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

ITEM
3.6
(ID # 8941)

MEETING DATE:
Tuesday, February 5, 2019

FROM : EXECUTIVE OFFICE:

SUBJECT: EXECUTIVE OFFICE: Pension Advisory Review Committee (PARC) 2019 Annual Pension Report, All Districts. [$0]

RECOMMENDED MOTION: That the Board of Supervisors:

1. Receive and file the 2019 PARC Annual Pension Report.

2. Direct staff to report back with any additional recommendations or updates on the County's pensions plans, including any legislative changes that could be incorporated in the County's Legislative Platform.

3. Direct the PARC to review the annual CalPERS pre-payment for FY19/20 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 19/20 budget.

ACTION: Policy

Don R. Kent, Assistant CEO-County Finance Officer 1/30/2019

MINUTES OF THE BOARD OF SUPERVISORS

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

Ayes:	Jeffries, Spiegel, Washington, Perez and Hewitt
Nays:	None
Absent:	None
Date:	February 5, 2019
xc:	E.O.

Kecia Harper
Clerk of the Board
By: Deputy

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

FINANCIAL DATA	Current Fiscal Year:	Next Fiscal Year:	Total Cost:	Ongoing Cost
COST	$0	$0	$0	$0
NET COUNTY COST	$0	$0	$0	$0
SOURCE OF FUNDS: N/A			Budget Adjustment No	
			For Fiscal Year: 18/19	

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 Treasurer-Tax Collector, County Finance Officer, the Human Resources Director, County Auditor-Controller, and, a local safety member department representative.

Board Policy B-25, Pension Management Policy, requires 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 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 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 John Bartel of Bartel Associates, LLC, CalPERS actuarial 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.

Pension Reform

The Board of Supervisors took the initiative on pension reform. As a result of labor negotiations, employees of the County agreed to pay their own member contributions. Additionally, a new second retirement tier was implemented in both the Miscellaneous and Safety plans with a lower benefit formula which became effective on August 24, 2012. Thereafter, Governor Brown initiated proposals resulting in changes to pension benefits. The passage of Assembly Bill (AB) 340 created the Public Employees' Pension Reform Act (PEPRA) that implemented new lower benefit formulas, 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). The lower benefit formula for Tier III is 2% at 62 for Miscellaneous and 2.7% at 57 for Safety.

Employer Rate Outlook

The CalPERS employer contribution rates for the Miscellaneous Plan will increase from 18.9% of payroll in FY 18/19 to 21.6% in FY 19/20, and for the Safety Plan, employer contribution rates will increase from 31.6% in FY 18/19 to 37.3% in FY 19/20.

Funded Status

The actual unfunded accrued liability for the period ended June 30, 2017 is $2.115 billion (an increase of $65 million from prior year) for the Miscellaneous Plan, and, $967 million (an increase of $9 million from prior year) for the Safety Plan. The combined total is $3.082 billion (an increase of $74 million from prior year).

The June 30, 2019 projected actuarial funded status, based on the market valuation for the Miscellaneous Plan, including Pension Obligation Bond (POB) proceeds, with amounts owed on the POB, is expected to be 69.3%, and, 69.6% for the Safety Plan.

Those funding levels, while well below the desired range of 80% to 90%, do place Riverside County in a better positon than many of its California county peers that are also participants in CalPERS. Bartel Associates analysis reflects the County to be ranked between the 25th percentile (Miscellaneous) and 50th percentile (Safety) in terms of its funded percentage.

For FY 17/18, CalPERS earned 8.6%, which was 1.35 percentage points above the expected return of 7.25%. While the investment return for the year was better than expected, challenges remain. 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.

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. To date, over the last fourteen years, the accumulated discount the County has received is $44.6 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 D Brandl 1/30/2019

Funding Status

The actual unfunded accrued liability for the period ended June 30, 2017 is $2.115 billion (an increase of $65 million from prior year) for the Miscellaneous Plan, and, $967 million (an increase of $9 million from prior year) for the Safety Plan. The combined total is $3.082 billion (an increase of $74 million from prior year).

The June 30, 2019 projected actuarial funded status based on the market valuation for:

1. The Miscellaneous Plan, including the deposit of the POB proceeds, ~~but not~~ **with** amounts owed on the POB, is expected to be 69.3%. By way of comparison, the last years' ratios were ~~69.9%, 74.2%, 71.9% and 77.3%.~~ **68.7%, 68.6%, 66.6% and 73.3%.**
2. The Safety Plan, including POB proceeds, ~~but not~~ **with** amounts owed on the POB, is expected to be 69.6%. By way of comparison, the last years' ratios were ~~68.9%, 71.9%, 69.8% and 75.2%.~~ **69.2%, 69.4%, 67.1% and 72.8%.**

Those funding levels, while well below the desired range of 80% to 90%, do place Riverside County in a better positon than many of its California county peers that are also participants in CalPERS. Bartel Associates analysis reflects the County to be ranked between the 25th percentile (Miscellaneous) and 50th percentile (Safety) in terms of its funded percentage.

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 18.9% of payroll in FY 18/19 to 21.6% in FY 19/20. The asset and assumption changes are partially offset by prior gains. The components for the rate change are as follows:

Composition of the FY 19/20
Miscellaneous Plan Employer Contribution Rates[1]
(slide 22 of the Bartel Report)

• 2018/19 Employer Contribution Rate	18.9%
• Asset Method Change (5th Year)	0.7%
• 6/30/14 Assumption Change (4th Year)	0.6%
• 6/30/16 Discount Rate Change (2nd Year)	0.2%
• 6/30/17 Discount Rate and Inflation (1st Year)	1.1%
• Other (Gains)/Losses	0.1%
Total FY 19/20 Employer Contribution Rate	**21.6%**

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

3.6

2019

Pension Advisory Review Committee

Annual Pension Report

February 5, 2019

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 pension 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 January 17, 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, but not amounts owed on the POB for FY 18/19, are expected to be 69.3% for the Miscellaneous Plan and 69.6% for the Safety Plan. 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 7 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 Internal Revenue Code Section 115 Supplemental Pension Trust, Other Post-Employment Benefits (OPEB) obligation, 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 substantial reduction of its OPEB liability, the creation of the LMF, and, the formation and funding of the Section 115 Pension Trust. These efforts 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 annual 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. The report also has identified and addressed specific questions (see FAQ's on page 17) that have come up in previous Board discussions, formal or otherwise.

In addition, this report provides some background information and funded status (page 17) of the smaller 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 17/18, CalPERS earned 8.6%, which was 1.35 percentage points above the expected return of 7.25%. While the investment return for the year was better than expected, challenges remain. 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 are showing results with total annual savings estimated at $107 million in employer contributions annually. Finally, the POB issued in 2005 to partially fund the County's unfunded liability is projected to have a net savings of $109.5 million by February 15, 2019.

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.

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 7.25%, and moving to below 7% 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%

Amortization Policy – In February 2018, CalPERS adopted changes to the policy effective as of the June 30, 2019 valuation and contributions beginning FY 20/21, 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.

Funding Status

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1. The Miscellaneous Plan, including the deposit of the POB proceeds, ~~but not~~ **with** amounts owed on the POB, is expected to be 69.3%. By way of comparison, the last years' ratios were ~~69.9%, 74.2%, 71.9% and 77.3%.~~ **68.7%, 68.6%, 66.6% and 73.3%.**
2. The Safety Plan, including POB proceeds, ~~but not~~ **with** amounts owed on the POB, is expected to be 69.6%. By way of comparison, the last years' ratios were ~~68.9%, 71.9%, 69.8% and 75.2%.~~ **69.2%, 69.4%, 67.1% and 72.8%.**

Those funding levels, while well below the desired range of 80% to 90%, do place Riverside County in a better positon than many of its California county peers that are also participants in CalPERS. Bartel Associates analysis reflects the County to be ranked between the 25th percentile (Miscellaneous) and 50th percentile (Safety) in terms of its funded percentage.

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 18.9% of payroll in FY 18/19 to 21.6% in FY 19/20. The asset and assumption changes are partially offset by prior gains. The components for the rate change are as follows:

Composition of the FY 19/20
Miscellaneous Plan Employer Contribution Rates[1]
(slide 22 of the Bartel Report)

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• Asset Method Change (5th Year)	0.7%
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• 6/30/16 Discount Rate Change (2nd Year)	0.2%
• 6/30/17 Discount Rate and Inflation (1st Year)	1.1%
• Other (Gains)/Losses	0.1%
Total FY 19/20 Employer Contribution Rate	**21.6%**

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

The Safety Plan employer contribution rates will increase from 31.6% in FY 18/19 to 37.3% in FY 19/20. The components of the rate changes are as follows:

Composition of the FY 19/20
Safety Plan Employer Contribution Rates[1]
(slide 44 of the Bartel Report)

• 2018/19 Employer Contribution Rate	31.6%
• Payroll <Expected	0.8%
• Asset Method Change (5th Year)	1.3%
• 6/30/14 Assumption Change (4th Year)	1.0%
• 6/30/16 Discount Rate Change (2nd Year)	0.3%
• 6/30/17 Discount Rate and Inflation (1st Year)	2.0%
• Other (Gains)/Losses	0.3%
Total FY 19/20 Employer Contribution Rate	**37.3%**

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 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)

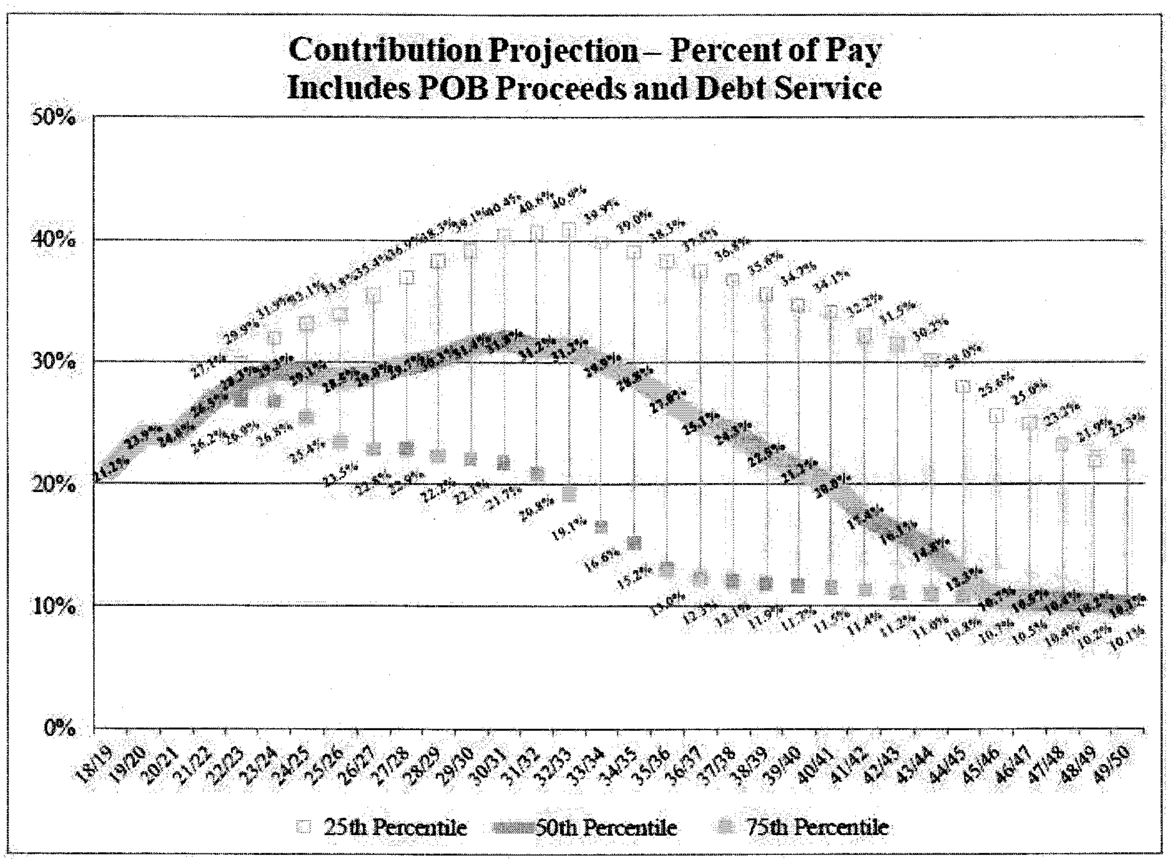
	Miscellaneous Plan			Safety Plan		
FY	**Rate[1]**	**Change from prior FY (+/-)**	**Difference from 2018 PARC Report projection**	**Rate[2]**	**Change from prior FY (+/-)**	**Difference from 2018 PARC Report projection**
16/17	19.1%[3]	NA	N/A	28.8%[3]	NA	N/A
17/18	19.4%[3]	+0.3%	N/A	30.3%[3]	+1.5%	N/A
18/19	21.2%[3]	+1.8%	N/A	33.7%[3]	+3.4%	N/A
19/20	23.9%	+2.7%	+0.4%	39.5%	+5.8%	+1.9%
20/21	24.0%	+0.1%	-2.1%	42.6%	+3.1%	-1.0%
21/22	26.5%	+2.5%	-1.4%	46.0%	+3.4%	+1.8%
22/23	28.3%	+1.8%	-1.1%	48.3%	+2.3%	+2.0%
23/24	29.3%	+1.0%	-0.8%	49.5%	+1.2%	+2.0%
24/25	29.1%	-0.2%	N/A	49.6%	+0.1%	N/A
25/26	28.5%	-0.6%	N/A	49.4%	-0.2%	N/A
26/27	29.0%	+0.5%	N/A	49.8%	+0.4%	N/A
27/28	29.7%	+0.7%	N/A	50.7%	+0.9%	N/A
28/29	30.3%	+0.6%	N/A	51.5%	+0.8%	N/A
29/30	31.4%	+1.1%	N/A	52.6%	+1.1%	N/A

1. Includes POB debt service, which are about 2.4 % 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 are about 2.1 % through 2023/24; 1.4% in 2024/25; and 0.4% thereafter. Safety POB debt service ends in 2035.
3. Rates for FY 16/17 through FY 19/20 are actual rates rather than projected.
4. Neither rates for Miscellaneous or Safety Plans includes employee contributions.

Longer-Term Projections

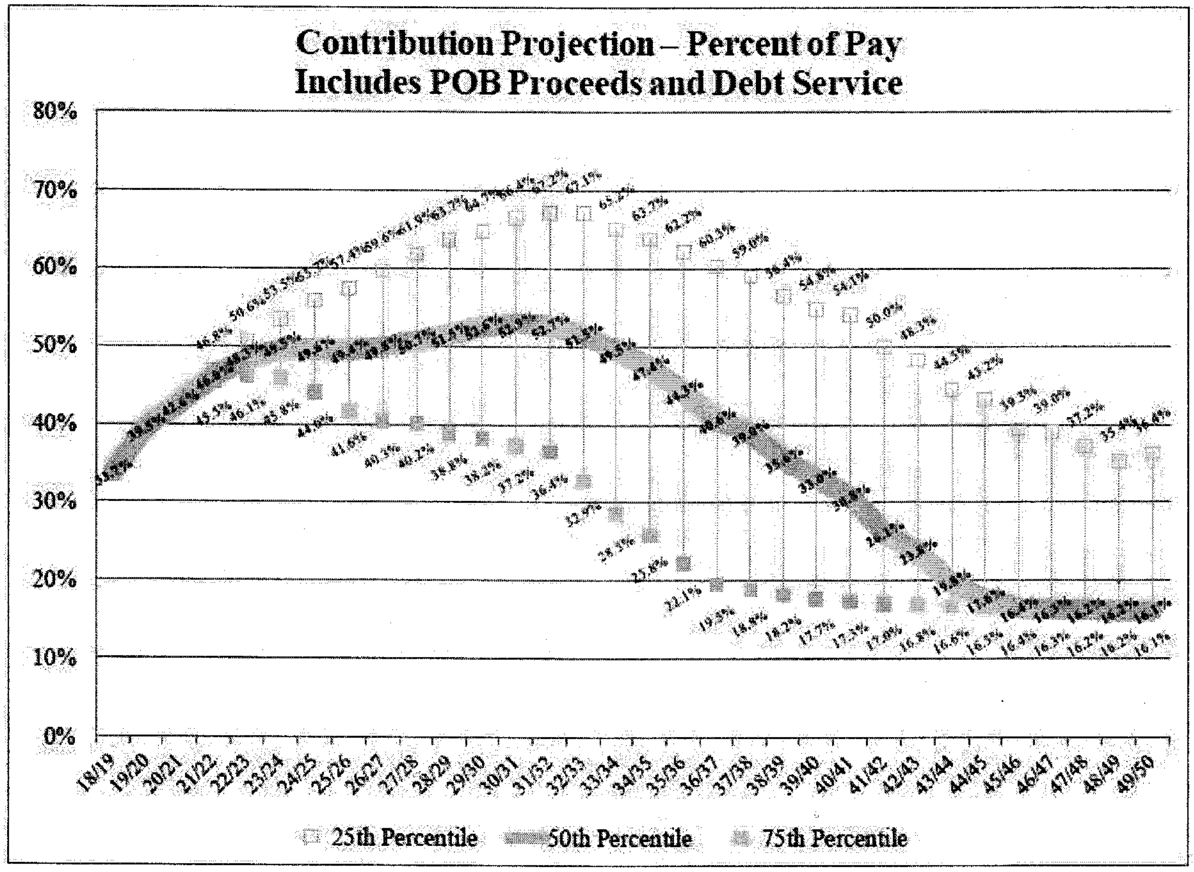
Listed below are two charts that show the projected employer contribution rates over the next thirty years for the County's Miscellaneous and Safety Plans, with a discount rate reduction from 7.5% to 7% over 3 years. Over the next decade, rates are expected to increase as CalPERS' assumption changes are absorbed and the reduction in the discount rate is implemented (as also seen in the preceding Table 2A and 3A). Once the smoothing is complete and assuming no other changes, the rates should decline over a sustained period (Table 2B and 3B). 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 on 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.

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



Source: Bartel Associates Report dated January 17, 2019. Created using a stochastic analysis of over 1,000 trials, which incorporates the likelihood of expected outcomes of several factors, producing the three scenarios.

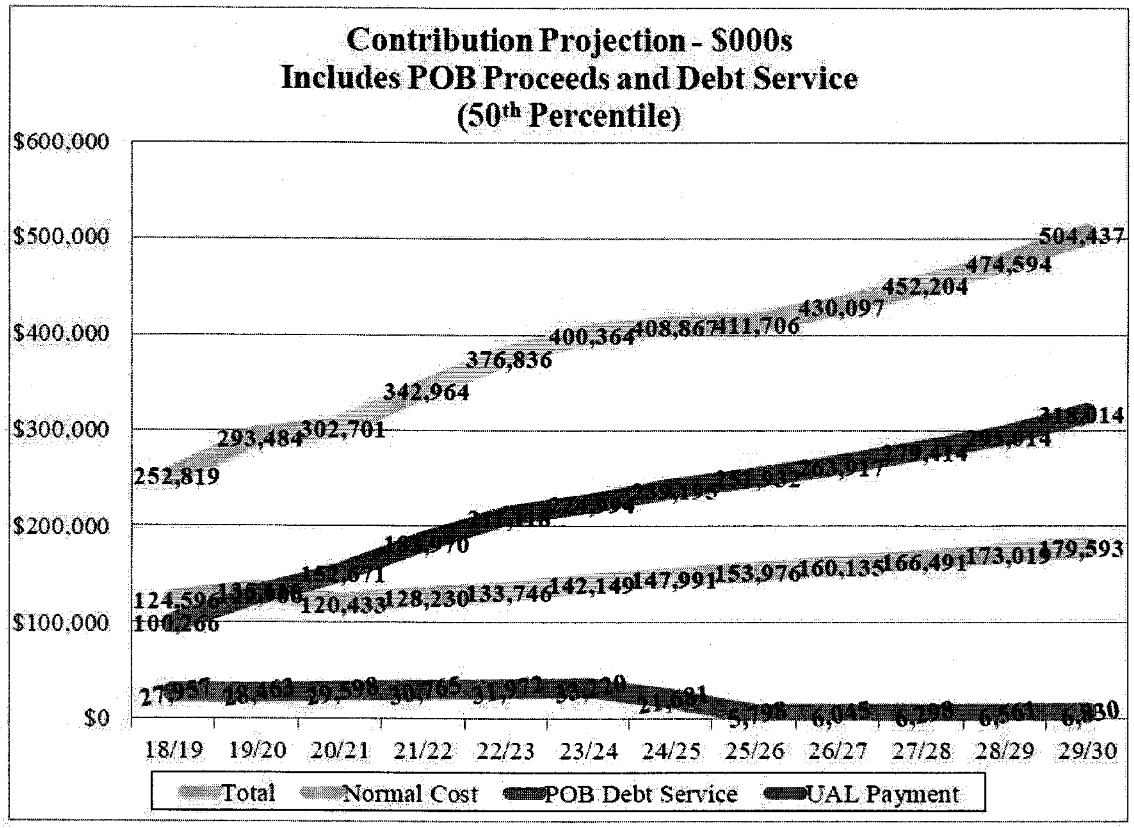
Table 3A - Employer Contribution Rate Projections – Safety (slide 52)



Source: Bartel Associates Report dated January 17, 2019. Created using a stochastic analysis of over 1,000 trials, which incorporates the likelihood of expected outcomes of several factors, producing the three scenarios.

Table 2B - Employer Contribution Projection in Dollars– Miscellaneous (slide 32)

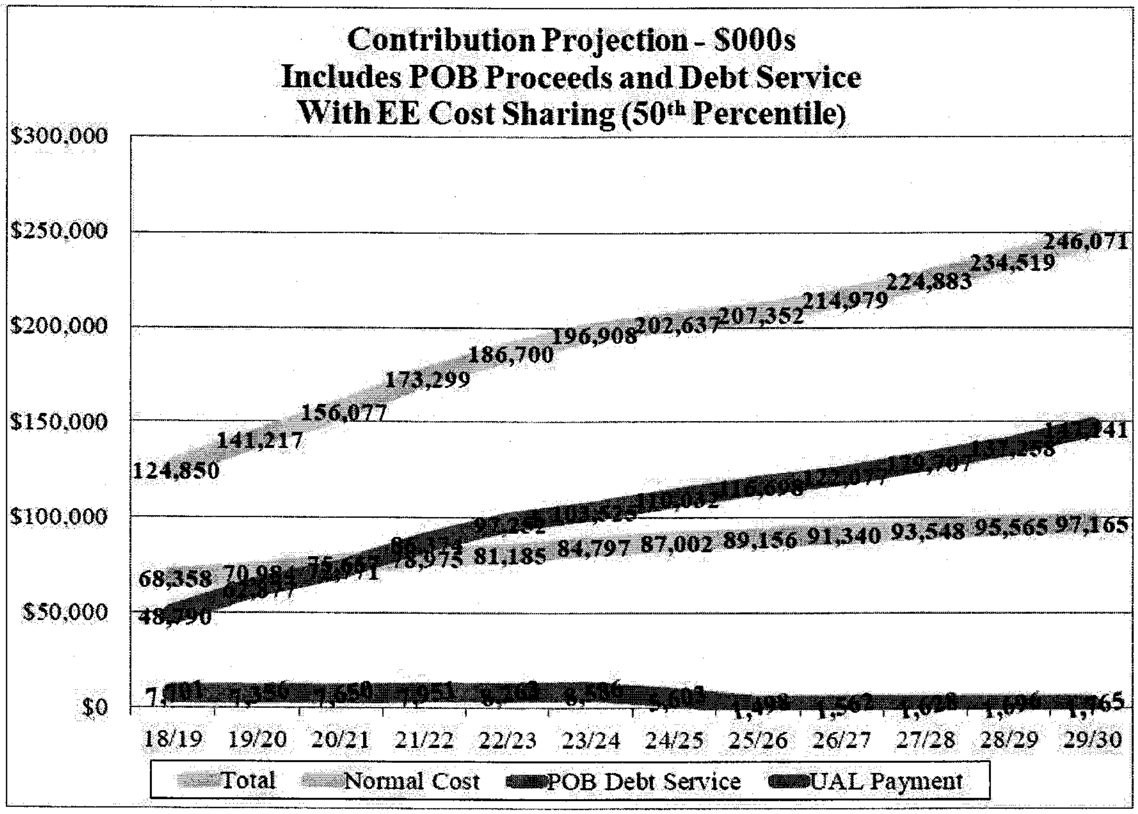
CONTRIBUTION PROJECTIONS - MISCELLANEOUS



Source: Bartel Associates Report dated January 17, 2019.

Table 3B - Employer Contribution Projection in Dollars– Safety (slide 54)

CONTRIBUTION PROJECTIONS - SAFETY



Source: Bartel Associates Report dated January 17, 2019.

Investment Returns

Aside from actuarial and demographic assumptions, the primary driver of the rate formula is CalPERS' investment performance. Poor investment performance following the financial crisis significantly increased the County's unfunded liability, driving up the required payments.

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

	Market Value of Assets	Net Accumulated (Arithmetic) Market Increase/(Decrease) Since 2008 [1]
▪ June 30, 2008	(5.1%)	**(5.1%)**
▪ June 30, 2009	(24.0)%	**(29.1%)**
▪ June 30, 2010	13.3%	**(15.8%)**
▪ June 30, 2011	21.7%	**5.9%**
▪ June 30, 2012	0.20%*	**6.1%**
▪ June 30, 2013	13.2%	**19.3%**
▪ June 30, 2014	17.7%*	**37.0%**
▪ June 30, 2015	2.4%	**39.4%**
▪ June 30, 2016	0.6%	**40.0%**
▪ June 30, 2017	11.2%	**51.2%**
▪ June 30, 2018	8.6%	**59.8%**

[1] Actual Return. Expected return through the same period was 83.125%, at a CalPERS assumed rate of return of 7.75% from 2008 through 2011, 7.5% for 2012 through 2016, 7.375% for 2017, and 7.25% for 2018.

*Corrections made per CalPERS from 0.1% to 0.2% for 6/30/2012, and, 18.4% to 17.7% for 6/30/2014.

Pension Obligation Bonds (POB's)

The County sold $400 million in POB's in 2005 to lock in a 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 7.25% to 6% over a twenty-year period. At the same time, the County converted its repayment from a rolling 30-year amortization schedule to a fixed amortization schedule of 30 and 25 years for the Miscellaneous and Safety Plans, respectively. Upon deposit of the bond proceeds with CalPERS, the County's rate was reduced and replaced by the lower amount of the bonds' debt service.

The POB's have a current outstanding total of $243.9 million and a remaining 16-year life. Bartel's analysis is projecting that as of February 15, 2019, the County will realize $109.5 million in net savings as a result of the sale of the bonds in February 2005. The POB's have a relatively low break-even rate (4.91%) versus CalPERS' expected return of 7.25%. 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 continue to do so in future years if appropriate.

Annual Prepayment

CalPERS offered an early payment discount of 3.62% for FY 18/19 in lieu of the periodic payments that coincided with payroll disbursements. PARC first recommended utilizing this approach in 2004 and the County has prepaid a portion of the annual payment every year since. To date, the accumulated discount the County has received is $44.6 million through FY 18/19. From a mechanical standpoint, the County makes an initial deposit, which reduces the amount that would otherwise be collected during the year. 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 Notes TRAN's borrowing. An alternative would be to borrow internally by drawing down General Fund cash. The amount needed to repay the amount borrowed is collected from departments during the course of the year.

CalPERS changed its prepayment policy in FY 17/18 and now allows only the unfunded liability payment portion to be prepaid. In FY 18/19, the County prepaid CalPERS $143.9 million (Safety $47.1 + Miscellaneous $96.8 = $143.9 million). The FY 19/20 required payment for the unfunded liability is $192.9 million, with an optional prepayment amount of $186.1 million, producing a potential discount of approximately $6.8 million. A final recommendation regarding the FY 19/20 prepayment will be made in conjunction with the FY 19/20 TRAN borrowing.

IRC Section 115 Supplemental 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 over time 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 monthly into the Trust.

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, 2018, the balance in the Trust was $17.2 million, up from last years' report of $5.1 million. The rate of return for the period ended June 30, 2018 was 5.45%.

To the extent excess funds are to become available to reduce the County's pension liabilities, the Trust would be the first option for those funds, versus CalPERS, due to the greater control and flexibility afforded to the County. In the early 2030's, CalPERS rates are expected to start declining under the worst-case projected scenarios. Upon such a decline, the prudent step would be to retain a portion of those savings by depositing the funds into the Trust, or, accelerating payments to pay down the unfunded liability.

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.

Shortly thereafter with little forewarning, Governor Brown initiated proposals resulting in changes to pension benefits. 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, shorter 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). The lower benefit formula for Tier III is 2% at 62 for Miscellaneous and 2.7% at 57 for Safety. Employee contribution rates for Tier III vary based on PEPRA rules. Listed below is a table of the three tiers.

Table 5
Riverside County Pension Tiers

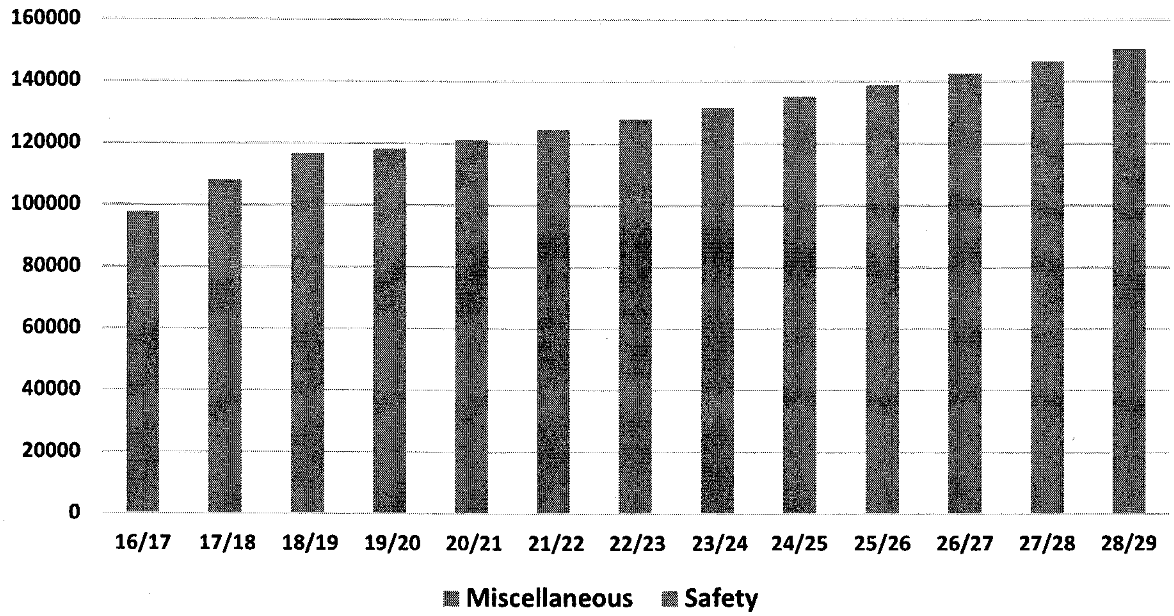
County Plan		Retirement Formula	Employee Contribution	Earliest Retirement Age	PEPRA Compensation Limits[1]	Final Compensation Period	Effective Date
Tier I	Miscellaneous	3% at 60	8%	50	N/A	12 months	7/11/2002
	Safety	3% at 50	9%	50	N/A	12 months	6/28/2001
Tier II	Miscellaneous	2% at 60	7%	50	N/A	36 months	8/24/2012
	Safety	2% at 60	9%	50	N/A	36 months	8/24/2012
Tier III - PEPRA	Miscellaneous	2% at 62	6.50%	52	$ 124,180	36 months	1/1/2013
	Safety	2.7% at 57	11.25%	50	$ 149,016	36 months	1/1/2013

[1] 2019 Compensation Limits are indexed annually.

The combined effects of the County's negotiations and the revisions to state pension law will lower the County's pension costs in the long term. In the near term, however, those positive effects are being obscured by the increased contributions to offset the period of losses and underperformance following the 2008 financial crisis.

The decline in long-term rates shown in Tables 2 and 3 above is driven by the fact that by over time, a majority of the County's employees are projected to be members of the new lower tiers. The following table isolates the projected gross savings as a result of eliminating the payment of the employee contribution by the County.

Table 6
Miscellaneous & Safety
Employee Contribution Savings ($000s)



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, 2017, their funded status of Tier I was 75.9% (funded status increased 2.0 percentage points from 73.9%, prior year); Tier II at 93.8% (funded status increased 2.6 percentage points from 91.2%, prior year); and the PEPRA Tier III at 92.1% (funded status increased 2.5 percentage points from 89.6%, prior year).

The Riverside County Flood Control and Water Conservation District's annual valuation report for June 30, 2017, shows a funded status of 65.7%, an increase of 1.8 percentage points from 63.9%, prior year.

The Riverside County Waste Resources Management District annual valuation report for June 30, 2017, shows a funded status of 72.4%, an increase of 1.3 percentage points from 71.1%, prior year.

Other Post-Employment Benefits (OPEB)

GASB 45 modified the reporting requirements for OPEB (other than pensions) 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 financial report. Such reporting does not trigger a funding requirement. The County's primary OPEB obligation is comprised of a modest contribution towards the cost of retiree medical care.

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 July 1, 2018, the CERBT was funded at 58.6% versus 70.8% from the prior year, July 1, 2017. The rate of return for the period ended June 30, 2018 was 6.29%. Per AON's Actuarial Valuation Report dated June 30, 2018, plan liabilities and annual costs are considerably higher than the prior valuation, primarily due to increased plan participation (i.e., retirees electing coverage) for CalPERS and RSA participants. As the past years' higher participation rate caused an increase in liabilities, the assumption was also increased to reflect this recent experience, resulting in an increase in liabilities exceeding $15 million. More details can be found in Attachment 4, Page iv. Since the OPEB Trust funded ratio is below 80%, the committee discussed and recommended not to take reimbursement as in years past from the Trust to reduce the CalPERS' pension liability, or transfer any excess funds to the Section 115 Trust for the foreseeable future. Staff and PARC will continue to monitor the funded status of the OPEB Trust.

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. The investments are 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 82.5%. According to the July 1, 2018 valuation (Attachment 5), the County's current required contribution rate is 1.53%. The rate of return for the period ended June 30, 2018 was 9.66% and had a balance of $41 million.

FAQ's - Responses to PARC presentation questions

During the 2017 PARC presentation to the Board, several questions were asked of staff. Listed below are the responses to those questions. The responses were prepared in consultation with the County's actuarial consultant, John Bartel.

1. Are there other options to reduce pension liability; is there anything additional being done?

   There are no immediate options to reduce the pension liability. One of the options for the Board to consider is to add additional funds to the Section 115 Pension Trust now to build up funds to smooth over anticipated future increases.

2. Where do you see us compared to other agencies in the State of California?

   Currently, Bartel Associates reports that the County is between the 25th and the 50th percentile as compared to the other Counties. Riverside County has a lower unfunded liability due to several factors that include issuance of Pension Obligation bonds, growth in the County is relatively new and as such, the County has a greater number of active employees than retirees. The creation of the additional tiers have led to a lower unfunded liability compared to other agencies.

3. Would an additional tier help? If so what kind of tier and formula? Do you see the possibility over time of another statewide movement?

   At this time, the County cannot add additional tiers, as the Public Employees' Pension Reform Act (PEPRA) is the current law.

4. Could we offer a defined contribution plan rather than a defined benefit plan?

   At this time, this option is not available to the County. In order for the County to move to this plan, the California Supreme Court would have to rule in its favor, the State Legislature would have to make a change to the legislation to provide this option, and, CalPERS would have to create an option for agencies to opt into.

5. With our existing tiers, what are some of the cost savings?

   The County has the option of offering classic hires the PEPRA benefit formulas. However, doing so would result in minimal savings; it would have a very tiny effect on pension obligations and could exacerbate recruiting issues.

Recommendations

1. Receive and file the 2019 PARC Annual Pension Report.
2. Direct staff to report back with any additional recommendations or updates on the County's pension plans, including any legislative changes that could be incorporated in the County's Legislative Platform.
3. Direct the PARC to review the annual CalPERS pre-payment for FY 19/20 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 19/20 budget.

Attachments

1. *Bartel Associates CalPERS Actuarial Issues – 6/30/17 Valuation - January 17, 2019*
2. *CalPERS 6/30/17 Miscellaneous Actuarial Valuation Reports*
3. *CalPERS 6/30/17 Safety Actuarial Valuation Reports*
4. *AON - Actuarial Valuation Report for Postretirement Benefits Plan 6/30/2018*
5. *AON - Actuarial Valuation Report for Part-Time and Temporary Employees Retirement Plan 7/1/18*

COUNTY OF RIVERSIDE
MISCELLANEOUS AND SAFETY PLANS

BARTEL ASSOCIATES, LLC

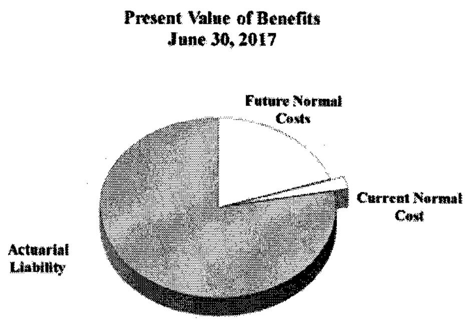
CalPERS Actuarial Issues – 6/30/17 Valuation Preliminary Results

John Bartel, President
Bianca Lin, Assistant Vice President
Wai Man Yam, Actuarial Analyst
Bartel Associates, LLC

January 17, 2019

Contents

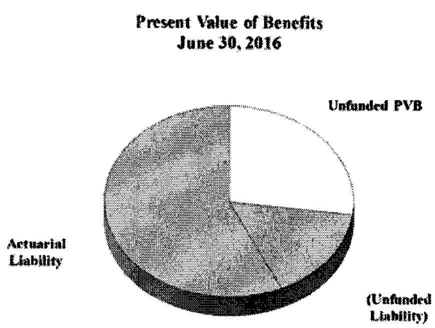
DEFINITIONS

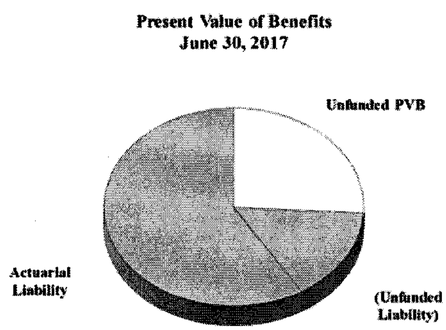


- **PVB - Present Value of all Projected Benefits:**
  - The value now of amounts due to be paid in the future
  - Discounted value (at valuation date - 6/30/17), of all future expected benefit payments based on various (actuarial) assumptions

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

DEFINITIONS



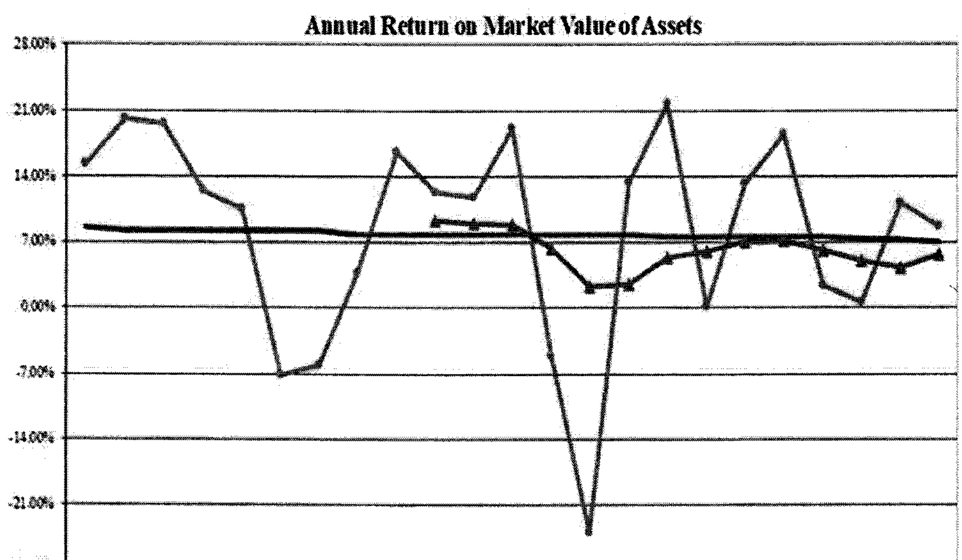


- **Target-** Have money in the bank to cover Actuarial Liability (past service)
- **Unfunded Liability -** Money short of target <u>at valuation date</u>
  - If all actuarial assumptions were always exactly met, then the plan assets would always equal AAL
  - Any difference is the unfunded (or overfunded) 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



	'96	'97	'98	'99	'00	'01	'02	'03	'04	'05	'06	'07	'08	'09	'10	'11	'12	'13	'14	'15	'16	'17	'18
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%
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%
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%	4.3%	5.8%

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

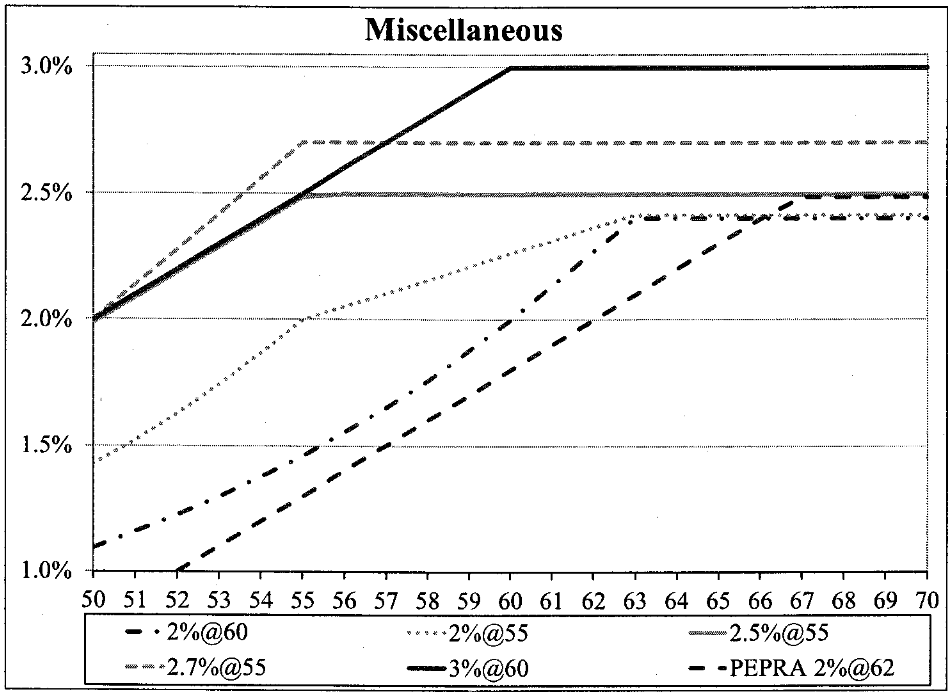
- At CalPERS, Enhanced Benefits implemented using all (future & prior) service
- Typically not negotiated with cost sharing
- County of Riverside

	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

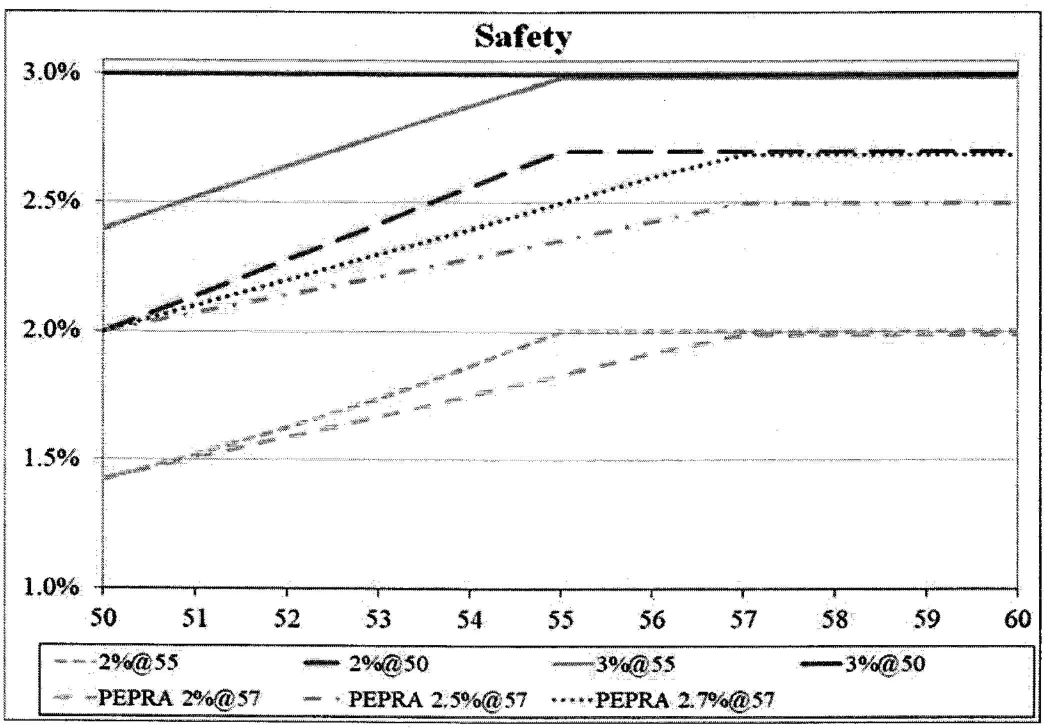
- Note:
  - ☐ FAE1 is highest one year (typically final) average earnings
  - ☐ FAE3 is highest three years (typically final three) average earnings

[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: 55% for Miscellaneous, 65% for Safety
  - Declining active population and increasing number of retirees
  - Higher percentage of retiree liability increases contribution volatility

- County of Riverside percentage of liability belonging to retirees:
  - Miscellaneous 45%
  - Safety 51%

CALPERS CHANGES

- Contribution policy changes:
  - No asset smoothing
  - No rolling amortization
  - 5-year ramp up
  - Included in 6/30/13 valuation (first impact 15/16 rates; full impact 19/20)
- Assumption changes:
  - Anticipate future mortality improvement
  - Other, less significant, changes
  - Included in 6/30/14 valuation (first impact 16/17 rates; full impact 20/21)
- CalPERS Board changed their discount rate:

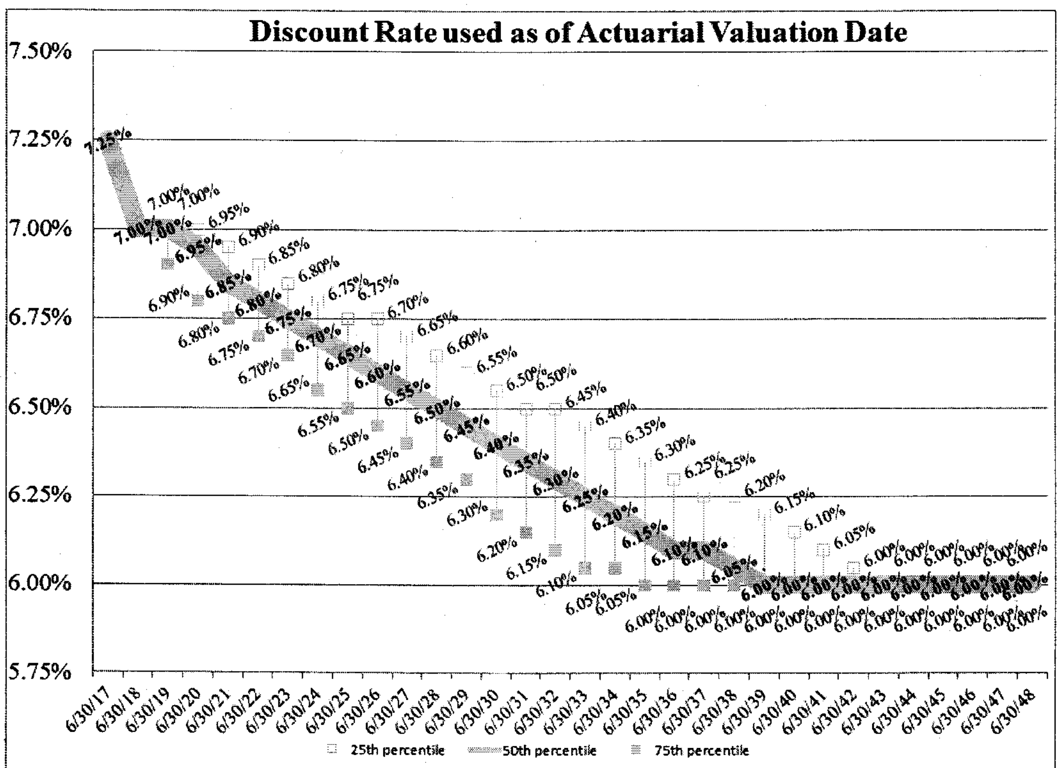
	Rate	Initial Impact	Full Impact
● 6/30/16 valuation	7.375%	18/19	22/23
● 6/30/17 valuation	7.25%	19/20	23/24
● 6/30/18 valuation	7.00%	20/21	24/25

- December 2017: CalPERS Board selected asset allocation similar to current portfolio. No change to the discount rate

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% over 20+ years
  - Risk mitigation suspended until 6/30/18 valuation
- 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
  - Included in this study

CalPERS Changes



SUMMARY OF DEMOGRAPHIC INFORMATION - MISCELLANEOUS

	1997	2007	2016	2017
Actives				
■ Counts	8,432	15,474	17,201	17,083
■ Average				
• Age	43	43	44	44
• County Service	9	8	10	10
• PERSable Wages	$ 33,400	$ 48,700	$ 63,400	$ 66,100
■ Total PERSable Wages	282,000,000	754,100,000	1,090,300,000	1,128,400,000
Inactive Members				
■ Counts				
• Transferred	1,591	3,144	3,878	3,823
• Separated	1,603	4,306	8,702	9,229
• Retired				
□ Service		4,969	8,597	9,230
□ Disability		587	619	643
□ Beneficiaries		683	916	948
□ Total	3,518	6,239	10,132	10,821
■ Average Annual County Provided Benefit for Service Retirees[2]		16,700	25,700	27,000

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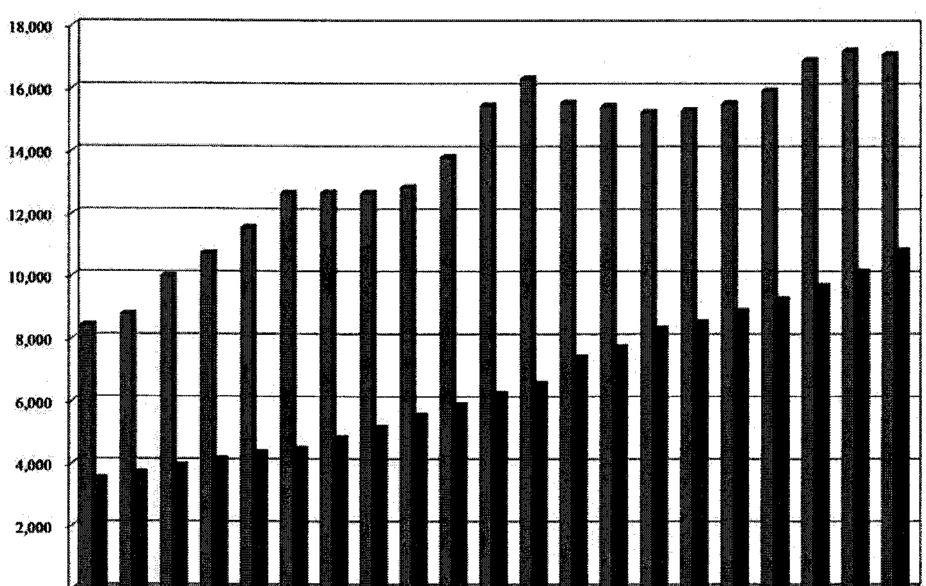
[2] Average County-provided pensions are based on County service & County benefit formula, and are not representative of benefits for long-service employees.

SUMMARY OF DEMOGRAPHIC INFORMATION - MISCELLANEOUS

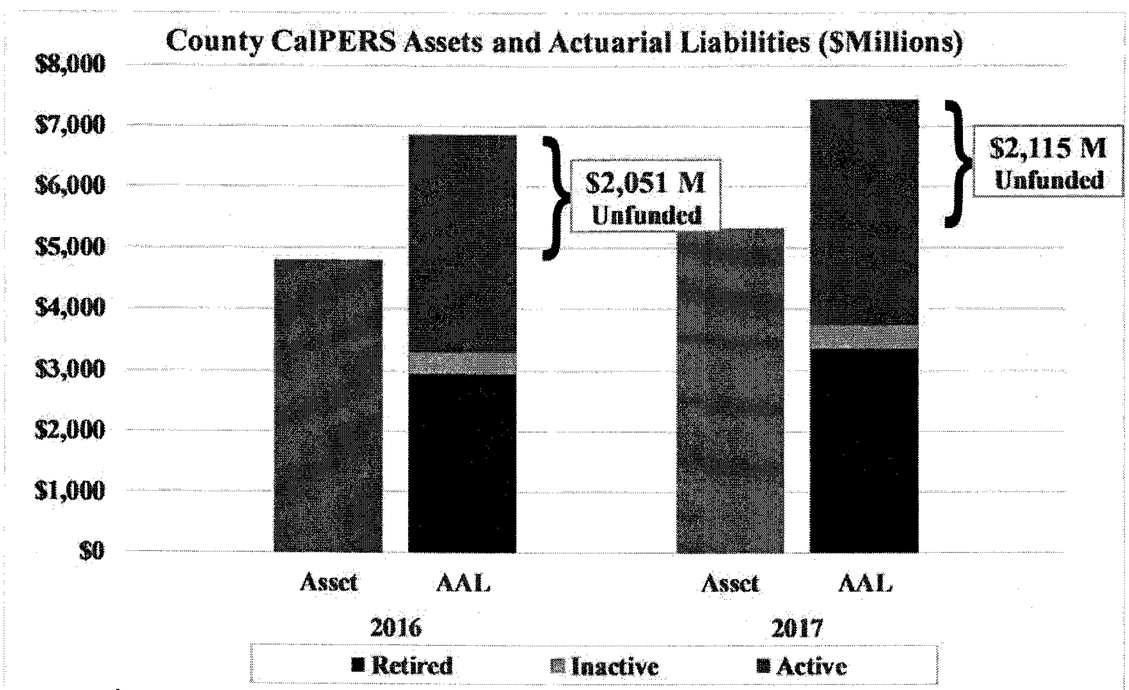


	'97	'98	'99	'00	'01	'02	'03	'04	'05	'06	'07	'08	'09	'10	'11	'12	'13	'14	'15	'16	'17
■ Active	8,432	8,783	9,998	10,739	11,562	12,656	12,671	12,664	12,847	13,896	15,474	16,322	15,550	15,446	15,243	15,298	15,530	15,934	16,891	17,201	17,083
■ Receiving Payments	3,518	3,716	3,935	4,147	4,356	4,467	4,815	5,146	5,544	5,892	6,239	6,554	7,385	7,710	8,318	8,504	8,880	9,247	9,667	10,132	10,821

Plan Funded Status - Miscellaneous

	June 30, 2016	June 30, 2017
Active AAL	$3,560,100,000	$3,704,000,000
Retiree AAL	2,948,000,000	3,350,900,000
Inactive AAL	342,000,000	386,400,000
Total AAL	6,850,100,000	7,441,300,000
Assets	4,799,600,000	5,325,800,000
Unfunded Liability	2,050,500,000	2,115,500,000
Funded Ratio	70.1%	71.6%

Plan Funded Status - Miscellaneous



PLAN FUNDED STATUS - MISCELLANEOUS

Discount Rate Sensitivity
June 30, 2017

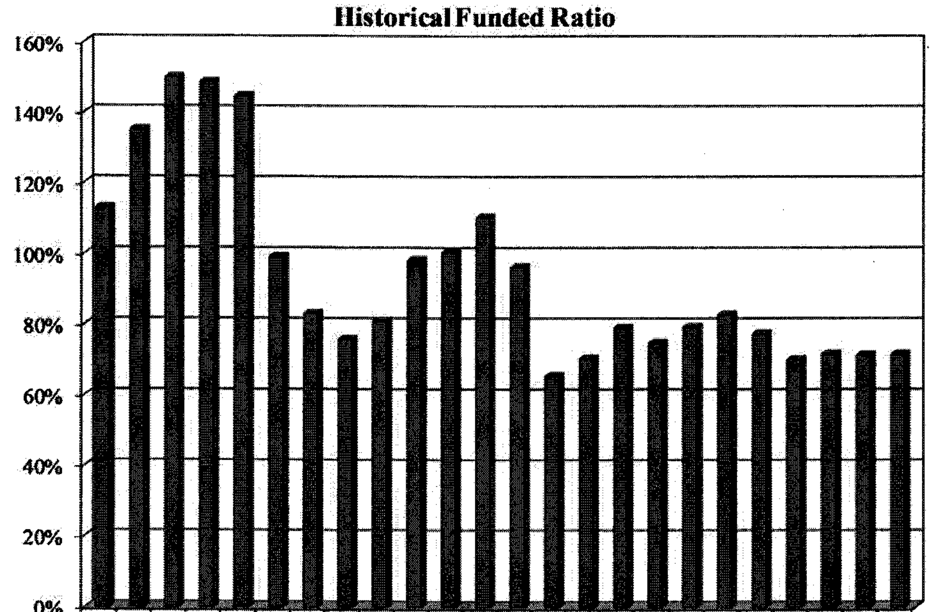
	Discount Rate		
	7.25%	7.00%	6.00%
AAL	$7,441,300,000	$7,658,400,000	$8,790,800,000
Assets	5,325,800,000	5,325,800,000	5,325,800,000
Unfunded Liability	2,115,500,000	2,332,600,000	3,465,000,000
Funded Ratio	71.6%	69.5%	60.6%

PLAN FUNDED STATUS - MISCELLANEOUS

Unfunded Accrued Liability Changes

■ **Unfunded Accrued Liability on 6/30/16**		$2,050,500,000
■ **Expected 6/30/17 Unfunded Accrued Liability**		2,130,300,000
■ **Other Changes**		
• Asset Loss (Gain) (11.2% return for FY 2017)	(181,400,000)	
• Assumption Change	114,100,000	
• Contribution & Experience Loss (Gain)	52,500,000	
• Total		(14,800,000)
■ **6/30/17 Unfunded Accrued Liability**		2,115,500,000

FUNDED RATIO - MISCELLANEOUS

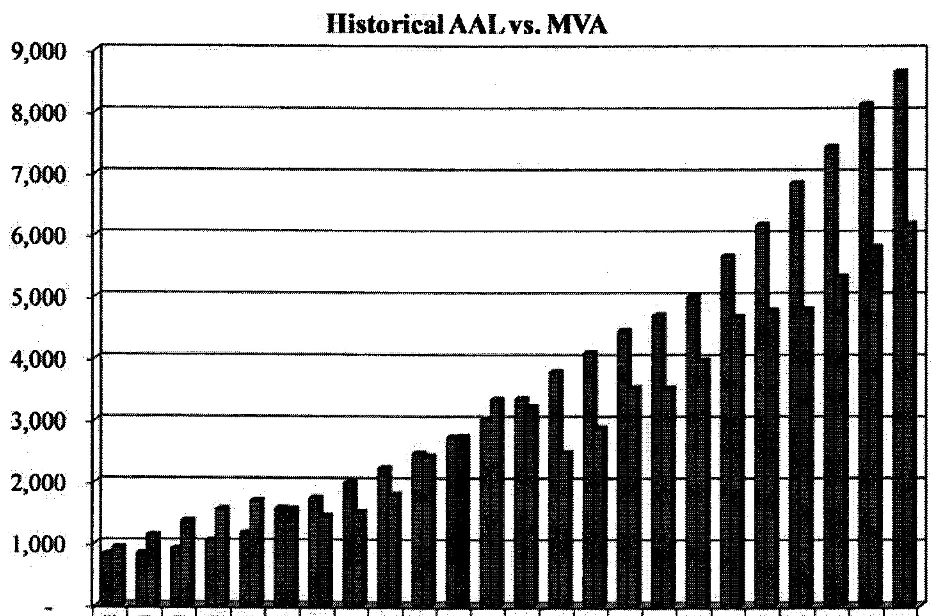


	'96	'97	'98	'99	'00	'01	'02	'03	'04	'05	'06	'07
MVA	113%	135%	150%	149%	144%	99%	83%	76%	81%	98%	100%	110%

	'08	'09	'10	'11	'12	'13	'14	'15	'16	'17	'18	'19
MVA	96%	65%	70%	79%	75%	79%	83%	77%	70%	72%	71%	72%

6/30/18 & 6/30/19 funded status estimated

FUNDED STATUS (MILLIONS) - MISCELLANEOUS



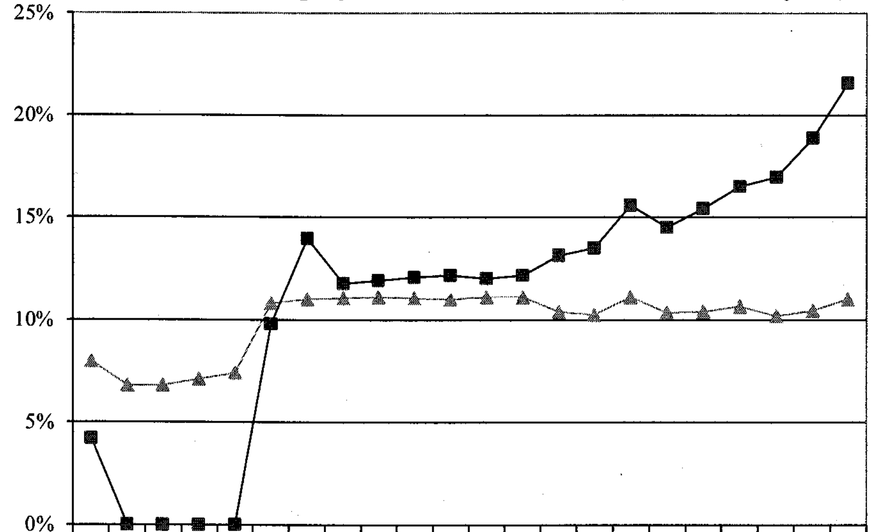
	'96	'97	'98	'99	'00	'01	'02	'03	'04	'05	'06	'07
AAL	831	844	920	1,053	1,178	1,577	1,750	1,999	2,232	2,472	2,742	3,029
Assets	939	1,140	1,379	1,564	1,702	1,564	1,454	1,517	1,807	2,429	2,754	3,342

	'08	'09	'10	'11	'12	'13	'14	'15	'16	'17	'18	'19
AAL	3,350	3,790	4,097	4,462	4,709	5,009	5,656	6,174	6,850	7,441	8,137	8,652
Assets	3,223	2,482	2,882	3,526	3,520	3,974	4,683	4,775	4,800	5,326	5,801	6,189

6/30/18 & 6/30/19 funded status estimated

CONTRIBUTION RATES - MISCELLANEOUS

Historical Employer Contribution Rates (Percent of Payroll)



	98/99	99/00	00/01	01/02	02/03	03/04	04/05	05/06	06/07	07/08	08/09
Normal Cost	8.0%	6.8%	6.8%	7.1%	7.4%	10.8%	11.0%	11.1%	11.1%	11.0%	11.0%
Total Rate	4.2%	0.0%	0.0%	0.0%	0.0%	9.8%	13.9%	11.8%	11.9%	12.1%	12.2%

	09/10	10/11	11/12	12/13	13/14	14/15	15/16	16/17	17/18	18/19	19/20
Normal Cost	11.1%	11.1%	10.4%	10.2%	11.1%	10.3%	10.4%	10.7%	10.2%	10.5%	11.0%
Total Rate	12.0%	12.2%	13.1%	13.5%	15.6%	14.5%	15.4%	16.5%	16.9%	18.9%	21.6%

CONTRIBUTION RATES - MISCELLANEOUS

	6/30/16 2018/2019	6/30/17 2019/2020
■ Total Normal Cost	18.0%	18.4%
■ Employee Normal Cost	7.5%	7.4%
■ Employer Normal Cost	10.5%	11.0%
■ Amortization Payments	8.4%	10.6%
■ Total Employer Contribution Rate	18.9%	21.6%

■ 2018/19 Employer Contribution Rate	18.9%
● Asset Method Change (5th Year)	0.7%
● 6/30/14 Assumption Change (4th Year)	0.6%
● 6/30/16 Discount Rate Change (2nd Year)	0.2%
● 6/30/17 Discount Rate & Inflation (1st Year)	1.1%
● Other (Gains)/Losses	0.1%
■ 2019/20 Employer Contribution Rate	21.6%

CONTRIBUTION PROJECTIONS - MISCELLANEOUS

- Market Value Investment Return:
  - June 30, 2018 — 8.6%[3]
  - Future returns based on stochastic analysis using 1,000 trials

Single Year Returns at[4]	25th Percentile	50th Percentile	75th Percentile
Current Investment Mix	**0.1%**	**7.0%**	**14.8%**
Ultimate Investment Mix	**0.8%**	**6.0%**	**11.4%**

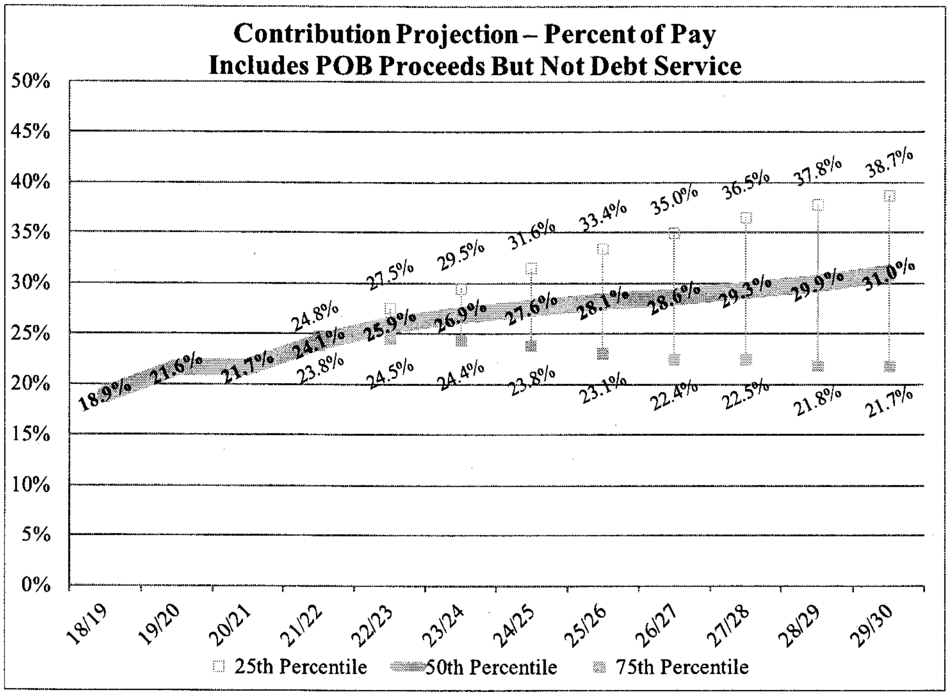
  - Assumes investment returns will, generally be 6.5% (as compared to 7.0%) over the next 10 years and higher beyond that.
- Assumption Changes – Discount Rate
  - Decrease to 7.0% by June 30, 2018 valuation
  - Additional Discount Rate decreases due to Risk Mitigation policy.
- No Other: Gains/Losses, Method/Assumption Changes, Benefit Improvements
- Different from CalPERS projection

3 based July 2018 CalPERS press release
4 Nth percentile means N percentage of our trials result in returns lower than the indicated rates.

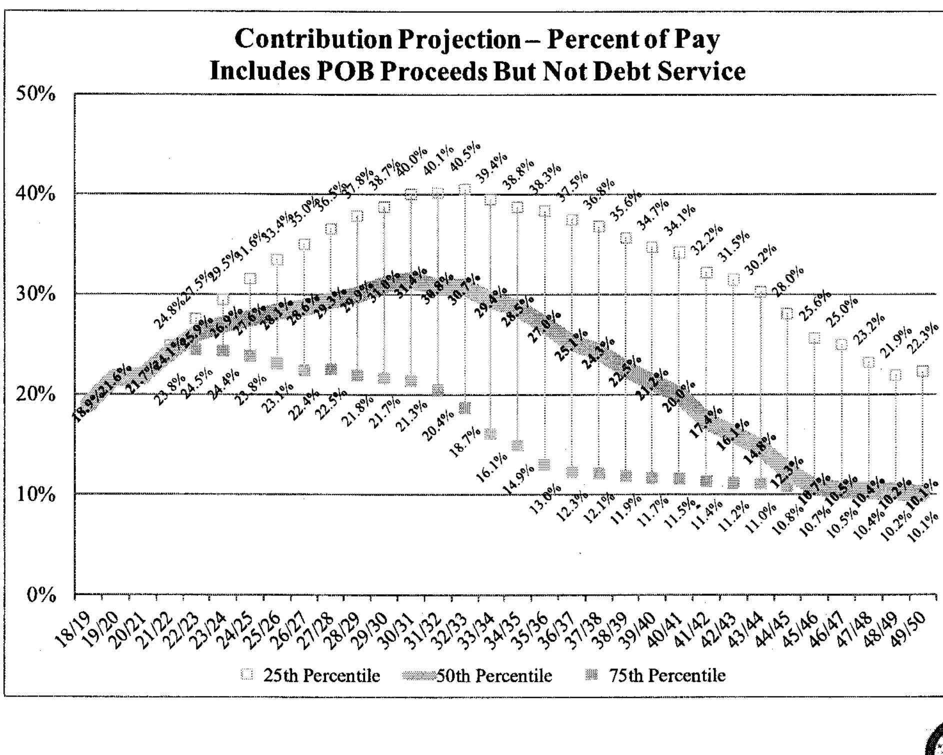
CONTRIBUTION PROJECTIONS - MISCELLANEOUS

- New hire assumptions:
  - 62.5% of 2018/19 new hires are PEPRA members and 37.5% are Classic members
  - Percentage of PEPRA member future hires to increase from 62.5% to 100% over 15 years

CONTRIBUTION PROJECTIONS - MISCELLANEOUS



CONTRIBUTION PROJECTIONS - MISCELLANEOUS



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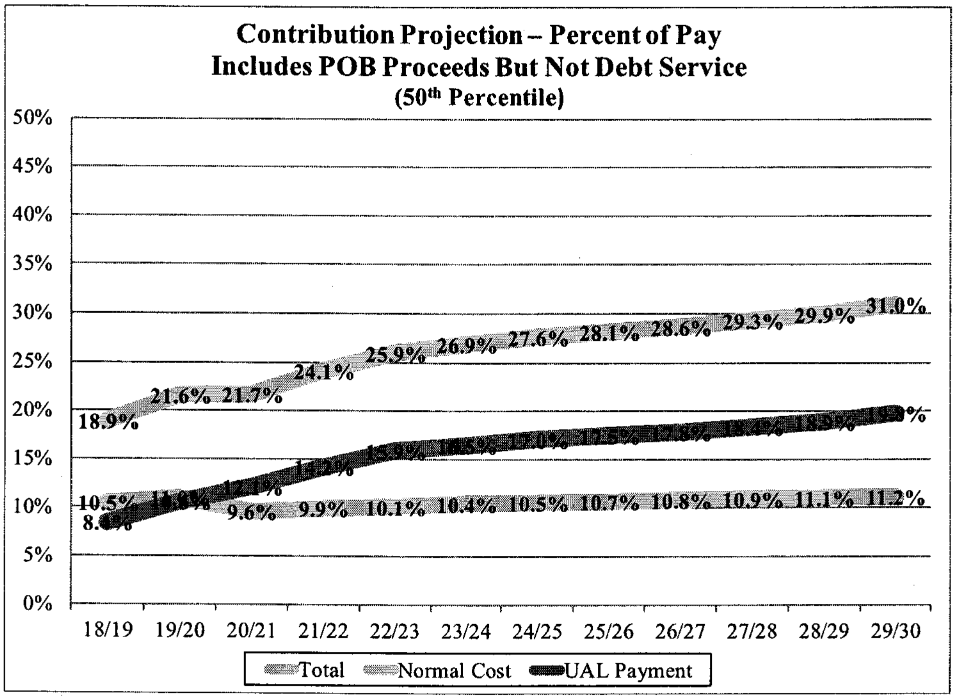
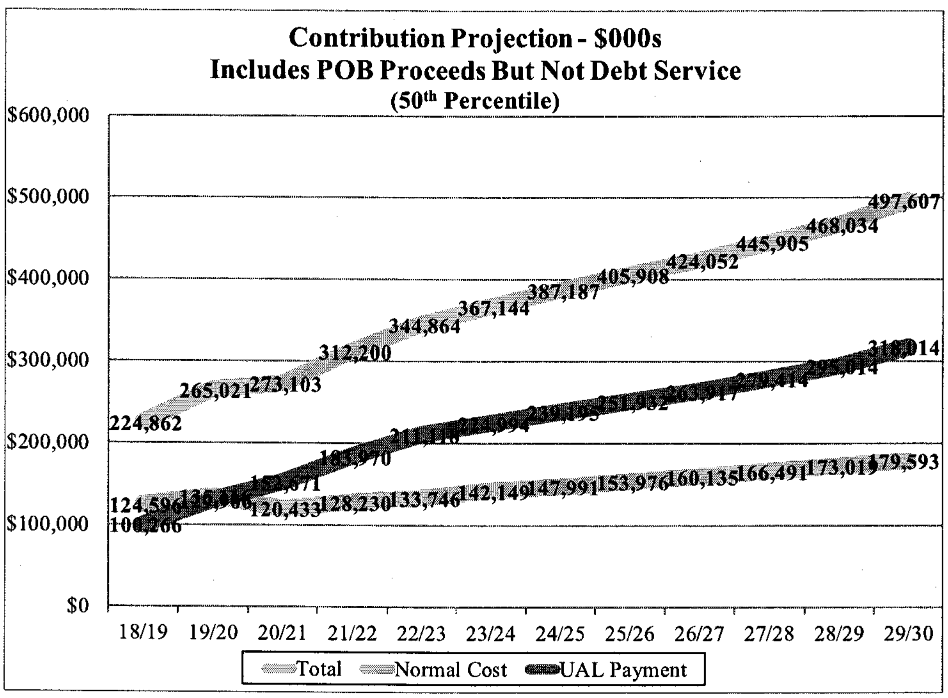
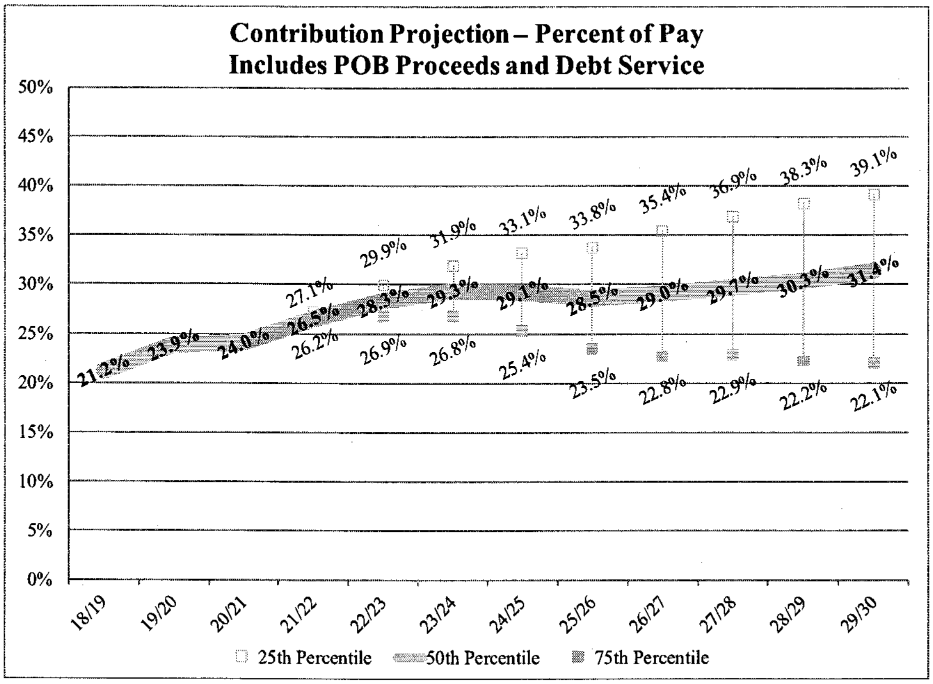


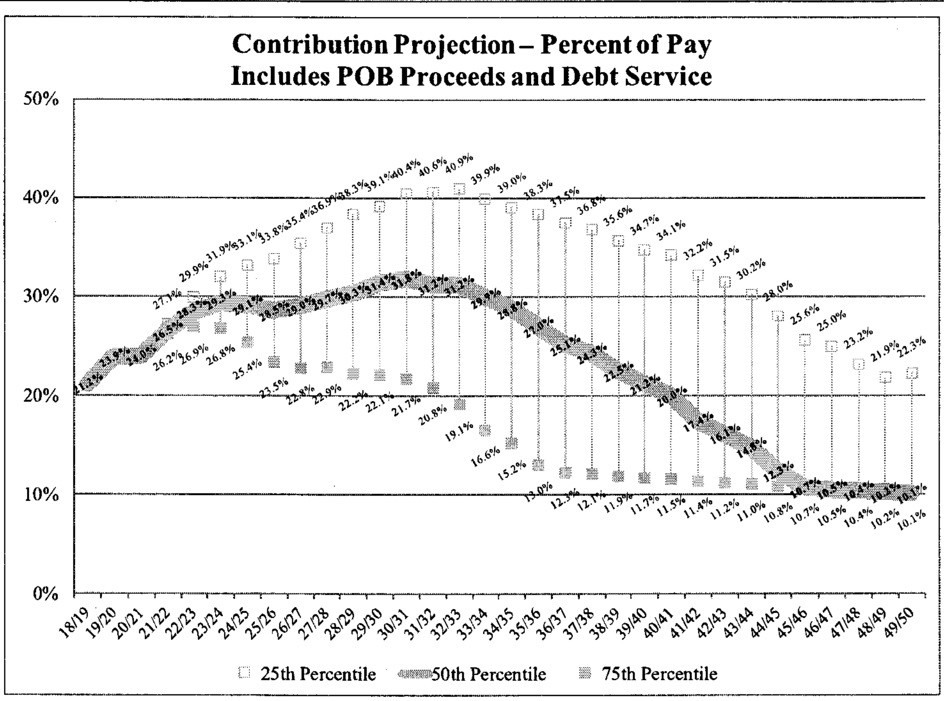
CONTRIBUTION PROJECTIONS - MISCELLANEOUS



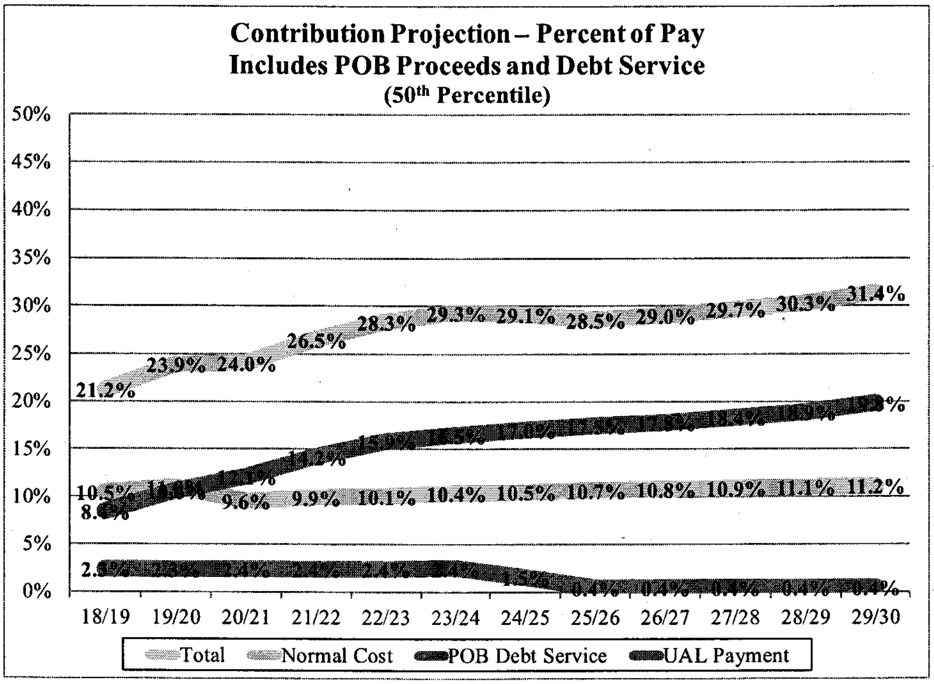
CONTRIBUTION PROJECTIONS - MISCELLANEOUS



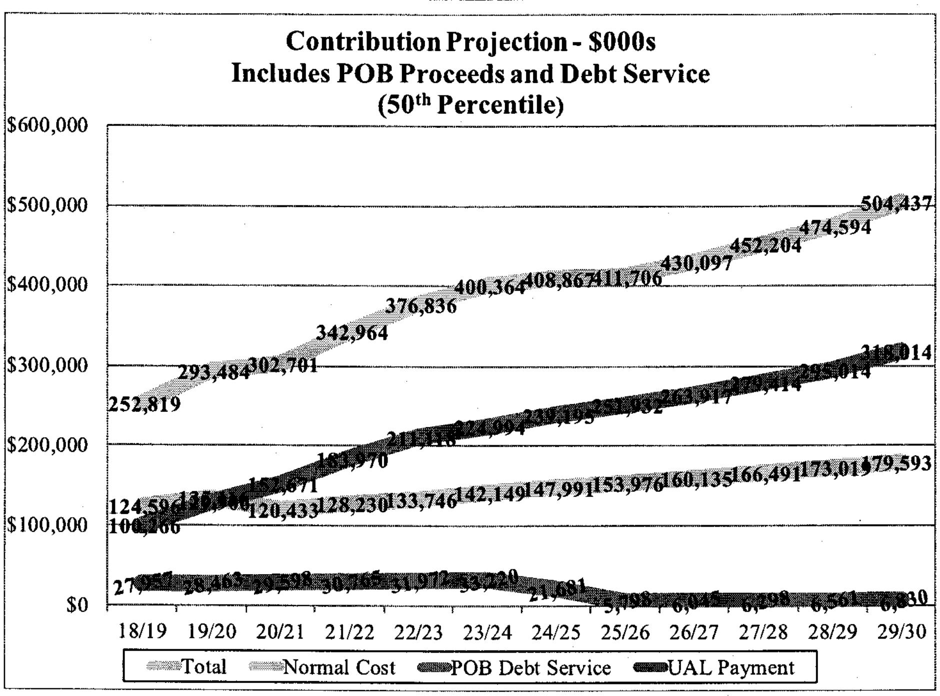
CONTRIBUTION PROJECTIONS - MISCELLANEOUS



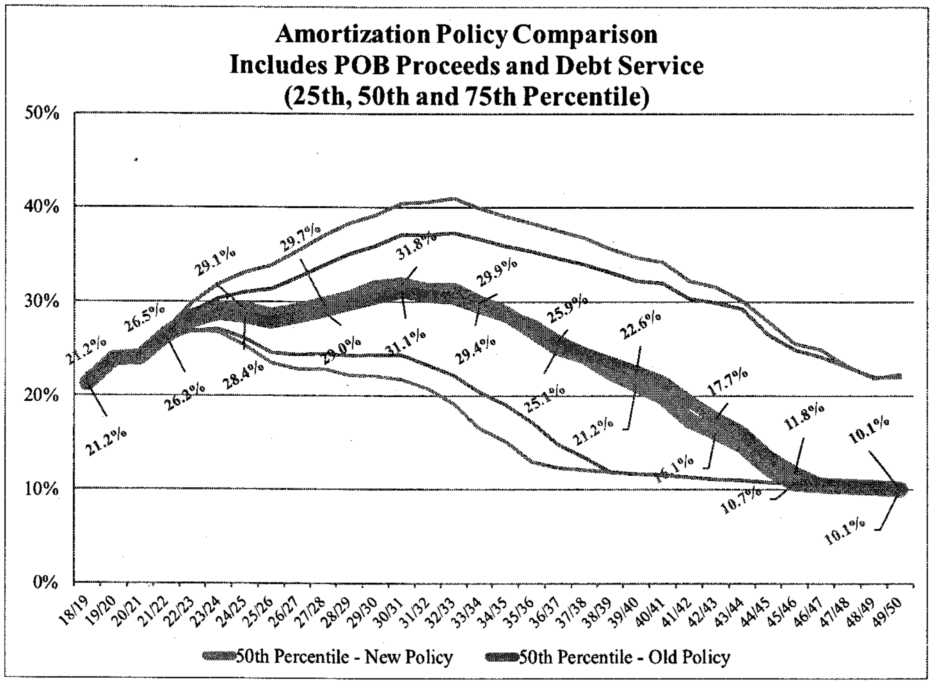
CONTRIBUTION PROJECTIONS - MISCELLANEOUS



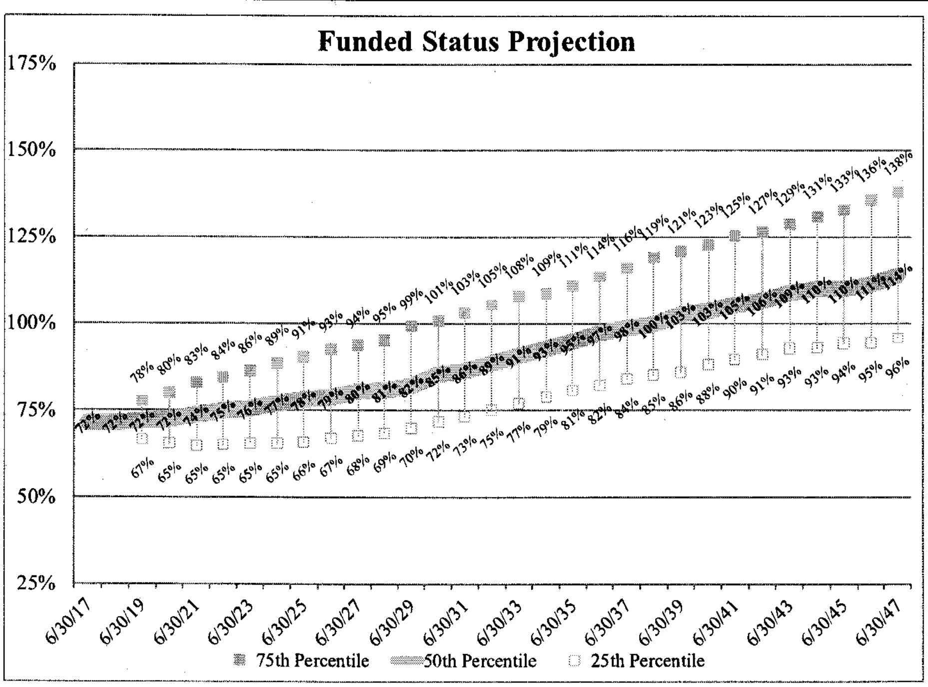
CONTRIBUTION PROJECTIONS - MISCELLANEOUS



CONTRIBUTION PROJECTIONS - MISCELLANEOUS



FUNDED STATUS - MISCELLANEOUS

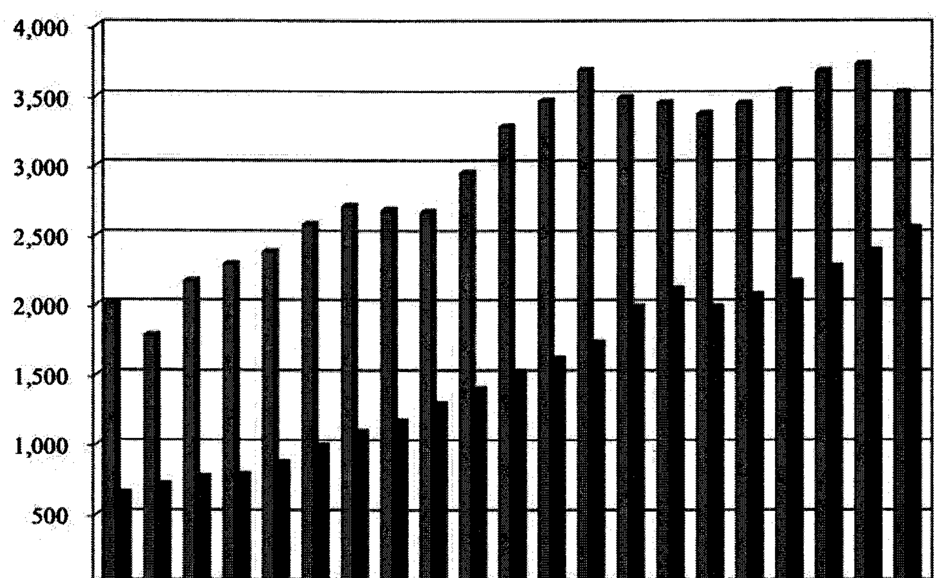


Summary of Demographic Information - Safety

	1997	2007	2016	2017
Actives				
■ Counts	2,010	3,282	3,731	3,527
■ Average				
• Age	39	38	39	40
• County Service	9	9	11	11
• PERSable Wages	$ 45,700	$ 65,400	$ 90,800	$ 93,100
■ Total PERSable Wages	91,900,000	214,600,000	338,800,000	328,400,000
Inactive Members				
■ Counts				
• Transferred	292	563	585	625
• Separated	205	380	582	625
• Retired				
□ Service		895	1,574	1,716
□ Disability		490	592	603
□ Beneficiaries		136	225	235
□ Total	651	1,521	2,391	2,554
■ Average Annual County Provided Benefit for Service Retirees[5]		33,500	53,300	56,100

[5] 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

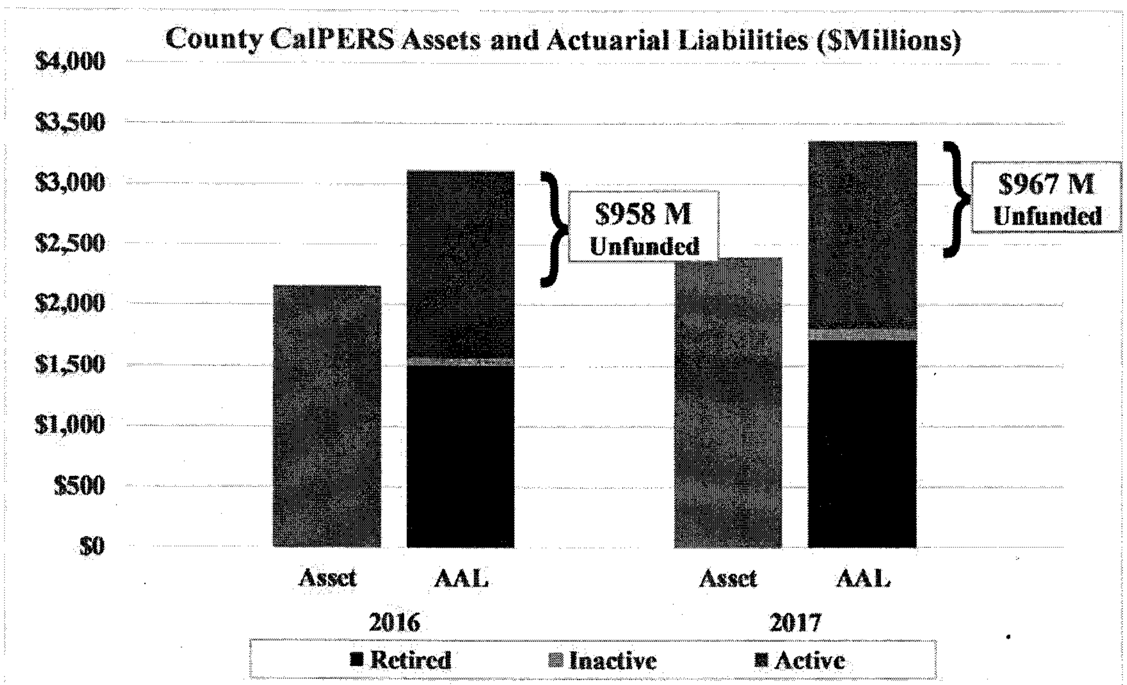


	'97	'98	'99	'00	'01	'02	'03	'04	'05	'06	'07	'08	'09	'10	'11	'12	'13	'14	'15	'16	'17
■ Active	2,01	1,78	2,17	2,29	2,38	2,58	2,70	2,68	2,67	2,94	3,28	3,46	3,68	3,49	3,45	3,37	3,44	3,54	3,68	3,73	3,52
■ Receiving Payments	651	711	767	785	872	993	1,09	1,16	1,29	1,39	1,52	1,61	1,72	1,98	2,11	1,98	2,07	2,16	2,27	2,39	2,55

PLAN FUNDED STATUS - SAFETY

	June 30, 2016	June 30, 2017
Active AAL	$1,540,300,000	$1,559,400,000
Retiree AAL	1,500,500,000	1,712,200,000
Inactive AAL	69,500,000	90,000,000
Total AAL	3,110,300,000	3,361,600,000
Assets	2,152,000,000	2,394,900,000
Unfunded Liability	958,300,000	966,700,000
Funded Ratio	69.2%	71.2%

PLAN FUNDED STATUS - SAFETY



PLAN FUNDED STATUS - SAFETY

Discount Rate Sensitivity

June 30, 2017

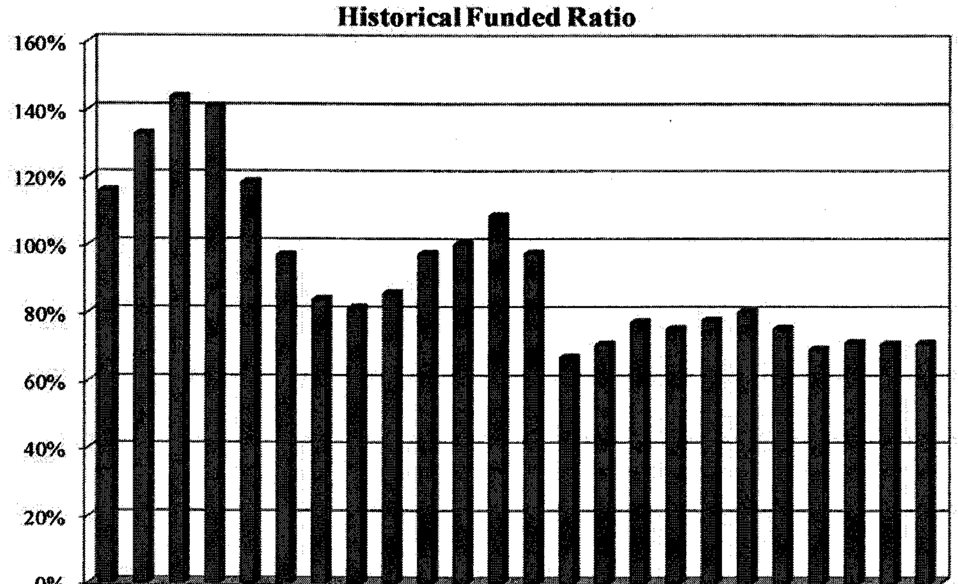
	Discount Rate		
	7.25%	**7.00%**	**6.00%**
AAL	$3,361,600,000	$3,465,700,000	$4,005,200,000
Assets	2,394,900,000	2,394,900,000	2,394,900,000
Unfunded Liability	966,700,000	1,070,800,000	1,610,300,000
Funded Ratio	73.8%	69.1%	59.8%

PLAN FUNDED STATUS - SAFETY

Unfunded Accrued Liability Changes

■ **Unfunded Accrued Liability on 6/30/16**		$ 958,300,000
■ **Expected 6/30/17 Unfunded Accrued Liability**		1,000,200,000
■ **Other Changes**		
• Asset Loss (Gain) (11.2% return for FY 2017)	(81,800,000)	
• Assumption Change	55,500,000	
• Contribution & Experience Loss (Gain)	(7,200,000)	
• Total		(33,500,000)
■ **6/30/17 Unfunded Accrued Liability**		966,700,000

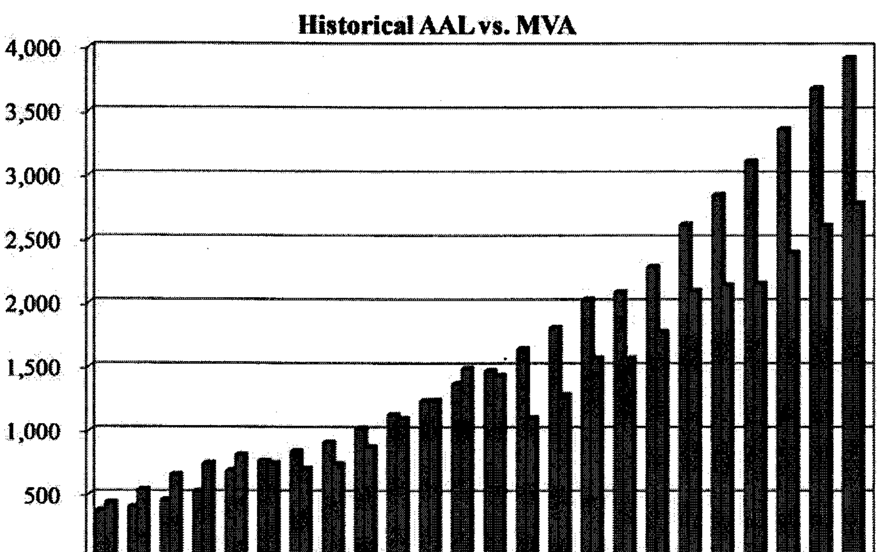
FUNDED RATIO - SAFETY



	'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	116%	133%	144%	141%	118%	97%	84%	81%	86%	97%	100%	109%	97%	67%	71%	77%	75%	78%	80%	75%	69%	71%	71%	71%

6/30/18 & 6/30/19 funded status estimated

FUNDED STATUS (MILLIONS) - SAFETY

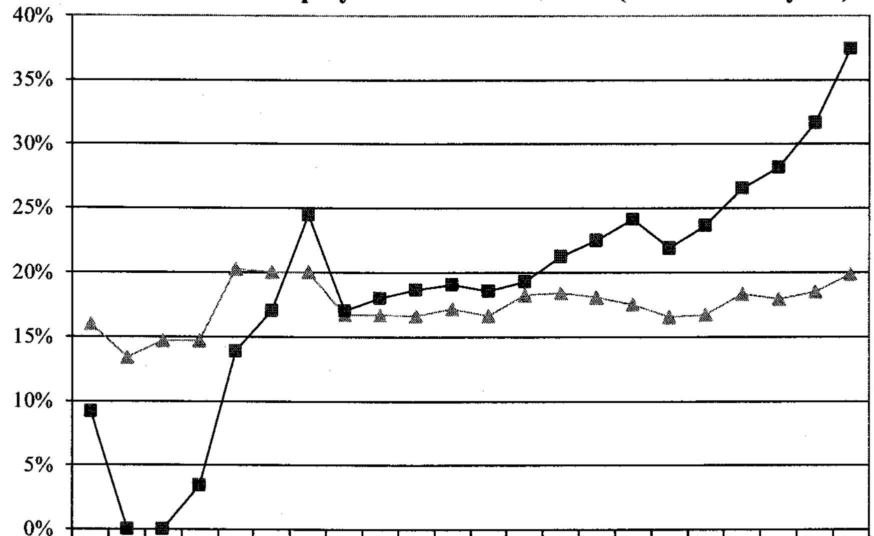


	'96	'97	'98	'99	'00	'01	'02	'03	'04	'05	'06	'07	'08	'09	'10	'11	'12	'13	'14	'15	'16	'17	'18	'19
AAL	381	407	457	529	686	768	840	907	1,021	1,127	1,232	1,370	1,469	1,643	1,809	2,032	2,086	2,286	2,616	2,846	3,110	3,362	3,684	3,919
Assets	441	540	657	746	812	745	704	738	874	1,097	1,234	1,487	1,432	1,100	1,280	1,566	1,567	1,776	2,098	2,141	2,152	2,395	2,607	2,782

6/30/18 & 6/30/19 funded status estimated

CONTRIBUTION RATES - SAFETY

Historical Employer Contribution Rates (Percent of Payroll)



	98/99	99/00	00/01	01/02	02/03	03/04	04/05	05/06	06/07	07/08	08/09	09/10	10/11	11/12	12/13	13/14	14/15	15/16	16/17	17/18	18/19	19/20
Normal Cost	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%
Total Rate	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%

CONTRIBUTION RATES - SAFETY

	6/30/16 2018/2019	6/30/17 2019/2020
■ Total Normal Cost	27.7%	29.2%
■ Employee Normal Cost	9.2%	9.3%
■ Employer Normal Cost	18.5%	19.9%
■ Amortization Payments	13.2%	17.6%
■ Total Employer Contribution Rate	31.6%	37.4%

■ 2018/19 Employer Contribution Rate	31.6%
• Payroll < Expected	0.8%
• Asset Method Change (5th Year)	1.3%
• 6/30/14 Assumption Change (4th Year)	1.0%
• 6/30/16 Discount Rate Change (2nd Year)	0.3%
• 6/30/17 Discount Rate & Inflation (1st Year)	2.0%
• Other (Gains)/Losses	0.3%
■ 2019/20 Employer Contribution Rate	37.4%

CONTRIBUTION PROJECTIONS - SAFETY

- Market Value Investment Return:
  - June 30, 2018 8.6%[6]
  - Future returns based on stochastic analysis using 1,000 trials

Single Year Returns at[7]	25th Percentile	50th Percentile	75th Percentile
Current Investment Mix	**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 10 years and higher beyond that.
- Assumption Changes – Discount Rate
  - Decrease to 7.0% by June 30, 2018 valuation
  - Additional Discount Rate decreases due to Risk Mitigation policy.
- No Other: Gains/Losses, Method/Assumption Changes, Benefit Improvements
- Different from CalPERS projection

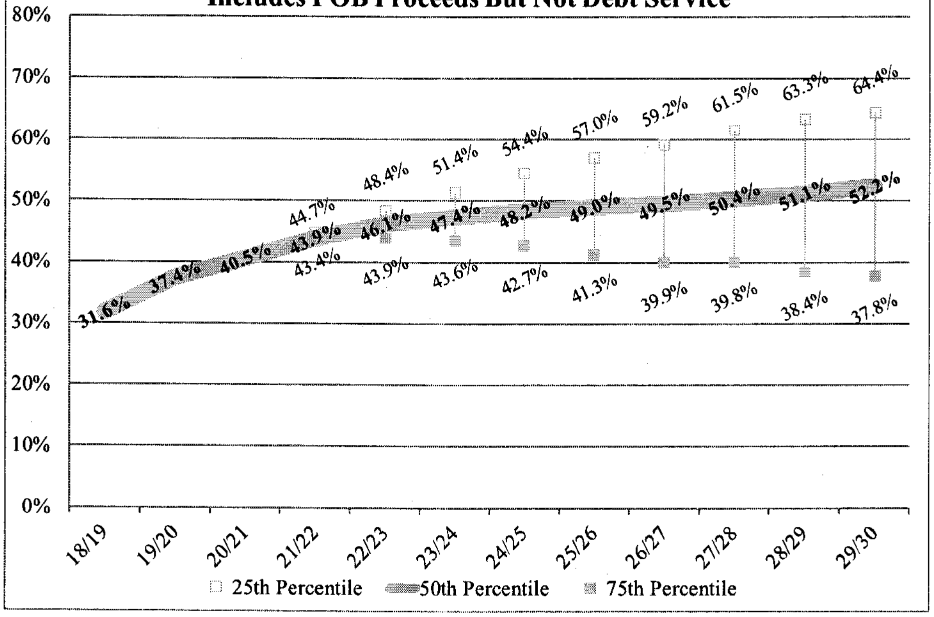
[6] based July 2018 CalPERS press release
[7] Nth percentile means N percentage of our trials result in returns lower than the indicated rates.

CONTRIBUTION PROJECTIONS - SAFETY

- New hire assumptions:
  - 75.0% of 2018/19 new hires are PEPRA members and 25.0% are Classic members
  - Percentage of PEPRA member future hires to increase from 75.0% to 100% over 5 years

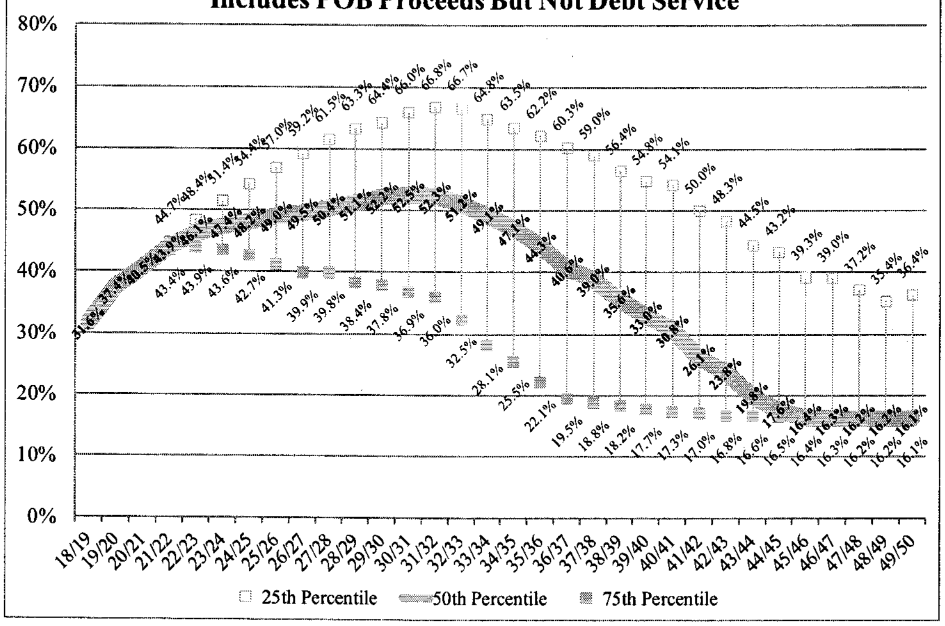
CONTRIBUTION PROJECTIONS - SAFETY

Contribution Projection – Percent of Pay
Includes POB Proceeds But Not Debt Service

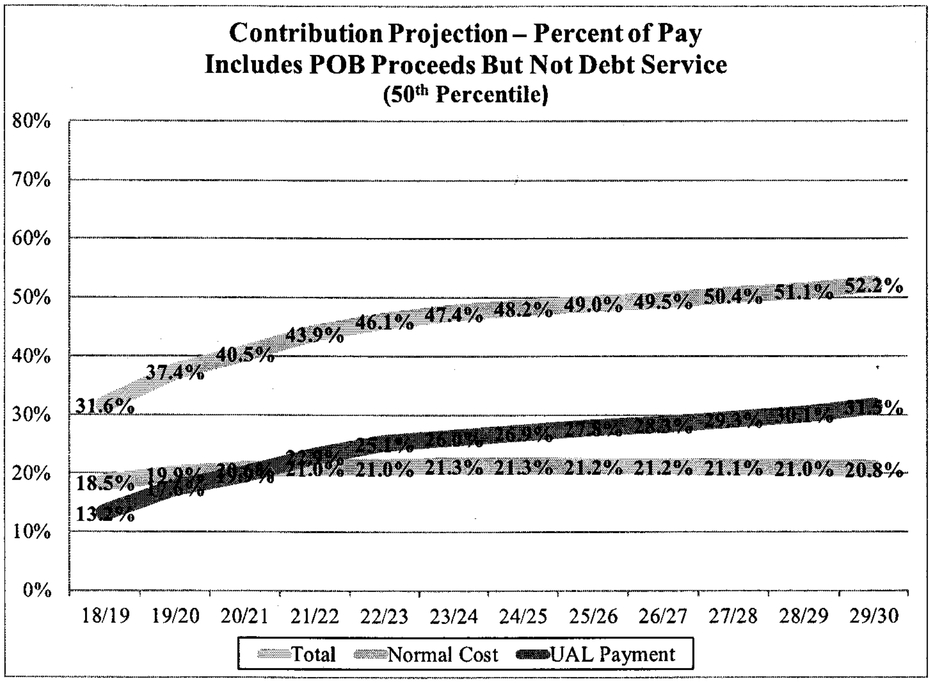


CONTRIBUTION PROJECTIONS - SAFETY

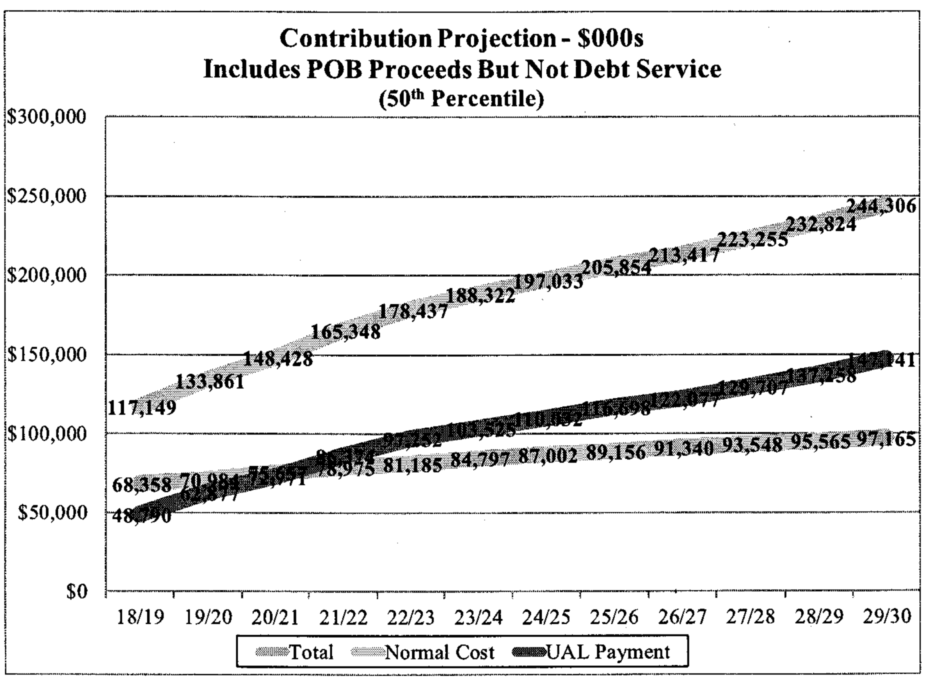
Contribution Projection – Percent of Pay
Includes POB Proceeds But Not Debt Service



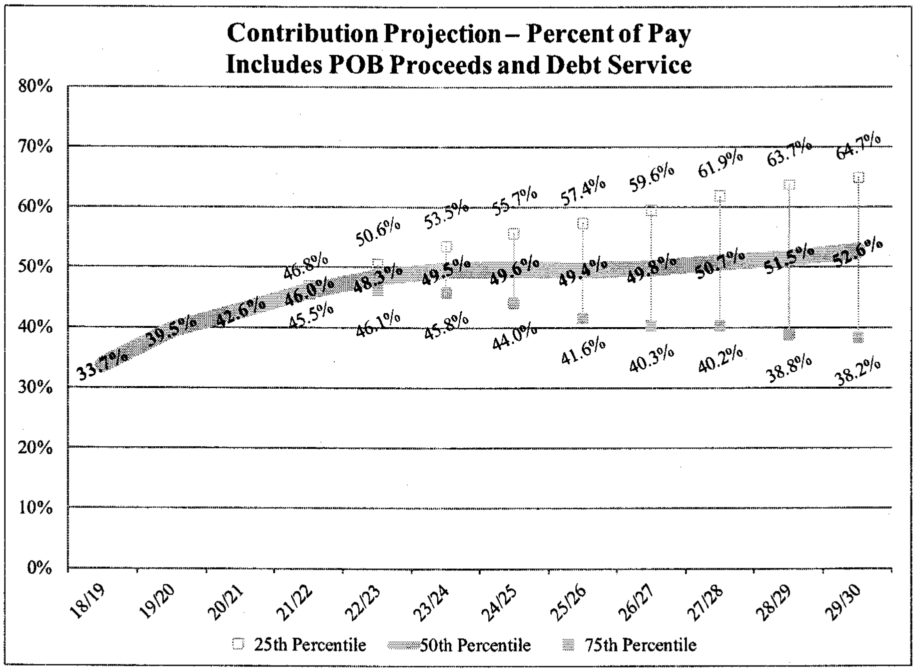
Contribution Projections - Safety



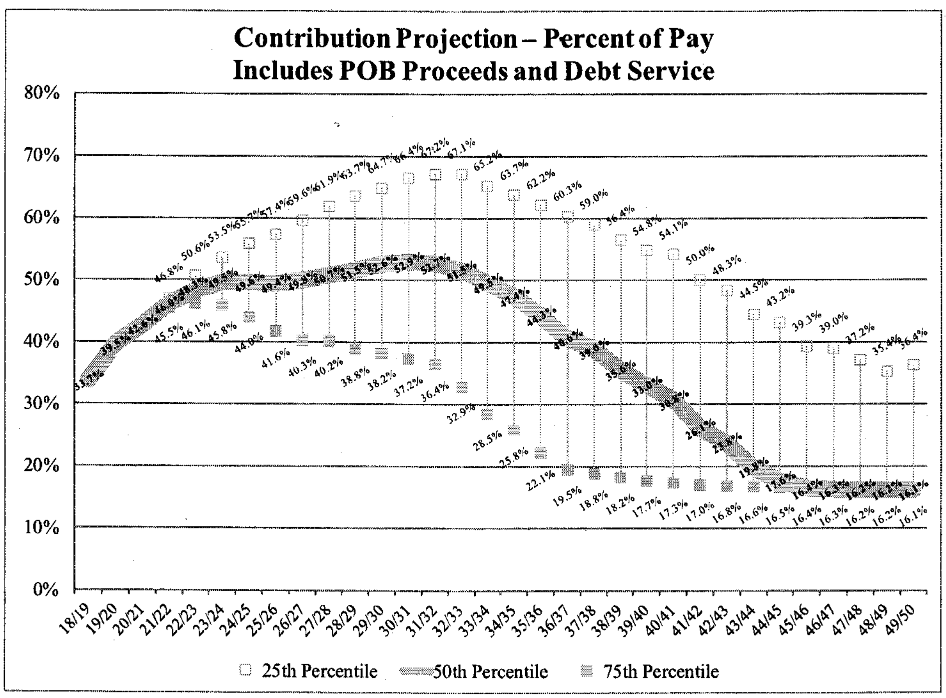
Contribution Projections - Safety



CONTRIBUTION PROJECTIONS - SAFETY



CONTRIBUTION PROJECTIONS - SAFETY



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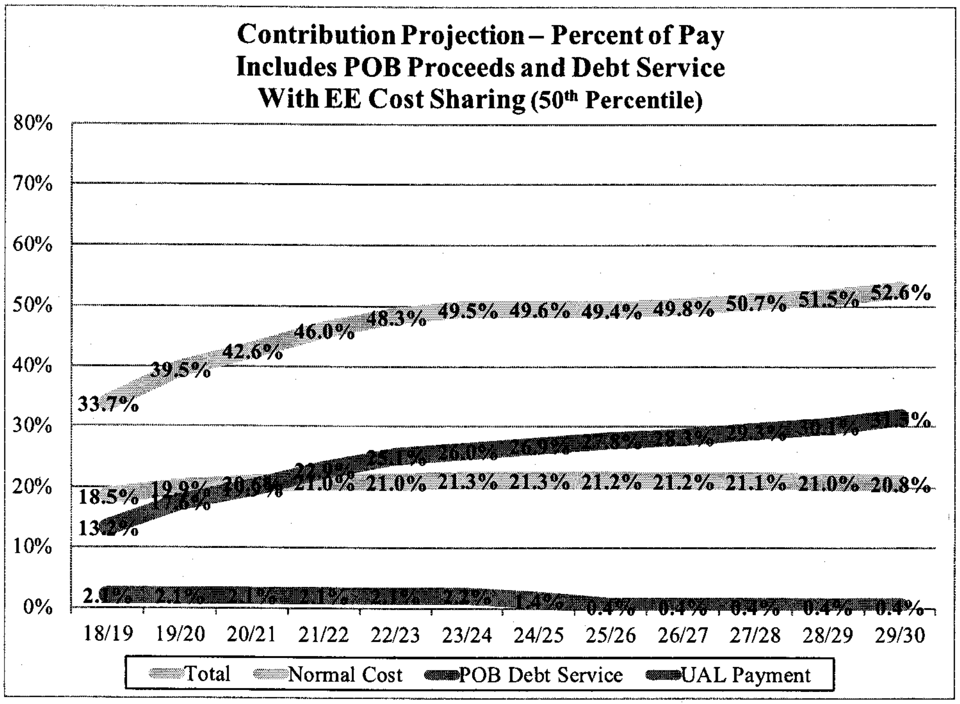

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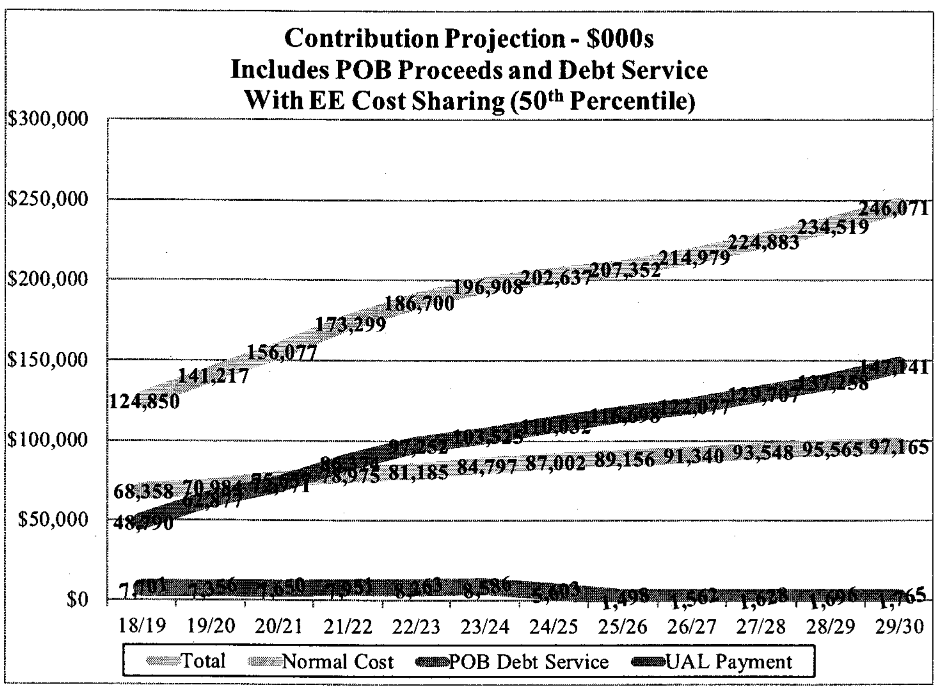

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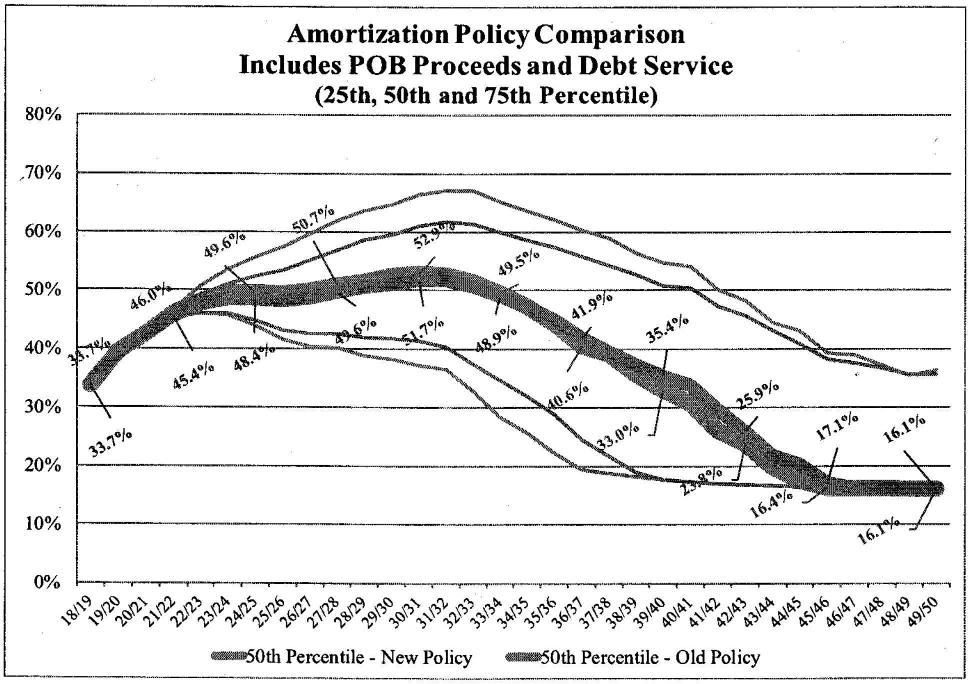
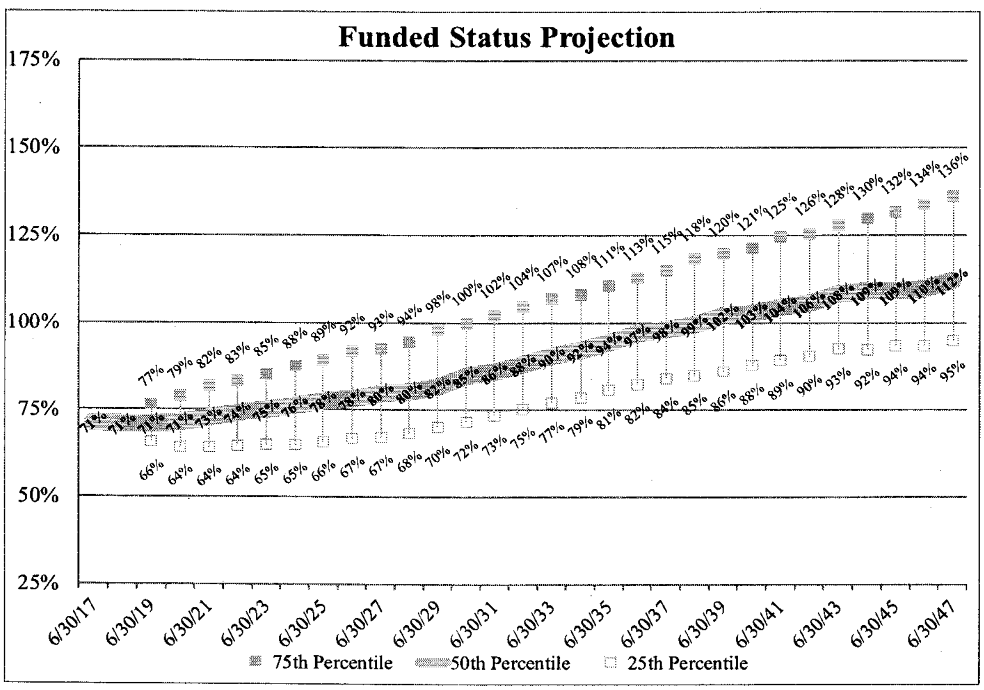
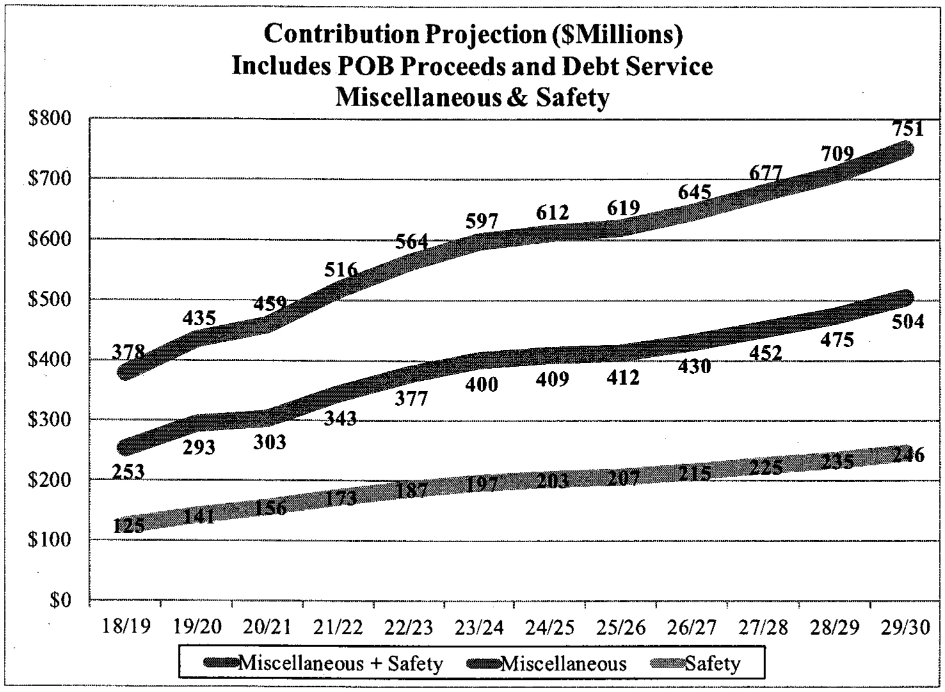


FUNDED STATUS - SAFETY



Combined Miscellaneous and Safety



Combined Miscellaneous and Safety

Funded Status Summary on June 30, 2017
(Amounts in $Millions)

	Miscellaneous	Safety	Total
■ AAL	$ 7,441	$ 3,362	$ 10,803
■ Assets	5,326	2,395	7,721
■ Unfunded AAL	2,115	967	3,082
■ Funded Ratio	71.6%	71.2%	71.5%

Payroll Projections
($000s)

FY	18/19	19/20	20/21	21/22	22/23
Miscellaneous	1,191,395	1,228,547	1,259,266	1,293,896	1,329,478
Safety	370,226	357,547	366,488	376,566	386,922
Total	1,561,621	1,586,094	1,625,754	1,670,462	1,716,399
FY	**23/24**	**24/25**	**25/26**	**26/27**	**27/28**
Miscellaneous	1,366,039	1,403,605	1,442,204	1,481,864	1,522,616
Safety	397,562	408,495	419,728	431,271	443,131
Total	1,763,600	1,812,099	1,861,932	1,913,135	1,965,747
FY	**28/29**	**29/30**			
Miscellaneous	1,564,488	1,607,511			
Safety	455,317	467,838			
Total	2,019,805	2,075,349			

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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, 2017 (Amounts in Millions)

Discount Rate	Ongoing Plan 7.25%	Termination Basis 1.75%	3.00%
Miscellaneous			
Actuarial Accrued Liability	$ 7,441	$ 14,489	$ 12,597
Assets	5,326	5,326	5,326
Unfunded AAL (UAAL)	2,115	9,163	7,271
Safety			
Actuarial Accrued Liability	$ 3,362	$ 6,739	$ 5,850
Assets	2,395	2,395	2,395
Unfunded AAL (UAAL)	967	4,344	3,455
Total			
Unfunded AAL (UAAL)	3,082	13,507	10,726
Funded Ratio	71.5%	36.8%	42.3%

POB (Millions) Bond Proceeds Balance

	Safety	Misc.	Total
■ POB @ **2/16/05**	**$ 85.7**	**$ 311.2**	**$ 396.9**
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■ **Balance @ 6/30/18**	**91.8**	**332.8**	**424.4**
■ Earning 7/1/18 - 2/15/19[8]	1.2	4.5	5.7
■ Amortization payment through 2/15/19[9]	(3.6)	(13.1)	(16.7)
■ **Balance @ 2/15/19**	**89.3**	**324.1**	**413.4**

[8] Based on CalPERS -1.9% actual return from 7/1/18 through 10/31/18 and assumed return from 11/1/18 to 2/15/2019.

[9] Based on a 25 year closed amortization

POB (Millions) Bond Proceeds Balance

	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
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■ 2/15/2018	$20.2	7.1	27.2	266.4
■ 8/15/2018	0.0	6.6	6.6	266.4
■ 2/15/2019	22.5	6.6	29.1	243.9

POB (MILLIONS)

- Net Estimated Gains through February 15, 2019:

A.	CalPERS Estimated Balance	$ 413.4
B.	Bond Proceeds Balance	243.9
C.	Cash Flow Savings/(Deficit) [Payments that would have been paid to CalPERS less POB debt service]	(60.0)
D.	Net [(A) – (B) + (C)]	109.5

- Net Estimated Gains through February 15, 2019:

E.	CalPERS Investment Earnings	$350.8
F.	POB Interest Payments	238.1
G.	Cost of Issuance	3.1
H.	Net [(E) – (F) – (G)]	109.5

- Above estimates based on market rate of return.

NET FUNDED RATIO (MILLIONS)

	Safety			
	6/30/16	6/30/17	Proj. 6/30/18	Proj. 6/30/19[10]
(1) AAL	$3,110	$3,362	$3,684	$ 3,919
(2) MVA	2,152	2,395	2,607	2,782
(3) UAAL [(1) - (2)]	958	967	1,077	1,137
(4) Funding Ratio [(2)/(1)]	69.2%	71.2%	70.8%	71.0%
(5) POB Balance	$66	$62	$58	$53
(6) Net MVA [(2) - (5)]	2,086	2,333	2,549	2,729
(7) Net Funding Ratio [(6)/(1)]	67.1%	69.4%	69.2%	69.6%

10 Projected 6/30/18 MVA based on assumed returns for 2018/19.

NET FUNDED RATIO (MILLIONS)

	Miscellaneous			
	6/30/16	6/30/17	Proj. 6/30/18	Proj. 6/30/19[11]
(1) AAL	$6,850	$7,441	$8,137	$8,652
(2) MVA	4,800	5,326	5,801	6,189
(3) UAAL [(1) - (2)]	2,050	2,115	2,336	2,463
(4) Funding Ratio [(2)/(1)]	70.1%	71.6%	71.3%	71.5%
(5) POB Balance	$239	$225	$209	$191
(6) Net MVA [(2) - (5)]	4,561	5,101	5,592	5,998
(7) Net Funding Ratio [(6)/(1)]	66.6%	68.6%	68.7%	69.3%

[11] Projected 6/30/18 MVA based on assumed returns for 2017/18.

NET FUNDED RATIO (MILLIONS)

	Total			
	6/30/16	6/30/17	Proj. 6/30/18	Proj. 6/30/19[12]
(1) AAL	$9,960	$10,803	$11,821	$12,571
(2) MVA	6,952	7,721	8,408	8,971
(3) UAAL [(1) - (2)]	3,008	3,082	3,413	3,600
(4) Funding Ratio [(2)/(1)]	69.8%	71.5%	71.1%	71.4%
(5) POB Balance	$305	$287	$266	$ 244
(6) Net MVA [(2) - (5)]	6,647	7,434	8,142	8,727
(7) Net Funding Ratio [(6)/(1)]	66.7%	68.8%	68.9%	69.4%

[12] Projected 6/30/18 MVA based on assumed returns for 2017/18.

PEPRA COST SHARING

- Target of 50% of total normal cost for everyone
- *New members* must pay greater of 50% of total normal cost or bargained amount if higher
- Employer cannot pay any part of *new 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:

	Classic Members		New Members
	Tier 1 3%@60 FAE1	Tier 2 2%@60 FAE3	PEPRA 2%@62 FAE3
Employer Normal Cost	12.2%	9.3%	7.39%
Member Normal Cost	9.9%	6.9%	6.50%
Total Normal Cost	20.1%	16.2%	13.89%
50% Target	10.1%	8.1%	6.95%

PEPRA COST SHARING

- Safety Plan:

	Classic Members		New Members
	Tier 1 3%@50 FAE1	Tier 2 3%@55 FAE3	PEPRA 2.7%@57 FAE3
Employer Normal Cost	21.1%	17.1%	12.71%
Member Normal Cost	9.0%	9.0%	11.75%
Total Normal Cost	30.1%	26.1%	24.46%
50% Target	15.1%	13.1%	12.23%

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
  - Council 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 Council 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 12.3¢ 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 6.5¢ 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) is coming

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?

IRREVOCABLE SUPPLEMENTAL (§115) PENSION TRUST

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CalPERS
California Public Employees' Retirement System
Actuarial Office
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(888) 225-7377 phone · (916) 795-2744 fax
www.calpers.ca.gov

July 2018

Miscellaneous Plan of the County of Riverside (CalPERS ID: 5982690295)
Annual Valuation Report as of June 30, 2017

Dear Employer,

As an attachment to this letter, you will find a copy of the June 30, 2017 actuarial valuation report of your pension plan. Your 2017 actuarial valuation report contains important actuarial information about your pension plan at CalPERS. Your CalPERS staff actuary, whose signature appears in the "Actuarial Certification" section on page 1, is available to discuss the report with you after August 1, 2018.

Required Contributions

The exhibit below displays the minimum required employer contributions and the Employee PEPRA Rate for Fiscal Year 2019-20 along with an estimate of the required contribution for Fiscal Year 2020-21. 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
2019-20	10.998%	$129,905,894	6.50%
Projected Results			
2020-21	*11.8%*	*$155,245,000*	*TBD*

The actual investment return for Fiscal Year 2017-18 was not known at the time this report was prepared. The projections above assume the investment return for that year would be 7.25 percent. ***If the actual investment return for Fiscal Year 2017-18 differs from 7.25 percent, the actual contribution requirements for the projected years will differ from those shown above.***

Moreover, the projected results for Fiscal Year 2020-21 assume that there are no future Plan changes, no further changes in assumptions other than those recently approved and no liability gains or losses. Such changes can have a significant impact on required contributions. Since they cannot be predicted in advance, the projected employer results shown above are estimates. The actual required employer contributions for Fiscal Year 2020-21 will be provided in next year's report.

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.

The required contributions shown above include a Normal Cost component expressed as a percentage of payroll and a payment toward Unfunded Accrued Liability expressed as a dollar amount. For illustrative total contribution requirements expressed as percentages of payroll, please see pages 4 and 5 of the report.

The "Risk Analysis" section of the valuation report starting on page 22 also contains estimated employer contributions in future years under a variety of investment return scenarios.

Changes since the Prior Year's Valuation

At its December 2016 meeting, 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 2019-20 determined in this valuation were calculated using a discount rate of 7.25 percent. The projected employer contributions on Page 5 are calculated under the assumption that the discount rate will be lowered to 7.00 percent next year, as adopted by the Board.

On December 19, 2017, the CalPERS Board of Administration adopted new actuarial assumptions based on the recommendations in the December 2017 CalPERS Experience Study and Review of Actuarial Assumptions. This study reviewed the retirement rates, termination rates, mortality rates, rates of salary increases and inflation assumption for Public Agencies. These new assumptions are incorporated in your actuarial valuations and will impact the required contribution for FY 2019-20. In addition, the Board adopted a new asset portfolio as part of its Asset Liability Management. The new asset mix supports a 7.00 percent discount rate. The reduction of the inflation assumption will be implemented in two steps in conjunction with the decreases in the discount rate. For the June 30, 2017 valuation an inflation rate of 2.625 percent will be used and a rate of 2.50 percent will be used in the following valuation.

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.

Beginning with Fiscal Year 2017-18 CalPERS began collecting employer contributions toward the plan's unfunded liability as dollar amounts instead of the prior method of a contribution rate. This change addressed potential funding issues that could arise from a declining payroll or reduction in the number of active members in the plan. Funding the unfunded liability as a percentage of payroll could lead to the underfunding of the plans. Due to stakeholder feedback regarding internal needs for total contributions expressed as a percentage of payroll, the reports include such results in the contribution projection on page 5. These results are provided for information purposes only. Contributions toward the unfunded liability will continue to be collected as dollar amounts.

The CalPERS Board of Administration adopted a Risk Mitigation Policy which is designed to reduce funding risk over time. This Policy has been temporarily suspended during the period over which the discount rate is being lowered. More details on the Risk Mitigation Policy can be found on our website.

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

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

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, 2018 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, 2017

for the Miscellaneous Plan of the County of Riverside

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

Required Contributions for Fiscal Year July 1, 2019 – June 30, 2020

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, 2017 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, 2017 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 2019-20.

Purpose of the Report

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

- Set forth the assets and accrued liabilities of this plan as of June 30, 2017;
- Determine the minimum required employer contributions for the fiscal year July 1, 2019 through June 30, 2020;
- Provide actuarial information as of June 30, 2017 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:

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

Required Contributions

		Fiscal Year 2019-20
Required Employer Contribution		
Employer Normal Cost Rate		**10.998%**
Plus, Either		
1) Monthly Employer Dollar UAL Payment	**$**	**10,825,491**
Or		
2) Annual UAL Prepayment Option	**$**	**125,438,313**
Required PEPRA Member Contribution Rate		**6.50%**

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)****. 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 2018-19		Fiscal Year 2019-20
Normal Cost Contribution as a Percentage of Payroll				
Total Normal Cost		17.970%		18.460%
Employee Contribution[1]		7.512%		7.462%
Employer Normal Cost[2]		10.458%		10.998%
Projected Annual Payroll for Contribution Year	$	1,191,395,234	$	1,228,546,672
Estimated Employer Contributions Based On Projected Payroll				
Total Normal Cost	$	214,093,722	$	226,789,716
Employee Contribution[1]		89,497,610		91,674,153
Employer Normal Cost[2]		124,596,112		135,115,563
Unfunded Liability Contribution		100,265,926		129,905,894
% of Projected Payroll (illustrative only)		8.416%		10.574%
Estimated Total Employer Contribution	$	224,862,038	$	265,021,457
% of Projected Payroll (illustrative only)		18.874%		21.572%

[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, 2016		June 30, 2017
1. Present Value of Projected Benefits	$	8,349,752,530	$	9,101,025,982
2. Entry Age Normal Accrued Liability		6,850,143,825		7,441,270,302
3. Market Value of Assets (MVA)	$	4,799,576,566	$	5,325,794,759
4. Unfunded Accrued Liability (UAL) [(2) – (3)]	$	2,050,567,259	$	2,115,475,543
5. Funded Ratio [(3) / (2)]		70.1%		71.6%

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 7.25% Return for Fiscal Year 2017-18)**				
Fiscal Year	**2019-20**	**2020-21**	**2021-22**	**2022-23**	**2023-24**	**2024-25**
Normal Cost %	10.998%	11.8%	11.8%	11.8%	11.8%	11.8%
UAL Payment	129,905,894	155,245,000	183,346,000	206,128,000	218,284,000	230,025,000
*Total as a % of Payroll**	*21.6%*	*24.1%*	*26.0%*	*27.3%*	*27.8%*	*28.2%*
Projected Payroll	*1,228,546,672*	*1,259,265,935*	*1,293,895,748*	*1,329,477,882*	*1,366,038,523*	*1,403,604,582*

*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.

Due to the adopted change in the discount rate for the next valuation in combination with the 5-year phase-in ramp, the increases in the required contributions are expected to continue for six years from Fiscal Year 2019-20 through Fiscal Year 2024-25.

For projected contributions under alternate investment return scenarios, please see the "Analysis of 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 Amortizations 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 6.6 percent over the 20 years ending June 30, 2017, 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

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 valuation. The minimum employer contribution for Fiscal Year 2019-20 determined in this valuation was calculated using a discount rate of 7.25 percent. The projected employer contributions on Page 5 are calculated assuming that the discount rate will be lowered to 7.00 percent next year as adopted by the Board. The decision to reduce the discount rate was primarily based on reduced capital market assumptions provided by external investment consultants and CalPERS investment staff. The specific decision adopted by the Board reflected recommendations from CalPERS staff and additional input from employer and employee stakeholder groups. Based on the investment allocation adopted by the Board and capital market assumptions, the reduced discount rate assumption provides a more realistic assumption for the long-term investment return of the fund.

On December 19, 2017, the CalPERS Board of Administration adopted new actuarial assumptions based on the recommendations in the December 2017 CalPERS Experience Study and Review of Actuarial Assumptions. This study reviewed the retirement rates, termination rates, mortality rates, rates of salary increases and inflation assumption for Public Agencies. These new assumptions are incorporated in this actuarial valuation and will impact the required contribution for FY 2019-20. In addition, the Board adopted a new asset portfolio as part of its Asset Liability Management. The new asset mix supports a 7.00 percent discount rate. The reduction of the inflation assumption will be implemented in two steps in conjunction with the decreases in the discount rate. For the June 30, 2017 valuation an inflation rate of 2.625 percent will be used and a rate of 2.50 percent will be used in the following valuation.

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.

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, 2017. Changes in the value of assets subsequent to that date are not reflected. Investment returns below the assumed rate of return will increase the retired contribution, while investment returns above the assumed rate of return will decrease the retired contribution.

This actuarial valuation report reflects statutory changes, regulatory changes and CalPERS Board actions through January 2018. 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

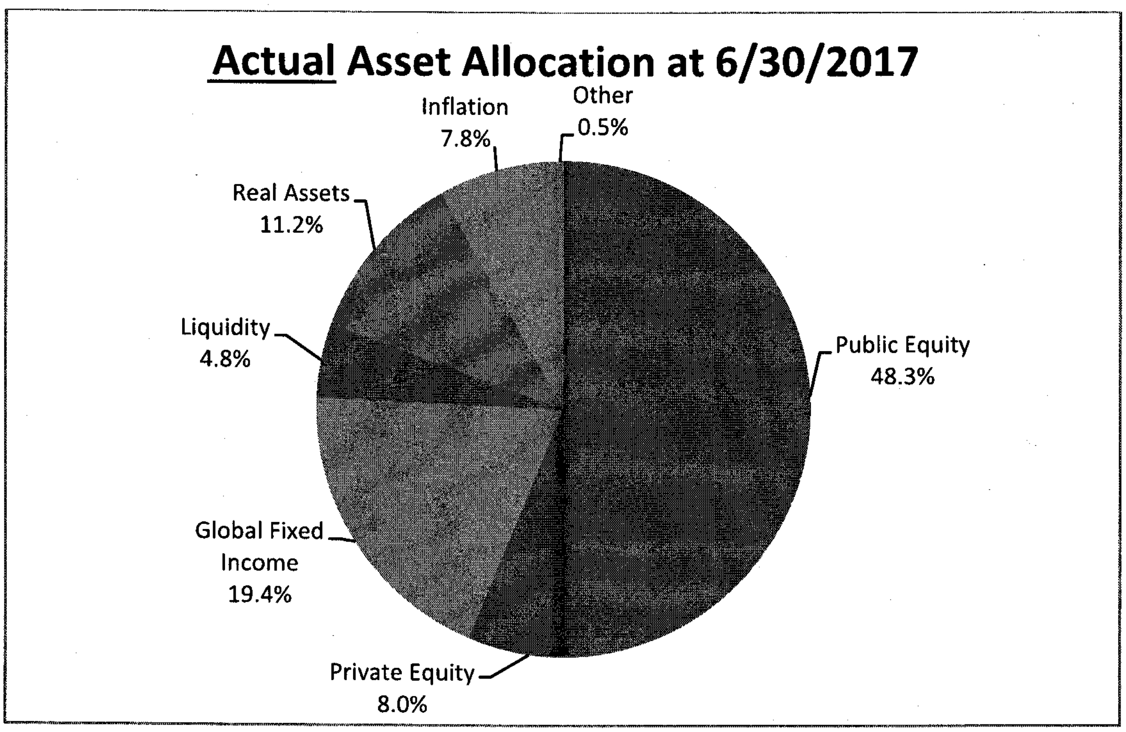
1.	Market Value of Assets as of 6/30/16 including Receivables	$	4,799,576,566
2.	Change in Receivables for Service Buybacks		(236,280)
3.	Employer Contributions		164,682,465
4.	Employee Contributions		83,898,789
5.	Benefit Payments to Retirees and Beneficiaries		(253,132,622)
6.	Refunds		(6,761,691)
7.	Lump Sum Payments		0
8.	Transfers and Miscellaneous Adjustments		3,701,475
9.	Net Investment Return		534,066,057
10.	Market Value of Assets as of 6/30/17 including Receivables	$	5,325,794,759

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.

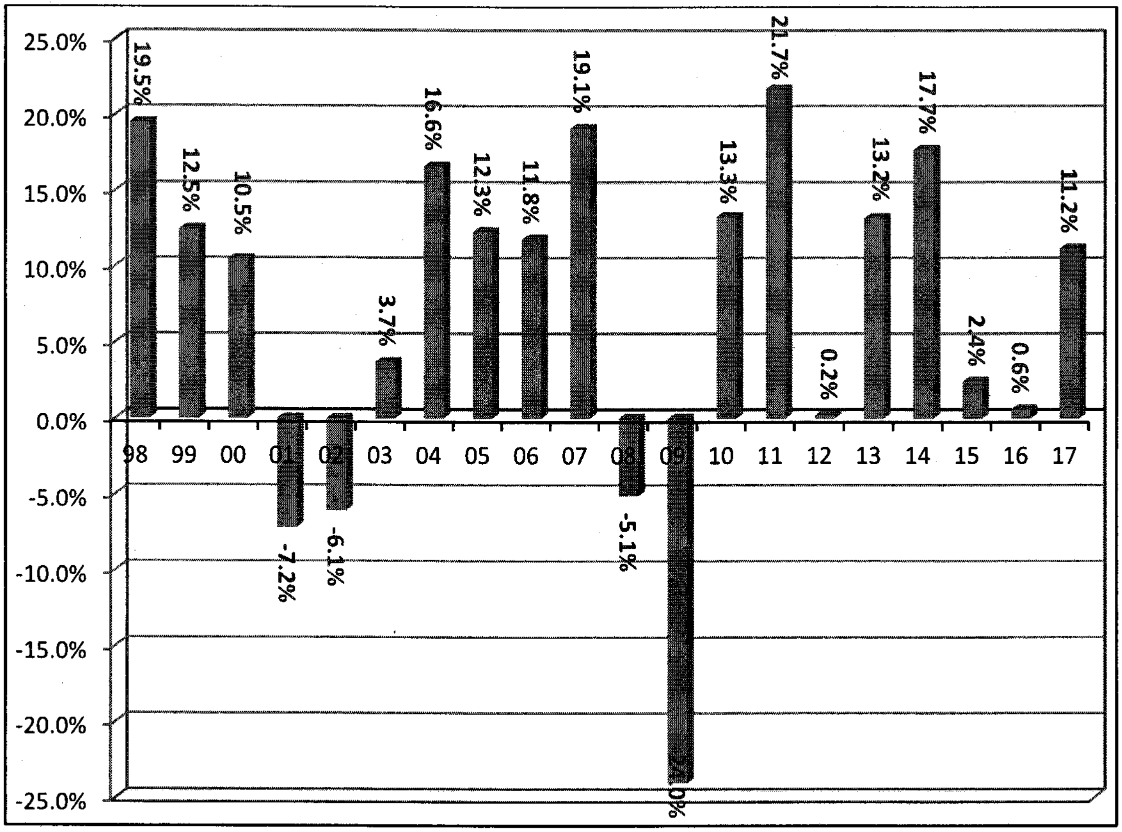
The asset allocation and market value of assets shown below reflect the values of the Public Employees' Retirement Fund (PERF) in its entirety as of June 30, 2017. The assets for County of Riverside Miscellaneous Plan are part of the PERF and are invested accordingly.

(A) Asset Class	(B) Market Value ($ Billion)	(C) Policy Target Allocation
Public Equity	156.2	50.0%
Private Equity	25.9	8.0%
Global Fixed Income	62.9	28.0%
Liquidity	15.5	1.0%
Real Assets	36.3	13.0%
Inflation Sensitive Assets	25.3	0.0%
Other	1.6	0.0%
Total Fund	**$323.7**	**100.0%**



CalPERS History of Investment Returns

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



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

History of CalPERS Geometric Mean Rates of Return and Volatilities					
	1 year	**5 year**	**10 year**	**20 year**	**30 year**
Geometric Return	11.2%	8.8%	4.3%	6.6%	8.2%
Volatility	–	7.3%	13.4%	11.5%	10.1%

Liabilities and Contributions

- **Development of Accrued and Unfunded Liabilities**
- **(Gain) / Loss Analysis 06/30/16 - 06/30/17**
- **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, 2016	June 30, 2017
1. Present Value of Projected Benefits			
a) Active Members	$	5,059,825,245	5,363,734,898
b) Transferred Members		193,790,565	201,106,979
c) Terminated Members		148,161,924	185,333,947
d) Members and Beneficiaries Receiving Payments		2,947,974,796	3,350,850,158
e) Total	$	8,349,752,530	9,101,025,982
2. Present Value of Future Employer Normal Costs	$	837,714,835	949,110,982
3. Present Value of Future Employee Contributions	$	661,893,870	710,644,698
4. Entry Age Normal Accrued Liability			
a) Active Members [(1a) - (2) - (3)]	$	3,560,216,540	3,703,979,218
b) Transferred Members (1b)		193,790,565	201,106,979
c) Terminated Members (1c)		148,161,924	185,333,947
d) Members and Beneficiaries Receiving Payments (1d)		2,947,974,796	3,350,850,158
e) Total	$	6,850,143,825	7,441,270,302
5. Market Value of Assets (MVA)	$	4,799,576,566	5,325,794,759
6. Unfunded Accrued Liability (UAL) [(4e) - (5)]	$	2,050,567,259	2,115,475,543
7. Funded Ratio [(5) / (4e)]		70.1%	71.6%

(Gain)/Loss Analysis 6/30/16 – 6/30/17

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 6/30/16	$	2,050,567,259
b) Expected Payment on the UAL during 2016-17		68,963,692
c) Interest through 6/30/17 [.07375 x (1a) - ((1.07375)$^{1/2}$ - 1) x (1b)]		148,731,533
d) Expected UAL before all other changes [(1a) - (1b) + (1c)]		2,130,335,100
e) Change due to plan changes		0
f) Change due to assumption change		114,064,771
g) Expected UAL after all other changes [(1d) + (1e) + (1f)]		2,244,399,871
h) Actual UAL as of 6/30/17		2,115,475,543
i) Total (Gain)/Loss for 2016-17 [(1h) - (1g)]	$	(128,924,328)
2. Contribution (Gain)/Loss for the Year		
a) Expected Contribution (Employer and Employee)	$	269,386,265
b) Interest on Expected Contributions		9,756,925
c) Actual Contributions		248,581,254
d) Interest on Actual Contributions		9,003,387
e) Expected Contributions with Interest [(2a) + (2b)]		279,143,190
f) Actual Contributions with Interest [(2c) + (2d)]		257,584,641
g) Contribution (Gain)/Loss [(2e) - (2f)]	$	21,558,549
3. Asset (Gain)/Loss for the Year		
a) Market Value of Assets as of 6/30/16	$	4,799,576,566
b) Prior Fiscal Year Receivables		(14,392,227)
c) Current Fiscal Year Receivables		14,155,947
d) Contributions Received		248,581,254
e) Benefits and Refunds Paid		(259,894,313)
f) Transfers and Miscellaneous Adjustments		3,701,475
g) Expected Int. [.07375 x (3a + 3b) + ((1.07375)$^{1/2}$ - 1) x ((3d) + (3e) + (3f))]		352,631,660
h) Expected Assets as of 6/30/17 [(3a) + (3b) + (3c) + (3d) + (3e) + (3f) + (3g)]		5,144,360,362
i) Market Value of Assets as of 6/30/17		5,325,794,759
j) Asset (Gain)/Loss [(3h) - (3i)]	$	(181,434,397)
4. Liability (Gain)/Loss for the Year		
a) Total (Gain)/Loss (1i)	$	(128,924,328)
b) Contribution (Gain)/Loss (2g)		21,558,549
c) Asset (Gain)/Loss (3j)		(181,434,397)
d) Liability (Gain)/Loss [(4a) - (4b) - (4c)]	$	30,951,520

Schedule of Amortization Bases

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, 2017.
- The required employer contributions determined by the valuation are for the fiscal year beginning two years after the valuation date: Fiscal Year 2019-20.

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

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

Reason for Base	Date Established	Ramp Up/Down 2019-20	Amorti-zation Period	Balance 6/30/17	Expected Payment 2017-18	Balance 6/30/18	Expected Payment 2018-19	Balance 6/30/19	Scheduled Payment for 2019-20
FS 30-YEAR AMORTIZATION	06/30/08	No Ramp	21	$(10,324,204)	$(716,650)	$(10,330,534)	$(728,364)	$(10,325,193)	$(748,219)
GOLDEN HANDSHAKE	06/30/09	No Ramp	12	$31,595,728	$3,047,995	$30,729,867	$3,109,916	$29,737,104	$3,193,876
ASSUMPTION CHANGE	06/30/09	No Ramp	12	$80,548,647	$7,770,414	$78,341,261	$7,928,273	$75,810,358	$8,142,315
SPECIAL (GAIN)/LOSS	06/30/09	No Ramp	22	$117,839,238	$7,980,184	$118,118,179	$8,107,384	$118,285,612	$8,328,576
GOLDEN HANDSHAKE	06/30/10	No Ramp	13	$1,125,365	$103,287	$1,099,989	$105,337	$1,070,649	$108,185
SPECIAL (GAIN)/LOSS	06/30/10	No Ramp	23	$82,979,728	$5,491,096	$83,309,093	$5,576,437	$83,573,956	$5,728,702
GOLDEN HANDSHAKE	06/30/11	No Ramp	14	$31,646,522	$2,775,346	$31,066,702	$2,829,144	$30,389,132	$2,905,722
ASSUMPTION CHANGE	06/30/11	No Ramp	14	$99,057,144	$8,687,143	$97,242,245	$8,855,535	$95,121,376	$9,095,235
SPECIAL (GAIN)/LOSS	06/30/11	No Ramp	24	$(45,843,600)	$(2,968,675)	$(46,092,854)	$(3,013,654)	$(46,313,598)	$(3,096,007)
PAYMENT (GAIN)/LOSS	06/30/12	No Ramp	25	$(70,055,822)	$(4,445,348)	$(70,531,197)	$(4,510,997)	$(70,973,049)	$(4,634,361)
(GAIN)/LOSS	06/30/12	No Ramp	25	$221,878,615	$14,079,166	$223,384,208	$14,287,089	$224,783,629	$14,677,804
(GAIN)/LOSS	06/30/13	100% →	26	$622,077,368	$25,119,227	$641,164,110	$33,996,766	$652,440,921	$43,658,994
ASSUMPTION CHANGE	06/30/14	80% ↗	17	$365,762,082	$13,616,404	$378,178,470	$20,805,253	$384,050,161	$28,495,007
(GAIN)/LOSS	06/30/14	80% ↗	27	$(475,566,881)	$(13,009,233)	$(496,572,913)	$(19,795,137)	$(512,074,294)	$(27,117,366)
(GAIN)/LOSS	06/30/15	60% ↗	28	$430,931,329	$6,068,208	$455,889,519	$12,301,581	$476,201,798	$18,959,569
ASSUMPTION CHANGE	06/30/16	40% ↗	19	$125,961,644	$(5,748,771)	$141,047,381	$2,661,593	$148,516,929	$5,468,982
(GAIN)/LOSS	06/30/16	40% ↗	29	$520,722,196	$0	$558,474,555	$7,749,770	$590,938,177	$15,926,622
ASSUMPTION CHANGE	06/30/17	20% ↗	20	$114,064,771	$(9,634,963)	$132,312,586	$(9,911,968)	$152,170,239	$2,867,754
(GAIN)/LOSS	06/30/17	20% ↗	30	$(128,924,328)	$0	$(138,271,342)	$0	$(148,296,014)	$(2,055,496)
TOTAL				**$2,115,475,543**	**$58,214,830**	**$2,208,559,324**	**$90,353,958**	**$2,275,107,893**	**$129,905,894**

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 2.875 percent per year. **The schedules do not reflect the impact of adopted discount rate changes that will become effective beyond June 30, 2017. Therefore, future amortization payments displayed in the Current Amortization Schedule on the following page will not match projected amortization payments shown in connection with Projected Employer Contributions provided elsewhere in this report.**

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**
6/30/2019	2,275,107,893	129,905,894	2,275,107,893	170,039,402	2,275,107,893	206,877,635
6/30/2020	2,305,520,625	152,337,524	2,263,957,731	174,928,034	2,225,807,476	212,825,367
6/30/2021	2,314,907,730	175,587,102	2,246,936,438	179,957,215	2,166,773,215	218,944,096
6/30/2022	2,300,897,770	193,166,848	2,223,472,801	185,130,985	2,097,122,316	225,238,739
6/30/2023	2,267,666,226	199,630,168	2,192,950,014	190,453,501	2,015,902,897	231,714,353
6/30/2024	2,225,331,878	205,369,537	2,154,702,242	195,929,039	1,922,088,821	238,376,140
6/30/2025	2,173,984,508	211,273,912	2,108,010,954	201,561,999	1,814,574,174	245,229,454
6/30/2026	2,112,799,793	217,348,034	2,052,100,966	207,356,907	1,692,167,314	252,279,801
6/30/2027	2,040,888,731	223,596,789	1,986,136,205	213,318,418	1,553,584,506	259,532,845
6/30/2028	1,957,292,806	230,025,198	1,909,215,165	219,451,322	1,397,443,078	266,994,415
6/30/2029	1,860,978,813	236,638,423	1,820,366,017	225,760,548	1,222,254,078	274,670,504
6/30/2030	1,750,833,298	243,441,777	1,718,541,372	232,251,164	1,026,414,396	282,567,281
6/30/2031	1,625,656,570	234,511,847	1,602,612,657	238,928,384	808,198,310	290,691,091
6/30/2032	1,500,652,506	230,800,059	1,471,364,074	245,797,576	565,748,413	299,048,459
6/30/2033	1,370,429,636	208,995,356	1,323,486,127	252,864,256	297,065,876	307,646,103
6/30/2034	1,253,346,900	199,922,378	1,157,568,663	260,134,103		
6/30/2035	1,137,171,784	185,641,605	972,093,415	267,612,959		
6/30/2036	1,027,363,366	170,374,436	765,425,990	275,306,831		
6/30/2037	925,404,759	165,941,461	535,807,281	283,221,903		
6/30/2038	820,645,012	161,112,764	281,344,244	291,364,532		
6/30/2039	713,290,859	160,689,551				
6/30/2040	598,591,816	166,666,239				
6/30/2041	469,387,538	139,630,195				
6/30/2042	358,814,902	128,902,668				
6/30/2043	251,335,349	122,388,490				
6/30/2044	142,809,713	72,529,917				
6/30/2045	78,050,292	44,984,839				
6/30/2046	37,121,929	34,566,202				
6/30/2047	4,015,965	4,158,997				
6/30/2048						
Totals		**4,850,138,210**		**4,511,369,078**		**3,812,636,283**
Interest Paid		**2,575,030,317**		**2,236,261,185**		**1,537,528,390**
Estimated Savings				**338,769,132**		**1,037,501,927**

* This schedule does not reflect the impact of adopted discount rate changes that will become effective beyond June 30, 2017. For Projected Employer Contributions, please see Page 5.

Reconciliation of Required Employer Contributions

Normal Cost (% of Payroll)

1. For Period 7/1/18 – 6/30/19	
a) Employer Normal Cost	10.458%
b) Employee Contribution	7.512%
c) Total Normal Cost	17.970%
2. Changes since the prior year annual valuation	
a) Effect of changes in demographics results	(0.340%)
b) Effect of plan changes	0.000%
c) Effect of changes in assumptions	0.830%
d) Net effect of the changes above [sum of (a) through (c)]	0.490%
3. 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%
Employer Normal Cost Change [(3a) – (1a)]	0.540%
Employee Contribution Change [(3b) – (1b)]	(0.050%)

Unfunded Liability Contribution ($)

1. For Period 7/1/18 – 6/30/19	100,265,926
2. Changes since the prior year annual valuation	
a) Effect of (gain)/loss during prior year[1]	(2,055,496)
b) Effect of plan changes	0
c) Effect of changes in assumptions[2]	2,867,754
d) Changes to prior year amortization payments[3]	28,827,710
e) Effect of changes due to Fresh Start	0
f) Effect of elimination of amortization base	0
g) Net effect of the changes above [sum of (a) through (f)]	29,639,968
3. For Period 7/1/19 – 6/30/20 [(1) + (2g)]	129,905,894

[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.

[2] The unfunded liability contribution for the change in assumptions 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.

The amounts shown for the period 7/1/18 – 6/30/19 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.

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

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

Risk Analysis

- **Analysis of Future Investment Return Scenarios**
- **Analysis of Discount Rate Sensitivity**
- **Volatility Ratios**
- **Hypothetical Termination Liability**

Analysis of Future Investment Return Scenarios

Analysis was performed to determine the effects of various future investment returns on required employer contributions. The projections below provide a range of results based on five investment return scenarios assumed to occur during the next four fiscal years (2017-18, 2018-19, 2019-20 and 2020-21). The projections also assume that all other actuarial assumptions will be realized and that no further changes to assumptions, contributions, benefits, or funding will occur.

Each of the five investment return scenarios assumes a return of 7.25 percent for fiscal year 2017-18. For fiscal years 2018-19, 2019-20, and 2020-21 each scenario assumes an alternate fixed annual return. The fixed return assumptions for the five scenarios are 1.0 percent, 4.0 percent, 7.0 percent, 9.0 percent and 12.0 percent.

The alternate investment returns were chosen based on stochastic analysis of possible future investment returns over the four-year period ending June 30, 2021. Using the expected returns and volatility of the asset classes in which the funds are invested, 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 2020-21	Projected Employer Contributions			
	2020-21	2021-22	2022-23	2023-24
1.0%				
Normal Cost	11.8%	11.8%	11.8%	11.8%
UAL Contribution	$155,245,000	$188,725,000	$222,670,000	$252,228,000
4.0%				
Normal Cost	11.8%	11.8%	11.8%	11.8%
UAL Contribution	$155,245,000	$186,035,000	$214,479,000	$235,587,000
7.0%				
Normal Cost	11.8%	11.8%	11.8%	11.8%
UAL Contribution	$155,245,000	$183,346,000	$206,128,000	$218,284,000
9.0%				
Normal Cost	11.8%	12.0%	12.3%	12.6%
UAL Contribution	$155,245,000	$181,659,000	$201,530,000	$209,465,000
12.0%				
Normal Cost	11.8%	12.0%	12.3%	12.6%
UAL Contribution	$155,245,000	$178,988,000	$193,024,000	$191,382,000

Given the temporary suspension of the Risk Mitigation Policy during the period over which the discount rate assumption is being phased down to 7.0 percent, the projections above were performed without reflection of any possible impact of this Policy for Fiscal Year 2020-21.

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 do not reflect the recent changes to the amortization policy effective with the June 30, 2019 valuation but the impact on the results above is expected to be minimal.

Analysis of Discount Rate Sensitivity

Shown below are various valuation results as of June 30, 2017 assuming alternate discount rates. Results are shown using the current discount rate of 7.25 percent as well as alternate discount rates of 6.0 percent, 7.0 percent, and 8.0 percent. The alternate rate of 7.0 percent was selected since the Board has adopted this rate as the final discount rate at the end of the three-year phase-in of the reduction in this assumption. The rates of 6.0 percent and 8.0 percent were selected since they illustrate the impact of a 1 percent increase or decrease to the 7.0 percent assumption. This analysis shows the potential plan impacts if the PERF were to realize investment returns of 6.0 percent, 7.0 percent, or 8.0 percent over the long-term.

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, 2017	Plan's Normal Cost	Accrued Liability	Unfunded Accrued Liability	Funded Status
7.25% (current discount rate)	18.460%	$7,441,270,302	$2,115,475,543	71.6%
6.0%	24.369%	$8,790,814,611	$3,465,019,852	60.6%
7.0%	19.253%	$7,658,360,699	$2,332,565,940	69.5%
8.0%	15.401%	$6,731,129,650	$1,405,334,891	79.1%

Volatility Ratios

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. Since the liability volatility ratio is a long-term measure, it is shown below at the current discount rate (7.25 percent) as well as the discount rate the Board has adopted to determine the contribution requirement in the June 30, 2018 actuarial valuation (7.00 percent).

Contribution Volatility		**As of June 30, 2017**
1. Market Value of Assets without Receivables	$	5,311,638,812
2. Payroll		1,128,397,500
3. Asset Volatility Ratio (AVR) [(1) / (2)]		4.7
4. Accrued Liability (7.25% discount rate)	$	7,441,270,302
5. Liability Volatility Ratio (LVR) [(4) / (2)]		6.6
6. Accrued Liability (7.00% discount rate)		7,658,360,699
7. Projected Liability Volatility Ratio [(6) / (2)]		6.8

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, 2017. 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] @ 1.75%	Funded Status	Unfunded Termination Liability @ 1.75%	Hypothetical Termination Liability[1,2] @ 3.00%	Funded Status	Unfunded Termination Liability @ 3.00%
$5,325,794,759	$14,488,757,540	36.8%	$9,162,962,781	$12,596,771,105	42.3%	$7,270,976,346

[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 2.61 percent on June 30, 2017, and was 2.83 percent on January 31, 2018.

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 for this plan. A description of principal standard and optional plan provisions is in Appendix B of this report.

	Contract Package						
Benefit Provision	Active Misc	Active Misc	Active Misc	Active Misc	Inactive Misc	Inactive Misc	Inactive Misc
Benefit Formula	2.0% @ 62	2.0% @ 60	3.0% @ 60	3.0% @ 60	2.0% @ 55	2.0% @ 55	2.0% @ 55
Social Security Coverage	Yes	Yes	Yes	Yes	Yes	No	Yes
Full/Modified	Full	Modified	Modified	Modified	Modified	Full	Modified
Employee Contribution Rate	6.50%	7.00%	8.00%	8.00%			
Final Average Compensation Period	Three Year	Three Year	One Year	One Year	One Year	One 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	No	No	No	Indexed	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.

	Contract Package				
Benefit Provision	Inactive Misc	Inactive Misc	Receiving Misc	Receiving Misc	
Benefit Formula	3.0% @ 60	3.0% @ 60			
Social Security Coverage	No	No			
Full/Modified	Full	Full			
Employee Contribution Rate					
Final Average Compensation Period	One Year	One Year			
Sick Leave Credit	No	No			
Non-Industrial Disability	Standard	Standard			
Industrial Disability	No	No			
Pre-Retirement Death Benefits					
Optional Settlement 2	No	No			
1959 Survivor Benefit Level	Indexed	Indexed			
Special	No	No			
Alternate (firefighters)	No	No			
Post-Retirement Death Benefits					
Lump Sum	$500	$500	$500	$500	
Survivor Allowance (PRSA)	Yes	Yes	Yes	Yes	
COLA	2%	2%	2%	2%	

Appendices

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