excess) | 3,246,554 | TBD |
| Covered-Employee Payroll | $1,399,892,784 | TBD |
| Contributions as a Percentage of Payroll | 0.39% | TBD |

Notes to Schedule:

Valuation Date: Actuarially determined contribution rates are calculated as of June 30, one year prior to the beginning of the fiscal year in which contributions are reported.

Methods and assumptions used to determine contribution rates:

| | |
|---|---|
| Actuarial Cost Method | Entry Age Normal with amortization of 7/1/2017 unfunded liability over a period ending 6/30/2037 and amortization of subsequent unanticipated changes in liability over 15-year periods and any asset gain/loss over 5-year periods. |
| Asset Valuation Method | Market Value |
| Salary Increases | 2.75% |
| Investment Rate of Return | 7.01%, net of OPEB plan investment expense, including inflation. |
| Retirement Age | Retirement rates developed in the 2018 CalPERS Experience Study |
| Mortality | Pub-2010 Headcount-Weighted Public Retirement Plans Mortality Tables using Scale MP-2019 |

[1] This was developed based on the prior year valuation

# Participant Information

These exhibit summaries contain participant demographic information.

### Active Employee Age/Service Distribution

| | Years of Service | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Age** | **0-4** | **5-9** | **10-14** | **15-19** | **20-24** | **25-29** | **30-34** | **>35** | **Total** |
| <25 | 308 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 312 |
| 25-29 | 1,270 | 342 | 19 | 0 | 0 | 0 | 0 | 0 | 1,631 |
| 30-34 | 1,319 | 874 | 482 | 7 | 0 | 0 | 0 | 0 | 2,682 |
| 35-39 | 952 | 731 | 1,112 | 236 | 7 | 0 | 0 | 0 | 3,038 |
| 40-44 | 714 | 520 | 925 | 634 | 156 | 2 | 0 | 0 | 2,951 |
| 45-49 | 573 | 435 | 767 | 636 | 420 | 88 | 5 | 0 | 2,924 |
| 50-54 | 404 | 320 | 537 | 428 | 296 | 163 | 66 | 1 | 2,215 |
| 55-59 | 335 | 276 | 433 | 364 | 203 | 139 | 101 | 33 | 1,884 |
| 60-64 | 134 | 158 | 244 | 217 | 104 | 56 | 31 | 10 | 954 |
| >65 | 61 | 47 | 87 | 67 | 29 | 10 | 10 | 8 | 319 |
| Total | 6,070 | 3,707 | 4,606 | 2,589 | 1,215 | 458 | 213 | 52 | 18,910 |

### Participant Statistics

| | **Safety Employees** | **Miscellaneous Employees** | **Total** |
|---|---|---|---|
| *Retirees* | | | |
| Number of retirees | 864 | 1,418 | 2,282 |
| Average age | 63.1 | 71.8 | 68.5 |
| Number of retiree spouses | 527 | 332 | 415 |
| *Actives* | | | |
| Number of actives | 3,316 | 15,594 | 18,910 |
| Average age | 40.2 | 44.3 | 43.6 |
| Average past service (years) | 11.7 | 9.8 | 10.2 |

**Development of GASB 75 Amortization Period for Changes in Liability**

| Status | July 1, 2018 | | July 1, 2019 | |
|---|---|---|---|---|
| | 2018 Count | Average Future Working Life | 2019 Count | Average Future Working Life[1] |
| Actives | 18,754 | 11.83 | 18,910 | 10.54 |
| Retirees | 2,283 | 0.00 | 2,282 | 0.00 |
| Total/Weighted Average | 21,037 | 10.55 | 21,192 | 9.41 |

**Active Participant Benefit Summary**

The table below summarizes the number of participants by bargaining units and the benefits valued. As described in the plan summary and actuarial assumptions sections, certain groups are eligible for PEMHCA benefits not shown in this summary.

| Union Code | Description | Bargaining Unit (used to determine contribution) | # Records | 2019 Monthly County Contribution | Health Plan | CalPERS Retirement Program |
|---|---|---|---|---|---|---|
| CNF | Confidential | Confidential | 239 | $ 256.00 | CalPERS | Misc |
| LEM | Law Enforcement Management | LEMU | 433 | $ 136.00 | CalPERS | Safety |
| MGT | Management (General) | Management | 945 | $ 256.00 | CalPERS | Misc |
| MLX | Law Enforcement Exec Staff | LE Exec Staff | 13 | $ 256.00 | CalPERS | Safety |
| PD7 | Public Defender, Prosecution (District Attorney's) | DDAA | 378 | $ 256.00 | CalPERS | Misc |
| RSA | RSA Law Enforcement | RSA | 2,291 | $ 25.00 | RSA | Safety |
| RSP | RSA Public Safety | RSA Public Safety | 579 | $ 136.00 | CalPERS | Safety |
| SE2 | SEIU Professional | SEIU | 3,052 | $ 25.00 | County | Misc |
| SE8 | SEIU Registered Nurses | SEIU | 1,217 | $ 25.00 | County | Misc |
| SE9 | SEIU Para Professional | SEIU | 1,047 | $ 25.00 | County | Misc |
| SES | SEIU Supervisory | SEIU | 1,534 | $ 25.00 | County | Misc |
| UNC | Unrepresented Confidential | Confidential | 180 | $ 256.00 | CalPERS | Misc |
| UNR | Unrepresented Management | Management | 6 | $ 256.00 | CalPERS | Misc |
| UP4 | LIUNA Inspection and Technical | LIUNA | 1,345 | $ 25.00 | County | Misc |
| UP5 | LIUNA Trades, Crafts and Labor | LIUNA | 927 | $ 25.00 | County | Misc |
| UP6 | LIUNA Supporting Services | LIUNA | 4,724 | $ 25.00 | County | Misc |
| | | County Total | 18,910 | | | |

* Confidential, Law Enforcement Management (LEMU), Management (General), Law Enforcement Executive Staff, Prosecution (DDAA), RSA Public Safety, Unrepresented Confidential, and Unrepresented management members are eligible to receive the greater of the PEMHCA amount or the bargained amount. Currently, Confidential, DDAA, Management (General), Law Enforcement Executive Staff, Unrepresented Confidential, and Unrepresented management are above the PEMHCA amount, LEMU and RSA Public Safety are at the PEMHCA amount.

Special District (Waste, Parks, Flood and RCA) employees are not included in this valuation.

[1] Based on demographic assumptions set out in the Actuarial Assumption and Methods section of this report

**Retired Participant Benefit Summary**

The table below summarizes the number of current retirees receiving various monthly County contribution amounts:

| Age | $25.00 | $139.00 | $256.00 | Total |
|---|---|---|---|---|
| <40 | 6 | 1 | 0 | 7 |
| 40-44 | 5 | 1 | 0 | 6 |
| 45-49 | 8 | 0 | 0 | 8 |
| 50-54 | 46 | 68 | 6 | 120 |
| 55-59 | 105 | 89 | 18 | 212 |
| 60-64 | 178 | 103 | 75 | 356 |
| 65-69 | 301 | 86 | 164 | 551 |
| 70-74 | 294 | 113 | 92 | 499 |
| 75-79 | 172 | 87 | 16 | 275 |
| 80-84 | 82 | 33 | 3 | 118 |
| 85-89 | 61 | 22 | 3 | 86 |
| 90-95 | 20 | 15 | 1 | 36 |
| >95 | 5 | 3 | 0 | 8 |
| Total | 1,283 | 621 | 378 | 2,282 |

# Summary of Principal Plan Provisions

The following plan provisions are the basis for the calculations in this actuarial valuation.

1. **Benefit Eligibility**
All employees who retire from active employment within 120 days of separation are eligible for participation. Participants are eligible for service retirement at or after age 50, or disability retirement at an age younger than 50, with at least 5 years of service. Former employees who become eligible for CalPERS pension benefits more than 120 days after separation are not eligible for retiree health benefits.

2. **Benefits / Plans Covered**
The County contributes a portion of an eligible retiree's medical plan premium under a County sponsored health plan (either at retirement or during a subsequent annual enrollment) for the retiree's lifetime. Contributions are based on the employee's bargaining unit at the time of retirement; as follows:

| ***Bargaining Unit*** | ***Monthly Contribution*** | | | | |
|---|---|---|---|---|---|
| ***at Retirement*** | **2016** | **2017** | **2018** | **2019** | **2020** |
| Confidential** | $256.00 | $256.00 | $256.00 | $256.00 | $256.00 |
| LEMU (Management)* | $128.00 | $128.00 | $133.12 | $136.00 | $139.00 |
| MLX (Executive Staff)** | $256.00 | $256.00 | $256.00 | $256.00 | $256.00 |
| LIUNA | $25.00 | $25.00 | $25.00 | $25.00 | $25.00 |
| Management** | $256.00 | $256.00 | $256.00 | $256.00 | $256.00 |
| District Attorneys (DDAA)* | $256.00 | $256.00 | $256.00 | $256.00 | $256.00 |
| RSA Law Enforcement | $25.00 | $25.00 | $25.00 | $25.00 | $25.00 |
| RSA Public Safety* | $125.00 | $128.00 | $133.12 | $136.00 | $139.00 |
| SEIU | $25.00 | $25.00 | $25.00 | $25.00 | $25.00 |
| Unrepresented** | $256.00 | $256.00 | $256.00 | $256.00 | $256.00 |

* Confidential, Law Enforcement Management (LEMU), MLX (Executive Staff), Management, Prosecution (Deputy DAs), RSA Public Safety, and Unrepresented members are eligible to receive the greater of the PEMHCA amount or the bargained amount. Currently, Confidential, MLX (Executive Staff), Management, Prosecution (Deputy DAs), and Unrepresented are above the PEMHCA amount, LEMU and RSA Public Safety are at the PEMHCA amount.

** Confidential, MLX (Executive Staff), Management and Unrepresented retired before 11/1/2005 receive a monthly contribution of $128 and after 11/1/2005 receive a monthly contribution of $256.

Future PEMHCA amounts increase at the same rate as Medical CPI. See Appendix A for a projection of the monthly PEMHCA contribution amounts.

RSA – The County contributes $25.00 per month to the RSA Benefit Trust for RSA Law Enforcement retirees. Although the Trust is responsible for providing a benefit with a much larger premium, the County is responsible for the $25.00 monthly contribution and this benefit is included in Plan liabilities.

Implicit Subsidy – Under CalPERS plans, retirees can receive coverage at premium rates that are subsidized due to demographic differences between those receiving benefits and the population used to develop premiums (e.g., blended active and retiree premiums.)

3. **Survivor Coverage Benefits**
Upon the death of the retiree, the eligible surviving spouse receives the same monthly benefit amount for their lifetime.

# Actuarial Assumptions and Methods

## 1. Actuarial Cost Method

The costs shown in the report were developed using the Entry Age Normal cost method.

The Entry Age Normal (EAN) cost method spreads plan costs for each participant from entry date (assuming the plan existed on the employee's hire date) to the expected retirement date. Under the EAN cost method, the plan's normal cost is developed as a level percentage of pay spread over the participants' working lifetime. For this purpose, pay is assumed to increase 3% per annum. The AAL is the cumulative value, on the valuation date, of prior service costs. For retirees, the AAL is the present value of all projected benefits.

The Plan costs are derived by making certain specific assumptions as to the rates of interest, mortality, turnover and other demographic events, which are assumed to hold for many years into the future. Actual experience may differ somewhat from the assumptions and the effect of such differences is spread over all periods. Due to these differences, the costs determined by the valuation must be regarded as estimates of the true Plan costs.

## 2. Funding Policy

The County's funding policy is to contribute the normal cost plus the amortization of unfunded liability based on the following:

- Amortization of the 2017 unfunded liability over the period ending June 30, 2037, plus
- 15-year amortization of subsequent unanticipated changes in liability (i.e., actuarial gains/losses and assumption changes), plus
- 5-year amortization of subsequent unanticipated changes in assets (i.e., asset gains/losses).

The amortization is calculated based on a level percentage of future payroll amounts

## 3. Discount Rate

6.73% - as of 7/1/2018
7.01% - as of 7/1/2019

Under GASB 75, the discount rate is based on a single equivalent rate that reflects a blend of:

- Expected return on assets during the period such that assets are projected to be sufficient to pay benefits of current participants; and
- 20-year, municipal bond yields / index for periods beyond the depletion of the assets.

Based on the current funding policy, projected cash flows, and the assumed asset return, the plan assets are not projected to be depleted, and the discount rate can be based on the expected asset return.

## 4. Expected Return on Assets

7.01% - Based on CalPERS CERBT Asset Allocation Strategy 2 (Effective 7/1/2017, the County changed from Strategy 1 to Strategy 2).

## 5. Payroll Increases

2.75% - This is the annual rate at which total payroll is expected to increase and is used in the funding method to calculate the funding contribution as a level percent of payroll.

**6. Inflation**

2.50% - This is the assumed annual rate of inflation for future years.

For demographic assumptions:

Public Agency Plice consists of Law Enforcement Management and Law Enforcement Executive Staff;

Public Agency County Peace Officer consists of RSA Law Enforcement and RSA Public Safety, and;

Miscellaneous consists of all other bargaining units.

**7. Mortality**

Mortality rates are based on the Pub-2010 headcount-weighted tables for general employees of all income levels, with generational future improvement scale MP-2019. Sample rates for the 2010 base year mortality are as follows:

| Age | Male | Female |
|---|---|---|
| 30 | 0.05% | 0.02% |
| 40 | 0.08% | 0.04% |
| 50 | 0.18% | 0.10% |
| 60 | 0.38% | 0.21% |
| 70 | 0.82% | 0.53% |
| 80 | 2.03% | 1.41% |
| 90 | 15.78% | 12.12% |

**8. Termination**

Termination rates developed in the 2017 CalPERS Experience Study were used in the valuation. The following sample rates are based on age and service:

**Public Agency Police**

| Attained | Years of Service | | | | | | |
|---|---|---|---|---|---|---|---|
| Age | 0 – 1 | 5 | 10 | 15 | 20 | 25 | 30 |
| 30 | 10.13% | 2.49% | 1.79% | 1.09% | 0.00% | 0.00% | 0.00% |
| 35 | 10.13% | 2.49% | 1.79% | 1.09% | 0.82% | 0.00% | 0.00% |
| 40 | 10.13% | 2.49% | 1.79% | 1.09% | 0.82% | 0.70% | 0.00% |
| 45 | 10.13% | 2.49% | 1.79% | 1.09% | 0.82% | 0.70% | 0.65% |
| 50 | 10.13% | 0.86% | 0.53% | 0.27% | 0.17% | 0.12% | 0.09% |
| 55 | 10.13% | 0.86% | 0.53% | 0.27% | 0.17% | 0.12% | 0.09% |

**Termination (cont.)**

**Public Agency County Peace Officer**

| Attained Age | Years of Service | | | | | | |
|---|---|---|---|---|---|---|---|
| | 0 – 1 | 5 | 10 | 15 | 20 | 25 | 30 |
| 30 | 23.76% | 2.42% | 1.06% | 0.50% | 0.00% | 0.00% | 0.00% |
| 35 | 23.76% | 2.42% | 1.06% | 0.50% | 0.24% | 0.00% | 0.00% |
| 40 | 23.76% | 2.42% | 1.06% | 0.50% | 0.24% | 0.10% | 0.00% |
| 45 | 23.76% | 2.42% | 1.06% | 0.50% | 0.24% | 0.10% | 0.06% |
| 50 | 23.76% | 2.42% | 1.06% | 0.50% | 0.24% | 0.10% | 0.06% |
| 55 | 23.76% | 2.42% | 1.06% | 0.50% | 0.24% | 0.10% | 0.06% |

**Miscellaneous**

| Attained Age | Years of Service | | | | | | |
|---|---|---|---|---|---|---|---|
| | 0 – 1 | 5 | 10 | 15 | 20 | 25 | 30 |
| 30 | 16.06% | 6.15% | 4.16% | 2.62% | 0.00% | 0.00% | 0.00% |
| 35 | 15.37% | 5.67% | 3.99% | 2.52% | 1.84% | 0.00% | 0.00% |
| 40 | 14.68% | 5.19% | 3.75% | 2.43% | 1.76% | 1.07% | 0.00% |
| 45 | 14.00% | 4.80% | 3.51% | 2.16% | 1.68% | 1.00% | 0.26% |
| 50 | 13.32% | 4.41% | 2.86% | 1.88% | 1.30% | 0.94% | 0.20% |
| 55 | 12.62% | 3.68% | 2.22% | 1.43% | 0.92% | 0.53% | 0.16% |

## 9. Disability

Disability rates developed in the 2017 CalPERS Experience Study were used in the valuation. Sample rates are as follows:

| | Public Agency Police | | Public Agency County Peace Officer | | CalPERS Miscellaneous | |
|---|---|---|---|---|---|---|
| Age | Male | Female | Male | Female | Male | Female |
| 25 | 0.18% | 0.18% | 0.14% | 0.14% | 0.02% | 0.01% |
| 30 | 0.50% | 0.50% | 0.26% | 0.26% | 0.02% | 0.02% |
| 35 | 0.82% | 0.82% | 0.41% | 0.41% | 0.04% | 0.07% |
| 40 | 1.14% | 1.14% | 0.58% | 0.58% | 0.10% | 0.14% |
| 45 | 1.46% | 1.46% | 0.80% | 0.80% | 0.15% | 0.19% |
| 50 | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| 55 | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |

## 10. Retirement Age

Retirement rates developed in the 2017 CalPERS Experience Study are used in the valuation. Sample rates are provided below.

- Hire date prior to August 24, 2012:
  - Police 3% @ 50 were used for safety employees (including County Peace Officers)
  - Miscellaneous 3% @ 60 rates were used for all other employees.
- Hire date August 24, 2012 to December 31, 2012:
  - Police 2% @ 50 were used for safety employees (including County Peace Officers)
  - Miscellaneous 2% @ 60 rates were used for all other employees.
- Hire date post December 31, 2012:
  - Police 2.7% @ 57 were used for safety employees (including County Peace Officers)
  - Miscellaneous 2% @ 62 rates were used for all other employees.

**Miscellaneous 3% @ 60**

| Attained | Years of Service | | | | | | |
|---|---|---|---|---|---|---|---|
| Age | 5 | 10 | 15 | 20 | 25 | 30 | 35 |
| 50 | 1.30% | 1.90% | 2.60% | 4.20% | 3.80% | 6.40% | 10.00% |
| 55 | 4.00% | 5.20% | 6.40% | 8.50% | 9.50% | 12.00% | 17.20% |
| 60 | 8.90% | 10.60% | 12.30% | 18.00% | 22.60% | 31.60% | 38.70% |
| 65 | 20.00% | 24.20% | 28.30% | 33.00% | 30.00% | 34.20% | 37.00% |
| 70 | 22.00% | 25.50% | 29.10% | 32.60% | 35.80% | 38.80% | 40.00% |
| 75 | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% |

**Miscellaneous 2% @ 60**

| Attained | Years of Service | | | | | | |
|---|---|---|---|---|---|---|---|
| Age | 5 | 10 | 15 | 20 | 25 | 30 | 35 |
| 50 | 2.00% | 2.00% | 2.00% | 2.00% | 2.00% | 15.00% | 15.00% |
| 55 | 1.90% | 2.60% | 3.30% | 9.20% | 13.60% | 14.60% | 15.00% |
| 60 | 7.00% | 7.40% | 8.90% | 11.30% | 13.70% | 16.10% | 24.60% |
| 65 | 14.00% | 17.80% | 21.50% | 26.40% | 32.10% | 37.70% | 41.20% |
| 70 | 14.00% | 17.80% | 21.50% | 26.40% | 32.10% | 37.70% | 41.20% |
| 75 | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% |

**Miscellaneous 2% @ 62**

| Attained | Years of Service | | | | | | |
|---|---|---|---|---|---|---|---|
| Age | 5 | 10 | 15 | 20 | 25 | 30 | 35 |
| 50 | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| 55 | 1.20% | 2.10% | 2.90% | 3.80% | 6.80% | 10.30% | 16.60% |
| 60 | 3.50% | 5.50% | 7.50% | 9.50% | 11.50% | 14.50% | 19.30% |
| 65 | 11.50% | 14.70% | 18.00% | 21.30% | 24.50% | 31.50% | 35.40% |
| 70 | 12.70% | 16.40% | 20.00% | 23.60% | 27.30% | 35.00% | 39.40% |
| 75 | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% |

**Police 3% @ 50**

| Attained | Years of Service | | | | | | |
|---|---|---|---|---|---|---|---|
| Age | 5 | 10 | 15 | 20 | 25 | 30 | 35 |
| 50 | 5.00% | 5.00% | 5.00% | 10.00% | 15.50% | 40.00% | 40.00% |
| 55 | 7.00% | 7.00% | 7.00% | 12.00% | 17.50% | 34.00% | 34.00% |
| 60 | 15.00% | 15.00% | 15.00% | 15.00% | 18.50% | 35.00% | 35.00% |
| 65 | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% |
| 70 | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% |
| 75 | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% |

**Police 2% @ 50**

| Attained | Years of Service | | | | | | |
|---|---|---|---|---|---|---|---|
| Age | 5 | 10 | 15 | 20 | 25 | 30 | 35 |
| 50 | 5.00% | 5.00% | 5.00% | 5.00% | 5.00% | 10.00% | 11.00% |
| 55 | 7.20% | 7.20% | 7.20% | 9.60% | 14.10% | 25.50% | 40.80% |
| 60 | 15.00% | 15.00% | 15.00% | 15.00% | 15.00% | 22.80% | 35.00% |
| 65 | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% |
| 70 | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% |
| 75 | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% |

**Police 2.7% @ 57**

| Attained | Years of Service | | | | | | |
|---|---|---|---|---|---|---|---|
| Age | 5 | 10 | 15 | 20 | 25 | 30 | 35 |
| 50 | 5.00% | 5.00% | 5.00% | 5.00% | 6.00% | 10.20% | 0.00% |
| 55 | 6.84% | 6.84% | 6.84% | 10.66% | 13.89% | 25.00% | 38.76% |
| 60 | 15.00% | 15.00% | 15.00% | 15.00% | 15.14% | 24.78% | 35.00% |
| 65 | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% |
| 70 | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% |
| 75 | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% |

## 11. Annual Medical Inflation ("Trend")

County Contribution: PEMHCA amounts have been determined through 2020 ($139.00). After 2020, the PEMHCA amounts will increase at the same rate as the Medical CPI. For valuation purposes, this is assumed to be 4% for all years. This applies to RSA Public Safety, Deputy District Attorney, Law Enforcement Management, Confidential, Management, Executive Staff, and Unrepresented who were assumed to participate in CalPERS Health Benefits programs and receive the PEMHCA amounts.

All other County contributions are assumed to remain at their current level.

For purposes of calculating the implicit subsidy, a medical trend rate assumption was used to develop the projected future medical claim amounts. The medical trend rate represents the long-term expected growth of medical benefits paid by the plan, due to non-age-related factors such as general medical inflation, utilization, new technology, and the like. The following table sets forth the trend assumptions used for the valuation:

| | Medical | |
|---|---|---|
| **Year** | **Pre Medicare** | **Post Medicare** |
| 2018 | Actual | Actual |
| 2019 | 7.33% | 8.71% |
| 2020 | 6.99% | 8.22% |
| 2021 | 6.65% | 7.71% |
| 2022 | 6.30% | 7.19% |
| 2023 | 5.95% | 6.66% |
| 2024 | 5.59% | 6.12% |
| 2025 | 5.23% | 5.59% |
| 2026 | 4.87% | 5.04% |
| 2027+ | 4.50% | 4.50% |

*Excise Tax (for implicit subsidy calculations)*

For the excise tax on medical benefits under the Affordable Care Act, the overall value of the benefit was compared to the excise tax threshold. The values of the benefits were assumed to increase with the valuation trend and the excise tax thresholds were assumed to increase by 2.5% per year. The excise tax threshold is estimated to be reached in 2025 for Pre Medicare plans and 2044 for Post Medicare plans, and the additional cost of the excise tax each year has been reflected in the liabilities, based on the following additional trend rates:

**Pre Medicare**

| Year | Additional Trend | Year | Additional Trend | Year | Additional Trend |
|---|---|---|---|---|---|
| 2025 | 0.1% | 2038-2039 | 0.8% | 2069-2082 | 0.3% |
| 2026 | 0.5% | 2040-2044 | 0.7% | 2083-2089 | 0.2% |
| 2027 | 0.4% | 2045-2050 | 0.6% | | |
| 2028-2036 | 0.3% | 2051-2058 | 0.5% | | |
| 2037 | 0.6% | 2059-2068 | 0.4% | | |

**Post Medicare**

| Year | Additional Trend | Year | Additional Trend | Year | Additional Trend |
|---|---|---|---|---|---|
| 2044 | 0.1% | 2059-2060 | 0.8% | 2080-2089 | 0.4% |
| 2045-2050 | 0.3% | 2061-2066 | 0.7% | 2090-2099 | 0.3% |
| 2051-2057 | 0.2% | 2067-2072 | 0.6% | | |
| 2058 | 0.5% | 2073-2079 | 0.5% | | |

## 12. Monthly Medical Costs (for implicit Subsidy calculations)

The table below shows 2020 premiums as of the valuation date based on the Southern California Region.

| Plan | HMO/PPO | Employee Only | Employee & 1 Dep. |
|---|---|---|---|
| Basic | | | |
| Anthem Select | HMO | $619.93 | $1,239.86 |
| Anthem Traditional | HMO | 902.63 | 1,805.26 |
| Blue Shield Access + | HMO | 813.17 | 1,626.34 |
| Exclusive Care | HMO | 587.76 | 1,189.76 |
| Health Net Salud y Más | HMO | 392.31 | 784.62 |
| Health Net SmartCare | HMO | 648.42 | 1,296.84 |
| Kaiser | HMO | 664.39 | 1,328.78 |
| PERS Choice | PPO | 710.29 | 1,420.58 |
| PERS Select | PPO | 435.74 | 871.48 |
| PERSCare | PPO | 931.12 | 1,862.24 |
| PORAC | PPO | 699.00 | 1,399.00 |
| Sharp | HMO | 606.02 | 1,212.04 |
| United Healthcare | HMO | 668.31 | 1,336.62 |
| Supplemental/Managed Medicare | | | |
| Kaiser | HMO | 339.43 | 678.86 |
| PERS Choice | PPO | 351.39 | 702.78 |
| PERS Select | PPO | 351.39 | 702.78 |
| PERSCare | PPO | 384.78 | 769.56 |
| PORAC | PPO | 513.00 | 1,022.00 |
| United Healthcare | PPO | 327.03 | 654.06 |

Monthly Medical costs were developed by applying age adjustments to the above premiums to reflect the implicit subsidy. These age adjustments are based on statewide information provided by CalPERS. Single rate age adjustment factors are used for retirees and spouses. A sampling of the factors used is included below:

**Aging Factors**

| Age | HMO Plans | PPO Plans |
|---|---|---|
| 20 | 0.28 | 0.25 |
| 30 | 0.50 | 0.44 |
| 40 | 0.66 | 0.59 |
| 50 | 0.99 | 0.89 |
| 60 | 1.46 | 1.30 |
| 64 | 1.69 | 1.51 |
| 65 | 0.78 | 0.75 |
| 70 | 0.91 | 0.86 |
| 80 | 1.16 | 1.15 |
| 90+ | 1.20 | 1.23 |

## 13. Retiree Contributions

Retirees pay the premiums in excess of the County contributions.

**14. Dental Benefits**

Retirees are eligible for dental benefits if they pay the entire premium. Since dental claims are not assumed to vary with age, costs are expected to be fully paid by retirees and no County liabilities exist.

**15. Participants Valued**

Only current active and retired participants are directly valued. No future entrants are considered in this valuation.

Certain employees are eligible for retirement benefits at termination but do not immediately elect coverage. Such former employees may still be eligible to elect retiree coverage at a later date. Although the liabilities for such benefits are not directly valued, the County believes that the likelihood of such former employees returning to elect benefit coverage is considerably small, except for RSA, as discussed below. The plan participation assumptions are adjusted to consider this liability.

For RSA, it is anticipated that a significant number of retirees will defer benefits to later years. The RSA retiree liability was loaded 15% to account for such current "deferred" retirees that are not included in the census data.

**16. Plan Participation**

Assumed plan participation rates of future retirees is as set out in the following table:

| Health Plan / Benefit | Assumed Participation Rate |
|---|---|
| CalPERS health plans | 60% |
| RSA health plans | 60% immediate / 20% defer to age 65 |
| County health plans | |
| $25 per month benefit | 10% |
| $256 per month benefit | N/A |

These percentages were developed based on a review of the County's recent experience.

**17. Spousal Coverage Assumption**

50% of future eligible retirees are assumed to cover their spouses. Males are assumed to be three years older than their female spouses. Current spousal coverage is used for current retirees.

**18. Participants Excluded**

Special District (Waste, Parks, Flood and RCA) employees, along with active Court members, were not included in this valuation.

**19. Affordable Care Act**

The impact of the Affordable Care Act was addressed in this valuation. In particular, the following items were reviewed:

- Reduced Funding on Medicare Advantage Plans by Federal Government
- Excise Taxes on High Cost Plans

The potential additional costs due to above items are included in the implicit subsidy liabilities of this valuation. The excise tax had the effect of increasing the liability approximately 2.09%.

## 20. Changes in Valuation Assumptions

The following assumptions were changed from the prior valuation:

1) Discount rate was updated from 6.73% to 7.01% due to change in CERBT expected return on assets.
2) Mortality rates were updated from the 2017 CalPERS Experience Study to the Pub-2010 headcount-weighted tables for General employees of all income levels.
3) Mortality improvement was updated from scale MP-2018 to scale MP-2019.
4) The claims table was updated to reflect most recent CalPERS monthly premiums available for 2019.
5) Participation rates for CalPERS and RSA (immediate) health plans participants were updated from 40% to 60% to reflect the more recent experience.

# Appendix A—Comparison of County Contribution to PEMHCA

The following table compares the projected monthly benefit per participant under the current plan to the projected monthly benefit per participant under PEMHCA. The PEMHCA amounts are assumed to increase at the same rate as medical inflation each year after 2020.

| | Current Benefits | | |
|---|---|---|---|
| **Year** | **Low - $25/month** | **High - $256/month** | **PEMHCA Benefit** |
| 2019 | $25.00 | $256.00 | $136.00 |
| 2020 | $25.00 | $256.00 | $139.00 |
| 2021 | $25.00 | $256.00 | $144.56 |
| 2022 | $25.00 | $256.00 | $150.34 |
| 2023 | $25.00 | $256.00 | $156.36 |
| 2024 | $25.00 | $256.00 | $162.61 |
| 2025 | $25.00 | $256.00 | $169.11 |
| 2026 | $25.00 | $256.00 | $175.88 |
| 2027 | $25.00 | $256.00 | $182.91 |
| 2028 | $25.00 | $256.00 | $190.23 |
| 2029 | $25.00 | $256.00 | $197.84 |
| 2030 | $25.00 | $256.00 | $205.75 |
| 2031 | $25.00 | $256.00 | $213.98 |
| 2032 | $25.00 | $256.00 | $222.54 |
| 2033 | $25.00 | $256.00 | $231.45 |
| 2034 | $25.00 | $256.00 | $240.70 |
| 2035 | $25.00 | $256.00 | $250.33 |
| 2036 | $25.00 | $256.00 | $260.34 |
| 2037 | $25.00 | $256.00 | $270.76 |
| 2038 | $25.00 | $256.00 | $281.59 |
| 2039 | $25.00 | $256.00 | $292.85 |
| 2040 | $25.00 | $256.00 | $304.57 |

# Appendix B—GASB 75 Expense Estimate for Fiscal Year Ending June 30, 2021

The following table illustrates the estimated OPEB expense under GASB 75 for the Fiscal Year ending June 30, 2021. The amounts shown are estimates based on the results of the July 1, 2019 actuarial valuation and a 7.01% discount rate.

| | Fiscal Year Ending 6/30/2021[1] |
|---|---|
| (1) Service Cost | $ 2,966,332 |
| (2) Interest Cost | 7,296,413 |
| (3) Expected Investment Return | (3,165,673) |
| (4) Employee Contributions | 0 |
| (5) Administrative Expense | 19,308 |
| (6) Plan Changes | 0 |
| (7) Amortization of Unrecognized | |
| (a) Liability (Gain)/Loss | 1,284,419 |
| (b) Asset (Gain)/Loss | (210,857) |
| (c) Assumption Change (Gain)/Loss | 4,330,198 |
| (8) Total Estimated Expense | $ 12,520,140 |
| (9) Total Expense as a Percentage of Payroll[2] | 0.94% |

The FYE 2021 estimate is higher than the FYE 2020 expense of $8.7 million, primarily due to FYE 2021 expense being based on higher liability and service cost than the FYE 2020 expense.

[1] Final FYE 2021 expense information will be provided in the actuarial valuation based on a June 30, 2020 measurement date reflecting updated census, assumptions, plan provisions and actual asset values, in addition to any asset, liability, or assumption gains/losses initially recognized over the period June 30, 2019 to June 30, 2020.
[2] Based on estimated payroll.

# Appendix C—Pre-65 / Post-65 Breakdown

Alternate breakdown of AAL is shown below to help understand the source of costs.

| | Pre-65 | Post-65 | Total |
|---|---|---|---|
| *All Benefits* | | | |
| County Contribution - Flat Dollar (County & RSA) | | | |
| Retirees | $526,700 | $3,507,712 | $4,034,412 |
| Actives | $1,090,659 | $1,692,649 | $2,783,308 |
| Subtotal | $1,617,359 | $5,200,361 | $6,817,720 |
| County Contribution - CalPERS Benefits | | | |
| Retirees | $3,421,719 | $24,918,930 | $28,340,649 |
| Actives | $7,580,799 | $16,620,405 | $24,201,204 |
| Subtotal | $11,002,518 | $41,539,335 | $52,541,853 |
| CalPERS - Implicit Subsidy | | | |
| Retirees | $10,830,446 | $5,756,402 | $16,586,848 |
| Actives | $24,706,292 | $2,470,028 | $27,176,320 |
| Subtotal | $35,536,738 | $8,226,430 | $43,763,168 |
| **Total AAL** | **$48,156,615** | **$54,966,126** | **$103,122,741** |
| Number of Retirees as of 7/1/2019[1] | 709 | 1,573 | 2,282 |
| Number of Actives as of 7/1/2019[1] | 18,591 | 319 | 18,910 |
| AAL Per Retiree | $20,845 | $21,731 | $21,456 |
| AAL Per Active | $1,795 | $65,151 | $2,864 |
| **Normal Cost** | | | |
| Flat Dollar (County & RSA) | $74,226 | $107,687 | 181,913 |
| CalPERS Benefits | $439,828 | $969,113 | 1,408,941 |
| CalPERS - Implicit Subsidy | $1,203,478 | $172,000 | 1,375,478 |
| **Total Normal Cost** | **$1,717,532** | **$1,248,800** | **$2,966,332** |

[1] For purpose of illustrating per participant AAL, counts reflect number of participants eligible for pre-65 and post-65 benefits, respectively.

*Proprietary & Confidential*

**DRAFT**
**11/22/2019**

# Actuarial Valuation Report

County of Riverside

Part-time and Temporary Employees' Retirement Plan

As of July 1, 2019

Empower Results®

# Executive Summary

## Background

The County of Riverside established the Part-Time and Temporary Employees' Retirement Plan to provide retirement benefits to eligible employees as a substitute for benefits under Social Security, as allowed under OBRA '90. The Plan is an IRS Section 401(a) defined benefit plan.

The County's current funding policy is to contribute a level percentage of pay based on the sum of

a) Normal Cost with interest and administrative expense, plus
b) Amortization of July 1, 2017 Unfunded Actuarial Accrued Liability (UAAL) over the period ending June 30, 2037, plus
c) Amortization of subsequent unanticipated changes in liability (i.e., actuarial gains / losses and changes in assumptions) over 15-year periods and unanticipated changes in assets over 5-year periods, less
d) Expected Employee Contributions

Amortization amounts are calculated based on the discount rate and payroll increase assumption appropriate for the valuation date.

## Summary of Results

### Funding Contribution

The funding contribution for Fiscal Year Ending (FYE) 2020 is $474,617 and was developed based on the prior year valuation. The funding contribution for FYE 2021 is $1,325,770 and is developed based on the funding policy described in the Background section above. This increase is a result of higher than expected liabilities due to actuarial losses on plan experience plus a change in actuarial assumptions resulting in higher liabilities and normal cost.

### GASB 68

This valuation is based on census data provided as of July 1, 2019 for the purpose of providing GASB 68 financial statement information, including expense, for FYE June 30, 2020. The final FYE June 30, 2020 expense is $1,684,009 which is higher than estimated in the prior valuation due to asset losses, assumption changes, and actuarial liability losses.

The measurement date for results shown in this valuation report is June 30, 2019.

### ASOP 51

In September 2017, the Actuarial Standards Board (ASB) introduced Actuarial Standard of Practice (ASOP) No. 51, *Assessment and Disclosure of Risk Associated with Measuring Pension Obligations and Determining Pension Plan Contributions*, which is effective for any actuarial work product with a measurement date on or after November 1, 2018. This ASOP provides guidance to actuaries with regard to the assessment and disclosure of the risk that actual future measurements may differ significantly from expected future measurements. Examples of future measurements include pension liabilities, actuarially determined contributions, and funded status. A report that addresses the requirements of ASOP 51 are provided in a report separate to these valuation results.

## Comparison to Prior Valuation

The purpose of the actuarial valuation of the Plan is to:

- Determine the Plan's funded status and annual costs; and
- Provide information for Government Accounting Standards Board financial statement disclosure.

The following table summarizes the current valuation results as of July 1, 2019, compared to prior year results:

| | July 1, 2018 | July 1, 2019 |
|---|---|---|
| Active participant count | 1,509 | 1,503 |
| **Funding Contribution** | | |
| Discount Rate | 6.00% | 6.00% |
| Actuarial accrued liability (Projected Unit Credit): | $48,815,097 | $55,684,019 |
| Smoothed value of plan assets | 40,274,623 | 42,667,330 |
| Unfunded liability | $8,540,474 | $13,016,689 |
| Funded percentage | 82.5% | 76.6% |
| Actuarially Determined Contribution (ADC), FYE 2020 / 2021 | $474,617 | $1,325,770 |
| Expected Participant Compensation | $31,019,000 | $32,979,000 |
| Contribution as a Percentage of Compensation | 1.53% | 4.02% |
| **GASB 68 Expense** | | |
| Discount Rate | 6.00% | 6.00% |
| Total Pension Liability (Entry Age Normal): | $45,797,809 | $53,122,016 |
| Plan Fiduciary Net Position | 41,575,975 | 43,574,690 |
| Net Pension Liability | $4,221,834 | $9,547,326 |
| GASB 68 Annual Pension Expense/(Income), FYE 2020 final / 2021 estimate | $1,684,009 | $2,263,000 |

Overall, the plan's Net Pension Liability increased from the prior valuation due to the net result of the following:

- Demographic experience was different than expected, primarily due to fewer termination than expected, which resulted in a liability loss;
- Termination assumptions were updated to reflect the recent experience, resulting in an increase in liabilities;
- Lump sum conversion rate was decreased from 5.00% to 4.00% to reflect the current bond market conditions, resulting in an increase in liability; and
- Assets were lower than expected due to unfavorable investment return on plan assets (4.66% actual compared to 6.0% assumed)
- Mortality assumptions were updated to reflect the recent public mortality table Pub-2010 amount-weighted for General employees, with generational future improvement scale MP-2019, resulting in an increase in liabilities;

# Projected Funding Status

## 90% Funded Status

The County's goal is to maintain a 90% funded status for the Plan. The valuation projects the Plan to be under 90% funded based on the cost method used for funding, as shown below.

| | |
|---|---|
| Projected Actuarial Accrued Liability (AAL), 6/30/2020 | $58,082,194 |
| 90% of Projected AAL | 52,273,975 |
| Projected Smoothed Value of Assets, 6/30/2020 | 45,072,623 |
| Shortfall for 90% funding, 6/30/2020 | 7,201,352 |
| Shortfall with interest to middle of year | 7,417,392 |
| Amortization already included in ADC, middle of year | 367,042 |
| Remaining 90% shortfall to fund | $7,050,350 |

The table below summarizes the estimated contribution projected in order to attain 90% at various future dates. The total contributions include the fiscal year ending June 30, 2021 ADC rate of 4.02%.

| Target Funding Date | Additional Annual Payment to Fund Shortfall | Additional FYE 2021 Contribution (% of pay) | Total FYE 2021 Contribution to Fund 90% by Target Date |
|---|---|---|---|
| 6/30/2021 | $7,050,000 | 21.38% | 25.40% |
| 6/30/2022 | 3,628,000 | 11.00% | 15.02% |
| 6/30/2023 | 2,488,000 | 7.54% | 11.56% |
| 6/30/2024 | 1,920,000 | 5.82% | 9.84% |
| 6/30/2025 | 1,579,000 | 4.79% | 8.81% |

## 80% Funded Status

The County also requested a review of maintaining an 80% funded status for the Plan. The valuation projects the Plan to be under 80% funded based on the cost method used for funding, as shown below.

| | |
|---|---|
| Projected Actuarial Accrued Liability (AAL), 6/30/2020 | $58,082,194 |
| 80% of Projected AAL | 46,465,756 |
| Projected Smoothed Value of Assets, 6/30/2020 | 45,072,623 |
| Shortfall for 80% funding, 6/30/2020 | 1,393,133 |
| Shortfall with interest to middle of year | 1,434,926 |
| Amortization already included in ADC, middle of year | 367,042 |
| Remaining 80% shortfall to fund | $1,067,884 |

The table below summarizes the estimated contribution projected in order to attain 80% at various future dates. The total contributions include the fiscal year ending June 30, 2021 ADC rate of 4.02%.

| Target Funding Date | Additional Annual Payment to Fund Shortfall | Additional FYE 2021 Contribution (% of pay) | Total FYE 2021 Contribution to Fund 80% by Target Date |
|---|---|---|---|
| 6/30/2021 | $1,068,000 | 3.24% | 7.26% |
| 6/30/2022 | 549,000 | 1.66% | 5.68% |
| 6/30/2023 | 377,000 | 1.14% | 5.16% |
| 6/30/2024 | 291,000 | 0.88% | 4.90% |
| 6/30/2025 | 239,000 | 0.72% | 4.74% |

* * *

This July 1, 2019 valuation is based on census data provided as of June 30, 2019 for the purpose of providing GASB 68 financial statement information, including final expense for the fiscal year ending June 30, 2020, estimated expense for fiscal year ending June 30, 2021 and the funding contribution amount for the fiscal year ending June 30, 2021.

The following report provides details of the results summarized above and the disclosure information for fiscal year ending 2020.

# Table of Contents

# Actuarial Valuation Certification

This report documents the results of the July 1, 2019 actuarial valuation for the County of Riverside Part-time and Temporary Employee's Retirement Plan. The information provided in this report is intended strictly for documenting the development of the Funding Contribution and disclosure items under Governmental Accounting Standards Board (GASB) Statements No. 68.

Determinations for purposes other than the financial accounting requirements may be significantly different from the results in this report. Thus, the use of this report for purposes other than those expressed here may not be appropriate.

This valuation has been conducted in accordance with generally accepted actuarial principles and practices, including the applicable Actuarial Standards of Practice as issued by the Actuarial Standards Board. In addition, the valuation results are based on our understanding of the financial accounting and reporting requirements under U.S. Generally Accepted Accounting Principles as set forth in Government Accounting Standards Board Statement 68 (GASB 68) including any guidance or interpretations provided by the Company and/or its audit partners prior to the issuance of this report. The information in this report is not intended to supersede or supplant the advice and interpretations of the County of Riverside's auditors.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to (but not limited to) such factors as the following:

- Plan experience differing from that anticipated by the economic or demographic assumptions
- Changes in actuarial methods or in economic or demographic assumptions
- Increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period)
- Changes in plan provisions or applicable law

Due to the limited scope of this valuation report, we have not included an analysis of the potential range of such future measurements. However, an assessment and disclosure of risks pertaining to the funding valuation as required by the actuarial standards of practice is being provided in a separate report.

In conducting the valuation, we have relied on personnel, plan design, and asset information supplied by the County of Riverside as of the valuation date. While we cannot verify the accuracy of all the information, the supplied information was reviewed for consistency and reasonableness. As a result of this review, we have no reason to doubt the substantial accuracy or completeness of the information and believe that it has produced appropriate results. We have relied on actual and expected contributions as summarized within this report.

Actuarial computations under GASB are for purposes of fulfilling plan and employer accounting requirements. The calculations reported herein have been made on a basis consistent with our understanding of these accounting standards. Determinations for purposes other than meeting Employer financial accounting requirements may be different from these results.

This report is intended for the sole use of the County of Riverside. It is intended only to supply information for the County of Riverside to comply with the stated purpose of the report and may not be appropriate for other business purposes. Reliance on information contained in this report by anyone for other than the intended purposes, puts the relying entity at risk of being misled because of confusion or failure to understand applicable assumptions, methodologies, or limitations of the report's conclusions.

Accordingly, no person or entity, including the County of Riverside, should base any representations or warranties in any business agreement on any statements or conclusions contained in this report without the written consent of Aon.

Funded status measurements shown in this report may not be appropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations, and funded status measurements for the employer and plan disclosure and reporting purposes may not be appropriate for assessing the need for or the amount of future contributions.

In determining the annual expense and Funding Contribution for the County of Riverside Part-time and Temporary Employees' Retirement Plan and information relating to plan disclosure and reporting requirements, Aon may be assisting the appropriate plan fiduciary as it performs tasks that are required for the administration of an employee benefit plan. Aon also may be consulting with the employer/plan sponsor (County of Riverside) as it considers alternative strategies for funding the plan, or as it evaluates information relating to employer reporting requirements. Thus, Aon potentially will be providing assistance to County of Riverside (and/or certain of its employees) acting in a fiduciary capacity (for the benefit of plan participants and beneficiaries) and to County of Riverside (and/or its executives) acting in a settlor capacity (for the benefit of the employer sponsoring the County of Riverside Part-time and Temporary Employees' Retirement Plan).

The undersigned are familiar with the near-term and long-term aspects of pension valuations and collectively meet the Qualification Standards of the American Academy of Actuaries necessary to render the actuarial opinions contained herein. The information provided in this report is dependent upon various factors as documented throughout this report, which may be subject to change. Each section of this report is considered to be an integral part of the actuarial opinions.

To our knowledge, no colleague of Aon providing services to the County of Riverside has any material direct or indirect financial interest in the County of Riverside. Thus, we believe there is no relationship existing that might affect our capacity to prepare and certify this actuarial report for the County of Riverside.

Respectfully submitted,

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November 23, 2019

# Summary of Liabilities

This exhibit shows the plan liabilities as of July 1, 2019 based on census data provided by the County as of June 30, 2019 and the Summary of Plan Provisions and Summary of Actuarial Assumptions described in this report.

The Actuarial Accrued Liability (AAL) is the portion of the actuarial present value of all future benefits to be paid to current plan participants that is attributable to past service.

GASB 68 prescribes use of the Entry Age Normal (EAN) cost method for development of expense and disclosure information. For funding contributions, the Projected Unit Credit (PUC) cost method is used to maintain a more stable contribution level for this plan that experiences high turnover rates.

| | **Funding Contributions** | **GASB 68** |
|---|---|---|
| Cost Method | PUC | EAN |
| Discount Rate | 6.00% | 6.00% |
| **Actuarial Accrued Liability (AAL), as of July 1, 2019** | | |
| Actives | $13,028,411 | $14,146,362 |
| Actives not accruing benefits[1] | 13,719,171 | 10,039,217 |
| Deferred Vested Terminated | 17,582,100 | 17,582,100 |
| Retirees and Beneficiaries | 11,354,337 | 11,354,337 |
| Total | $55,684,019 | $ 53,122,016 |
| **Normal (Service) Cost, as of July 1, 2019** | $1,247,333 | $1,255,013 |

[1] Participants who become full-time employees and transfer to CalPERS are no longer accruing a benefit under the plan.

# Summary of Plan Assets

This exhibit develops the asset values used in the valuation.

| **Statement of Invested Plan Assets as of June 30, 2019** | **2019** |
|---|---|
| 1. Mutual Funds – Equity | $30,334,221 |
| 2. Mutual Funds – Fixed Income | 12,506,225 |
| 3. Cash and Equivalents (including receivables) | 734,244 |
| 4. Total Assets held in Trust for Pension Benefits | $43,574,690 |
| | |
| **Reconciliation of Plan Assets** | |
| 1. Market Value of Assets at beginning of Plan Year | $41,575,975 |
| 2. Employer Contributions | 831,825 |
| 3. Employee Contributions | 1,701,351 |
| 4. Net Investment Income | 1,939,447 |
| 5. Benefit Payments | (2,222,152) |
| 6. Administrative Expenses | (251,756) |
| 7. Market Value of Assets at end of Plan Year | $43,574,690 |
| | |
| Rate of Return for 2018/2019 Plan year (net of expenses) | 4.66% |
| | |
| **Development of (Gain)/Loss** | |
| 1. Expected Investment Earnings (assumed 6.00%) | $2,496,311 |
| 2. Actual Investment Earnings | 1,939,447 |
| 3. (Gain)/Loss on Assets (1)-(2) | **$556,864** |
| | |
| **Smoothed Value of Assets as of June 30, 2019** | |
| 1. Market Value of Assets at end of Plan Year | $43,574,690 |
| 2. Unrecognized (Gain)/Loss[1] | (907,360) |
| 3. Preliminary Smoothed Value of Assets at end of Plan Year (1)+(2) | $42,667,330 |
| 4. Lower Corridor (80% of Market Value) | $34,859,752 |
| 5. Upper Corridor (120% of Market Value) | $52,289,628 |
| 6. Smoothed Value of Assets | $42,667,330 |

[1] Schedule of the Current and Prior Asset (Gains)/Losses as of June 30, 2019

| Date Established | Original (Gain)/Loss | Years Remaining as of 06/30/2019 | Amount recognized | Total Amount Unrecognized |
|---|---|---|---|---|
| 7/1/2019 | $556,864 | 4 | $111,373 | $445,491 |
| 7/1/2018 | ($1,383,353) | 3 | ($553,341) | ($830,012) |
| 7/1/2017 | ($2,327,445) | 2 | ($1,396,467) | ($930,978) |
| 7/1/2016 | $2,040,695 | 1 | $1,632,556 | $408,139 |
| Total | | | ($205,879) | ($907,360) |

# Development of Funding Contribution

The County's current funding policy is to contribute an amount equal to a level percentage of pay based on the sum of:

a) Normal Cost with interest and administrative expense, plus
b) Amortization of July 1, 2017 Unfunded Actuarial Accrued Liability (UAAL) over the period ending June 30, 2037, plus
c) Amortization of subsequent unanticipated changes in liability (i.e., actuarial gains / losses and changes in assumptions) over 15-year periods and unanticipated changes in assets over 5-year periods, less
d) Expected Employee Contributions

The following table shows the development of the funding contribution as a level percentage of pay, assuming middle of year payment, for the FYE June 30, 2029:

| | Total |
|---|---|
| **Funding Contribution, FYE June 30, 2021** | |
| Projected Normal Cost (including expense), plus interest | $1,586,260 |
| Amortization of UAAL, plus interest | 976,223 |
| Expected Employee Contributions During FYE June 30, 2021 | (1,236,713) |
| Funding Contribution | $1,325,770 |
| **Funding Contribution as a Percentage of Pay** | |
| Estimated Participant Compensation[1] | $32,979,000 |
| Normal Cost | 4.81% |
| Amortization of UAAL | 2.96% |
| Employee Contributions | (3.75%) |
| Funding Contribution, not less than 0 | 4.02% |

We understand the County makes plan contributions based on the percentage of pay determined above. To the extent actual funding differs from dollar ***amount*** anticipated, the variation will be reflected in future contribution levels through amortization of unexpected changes in the UAAL.

The following table shows the development of the liability gain / loss as of June 30, 2019.

| | |
|---|---|
| Liability as of June 30, 2018 | $48,815,097 |
| Service Cost | 932,616 |
| Interest on Liability | 2,918,198 |
| Plan Change | 0 |
| Assumption Changes | **2,564,505** |
| Benefit Payments | (2,222,152) |
| Expected Liability as of June 30, 2019 | 53,008,264 |
| Actual Liability as of June 30, 2019 | 55,684,019 |
| Liability (Gain)/Loss | **$2,675,755** |

[1] Based on 2.75% payroll increase assumption.

## Amortization Schedule

The following table shows the amortization of Unfunded Actuarial Accrued Liability as of July 1, 2020. Amortization of bases is first recognized in the fiscal year subsequent to the year established.

| Date Established | Type of Base | Original Period | Remaining Period as of June 30, 2019 | Original Balance | Balance Remaining as of June 30, 2020 | Amortization Recognized in FYE June 30, 2021 |
|---|---|---|---|---|---|---|
| 7/1/2017 | 7/1/2017 UAAL[1] | 20 | 17 | $8,013,534 | $7,333,538 | $547,035 |
| 7/1/2018 | Liability (Gain)/Loss | 15 | 14 | 1,628,720 | 1,679,673 | 145,743 |
| 7/1/2018 | Assets (Gain)/Loss | 5 | 4 | (1,383,353) | (1,223,812) | (320,389) |
| 7/1/2018 | Assumptions | 15 | 14 | (67,964) | (70,092) | (6,082) |
| 7/1/2019 | Liability (Gain)/Loss | 15 | 15 | 2,675,755 | 2,836,300 | 233,027 |
| 7/1/2019 | Assets (Gain)/Loss | 5 | 5 | 556,864 | 590,276 | 125,520 |
| 7/1/2019 | Assumptions | 15 | 15 | 2,564,505 | 2,718,375 | 223,338 |
| | Total Charges | | | $13,988,060 | $13,864,259 | $948,192 |

[1] Includes Asset (Gain)/Loss as of 6/30/2017

# GASB 68 Reporting and Disclosure Information for Fiscal Year Ending June 30, 2020

## Development of GASB 68 Annual Expense

The expense amounts shown below have been prepared for GASB 68 reporting purposes for the fiscal year ending June 30, 2020 based on a Valuation Date of July 1, 2019 and Measurement period July 1, 2018 to July 1, 2019.

The following table illustrates the Net Pension Liability under GASB 68.

| | **Fiscal Year Ending 6/30/2019** | **Fiscal Year Ending 6/30/2020** |
|---|---|---|
| 1. Pension Liability | | |
| (a) Actives | $ 11,923,074 | $ 14,146,362 |
| (b) Actives not accruing benefits[1] | $ 8,843,733 | $ 10,039,217 |
| (c) Deferred Vested Terminated | $ 16,153,016 | $ 17,582,100 |
| (d) Retirees and Beneficiaries | $ 8,877,986 | $ 11,354,337 |
| (e) Total | $ 45,797,809 | $ 53,122,016 |
| 2. Plan Fiduciary Net Position | $ 41,575,975 | $ 43,574,690 |
| 3. Net Pension Liability | $ 4,221,834 | $ 9,547,326 |
| 4. Plan Fiduciary Net Position as a Percentage of the Total Pension Liability | 90.78% | 82.03% |
| 5. Deferred Outflow of Resources for Contributions Made After Measurement Date | $ 831,825 | TBD |

| **Annual Expense, FYE June 30, 2020** | |
|---|---|
| 1. Service Cost | $ 1,082,026 |
| 2. Interest Cost | 2,747,097 |
| 3. Expected Return on Assets | (2,496,311) |
| 4. Employee Contributions | (1,701,351) |
| 5. Administrative Expense | 251,756 |
| 6. Plan Changes | 0 |
| 7. Amortization of Unrecognized | |
| (a) Liability (Gain)/Loss | 1,121,877 |
| (b) Asset (Gain)/Loss | 157,642 |
| (c) Assumption Changes | 521,273 |
| (d) Total | 1,800,792 |
| 8. Annual Expense | $ 1,684,009 |

[1] Participants who become full-time employees and transfer to CalPERS are no longer accruing a benefit under the plan.

# Reconciliation of Net Pension Liability

The following table shows details regarding the Total Pension Liability, Plan Fiduciary Net Position and Net Pension Liability for the measurement period June 30, 2018 to June 30, 2019.

| | Increase (Decrease) | | |
|---|---|---|---|
| | **Total Pension Liability (a)** | **Plan Fiduciary Net Position (b)** | **Net Pension Liability (a) – (b)** |
| **Balance Recognized at 6/30/2019 (Based on 6/30/2018 Measurement Date)** | $45,797,809 | $41,575,975 | $4,221,834 |
| **Changes for the year:** | | | |
| Service Cost | $1,082,026 | N/A | $1,082,026 |
| Interest Cost | $2,747,097 | N/A | $2,747,097 |
| Plan Amendment | $0 | N/A | $0 |
| Differences Between expected and actual experience | $2,732,087 | N/A | $2,732,087 |
| Changes of Assumptions | $2,985,149 | N/A | $2,985,149 |
| Benefit Payments, including refunds of employee contributions | ($2,222,152) | ($2,222,152) | $0 |
| Contributions – Employer | N/A | $831,825 | ($831,825) |
| Contributions – Employee | N/A | $1,701,351 | ($1,701,351) |
| Net Investment Income | N/A | $1,939,447 | ($1,939,447) |
| Administrative Expenses | N/A | ($251,756) | $251,756 |
| Other Changes | $0 | $0 | $0 |
| **Net Changes** | $7,324,207 | $1,998,715 | $5,325,492 |
| **Balance Recognized at 6/30/2020 (Based on 6/30/2019 Measurement Date)** | $53,122,016 | $43,574,690 | $9,547,326 |

# Development of Items Used in Determination of 2020 Expense

### Liability (Gain)/Loss

The following table illustrates the liability (gain)/loss under GASB 68.

| | | Fiscal Year Ending 6/30/2020 |
|---|---|---|
| 1. | Pension Liability at Beginning of Measurement Period | $ 45,797,809 |
| 2. | Service Cost | 1,082,026 |
| 3. | Interest on the Total Pension Liability | 2,747,097 |
| 4. | Changes of Benefit Terms | 0 |
| 5. | Changes of Assumptions | 2,985,149 |
| 6. | Benefit Payments | (2,222,152) |
| 7. | Expected Pension Liability at End of Measurement Period | 50,389,929 |
| 8. | Actual Pension Liability at End of Measurement Period | 53,122,016 |
| 9. | Pension Liability (Gain)/Loss | $ 2,732,087 |
| 10. | Average Future Working Life Expectancy | 8.78 |
| 11. | Pension Liability (Gain)/Loss Amortization | $ 311,172 |

### Asset (Gain)/Loss

The following illustrates the asset (gain)/loss under GASB 68.

| | | Fiscal Year Ending 6/30/2020 |
|---|---|---|
| 1. | Pension Asset at Beginning of Measurement Period | $ 41,575,975 |
| 2. | Contributions—Employer | 831,825 |
| 3. | Contributions—Employee | 1,701,351 |
| 4. | Expected Investment Income | 2,496,311 |
| 5. | Benefit Payments | (2,222,152) |
| 6. | Administrative Expense | (251,756) |
| 7. | Other | 0 |
| 8. | Expected Pension Asset at End of Measurement Period | 44,131,554 |
| 9. | Actual Pension Asset at End of Measurement Period | 43,574,690 |
| 10. | Pension Asset (Gain)/Loss | $ 556,864 |
| 11. | Amortization Factor | 5.00 |
| 12. | Pension Asset (Gain)/Loss Amortization | $ 111,373 |

## Deferred Outflows/Inflows of Resources

The following table illustrates the Deferred Inflows and Outflows as of June 30, 2020 under GASB 68.

| | Deferred Outflows of Resources | Deferred Inflows of Resources |
|---|---|---|
| 1. Difference between actual and expected experience | $5,927,879 | $0 |
| 2. Net difference between expected and actual earnings on pension plan investments | 0 | 917,808 |
| 3. Assumption changes | 3,891,138 | 761,256 |
| 4. Total | $9,819,017 | $1,679,074 |

## Amortization of Deferred Inflows/Outflows

The table below lists the amortization bases included in the deferred inflows/outflows as of June 30, 2020.

| Date | | Period[1] | | Balance | | Annual |
|---|---|---|---|---|---|---|
| Established | Type of Base | Original | Remaining | Original | Remaining | Payment |
| 6/30/2019 | Liability (Gain)/Loss | 8.78 | 7.78 | $2,732,087 | $2,420,915 | $311,172 |
| 6/30/2019 | Asset (Gain)/Loss | 5.00 | 4.00 | 556,864 | 445,491 | 111,373 |
| 6/30/2019 | Assumptions | 8.78 | 7.78 | 2,985,149 | 2,645,155 | 339,994 |
| 6/30/2018 | Liability (Gain)/Loss | 8.07 | 6.07 | 1,620,937 | 1,219,217 | 200,860 |
| 6/30/2018 | Asset (Gain)/Loss | 5.00 | 3.00 | (1,383,353) | (830,011) | (276,671) |
| 6/30/2018 | Assumptions | 8.07 | 6.07 | 39,510 | 29,718 | 4,896 |
| 6/30/2017 | Liability (Gain)/Loss | 7.97 | 4.97 | 1,456,980 | 908,556 | 182,808 |
| 6/30/2017 | Asset (Gain)/Loss | 5.00 | 2.00 | (2,353,591) | (941,437) | (470,718) |
| 6/30/2017 | Assumptions | 7.97 | 4.97 | (746,218) | (465,334) | (93,628) |
| 6/30/2016 | Liability (Gain)/Loss | 7.97 | 3.97 | 1,524,469 | 759,365 | 191,276 |
| 6/30/2016 | Asset (Gain)/Loss | 5.00 | 1.00 | 2,040,695 | 408,139 | 408,139 |
| 6/30/2016 | Assumptions | 7.97 | 3.97 | (594,082) | (295,922) | (74,540) |
| 6/30/2015 | Liability (Gain)/Loss | 8.53 | 3.53 | 795,023 | 329,007 | 93,203 |
| 6/30/2015 | Asset (Gain)/Loss | 5.00 | 0.00 | 1,927,595 | 0 | 385,519 |
| 6/30/2015 | Assumptions | 8.53 | 3.53 | 2,939,020 | 1,216,265 | 344,551 |
| 6/30/2014 | Liability (Gain)/Loss | 8.04 | 2.04 | 1,146,168 | 290,819 | 142,558 |
| | Total Charges | | | $14,687,253 | $ 8,139,943 | $1,800,792 |

[1] Periods prior to 6/30/2017 were based on future working life as of the end of the measurement period.

Amounts reported as Deferred Outflows of Resources and Deferred (Inflows) of Resources related to pensions will be recognized in pension expense as follows:

| Year Ending June 30 | |
|---|---|
| 2021 | $1,415,273 |
| 2022 | $1,007,134 |
| 2023 | $1,340,998 |
| 2024 | $1,402,717 |
| 2025 | $943,426 |
| Thereafter | $2,030,395 |

# Plan Fiduciary Net Position Projection

The following table illustrates the projection of the fiduciary net position for use in the calculation of the discount rate as of June 30, 2020.

*($ in thousands)*

| Year Ending June 30[2] | Beginning Fiduciary Net Position (a) | Total Contributions (b) | Benefit Payments (c) | Administrative Expenses (d) | Investment Earnings (e) | Ending Fiduciary Net Position[1] (f) |
|---|---|---|---|---|---|---|
| 2020 | $43,575 | $1,630 | $2,968 | $228 | $2,569 | $44,578 |
| 2021 | 44,578 | 1,834 | 2,475 | 208 | 2,650 | 46,379 |
| 2022 | 46,379 | 1,658 | 2,469 | 202 | 2,754 | 48,120 |
| 2023 | 48,120 | 1,516 | 2,606 | 199 | 2,850 | 49,681 |
| 2024 | 49,681 | 1,436 | 2,720 | 198 | 2,938 | 51,137 |
| 2025 | 51,137 | 1,772 | 2,829 | 197 | 3,032 | 52,915 |
| 2026 | 52,915 | 1,620 | 2,937 | 197 | 3,131 | 54,533 |
| 2027 | 54,533 | 1,627 | 3,092 | 197 | 3,224 | 56,094 |
| 2028 | 56,094 | 1,647 | 3,250 | 197 | 3,313 | 57,607 |
| 2029 | 57,607 | 1,676 | 3,430 | 197 | 3,399 | 59,056 |
| 2030 | 59,056 | 1,710 | 3,582 | 197 | 3,483 | 60,469 |
| 2031 | 60,469 | 1,747 | 3,592 | 197 | 3,569 | 61,996 |
| 2032 | 61,996 | 1,787 | 3,632 | 197 | 3,660 | 63,614 |
| 2033 | 63,614 | 1,830 | 3,738 | 198 | 3,755 | 65,263 |
| 2034 | 65,263 | 1,874 | 3,749 | 198 | 3,855 | 67,046 |
| 2035 | 67,046 | 1,710 | 3,900 | 198 | 3,953 | 68,610 |
| 2036 | 68,610 | 1,045 | 3,970 | 199 | 4,025 | 69,511 |
| 2037 | 69,511 | 1,068 | 4,062 | 199 | 4,077 | 70,396 |
| 2038 | 70,396 | 198 | 4,179 | 198 | 4,100 | 70,317 |
| 2039 | 70,317 | 197 | 4,179 | 197 | 4,096 | 70,233 |
| 2040 | 70,233 | 196 | 4,291 | 196 | 4,087 | 70,030 |
| 2041 | 70,030 | 195 | 4,316 | 195 | 4,074 | 69,788 |
| 2042 | 69,788 | 194 | 4,481 | 194 | 4,055 | 69,362 |
| 2043 | 69,362 | 192 | 4,527 | 192 | 4,028 | 68,863 |
| 2044 | 68,863 | 190 | 4,567 | 190 | 3,997 | 68,293 |
| 2045 | 68,293 | 187 | 4,595 | 187 | 3,962 | 67,660 |
| 2046 | 67,660 | 184 | 4,695 | 184 | 3,921 | 66,886 |
| 2047 | 66,886 | 181 | 4,720 | 181 | 3,874 | 66,040 |
| 2048 | 66,040 | 177 | 4,819 | 177 | 3,820 | 65,040 |
| 2049 | 65,040 | 173 | 4,824 | 173 | 3,760 | 63,976 |

[1] (f)=(a) + (b) – (c) – (d) + (e)
[2] Years later than 2049 were omitted from this table.

# Plan Fiduciary Net Position

The last year in which projected benefit payments are due from the Plan is 2114.

The Plan's projected fiduciary net position is not projected to reach $0.

As such, the Plan's fiduciary net position was projected to be available to make all projected future benefit payments for current Plan members. In other words, there is no projected "depletion date" when projected benefits are not covered by projected assets. Therefore, the long-term expected rate of return on Plan investments of 6.00% per annum was applied to all periods of projected benefit payments to determine the total Pension liability as of June 30, 2020 shown earlier in this report.

**Asset Projection Basis**

In projecting the Plan's fiduciary net position, the following assumptions were made:

1. Interest rate for discounting was 6.00% per annum.

2. Projected total contributions are employer and employee contributions to the unfunded actuarial accrued liability and normal cost (for the current active population only). Contributions are assumed to be paid mid-year.

3. Projected employee contributions to the plan are 3.75% of compensation.

4. Assumed contributions are based on the County of Riverside continuing to follow the current funding policy.

5. Projected benefit payments have been determined in accordance with Paragraph 39 of GASB Statement No. 67, and are based on the closed group of active, inactive vested, retired members and beneficiaries as of June 30, 2020. Benefit payments are assumed to be paid mid-year.

6. Administrative expenses are assumed to be $225,000 per year increased with inflation at 2.5% per year and pro-rated based on projected proportion of headcount that relates to current population.

## Sensitivity to Discount Rate

The following table illustrates the impact of interest rate sensitivity on the Net Pension Liability for fiscal year ending June 30, 2019:

| | 1% Decrease (5.0%) | Current Rate (6.0%) | 1% Increase (7.0%) |
|---|---|---|---|
| Total Pension Liability | $53,221,303 | $45,797,809 | $39,611,371 |
| Plan Fiduciary Net Position | (41,575,975) | (41,575,975) | (41,575,975) |
| Net Pension Liability | $11,645,328 | $4,221,834 | ($1,964,604) |

The following table illustrates the impact of interest rate sensitivity on the Net Pension Liability for fiscal year ending June 30, 2020:

| | 1% Decrease (5.0%) | Current Rate (6.0%) | 1% Increase (7.0%) |
|---|---|---|---|
| Total Pension Liability | $62,078,659 | $53,122,016 | $46,121,113 |
| Plan Fiduciary Net Position | (43,574,690) | (43,574,690) | (43,574,690) |
| Net Pension Liability | $18,503,969 | $9,547,326 | $2,546,423 |

## Schedule of Changes in the Net Pension Liability and Related Ratios

The following exhibit is a 10-year history of change in Net Pension Liability.

| Year Ending June 30, | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|---|---|---|---|---|---|---|
| **Total Pension Liability** | | | | | | |
| Service Cost | $1,556,594 | $1,511,755 | $1,717,422 | $1,913,998 | $1,299,918 | $1,082,026 |
| Interest Cost | $1,800,053 | $1,983,322 | $2,186,254 | $2,358,408 | $2,547,913 | $2,747,097 |
| Changes of Benefit Terms | $0 | $0 | $0 | $0 | $0 | $0 |
| Differences Between Expected and Actual Experiences | $1,146,168 | $795,023 | $1,524,469 | $1,456,980 | $1,620,937 | $2,732,087 |
| Changes of Assumptions | $0 | $2,939,020 | ($594,082) | ($746,218) | $39,510 | $2,985,149 |
| Benefit Payments, Including Refunds of Member Contributions | ($1,761,676) | ($1,511,284) | ($1,506,614) | ($1,757,166) | ($1,726,399) | ($2,222,152) |
| Net Change in Total Pension Liability | $2,741,139 | $5,717,836 | $3,327,449 | $3,226,002 | $3,781,879 | $7,324,207 |
| Total Pension Liability (Beginning) | $27,003,504 | $29,744,643 | $35,462,479 | $38,789,928 | $42,015,930 | $45,797,809 |
| Total Pension Liability (Ending) | $29,744,643 | $35,462,479 | $38,789,928 | $42,015,930 | $45,797,809 | $53,122,016 |
| **Plan Fiduciary Net Position** | | | | | | |
| Contributions—Employer | $955,554 | $606,694 | $667,952 | $1,341,340 | $815,531 | $831,825 |
| Contributions—Member | $1,394,450 | $1,266,962 | $1,399,254 | $1,674,410 | $1,632,926 | $1,701,351 |
| Net Investment Income | $4,437,066 | $131,206 | ($116,966) | $4,288,900 | $3,647,940 | $1,939,447 |
| Benefit Payments, Including Refunds of Member Contributions | ($1,761,676) | ($1,511,284) | ($1,506,614) | ($1,757,166) | ($1,726,399) | ($2,222,152) |
| Administrative Expense | ($227,581) | ($217,041) | ($188,657) | ($127,973) | ($347,081) | ($251,756) |
| Other | $0 | $0 | $0 | $0 | $0 | $0 |
| Net Change in Plan Fiduciary Net Position | $4,797,813 | $276,537 | $254,969 | $5,419,511 | $4,022,617 | $1,998,715 |
| Plan Fiduciary Net Position (Beginning) | $26,804,528 | $31,602,341 | $31,878,878 | $32,133,847 | $37,553,358 | $41,575,975 |
| Plan Fiduciary Net Position (Ending) | $31,602,341 | $31,878,878 | $32,133,847 | $37,553,358 | $41,575,975 | $43,574,690 |
| **Net Pension Liability (Ending)** | ($1,857,698) | $3,583,601 | $6,656,081 | $4,462,572 | $4,221,834 | $9,547,326 |
| Net Position as a % of Pension Liability | 106.25% | 89.89% | 82.84% | 89.38% | 90.78% | 82.03% |
| Covered-Employee Payroll | $29,516,733 | $23,120,653 | $33,058,770 | $34,610,720 | $29,381,080 | $32,096,397 |
| Net Pension Liability as a % of Payroll | (6.29%) | 15.50% | 20.13% | 12.89% | 14.37% | 29.75% |

***Notes to Schedule:***

- *No changes have been made over the 10-year history since GASB 68 has become effective.*

## Schedule of Contributions

The follow exhibit is a 10-year history of Schedule of Contributions.

| **Year Ending June 30,** | **2015** | **2016** | **2017** | **2018** | **2019** | **2020** |
|---|---|---|---|---|---|---|
| Actuarially Determined Contributions | $252,273 | $122,127 | $727,119 | $656,930 | $610,522 | $474,617 |
| Contributions in Relation to the Actuarially Determined Contribution | $606,694 | $667,952 | $1,341,340 | $815,531 | $831,825 | TBD |
| Contribution Deficiency/(Excess) | ($354,421) | ($545,825) | ($585,457) | ($158,601) | ($221,303) | TBD |
| Covered-Employee Payroll | $37,918,375 | $41,747,000 | $44,650,933 | $43,544,693 | $50,109,940 | TBD |
| Contributions as a Percentage of Covered-Employee Payroll | 1.60% | 1.60% | 3.00% | 1.87% | 1.66% | TBD |

## Schedule of Investment Returns

The follow exhibit is a 10-year history of Investment Returns.

| Year Ending June 30, | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|---|---|---|---|---|---|---|
| Annual Money-Weighted Rate of Return, Net of Investment Expense | 16.5% | 0.41% | (0.36%) | 13.12% | 9.66% | 4.66% |

*These schedules are presented to illustrate the requirement to show information for 10 years. However, until a full 10-year trend is compiled, pension plans should present information for those years for which information is available*

# Participant Information

The below exhibits summarize participant demographic information as of June 30, 2019.

| | |
|---|---|
| **Number of Participants:** | |
| Actives | 1,503 |
| Full-time Actives (not accruing benefits)[1] | 5,040 |
| Deferred Vested | 2,448 |
| Retirees | 321 |
| Total | 9,312 |
| **Participant Compensation – Active Participants Currently Accruing Benefits** | |
| Compensation (prior year) | $32,096,397 |
| Number of Active Participants below assumed retirement age | 1,503 |
| Average Compensation | $21,355 |
| **Actives** | |
| Average Age | 39.42 |
| Average Benefit Service (years) | 3.18 |
| **Full-time Actives** | |
| Average Age | 43.14 |
| Average Accrued Annual Benefit | $534 |
| **Deferred Vested** | |
| Average Age | 48.03 |
| Average Accrued Annual Benefit | $1,339 |
| **Retired** | |
| Average Age | 73.67 |
| Average Annual Benefit | $3,677 |

**Reconciliation of Participants from Prior Valuation**

| | Active | Full-time Actives[1] | Terminated Vested | Retirees and Beneficiaries | Total |
|---|---|---|---|---|---|
| As of July 1, 2018 | 1,509 | 4,690 | 2,792 | 289 | 9,280 |
| Duplicates | 0 | 0 | 0 | 0 | 0 |
| Classification Change | (387) | 387 | | | 0 |
| New Entrants | 701 | 236 | 90 | 5 | 1,032 |
| Vested Terminations | (149) | (115) | 264 | 0 | 0 |
| Rehires | 36 | 41 | (72) | 0 | 5 |
| Retired | (8) | (3) | (26) | 37 | 0 |
| Deaths | 0 | 0 | 0 | (10) | (10) |
| Lump Sum Cash-outs | (199) | (196) | (600) | | (995) |
| Data Correction | 0 | 0 | 0 | 0 | 0 |
| Net Change | (6) | 350 | (344) | 32 | 32 |
| As of July 1, 2019 | **1,503** | **5,040** | **2,448** | **321** | **9,312** |

[1] Participants who become full-time employees and transfer to CalPERS are no longer accruing a benefit under the plan.

**Active Age Distribution as of July 1, 2019**

| Age | Number of Participants |
|---|---|
| 15-19 | 23 |
| 20-24 | 156 |
| 25-29 | 282 |
| 30-34 | 251 |
| 35-39 | 171 |
| 40-44 | 148 |
| 45-49 | 136 |
| 50-54 | 100 |
| 55-59 | 81 |
| 60-64 | 79 |
| 65-69 | 43 |
| 70-74 | 16 |
| 75 + | 17 |
| Total | 1,503 |

**Active Career Earnings Distribution as of July 1, 2019**

| Career Earnings | Number of Participants |
|---|---|
| Under $5,000 | 492 |
| $5,000 - $10,000 | 229 |
| $10,000 - $25,000 | 199 |
| $25,000 - $50,000 | 104 |
| $50,000 - $100,000 | 169 |
| Over $100,000 | 310 |
| Total | 1,503 |

This valuation includes the following active participants by category:

| Category | Number of participants |
|---|---|
| ▪ Seasonal | 0 |
| ▪ Resident/Physician | 91 |
| ▪ Per Diem | 650 |
| ▪ Temporary | 760 |
| ▪ Regular | 2 |
| | 1,503 |

**Development of GASB 75 Amortization Period for Changes in Liability**

| | | July 1, 2018 | | July 1, 2019 | |
|---|---|---|---|---|---|
| | **Status** | **Count** | **Average Future Working Life** | **Count** | **Average Future Working Life[1]** |
| 1. | Actives | 1,509 | 0.69 | 1,503 | 0.98 |
| 2. | Actives not accruing benefits | 4,690 | 17.16 | 5,040 | 16.91 |
| 3. | Deferred Vested Terminated | 2,792 | 0.00 | 2,448 | 0.00 |
| 4. | Retirees | 289 | 0.00 | 321 | 0.00 |
| 5. | Total/Weighted Average | 9,280 | 8.78 | 9,312 | 9.31 |

[1] Based on demographic assumptions set out in the Actuarial Assumption and Methods section of this report

# Summary of Principal Plan Provisions

**1. Membership Requirements**

All employees of the County not covered by another retirement plan as provided by Code Section 3121(b)(7)(F).

**2. Career Compensation**

Total amount of compensation, limited annually by the Social Security Wage Base.

**3. Normal or Late Retirement Benefit**

Eligibility: Age 65

Benefit: 2% times Career Compensation, payable as a single life annuity.

**4. Pre-Retirement Death Benefit**

Refund of contributions accumulated with interest at 5% per annum.

**5. Death after Retirement**

None. Benefits are payable for the life of the employee only.

**6. Termination Benefit**

Normal retirement benefit accrued to date of termination.

A lump sum distribution is paid if the actuarial equivalent benefit is less than $5,000. Actuarial Equivalence for this purpose is based on the greater of the factor produced under the UP1984 unisex mortality table at 6% or the applicable mortality table and interest rate under 417(e).

**7. Vesting**

Benefits are 100% vested immediately.

**8. Member Contributions**

3.75% of compensation per pay period.

# Actuarial Assumptions and Methods

1. **Actuarial Cost Method**

   Actuarially Determined Contributions – Projected Unit Credit

   GASB 68 – Entry Age Normal

2. **Funding Contribution Methodology**

   Funding contributions are based on the sum of:

   a) Normal Cost with interest and administrative expense, plus
   b) Amortization of July 1, 2017 Unfunded Actuarial Accrued Liability (UAAL) over the period ending June 30, 2037, plus
   c) Amortization of subsequent unanticipated changes in liability (i.e., actuarial gains / losses and changes in assumptions) over 15-year periods and unanticipated changes in assets year 5-year periods, less
   d) Expected Employee Contributions

3. **Interest Rates**

   Funding Interest Rate – 6.00%
   Used as the asset return assumption and based on the long term expected return on plan assets.

   GASB 68 Discount Rate – 6.00%
   The discount rate is based on a single equivalent rate that reflects a blend of:

   - Expected return on assets during the period such that assets are projected to be sufficient to pay benefits of current participants (6.00%); and
   - Municipal bond index for periods beyond the depletion of assets (3.50%).

   Based on the current funding policy, projected cash flows, and the assumed asset return, the plan assets are not projected to be depleted, and the discount rate can be based on the 6.00% asset return.

   Lump Sum Interest Rate – 4.00%
   Used to estimate lump sum benefit amounts and based on the long term expected effective rate used for determining lump sums under plan provisions. Generally, this is based on high quality corporate bonds. This rate is independent of the plan's asset allocation and expected return.

4. **Salary Increases**

   2.75% per year

5. **Payroll Growth (used for amortization of unfunded liability)**

   2.75% per year (same as CalPERS assumption)

## 6. Mortality

Pub-2010 amount-weighted tables for General employees of all income levels, projected using improvement scale MP-2019 from 2010.

Sample rates for the 2010 base year are as follows:

| Age | Male | Female |
|---|---|---|
| 30 | 0.04% | 0.02% |
| 40 | 0.07% | 0.04% |
| 50 | 0.30% | 0.02% |
| 60 | 0.61% | 0.38% |
| 70 | 0.70% | 0.49% |
| 80 | 1.73% | 1.33% |
| 90 | 14.67% | 11.49% |

## 7. Termination Rates

*Actives (accruing benefits)*

| | Years of Service | |
|---|---|---|
| Attained Age | 0-2 | 2+ |
| 20-24 | 65% | 65% |
| 25-29 | 65% | 55% |
| 30-34 | 65% | 50% |
| 35-39 | 65% | 50% |
| 40-44 | 65% | 40% |
| 45-49 | 65% | 40% |
| 50-54 | 55% | 40% |
| 55-59 | 50% | 35% |
| 60-64 | 50% | 30% |

*Full-time Actives (no longer accruing benefits)*

Turnover rates developed in the 2017 CalPERS Experience Study for Miscellaneous were used in the valuation. The following sample rates are based on age and service:

| Attained | Years of Service | | | | | | |
|---|---|---|---|---|---|---|---|
| Age | 0 – 1 | 5 | 10 | 15 | 20 | 25 | 30 |
| 30 | 16.06% | 6.15% | 4.16% | 2.62% | 0.00% | 0.00% | 0.00% |
| 35 | 15.37% | 5.67% | 3.99% | 2.52% | 1.84% | 0.00% | 0.00% |
| 40 | 14.68% | 5.19% | 3.75% | 2.43% | 1.76% | 1.07% | 0.00% |
| 45 | 14.00% | 4.80% | 3.51% | 2.16% | 1.68% | 1.00% | 0.26% |
| 50 | 13.32% | 4.41% | 2.86% | 1.88% | 1.30% | 0.94% | 0.20% |
| 55 | 12.62% | 3.68% | 2.22% | 1.43% | 0.92% | 0.53% | 0.16% |

## 8. Retirement Rates

*Actives (accruing benefits)*

| Attained Age | Probability of Retirement |
|---|---|
| 65-66 | 60% |
| 67-74 | 50% |
| 75+ | 100% |

*Full-time Actives (no longer accruing benefits)*

Retirement rates developed in the 2017 CalPERS Experience Study for Miscellaneous were used in the valuation. Applicable retirement rate table is based on employee date of hire, as summarized below:

- Hire date prior to August 24, 2012: Miscellaneous 3% @ 60 rates
- Hire date August 24, 2012 to December 31, 2012: Miscellaneous 2% @ 60 rates
- Hire date post December 31, 2012: Miscellaneous 2% @ 62 rates

Sample rates from the 'Miscellaneous 3% @ 60 table' are as follows:

| Attained | Years of Service | | | | | | |
|---|---|---|---|---|---|---|---|
| Age | 5 | 10 | 15 | 20 | 25 | 30 | 35 |
| <65 | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| 65 | 20.00% | 24.20% | 28.30% | 33.00% | 30.00% | 34.20% | 37.00% |
| 70 | 22.00% | 25.50% | 29.10% | 32.60% | 35.80% | 38.80% | 40.00% |
| 75 | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% |

Sample rates from the 'Miscellaneous 2% @ 60 table' are as follows:

| Attained | Years of Service | | | | | | |
|---|---|---|---|---|---|---|---|
| Age | 5 | 10 | 15 | 20 | 25 | 30 | 35 |
| <65 | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| 65 | 14.00% | 17.80% | 21.50% | 26.40% | 32.10% | 37.70% | 41.20% |
| 70 | 14.00% | 17.80% | 21.50% | 26.40% | 32.10% | 37.70% | 41.20% |
| 75 | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% |

Sample rates from the 'Miscellaneous 2% @ 62 table' are as follows:

| Attained | Years of Service | | | | | | |
|---|---|---|---|---|---|---|---|
| Age | 5 | 10 | 15 | 20 | 25 | 30 | 35 |
| <65 | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| 65 | 11.50% | 14.70% | 18.00% | 21.30% | 24.50% | 31.50% | 35.40% |
| 70 | 12.70% | 16.40% | 20.00% | 23.60% | 27.30% | 35.00% | 39.40% |
| 75 | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% |

**9. Value of Assets**

Funding – Effective June 30, 2014, smoothed asset value, with differences between actual and expected earnings recognized over a 5-year period (with the first year of recognition being the period in which the Gain/(Loss) occurred), subject to an 80%-120% corridor around market value.

GASB 68 – Market value

**10. Form of Benefit Paid**

Lump sums paid immediately at termination for benefits with a present value less than $5,000. Single life annuities deferred to normal retirement age paid for benefits with a present value greater than $5,000.

**11. Administrative Expenses**

Assumed $225,000 per year

**12. Participants Valued**

Only current active, full time active, terminated vested, retirees and beneficiaries of the plan as of June 30, 2019 are included in the valuation.

### Changes in Assumptions and Methods Since the Prior Valuation

1) Lump sum conversion rate was updated from 5.00% to 4.00%.
2) Termination assumptions for actives who are accruing benefits were updated to reflect recent experience. Prior rates were based on age only and started at 65% for those under age 30, 60% for those age 30-49 and 50% for those age 50-64.
3) Base mortality assumptions were updated to reflect the most recent public mortality table, from RP-2006 and CalPERS 2017 Experience Study to Pub-2010 amount-weighted for General employees.
4) Mortality improvement scale was updated from MP-2018 to MP-2019
5) Actuarial increases for retirees currently beyond normal retirement age are now directly valued through benefit adjustments determined by County. Previously this was estimated through a $200,000 load on liability

# Appendix A – Estimated Annual Expense for FYE 2021

## Development of Annual Expense FYE 2021 under GASB 68 (Estimate)

The estimated expense amount shown below has been prepared for GASB 68 for the fiscal year ending June 30, 2021.

The Actuarial Accrued Liability as of July 1, 2019 has been prepared using the Entry Age Normal cost method, as required by GASB 68. The following estimated expense amounts have been prepared based on a Valuation Date of July 1, 2019, Measurement Date of July 1, 2020 and interest rate of 6.00%.

*The expense shown below will be updated in next year's report to reflect actual administrative costs, employee contributions, and any gains or losses with respect to assets and liabilities.*

| | |
|---|---|
| **Unfunded Actuarial Accrued Liability, as of July 1, 2019** | |
| Actuarial Accrued Liability as of 7/1/2019 | $53,122,016 |
| Value of Plan Assets as of 7/1/2019 | 43,574,690 |
| Unfunded Actuarial Accrued Liability (UAAL) | $9,547,326 |
| **Estimated Annual Expense, FYE June 30, 2021**[10] | |
| 1. Service Cost | $1,255,000 |
| 2. Interest Cost | 3,198,000 |
| 3. Expected Return on Assets | (2,593,000) |
| 4. Employee Contributions | (1,237,000) |
| 5. Administrative Expense | 225,000 |
| 6. Plan Changes | 0 |
| 7. Amortization of Unrecognized | |
| (a) Liability (Gain)/Loss | 1,122,000 |
| (b) Asset (Gain)/Loss | (228,000) |
| (c) Assumption Changes | 521,000 |
| (d) Total | 1,415,000 |
| 8. Annual Expense | $2,263,000 |

[10] Final FYE 2021 expense information will be provided in the actuarial valuation based on a June 30, 2020 measurement date reflecting updated census, assumptions, plan provisions and actual asset values, in addition to any asset, liability, or assumption gains/losses initially recognized over the period June 30, 2019 to June 30, 2020

# Riverside County Board of Supervisors
## Request to Speak

Submit request to Clerk of Board (right of podium), Speakers are entitled to three (3) minutes, subject to Board Rules listed on the reverse side of this form.

**SPEAKER'S NAME:** ROY BUCKERT

**Address:** ______________________

**City:** ______________ **Zip:** ______________

**Phone #:** ______________

**Date:** ______________ **Agenda #** 3, 4

**PLEASE STATE YOUR POSITION BELOW:**

**Position on "Regular" (non-appealed) Agenda Item:**

____ **Support** ____ **Oppose** ✓ **Neutral**

**Note:** If you are here for an agenda item that is filed for "Appeal", please state separately your position on the appeal below:

____ **Support** ____ **Oppose** ____ **Neutral**

**I give my 3 minutes to:** ______________________

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**SPEAKER'S NAME:** ALI MAZAREI

**Address:** 18058 GREEN ORCHARD PL

**City:** RIVERSIDE **Zip:** 92508

**Phone #:** 714-715-1685

**Date:** 1-14-20 **Agenda #** 3.4

**PLEASE STATE YOUR POSITION BELOW:**

**Position on "Regular" (non-appealed) Agenda Item:**

________**Support** ___X___**Oppose** ________**Neutral**

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**SPEAKER'S NAME:** Matthew Johnson

**Address:** 25890 Chambers

**City:** Sun City **Zip:** 92586

**Phone #:** 951-538-3387

**Date:** 1-14-2020 **Agenda #** 3.4

**PLEASE STATE YOUR POSITION BELOW:**

**Position on "Regular" (non-appealed) Agenda Item:**

________ **Support** ________ **Oppose** ________ **Neutral**

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**SPEAKER'S NAME:** RANDY ROBINSON

**Address:** 27231

**City:** SUN CITY CA **Zip:** 92586

**Phone #:** (951) 719-6903

**Date:** 1-14/20 **Agenda #** 3.4

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