

CalPERS Community Workshop July 18, 2019
Summary Listing of Background Documents Provided

- 1) City Managers Department Pension Sustainability Working Group White Paper
- 2) CalPERS Actuarial Reports as of June 30, 2017 including:
 - 2a) Miscellaneous Plan
 - 2b) Safety First Tier Plan
 - 2c) Safety Second Tier Plan
 - 2d) Safety Police Third Tier Plan
 - 2e) Safety Fire Third Tier Plan
 - 2f) PEPRSA Safety Police Plan
 - 2g) PEPRSA Safety Fire Plan
- 3) August 10, 2018 Memorandum re CalPERS Unfunded Liabilities from 6/30/17 Actuarial Reports including attached summary of Unfunded Actuarial Liabilities (UAL)
- 4) CalPERS Unfunded Liabilities and Funding Strategy Staff Report to City Council dated September 18, 2018
- 5) CalPERS Unfunded Liabilities and Funding Strategy Presentation with Talking Points to City Council dated September 18, 2018
- 6) CalPERS Prepayment Option Analysis after Additional Discretionary Payment in September, 2018
- 7) CalPERS Prepayment Option Analysis from July/August 2018 Actuarial Reports
- 8) PERS Cost Projections Analysis Using July 2018 Actuarial Reports
- 9) 6/30/17 Actuarial Reports Analysis Comparing 30 Year, 20 Year, and 15 Year Amortization Schedules
- 10) Summary of Projected Hypothetical Termination Liability to Leave CalPERS

City of Yuba City
Projected Hypothetical Termination Liability

	<i>Assumed Discount Rate of 1.75%</i>	<i>Assumed Discount Rate of 3.00%</i>
Miscellaneous Plan	\$ 126,602,908	\$ 102,305,745
Safety Tier 1 Plan	82,323,315	71,817,690
Safety Tier 2 Plan	90,768,206	68,796,382
Safety Police Tier 3 Plan	974,501	527,981
Safety Fire Tier 3 Plan	531,496	284,287
PEPRA Safety Police Plan	499,978	244,103
PEPRA Safety Fire Plan	398,972	188,696
Total Estimated Termination Liability	<u>\$ 302,099,376</u>	<u>\$ 244,164,884</u>

City Managers Department Pension Sustainability Working Group – White Paper

JANUARY 2019



CITY MANAGERS DEPARTMENT

PENSION SUSTAINABILITY WORKING GROUP – WHITE PAPER

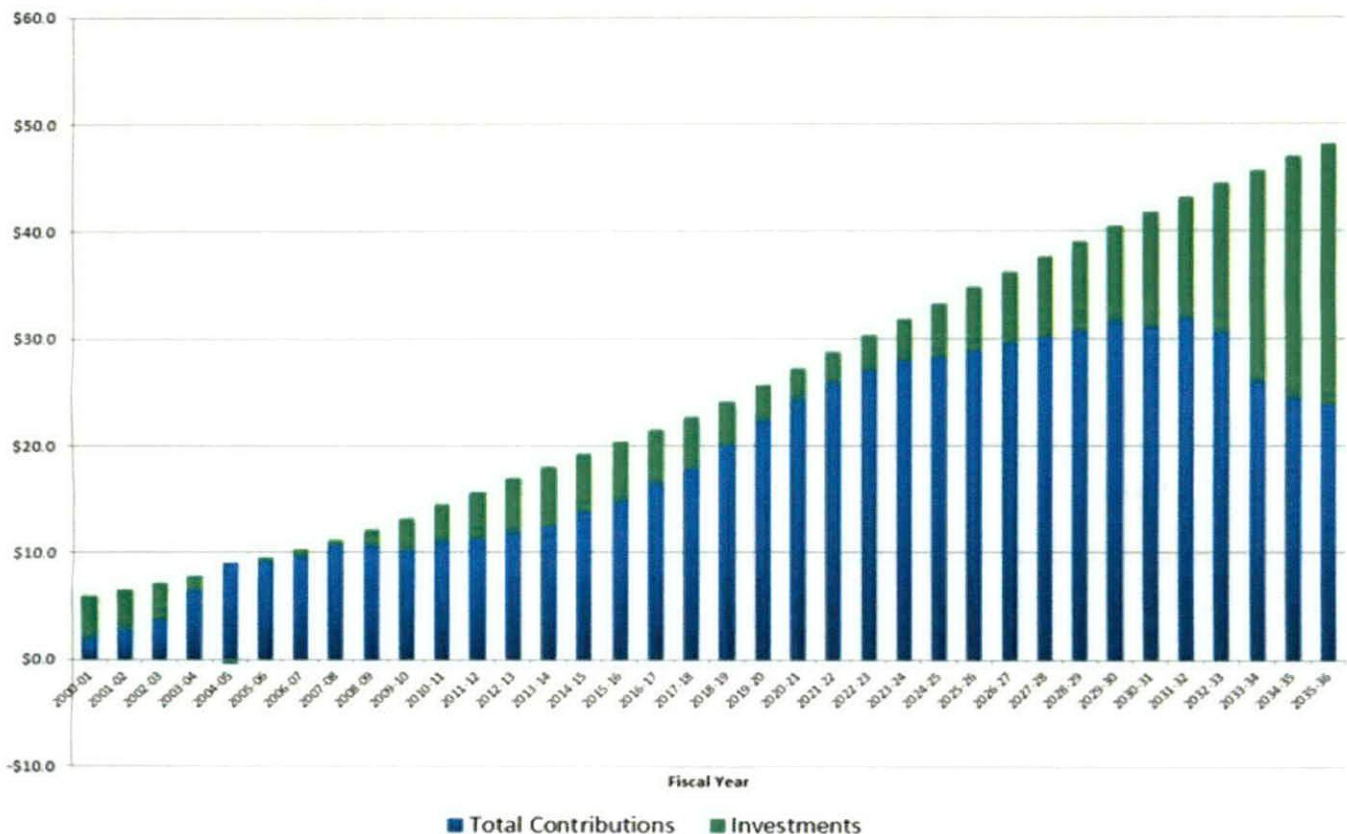
This whitepaper is the product of the Pension Stability Working Group, which consists of city officials from across the state (City Managers, Finance Directors, Human Resource Directors, and Elected Officials.) These individuals convened, under the umbrella of the City Managers professional department, to drive awareness and inform fellow local government officials of the fiscal challenges that cities will face as a direct result of increasing pension obligations as well as educate them on the overall sustainability of local pension structures.

It is important to note that this document and its contents have not been approved or endorsed by the League of California Cities' governing bodies or Board of Directors. The recommendations put forth in this document shall not be construed, as the policy proposals, preferences, recommendations, or direction of the League of California Cities on this matter.

Executive Summary

Over the past decade pension expenses have increased substantively for municipal governments across the nation. As CalPERS continues to implement its strategic goal of improving the long-term sustainability of the system, all actions to further reduce risk have resulted in increased costs to most member agencies.

Historical & Projected PERF Contributions & Investments for Benefit Payments



As shown by the chart above provided by CalPERS the peak of these contributions is projected to happen over the next 10 -12 years.

The reality is that pension cost increases of this magnitude are unsustainable despite the post-recession economic recovery and many cities across California cannot absorb the increased costs of providing retirement benefits. As such, without intervention, the cost of pension benefits will reduce capacity to pay for programs and services. It is within this context that the League of California Cities City Manager's Department initiated this white paper, to outline options and opportunities to balance the reality of rising pension costs with the organizational mandate to deliver programs and services to the communities they serve.

With regard to public pensions, we find as follows:

1. We must recognize the importance and value of attracting and retaining high-performing public employees to design and deliver vital public services to local communities.
2. We must recognize and support the value of a reasonable, dependable, and financially sustainable, employer-employee funded Defined Benefit (DB) plans for career employees; supplemented with other retirement savings options including personal savings (e.g. 457 Plan or 401a Defined Contribution Plan (DCP)).
3. Employees should incur/pay at least half of their Public Pension "Normal Costs" and be allowed to negotiate a cost-sharing of the full ARC as well.
4. Employee pensions should be portable across all public agencies to sustain a competent cadre of California public servants.

The following summarize the recommendations included in the white paper:

1. Develop a strategy for how to revise the application of COLA's to retiree benefits.
2. If the Courts do not rule in a manner that enables us to rectify the existing problems, the League should initiate a dialogue with its membership regarding the cost/benefit and strength of support for the League sponsoring a statewide initiative to change the pension system.
3. Continue lobbying strategy primarily directed at the CalPERS Board, pushing for changes in their current investment strategy.
4. Re-consider converting currently deemed "Classic" employees to the same benefit formula now in place for PEPRAs employees, for future years of service.

INTRODUCTION

The Great Recession has forever altered and indelibly marked the current financial condition of the California Public Employees Retirement System (CalPERS). The same can arguably be said of all other similarly managed, Defined Benefit Retirement Systems for public employees across this State and the Nation. The concerns and challenges facing these retirement systems are well-documented and the calls for action are registered regularly in the media. Strong concerns also exist among those of us that are charged with managing public agency budgets and employee expectations of a fair and secure retirement. The time to act is now as delays only serve to compound the problems.

Indeed, significant statewide pension reforms have been implemented since the financial collapse of 2008/09 wherein CalPERS saw a negative 27 percent return yielding a combined loss of 34.75 percent of total assets (discount rate 7.75 percent minus negative 27 percent fiscal year (FY) return). Equally noteworthy is that substantial compensation and benefit concessions have been negotiated at the bargaining tables of public agencies and their represented employees. And yet, despite the actions mentioned above and the strong recovery of our State's economy, major demographic forces and structural weaknesses continue to plague CalPERS and its member agencies. As a consequence, serious challenges exist for the great majority of public agencies struggling to absorb the skyrocketing costs of public employee pensions. Pressure continues to mount on the long-term sustainability of CalPERS and the financial solvency of our municipalities.

In this context, the City Managers Department Pension Committee reconvened for the purpose of drafting a new White Paper on this topic. Our objective is to shine an even brighter light on the issues and challenges that lie ahead of us; to identify the root cause of those problems and; to offer some well-reasoned actions that if implemented, could be of significant assistance to our cities as we collectively try to work through the anticipated financial hardships of the next 10 - 20 years. Moreover, our hope is that this White Paper will assist the League's Board of Directors with its efforts to both educate and gain attention and support of employee organizations, the State Legislature and the Governor for enacting further legislative reforms or identifying alternative revenue sources to address rising costs.

PROBLEM STATEMENT

Pension costs for California municipalities have and will continue to increase at a precipitous rate for the next several years as CalPERS implements changes to reduce risk in the fund and increase the overall funded status. These changes are detailed below. In most cases, CalPERS costs have increased at a rate that has far exceeded cities' annual revenue growth.

However, the most prominent root-cause of the pension system's cost escalation began with the enhanced pension benefits granted by employers following the passage of SB 400 and AB 616 in 1999/2000. The high cost impact and retroactivity of these enhanced benefits granted without the requisite contributions to the fund, in combination with the effects of a bursting Dotcom bubble in 2001, prompted the first of many efforts by our City Managers Department to sound an alarm about the unsustainability of the new pension benefits.

To be fair, we must also acknowledge that average salaries for municipal employees grew significantly during the late 90's and early 2000's. These higher salaries and enhanced pensions, combined with CalPERS' significant investment pool losses in 2008-09 and the long, slow recovery from the Great Recession has created a huge hole for both the pension system and city budgets to climb out of. The Public Employee Pension Reform Act (PEPRA) adopted in 2012 will bring much needed relief in the years to come, but the anticipated benefits of those reforms are only applicable to new PERS members and therefore understood to be long-term in nature. They have proven to be insufficient to address the present and near-term problems.

There are many factors contributing to the rising cost of maintaining an adequately funded pension system. They are presented below:

1. Lowering the Assumed Rate of Return (Discount Rate) on the Public Employee Retirement Fund (PERF)

- As legitimate as this may be, (and please know that we as city managers support it), it has the immediate effect of lowering the system's funded status and thereby requiring even larger annual contributions from employers. This could become even more burdensome to the extent that the Discount Rate is lowered below 7.0%.
- CalPERS currently expects 5.8% annual returns until it finishes an allocation revision process scheduled for completion by July 2018. Their targeted annual return after July 2018 will be 6.2%.

2. Limited PERF Growth Despite Positive Market Trends

- With seven years of positive economic growth, the PERF has only improved seven percent in terms of funded status (2008: Approx. 61% Funded; 2017: Approx. 68% funded) including the most recent 2016-17 FY estimated earnings of 11.2%.
- Some would argue that CalPERS' investment strategy is handcuffed by an increasingly restricted list of investment options, as dictated by the CalPERS Board's ESG¹ Policy and/or by legislative action.
- Others point to CalPERS' adoption of a funding risk mitigation policy to reduce volatility in the system (appreciated by employers) and strengthen long-term sustainability of the PERF. A strategy driven in large part by the aging demographic of its membership and the growing need to protect current assets to pay ongoing benefits.

3. Revising Mortality Tables and other Actuarial Assumptions

- While mortality tables have been revised to reflect retirees are living longer, it does not fix the underfunding problem associated with existing retirees outliving the average mortality age used to compute their contributions when they were working. This serves to increase unfunded liability (Unfunded Actuarial Accrued Liability (UAAL)) and concomitantly the future costs.
- Mortality studies have also found that there is no measurable difference in the lifespan of Safety employees, who are incentivized to retire at a younger age than their Miscellaneous counterparts.

4. Shrinking Ratio of Active vs Retired Employees

- There is now, or soon will be, more retired CalPERS members receiving benefit payments in a given year than there are active employees contributing to the plan. Many of our cities' plans are in this position today.
- In 2001, there were two active workers for every retiree. In 2016, there were 1.3 active employees for every retiree. CalPERS is predicting that within the next 10-20 years there will be 0.6 workers for every Retiree.²

¹ CalPERS wants 100% of their internal and external managers to have policies and procedures in place to integrate their "Environmental, Social and Governance (ESG) considerations into investment decision making.

² CalPERS "2016 Annual Review of funding levels and Risk," September 20, 2016.

- This reality compels CalPERS to make strategic adjustments to their investment portfolio in order to ensure enough cash on hand to pay current annual benefits. We are told that, in some cases, plan assets are being sold at less than optimal market times to do this.

5. The Perpetuation of Costly Practices and Benefit Interpretations

- There exists an abusive practice of relatively unencumbered use of “industrial disability retirements” for Safety personnel which can dramatically increase a city’s UAAL.
- There continues to be broad categories of “Specialty Pays” included in the calculation of an employee’s final pension.
- Automatic Cost of Living Adjustments (COLAs) for Retirees in excess of the actual rate of inflation in a given year serve to shift a larger share of the funding burden to the younger/active members in the pension system.

It should be acknowledged that SB 400 and AB 616 were not mandates on local agencies. Simply put, local agencies agreed through the collective bargaining process to adopt these enhanced formulas and the retroactivity that came with them. While local agencies at the time may have felt misled by CalPERS actuarial reports which assumed among other things a much higher rate of return, combined with regional pressures from local labor organizations and neighboring agencies to remain competitive in attracting and retaining public employees, the fact remains that virtually every CalPERS stakeholder has in some way contributed to the underlying cause of the situation as it stands today. However, as city leaders we are charged with finding new and innovative ways to both ensure the pension benefit promised to our employees and that we can provide essential services to the public while operating with transparency, integrity and fiscal discipline.

One of the notable consequences of these realities is that the PERF’s UAAL, which is the current value of assets held in the investment pool versus the projected amount of money (liabilities) required to pay current and future benefits to its members, is well below the 75% – 85% level that most experts say is minimally appropriate. As many will recall, the PERF was deemed “Super Funded” in the late 1990’s and even after the losses incurred by the implosion of the Dotcom bubble, the funded status grew back to 102% in June 2007 just prior to the Great Recession. The funded status of the overall PERF was only 70% in January 2018. The Public Agency’s Pool was also at 70%.

The other notable consequence of this significant drop in funded status is that employer’s (cities’) Annual Required Contributions (ARC) as determined by CalPERS, are necessarily increasing to compensate for this condition. According to the League’s Retirement System Sustainability Study, “rising pension costs will require cities over the next seven years to nearly double the percentage of their General Fund dollars they pay to CalPERS.” Even though these increases are phased in over the next seven years, there is widespread recognition that the escalating costs are creating extreme financial hardships today.

It is now commonplace for local governments to be budgeting upwards of 70% to 80% or more of a Safety employee’s salary and 40% or more of a Miscellaneous employee’s salary just to fund their pensions. Ironically, this is double the contribution level that was deemed “unsustainable” by CalPERS’

own Chief Actuary eight years ago.³ Worse yet, the trend is projected to continue upward for at least six more years as shown in the following chart. (Note: Normal Cost and UAL Payment % shown are additive for each year, but the year to year changes are cumulative, not compounding.)

CalPERS' January 19, 2017 Circular Letter on Increased Contribution Rates

Valuation Date	FY Impact	Normal Cost		UAL Payments	
		Misc. Plans	Safety Plans	Misc. Plans	Safety Plans
6/30/2016	2018-19	0.25%- 0.75%	0.5%- 1.25%	2%- 3%	2%- 3%
6/30/2017	2019-20	0.5%- 1.5%	1.0%- 2.5%	4%- 6%	4%- 6%
6/30/2018	2020-21	1.0%- 3.0%	2.0%- 5.0%	10%- 15%	10%- 15%
6/30/2019	2021-22	1.0%- 3.0%	2.0%- 5.0%	15%- 20%	15%- 20%
6/30/2020	2022-23	1.0%- 3.0%	2.0%- 5.0%	20%- 25%	20%- 25%
6/30/2021	2023-24	1.0%- 3.0%	2.0%- 5.0%	25%- 30%	25%- 30%
6/30/2022	2024-25	1.0%- 3.0%	2.0%- 5.0%	30%- 40%	30%- 40%

The grave concern therefore, is that cities already in financial distress are pushed even closer to the brink of insolvency. Those cities which are not in as dire a condition are likely to reduce important programs and infrastructure investment to avoid a similar fate, but doing so may also be harming their long-term financial condition. As the ones most responsible for the financial security of our cities, we are deeply troubled, just as we were in 2003 and as we expressed more succinctly in our 2011 Pension Action Plan, we continue to believe: **THIS IS UNSUSTAINABLE!**

Clearly, there is important work to be done at the local level in order to avoid serious problems. At this point, we do not believe we can do it alone as the necessary structural changes toward pension system and municipal fiscal sustainability are likely going to require the California Supreme Court, the State Legislature and the Governor to help pave the way.

A PRINCIPLED APPROACH

As the discussion of this issue continues, there should be no confusion about where cities stand on the issue of retirement security for municipal employees. We believe that a safe and secure defined-benefit pension plan is an all-important component of the personal financial planning of America's and California's middle class. Moreover, we believe that Defined Benefit Plans (DBP) have proven to be the

³CalPERS Chief Actuary, Mr. Ron Seeling, in 2009 was the first CalPERS representative to publicly acknowledge the unsustainable rate of pension costs as a percentage of employee salaries with the following, now infamous quote: "I don't want to sugarcoat anything...We are facing decades without significant turnarounds in assets, decades of....what I, my personal words, nobody else's...unsustainable pension costs of between 25 percent of pay for a miscellaneous plan and 40 to 50 percent of pay for a safety plan... unsustainable pension costs. We've got to find some other solutions."

most effective vehicle to accumulate and distribute pension benefits to employees.⁴ However, the promised benefits must be reasonable, sustainable, and just as importantly, they must be dependable. To that end, we must be willing to restore the pension plan paradigm to focusing on *reasonable* retirement security and not one of providing an unreasonably generous form of deferred compensation. We believe it is in the shared interest of state and local elected and appointed leaders to come together on this issue with organized labor to identify a politically feasible and fiscally attainable resolution.

With regard to public pensions, we find as follows⁵:

1. We must recognize the importance and value of attracting and retaining high-performing public employees to design and deliver vital public services to local communities.
2. We must recognize and support the value of a reasonable, dependable, and financially sustainable, employer-employee funded DBPs for career employees; supplemented with other retirement savings options including personal savings (e.g. 457 Plan or 401a Defined Contribution Plan (DCP)).
3. Employees should incur/pay at least half of their Public Pension “Normal Costs” and be allowed to negotiate a cost-sharing of the full ARC as well.
4. Employee pensions should be portable across all public agencies to sustain a competent cadre of California public servants.

PEPRA (2013)

While our dire prognosis for public pension sustainability is sufficient reason for concern, the present condition would certainly be a lot worse if Governor Brown had not been successful in moving the Legislature to act upon the pension reform measures outlined in his “12 Point Plan” inspired by the Little Hoover Commission’s report, *Public Pensions for Retirement Security*, released in February, 2011. The PEPRA was enacted by the Legislature and became effective on January 1, 2013. We applaud the Governor’s and the Legislature’s work in this regard. PEPRA incorporated many of the recommendations that were included in our *2011 Pension Reform Action Plan*. Among the more important of those reforms were the following:

- PEPRA pension payments are based on the average of the three highest paid years worked, eliminating the single highest year option.
- New, less generous pension formulas were created for both Safety and Miscellaneous employees, along with extending their targeted retirement ages.
- No overtime, vacation, sick leave or other “pension-spiking” provisions may be included in the calculation of final pension compensation.

⁴ According to the National Institute of Retirement Security, dollar for dollar, a Defined Benefit Plan (DBP) yields considerably more (46%) retirement savings than a Defined Contribution Plan (DCP).

⁵ Original draft recommendations included the following: Pension plans should be designed to enable a career public employee with 30 or more years of service to receive a minimum of 50% and a maximum of 75% of their pre-retirement income, predicated upon using the highest 3-year average salary when computing the final pension benefit. This recommendation was rejected by the League’s Government, Transparency and Labor Relations policy committee and the League Board but is included here to reflect the broad spectrum of options considered.

- Prohibits the purchase of “Air Time”.
- Eliminated the provision that allowed employers to pay the member’s annual pension contribution (EPMC) for new hires. EPMC can still be negotiated with “classic Members”.
- Employers and their represented employees may now agree to a greater sharing of pension costs through the collective bargaining process.
- Prohibits retroactive pension benefit increases.
- Prohibits pension contribution “holidays” from the ARC.

As necessary and beneficial as these reforms may be, their influence on lowering the current and near-term costs is relatively small. In our 2011 Pension Reform Action Plan, we identified a list of cost-saving measures that many cities had already put in place and others could pursue through the collective bargaining process. Virtually all of those actions, which included establishing new employment tiers with less generous benefits for new employees; greater pension cost sharing by employees and; terminating EPMC benefits, were put in place well before the PEPR bill was introduced and subsequently passed. None of these reforms; however, adequately addressed the existing UAAL for current employees, and therefore the reforms are not expected to make an appreciable difference in the time period for which we are presently most concerned (i.e. the next decade). Therefore, we continue to sound the alarm that more statutory and structural reforms are necessary to ensure the sustainability of the pension system and to assist our member cities with managing the associated costs.

The two opportunities we think would generate the most immediate and tangible savings are:

1. Employers must have a legal means (or pathway) to change/lower the prospective pension benefits of current/active employees without being required to provide an alternative benefit of equal or greater value.
2. Employers must have a legal means (or pathway) to modify the annual COLA automatically added to a retiree’s pension benefit payment.

We believe that both of these authorities, if provided by the State Legislature and/or deemed permissible by the Supreme Court, could be thoughtfully and effectually applied while maintaining reasonable pension benefits for all employees and retirees.

MOVING TOWARD A SUSTAINABLE FUTURE: PEPR 2.0

One other positive note about PEPR is that it essentially eliminated the competition among cities to provide the best pension benefits and employee/employer cost-sharing arrangements for these new employees. PEPR has leveled the pension playing field among cities. Under PEPR, all employers are required to offer identical pension plans to these new employees, with all employees required to pay half of the normal cost.

Labor group pressure to increase the pension benefits for their represented employees is not an issue because that door was closed legislatively. The only flexibility for employers remains the ability to require additional cost sharing by PEPR employees and in 2018, employers gain the option to impose

additional cost sharing through the collective bargaining process. This may be an unintended consequence, but it may also provide a model and path forward for future pension changes.⁶

As mentioned previously, we also believe that employers need the authority to modify, suspend, or even eliminate the COLA benefits currently provided to retirees. This is understandably a highly controversial proposal and is certain to generate a very strong, primarily negative, response from all categories of CalPERS participants, whether currently retired or not. It should be expected that retired members in particular will “cry foul” and they will be justified in doing so. In a narrow or individual context, any measurable change to the promised benefit structure that a retiree has planned their life around will be deemed unfair and completely counter to the basic premise of a DBP retirement system. However, it frankly makes little sense to routinely raise the annual “salary” (benefit payments) for a city’s retirees when the consequence of that action is to render it impractical, imprudent or truly impossible to grant any form of salary increase or COLA to a city’s current, active employees or simply to maintain current services and staffing levels.

When there is no money in the budget for employee raises because an employer’s ARC payments are set at an unsustainably high level; that is a serious problem. It creates the impression, if not the reality, that current employees are being unfairly burdened with the obligation to pay for the growing benefits of their retired counterparts. Moreover, it is difficult to explain to the average taxpayer how a retired public employee can receive more money in retirement (after several years of COLA’s) than they were previously paid when they were working⁷. So, there is both a legitimate “fairness” question and an “equity” issue regarding balancing the intertwined interests of all the parties affected by this recommendation. Once again, we would assert that the primary purpose of a responsible retirement program is to provide our employees with a *reasonable and secure pension*, not an excessively generous form of *deferred compensation* such as is now provided by the enhanced pension plans for Classic employees. And we believe that the current shortfall in the PERF’s funded status cannot be corrected in a timely way without the additional participation of retired members.

COMPETING INTERESTS CREATE A CONUNDRUM

One of the many difficulties in developing a mutually agreed upon path toward greater sustainability lies with the competing interests of the players involved. The CalPERS Board (Board), for example, is

⁶ *While the League is a staunch defender of local control in all areas, the City Managers considered that in this instance, a uniform approach may be the best way to consider any future pension changes. For example, should benefit formulas be changed prospectively, it could be implemented for all Classic Employees statewide, using the PEPR model of a single-plan design for all employers. If done uniformly, such a change would not create an unhealthy “race to the top” in retirement benefits. This recommendation was rejected by the League’s Government, Transparency and Labor Relations policy committee and the League Board but is included here to reflect the broad spectrum of options considered.*

⁷ *This may apply with more frequency to a public safety retiree that worked a full career, but less to a typical miscellaneous retiree who retires at a much lower percentage of salary and therefore it would take many years (10-20 or more), if ever, before the retiree made more in retirement than they made when they worked.*

charged with fiduciary responsibility for managing the PERF assets of its members, i.e. the active and retired employees whose contributions they hold in trust. The 13-Member Board's composition has four Ex-Officio Members; six elected members; and three appointed members, one of whom is currently a local government elected official. Clearly, employee/annuitant interests are strongly represented on the Board and employer interests are in the minority, if not completely non-existent. In addition, there is no requirement that Board Members (with the obvious exception of State Treasurer Chang and Controller Yee, who are both Ex-Officio Members) have the professional training, knowledge, or expertise to oversee the management and investment of the system's billions of dollars in assets. This structural imbalance is, in our view, a governance problem that needs to be addressed.

Second, there is wide disagreement over the proper target for funded status of the assets held in trust by CalPERS. The long-standing conventional belief is that 75% - 85% funded status is reasonable and sufficient to maintain a high degree of confidence that the system will have adequate assets available to pay the benefits earned by retirees for the remainder of their lives. The logic that supports this view is that public pension systems, in contrast to private pension systems, are funded by government agencies with taxing authority and they do not run the same degree of risk of going out of business. Therefore, the importance of maintaining a 100% funded status is diminished by the reasonable certainty that the contribution of money into the system will continue indefinitely. But reputable institutions such as Stanford University and experts (Gerard Miller; John Bartel) who believe the proper goal is to reach and maintain 100% funded status. The Board has likewise established a goal of returning the PERF to 100% funded with an acceptable level of risk.⁸ On its face, this seems appropriate, however there is a high price to be paid by employers and active PEPRA employees for attaining and maintaining that standard, particularly when the PERF's investment income (which is generally 2/3rds of total annual income) fails to reach or exceed the assumed rate of return. When investment returns go down or fall below projections, employer and employee contributions must go up if the funded status goal is going to be achieved. Ironically, the difficulty in achieving the assumed rate of return in recent years is caused, in part, by CalPERS' 2014 investment strategy to "de-risk" the pool's investments over time so that there is less annual volatility in employer contribution rates. But therewith comes lower returns.

Third, the setting of Discount Rate has become somewhat politicized of late and its calculation approach is often disputed. Once again, one's beliefs about the proper investment benchmark and time parameter to use for establishing the Discount Rate will significantly sway the argument here. Joe Naton at Stanford University for example, would say that a pension system below 100% funding ratio must use a "risk-free" rate of return as the discount rate for estimating its future liability. This would equate to investments held solely in U.S. Treasury Bonds or the equivalent. However, CalPERS' Investment Portfolio is comprised of multiple asset classes with an assumed rate of return that well exceeds "risk-free" Treasury Bond interest rates. So, the problem created by lowering the Discount Rate, de-risking the pool and committing to 100% in funded status, is that employer contribution rates must necessarily rise to make up for the projected shortfall. This is, in effect, the circumstance we find ourselves in now.

⁸ CalPERS Strategic Plan | 2017-22 pg. 7

LOCAL AGENCIES NEED LEGAL AVENUES FOR RELIEF

The “California Rule” as it is commonly known, was first established by the Supreme Court in their 1955 ruling in *Manning Allen v. City of Long Beach* wherein the Court effectively stated that an employee’s vested rights to promised pension benefit(s) cannot be prospectively changed to the employee’s disadvantage without the employer providing the employee with a comparable new advantage. This ruling has served to deter employers from attempting to enact future benefit changes for current employees prospectively. It has also prevented any serious consideration of retracting or modifying the benefits provided to current retirees.

Moreover, protecting public pensions has been the “Holy Grail” of public employee unions who are apt to dispute that the current circumstances are unsustainable. But in our view, there should be no disputing the fiscal reality that when a significantly larger portion of a municipalities’ revenues are being utilized for the payment of employee pension costs, it correlates directly with diminished resources being available to provide the basic services that our citizenry wants and expects (See California Crowd-Out Report by Stephen D. Eide, Senior Fellow, Manhattan Institute http://www.manhattan-institute.org/pdf/cr_98.pdf). Something has to give in this situation and our fear is that there will be even louder public outcry when basic public services, such as public safety staffing and response times; infrastructure maintenance, senior services, library hours etc. are severely curtailed, leading to both unintended and undesired consequences.

In the eyes of some, a recent decision in the *Marin Association of Public Employees v. Marin County Employees’ Retirement Association (2016)* a lower court opened the door to a new interpretation of contract law as it pertains to vested pension benefits. In the Marin case, the court held that the county’s implementation of PEPRAs anti-pension spiking provisions with respect to employees employed prior to PEPRAs enactment did not impair a vested right even though the county had not offered employees any comparable new advantage. The court noted that *Manning Allen* stated that a comparable new advantage “should” be provided, not that it “must” be provided. The court concluded that it was permissible for the county to provide a comparable new advantage, but it was not required to do so. The California Supreme Court has accepted this case for review.

In another recent court case, *Cal Fire Local 2881 v. California Public Employees’ Retirement System (2016)* the court held that PEPRAs elimination of air time for employees employed prior to PEPRAs enactment did not impair a vested right. The court adopted the *Marin Association’s* analysis regarding the “comparable new advantage” requirement. The California Supreme Court has accepted this case for review as well. Governor Brown submitted a detailed brief on this case and the League also filed an Amicus Brief (<https://www.cacities.org/Resources-Documents/Policy-Advocacy-Section/Hot-Issues/Retirement-System-Sustainability/League-Amicus-Brief-in-Cal-FIRE.aspx>).

As of December 5, 2018 the California Supreme Court heard oral arguments in *Cal Fire Local 2881 v. California Public Employees’ Retirement System*. At oral argument, the union’s attorney argued that all aspects of a pension benefit as it exists on the first day of an employee’s employment become vested because each aspect is a part of the promise made to induce the employee to accept the position and therefore constitutes a form of deferred compensation. The state’s attorney countered this argument by citing California Supreme Court precedent holding that there is a presumption against finding that

statutes – as opposed to contracts – create vested contractual rights. The state’s attorney pointed out that there was no language in the statute to indicate that the Legislature intended for the benefit to vest such that it could not be eliminated or modified in the future.

The questions from the Bench seemed to indicate that the Court will agree with the state’s argument on this point when it issues its ruling in 2019. If the Court does agree with the state that the right was not vested, it is not necessary for the Court to address the California rule, since the rule does not apply to benefits that are not vested.

The Court has four other cases pending on its docket that implicate the California rule. Three of those cases are being held in abeyance pending the outcome of this case. The one remaining case – *Alameda County Deputy Sheriff’s Association v. Alameda County Employees’ Retirement Association* – is fully briefed and can be set for oral argument anytime.

Under the California Rules of Court, once oral argument is held and the Court takes the case under submission, it has 90 days within which to issue an opinion.

Given the outcome of these two cases, there is some hope that the Supreme Court will change the long-standing interpretation of the California Rule and create a new opportunity for redirecting the unsustainable trajectory of employer/employee pension contributions. Unfortunately, there is no way to reasonably predict when and/or how long it will take to get a judicial ruling that is actionable by cities. Therefore, we believe it is incumbent upon the League’s leadership to develop and offer well-reasoned and well-constructed actions for the State Legislature to consider. Ones that have some measure of broad-based support, particularly with organized labor.

If the Court does not substantially modify the California Rule, we then suggest that the League engage the public, the media, labor groups, pension experts, the Legislature, and the Governor in a collaborative way to bring forth bipartisan changes to the structure of Public Employee Retirement Law in whatever ways are deemed necessary to protect the fiscal integrity of cities and the retirement system itself. This could include sponsoring an initiative of our own design if legislative change is not forthcoming or is deemed insufficient to solve the problems we face.

WE ARE NOT ALONE

While it is not particularly comforting, it is important to know that California’s pension system issues are not unique nor are they significantly worse than those confronting a large number of other states across the nation. In April 2011 the PEW Center On The States issued a report, entitled “The Widening Gap: The Great Recession’s Impact on State Pension and Retiree Health Care Costs” www.pewcenteronthestates.org which revealed that in 2009 the funded status of a growing number of state pension systems (31 in all) had dropped below the Government Accountability Office’s recommended level of 80%. Moreover, virtually all of these states were failing to pay the full amount of their required annual pension contributions (including California) which compounded the shortfall.

In December 2016, the Center for State & Local Government Excellence released an issue brief entitled “State and Local Pension Reform since the Financial Crisis.” The report may be accessed at <http://slge.org/wp-content/uploads/2016/12/State-and-Local-Pension-Reform-Since-the-Financial-Crisis.pdf>. The authors from the Center for Retirement Research at Boston College found that “in the

wake of the financial crisis, many state and local pension plans have reduced benefits and increased required employee contributions to curb rising employer costs.⁹ Their research also showed that many states have successfully made changes in their pension system benefits for both current and new employees. The most common changes for current employees involved increasing employee contributions and cutting COLA's. The most common changes for new employees were reducing the core benefits, i.e. extending retirement ages, reducing benefit multipliers and the definition of final salary. The degree and extent to which these changes were successfully implemented correlated heavily with the relative strength of the legal protections in place in each state.

Dallas, Texas is attempting to address their UAAL pension problem through a state legislative effort that would raise the retirement age for police and fire employees to 58 from 55, eliminate COLAs, and lower a multiplier used to determine the size of officers' and firefighters' benefit checks. The city Retirement Board voted 9-0 to support the proposed legislation.

The purpose of providing the above information is simply to point out that public employee pension systems across the country are struggling to maintain financial solvency. This is pushing the systems' trustees to pursue increasingly draconian measures to lower their cost structures to protect the retirement savings of their members.

RECOMMENDATIONS ON WHERE TO FOCUS THE LEAGUE'S EFFORTS

As a general statement, we believe the focus of the League should be on helping cities successfully manage their way through the financial challenges created by the current conditions of the pension system. We acknowledge that this won't be easy to achieve, as there is always opposition to making changes that affect someone's personal finances. Nevertheless, we think it is important to push for the recommended changes now. There is no better time. Simply nibbling around the edges of this problem is not going to get it done.

To this end, we recommend as follows:

- 1. Develop a strategy for how to revise the application of COLA's to retiree benefits (when/how much).**
 - a. Retirees should not be exempt from solving the present funding challenges. After all, many of these members benefitted most from the enhanced pension formulas, receiving significant increases in benefit payments virtually overnight without making additional contributions into the system. Let us not forget that the underlying premise for enhancing the pension formulas in 1999/2000 was predicated upon the false belief that the PERF could easily afford the increased benefit payments. That has proven to be a major miscalculation. Moreover, the currently high UAAL component of most employer's ARC payments is generated by the shortfall in current assets needed to make the pension payments to retirees (including COLAs).
 - b. It is fair to conclude that both active and retired employees have the same fundamental interest in protecting their retirement security which can only be assured if the pension system is properly funded. If current/active employees are compelled to make larger

⁹ *Jean-Pierre Aubry and Caroline V. Crawford*

contribution payments, it stands to reason that retirees should also contribute by having their COLAs reduced and/or eliminated until the funded status of the PERF returns to the desired level.

- c. This recommendation is certain to engender strong opposition from many different fronts, so there may be a need to consider a variety of approaches to implementation. Toward that end, one option could be to limit COLA adjustments to only those retirees whose annual pension compensation falls below a certain dollar threshold such as the PEPRAs salary cap or the IRS pension cap.
 - d. Another approach is to establish longer time parameters for retirees to be eligible for COLA adjustments, i.e. instead of an annual COLA when warranted by the change in CPI, they could be stretched out to 5-year adjustments, and they could be further limited in total amount as well, i.e. 50% of the 5-year change in CPI.
 - e. Lastly, there could also be a more “case specific” qualifier that would prohibit the payment of COLAs to a given city’s retirees when that city’s PERF funded status is below an agreed upon level of say 90%. This would serve to incentivize the underfunded employers to pay off or pay down their UAAL as fast as possible and it would presumably generate employee support for such as well.
2. **If the Courts do not rule in a manner that enables us to rectify the existing problems, the League should initiate a dialogue with its membership regarding the cost/benefit and strength of support for the League sponsoring a statewide initiative to change the pension system in the manner described above.**
 3. **Continue lobbying strategy primarily directed at the CalPERS Board, pushing for changes in their current investment strategy.**
 - a. We need the CalPERS Board to understand that their efforts to reduce contribution rate volatility, to de-risk the investment portfolio and to seemingly place greater importance on their ESG policy than on their fiduciary responsibility to generate acceptable investment returns is causing too great a hardship on municipal budgets.
 4. **Re-consider converting currently deemed “Classic” employees to the same benefit formula now in place for PEPRAs employees, for all future years of service.**
 - a. Should the Court rule in the manner we desire, we would contend that this is both prudent and fair. Presumably, it will require the Legislature to adopt new law(s) or amend existing ones to make the proposed change.
 - b. We recommend that the League begin now with engaging affected stakeholders and soliciting input on how to appropriately construct the required legislation.

OTHER COST-SAVING MEASURES WORTH CONSIDERING

Given that the timeline for the Courts and Legislature to act may extend well beyond some city’s ability to persevere through their mounting financial hardships, we have attempted to identify a few of the actions that some cities have already taken to mitigate their immediate challenges and may therefore be of assistance to other cities as well.

1. **Develop and implement a plan to pay down the UAAL as quickly as possible.**
 - a. When the Discount Rate is measurably higher than what a city can earn by investing its unallocated reserve funds in the State Treasurer's Local Agency Investment Fund (currently 1.5% for the 1st Quarter of 2019) this idea warrants consideration.
 - b. It is the UAAL portion of each city's ARC that is growing at a faster pace, so developing and implementing a payment schedule that expedites the payoff of this liability will reap significant dividends.
2. **Create a Pension Rate Stabilization Program**
 - a. Several cities are creating a Section 115 Trust as a place for setting aside excess, unallocated reserves or year-end budget savings to having another financial tool or resource to utilize for reducing future pension costs.
 - b. Work with CalPERS to determine if established 115 Trusts can be used to lower the calculated liability and annual pension costs.
3. **Change the service delivery method of certain public services**
 - a. This will be a politically challenging undertaking for many cities, as it involves personnel reductions, but it is becoming commonplace to deliver certain services (such as landscape maintenance) by either outsourcing them altogether (to the private sector) or providing them through a Joint Powers Authority that may still offer PERS benefits, but at a less expensive formula or in a more cost-effective approach i.e. "shared services."
4. **Employee cost sharing of the annual pension contribution**
 - a. This could be for a defined period of time or until the total ARC cost reduces to a more normal level as a percentage of payroll.

CONCLUSION

Municipal government is facing a stark reality as pension cost increases outpace revenue growth over the long term. As such, many cities across California will be forced to make difficult decisions relative to staffing and service levels. While the courts may provide some relief in the future, cities cannot continue to piecemeal our response to these realities. It is critical that we continue our efforts to and as such, should consider all options and opportunities to balance the commitment to employees with the expectations of the community.



California Public Employees' Retirement System
Actuarial Office
P.O. Box 942709
Sacramento, CA 94229-2709
TTY: (916) 795-3240
(888) 225-7377 phone • (916) 795-2744 fax
www.calpers.ca.gov

September 24, 2018

CalPERS ID: 6515248486
Employer Name: CITY OF YUBA CITY
Rate Plan: MISCELLANEOUS PLAN [449]

Re: Lump Sum Payment to reduce the Unfunded Actuarial Liability

Dear Requestor:

As requested, 2019-2020 employer contribution rate information on your lump sum payment follows.

If you are aware of others interested in this information (i.e. payroll staff, county court employees, port districts, etc.), please inform them.

The information is based on the most recent annual valuation and assumes payment *by September 27, 2018 and* no further contractual or financing changes taking effect before June 30, 2019. The Unfunded Liability will be reduced or eliminated by a lump sum payment in the amount of **\$750,000**. The payment will be applied to the Assumption Change 6/30/2003 base.

There will be no change to your 2018-19 contributions.

Valuation as of June 30, 2017	Pre-Payment	Post Payment
Projected 6/30/2019 Total Unfunded Liability ¹	\$ 34,117,957	
Payment on 9/27/2018	\$ 750,000	
Revised 6/30/2019 Total Unfunded Liability¹		\$ 33,328,615
2019-2020 Employer Contributions		
Total Normal Cost	19.100%	19.100%
Employee Contribution	<u>7.679%</u>	<u>7.679%</u>
Employer Normal Cost	11.421%	11.421%
Payment on Assumption Change 6/30/03 Base	\$ 298,687	\$ 146,550
Payment on all other bases	2,530,024	2,530,024
2019-2020 Employer Unfunded Liability Payment	\$ 2,828,711	\$ 2,676,574

¹Calculated amounts were projected from June 30, 2018 to June 30, 2019 based on a discount rate of 7.00%, which will be used in the June 30, 2018 valuation, rather than the 7.25% used in the June 30, 2017 valuation.

Required Employer Contribution		Fiscal Year
		2019-20
Employer Normal Cost Rate		11.421%
Plus Either		
1) Monthly Employer Dollar UAL Payment	\$	223,048
Or		
2) Annual UAL Prepayment Option	\$	2,584,524
<p><i>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).</i></p> <p><i>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.</i></p>		

To initiate this change, the enclosed Lump Sum Payment Request must be completed and returned to the Fiscal Services Division with a wire transfer or a check by September 27, 2018. A copy should be sent to us.

If you have questions, please call (888) CalPERS (225-7377).



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

LUMP SUM PAYMENT REQUEST

Please complete and return this form to the following address:

CalPERS – FRAS
ATTN: Cashiers Unit
P.O. Box 942703
Sacramento, CA 94229-2703

Or fax to: 916-795-7622.

If a wire transfer is being used, it should go to the following account:

ABA#0260-0959-3

Bank of America Sacramento Main
555 Capitol Mall, Suite 1555
Sacramento, CA 95814

For credit to State of CA, CalPERS
Account # 01482-80005

Please e-mail FCSD_public_agency_wires@calpers.ca.gov and your actuary on the day of the wire to ensure timely crediting to your account. Any individual wire totaling over \$5,000,000 requires a 72 hour notice.

Employer Name: CITY OF YUBA CITY

CalPERS ID: 6515248486

Member Group or Plan: MISCELLANEOUS PLAN

Rate Plan ID: 449

Amount: **\$ 750,000**

Purpose:	Pay Down Unfunded Liability
Base(s) to which payment is applied:	Assumption Change 6/30/03

In recognition of our payment please revise our required employer contribution effective July 1, 2019:

Name and Title: (Please Print): _____

Signature: _____ Date: _____

Mailing Address: _____

City/State/Zip: _____

Telephone Number: _____ Fax Number: _____

E-mail Address: _____

Fiscal Services verification Date Received _____ Amount Received _____

PERS01F0036 DMC (02-2009) Reference # _____ Name and Date: _____



California Public Employees' Retirement System
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P.O. Box 942701
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www.calpers.ca.gov

July 2018

**Miscellaneous Plan of the City of Yuba City (CalPERS ID: 6515248486)
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	11.421%	\$2,828,711	7.00%
<i>Projected Results</i>			
2020-21	12.1%	\$3,039,000	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,

A handwritten signature in black ink, appearing to read 'Scott Terando', with a stylized flourish at the end.

SCOTT TERANDO
Chief Actuary



**Actuarial Valuation
as of June 30, 2017**

**for the
Miscellaneous Plan
of the
City of Yuba City**

(CalPERS ID: 6515248486)

(Rate Plan ID: 449)

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

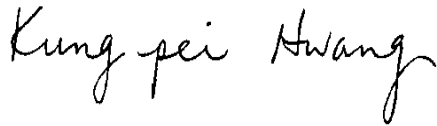
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Actuarial Certification

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 City of Yuba City. 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.



KUNG-PEI HWANG, ASA, 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 City of Yuba City 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
Required Employer Contribution		2019-20
Employer Normal Cost Rate		11.421%
<i>Plus, Either</i>		
1) Monthly Employer Dollar UAL Payment	\$	235,726
<i>Or</i>		
2) Annual UAL Prepayment Option	\$	2,731,429
Required PEPRRA Member Contribution Rate		7.00%
<p>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).</p> <p>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.</p> <p>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.</p> <p>For additional detail regarding the determination of the required contribution for PEPRRA members, see Appendix D. Required member contributions for Classic members can be found in Appendix B.</p>		

	Fiscal Year	Fiscal Year
	2018-19	2019-20
Normal Cost Contribution as a Percentage of Payroll		
Total Normal Cost	18.525%	19.100%
Employee Contribution ¹	7.733%	7.679%
Employer Normal Cost ²	10.792%	11.421%
Projected Annual Payroll for Contribution Year	\$ 11,221,878	\$ 11,572,124
Estimated Employer Contributions Based On Projected Payroll		
Total Normal Cost	\$ 2,078,853	\$ 2,210,275
Employee Contribution ¹	867,788	888,623
Employer Normal Cost ²	1,211,065	1,321,652
Unfunded Liability Contribution	2,479,328	2,828,711
% of Projected Payroll (illustrative only)	22.094%	24.444%
Estimated Total Employer Contribution	\$ 3,690,393	\$ 4,150,363
% of Projected Payroll (illustrative only)	32.886%	35.865%

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 PEPRRA members, the member contribution rate is based on 50 percent of the normal cost. A development of PEPRRA 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	\$ 129,565,267	\$ 134,739,239
2. Entry Age Normal Accrued Liability	115,131,252	118,775,214
3. Market Value of Assets (MVA)	\$ 77,745,445	\$ 84,981,656
4. Unfunded Accrued Liability (UAL) [(2) – (3)]	\$ 37,385,807	\$ 33,793,558
5. Funded Ratio [(3) / (2)]	67.5%	71.5%

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 PEPR 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 %	11.421%	12.1%	12.1%	12.1%	12.1%	12.1%
UAL Payment	2,828,711	3,039,000	3,292,000	3,478,000	3,215,000	3,353,000
<i>Total as a % of Payroll*</i>	<i>35.9%</i>	<i>37.7%</i>	<i>39.1%</i>	<i>39.8%</i>	<i>37.1%</i>	<i>37.4%</i>
<i>Projected Payroll</i>	<i>11,572,124</i>	<i>11,861,481</i>	<i>12,187,671</i>	<i>12,522,832</i>	<i>12,867,211</i>	<i>13,221,059</i>

*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	\$	77,745,445
2.	Change in Receivables for Service Buybacks		(17,301)
3.	Employer Contributions		2,480,007
4.	Employee Contributions		1,189,127
5.	Benefit Payments to Retirees and Beneficiaries		(5,052,734)
6.	Refunds		(20,699)
7.	Lump Sum Payments		0
8.	Transfers and Miscellaneous Adjustments		104,110
9.	Net Investment Return		8,553,701
10.	Market Value of Assets as of 6/30/17 including Receivables	\$	<u>84,981,656</u>

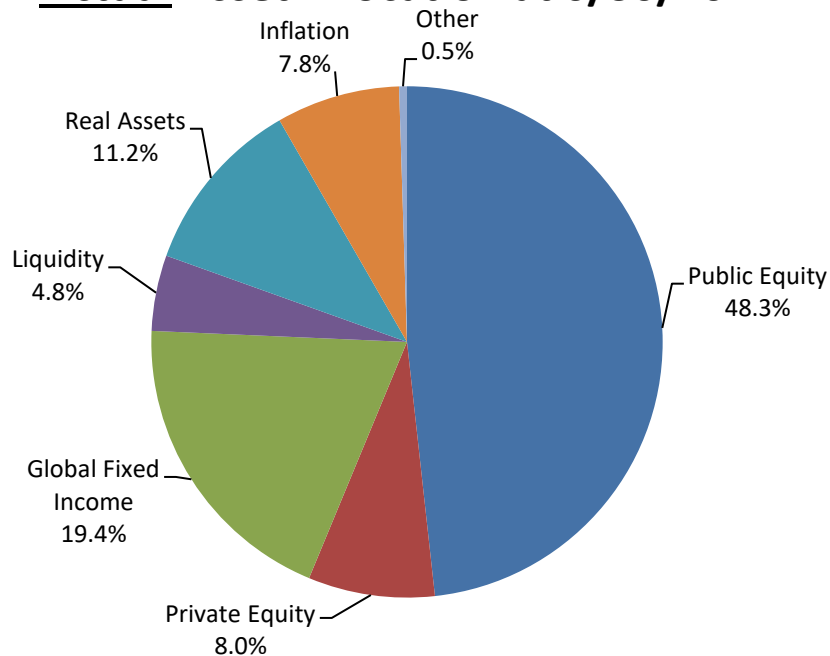
Asset Allocation

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 City of Yuba City Miscellaneous Plan are part of the PERF and are invested accordingly.

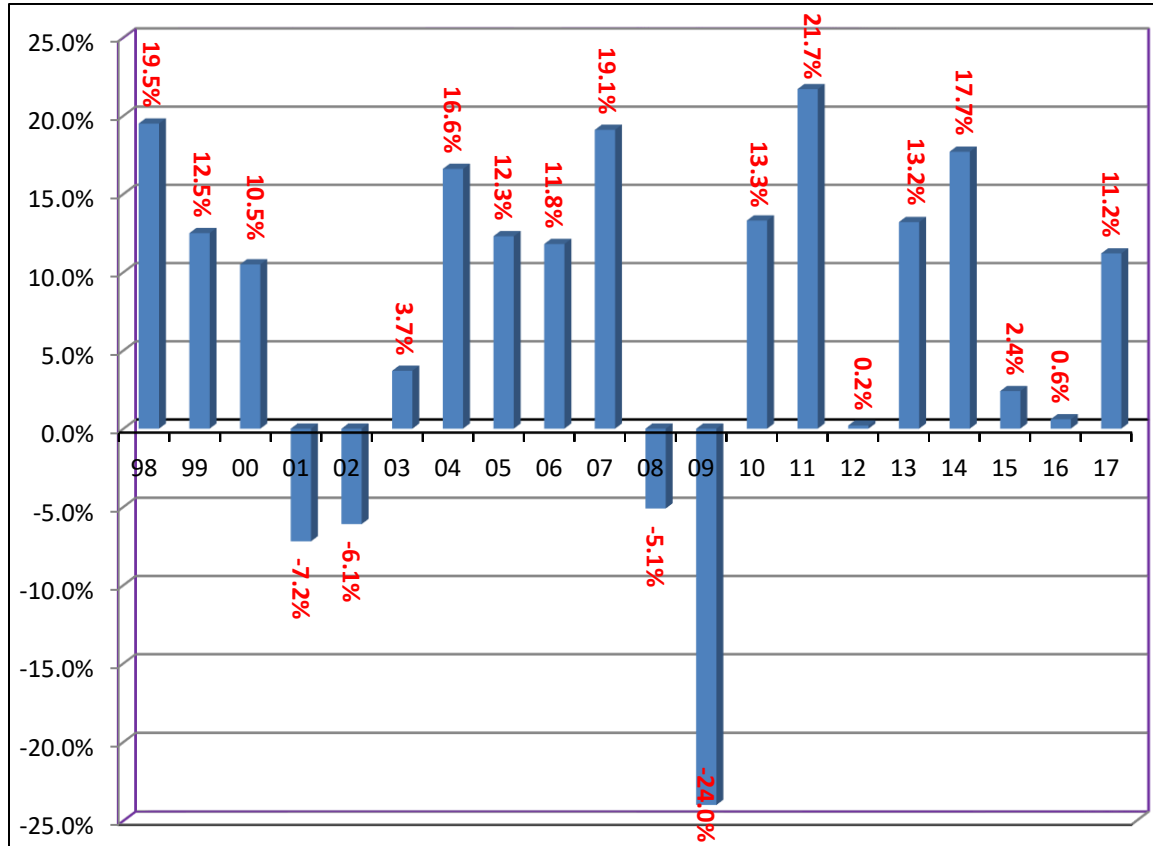
(A) Asset Class	(B) Market Value (\$ Billion)	(C) Policy Target Allocation
Public Equity	156.2	50.0%
Private Equity	25.9	8.0%
Global Fixed Income	62.9	28.0%
Liquidity	15.5	1.0%
Real Assets	36.3	13.0%
Inflation Sensitive Assets	25.3	0.0%
Other	1.6	0.0%
Total Fund	\$323.7	100.0%

Actual Asset Allocation at 6/30/2017



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	\$ 52,294,820	52,966,726
b) Transferred Members	10,275,872	11,050,049
c) Terminated Members	1,707,324	1,754,509
d) Members and Beneficiaries Receiving Payments	65,287,251	68,967,955
e) Total	\$ 129,565,267	134,739,239
2. Present Value of Future Employer Normal Costs	\$ 8,099,058	9,162,984
3. Present Value of Future Employee Contributions	\$ 6,334,957	6,801,041
4. Entry Age Normal Accrued Liability		
a) Active Members [(1a) - (2) - (3)]	\$ 37,860,805	37,002,701
b) Transferred Members (1b)	10,275,872	11,050,049
c) Terminated Members (1c)	1,707,324	1,754,509
d) Members and Beneficiaries Receiving Payments (1d)	65,287,251	68,967,955
e) Total	\$ 115,131,252	118,775,214
5. Market Value of Assets (MVA)	\$ 77,745,445	84,981,656
6. Unfunded Accrued Liability (UAL) [(4e) - (5)]	\$ 37,385,807	33,793,558
7. Funded Ratio [(5) / (4e)]	67.5%	71.5%

(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	\$	37,385,807
b) Expected Payment on the UAL during 2016-17		1,813,652
c) Interest through 6/30/17 $[(.07375 \times (1a) - ((1.07375)^{1/2} - 1) \times (1b))]$		2,691,514
d) Expected UAL before all other changes $[(1a) - (1b) + (1c)]$		38,263,669
e) Change due to plan changes		0
f) Change due to assumption change		(90,653)
g) Expected UAL after all other changes $[(1d) + (1e) + (1f)]$		38,173,016
h) Actual UAL as of 6/30/17		33,793,558
i) Total (Gain)/Loss for 2016-17 $[(1h) - (1g)]$	\$	(4,379,458)

2. Contribution (Gain)/Loss for the Year

a) Expected Contribution (Employer and Employee)	\$	3,761,746
b) Interest on Expected Contributions		136,247
c) Actual Contributions		3,669,134
d) Interest on Actual Contributions		132,893
e) Expected Contributions with Interest $[(2a) + (2b)]$		3,897,993
f) Actual Contributions with Interest $[(2c) + (2d)]$		3,802,027
g) Contribution (Gain)/Loss $[(2e) - (2f)]$	\$	95,966

3. Asset (Gain)/Loss for the Year

a) Market Value of Assets as of 6/30/16	\$	77,745,445
b) Prior Fiscal Year Receivables		(145,322)
c) Current Fiscal Year Receivables		128,021
d) Contributions Received		3,669,134
e) Benefits and Refunds Paid		(5,073,433)
f) Transfers and Miscellaneous Adjustments		104,110
g) Expected Int. $[(.07375 \times (3a + 3b) + ((1.07375)^{1/2} - 1) \times ((3d) + (3e) + (3f))]$		5,675,917
h) Expected Assets as of 6/30/17 $[(3a) + (3b) + (3c) + (3d) + (3e) + (3f) + (3g)]$		82,103,872
i) Market Value of Assets as of 6/30/17		84,981,656
j) Asset (Gain)/Loss $[(3h) - (3i)]$	\$	(2,877,784)

4. Liability (Gain)/Loss for the Year

a) Total (Gain)/Loss (1i)	\$	(4,379,458)
b) Contribution (Gain)/Loss (2g)		95,966
c) Asset (Gain)/Loss (3j)		(2,877,784)
d) Liability (Gain)/Loss $[(4a) - (4b) - (4c)]$	\$	(1,597,640)

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	Amortization 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
BENEFIT CHANGE	06/30/02	No Ramp	4	\$1,480,532	\$284,312	\$1,293,432	\$291,185	\$1,085,650	\$298,875
ASSUMPTION CHANGE	06/30/03	No Ramp	6	\$1,895,590	\$284,328	\$1,738,566	\$290,931	\$1,563,319	\$298,687
METHOD CHANGE	06/30/04	No Ramp	7	\$(163,727)	\$(22,272)	\$(152,532)	\$(22,779)	\$(140,001)	\$(23,388)
ASSUMPTION CHANGE	06/30/09	No Ramp	12	\$3,332,120	\$321,445	\$3,240,806	\$327,975	\$3,136,108	\$336,830
SPECIAL (GAIN)/LOSS	06/30/09	No Ramp	22	\$1,520,382	\$102,962	\$1,523,980	\$104,603	\$1,526,140	\$107,457
SPECIAL (GAIN)/LOSS	06/30/10	No Ramp	23	\$646,928	\$42,810	\$649,495	\$43,475	\$651,560	\$44,662
ASSUMPTION CHANGE	06/30/11	No Ramp	14	\$219,129	\$19,217	\$215,114	\$19,590	\$210,422	\$20,120
SPECIAL (GAIN)/LOSS	06/30/11	No Ramp	24	\$(1,460,877)	\$(94,601)	\$(1,468,820)	\$(96,035)	\$(1,475,854)	\$(98,659)
PAYMENT (GAIN)/LOSS	06/30/12	No Ramp	25	\$384,480	\$24,397	\$387,089	\$24,757	\$389,514	\$25,434
(GAIN)/LOSS	06/30/12	No Ramp	25	\$9,470,839	\$600,966	\$9,535,105	\$609,841	\$9,594,839	\$626,519
(GAIN)/LOSS	06/30/13	100% →	26	\$11,369,775	\$459,107	\$11,718,625	\$621,363	\$11,924,732	\$797,960
ASSUMPTION CHANGE	06/30/14	80% ↗	17	\$6,463,292	\$240,612	\$6,682,699	\$367,645	\$6,786,455	\$503,528
(GAIN)/LOSS	06/30/14	80% ↗	27	\$(8,580,035)	\$(234,709)	\$(8,959,019)	\$(357,138)	\$(9,238,690)	\$(489,243)
(GAIN)/LOSS	06/30/15	60% ↗	28	\$4,987,334	\$70,229	\$5,276,186	\$142,371	\$5,511,267	\$219,426
ASSUMPTION CHANGE	06/30/16	40% ↗	19	\$2,000,646	\$(58,615)	\$2,206,395	\$41,636	\$2,323,240	\$85,551
(GAIN)/LOSS	06/30/16	40% ↗	29	\$4,697,262	\$0	\$5,037,814	\$69,908	\$5,330,657	\$143,669
ASSUMPTION CHANGE	06/30/17	20% ↗	20	\$(90,653)	\$(74,900)	\$(19,658)	\$(77,054)	\$58,715	\$1,107
(GAIN)/LOSS	06/30/17	20% ↗	30	\$(4,379,458)	\$0	\$(4,696,969)	\$0	\$(5,037,499)	\$(69,824)
TOTAL				\$33,793,558	\$1,965,288	\$34,208,307	\$2,402,274	\$34,200,574	\$2,828,711

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

Date	<u>Current Amortization Schedule*</u>		<u>Alternate Schedules</u>			
	Balance	Payment	15 Year Amortization		10 Year Amortization	
			Balance	Payment	Balance	Payment
6/30/2019	34,200,574	2,828,711	34,200,574	3,109,889	34,200,574	4,241,532
6/30/2020	33,750,658	3,036,167	33,459,465	3,199,299	32,287,518	4,363,476
6/30/2021	33,053,280	3,249,434	32,572,032	3,291,279	30,109,479	4,488,926
6/30/2022	32,084,477	3,392,822	31,525,005	3,385,903	27,643,614	4,617,982
6/30/2023	30,896,942	3,078,640	30,304,073	3,483,247	24,865,321	4,750,749
6/30/2024	29,948,684	3,167,151	28,893,813	3,583,391	21,748,106	4,887,333
6/30/2025	28,840,012	2,904,150	27,277,598	3,686,413	18,263,444	5,027,844
6/30/2026	27,923,330	3,016,167	25,437,516	3,792,398	14,380,629	5,172,395
6/30/2027	26,824,181	3,102,882	23,354,269	3,901,429	10,066,611	5,321,101
6/30/2028	25,555,540	3,192,087	21,007,072	4,013,595	5,285,824	5,474,083
6/30/2029	24,102,543	3,283,860	18,373,542	4,128,986		
6/30/2030	22,449,160	3,378,268	15,429,581	4,247,694		
6/30/2031	20,578,136	3,002,105	12,149,246	4,369,816		
6/30/2032	18,961,024	2,906,449	8,504,617	4,495,448		
6/30/2033	17,325,734	2,772,892	4,465,645	4,624,692		
6/30/2034	15,710,199	2,594,590				
6/30/2035	14,162,190	2,402,005				
6/30/2036	12,701,395	2,196,203				
6/30/2037	11,347,824	2,186,253				
6/30/2038	9,906,424	2,173,915				
6/30/2039	8,373,299	2,234,463				
6/30/2040	6,666,316	2,298,707				
6/30/2041	4,769,046	1,866,591				
6/30/2042	3,181,732	1,762,987				
6/30/2043	1,586,631	1,643,140				
6/30/2044						
6/30/2045						
6/30/2046						
6/30/2047						
6/30/2048						
Totals		67,670,639		57,313,479		48,345,421
Interest Paid		33,470,065		23,112,905		14,144,847
Estimated Savings				10,357,160		19,325,218

* 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	10.792%
b) Employee Contribution	7.733%
c) Total Normal Cost	18.525%
2. Changes since the prior year annual valuation	
a) Effect of changes in demographics results	(0.110%)
b) Effect of plan changes	0.000%
c) Effect of changes in assumptions	0.685%
d) Net effect of the changes above [sum of (a) through (c)]	0.575%
3. For Period 7/1/19 – 6/30/20	
a) Employer Normal Cost	11.421%
b) Employee Contribution	7.679%
c) Total Normal Cost	19.100%
Employer Normal Cost Change [(3a) – (1a)]	0.629%
Employee Contribution Change [(3b) – (1b)]	(0.054%)

Unfunded Liability Contribution (\$)

1. For Period 7/1/18 – 6/30/19	2,479,328
2. Changes since the prior year annual valuation	
a) Effect of (gain)/loss during prior year ¹	(69,824)
b) Effect of plan changes	0
c) Effect of changes in assumptions ²	1,107
d) Changes to prior year amortization payments ³	418,100
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)]	349,383
3. For Period 7/1/19 – 6/30/20 [(1) + (2g)]	2,828,711

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	11.314%	12.281%	N/A
2014 - 15	11.412%	13.403%	N/A
2015 - 16	11.465%	15.248%	N/A
2016 - 17	11.272%	16.558%	N/A
2017 - 18	10.739%	N/A	2,098,803
2018 - 19	10.792%	N/A	2,479,328
2019 - 20	11.421%	N/A	2,828,711

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	\$ 86,818,020	\$ 62,015,528	\$ 24,802,492	71.4%	\$ 10,059,864
06/30/12	91,193,884	61,357,002	29,836,882	67.3%	9,770,226
06/30/13	95,085,680	68,392,360	26,693,320	71.9%	9,711,188
06/30/14	104,639,224	78,850,150	25,789,074	75.4%	10,048,237
06/30/15	109,510,122	78,905,065	30,605,057	72.1%	10,065,290
06/30/16	115,131,252	77,745,445	37,385,807	67.5%	10,269,608
06/30/17	118,775,214	84,981,656	33,793,558	71.5%	10,628,783

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	12.1%	12.1%	12.1%	12.1%
UAL Contribution	\$3,039,000	\$3,376,000	\$3,735,000	\$3,739,000
4.0%				
Normal Cost	12.1%	12.1%	12.1%	12.1%
UAL Contribution	\$3,039,000	\$3,334,000	\$3,608,000	\$3,482,000
7.0%				
Normal Cost	12.1%	12.1%	12.1%	12.1%
UAL Contribution	\$3,039,000	\$3,292,000	\$3,478,000	\$3,215,000
9.0%				
Normal Cost	12.1%	12.3%	12.6%	12.9%
UAL Contribution	\$3,039,000	\$3,264,000	\$3,405,000	\$3,078,000
12.0%				
Normal Cost	12.1%	12.3%	12.6%	12.9%
UAL Contribution	\$3,039,000	\$3,223,000	\$3,272,000	\$2,798,000

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 PEPPRA 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)	19.100%	\$118,775,214	\$33,793,558	71.5%
6.0%	25.127%	\$137,743,202	\$52,761,546	61.7%
7.0%	19.739%	\$120,778,891	\$35,797,235	70.4%
8.0%	15.708%	\$106,873,941	\$21,892,285	79.5%

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	\$	84,853,635
2. Payroll		10,628,783
3. Asset Volatility Ratio (AVR) [(1) / (2)]		8.0
4. Accrued Liability (7.25% discount rate)	\$	118,775,214
5. Liability Volatility Ratio (LVR) [(4) / (2)]		11.2
6. Accrued Liability (7.00% discount rate)		120,778,891
7. Projected Liability Volatility Ratio [(6) / (2)]		11.4

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%
\$84,981,656	\$211,584,564	40.2%	\$126,602,908	\$187,287,401	45.4%	\$102,305,745

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.

Benefit Provision	Contract Package						
	Active Misc	Active Misc	Active Misc	Active Misc	Inactive Misc	Inactive Misc	Inactive Misc
Benefit Formula	2.7% @ 55	2.7% @ 55	2.0% @ 62	2.0% @ 55	2.0% @ 55	2.0% @ 55	2.7% @ 55
Social Security Coverage	No	No	No	No	Yes	No	Yes
Full/Modified	Full	Full	Full	Full	Modified	Full	Modified
Employee Contribution Rate	8.00%	8.00%	7.00%	7.00%			
Final Average Compensation Period	One Year	Three Year	Three Year	Three Year	One Year	One Year	One Year
Sick Leave Credit	No	No	No	No	No	No	No
Non-Industrial Disability	Improved	Improved	Improved	Improved	Improved	Improved	Improved
Industrial Disability	No	No	No	No	No	No	No
Pre-Retirement Death Benefits							
Optional Settlement 2	Yes	Yes	Yes	Yes	Yes	Yes	Yes
1959 Survivor Benefit Level	Indexed	Indexed	Indexed	Indexed	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	3%	3%	3%	3%	3%	3%	3%

Plan's Major Benefit Options

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

Benefit Provision	Contract Package		
	Inactive Misc	Receiving Misc	
Benefit Formula	2.0% @ 55		
Social Security Coverage	No		
Full/Modified	Full		
Employee Contribution Rate			
Final Average Compensation Period	Three Year		
Sick Leave Credit	No		
Non-Industrial Disability	Improved		
Industrial Disability	No		
Pre-Retirement Death Benefits			
Optional Settlement 2	Yes		
1959 Survivor Benefit Level	Indexed		
Special	No		
Alternate (firefighters)	No		
Post-Retirement Death Benefits			
Lump Sum	\$500	\$500	
Survivor Allowance (PRSA)	Yes	Yes	
COLA	3%	3%	

Appendices

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

Appendix A

Actuarial Methods and Assumptions

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

Actuarial Data

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

Actuarial Methods

Actuarial Cost Method

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

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

Amortization of Unfunded Actuarial Accrued Liability

The excess of the total actuarial accrued liability over the market value of plan assets is called the unfunded actuarial accrued liability (UAL). Funding requirements are determined by adding the normal cost and an amortization payment toward the unfunded liability. The unfunded liability is amortized as a "level percent of pay". Commencing with the June 30, 2013 valuation, all new gains or losses are amortized over a fixed 30-year period with a 5-year ramp up at the beginning and a 5-year ramp down at the end of the amortization period. All changes in liability due to plan amendments (other than golden handshakes) are amortized over a 20-year period with no ramp. Changes in actuarial assumptions or changes in actuarial methodology are amortized over a 20-year period with a 5-year ramp up at the beginning and a 5-year ramp down at the end of the amortization period. Changes in unfunded accrued liability due to a Golden Handshake will be amortized over a period of five years. A summary of the current policy is provided in the table below:

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

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

Exceptions for Inconsistencies:

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

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

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

Exceptions for Inactive Plans:

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

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

Asset Valuation Method

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

PEPRA Normal Cost Rate Methodology

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

Each non-pooled plan is stable with a sufficiently large demographic representation of active employees. It is preferable to determine normal cost using a large active population ongoing so that this rate remains relatively stable. The total PEPR normal cost will be calculated using all active members within a non-pooled plan until the number of members covered under the PEPR formula meets either:

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

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

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

Actuarial Assumptions

In 2017, CalPERS completed its most recent asset liability management study incorporating actuarial assumptions and strategic asset allocation. In December 2017, the CalPERS Board of Administration adopted relatively modest changes to the asset allocation that reduced the expected volatility of returns. The adopted asset allocation was expected to have a long-term blended return that continued to support a discount rate assumption of 7.00 percent. The Board also approved several changes to the demographic assumptions that more closely aligned with actual experience. These new actuarial assumptions were first used in this, the June 30, 2017 valuation to set the Fiscal Year 2019-20 contribution for public agency employers.

On December 21, 2016, the CalPERS Board of Administration lowered the discount rate from 7.50 percent to 7.00 percent using a three-year phase-in beginning with the June 30, 2016 actuarial valuations. The minimum employer contributions for Fiscal Year 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 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 schedule provides a more realistic assumption for the long-term investment return of the fund.

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

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

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

Economic Assumptions

Discount Rate

The prescribed discount rate assumption adopted by the Board on December 21, 2016 is 7.25 percent compounded annually (net of investment and administrative expenses) as of 6/30/2017.

The Board also prescribed that the assumed discount rate will reduce to 7.0 percent compounded annually (net of expenses) as of 6/30/2018. This change to the discount rate assumption is not reflected in the determination of required contributions determined in this report for Fiscal Year 2019-20.

Termination Liability Discount Rate

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

The hypothetical termination liabilities in this report are calculated using an observed range of market interest rates. This range is based on the lowest and highest 20-year Treasury bond observed during an approximate 2-year period centered around the valuation date. The 20-year Treasury bond has a similar duration to most plan liabilities and serves as a good proxy for the termination discount rate. The 20-year Treasury yield was 2.61 percent on June 30, 2017.

Salary Growth

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

Public Agency Miscellaneous

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

Public Agency Fire

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

Public Agency Police

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

Salary Growth (continued)

Public Agency County Peace Officers			
<u>Duration of Service</u>	<u>(Entry Age 20)</u>	<u>(Entry Age 30)</u>	<u>(Entry Age 40)</u>
0	0.1320	0.1320	0.1320
1	0.0960	0.0960	0.0960
2	0.0657	0.0657	0.0657
3	0.0525	0.0525	0.0525
4	0.0419	0.0419	0.0419
5	0.0335	0.0335	0.0335
10	0.0170	0.0170	0.0170
15	0.0150	0.0150	0.0150
20	0.0150	0.0150	0.0150
25	0.0175	0.0175	0.0175
30	0.0200	0.0200	0.0200

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

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

Overall Payroll Growth

2.875 percent compounded annually (used in projecting the payroll over which the unfunded liability is amortized). This assumption is used for all plans with active members. For the June 30, 2018 valuation the payroll growth assumption will be 2.75 percent.

Inflation

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

Non-valued Potential Additional Liabilities

The potential liability loss for a cost-of-living increase exceeding the 2.625 percent inflation assumption, and any potential liability loss from future member service purchases are not reflected in the valuation.

Miscellaneous Loading Factors

Credit for Unused Sick Leave

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

Conversion of Employer Paid Member Contributions (EPMC)

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

Norris Decision (Best Factors)

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

Termination Liability

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

Demographic Assumptions**Pre-Retirement Mortality**

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

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

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

Post-Retirement Mortality

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

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

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

Marital Status

For active members, a percentage who are married upon retirement is assumed according to member category as shown in the following table.

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

Age of Spouse

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

Terminated Members

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

Termination with Refund

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

Public Agency Miscellaneous

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

Public Agency Safety

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

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

Schools

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

Termination with Vested Benefits

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

Public Agency Miscellaneous

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

Public Agency Safety

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

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

Schools

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

Non-Industrial (Not Job-Related) Disability

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

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

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

Industrial (Job-Related) Disability

Rates vary by age and category.

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

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

Service Retirement

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

Service Retirement

Public Agency Miscellaneous 1.5% @ 65

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

Public Agency Miscellaneous 2% @ 60

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

Service Retirement

Public Agency Miscellaneous 2% @ 55						
Age	Duration of Service					
	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.008	0.013	0.018	0.021	0.022	0.033
51	0.009	0.016	0.020	0.023	0.026	0.036
52	0.015	0.018	0.020	0.021	0.025	0.030
53	0.016	0.020	0.024	0.028	0.031	0.035
54	0.018	0.022	0.026	0.030	0.034	0.038
55	0.040	0.040	0.056	0.093	0.109	0.154
56	0.034	0.050	0.066	0.092	0.107	0.138
57	0.042	0.048	0.058	0.082	0.096	0.127
58	0.046	0.054	0.062	0.090	0.106	0.131
59	0.045	0.055	0.066	0.097	0.115	0.144
60	0.058	0.075	0.093	0.126	0.143	0.169
61	0.065	0.088	0.111	0.146	0.163	0.189
62	0.136	0.118	0.148	0.190	0.213	0.247
63	0.130	0.133	0.174	0.212	0.249	0.285
64	0.113	0.129	0.165	0.196	0.223	0.249
65	0.145	0.173	0.201	0.233	0.266	0.289
66	0.170	0.199	0.229	0.258	0.284	0.306
67	0.250	0.204	0.233	0.250	0.257	0.287
68	0.227	0.175	0.193	0.215	0.240	0.262
69	0.200	0.180	0.180	0.198	0.228	0.246
70	0.150	0.171	0.192	0.239	0.304	0.330

Public Agency Miscellaneous 2.5% @ 55						
Age	Duration of Service					
	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.008	0.014	0.020	0.026	0.033	0.050
51	0.008	0.015	0.023	0.030	0.037	0.059
52	0.009	0.016	0.023	0.030	0.037	0.061
53	0.014	0.021	0.028	0.035	0.042	0.063
54	0.014	0.022	0.030	0.039	0.047	0.068
55	0.020	0.038	0.055	0.073	0.122	0.192
56	0.025	0.047	0.069	0.091	0.136	0.196
57	0.030	0.048	0.065	0.083	0.123	0.178
58	0.035	0.054	0.073	0.093	0.112	0.153
59	0.035	0.054	0.073	0.092	0.131	0.183
60	0.044	0.072	0.101	0.130	0.158	0.197
61	0.050	0.078	0.105	0.133	0.161	0.223
62	0.055	0.093	0.130	0.168	0.205	0.268
63	0.090	0.124	0.158	0.192	0.226	0.279
64	0.080	0.112	0.144	0.175	0.207	0.268
65	0.120	0.156	0.193	0.229	0.265	0.333
66	0.132	0.172	0.212	0.252	0.292	0.366
67	0.132	0.172	0.212	0.252	0.292	0.366
68	0.120	0.156	0.193	0.229	0.265	0.333
69	0.120	0.156	0.193	0.229	0.265	0.333
70	0.120	0.156	0.193	0.229	0.265	0.333

Service Retirement

Public Agency Miscellaneous 2.7% @ 55

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

Public Agency Miscellaneous 3% @ 60

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

Service Retirement

Public Agency Miscellaneous 2% @ 62						
Age	Duration of Service					
	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.000	0.000	0.000	0.000	0.000	0.000
51	0.000	0.000	0.000	0.000	0.000	0.000
52	0.005	0.008	0.012	0.015	0.019	0.031
53	0.007	0.011	0.014	0.018	0.021	0.032
54	0.007	0.011	0.015	0.019	0.023	0.034
55	0.010	0.019	0.028	0.036	0.061	0.096
56	0.014	0.026	0.038	0.050	0.075	0.108
57	0.018	0.029	0.039	0.050	0.074	0.107
58	0.023	0.035	0.048	0.060	0.073	0.099
59	0.025	0.038	0.051	0.065	0.092	0.128
60	0.031	0.051	0.071	0.091	0.111	0.138
61	0.038	0.058	0.079	0.100	0.121	0.167
62	0.044	0.074	0.104	0.134	0.164	0.214
63	0.077	0.105	0.134	0.163	0.192	0.237
64	0.072	0.101	0.129	0.158	0.187	0.242
65	0.108	0.141	0.173	0.206	0.239	0.300
66	0.132	0.172	0.212	0.252	0.292	0.366
67	0.132	0.172	0.212	0.252	0.292	0.366
68	0.120	0.156	0.193	0.229	0.265	0.333
69	0.120	0.156	0.193	0.229	0.265	0.333
70	0.120	0.156	0.193	0.229	0.265	0.333

Service Retirement

Public Agency Fire ½ @ 55 and 2% @ 55			
Age	Rate	Age	Rate
50	0.0159	56	0.1108
51	0.0000	57	0.0000
52	0.0344	58	0.0950
53	0.0199	59	0.0441
54	0.0413	60	1.00000
55	0.0751		

Public Agency Police ½ @ 55 and 2% @ 55			
Age	Rate	Age	Rate
50	0.0255	56	0.0692
51	0.0000	57	0.0511
52	0.0164	58	0.0724
53	0.0272	59	0.0704
54	0.0095	60	0.3000
55	0.1667		

Service Retirement

Public Agency Police 2% @ 50						
Age	Duration of Service					
	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.050	0.050	0.050	0.050	0.050	0.100
51	0.040	0.040	0.040	0.040	0.058	0.094
52	0.040	0.040	0.040	0.040	0.061	0.087
53	0.040	0.040	0.040	0.040	0.082	0.123
54	0.040	0.040	0.040	0.046	0.098	0.158
55	0.072	0.072	0.072	0.096	0.141	0.255
56	0.066	0.066	0.066	0.088	0.129	0.228
57	0.060	0.060	0.060	0.080	0.118	0.213
58	0.080	0.080	0.080	0.088	0.138	0.228
59	0.080	0.080	0.080	0.092	0.140	0.228
60	0.150	0.150	0.150	0.150	0.150	0.228
61	0.144	0.144	0.144	0.144	0.144	0.170
62	0.150	0.150	0.150	0.150	0.150	0.213
63	0.150	0.150	0.150	0.150	0.150	0.213
64	0.150	0.150	0.150	0.150	0.150	0.319
65	1.000	1.000	1.000	1.000	1.000	1.000

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

Service Retirement

Public Agency Fire 2% @ 50						
Age	Duration of Service					
	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.009	0.009	0.009	0.009	0.013	0.020
51	0.013	0.013	0.013	0.013	0.020	0.029
52	0.018	0.018	0.018	0.018	0.028	0.042
53	0.052	0.052	0.052	0.052	0.079	0.119
54	0.067	0.067	0.067	0.067	0.103	0.154
55	0.089	0.089	0.089	0.089	0.136	0.204
56	0.083	0.083	0.083	0.083	0.127	0.190
57	0.082	0.082	0.082	0.082	0.126	0.189
58	0.088	0.088	0.088	0.088	0.136	0.204
59	0.074	0.074	0.074	0.074	0.113	0.170
60	0.100	0.100	0.100	0.100	0.154	0.230
61	0.072	0.072	0.072	0.072	0.110	0.165
62	0.099	0.099	0.099	0.099	0.152	0.228
63	0.114	0.114	0.114	0.114	0.175	0.262
64	0.114	0.114	0.114	0.114	0.175	0.262
65	1.000	1.000	1.000	1.000	1.000	1.000

Service Retirement

Public Agency Police 3% @ 55						
Age	Duration of Service					
	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.035	0.035	0.035	0.035	0.070	0.090
51	0.028	0.028	0.028	0.029	0.065	0.101
52	0.032	0.032	0.032	0.039	0.066	0.109
53	0.028	0.028	0.028	0.043	0.075	0.132
54	0.038	0.038	0.038	0.074	0.118	0.333
55	0.070	0.070	0.070	0.120	0.175	0.340
56	0.060	0.060	0.060	0.110	0.165	0.330
57	0.060	0.060	0.060	0.110	0.165	0.320
58	0.080	0.080	0.080	0.100	0.185	0.350
59	0.090	0.090	0.095	0.130	0.185	0.350
60	0.150	0.150	0.150	0.150	0.185	0.350
61	0.120	0.120	0.120	0.120	0.160	0.350
62	0.150	0.150	0.150	0.150	0.200	0.350
63	0.150	0.150	0.150	0.150	0.200	0.400
64	0.150	0.150	0.150	0.150	0.175	0.350
65	1.000	1.000	1.000	1.000	1.000	1.000

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

Service Retirement

Public Agency Fire 3% @ 55						
Age	Duration of Service					
	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.001	0.001	0.001	0.006	0.016	0.069
51	0.002	0.002	0.002	0.006	0.018	0.071
52	0.012	0.012	0.012	0.021	0.040	0.098
53	0.032	0.032	0.032	0.049	0.085	0.149
54	0.057	0.057	0.057	0.087	0.144	0.217
55	0.073	0.073	0.073	0.109	0.179	0.259
56	0.064	0.064	0.064	0.097	0.161	0.238
57	0.063	0.063	0.063	0.095	0.157	0.233
58	0.065	0.065	0.065	0.099	0.163	0.241
59	0.088	0.088	0.088	0.131	0.213	0.299
60	0.105	0.105	0.105	0.155	0.251	0.344
61	0.118	0.118	0.118	0.175	0.282	0.380
62	0.087	0.087	0.087	0.128	0.210	0.295
63	0.067	0.067	0.067	0.100	0.165	0.243
64	0.067	0.067	0.067	0.100	0.165	0.243
65	1.000	1.000	1.000	1.000	1.000	1.000

Service Retirement

Public Agency Police 3% @ 50						
Age	Duration of Service					
	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.050	0.050	0.050	0.100	0.155	0.400
51	0.040	0.040	0.040	0.090	0.140	0.380
52	0.040	0.040	0.040	0.070	0.115	0.350
53	0.040	0.040	0.040	0.080	0.135	0.350
54	0.040	0.040	0.040	0.090	0.145	0.350
55	0.070	0.070	0.070	0.120	0.175	0.340
56	0.060	0.060	0.060	0.110	0.165	0.330
57	0.060	0.060	0.060	0.110	0.165	0.320
58	0.080	0.080	0.080	0.100	0.185	0.350
59	0.090	0.090	0.095	0.130	0.185	0.350
60	0.150	0.150	0.150	0.150	0.185	0.350
61	0.120	0.120	0.120	0.120	0.160	0.350
62	0.150	0.150	0.150	0.150	0.200	0.350
63	0.150	0.150	0.150	0.150	0.200	0.400
64	0.150	0.150	0.150	0.150	0.175	0.350
65	1.000	1.000	1.000	1.000	1.000	1.000

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

Service Retirement

Public Agency Fire 3% @ 50						
Age	Duration of Service					
	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.020	0.020	0.020	0.040	0.130	0.192
51	0.008	0.008	0.008	0.023	0.107	0.164
52	0.023	0.023	0.023	0.043	0.136	0.198
53	0.023	0.023	0.023	0.043	0.135	0.198
54	0.027	0.027	0.027	0.048	0.143	0.207
55	0.043	0.043	0.043	0.070	0.174	0.244
56	0.053	0.053	0.053	0.085	0.196	0.269
57	0.054	0.054	0.054	0.086	0.197	0.271
58	0.052	0.052	0.052	0.084	0.193	0.268
59	0.075	0.075	0.075	0.116	0.239	0.321
60	0.065	0.065	0.065	0.102	0.219	0.298
61	0.076	0.076	0.076	0.117	0.241	0.324
62	0.068	0.068	0.068	0.106	0.224	0.304
63	0.027	0.027	0.027	0.049	0.143	0.208
64	0.094	0.094	0.094	0.143	0.277	0.366
65	1.000	1.000	1.000	1.000	1.000	1.000

Service Retirement

Public Agency Police 2% @ 57						
Age	Duration of Service					
	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.040	0.040	0.040	0.040	0.040	0.080
51	0.028	0.028	0.028	0.028	0.040	0.066
52	0.028	0.028	0.028	0.028	0.043	0.061
53	0.028	0.028	0.028	0.028	0.057	0.086
54	0.028	0.028	0.028	0.032	0.069	0.110
55	0.050	0.050	0.050	0.067	0.099	0.179
56	0.046	0.046	0.046	0.062	0.090	0.160
57	0.054	0.054	0.054	0.072	0.106	0.191
58	0.060	0.060	0.060	0.066	0.103	0.171
59	0.060	0.060	0.060	0.069	0.105	0.171
60	0.113	0.113	0.113	0.113	0.113	0.171
61	0.108	0.108	0.108	0.108	0.108	0.128
62	0.113	0.113	0.113	0.113	0.113	0.159
63	0.113	0.113	0.113	0.113	0.113	0.159
64	0.113	0.113	0.113	0.113	0.113	0.239
65	1.000	1.000	1.000	1.000	1.000	1.000

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

Service Retirement

Public Agency Fire 2% @ 57						
Age	Duration of Service					
	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.005	0.005	0.005	0.005	0.008	0.012
51	0.006	0.006	0.006	0.006	0.009	0.013
52	0.012	0.012	0.012	0.012	0.019	0.028
53	0.033	0.033	0.033	0.033	0.050	0.075
54	0.045	0.045	0.045	0.045	0.069	0.103
55	0.061	0.061	0.061	0.061	0.094	0.140
56	0.055	0.055	0.055	0.055	0.084	0.126
57	0.081	0.081	0.081	0.081	0.125	0.187
58	0.059	0.059	0.059	0.059	0.091	0.137
59	0.055	0.055	0.055	0.055	0.084	0.126
60	0.085	0.085	0.085	0.085	0.131	0.196
61	0.085	0.085	0.085	0.085	0.131	0.196
62	0.085	0.085	0.085	0.085	0.131	0.196
63	0.085	0.085	0.085	0.085	0.131	0.196
64	0.085	0.085	0.085	0.085	0.131	0.196
65	1.000	1.000	1.000	1.000	1.000	1.000

Service Retirement

Public Agency Police 2.5% @ 57						
Age	Duration of Service					
	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.050	0.050	0.050	0.050	0.050	0.100
51	0.038	0.038	0.038	0.038	0.055	0.089
52	0.038	0.038	0.038	0.038	0.058	0.082
53	0.036	0.036	0.036	0.036	0.073	0.111
54	0.036	0.036	0.036	0.041	0.088	0.142
55	0.061	0.061	0.061	0.082	0.120	0.217
56	0.056	0.056	0.056	0.075	0.110	0.194
57	0.060	0.060	0.060	0.080	0.118	0.213
58	0.072	0.072	0.072	0.079	0.124	0.205
59	0.072	0.072	0.072	0.083	0.126	0.205
60	0.135	0.135	0.135	0.135	0.135	0.205
61	0.130	0.130	0.130	0.130	0.130	0.153
62	0.135	0.135	0.135	0.135	0.135	0.191
63	0.135	0.135	0.135	0.135	0.135	0.191
64	0.135	0.135	0.135	0.135	0.135	0.287
65	1.000	1.000	1.000	1.000	1.000	1.000

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

Service Retirement

Public Agency Fire 2.5% @ 57						
Age	Duration of Service					
	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.007	0.007	0.007	0.007	0.010	0.015
51	0.008	0.008	0.008	0.008	0.012	0.018
52	0.016	0.016	0.016	0.016	0.025	0.038
53	0.042	0.042	0.042	0.042	0.064	0.096
54	0.057	0.057	0.057	0.057	0.088	0.132
55	0.074	0.074	0.074	0.074	0.114	0.170
56	0.066	0.066	0.066	0.066	0.102	0.153
57	0.090	0.090	0.090	0.090	0.139	0.208
58	0.071	0.071	0.071	0.071	0.110	0.164
59	0.066	0.066	0.066	0.066	0.101	0.151
60	0.102	0.102	0.102	0.102	0.157	0.235
61	0.102	0.102	0.102	0.102	0.157	0.236
62	0.102	0.102	0.102	0.102	0.157	0.236
63	0.102	0.102	0.102	0.102	0.157	0.236
64	0.102	0.102	0.102	0.102	0.157	0.236
65	1.000	1.000	1.000	1.000	1.000	1.000

Service Retirement

Public Agency Police 2.7% @ 57						
Age	Duration of Service					
	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.0500	0.0500	0.0500	0.0500	0.0500	0.1000
51	0.0400	0.0400	0.0400	0.0400	0.0575	0.0942
52	0.0380	0.0380	0.0380	0.0380	0.0580	0.0825
53	0.0380	0.0380	0.0380	0.0380	0.0774	0.1169
54	0.0380	0.0380	0.0380	0.0437	0.0931	0.1497
55	0.0684	0.0684	0.0684	0.0912	0.1340	0.2423
56	0.0627	0.0627	0.0627	0.0836	0.1228	0.2168
57	0.0600	0.0600	0.0600	0.0800	0.1175	0.2125
58	0.0800	0.0800	0.0800	0.0880	0.1375	0.2275
59	0.0800	0.0800	0.0800	0.0920	0.1400	0.2275
60	0.1500	0.1500	0.1500	0.1500	0.1500	0.2275
61	0.1440	0.1440	0.1440	0.1440	0.1440	0.1700
62	0.1500	0.1500	0.1500	0.1500	0.1500	0.2125
63	0.1500	0.1500	0.1500	0.1500	0.1500	0.2125
64	0.1500	0.1500	0.1500	0.1500	0.1500	0.3188
65	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

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

Service Retirement

Public Agency Fire 2.7% @ 57						
Age	Duration of Service					
	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.0065	0.0065	0.0065	0.0065	0.0101	0.0151
51	0.0081	0.0081	0.0081	0.0081	0.0125	0.0187
52	0.0164	0.0164	0.0164	0.0164	0.0254	0.0380
53	0.0442	0.0442	0.0442	0.0442	0.0680	0.1018
54	0.0606	0.0606	0.0606	0.0606	0.0934	0.1397
55	0.0825	0.0825	0.0825	0.0825	0.1269	0.1900
56	0.0740	0.0740	0.0740	0.0740	0.1140	0.1706
57	0.0901	0.0901	0.0901	0.0901	0.1387	0.2077
58	0.0790	0.0790	0.0790	0.0790	0.1217	0.1821
59	0.0729	0.0729	0.0729	0.0729	0.1123	0.1681
60	0.1135	0.1135	0.1135	0.1135	0.1747	0.2615
61	0.1136	0.1136	0.1136	0.1136	0.1749	0.2618
62	0.1136	0.1136	0.1136	0.1136	0.1749	0.2618
63	0.1136	0.1136	0.1136	0.1136	0.1749	0.2618
64	0.1136	0.1136	0.1136	0.1136	0.1749	0.2618
65	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

Service Retirement

Schools 2% @ 55						
Age	Duration of Service					
	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
50	0.004	0.007	0.011	0.012	0.013	0.015
51	0.004	0.008	0.011	0.014	0.016	0.017
52	0.005	0.010	0.014	0.016	0.018	0.021
53	0.006	0.012	0.016	0.020	0.022	0.025
54	0.008	0.017	0.023	0.027	0.031	0.034
55	0.021	0.042	0.058	0.069	0.077	0.086
56	0.019	0.037	0.053	0.062	0.069	0.078
57	0.019	0.038	0.054	0.064	0.071	0.079
58	0.022	0.045	0.062	0.074	0.082	0.092
59	0.025	0.049	0.069	0.082	0.090	0.101
60	0.033	0.066	0.092	0.109	0.121	0.135
61	0.037	0.072	0.101	0.119	0.133	0.149
62	0.066	0.131	0.184	0.218	0.242	0.271
63	0.064	0.126	0.178	0.209	0.233	0.261
64	0.059	0.117	0.163	0.193	0.215	0.240
65	0.080	0.158	0.221	0.261	0.291	0.326
66	0.081	0.160	0.224	0.265	0.296	0.330
67	0.070	0.139	0.194	0.229	0.255	0.286
68	0.063	0.124	0.173	0.205	0.228	0.255
69	0.066	0.130	0.183	0.216	0.241	0.270
70	0.071	0.140	0.196	0.231	0.258	0.289

Miscellaneous

Internal Revenue Code Section 415

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

Internal Revenue Code Section 401(a) (17)

The limitations on compensation imposed by Internal Revenue Code Section 401(a) (17) are taken into account in this valuation. Each year, the impact of any changes in the compensation limitation since the prior valuation is included and amortized as part of the actuarial gain or loss base. The compensation limit for classic members for the 2017 calendar year is \$270,000.

Appendix B

Principal Plan Provisions

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

Service Retirement

Eligibility

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

Benefit

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

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

Miscellaneous Plan Formulas

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

Safety Plan Formulas

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

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

PEPRA Safety Plan Formulas

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

- The *years of service* is the amount credited by CalPERS to a member while he or she is employed in this group (or for other periods that are recognized under the employer's contract with CalPERS). For a member who has earned service with multiple CalPERS employers, the benefit from each employer is calculated separately according to each employer's contract, and then added together for the total allowance. An agency may contract for an optional benefit where any unused sick leave accumulated at the time of retirement will be converted to credited service at a rate of 0.004 years of service for each day of sick leave.
- The *final compensation* is the monthly average of the member's highest 36 or 12 consecutive months' full-time equivalent monthly pay (no matter which CalPERS employer paid this compensation). The standard benefit is 36 months. Employers had the option of providing a final compensation equal to the highest 12 consecutive months for classic plans only. Final compensation must be defined by the highest 36 consecutive months' pay under the 1.5% at 65 formula. PEPRA members have a cap on the annual salary that can be used to calculate final compensation for all new members based on the Social Security contribution and benefit base. For employees that participate in Social Security this cap is \$118,775 for 2017 and for those employees that do not participate in Social Security the cap for 2017 is \$142,530. Adjustments to the caps are permitted annually based on changes to the CPI for all urban consumers.
- Employees must be covered by Social Security with the 1.5% at 65 formula. Social Security is optional for all other benefit formulas. For employees covered by Social Security, the modified formula is the standard benefit. Under this type of formula, the final compensation is offset by \$133.33 (or by one third if the final compensation is less than \$400). Employers may contract for the full benefit with Social Security that will eliminate the offset applicable to the final compensation. For employees not covered by Social Security, the full benefit is paid with

no offsets. Auxiliary organizations of the CSUC system may elect reduced contribution rates, in which case the offset is \$317 if members are not covered by Social Security or \$513 if members are covered by Social Security.

- The miscellaneous and PEPRA safety service retirement benefit is not capped. The classic Safety service retirement benefit is capped at 90 percent of final compensation.

Vested Deferred Retirement

Eligibility for Deferred Status

A CalPERS member becomes eligible for a deferred vested retirement benefit when he or she leaves employment, keeps his or her contribution account balance on deposit with CalPERS, **and** has earned at least 5 years of credited service (total service across all CalPERS employers, and with certain other retirement systems with which CalPERS has reciprocity agreements).

Eligibility to Start Receiving Benefits

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

Benefit

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

Non-Industrial (Non-Job Related) Disability Retirement

Eligibility

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

Standard Benefit

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

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

Improved Benefit

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

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

Industrial (Job Related) Disability Retirement

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

Eligibility

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

Standard Benefit

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

Increased Benefit (75 percent of Final Compensation)

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

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

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

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

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

Post-Retirement Death Benefit

Standard Lump Sum Payment

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

Improved Lump Sum Payment

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

Form of Payment for Retirement Allowance

Standard Form of Payment

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

Improved Form of Payment (Post-Retirement Survivor Allowance)

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

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

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

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

Pre-Retirement Death Benefits

Basic Death Benefit

This is a standard benefit.

Eligibility

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

Benefit

The basic death benefit is a lump sum in the amount of the member's accumulated contributions, where interest is currently credited at 7.5 percent per year, plus a lump sum in the amount of one month's salary for each completed year of current service, up to a maximum of six months' salary. For purposes of this benefit, one month's salary is defined as the member's average monthly full-time rate of compensation during the 12 months preceding death.

1957 Survivor Benefit

This is a standard benefit.

Eligibility

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

Benefit

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

Optional Settlement 2 Death Benefit

This is an optional benefit.

Eligibility

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

Benefit

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

Special Death Benefit

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

Eligibility

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

Benefit

The special death benefit is a monthly allowance equal to 50 percent of final compensation, and will be increased whenever the compensation paid to active employees is increased but ceasing to increase when the member would have attained age 50. The allowance is payable to the surviving spouse until death at which time the allowance is continued to any unmarried child(ren) under age 22. There is a guarantee that the total amount paid will at least equal the basic death benefit.

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

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

Alternate Death Benefit for Local Fire Members

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

Eligibility

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

Benefit

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

Cost-of-Living Adjustments (COLA)

Standard Benefit

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

Improved Benefit

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

Purchasing Power Protection Allowance (PPPA)

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

Employee Contributions

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

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

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

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

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

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

Refund of Employee Contributions

If the member’s service with the employer ends, and if the member does not satisfy the eligibility conditions for any of the retirement benefits above, the member may elect to receive a refund of his or her employee contributions, which are credited with 6 percent interest compounded annually.

1959 Survivor Benefit

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

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

Appendix C

Participant Data

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

Summary of Valuation Data

	June 30, 2016	June 30, 2017
1. Active Members		
a) Counts	165	167
b) Average Attained Age	44.00	44.22
c) Average Entry Age to Rate Plan	33.89	34.36
d) Average Years of Service	10.11	9.86
e) Average Annual Covered Pay	\$ 62,240	\$ 63,645
f) Annual Covered Payroll	10,269,608	10,628,783
g) Projected Annual Payroll for Contribution Year	11,221,878	11,572,124
h) Present Value of Future Payroll	82,568,189	89,424,512
2. Transferred Members		
a) Counts	98	109
b) Average Attained Age	49.01	47.76
c) Average Years of Service	4.29	4.16
d) Average Annual Covered Pay	\$ 83,667	\$ 83,089
3. Terminated Members		
a) Counts	89	95
b) Average Attained Age	46.71	46.84
c) Average Years of Service	2.38	2.27
d) Average Annual Covered Pay	\$ 39,080	\$ 37,988
4. Retired Members and Beneficiaries		
a) Counts	235	241
b) Average Attained Age	69.87	70.07
c) Average Annual Benefits	\$ 20,740	\$ 21,470
5. Active to Retired Ratio [(1a) / (4a)]	0.70	0.69

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

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

Active Members

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

Distribution of Active Members by Age and Service

Attained Age	Years of Service at Valuation Date						Total
	0-4	5-9	10-14	15-19	20-25	25+	
15-24	7	0	0	0	0	0	7
25-29	18	0	1	0	0	0	19
30-34	14	3	6	1	0	0	24
35-39	7	2	6	1	1	0	17
40-44	4	1	3	6	1	0	15
45-49	8	3	9	6	1	1	28
50-54	4	2	4	4	5	5	24
55-59	3	1	5	4	0	1	14
60-64	1	1	5	1	3	1	12
65 and over	3	1	1	1	0	1	7
All Ages	69	14	40	24	11	9	167

Distribution of Average Annual Salaries by Age and Service

Attained Age	Years of Service at Valuation Date						Average
	0-4	5-9	10-14	15-19	20-25	25+	
15-24	\$39,053	\$0	\$0	\$0	\$0	\$0	\$39,053
25-29	45,375	0	69,583	0	0	0	46,649
30-34	45,899	65,739	52,317	46,162	0	0	49,994
35-39	50,324	50,231	83,576	52,028	61,615	0	62,813
40-44	89,081	129,543	55,924	78,098	171,054	0	86,218
45-49	46,253	62,545	81,315	76,305	212,375	88,973	73,167
50-54	90,858	62,947	65,162	80,377	58,962	92,063	76,109
55-59	41,218	108,164	61,869	81,131	0	74,635	67,166
60-64	7,199	83,459	58,882	52,944	57,701	85,275	58,032
65 and over	46,130	20,384	85,679	55,336	0	96,325	56,588
All Ages	\$49,913	\$68,054	\$68,366	\$74,122	\$82,996	\$89,503	\$63,645

Transferred and Terminated Members

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

Attained Age	Years of Service at Valuation Date						Total	Average Salary
	0-4	5-9	10-14	15-19	20-25	25+		
15-24	1	0	0	0	0	0	1	\$41,386
25-29	4	0	0	0	0	0	4	56,439
30-34	7	2	0	0	0	0	9	57,981
35-39	11	1	0	0	0	0	12	55,238
40-44	9	9	2	0	0	0	20	80,751
45-49	8	2	1	0	1	0	12	94,416
50-54	16	5	1	0	0	0	22	101,019
55-59	8	1	3	0	0	0	12	95,431
60-64	8	2	2	2	0	0	14	89,339
65 and over	2	1	0	0	0	0	3	79,512
All Ages	74	23	9	2	1	0	109	83,089

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

Attained Age	Years of Service at Valuation Date						Total	Average Salary
	0-4	5-9	10-14	15-19	20-25	25+		
15-24	2	0	0	0	0	0	2	\$30,503
25-29	7	0	0	0	0	0	7	40,213
30-34	9	1	0	0	0	0	10	34,014
35-39	10	0	0	0	0	0	10	44,482
40-44	12	1	1	0	0	0	14	35,760
45-49	9	1	0	0	0	0	10	47,678
50-54	14	3	0	0	0	0	17	37,443
55-59	9	2	0	0	0	0	11	34,336
60-64	6	2	0	0	0	0	8	43,136
65 and over	5	1	0	0	0	0	6	24,112
All Ages	83	11	1	0	0	0	95	37,988

Retired Members and Beneficiaries

Distribution of Retirees and Beneficiaries by Age and Retirement Type*

Attained Age	Service Retirement	Non-Industrial Disability	Industrial Disability	Non-Industrial Death	Industrial Death	Death After Retirement	Total
Under 30	0	0	0	0	0	0	0
30-34	0	0	0	0	0	0	0
35-39	0	0	0	0	0	0	0
40-44	0	0	0	0	0	0	0
45-49	0	2	0	0	0	0	2
50-54	5	3	1	0	0	0	9
55-59	23	0	0	1	0	2	26
60-64	31	2	0	0	0	5	38
65-69	47	2	0	0	0	3	52
70-74	40	4	0	0	0	10	54
75-79	22	0	0	0	0	2	24
80-84	11	0	0	0	0	4	15
85 and Over	11	1	0	0	0	9	21
All Ages	190	14	1	1	0	35	241

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

Attained Age	Service Retirement	Non-Industrial Disability	Industrial Disability	Non-Industrial Death	Industrial Death	Death After Retirement	Average
Under 30	\$0	\$0	\$0	\$0	\$0	\$0	\$0
30-34	0	0	0	0	0	0	0
35-39	0	0	0	0	0	0	0
40-44	0	0	0	0	0	0	0
45-49	0	15,465	0	0	0	0	15,465
50-54	24,695	13,308	42	0	0	0	18,160
55-59	24,400	0	0	15,056	0	13,066	23,168
60-64	24,207	1,591	0	0	0	21,007	22,596
65-69	32,207	9,244	0	0	0	34,588	31,461
70-74	21,075	11,851	0	0	0	11,589	18,635
75-79	15,780	0	0	0	0	5,167	14,896
80-84	21,255	0	0	0	0	17,387	20,223
85 and Over	11,891	2,407	0	0	0	9,186	10,280
All Ages	\$23,703	\$10,167	\$42	\$15,056	\$0	\$14,668	\$21,470

Retired Members and Beneficiaries (continued)

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

Years Retired	Service Retirement	Non-Industrial Disability	Industrial Disability	Non-Industrial Death	Industrial Death	Death After Retirement	Total
Under 5 Yrs	59	5	0	0	0	10	74
5-9	42	0	1	1	0	10	54
10-14	48	0	0	0	0	3	51
15-19	19	3	0	0	0	9	31
20-24	9	1	0	0	0	1	11
25-29	10	3	0	0	0	2	15
30 and Over	3	2	0	0	0	0	5
All Years	190	14	1	1	0	35	241

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

Years Retired	Service Retirement	Non-Industrial Disability	Industrial Disability	Non-Industrial Death	Industrial Death	Death After Retirement	Average
Under 5 Yrs	\$25,435	\$11,592	\$0	\$0	\$0	\$15,551	\$23,164
5-9	26,225	0	42	15,056	0	11,349	22,778
10-14	25,217	0	0	0	0	9,149	24,271
15-19	17,166	9,097	0	0	0	20,608	17,384
20-24	18,105	14,538	0	0	0	15,130	17,510
25-29	15,949	12,902	0	0	0	8,169	14,302
30 and Over	14,163	1,920	0	0	0	0	9,266
All Years	\$23,703	\$10,167	\$42	\$15,056	\$0	\$14,668	\$21,470

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

Appendix D

Normal Cost Information by Group

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

Normal Cost by Benefit Group

The table below displays the Total Normal Cost broken out by benefit group for Fiscal Year 2019-20. The Total Normal Cost is the annual cost of service accrual for the fiscal year for active employees and can be viewed as the long-term contribution rate for the benefits contracted. Generally, the normal cost for a benefit group subject to more generous benefit provisions will exceed the normal cost for a group with less generous benefits. However, based on the characteristics of the members (particularly when the number of actives is small), this may not be the case. Future measurements of the Total Normal Cost for each group may differ significantly from the current values due to such factors as: changes in the demographics of the group, changes in economic and demographic assumptions, changes in plan benefits or applicable law.

Rate Plan Identifier	Benefit Group Name	Total Normal Cost FY 2019-20	Number of Actives	Payroll on 6/30/2017
449	Miscellaneous First Tier	18.135%	6	546,701
26340	Miscellaneous PEPRA	14.513%	58	2,639,995
30434	Miscellaneous Second Tier	20.964%	93	6,718,539
30435	Miscellaneous Third Tier	19.500%	10	723,548

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

PEPRA Member Contribution Rates

The table below shows the determination of the PEPRA Member contribution rates based on 50 percent of the Total Normal Cost for each respective plan on June 30, 2017. Assembly Bill (AB) 340 created PEPRA that implemented new benefit formulas and a final compensation period as well as new contribution requirements for new employees. In accordance with Section Code 7522.30(b), "new members ... shall have an initial contribution rate of at least 50 percent of the normal cost rate." The normal cost for the plan is dependent on the benefit levels, actuarial assumptions and demographics of the plan particularly the entry age into the plan. Should the total normal cost of the plan change by one percent or more from the base total normal cost established for the plan, the new member rate shall be 50 percent of the new normal cost rounded to the nearest quarter percent.

Rate Plan Identifier	Benefit Group Name	Basis for Current Rate		Rates Effective July 1, 2019			
		Total Normal Cost	Member Rate	Total Normal Cost	Change	Change Needed	Member Rate
26340	Miscellaneous PEPRA	14.000%	7.000%	14.076%	0.076%	No	7.000%

The PEPRA employee contribution rate determined in the table above may not necessarily be 50 percent of the Total Normal Cost by Group based on the PEPRA Normal Cost calculation methodology. Each non-pooled plan is stable with a sufficiently large demographic representation of active employees. It is preferable to determine normal cost using a large active population ongoing so that this rate remains relatively stable. The total PEPRA normal cost will be calculated using all active members within a non-pooled plan until the number of members covered under the PEPRA formula meets either:

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

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

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

Appendix E

Glossary of Actuarial Terms

Glossary of Actuarial Terms

Accrued Liability (*also called Actuarial Accrued Liability or Entry Age Normal Accrued Liability*)

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

Actuarial Assumptions

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

Actuarial Methods

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

Actuarial Valuation

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

Amortization Bases

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

Generally, in an actuarial valuation, the separate bases consist of changes in unfunded liability due to contract amendments, actuarial assumption changes, actuarial methodology changes, and/or gains and losses. Payment periods are determined by Board policy and vary based on the cause of the change.

Amortization Period

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

Classic Member (under PEPPRA)

A classic member is a member who joined CalPERS prior to January 1, 2013 and who is not defined as a new member under PEPPRA. (See definition of new member below)

Discount Rate Assumption

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

Entry Age

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

Entry Age Normal Cost Method

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

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

Fresh Start

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

Funded Status

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

GASB 68

Statement No. 68 of the Governmental Accounting Standards Board. The accounting standard governing a state or local governmental employer's accounting and financial reporting for pensions. GASB 68 replaces GASB 27 effective the first fiscal year beginning after June 15, 2014.

New Member (under PEPPRA)

A new member includes an individual who becomes a member of a public retirement system for the first time on or after January 1, 2013, and who was not a member of another public retirement system prior to that date, and who is not subject to reciprocity with another public retirement system.

Normal Cost

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

Pension Actuary

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

PEPPRA

The California Public Employees' Pension Reform Act of 2013

Prepayment Contribution

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

Present Value of Benefits (PVB)

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

Unfunded Accrued Liability (UAL)

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



California Public Employees' Retirement System
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www.calpers.ca.gov

August 2018

**Safety First Tier Plan of the City of Yuba City
(CalPERS ID: 6515248486)
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 the pension plan.

Because this plan is in a risk pool, the following valuation report has been separated into two sections:

- Section 1 contains specific information for the plan including the development of the current and projected employer contributions, and
- Section 2 contains the Risk Pool Actuarial Valuation appropriate to the plan as of June 30, 2017.

Section 2 can be found on the CalPERS website at (www.calpers.ca.gov). From the home page, go to "Forms & Publications" and select "View All". In the search box, enter "Risk Pool" and from the results list download the Miscellaneous or Safety Risk Pool Actuarial Valuation Report as appropriate.

Your June 30, 2017 actuarial valuation report contains important actuarial information about your pension plan at CalPERS. Your assigned 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.

The exhibit below displays the minimum employer contributions, before any cost sharing, for Fiscal Year 2019-20 along with estimates of the required contributions 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 employer contributions in this report do not reflect any cost sharing arrangements you may have with your employees.**

Required Contribution

Fiscal Year	Employer Normal Cost Rate	Employer Payment of Unfunded Liability
2019-20	25.612%	\$1,545,867
<i>Projected Results</i>		
2020-21	27.1%	\$1,733,000

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 "Risk Analysis" section of the valuation report 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 valuations. 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 was 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.

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, "Statement of Actuarial Data, Methods and Assumptions" of the Section 2 report.

We understand that you might have a number of 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 to contact us with actuarial related questions.

If you have other questions, please call our customer contact center at (888) CalPERS or **(888-225-7377)**.

Sincerely,



SCOTT TERANDO
Chief Actuary



**Actuarial Valuation
as of June 30, 2017**

**for the
Safety First Tier Plan
of the
City of Yuba City
(CalPERS ID: 6515248486)**

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

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Section 1 – Plan Specific Information

Section 2 – Risk Pool Actuarial Valuation Information

Section 1

CALIFORNIA PUBLIC EMPLOYEES' RETIREMENT SYSTEM

Plan Specific Information for the Safety First Tier Plan of the City of Yuba City

**(CalPERS ID: 6515248486)
(Rate Plan: 8743)**

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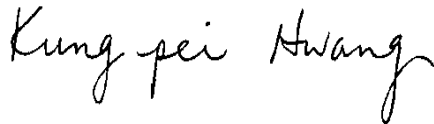
Actuarial Certification

Section 1 of this report is based on the member and financial data contained in our records as of June 30, 2017 which was provided by your agency and the benefit provisions under your contract with CalPERS. Section 2 of this report is based on the member and financial data as of June 30, 2017 provided by employers participating in the Safety Risk Pool to which the plan belongs and benefit provisions under the CalPERS contracts for those agencies.

As set forth in Section 2 of this report, the pool actuaries have certified that, in their opinion, the valuation of the risk pool containing your Safety First Tier Plan has been performed in accordance with generally accepted actuarial principles consistent with standards of practice prescribed by the Actuarial Standards Board, and that the assumptions and methods are internally consistent and reasonable for the risk pool as of the date of this valuation and as prescribed by the CalPERS Board of Administration according to provisions set forth in the California Public Employees' Retirement Law.

Having relied upon the information set forth in Section 2 of this report and based on the census and benefit provision information for the plan, it is my opinion as the plan actuary that Unfunded Accrued Liability amortization bases as of June 30, 2017 and employer contribution as of July 1, 2019, have been properly and accurately determined in accordance with the principles and standards stated above.

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



KUNG-PEI HWANG, ASA, MAAA
Senior Pension Actuary, CalPERS
Plan Actuary

Highlights and Executive Summary

- **Introduction**
- **Purpose of Section 1**
- **Required Employer Contributions**
- **Plan's Funded Status**
- **Projected Employer Contributions**
- **Changes Since the Prior Year's Valuation**
- **Subsequent Events**

Introduction

This report presents the results of the June 30, 2017 actuarial valuation of the Safety First Tier Plan of the City of Yuba City of the California Public Employees' Retirement System (CalPERS). This actuarial valuation sets the required employer contributions for Fiscal Year 2019-20.

Purpose of Section 1

This Section 1 report for the Safety First Tier Plan of the City of Yuba City of the California Public Employees' Retirement System (CalPERS) was prepared by the plan actuary in order to:

- Set forth the assets and accrued liabilities of this plan as of June 30, 2017;
- Determine the minimum required employer contribution for this plan for the fiscal year July 1, 2019 through June 30, 2020; and
- 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 GASB Statement No. 68 for a Cost Sharing 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 9.

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 Employer Contributions

		Fiscal Year
Required Employer Contributions		2019-20
Employer Normal Cost Rate		25.612%
<i>Plus, Either</i>		
1) Monthly Employer Dollar UAL Payment	\$	128,822.29
<i>Or</i>		
2) Annual Lump Sum Prepayment Option	\$	1,492,704
<p><i>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).</i></p> <p><i>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.</i></p> <p><i>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.</i></p>		

	Fiscal Year	Fiscal Year
	2018-19	2019-20
Development of Normal Cost as a Percentage of Payroll¹		
Base Total Normal Cost for Formula	28.405%	29.696%
Surcharge for Class 1 Benefits ²		
a) FAC 1	1.140%	1.220%
b) PRSA	1.790%	1.727%
c) 3% COLA	2.185%	1.958%
Phase out of Normal Cost Difference ³	0.000%	0.000%
Plan's Total Normal Cost	33.520%	34.601%
Formula's Expected Employee Contribution Rate	8.989%	8.989%
Employer Normal Cost Rate	24.531%	25.612%
Projected Payroll for the Contribution Fiscal Year	\$ 757,706	\$ 769,614
Estimated Employer Contributions Based on Projected Payroll		
Plan's Estimated Employer Normal Cost	\$ 185,873	\$ 197,114
Plan's Payment on Amortization Bases ⁴	1,268,454	1,545,867
% of Projected Payroll (illustrative only)	167.407%	200.863%
Estimated Total Employer Contribution	\$ 1,454,327	\$ 1,742,981
% of Projected Payroll (illustrative only)	191.938%	226.475%

¹ The results shown for Fiscal Year 2018-19 reflect the prior year valuation and may not take into account any lump sum payment, side fund payoff, or rate adjustment made after June 30, 2017.

² Section 2 of this report contains a list of Class 1 benefits and corresponding surcharges for each benefit.

³ The normal cost difference is phased out over a five-year period. The phase out of normal cost difference is 100 percent for the first year of pooling, and is incrementally reduced by 20 percent of the original normal cost difference for each subsequent year. This is non-zero only for plans that joined a pool within the past 5 years. Most plans joined a pool June 30, 2003, when risk pooling was implemented.

⁴ See page 9 for a breakdown of the Amortization Bases.

Plan's Funded Status

		June 30, 2016		June 30, 2017
1. Present Value of Projected Benefits (PVB)	\$	72,375,236	\$	72,607,792
2. Entry Age Normal Accrued Liability (AL)		71,805,762		72,115,503
3. Plan's Market Value of Assets (MVA)		49,680,999		49,508,910
4. Unfunded Accrued Liability (UAL) [(2) - (3)]		22,124,763		22,606,593
5. Funded Ratio [(3) / (2)]		69.2%		68.7%

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 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, "Statement of Actuarial Data, Methods and Assumptions" of the Section 2 report. 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.

	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 %	25.612%	27.1%	27.1%	27.1%	27.1%	27.1%
UAL Payment	\$1,545,867	\$1,733,000	\$1,957,000	\$2,139,000	\$2,250,000	\$2,362,000

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 of Section 2. This method phases in the impact of unanticipated 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 changes in the discount rate for next year's 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.

Changes since the Prior Year's Valuation

Benefits

None. 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 of Section 2 for a summary of the plan provisions used in this valuation.

Actuarial Methods and Assumptions

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 valuations. 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 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 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 three-year 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 and Liabilities

- **Breakdown of Entry Age Normal Accrued Liability**
- **Allocation of Plan's Share of Pool's Experience/Assumption Change**
- **Development of Plan's Share of Pool's MVA**
- **Schedule of Plan's Amortization Bases**
- **Amortization Schedule and Alternatives**
- **Employer Contribution History**
- **Funding History**

Breakdown of Entry Age Normal Accrued Liability

Active Members	\$	8,174,513
Transferred Members		2,782,541
Terminated Members		414,941
Members and Beneficiaries Receiving Payments		<u>60,743,508</u>
Total	\$	72,115,503

Allocation of Plan's Share of Pool's Experience/Assumption Change

It is the policy of CalPERS to ensure equity within the risk pools by allocating the pool's experience gains/losses and assumption changes in a manner that treats each employer equitably and maintains benefit security for the members of the System while minimizing substantial variations in employer contributions. The Pool's experience gains/losses and impact of assumption/method changes is allocated to the plan as follows:

1. Plan's Accrued Liability	\$	72,115,503
2. Projected UAL balance at 6/30/17		22,898,232
3. Pool's Accrued Liability ¹	\$	20,966,498,823
4. Sum of Pool's Individual Plan UAL Balances at 6/30/17 ¹		5,939,788,240
5. Pool's 2016/17 Investment & Asset (Gain)/Loss		(513,476,842)
6. Pool's 2016/17 Other (Gain)/Loss		13,232,897
7. Plan's Share of Pool's Asset (Gain)/Loss $[(1) - (2)] / [(3) - (4)] * (5)$		(1,681,800)
8. Plan's Share of Pool's Other (Gain)/Loss $[(1)] / [(3)] * (6)$		45,515
9. Plan's New (Gain)/Loss as of 6/30/2017 $[(7) + (8)]$	\$	(1,636,285)
10. Increase in Pool's Accrued Liability due to Change in Assumptions ¹		390,935,533
11. Plan's Share of Pool's Change in Assumptions $[(1)] / [(3)] * (10)$	\$	1,344,646

¹ Does not include plans that transferred to Pool on the valuation date.

Development of the Plan's Share of Pool's Market Value of Assets

12. Plan's UAL $[(2) + (9) + (11)]$	\$	22,606,593
13. Plan's Share of Pool's MVA $[(1) - (12)]$	\$	49,508,910

Schedule of Plan's 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 employer contribution determined by the valuation is 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 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 payment on the UAL for the fiscal year and adjusting for interest. 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	Amortization Period	Balance 6/30/17	Payment 2017-18	Balance 6/30/18	Payment 2018-19	Amounts for Fiscal 2019-20	
								Balance 6/30/19	Scheduled Payment for 2019-20
SHARE OF PRE-2013 POOL UAL	06/30/13	No Ramp	18	\$8,309,177	\$628,146	\$8,261,074	\$639,204	\$8,198,032	\$656,581
ASSET (GAIN)/LOSS	06/30/13	100% →	26	\$8,883,656	\$358,718	\$9,156,227	\$485,495	\$9,317,267	\$623,478
NON-ASSET (GAIN)/LOSS	06/30/13	100% →	26	\$(100,850)	\$(4,072)	\$(103,945)	\$(5,512)	\$(105,773)	\$(7,078)
ASSET (GAIN)/LOSS	06/30/14	80% ↗	27	\$(5,918,798)	\$(161,910)	\$(6,180,234)	\$(246,366)	\$(6,373,160)	\$(337,497)
NON-ASSET (GAIN)/LOSS	06/30/14	80% ↗	27	\$74,592	\$2,040	\$77,887	\$3,105	\$80,318	\$4,253
ASSUMPTION CHANGE	06/30/14	80% ↗	17	\$3,987,747	\$148,454	\$4,123,117	\$226,831	\$4,187,133	\$310,669
ASSET (GAIN)/LOSS	06/30/15	60% ↗	28	\$3,319,904	\$46,749	\$3,512,183	\$94,772	\$3,668,669	\$146,065
NON-ASSET (GAIN)/LOSS	06/30/15	60% ↗	28	\$(12,550)	\$(177)	\$(13,277)	\$(358)	\$(13,869)	\$(552)
ASSET (GAIN)/LOSS	06/30/16	40% ↗	29	\$3,823,137	\$0	\$4,100,314	\$56,899	\$4,338,661	\$116,933
NON-ASSET (GAIN)/LOSS	06/30/16	40% ↗	29	\$(653,535)	\$0	\$(700,916)	\$(9,726)	\$(741,660)	\$(19,989)
ASSUMPTION CHANGE	06/30/16	40% ↗	19	\$1,185,752	\$(5,787)	\$1,277,712	\$24,111	\$1,345,376	\$49,542
ASSET (GAIN)/LOSS	06/30/17	20% ↗	30	\$(1,681,800)	\$0	\$(1,803,731)	\$0	\$(1,934,501)	\$(26,814)
NON-ASSET (GAIN)/LOSS	06/30/17	20% ↗	30	\$45,515	\$0	\$48,815	\$0	\$52,354	\$726
ASSUMPTION CHANGE	06/30/17	20% ↗	20	\$1,344,646	\$(9,796)	\$1,452,278	\$(10,078)	\$1,568,005	\$29,550
TOTAL				\$22,606,593	\$1,002,365	\$23,207,504	\$1,258,377	\$23,586,852	\$1,545,867

The (gain)/loss bases are the plan's allocated share of the risk pool's (gain)/loss for the fiscal year as disclosed on the previous page. These (gain)/loss bases will be amortized according to Board policy over 30 years with a 5-year ramp-up.

If the total Unfunded Liability is negative (i.e., plan has a surplus), the scheduled payment is \$0, because the minimum required contribution under PEPRA must be at least equal to the normal cost.

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 for each year into the future. **The schedules do not attempt to reflect any experience after June 30, 2017 that may deviate from the actuarial assumptions. Therefore, future amortization payments displayed in the Current Amortization Schedule may 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

Date	<u>Current Amortization Schedule</u>		<u>Alternate Schedules</u>			
	Balance	Payment	20 Year Amortization		15 Year Amortization	
			Balance	Payment	Balance	Payment
6/30/2019	23,586,853	1,545,867	23,586,853	1,762,859	23,586,853	2,144,774
6/30/2020	23,695,975	1,713,315	23,471,255	1,813,541	23,075,738	2,206,436
6/30/2021	23,639,598	1,895,085	23,294,789	1,865,680	22,463,709	2,269,871
6/30/2022	23,390,889	2,033,082	23,051,534	1,919,319	21,741,613	2,335,130
6/30/2023	22,981,236	2,095,411	22,735,093	1,974,499	20,899,583	2,402,265
6/30/2024	22,477,336	2,155,654	22,338,565	2,031,266	19,926,979	2,471,330
6/30/2025	21,874,513	2,217,629	21,854,500	2,089,665	18,812,336	2,542,381
6/30/2026	21,163,804	2,281,386	21,274,861	2,149,743	17,543,301	2,615,474
6/30/2027	20,335,541	2,346,976	20,590,981	2,211,548	16,106,563	2,690,669
6/30/2028	19,379,303	2,414,451	19,793,513	2,275,130	14,487,790	2,768,026
6/30/2029	18,283,858	2,483,867	18,872,382	2,340,540	12,671,543	2,847,607
6/30/2030	17,037,107	2,555,278	17,816,730	2,407,830	10,641,203	2,929,476
6/30/2031	15,626,011	2,628,742	16,614,856	2,477,056	8,378,879	3,013,698
6/30/2032	14,036,530	2,592,048	15,254,155	2,548,271	5,865,315	3,100,342
6/30/2033	12,369,813	2,551,071	13,721,052	2,621,534	3,079,788	3,189,477
6/30/2034	10,624,695	2,467,700	12,000,926	2,696,903		
6/30/2035	8,839,397	2,330,919	10,078,038	2,774,439		
6/30/2036	7,066,317	2,184,233	7,935,444	2,854,204		
6/30/2037	5,316,599	1,062,934	5,554,905	2,936,262		
6/30/2038	4,601,261	1,000,413	2,916,796	3,020,680		
6/30/2039	3,898,808	977,085				
6/30/2040	3,169,587	1,005,176				
6/30/2041	2,358,406	804,085				
6/30/2042	1,696,668	750,492				
6/30/2043	1,042,455	597,387				
6/30/2044	499,370	336,402				
6/30/2045	187,191	114,429				
6/30/2046	82,258	85,188				
6/30/2047						
6/30/2048						
Totals		47,226,302		46,770,968		39,526,957
Interest Paid		23,639,449		23,184,115		15,940,104
Estimated Savings				455,334		7,699,346

* 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.

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 Liability Payment (\$)
2016 - 17	23.322%	\$833,853
2017 - 18	23.510%	\$1,017,949
2018 - 19	24.531%	\$1,268,454
2019 - 20	25.612%	\$1,545,867

Funding History

The funding history below shows the plan's actuarial accrued liability, share of the pool's market value of assets, share of the pool's unfunded liability, funded ratio, and annual covered payroll.

Valuation Date		Accrued Liability (AL)		Share of Pool's Market Value of Assets (MVA)		Plan's Share of Pool's Unfunded Liability	Funded Ratio		Annual Covered Payroll
06/30/2011	\$	59,532,299	\$	46,981,541	\$	12,550,758	78.9%	\$	2,146,190
06/30/2012		62,121,578		45,810,468		16,311,110	73.7%		1,924,385
06/30/2013		63,908,318		49,544,106		14,364,212	77.5%		1,820,456
06/30/2014		68,615,097		54,846,646		13,768,451	79.9%		1,295,044
06/30/2015		70,034,853		52,556,342		17,478,511	75.0%		952,126
06/30/2016		71,805,762		49,680,999		22,124,763	69.2%		693,408
06/30/2017		72,115,503		49,508,910		22,606,593	68.7%		706,877

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	27.1%	27.1%	27.1%	27.1%
UAL Contribution	\$1,733,000	\$2,005,000	\$2,288,000	\$2,553,000
4.0%				
Normal Cost	27.1%	27.1%	27.1%	27.1%
UAL Contribution	\$1,733,000	\$1,981,000	\$2,214,000	\$2,404,000
7.0%				
Normal Cost	27.1%	27.1%	27.1%	27.1%
UAL Contribution	\$1,733,000	\$1,957,000	\$2,139,000	\$2,250,000
9.0%				
Normal Cost	27.1%	27.6%	28.1%	28.5%
UAL Contribution	\$1,733,000	\$1,940,000	\$2,094,000	\$2,165,000
12.0%				
Normal Cost	27.1%	27.6%	28.1%	28.5%
UAL Contribution	\$1,733,000	\$1,915,000	\$2,018,000	\$2,004,000

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. In addition, the projections above do not reflect the recent changes to the new 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 Total Normal Cost	Accrued Liability	Unfunded Accrued Liability	Funded Status
7.25% (current discount rate)	34.601%	\$72,115,503	\$22,606,593	68.7%
6.0%	45.616%	\$82,241,539	\$32,732,629	60.2%
7.0%	36.087%	\$73,150,250	\$23,641,340	67.7%
8.0%	28.852%	\$65,616,989	\$16,108,079	75.5%

Volatility Ratios

Actuarial calculations are based on a number of assumptions about long-term demographic and economic behavior. Unless these assumptions (terminations, deaths, disabilities, retirements, salary growth, and investment return) are exactly realized each year, there will be differences on a year-to-year basis. The year-to-year differences between actual experience and the assumptions are called actuarial gains and losses and serve to lower or raise 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 contribution 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 shown 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).

Rate Volatility	As of June 30, 2017	
1. Market Value of Assets	\$	49,508,910
2. Payroll		706,877
3. Asset Volatility Ratio (AVR) [(1) / (2)]		70.0
4. Accrued Liability	\$	72,115,503
5. Liability Volatility Ratio (LVR) [(4) / (2)]		102.0
6. Accrued Liability (7.00% discount rate)		73,150,250
7. Projected Liability Volatility Ratio [(6) / (2)]		103.5

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 compared to the plan's ongoing funding liability. For the 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 funding risk is limited. However, this asset allocation has a lower expected rate of return than the PERF and consequently, a lower discount rate is assumed. 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%
\$49,508,910	\$131,832,225	37.6%	\$82,323,315	\$121,326,600	40.8%	\$71,817,690

¹ The hypothetical liabilities calculated above include a 5 percent mortality 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.

Participant Data

The table below shows a summary of your plan's member data upon which this valuation is based:

	June 30, 2016	June 30, 2017
Reported Payroll	\$ 693,408	\$ 706,877
Projected Payroll for Contribution Purposes	\$ 757,706	\$ 769,614
Number of Members		
Active	6	6
Transferred	7	7
Separated	4	4
Retired	107	107

List of Class 1 Benefit Provisions

This plan has the additional Class 1 Benefit Provisions:

- One Year Final Compensation (FAC 1)
- Post-Retirement Survivor Allowance (PRSA)
- 3% Annual Cost-of-Living Allowance Increase (3% COLA)

Plan's Major Benefit Options

SECTION 1 – Plan Specific Information for the Safety First Tier Plan of the City of Yuba City

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 Appendix B within Section 2 of this report.

Benefit Provision	Contract package				
	Active Police	Active Fire	Receiving Fire	Receiving Police	
Benefit Formula	3.0% @ 50	3.0% @ 50			
Social Security Coverage	No	No			
Full/Modified	Full	Full			
Employee Contribution Rate	9.00%	9.00%			
Final Average Compensation Period	One Year	One Year			
Sick Leave Credit	Yes	Yes			
Non-Industrial Disability	Improved	Improved			
Industrial Disability	Yes	Yes			
Pre-Retirement Death Benefits					
Optional Settlement 2	Yes	Yes			
1959 Survivor Benefit Level	Indexed	Indexed			
Special	Yes	Yes			
Alternate (firefighters)	No	No	No	No	
Post-Retirement Death Benefits					
Lump Sum	\$500	\$500	\$500	\$500	
Survivor Allowance (PRSA)	Yes	Yes	Yes	Yes	
COLA	3%	3%	3%	3%	

Section 2

CALIFORNIA PUBLIC EMPLOYEES' RETIREMENT SYSTEM

**Section 2 may be found on the CalPERS website
(www.calpers.ca.gov) in the Forms and
Publications section**



California Public Employees' Retirement System
Actuarial Office
P.O. Box 942709
Sacramento, CA 94229-2709
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(888) 225-7377 phone – (916) 795-2744 fax
www.calpers.ca.gov

August 2018

**Safety Second Tier Plan of the City of Yuba City
(CalPERS ID: 6515248486)
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 the pension plan.

Because this plan is in a risk pool, the following valuation report has been separated into two sections:

- Section 1 contains specific information for the plan including the development of the current and projected employer contributions, and
- Section 2 contains the Risk Pool Actuarial Valuation appropriate to the plan as of June 30, 2017.

Section 2 can be found on the CalPERS website at (www.calpers.ca.gov). From the home page, go to "Forms & Publications" and select "View All". In the search box, enter "Risk Pool" and from the results list download the Miscellaneous or Safety Risk Pool Actuarial Valuation Report as appropriate.

Your June 30, 2017 actuarial valuation report contains important actuarial information about your pension plan at CalPERS. Your assigned 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.

The exhibit below displays the minimum employer contributions, before any cost sharing, for Fiscal Year 2019-20 along with estimates of the required contributions 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 employer contributions in this report do not reflect any cost sharing arrangements you may have with your employees.**

Required Contribution

Fiscal Year	Employer Normal Cost Rate	Employer Payment of Unfunded Liability
2019-20	24.392%	\$915,312
<i>Projected Results</i>		
2020-21	25.8%	\$1,075,000

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 "Risk Analysis" section of the valuation report 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 valuations. 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 was 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.

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, "Statement of Actuarial Data, Methods and Assumptions" of the Section 2 report.

We understand that you might have a number of 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 to contact us with actuarial related questions.

If you have other questions, please call our customer contact center at (888) CalPERS or **(888-225-7377)**.

Sincerely,



SCOTT TERANDO
Chief Actuary



**Actuarial Valuation
as of June 30, 2017**

**for the
Safety Second Tier Plan
of the
City of Yuba City
(CalPERS ID: 6515248486)**

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

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Section 1 – Plan Specific Information

Section 2 – Risk Pool Actuarial Valuation Information

Section 1

CALIFORNIA PUBLIC EMPLOYEES' RETIREMENT SYSTEM

Plan Specific Information for the Safety Second Tier Plan of the City of Yuba City

**(CalPERS ID: 6515248486)
(Rate Plan: 8744)**

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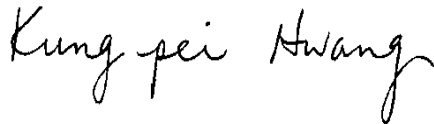
Actuarial Certification

Section 1 of this report is based on the member and financial data contained in our records as of June 30, 2017 which was provided by your agency and the benefit provisions under your contract with CalPERS. Section 2 of this report is based on the member and financial data as of June 30, 2017 provided by employers participating in the Safety Risk Pool to which the plan belongs and benefit provisions under the CalPERS contracts for those agencies.

As set forth in Section 2 of this report, the pool actuaries have certified that, in their opinion, the valuation of the risk pool containing your Safety Second Tier Plan has been performed in accordance with generally accepted actuarial principles consistent with standards of practice prescribed by the Actuarial Standards Board, and that the assumptions and methods are internally consistent and reasonable for the risk pool as of the date of this valuation and as prescribed by the CalPERS Board of Administration according to provisions set forth in the California Public Employees' Retirement Law.

Having relied upon the information set forth in Section 2 of this report and based on the census and benefit provision information for the plan, it is my opinion as the plan actuary that Unfunded Accrued Liability amortization bases as of June 30, 2017 and employer contribution as of July 1, 2019, have been properly and accurately determined in accordance with the principles and standards stated above.

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



KUNG-PEI HWANG, ASA, MAAA
Senior Pension Actuary, CalPERS
Plan Actuary

Highlights and Executive Summary

- **Introduction**
- **Purpose of Section 1**
- **Required Employer Contributions**
- **Plan's Funded Status**
- **Projected Employer Contributions**
- **Changes Since the Prior Year's Valuation**
- **Subsequent Events**

Introduction

This report presents the results of the June 30, 2017 actuarial valuation of the Safety Second Tier Plan of the City of Yuba City of the California Public Employees' Retirement System (CalPERS). This actuarial valuation sets the required employer contributions for Fiscal Year 2019-20.

Purpose of Section 1

This Section 1 report for the Safety Second Tier Plan of the City of Yuba City of the California Public Employees' Retirement System (CalPERS) was prepared by the plan actuary in order to:

- Set forth the assets and accrued liabilities of this plan as of June 30, 2017;
- Determine the minimum required employer contribution for this plan for the fiscal year July 1, 2019 through June 30, 2020; and
- 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 GASB Statement No. 68 for a Cost Sharing 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 9.

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 Employer Contributions

		Fiscal Year
Required Employer Contributions		2019-20
Employer Normal Cost Rate		24.392%
<i>Plus, Either</i>		
1) Monthly Employer Dollar UAL Payment	\$	76,276.00
<i>Or</i>		
2) Annual Lump Sum Prepayment Option	\$	883,834
<p>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).</p> <p>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.</p> <p>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.</p>		

	Fiscal Year	Fiscal Year
	2018-19	2019-20
Development of Normal Cost as a Percentage of Payroll¹		
Base Total Normal Cost for Formula	28.405%	29.696%
Surcharge for Class 1 Benefits ²		
a) PRSA	1.790%	1.727%
b) 3% COLA	2.185%	1.958%
Phase out of Normal Cost Difference ³	0.000%	0.000%
Plan's Total Normal Cost	32.380%	33.381%
Formula's Expected Employee Contribution Rate	8.989%	8.989%
Employer Normal Cost Rate	23.391%	24.392%
Projected Payroll for the Contribution Fiscal Year	\$ 6,733,754	\$ 5,875,889
Estimated Employer Contributions Based on Projected Payroll		
Plan's Estimated Employer Normal Cost	\$ 1,575,092	\$ 1,433,247
Plan's Payment on Amortization Bases ⁴	717,865	915,312
% of Projected Payroll (illustrative only)	10.661%	15.577%
Estimated Total Employer Contribution	\$ 2,292,957	\$ 2,348,559
% of Projected Payroll (illustrative only)	34.052%	39.969%

¹ The results shown for Fiscal Year 2018-19 reflect the prior year valuation and may not take into account any lump sum payment, side fund payoff, or rate adjustment made after June 30, 2017.

² Section 2 of this report contains a list of Class 1 benefits and corresponding surcharges for each benefit.

³ The normal cost difference is phased out over a five-year period. The phase out of normal cost difference is 100 percent for the first year of pooling, and is incrementally reduced by 20 percent of the original normal cost difference for each subsequent year. This is non-zero only for plans that joined a pool within the past 5 years. Most plans joined a pool June 30, 2003, when risk pooling was implemented.

⁴ See page 9 for a breakdown of the Amortization Bases.

Plan's Funded Status

		June 30, 2016	June 30, 2017
1. Present Value of Projected Benefits (PVB)	\$	73,771,355	\$ 79,727,115
2. Entry Age Normal Accrued Liability (AL)		57,372,863	65,491,485
3. Plan's Market Value of Assets (MVA)		43,616,966	51,587,742
4. Unfunded Accrued Liability (UAL) [(2) - (3)]		13,755,897	13,903,743
5. Funded Ratio [(3) / (2)]		76.0%	78.8%

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 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, "Statement of Actuarial Data, Methods and Assumptions" of the Section 2 report. 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.

	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 %	24.392%	25.8%	25.8%	25.8%	25.8%	25.8%
UAL Payment	\$915,312	\$1,075,000	\$1,258,000	\$1,410,000	\$1,498,000	\$1,587,000

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 of Section 2. This method phases in the impact of unanticipated 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 changes in the discount rate for next year's 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.

Changes since the Prior Year's Valuation

Benefits

None. 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 of Section 2 for a summary of the plan provisions used in this valuation.

Actuarial Methods and Assumptions

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 valuations. 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 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 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 three-year 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 and Liabilities

- **Breakdown of Entry Age Normal Accrued Liability**
- **Allocation of Plan's Share of Pool's Experience/Assumption Change**
- **Development of Plan's Share of Pool's MVA**
- **Schedule of Plan's Amortization Bases**
- **Amortization Schedule and Alternatives**
- **Employer Contribution History**
- **Funding History**

Breakdown of Entry Age Normal Accrued Liability

Active Members	\$	31,277,134
Transferred Members		9,115,685
Terminated Members		1,432,580
Members and Beneficiaries Receiving Payments		<u>23,666,086</u>
Total	\$	65,491,485

Allocation of Plan's Share of Pool's Experience/Assumption Change

It is the policy of CalPERS to ensure equity within the risk pools by allocating the pool's experience gains/losses and assumption changes in a manner that treats each employer equitably and maintains benefit security for the members of the System while minimizing substantial variations in employer contributions. The Pool's experience gains/losses and impact of assumption/method changes is allocated to the plan as follows:

1. Plan's Accrued Liability	\$	65,491,485
2. Projected UAL balance at 6/30/17		14,387,542
3. Pool's Accrued Liability ¹	\$	20,966,498,823
4. Sum of Pool's Individual Plan UAL Balances at 6/30/17 ¹		5,939,788,240
5. Pool's 2016/17 Investment & Asset (Gain)/Loss		(513,476,842)
6. Pool's 2016/17 Other (Gain)/Loss		13,232,897
7. Plan's Share of Pool's Asset (Gain)/Loss $[(1) - (2)] / [(3) - (4)] * (5)$		(1,746,270)
8. Plan's Share of Pool's Other (Gain)/Loss $[(1)] / [(3)] * (6)$		41,335
9. Plan's New (Gain)/Loss as of 6/30/2017 $[(7) + (8)]$	\$	(1,704,935)
10. Increase in Pool's Accrued Liability due to Change in Assumptions ¹		390,935,533
11. Plan's Share of Pool's Change in Assumptions $[(1)] / [(3)] * (10)$	\$	1,221,136

¹ Does not include plans that transferred to Pool on the valuation date.

Development of the Plan's Share of Pool's Market Value of Assets

12. Plan's UAL $[(2) + (9) + (11)]$	\$	13,903,743
13. Plan's Share of Pool's MVA $[(1) - (12)]$	\$	51,587,742

Schedule of Plan's 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 employer contribution determined by the valuation is 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 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 payment on the UAL for the fiscal year and adjusting for interest. 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	Amortization Period	Balance 6/30/17	Payment 2017-18	Balance 6/30/18	Payment 2018-19	Amounts for Fiscal 2019-20	
								Balance 6/30/19	Scheduled Payment for 2019-20
SHARE OF PRE-2013 POOL UAL	06/30/13	No Ramp	18	\$3,835,737	\$289,969	\$3,813,531	\$295,074	\$3,784,429	\$303,095
ASSET (GAIN)/LOSS	06/30/13	100% →	26	\$5,454,877	\$220,266	\$5,622,245	\$298,111	\$5,721,129	\$382,837
NON-ASSET (GAIN)/LOSS	06/30/13	100% →	26	\$(61,925)	\$(2,500)	\$(63,826)	\$(3,384)	\$(64,949)	\$(4,346)
ASSET (GAIN)/LOSS	06/30/14	80% ↗	27	\$(4,124,872)	\$(112,837)	\$(4,307,069)	\$(171,695)	\$(4,441,521)	\$(235,205)
NON-ASSET (GAIN)/LOSS	06/30/14	80% ↗	27	\$50,041	\$1,369	\$52,251	\$2,083	\$53,882	\$2,853
ASSUMPTION CHANGE	06/30/14	80% ↗	17	\$2,824,439	\$105,147	\$2,920,319	\$160,660	\$2,965,660	\$220,040
ASSET (GAIN)/LOSS	06/30/15	60% ↗	28	\$2,592,483	\$36,506	\$2,742,632	\$74,006	\$2,864,831	\$114,061
NON-ASSET (GAIN)/LOSS	06/30/15	60% ↗	28	\$(9,108)	\$(128)	\$(9,636)	\$(260)	\$(10,065)	\$(401)
ASSET (GAIN)/LOSS	06/30/16	40% ↗	29	\$3,353,538	\$0	\$3,596,670	\$49,910	\$3,805,741	\$102,570
NON-ASSET (GAIN)/LOSS	06/30/16	40% ↗	29	\$(522,175)	\$0	\$(560,033)	\$(7,771)	\$(592,588)	\$(15,971)
ASSUMPTION CHANGE	06/30/16	40% ↗	19	\$994,507	\$(51,432)	\$1,119,873	\$21,132	\$1,179,179	\$43,422
ASSET (GAIN)/LOSS	06/30/17	20% ↗	30	\$(1,746,270)	\$0	\$(1,872,874)	\$0	\$(2,008,658)	\$(27,842)
NON-ASSET (GAIN)/LOSS	06/30/17	20% ↗	30	\$41,335	\$0	\$44,331	\$0	\$47,545	\$659
ASSUMPTION CHANGE	06/30/17	20% ↗	20	\$1,221,136	\$(74,794)	\$1,387,126	\$(76,944)	\$1,567,377	\$29,538
TOTAL				\$13,903,743	\$411,566	\$14,485,540	\$640,922	\$14,871,992	\$915,310

The (gain)/loss bases are the plan's allocated share of the risk pool's (gain)/loss for the fiscal year as disclosed on the previous page. These (gain)/loss bases will be amortized according to Board policy over 30 years with a 5-year ramp-up.

If the total Unfunded Liability is negative (i.e., plan has a surplus), the scheduled payment is \$0, because the minimum required contribution under PEPRA must be at least equal to the normal cost.

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 for each year into the future. **The schedules do not attempt to reflect any experience after June 30, 2017 that may deviate from the actuarial assumptions. Therefore, future amortization payments displayed in the Current Amortization Schedule may 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

Date	<u>Current Amortization Schedule</u>		<u>Alternate Schedules</u>			
	Balance	Payment	20 Year Amortization		15 Year Amortization	
			Balance	Payment	Balance	Payment
6/30/2019	14,871,993	915,312	14,871,993	1,111,519	14,871,993	1,352,324
6/30/2020	15,002,301	1,046,740	14,799,106	1,143,475	14,549,724	1,391,203
6/30/2021	15,005,947	1,188,226	14,687,841	1,176,350	14,163,827	1,431,200
6/30/2022	14,863,333	1,295,733	14,534,463	1,210,170	13,708,531	1,472,347
6/30/2023	14,599,043	1,335,624	14,334,941	1,244,962	13,177,614	1,514,677
6/30/2024	14,274,281	1,374,023	14,084,922	1,280,755	12,564,367	1,558,224
6/30/2025	13,886,207	1,413,526	13,779,709	1,317,576	11,861,562	1,603,023
6/30/2026	13,429,088	1,454,165	13,414,234	1,355,457	11,061,409	1,649,110
6/30/2027	12,896,740	1,495,972	12,983,034	1,394,426	10,155,517	1,696,522
6/30/2028	12,282,502	1,538,981	12,480,214	1,434,516	9,134,847	1,745,297
6/30/2029	11,579,190	1,583,227	11,899,423	1,475,758	7,989,667	1,795,474
6/30/2030	10,779,067	1,628,745	11,233,812	1,518,186	6,709,496	1,847,094
6/30/2031	9,873,796	1,675,571	10,476,006	1,561,834	5,283,055	1,900,198
6/30/2032	8,854,398	1,644,225	9,618,056	1,606,737	3,698,201	1,954,829
6/30/2033	7,793,557	1,609,691	8,651,403	1,652,931	1,941,869	2,011,030
6/30/2034	6,691,568	1,538,598	7,566,829	1,700,452		
6/30/2035	5,583,310	1,415,599	6,354,409	1,749,340		
6/30/2036	4,522,083	1,284,255	5,003,459	1,799,634		
6/30/2037	3,519,939	730,973	3,502,481	1,851,373		
6/30/2038	3,018,128	664,172	1,839,099	1,904,600		
6/30/2039	2,549,115	631,197				
6/30/2040	2,080,248	649,344				
6/30/2041	1,558,595	526,791				
6/30/2042	1,126,040	508,138				
6/30/2043	681,442	413,173				
6/30/2044	302,958	224,379				
6/30/2045	92,551	81,188				
6/30/2046	15,182	15,722				
6/30/2047						
6/30/2048						
Totals		29,883,290		29,490,051		24,922,554
Interest Paid		15,011,298		14,618,058		10,050,561
Estimated Savings				393,239		4,960,736

* 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.

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 Liability Payment (\$)
2016 - 17	22.215%	\$419,403
2017 - 18	22.402%	\$537,791
2018 - 19	23.391%	\$717,865
2019 - 20	24.392%	\$915,312

Funding History

The funding history below shows the plan's actuarial accrued liability, share of the pool's market value of assets, share of the pool's unfunded liability, funded ratio, and annual covered payroll.

Valuation Date		Accrued Liability (AL)		Share of Pool's Market Value of Assets (MVA)		Plan's Share of Pool's Unfunded Liability	Funded Ratio		Annual Covered Payroll
06/30/2011	\$	31,759,885	\$	25,064,181	\$	6,695,704	78.9%	\$	7,844,823
06/30/2012		35,009,628		25,817,236		9,192,392	73.7%		7,891,565
06/30/2013		39,241,950		30,421,820		8,820,130	77.5%		7,526,031
06/30/2014		46,031,612		38,309,404		7,722,208	83.2%		7,274,488
06/30/2015		50,823,128		41,040,179		9,782,949	80.8%		7,201,747
06/30/2016		57,372,863		43,616,966		13,755,897	76.0%		6,162,339
06/30/2017		65,491,485		51,587,742		13,903,743	78.8%		5,396,896

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	25.8%	25.8%	25.8%	25.8%
UAL Contribution	\$1,075,000	\$1,308,000	\$1,564,000	\$1,813,000
4.0%				
Normal Cost	25.8%	25.8%	25.8%	25.8%
UAL Contribution	\$1,075,000	\$1,283,000	\$1,488,000	\$1,658,000
7.0%				
Normal Cost	25.8%	25.8%	25.8%	25.8%
UAL Contribution	\$1,075,000	\$1,258,000	\$1,410,000	\$1,498,000
9.0%				
Normal Cost	25.8%	26.3%	26.7%	27.2%
UAL Contribution	\$1,075,000	\$1,243,000	\$1,370,000	\$1,420,000
12.0%				
Normal Cost	25.8%	26.3%	26.7%	27.2%
UAL Contribution	\$1,075,000	\$1,218,000	\$1,290,000	\$1,252,000

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. In addition, the projections above do not reflect the recent changes to the new 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 Total Normal Cost	Accrued Liability	Unfunded Accrued Liability	Funded Status
7.25% (current discount rate)	33.381%	\$65,491,485	\$13,903,743	78.8%
6.0%	44.007%	\$79,285,421	\$27,697,679	65.1%
7.0%	34.814%	\$66,974,162	\$15,386,420	77.0%
8.0%	27.834%	\$57,246,781	\$5,659,039	90.1%

Volatility Ratios

Actuarial calculations are based on a number of assumptions about long-term demographic and economic behavior. Unless these assumptions (terminations, deaths, disabilities, retirements, salary growth, and investment return) are exactly realized each year, there will be differences on a year-to-year basis. The year-to-year differences between actual experience and the assumptions are called actuarial gains and losses and serve to lower or raise 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 contribution 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 shown 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).

Rate Volatility	As of June 30, 2017	
1. Market Value of Assets	\$	51,587,742
2. Payroll		5,396,896
3. Asset Volatility Ratio (AVR) [(1) / (2)]		9.6
4. Accrued Liability	\$	65,491,485
5. Liability Volatility Ratio (LVR) [(4) / (2)]		12.1
6. Accrued Liability (7.00% discount rate)		66,974,162
7. Projected Liability Volatility Ratio [(6) / (2)]		12.4

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 compared to the plan's ongoing funding liability. For the 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 funding risk is limited. However, this asset allocation has a lower expected rate of return than the PERF and consequently, a lower discount rate is assumed. 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%
\$51,587,742	\$142,355,948	36.2%	\$90,768,206	\$120,384,124	42.9%	\$68,796,382

¹ The hypothetical liabilities calculated above include a 5 percent mortality 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.

Participant Data

The table below shows a summary of your plan's member data upon which this valuation is based:

	June 30, 2016	June 30, 2017
Reported Payroll	\$ 6,162,339	\$ 5,396,896
Projected Payroll for Contribution Purposes	\$ 6,733,754	\$ 5,875,889
Number of Members		
Active	63	54
Transferred	55	54
Separated	26	21
Retired	35	47

List of Class 1 Benefit Provisions

This plan has the additional Class 1 Benefit Provisions:

- Post-Retirement Survivor Allowance (PRSA)
- 3% Annual Cost-of-Living Allowance Increase (3% COLA)

Plan's Major Benefit Options

SECTION 1 – Plan Specific Information for the Safety Second Tier Plan of the City of Yuba City

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 Appendix B within Section 2 of this report.

Benefit Provision	Contract package						
	Active Police	Active Fire	Inactive Fire	Receiving Fire	Receiving Police	Receiving Fire	
Benefit Formula	3.0% @ 50	3.0% @ 50	3.0% @ 50				
Social Security Coverage	No	No	No				
Full/Modified	Full	Full	Full				
Employee Contribution Rate	9.00%	9.00%					
Final Average Compensation Period	Three Year	Three Year	One Year				
Sick Leave Credit	Yes	Yes	Yes				
Non-Industrial Disability	Standard	Standard	Improved				
Industrial Disability	Yes	Yes	Yes				
Pre-Retirement Death Benefits							
Optional Settlement 2	Yes	Yes	Yes				
1959 Survivor Benefit Level	Indexed	Indexed	level 3				
Special	Yes	Yes	Yes				
Alternate (firefighters)	No	No	No	No	No	No	
Post-Retirement Death Benefits							
Lump Sum	\$500	\$500	\$500	\$500	\$500	\$500	
Survivor Allowance (PRSA)	Yes	Yes	No	Yes	Yes	Yes	
COLA	3%	3%	2%	3%	3%	2%	

Section 2

CALIFORNIA PUBLIC EMPLOYEES' RETIREMENT SYSTEM

**Section 2 may be found on the CalPERS website
(www.calpers.ca.gov) in the Forms and
Publications section**



California Public Employees' Retirement System
Actuarial Office
P.O. Box 942709
Sacramento, CA 94229-2709
TTY: (916) 795-3240
(888) 225-7377 phone – (916) 795-2744 fax
www.calpers.ca.gov

August 2018

**Safety Police Third Tier Plan of the City of Yuba City
(CalPERS ID: 6515248486)
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 the pension plan.

Because this plan is in a risk pool, the following valuation report has been separated into two sections:

- Section 1 contains specific information for the plan including the development of the current and projected employer contributions, and
- Section 2 contains the Risk Pool Actuarial Valuation appropriate to the plan as of June 30, 2017.

Section 2 can be found on the CalPERS website at (www.calpers.ca.gov). From the home page, go to "Forms & Publications" and select "View All". In the search box, enter "Risk Pool" and from the results list download the Miscellaneous or Safety Risk Pool Actuarial Valuation Report as appropriate.

Your June 30, 2017 actuarial valuation report contains important actuarial information about your pension plan at CalPERS. Your assigned 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.

The exhibit below displays the minimum employer contributions, before any cost sharing, for Fiscal Year 2019-20 along with estimates of the required contributions 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 employer contributions in this report do not reflect any cost sharing arrangements you may have with your employees.**

Required Contribution

Fiscal Year	Employer Normal Cost Rate	Employer Payment of Unfunded Liability
2019-20	22.413%	\$12,394
<i>Projected Results</i>		
2020-21	23.7%	\$14,000

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 "Risk Analysis" section of the valuation report 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 valuations. 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 was 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.

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, "Statement of Actuarial Data, Methods and Assumptions" of the Section 2 report.

We understand that you might have a number of 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 to contact us with actuarial related questions.

If you have other questions, please call our customer contact center at (888) CalPERS or (888-225-7377).

Sincerely,



SCOTT TERANDO
Chief Actuary



**Actuarial Valuation
as of June 30, 2017**

**for the
Safety Police Third Tier Plan
of the
City of Yuba City
(CalPERS ID: 6515248486)**

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

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Section 2 – Risk Pool Actuarial Valuation Information

Section 1

CALIFORNIA PUBLIC EMPLOYEES' RETIREMENT SYSTEM

Plan Specific Information for the Safety Police Third Tier Plan of the City of Yuba City

**(CalPERS ID: 6515248486)
(Rate Plan: 23001)**

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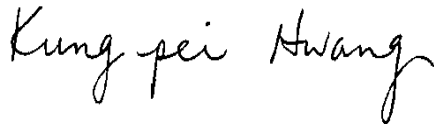
Actuarial Certification

Section 1 of this report is based on the member and financial data contained in our records as of June 30, 2017 which was provided by your agency and the benefit provisions under your contract with CalPERS. Section 2 of this report is based on the member and financial data as of June 30, 2017 provided by employers participating in the Safety Risk Pool to which the plan belongs and benefit provisions under the CalPERS contracts for those agencies.

As set forth in Section 2 of this report, the pool actuaries have certified that, in their opinion, the valuation of the risk pool containing your Safety Police Third Tier Plan has been performed in accordance with generally accepted actuarial principles consistent with standards of practice prescribed by the Actuarial Standards Board, and that the assumptions and methods are internally consistent and reasonable for the risk pool as of the date of this valuation and as prescribed by the CalPERS Board of Administration according to provisions set forth in the California Public Employees' Retirement Law.

Having relied upon the information set forth in Section 2 of this report and based on the census and benefit provision information for the plan, it is my opinion as the plan actuary that Unfunded Accrued Liability amortization bases as of June 30, 2017 and employer contribution as of July 1, 2019, have been properly and accurately determined in accordance with the principles and standards stated above.

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



KUNG-PEI HWANG, ASA, MAAA
Senior Pension Actuary, CalPERS
Plan Actuary

Highlights and Executive Summary

- **Introduction**
- **Purpose of Section 1**
- **Required Employer Contributions**
- **Plan's Funded Status**
- **Projected Employer Contributions**
- **Changes Since the Prior Year's Valuation**
- **Subsequent Events**

Introduction

This report presents the results of the June 30, 2017 actuarial valuation of the Safety Police Third Tier Plan of the City of Yuba City of the California Public Employees' Retirement System (CalPERS). This actuarial valuation sets the required employer contributions for Fiscal Year 2019-20.

Purpose of Section 1

This Section 1 report for the Safety Police Third Tier Plan of the City of Yuba City of the California Public Employees' Retirement System (CalPERS) was prepared by the plan actuary in order to:

- Set forth the assets and accrued liabilities of this plan as of June 30, 2017;
- Determine the minimum required employer contribution for this plan for the fiscal year July 1, 2019 through June 30, 2020; and
- 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 GASB Statement No. 68 for a Cost Sharing 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 9.

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 Employer Contributions

		Fiscal Year
Required Employer Contributions		2019-20
Employer Normal Cost Rate		22.413%
<i>Plus, Either</i>		
1) Monthly Employer Dollar UAL Payment	\$	1,032.83
<i>Or</i>		
2) Annual Lump Sum Prepayment Option	\$	11,968
<p>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).</p> <p>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.</p> <p>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.</p>		

	Fiscal Year	Fiscal Year
	2018-19	2019-20
Development of Normal Cost as a Percentage of Payroll¹		
Base Total Normal Cost for Formula	26.598%	27.914%
Surcharge for Class 1 Benefits ²		
a) PRSA	1.739%	1.675%
b) 3% COLA	2.005%	1.810%
Phase out of Normal Cost Difference ³	0.000%	0.000%
Plan's Total Normal Cost	30.342%	31.399%
Formula's Expected Employee Contribution Rate	8.984%	8.986%
Employer Normal Cost Rate	21.358%	22.413%
Projected Payroll for the Contribution Fiscal Year	\$ 807,982	\$ 928,668
Estimated Employer Contributions Based on Projected Payroll		
Plan's Estimated Employer Normal Cost	\$ 172,569	\$ 208,142
Plan's Payment on Amortization Bases ⁴	11,683	12,394
% of Projected Payroll (illustrative only)	1.446%	1.335%
Estimated Total Employer Contribution	\$ 184,252	\$ 220,536
% of Projected Payroll (illustrative only)	22.804%	23.748%

¹ The results shown for Fiscal Year 2018-19 reflect the prior year valuation and may not take into account any lump sum payment, side fund payoff, or rate adjustment made after June 30, 2017.

² Section 2 of this report contains a list of Class 1 benefits and corresponding surcharges for each benefit.

³ The normal cost difference is phased out over a five-year period. The phase out of normal cost difference is 100 percent for the first year of pooling, and is incrementally reduced by 20 percent of the original normal cost difference for each subsequent year. This is non-zero only for plans that joined a pool within the past 5 years. Most plans joined a pool June 30, 2003, when risk pooling was implemented.

⁴ See page 9 for a breakdown of the Amortization Bases.

Plan's Funded Status

		June 30, 2016		June 30, 2017
1. Present Value of Projected Benefits (PVB)	\$	3,637,853	\$	4,338,841
2. Entry Age Normal Accrued Liability (AL)		487,794		827,552
3. Plan's Market Value of Assets (MVA)		454,054		795,991
4. Unfunded Accrued Liability (UAL) [(2) - (3)]		33,740		31,561
5. Funded Ratio [(3) / (2)]		93.1%		96.2%

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 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, "Statement of Actuarial Data, Methods and Assumptions" of the Section 2 report. 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.

	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 %	22.413%	23.7%	23.7%	23.7%	23.7%	23.7%
UAL Payment	\$12,394	\$14,000	\$16,000	\$18,000	\$6,400	\$7,700

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 of Section 2. This method phases in the impact of unanticipated 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 changes in the discount rate for next year's 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.

Changes since the Prior Year's Valuation

Benefits

None. 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 of Section 2 for a summary of the plan provisions used in this valuation.

Actuarial Methods and Assumptions

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 valuations. 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 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 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 three-year 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 and Liabilities

- **Breakdown of Entry Age Normal Accrued Liability**
- **Allocation of Plan's Share of Pool's Experience/Assumption Change**
- **Development of Plan's Share of Pool's MVA**
- **Schedule of Plan's Amortization Bases**
- **Amortization Schedule and Alternatives**
- **Employer Contribution History**
- **Funding History**

Breakdown of Entry Age Normal Accrued Liability

Active Members	\$	792,208
Transferred Members		33,709
Terminated Members		1,635
Members and Beneficiaries Receiving Payments		0
Total	\$	827,552

Allocation of Plan's Share of Pool's Experience/Assumption Change

It is the policy of CalPERS to ensure equity within the risk pools by allocating the pool's experience gains/losses and assumption changes in a manner that treats each employer equitably and maintains benefit security for the members of the System while minimizing substantial variations in employer contributions. The Pool's experience gains/losses and impact of assumption/method changes is allocated to the plan as follows:

1. Plan's Accrued Liability	\$	827,552
2. Projected UAL balance at 6/30/17		42,437
3. Pool's Accrued Liability ¹	\$	20,966,498,823
4. Sum of Pool's Individual Plan UAL Balances at 6/30/17 ¹		5,939,788,240
5. Pool's 2016/17 Investment & Asset (Gain)/Loss		(513,476,842)
6. Pool's 2016/17 Other (Gain)/Loss		13,232,897
7. Plan's Share of Pool's Asset (Gain)/Loss $[(1) - (2)] / [(3) - (4)] * (5)$		(26,828)
8. Plan's Share of Pool's Other (Gain)/Loss $[(1)] / [(3)] * (6)$		522
9. Plan's New (Gain)/Loss as of 6/30/2017 $[(7) + (8)]$	\$	(26,306)
10. Increase in Pool's Accrued Liability due to Change in Assumptions ¹		390,935,533
11. Plan's Share of Pool's Change in Assumptions $[(1)] / [(3)] * (10)$	\$	15,430

¹ Does not include plans that transferred to Pool on the valuation date.

Development of the Plan's Share of Pool's Market Value of Assets

12. Plan's UAL $[(2) + (9) + (11)]$	\$	31,561
13. Plan's Share of Pool's MVA $[(1) - (12)]$	\$	795,991

Schedule of Plan's 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 employer contribution determined by the valuation is 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 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 payment on the UAL for the fiscal year and adjusting for interest. 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	Amortization Period	Balance 6/30/17	Payment 2017-18	Balance 6/30/18	Payment 2018-19	Amounts for Fiscal 2019-20	
								Balance 6/30/19	Scheduled Payment for 2019-20
FRESH START	06/30/16	No Ramp	4	\$42,437	\$(6,171)	\$51,904	\$11,683	\$43,568	\$11,994
NON-ASSET (GAIN)/LOSS	06/30/17	20% ↗	30	\$522	\$0	\$560	\$0	\$601	\$8
ASSUMPTION CHANGE	06/30/17	20% ↗	20	\$15,430	\$(11,821)	\$28,791	\$(12,161)	\$43,472	\$819
ASSET (GAIN)/LOSS	06/30/17	20% ↗	30	\$(26,828)	\$0	\$(28,773)	\$0	\$(30,859)	\$(428)
TOTAL				\$31,561	\$(17,992)	\$52,482	\$(478)	\$56,782	\$12,393

The (gain)/loss bases are the plan's allocated share of the risk pool's (gain)/loss for the fiscal year as disclosed on the previous page. These (gain)/loss bases will be amortized according to Board policy over 30 years with a 5-year ramp-up.

If the total Unfunded Liability is negative (i.e., plan has a surplus), the scheduled payment is \$0, because the minimum required contribution under PEPRA must be at least equal to the normal cost.

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 for each year into the future. **The schedules do not attempt to reflect any experience after June 30, 2017 that may deviate from the actuarial assumptions. Therefore, future amortization payments displayed in the Current Amortization Schedule may 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

Date	<u>Current Amortization Schedule</u>		<u>Alternate Schedules</u>			
	Balance	Payment	5 Year Amortization		0 Year Amortization	
			Balance	Payment	Balance	Payment
6/30/2019	56,782	12,394	56,782	12,760	N/A	N/A
6/30/2020	48,063	13,162	47,684	13,127		
6/30/2021	37,918	13,963	37,546	13,505		
6/30/2022	26,206	14,800	26,283	13,893		
6/30/2023	12,779	2,239	13,801	14,292		
6/30/2024	11,386	2,304				
6/30/2025	9,826	2,370				
6/30/2026	8,084	2,438				
6/30/2027	6,145	2,508				
6/30/2028	3,993	2,580				
6/30/2029	1,610	1,668				
6/30/2030						
6/30/2031						
6/30/2032						
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6/30/2046						
6/30/2047						
6/30/2048						
Totals		70,426		67,577		N/A
Interest Paid		13,644		10,795		N/A
Estimated Savings				2,849		N/A

* 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.

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 Liability Payment (\$)
2016 - 17	20.218%	\$0
2017 - 18	20.404%	\$0
2018 - 19	21.358%	\$11,683
2019 - 20	22.413%	\$12,394

Funding History

The funding history below shows the plan's actuarial accrued liability, share of the pool's market value of assets, share of the pool's unfunded liability, funded ratio, and annual covered payroll.

Valuation Date		Accrued Liability (AL)		Share of Pool's Market Value of Assets (MVA)		Plan's Share of Pool's Unfunded Liability	Funded Ratio		Annual Covered Payroll
06/30/2013	\$	15,540	\$	12,524	\$	3,016	80.6%	\$	183,035
06/30/2014		93,492		104,559		(11,067)	111.8%		400,723
06/30/2015		245,268		251,206		(5,938)	102.4%		580,781
06/30/2016		487,794		454,054		33,740	93.1%		739,418
06/30/2017		827,552		795,991		31,561	96.2%		852,965

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	23.7%	23.7%	23.7%	23.7%
UAL Contribution	\$14,000	\$17,000	\$20,000	\$11,000
4.0%				
Normal Cost	23.7%	23.7%	23.7%	23.7%
UAL Contribution	\$14,000	\$16,000	\$19,000	\$8,900
7.0%				
Normal Cost	23.7%	23.7%	23.7%	23.7%
UAL Contribution	\$14,000	\$16,000	\$18,000	\$6,400
9.0%				
Normal Cost	23.7%	24.1%	24.6%	25.0%
UAL Contribution	\$14,000	\$16,000	\$17,000	\$5,400
12.0%				
Normal Cost	23.7%	24.1%	24.6%	25.0%
UAL Contribution	\$14,000	\$15,000	\$0	\$0

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. In addition, the projections above do not reflect the recent changes to the new 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 Total Normal Cost	Accrued Liability	Unfunded Accrued Liability	Funded Status
7.25% (current discount rate)	31.399%	\$827,552	\$31,561	96.2%
6.0%	40.977%	\$1,048,873	\$252,882	75.9%
7.0%	32.717%	\$850,936	\$54,945	93.5%
8.0%	26.395%	\$697,434	\$(98,557)	114.1%

Volatility Ratios

Actuarial calculations are based on a number of assumptions about long-term demographic and economic behavior. Unless these assumptions (terminations, deaths, disabilities, retirements, salary growth, and investment return) are exactly realized each year, there will be differences on a year-to-year basis. The year-to-year differences between actual experience and the assumptions are called actuarial gains and losses and serve to lower or raise 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 contribution 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 shown 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).

Rate Volatility	As of June 30, 2017	
1. Market Value of Assets	\$	795,991
2. Payroll		852,965
3. Asset Volatility Ratio (AVR) [(1) / (2)]		0.9
4. Accrued Liability	\$	827,552
5. Liability Volatility Ratio (LVR) [(4) / (2)]		1.0
6. Accrued Liability (7.00% discount rate)		850,936
7. Projected Liability Volatility Ratio [(6) / (2)]		1.0

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 compared to the plan's ongoing funding liability. For the 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 funding risk is limited. However, this asset allocation has a lower expected rate of return than the PERF and consequently, a lower discount rate is assumed. 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%
\$795,991	\$1,770,491	45.0%	\$974,501	\$1,323,971	60.1%	\$527,981

¹ The hypothetical liabilities calculated above include a 5 percent mortality 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.

Participant Data

The table below shows a summary of your plan's member data upon which this valuation is based:

	June 30, 2016	June 30, 2017
Reported Payroll	\$ 739,418	\$ 852,965
Projected Payroll for Contribution Purposes	\$ 807,982	\$ 928,668
Number of Members		
Active	9	10
Transferred	2	2
Separated	1	1
Retired	0	0

List of Class 1 Benefit Provisions

This plan has the additional Class 1 Benefit Provisions:

- Post-Retirement Survivor Allowance (PRSA)
- 3% Annual Cost-of-Living Allowance Increase (3% COLA)

Plan's Major Benefit Options

SECTION 1 – Plan Specific Information for the Safety Police Third Tier Plan of the City of Yuba City

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 Appendix B within Section 2 of this report.

Benefit Provision	Contract package	
	Active Police	
Benefit Formula	3.0% @ 55	
Social Security Coverage	No	
Full/Modified	Full	
Employee Contribution Rate	9.00%	
Final Average Compensation Period	Three Year	
Sick Leave Credit	Yes	
Non-Industrial Disability	Standard	
Industrial Disability	Yes	
Pre-Retirement Death Benefits		
Optional Settlement 2	Yes	
1959 Survivor Benefit Level	Indexed	
Special	Yes	
Alternate (firefighters)	No	
Post-Retirement Death Benefits		
Lump Sum	\$500	
Survivor Allowance (PRSA)	Yes	
COLA	3%	

Section 2

CALIFORNIA PUBLIC EMPLOYEES' RETIREMENT SYSTEM

**Section 2 may be found on the CalPERS website
(www.calpers.ca.gov) in the Forms and
Publications section**



California Public Employees' Retirement System
Actuarial Office
P.O. Box 942709
Sacramento, CA 94229-2709
TTY: (916) 795-3240
(888) 225-7377 phone – (916) 795-2744 fax
www.calpers.ca.gov

August 2018

**Safety Fire Third Tier Plan of the City of Yuba City
(CalPERS ID: 6515248486)
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 the pension plan.

Because this plan is in a risk pool, the following valuation report has been separated into two sections:

- Section 1 contains specific information for the plan including the development of the current and projected employer contributions, and
- Section 2 contains the Risk Pool Actuarial Valuation appropriate to the plan as of June 30, 2017.

Section 2 can be found on the CalPERS website at (www.calpers.ca.gov). From the home page, go to "Forms & Publications" and select "View All". In the search box, enter "Risk Pool" and from the results list download the Miscellaneous or Safety Risk Pool Actuarial Valuation Report as appropriate.

Your June 30, 2017 actuarial valuation report contains important actuarial information about your pension plan at CalPERS. Your assigned 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.

The exhibit below displays the minimum employer contributions, before any cost sharing, for Fiscal Year 2019-20 along with estimates of the required contributions 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 employer contributions in this report do not reflect any cost sharing arrangements you may have with your employees.**

Required Contribution

Fiscal Year	Employer Normal Cost Rate	Employer Payment of Unfunded Liability
2019-20	22.413%	\$4,230
<i>Projected Results</i>		
2020-21	23.7%	\$5,000

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 "Risk Analysis" section of the valuation report 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 valuations. 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 was 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.

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, "Statement of Actuarial Data, Methods and Assumptions" of the Section 2 report.

We understand that you might have a number of 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 to contact us with actuarial related questions.

If you have other questions, please call our customer contact center at (888) CalPERS or **(888-225-7377)**.

Sincerely,



SCOTT TERANDO
Chief Actuary



**Actuarial Valuation
as of June 30, 2017**

**for the
Safety Fire Third Tier Plan
of the
City of Yuba City
(CalPERS ID: 6515248486)**

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

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Section 1

CALIFORNIA PUBLIC EMPLOYEES' RETIREMENT SYSTEM

Plan Specific Information for the Safety Fire Third Tier Plan of the City of Yuba City

**(CalPERS ID: 6515248486)
(Rate Plan: 23002)**

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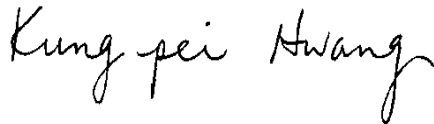
Actuarial Certification

Section 1 of this report is based on the member and financial data contained in our records as of June 30, 2017 which was provided by your agency and the benefit provisions under your contract with CalPERS. Section 2 of this report is based on the member and financial data as of June 30, 2017 provided by employers participating in the Safety Risk Pool to which the plan belongs and benefit provisions under the CalPERS contracts for those agencies.

As set forth in Section 2 of this report, the pool actuaries have certified that, in their opinion, the valuation of the risk pool containing your Safety Fire Third Tier Plan has been performed in accordance with generally accepted actuarial principles consistent with standards of practice prescribed by the Actuarial Standards Board, and that the assumptions and methods are internally consistent and reasonable for the risk pool as of the date of this valuation and as prescribed by the CalPERS Board of Administration according to provisions set forth in the California Public Employees' Retirement Law.

Having relied upon the information set forth in Section 2 of this report and based on the census and benefit provision information for the plan, it is my opinion as the plan actuary that Unfunded Accrued Liability amortization bases as of June 30, 2017 and employer contribution as of July 1, 2019, have been properly and accurately determined in accordance with the principles and standards stated above.

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



KUNG-PEI HWANG, ASA, MAAA
Senior Pension Actuary, CalPERS
Plan Actuary

Highlights and Executive Summary

- **Introduction**
- **Purpose of Section 1**
- **Required Employer Contributions**
- **Plan's Funded Status**
- **Projected Employer Contributions**
- **Changes Since the Prior Year's Valuation**
- **Subsequent Events**

Introduction

This report presents the results of the June 30, 2017 actuarial valuation of the Safety Fire Third Tier Plan of the City of Yuba City of the California Public Employees' Retirement System (CalPERS). This actuarial valuation sets the required employer contributions for Fiscal Year 2019-20.

Purpose of Section 1

This Section 1 report for the Safety Fire Third Tier Plan of the City of Yuba City of the California Public Employees' Retirement System (CalPERS) was prepared by the plan actuary in order to:

- Set forth the assets and accrued liabilities of this plan as of June 30, 2017;
- Determine the minimum required employer contribution for this plan for the fiscal year July 1, 2019 through June 30, 2020; and
- 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 GASB Statement No. 68 for a Cost Sharing 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 9.

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 Employer Contributions

		Fiscal Year
Required Employer Contributions		2019-20
Employer Normal Cost Rate		22.413%
<i>Plus, Either</i>		
1) Monthly Employer Dollar UAL Payment	\$	352.49
<i>Or</i>		
2) Annual Lump Sum Prepayment Option	\$	4,084
<p>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).</p> <p>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.</p> <p>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.</p>		

	Fiscal Year	Fiscal Year
	2018-19	2019-20
Development of Normal Cost as a Percentage of Payroll¹		
Base Total Normal Cost for Formula	26.598%	27.914%
Surcharge for Class 1 Benefits ²		
a) PRSA	1.739%	1.675%
b) 3% COLA	2.005%	1.810%
Phase out of Normal Cost Difference ³	0.000%	0.000%
Plan's Total Normal Cost	30.342%	31.399%
Formula's Expected Employee Contribution Rate	8.984%	8.986%
Employer Normal Cost Rate	21.358%	22.413%
Projected Payroll for the Contribution Fiscal Year	\$ 468,005	\$ 492,000
Estimated Employer Contributions Based on Projected Payroll		
Plan's Estimated Employer Normal Cost	\$ 99,957	\$ 110,272
Plan's Payment on Amortization Bases ⁴	3,919	4,230
% of Projected Payroll (illustrative only)	0.837%	0.860%
Estimated Total Employer Contribution	\$ 103,876	\$ 114,502
% of Projected Payroll (illustrative only)	22.195%	23.273%

¹ The results shown for Fiscal Year 2018-19 reflect the prior year valuation and may not take into account any lump sum payment, side fund payoff, or rate adjustment made after June 30, 2017.

² Section 2 of this report contains a list of Class 1 benefits and corresponding surcharges for each benefit.

³ The normal cost difference is phased out over a five-year period. The phase out of normal cost difference is 100 percent for the first year of pooling, and is incrementally reduced by 20 percent of the original normal cost difference for each subsequent year. This is non-zero only for plans that joined a pool within the past 5 years. Most plans joined a pool June 30, 2003, when risk pooling was implemented.

⁴ See page 9 for a breakdown of the Amortization Bases.

Plan's Funded Status

		June 30, 2016		June 30, 2017
1. Present Value of Projected Benefits (PVB)	\$	2,017,379	\$	2,535,670
2. Entry Age Normal Accrued Liability (AL)		176,086		443,479
3. Plan's Market Value of Assets (MVA)		167,529		436,863
4. Unfunded Accrued Liability (UAL) [(2) - (3)]		8,557		6,616
5. Funded Ratio [(3) / (2)]		95.1%		98.5%

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 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, "Statement of Actuarial Data, Methods and Assumptions" of the Section 2 report. 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.

	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 %	22.413%	23.7%	23.7%	23.7%	23.7%	23.7%
UAL Payment	\$4,230	\$5,000	\$5,900	\$6,800	\$3,400	\$4,000

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 of Section 2. This method phases in the impact of unanticipated 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 changes in the discount rate for next year's 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.

Changes since the Prior Year's Valuation

Benefits

None. 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 of Section 2 for a summary of the plan provisions used in this valuation.

Actuarial Methods and Assumptions

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 valuations. 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 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 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 three-year 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 and Liabilities

- **Breakdown of Entry Age Normal Accrued Liability**
- **Allocation of Plan's Share of Pool's Experience/Assumption Change**
- **Development of Plan's Share of Pool's MVA**
- **Schedule of Plan's Amortization Bases**
- **Amortization Schedule and Alternatives**
- **Employer Contribution History**
- **Funding History**

Breakdown of Entry Age Normal Accrued Liability

Active Members	\$	359,441
Transferred Members		84,038
Terminated Members		0
Members and Beneficiaries Receiving Payments		0
Total	\$	443,479

Allocation of Plan's Share of Pool's Experience/Assumption Change

It is the policy of CalPERS to ensure equity within the risk pools by allocating the pool's experience gains/losses and assumption changes in a manner that treats each employer equitably and maintains benefit security for the members of the System while minimizing substantial variations in employer contributions. The Pool's experience gains/losses and impact of assumption/method changes is allocated to the plan as follows:

1. Plan's Accrued Liability	\$	443,479
2. Projected UAL balance at 6/30/17		12,784
3. Pool's Accrued Liability ¹	\$	20,966,498,823
4. Sum of Pool's Individual Plan UAL Balances at 6/30/17 ¹		5,939,788,240
5. Pool's 2016/17 Investment & Asset (Gain)/Loss		(513,476,842)
6. Pool's 2016/17 Other (Gain)/Loss		13,232,897
7. Plan's Share of Pool's Asset (Gain)/Loss $[(1) - (2)] / [(3) - (4)] * (5)$		(14,717)
8. Plan's Share of Pool's Other (Gain)/Loss $[(1)] / [(3)] * (6)$		280
9. Plan's New (Gain)/Loss as of 6/30/2017 $[(7) + (8)]$	\$	(14,437)
10. Increase in Pool's Accrued Liability due to Change in Assumptions ¹		390,935,533
11. Plan's Share of Pool's Change in Assumptions $[(1)] / [(3)] * (10)$	\$	8,269

¹ Does not include plans that transferred to Pool on the valuation date.

Development of the Plan's Share of Pool's Market Value of Assets

12. Plan's UAL $[(2) + (9) + (11)]$	\$	6,616
13. Plan's Share of Pool's MVA $[(1) - (12)]$	\$	436,863

Schedule of Plan's 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 employer contribution determined by the valuation is 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 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 payment on the UAL for the fiscal year and adjusting for interest. 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	Amortization Period	Balance 6/30/17	Payment 2017-18	Balance 6/30/18	Payment 2018-19	Amounts for Fiscal 2019-20	
								Balance 6/30/19	Scheduled Payment for 2019-20
FRESH START	06/30/16	No Ramp	4	\$12,784	\$(3,575)	\$17,413	\$3,919	\$14,617	\$4,024
NON-ASSET (GAIN)/LOSS	06/30/17	20% ↗	30	\$280	\$0	\$300	\$0	\$322	\$4
ASSUMPTION CHANGE	06/30/17	20% ↗	20	\$8,269	\$(6,263)	\$15,354	\$(6,443)	\$23,139	\$436
ASSET (GAIN)/LOSS	06/30/17	20% ↗	30	\$(14,717)	\$0	\$(15,784)	\$0	\$(16,929)	\$(235)
TOTAL				\$6,616	\$(9,838)	\$17,283	\$(2,524)	\$21,149	\$4,229

The (gain)/loss bases are the plan's allocated share of the risk pool's (gain)/loss for the fiscal year as disclosed on the previous page. These (gain)/loss bases will be amortized according to Board policy over 30 years with a 5-year ramp-up.

If the total Unfunded Liability is negative (i.e., plan has a surplus), the scheduled payment is \$0, because the minimum required contribution under PEPRA must be at least equal to the normal cost.

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 for each year into the future. **The schedules do not attempt to reflect any experience after June 30, 2017 that may deviate from the actuarial assumptions. Therefore, future amortization payments displayed in the Current Amortization Schedule may 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

Date	<u>Current Amortization Schedule</u>		<u>Alternate Schedules</u>			
	Balance	Payment	5 Year Amortization		0 Year Amortization	
			Balance	Payment	Balance	Payment
6/30/2019	21,150	4,230	21,150	4,753	N/A	N/A
6/30/2020	18,303	4,563	17,761	4,890		
6/30/2021	14,904	4,912	13,985	5,030		
6/30/2022	10,897	5,278	9,790	5,175		
6/30/2023	6,221	1,153	5,140	5,324		
6/30/2024	5,478	1,186				
6/30/2025	4,647	1,220				
6/30/2026	3,720	1,255				
6/30/2027	2,689	1,292				
6/30/2028	1,547	1,329				
6/30/2029	283	293				
6/30/2030						
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6/30/2044						
6/30/2045						
6/30/2046						
6/30/2047						
6/30/2048						
Totals		26,712		25,171		N/A
Interest Paid		5,562		4,021		N/A
Estimated Savings				1,541		N/A

* 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.

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 Liability Payment (\$)
2016 - 17	20.218%	\$0
2017 - 18	20.404%	\$0
2018 - 19	21.358%	\$3,919
2019 - 20	22.413%	\$4,230

Funding History

The funding history below shows the plan's actuarial accrued liability, share of the pool's market value of assets, share of the pool's unfunded liability, funded ratio, and annual covered payroll.

Valuation Date		Accrued Liability (AL)		Share of Pool's Market Value of Assets (MVA)		Plan's Share of Pool's Unfunded Liability	Funded Ratio		Annual Covered Payroll
06/30/2013	\$	19,166	\$	15,445	\$	3,721	80.6%	\$	109,878
06/30/2014		56,444		60,860		(4,416)	107.8%		130,775
06/30/2015		84,862		90,476		(5,614)	106.6%		103,261
06/30/2016		176,086		167,529		8,557	95.1%		428,291
06/30/2017		443,479		436,863		6,616	98.5%		451,893

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	23.7%	23.7%	23.7%	23.7%
UAL Contribution	\$5,000	\$6,400	\$8,200	\$6,000
4.0%				
Normal Cost	23.7%	23.7%	23.7%	23.7%
UAL Contribution	\$5,000	\$6,100	\$7,500	\$4,700
7.0%				
Normal Cost	23.7%	23.7%	23.7%	23.7%
UAL Contribution	\$5,000	\$5,900	\$6,800	\$3,400
9.0%				
Normal Cost	23.7%	24.1%	24.6%	25.0%
UAL Contribution	\$5,000	\$5,800	\$6,600	\$2,800
12.0%				
Normal Cost	23.7%	24.1%	24.6%	25.0%
UAL Contribution	\$5,000	\$5,600	\$0	\$0

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. In addition, the projections above do not reflect the recent changes to the new 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 Total Normal Cost	Accrued Liability	Unfunded Accrued Liability	Funded Status
7.25% (current discount rate)	31.399%	\$443,479	\$6,616	98.5%
6.0%	40.977%	\$571,505	\$134,642	76.4%
7.0%	32.717%	\$456,823	\$19,960	95.6%
8.0%	26.395%	\$367,752	\$(69,111)	118.8%

Volatility Ratios

Actuarial calculations are based on a number of assumptions about long-term demographic and economic behavior. Unless these assumptions (terminations, deaths, disabilities, retirements, salary growth, and investment return) are exactly realized each year, there will be differences on a year-to-year basis. The year-to-year differences between actual experience and the assumptions are called actuarial gains and losses and serve to lower or raise 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 contribution 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 shown 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).

Rate Volatility	As of June 30, 2017	
1. Market Value of Assets	\$	436,863
2. Payroll		451,893
3. Asset Volatility Ratio (AVR) [(1) / (2)]		1.0
4. Accrued Liability	\$	443,479
5. Liability Volatility Ratio (LVR) [(4) / (2)]		1.0
6. Accrued Liability (7.00% discount rate)		456,823
7. Projected Liability Volatility Ratio [(6) / (2)]		1.0

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 compared to the plan's ongoing funding liability. For the 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 funding risk is limited. However, this asset allocation has a lower expected rate of return than the PERF and consequently, a lower discount rate is assumed. 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%
\$436,863	\$968,359	45.1%	\$531,496	\$721,151	60.6%	\$284,287

¹ The hypothetical liabilities calculated above include a 5 percent mortality 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.

Participant Data

The table below shows a summary of your plan's member data upon which this valuation is based:

	June 30, 2016	June 30, 2017
Reported Payroll	\$ 428,291	\$ 451,893
Projected Payroll for Contribution Purposes	\$ 468,005	\$ 492,000
Number of Members		
Active	7	6
Transferred	0	1
Separated	0	0
Retired	0	0

List of Class 1 Benefit Provisions

This plan has the additional Class 1 Benefit Provisions:

- Post-Retirement Survivor Allowance (PRSA)
- 3% Annual Cost-of-Living Allowance Increase (3% COLA)

Plan's Major Benefit Options

SECTION 1 – Plan Specific Information for the Safety Fire Third Tier Plan of the City of Yuba City

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 Appendix B within Section 2 of this report.

Benefit Provision	Contract package	
	Active Fire	
Benefit Formula	3.0% @ 55	
Social Security Coverage	No	
Full/Modified	Full	
Employee Contribution Rate	9.00%	
Final Average Compensation Period	Three Year	
Sick Leave Credit	Yes	
Non-Industrial Disability	Standard	
Industrial Disability	Yes	
Pre-Retirement Death Benefits		
Optional Settlement 2	Yes	
1959 Survivor Benefit Level	Indexed	
Special	Yes	
Alternate (firefighters)	No	
Post-Retirement Death Benefits		
Lump Sum	\$500	
Survivor Allowance (PRSA)	Yes	
COLA	3%	

Section 2

CALIFORNIA PUBLIC EMPLOYEES' RETIREMENT SYSTEM

**Section 2 may be found on the CalPERS website
(www.calpers.ca.gov) in the Forms and
Publications section**



California Public Employees' Retirement System
Actuarial Office
P.O. Box 942709
Sacramento, CA 94229-2709
TTY: (916) 795-3240
(888) 225-7377 phone – (916) 795-2744 fax
www.calpers.ca.gov

August 2018

**PEPRA Safety Police Plan of the City of Yuba City
(CalPERS ID: 6515248486)
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 the pension plan.

Because this plan is in a risk pool, the following valuation report has been separated into two sections:

- Section 1 contains specific information for the plan including the development of the current and projected employer contributions, and
- Section 2 contains the Risk Pool Actuarial Valuation appropriate to the plan as of June 30, 2017.

Section 2 can be found on the CalPERS website at (www.calpers.ca.gov). From the home page, go to "Forms & Publications" and select "View All". In the search box, enter "Risk Pool" and from the results list download the Miscellaneous or Safety Risk Pool Actuarial Valuation Report as appropriate.

Your June 30, 2017 actuarial valuation report contains important actuarial information about your pension plan at CalPERS. Your assigned 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.

The exhibit below displays the minimum employer contributions, before any cost sharing, for Fiscal Year 2019-20 along with estimates of the required contributions 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 employer contributions in this report do not reflect any cost sharing arrangements you may have with your employees.**

Required Contribution

Fiscal Year	Employer Normal Cost Rate	Employer Payment of Unfunded Liability
2019-20	14.381%	\$1,513
<i>Projected Results</i>		
2020-21	14.5%	\$3,200

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 "Risk Analysis" section of the valuation report 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 valuations. 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 was 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.

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, "Statement of Actuarial Data, Methods and Assumptions" of the Section 2 report.

We understand that you might have a number of 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 to contact us with actuarial related questions.

If you have other questions, please call our customer contact center at (888) CalPERS or **(888-225-7377)**.

Sincerely,



SCOTT TERANDO
Chief Actuary



**Actuarial Valuation
as of June 30, 2017**

**for the
PEPRA Safety Police Plan
of the
City of Yuba City
(CalPERS ID: 6515248486)**

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

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Section 1 – Plan Specific Information

Section 2 – Risk Pool Actuarial Valuation Information

Section 1

CALIFORNIA PUBLIC EMPLOYEES' RETIREMENT SYSTEM

Plan Specific Information for the PEPRA Safety Police Plan of the City of Yuba City

**(CalPERS ID: 6515248486)
(Rate Plan: 25363)**

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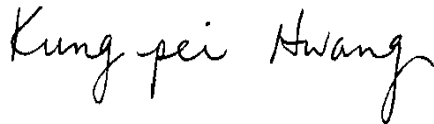
Actuarial Certification

Section 1 of this report is based on the member and financial data contained in our records as of June 30, 2017 which was provided by your agency and the benefit provisions under your contract with CalPERS. Section 2 of this report is based on the member and financial data as of June 30, 2017 provided by employers participating in the Safety Risk Pool to which the plan belongs and benefit provisions under the CalPERS contracts for those agencies.

As set forth in Section 2 of this report, the pool actuaries have certified that, in their opinion, the valuation of the risk pool containing your PEPRA Safety Police Plan has been performed in accordance with generally accepted actuarial principles consistent with standards of practice prescribed by the Actuarial Standards Board, and that the assumptions and methods are internally consistent and reasonable for the risk pool as of the date of this valuation and as prescribed by the CalPERS Board of Administration according to provisions set forth in the California Public Employees' Retirement Law.

Having relied upon the information set forth in Section 2 of this report and based on the census and benefit provision information for the plan, it is my opinion as the plan actuary that Unfunded Accrued Liability amortization bases as of June 30, 2017 and employer contribution as of July 1, 2019, have been properly and accurately determined in accordance with the principles and standards stated above.

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



KUNG-PEI HWANG, ASA, MAAA
Senior Pension Actuary, CalPERS
Plan Actuary

Highlights and Executive Summary

- **Introduction**
- **Purpose of Section 1**
- **Required Employer Contributions**
- **Plan's Funded Status**
- **Projected Employer Contributions**
- **Changes Since the Prior Year's Valuation**
- **Subsequent Events**

Introduction

This report presents the results of the June 30, 2017 actuarial valuation of the PEPRA Safety Police Plan of the City of Yuba City of the California Public Employees' Retirement System (CalPERS). This actuarial valuation sets the required employer contributions for Fiscal Year 2019-20.

Purpose of Section 1

This Section 1 report for the PEPRA Safety Police Plan of the City of Yuba City of the California Public Employees' Retirement System (CalPERS) was prepared by the plan actuary in order to:

- Set forth the assets and accrued liabilities of this plan as of June 30, 2017;
- Determine the minimum required employer contribution for this plan for the fiscal year July 1, 2019 through June 30, 2020; and
- 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 GASB Statement No. 68 for a Cost Sharing 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 9.

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 Employer Contributions

		Fiscal Year
Required Employer Contributions		2019-20
Employer Normal Cost Rate		14.381%
<i>Plus, Either</i>		
1) Monthly Employer Dollar UAL Payment	\$	126.06
<i>Or</i>		
2) Annual Lump Sum Prepayment Option	\$	1,461
<p><i>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).</i></p> <p><i>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.</i></p> <p><i>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.</i></p>		

	Fiscal Year	Fiscal Year
	2018-19	2019-20
Development of Normal Cost as a Percentage of Payroll¹		
Base Total Normal Cost for Formula	24.141%	25.034%
Surcharge for Class 1 Benefits ²		
a) PRSA	1.574%	1.502%
b) 3% COLA	1.789%	1.595%
Phase out of Normal Cost Difference ³	0.000%	0.000%
Plan's Total Normal Cost	27.504%	28.131%
Plan's Employee Contribution Rate	13.750%	13.750%
Employer Normal Cost Rate	13.754%	14.381%
Projected Payroll for the Contribution Fiscal Year	\$ 507,639	\$ 1,048,424
Estimated Employer Contributions Based on Projected Payroll		
Plan's Estimated Employer Normal Cost	\$ 69,821	\$ 150,774
Plan's Payment on Amortization Bases ⁴	557	1,513
% of Projected Payroll (illustrative only)	0.110%	0.144%
Estimated Total Employer Contribution	\$ 70,378	\$ 152,287
% of Projected Payroll (illustrative only)	13.864%	14.525%

¹ The results shown for Fiscal Year 2018-19 reflect the prior year valuation and may not take into account any lump sum payment, side fund payoff, or rate adjustment made after June 30, 2017.

² Section 2 of this report contains a list of Class 1 benefits and corresponding surcharges for each benefit.

³ The normal cost difference is phased out over a five-year period. The phase out of normal cost difference is 100 percent for the first year of pooling, and is incrementally reduced by 20 percent of the original normal cost difference for each subsequent year. This is non-zero only for plans that joined a pool within the past 5 years. Most plans joined a pool June 30, 2003, when risk pooling was implemented.

⁴ See page 9 for a breakdown of the Amortization Bases.

Plan's Funded Status

		June 30, 2016		June 30, 2017
1. Present Value of Projected Benefits (PVB)	\$	2,124,610	\$	4,506,005
2. Entry Age Normal Accrued Liability (AL)		134,551		342,019
3. Plan's Market Value of Assets (MVA)		119,750		326,688
4. Unfunded Accrued Liability (UAL) [(2) - (3)]		14,801		15,331
5. Funded Ratio [(3) / (2)]		89.0%		95.5%

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 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, "Statement of Actuarial Data, Methods and Assumptions" of the Section 2 report. 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.

	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 %	14.381%	14.5%	14.5%	14.5%	14.5%	14.5%
UAL Payment	\$1,513	\$3,200	\$5,000	\$6,800	\$8,300	\$9,400

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 of Section 2. This method phases in the impact of unanticipated 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 changes in the discount rate for next year's 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.

Changes since the Prior Year's Valuation

Benefits

None. 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 of Section 2 for a summary of the plan provisions used in this valuation.

Actuarial Methods and Assumptions

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 valuations. 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 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 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 three-year 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 and Liabilities

- **Breakdown of Entry Age Normal Accrued Liability**
- **Allocation of Plan's Share of Pool's Experience/Assumption Change**
- **Development of Plan's Share of Pool's MVA**
- **Schedule of Plan's Amortization Bases**
- **Amortization Schedule and Alternatives**
- **Employer Contribution History**
- **Funding History**

Breakdown of Entry Age Normal Accrued Liability

Active Members	\$	289,167
Transferred Members		30,001
Terminated Members		22,851
Members and Beneficiaries Receiving Payments		0
Total	\$	342,019

Allocation of Plan's Share of Pool's Experience/Assumption Change

It is the policy of CalPERS to ensure equity within the risk pools by allocating the pool's experience gains/losses and assumption changes in a manner that treats each employer equitably and maintains benefit security for the members of the System while minimizing substantial variations in employer contributions. The Pool's experience gains/losses and impact of assumption/method changes is allocated to the plan as follows:

1. Plan's Accrued Liability	\$	342,019
2. Projected UAL balance at 6/30/17		19,750
3. Pool's Accrued Liability ¹	\$	20,966,498,823
4. Sum of Pool's Individual Plan UAL Balances at 6/30/17 ¹		5,939,788,240
5. Pool's 2016/17 Investment & Asset (Gain)/Loss		(513,476,842)
6. Pool's 2016/17 Other (Gain)/Loss		13,232,897
7. Plan's Share of Pool's Asset (Gain)/Loss $[(1) - (2)] / [(3) - (4)] * (5)$		(11,012)
8. Plan's Share of Pool's Other (Gain)/Loss $[(1)] / [(3)] * (6)$		216
9. Plan's New (Gain)/Loss as of 6/30/2017 $[(7) + (8)]$	\$	(10,796)
10. Increase in Pool's Accrued Liability due to Change in Assumptions ¹		390,935,533
11. Plan's Share of Pool's Change in Assumptions $[(1)] / [(3)] * (10)$	\$	6,377

¹ Does not include plans that transferred to Pool on the valuation date.

Development of the Plan's Share of Pool's Market Value of Assets

12. Plan's UAL $[(2) + (9) + (11)]$	\$	15,331
13. Plan's Share of Pool's MVA $[(1) - (12)]$	\$	326,688

Schedule of Plan's 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 employer contribution determined by the valuation is 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 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 payment on the UAL for the fiscal year and adjusting for interest. 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	Amortization Period	Balance 6/30/17	Payment 2017-18	Balance 6/30/18	Payment 2018-19	Amounts for Fiscal 2019-20	
								Balance 6/30/19	Scheduled Payment for 2019-20
ASSET (GAIN)/LOSS	06/30/14	80% ↗	27	\$(1,515)	\$(41)	\$(1,582)	\$(63)	\$(1,631)	\$(86)
NON-ASSET (GAIN)/LOSS	06/30/14	80% ↗	27	\$15	\$0	\$16	\$1	\$16	\$1
ASSUMPTION CHANGE	06/30/14	80% ↗	17	\$3,415	\$127	\$3,531	\$194	\$3,586	\$266
ASSET (GAIN)/LOSS	06/30/15	60% ↗	28	\$3,765	\$53	\$3,983	\$107	\$4,161	\$166
NON-ASSET (GAIN)/LOSS	06/30/15	60% ↗	28	\$(12)	\$0	\$(13)	\$0	\$(14)	\$(1)
ASSET (GAIN)/LOSS	06/30/16	40% ↗	29	\$9,195	\$0	\$9,862	\$137	\$10,435	\$281
ASSUMPTION CHANGE	06/30/16	40% ↗	19	\$6,112	\$(3,877)	\$10,570	\$199	\$11,130	\$410
NON-ASSET (GAIN)/LOSS	06/30/16	40% ↗	29	\$(1,225)	\$0	\$(1,314)	\$(18)	\$(1,391)	\$(37)
NON-ASSET (GAIN)/LOSS	06/30/17	20% ↗	30	\$216	\$0	\$232	\$0	\$248	\$3
ASSET (GAIN)/LOSS	06/30/17	20% ↗	30	\$(11,012)	\$0	\$(11,811)	\$0	\$(12,667)	\$(176)
ASSUMPTION CHANGE	06/30/17	20% ↗	20	\$6,377	\$(13,345)	\$20,660	\$(13,729)	\$36,376	\$686
TOTAL				\$15,331	\$(17,083)	\$34,134	\$(13,172)	\$50,249	\$1,513

The (gain)/loss bases are the plan's allocated share of the risk pool's (gain)/loss for the fiscal year as disclosed on the previous page. These (gain)/loss bases will be amortized according to Board policy over 30 years with a 5-year ramp-up.

If the total Unfunded Liability is negative (i.e., plan has a surplus), the scheduled payment is \$0, because the minimum required contribution under PEPRA must be at least equal to the normal cost.

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 for each year into the future. **The schedules do not attempt to reflect any experience after June 30, 2017 that may deviate from the actuarial assumptions. Therefore, future amortization payments displayed in the Current Amortization Schedule may 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

Date	<u>Current Amortization Schedule</u>		<u>Alternate Schedules</u>			
	Balance	Payment	15 Year Amortization		10 Year Amortization	
			Balance	Payment	Balance	Payment
6/30/2019	50,250	1,513	50,250	4,569	50,250	6,232
6/30/2020	52,326	2,524	49,161	4,701	47,439	6,411
6/30/2021	53,507	3,544	47,857	4,836	44,239	6,595
6/30/2022	53,716	4,560	46,319	4,975	40,616	6,785
6/30/2023	52,888	5,266	44,525	5,118	36,534	6,980
6/30/2024	51,268	5,418	42,453	5,265	31,954	7,181
6/30/2025	49,374	5,574	40,078	5,416	26,834	7,387
6/30/2026	47,182	5,734	37,375	5,572	21,129	7,600
6/30/2027	44,665	5,899	34,314	5,732	14,791	7,818
6/30/2028	41,794	6,068	30,865	5,897	7,766	8,043
6/30/2029	38,540	6,243	26,996	6,067		
6/30/2030	34,869	6,422	22,670	6,241		
6/30/2031	30,746	6,607	17,851	6,420		
6/30/2032	26,133	6,701	12,496	6,605		
6/30/2033	21,089	6,794	6,561	6,795		
6/30/2034	15,581	6,574				
6/30/2035	9,902	5,257				
6/30/2036	5,176	3,859				
6/30/2037	1,555	1,610				
6/30/2038						
6/30/2039						
6/30/2040						
6/30/2041						
6/30/2042						
6/30/2043						
6/30/2044						
6/30/2045						
6/30/2046						
6/30/2047						
6/30/2048						
Totals		96,166		84,209		71,032
Interest Paid		45,916		33,959		20,783
Estimated Savings				11,957		25,133

* 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.

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 Liability Payment (\$)
2016 - 17	13.782%	\$42
2017 - 18	13.690%	\$139
2018 - 19	13.754%	\$557
2019 - 20	14.381%	\$1,513

Funding History

The funding history below shows the plan's actuarial accrued liability, share of the pool's market value of assets, share of the pool's unfunded liability, funded ratio, and annual covered payroll.

Valuation Date		Accrued Liability (AL)		Share of Pool's Market Value of Assets (MVA)		Plan's Share of Pool's Unfunded Liability	Funded Ratio		Annual Covered Payroll
06/30/2014	\$	13,642	\$	14,221	\$	(579)	104.2%	\$	112,873
06/30/2015		63,401		59,588		3,813	94.0%		158,079
06/30/2016		134,551		119,750		14,801	89.0%		464,561
06/30/2017		342,019		326,688		15,331	95.5%		962,958

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	14.5%	14.5%	14.5%	14.5%
UAL Contribution	\$3,200	\$5,300	\$7,800	\$10,000
4.0%				
Normal Cost	14.5%	14.5%	14.5%	14.5%
UAL Contribution	\$3,200	\$5,100	\$7,300	\$9,400
7.0%				
Normal Cost	14.5%	14.5%	14.5%	14.5%
UAL Contribution	\$3,200	\$5,000	\$6,800	\$8,300
9.0%				
Normal Cost	14.5%	14.9%	15.3%	15.1%
UAL Contribution	\$3,200	\$4,900	\$6,600	\$7,900
12.0%				
Normal Cost	14.5%	14.9%	15.3%	15.1%
UAL Contribution	\$3,200	\$4,800	\$6,100	\$6,800

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. In addition, the projections above do not reflect the recent changes to the new 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 Total Normal Cost	Accrued Liability	Unfunded Accrued Liability	Funded Status
7.25% (current discount rate)	28.131%	\$342,019	\$15,331	95.5%
6.0%	36.482%	\$446,946	\$120,258	73.1%
7.0%	29.291%	\$352,956	\$26,268	92.6%
8.0%	23.801%	\$282,088	\$(44,600)	115.8%

Volatility Ratios

Actuarial calculations are based on a number of assumptions about long-term demographic and economic behavior. Unless these assumptions (terminations, deaths, disabilities, retirements, salary growth, and investment return) are exactly realized each year, there will be differences on a year-to-year basis. The year-to-year differences between actual experience and the assumptions are called actuarial gains and losses and serve to lower or raise 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 contribution 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 shown 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).

Rate Volatility	As of June 30, 2017	
1. Market Value of Assets	\$	326,688
2. Payroll		962,958
3. Asset Volatility Ratio (AVR) [(1) / (2)]		0.3
4. Accrued Liability	\$	342,019
5. Liability Volatility Ratio (LVR) [(4) / (2)]		0.4
6. Accrued Liability (7.00% discount rate)		352,956
7. Projected Liability Volatility Ratio [(6) / (2)]		0.4

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 compared to the plan's ongoing funding liability. For the 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 funding risk is limited. However, this asset allocation has a lower expected rate of return than the PERF and consequently, a lower discount rate is assumed. 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%
\$326,688	\$826,666	39.5%	\$499,978	\$570,792	57.2%	\$244,103

¹ The hypothetical liabilities calculated above include a 5 percent mortality 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.

Participant Data

The table below shows a summary of your plan's member data upon which this valuation is based:

	June 30, 2016	June 30, 2017
Reported Payroll	\$ 464,561	\$ 962,958
Projected Payroll for Contribution Purposes	\$ 507,639	\$ 1,048,424
Number of Members		
Active	8	17
Transferred	3	6
Separated	6	7
Retired	0	0

List of Class 1 Benefit Provisions

This plan has the additional Class 1 Benefit Provisions:

- Post-Retirement Survivor Allowance (PRSA)
- 3% Annual Cost-of-Living Allowance Increase (3% COLA)

Plan's Major Benefit Options

SECTION 1 – Plan Specific Information for the PEPR Safety Police Plan of the City of Yuba City

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 Appendix B within Section 2 of this report.

Benefit Provision	Contract package	
	Active Police	
Benefit Formula	2.7% @ 57	
Social Security Coverage	No	
Full/Modified	Full	
Employee Contribution Rate	13.75%	
Final Average Compensation Period	Three Year	
Sick Leave Credit	Yes	
Non-Industrial Disability	Standard	
Industrial Disability	Yes	
Pre-Retirement Death Benefits		
Optional Settlement 2	Yes	
1959 Survivor Benefit Level	Indexed	
Special	Yes	
Alternate (firefighters)	No	
Post-Retirement Death Benefits		
Lump Sum	\$500	
Survivor Allowance (PRSA)	Yes	
COLA	3%	

Section 2

CALIFORNIA PUBLIC EMPLOYEES' RETIREMENT SYSTEM

**Section 2 may be found on the CalPERS website
(www.calpers.ca.gov) in the Forms and
Publications section**



California Public Employees' Retirement System
Actuarial Office
P.O. Box 942709
Sacramento, CA 94229-2709
TTY: (916) 795-3240
(888) 225-7377 phone – (916) 795-2744 fax
www.calpers.ca.gov

August 2018

**PEPRA Safety Fire Plan of the City of Yuba City
(CalPERS ID: 6515248486)
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 the pension plan.

Because this plan is in a risk pool, the following valuation report has been separated into two sections:

- Section 1 contains specific information for the plan including the development of the current and projected employer contributions, and
- Section 2 contains the Risk Pool Actuarial Valuation appropriate to the plan as of June 30, 2017.

Section 2 can be found on the CalPERS website at (www.calpers.ca.gov). From the home page, go to "Forms & Publications" and select "View All". In the search box, enter "Risk Pool" and from the results list download the Miscellaneous or Safety Risk Pool Actuarial Valuation Report as appropriate.

Your June 30, 2017 actuarial valuation report contains important actuarial information about your pension plan at CalPERS. Your assigned 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.

The exhibit below displays the minimum employer contributions, before any cost sharing, for Fiscal Year 2019-20 along with estimates of the required contributions 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 employer contributions in this report do not reflect any cost sharing arrangements you may have with your employees.**

Required Contribution

Fiscal Year	Employer Normal Cost Rate	Employer Payment of Unfunded Liability
2019-20	14.381%	\$1,185
<i>Projected Results</i>		
2020-21	14.5%	\$2,400

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 "Risk Analysis" section of the valuation report 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 valuations. 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 was 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.

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, "Statement of Actuarial Data, Methods and Assumptions" of the Section 2 report.

We understand that you might have a number of 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 to contact us with actuarial related questions.

If you have other questions, please call our customer contact center at (888) CalPERS or **(888-225-7377)**.

Sincerely,



SCOTT TERANDO
Chief Actuary



**Actuarial Valuation
as of June 30, 2017**

**for the
PEPRA Safety Fire Plan
of the
City of Yuba City
(CalPERS ID: 6515248486)**

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

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Section 2 – Risk Pool Actuarial Valuation Information

Section 1

CALIFORNIA PUBLIC EMPLOYEES' RETIREMENT SYSTEM

Plan Specific Information for the PEPRA Safety Fire Plan of the City of Yuba City

**(CalPERS ID: 6515248486)
(Rate Plan: 25362)**

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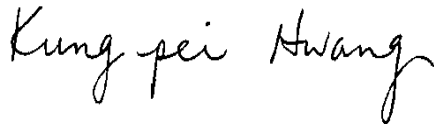
Actuarial Certification

Section 1 of this report is based on the member and financial data contained in our records as of June 30, 2017 which was provided by your agency and the benefit provisions under your contract with CalPERS. Section 2 of this report is based on the member and financial data as of June 30, 2017 provided by employers participating in the Safety Risk Pool to which the plan belongs and benefit provisions under the CalPERS contracts for those agencies.

As set forth in Section 2 of this report, the pool actuaries have certified that, in their opinion, the valuation of the risk pool containing your PEPRA Safety Fire Plan has been performed in accordance with generally accepted actuarial principles consistent with standards of practice prescribed by the Actuarial Standards Board, and that the assumptions and methods are internally consistent and reasonable for the risk pool as of the date of this valuation and as prescribed by the CalPERS Board of Administration according to provisions set forth in the California Public Employees' Retirement Law.

Having relied upon the information set forth in Section 2 of this report and based on the census and benefit provision information for the plan, it is my opinion as the plan actuary that Unfunded Accrued Liability amortization bases as of June 30, 2017 and employer contribution as of July 1, 2019, have been properly and accurately determined in accordance with the principles and standards stated above.

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



KUNG-PEI HWANG, ASA, MAAA
Senior Pension Actuary, CalPERS
Plan Actuary

Highlights and Executive Summary

- **Introduction**
- **Purpose of Section 1**
- **Required Employer Contributions**
- **Plan's Funded Status**
- **Projected Employer Contributions**
- **Changes Since the Prior Year's Valuation**
- **Subsequent Events**

Introduction

This report presents the results of the June 30, 2017 actuarial valuation of the PEPRA Safety Fire Plan of the City of Yuba City of the California Public Employees' Retirement System (CalPERS). This actuarial valuation sets the required employer contributions for Fiscal Year 2019-20.

Purpose of Section 1

This Section 1 report for the PEPRA Safety Fire Plan of the City of Yuba City of the California Public Employees' Retirement System (CalPERS) was prepared by the plan actuary in order to:

- Set forth the assets and accrued liabilities of this plan as of June 30, 2017;
- Determine the minimum required employer contribution for this plan for the fiscal year July 1, 2019 through June 30, 2020; and
- 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 GASB Statement No. 68 for a Cost Sharing 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 9.

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 Employer Contributions

		Fiscal Year
Required Employer Contributions		2019-20
Employer Normal Cost Rate		14.381%
<i>Plus, Either</i>		
1) Monthly Employer Dollar UAL Payment	\$	98.76
<i>Or</i>		
2) Annual Lump Sum Prepayment Option	\$	1,144
<p>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).</p> <p>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.</p> <p>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.</p>		

	Fiscal Year	Fiscal Year
	2018-19	2019-20
Development of Normal Cost as a Percentage of Payroll¹		
Base Total Normal Cost for Formula	24.141%	25.034%
Surcharge for Class 1 Benefits ²		
a) PRSA	1.574%	1.502%
b) 3% COLA	1.789%	1.595%
Phase out of Normal Cost Difference ³	0.000%	0.000%
Plan's Total Normal Cost	27.504%	28.131%
Plan's Employee Contribution Rate	13.750%	13.750%
Employer Normal Cost Rate	13.754%	14.381%
Projected Payroll for the Contribution Fiscal Year	\$ 518,532	\$ 622,790
Estimated Employer Contributions Based on Projected Payroll		
Plan's Estimated Employer Normal Cost	\$ 71,319	\$ 89,563
Plan's Payment on Amortization Bases ⁴	490	1,185
% of Projected Payroll (illustrative only)	0.095%	0.190%
Estimated Total Employer Contribution	\$ 71,809	\$ 90,748
% of Projected Payroll (illustrative only)	13.849%	14.571%

¹ The results shown for Fiscal Year 2018-19 reflect the prior year valuation and may not take into account any lump sum payment, side fund payoff, or rate adjustment made after June 30, 2017.

² Section 2 of this report contains a list of Class 1 benefits and corresponding surcharges for each benefit.

³ The normal cost difference is phased out over a five-year period. The phase out of normal cost difference is 100 percent for the first year of pooling, and is incrementally reduced by 20 percent of the original normal cost difference for each subsequent year. This is non-zero only for plans that joined a pool within the past 5 years. Most plans joined a pool June 30, 2003, when risk pooling was implemented.

⁴ See page 9 for a breakdown of the Amortization Bases.

Plan's Funded Status

		June 30, 2016		June 30, 2017
1. Present Value of Projected Benefits (PVB)	\$	2,403,485	\$	2,964,229
2. Entry Age Normal Accrued Liability (AL)		97,680		284,612
3. Plan's Market Value of Assets (MVA)		86,418		272,242
4. Unfunded Accrued Liability (UAL) [(2) - (3)]		11,262		12,370
5. Funded Ratio [(3) / (2)]		88.5%		95.7%

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 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, "Statement of Actuarial Data, Methods and Assumptions" of the Section 2 report. 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.

	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 %	14.381%	14.5%	14.5%	14.5%	14.5%	14.5%
UAL Payment	\$1,185	\$2,400	\$3,600	\$4,800	\$5,800	\$6,500

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 of Section 2. This method phases in the impact of unanticipated 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 changes in the discount rate for next year's 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.

Changes since the Prior Year's Valuation

Benefits

None. 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 of Section 2 for a summary of the plan provisions used in this valuation.

Actuarial Methods and Assumptions

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 valuations. 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 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 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 three-year 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 and Liabilities

- **Breakdown of Entry Age Normal Accrued Liability**
- **Allocation of Plan's Share of Pool's Experience/Assumption Change**
- **Development of Plan's Share of Pool's MVA**
- **Schedule of Plan's Amortization Bases**
- **Amortization Schedule and Alternatives**
- **Employer Contribution History**
- **Funding History**

Breakdown of Entry Age Normal Accrued Liability

Active Members	\$	249,175
Transferred Members		35,437
Terminated Members		0
Members and Beneficiaries Receiving Payments		0
Total	\$	284,612

Allocation of Plan's Share of Pool's Experience/Assumption Change

It is the policy of CalPERS to ensure equity within the risk pools by allocating the pool's experience gains/losses and assumption changes in a manner that treats each employer equitably and maintains benefit security for the members of the System while minimizing substantial variations in employer contributions. The Pool's experience gains/losses and impact of assumption/method changes is allocated to the plan as follows:

1. Plan's Accrued Liability	\$	284,612
2. Projected UAL balance at 6/30/17		16,060
3. Pool's Accrued Liability ¹	\$	20,966,498,823
4. Sum of Pool's Individual Plan UAL Balances at 6/30/17 ¹		5,939,788,240
5. Pool's 2016/17 Investment & Asset (Gain)/Loss		(513,476,842)
6. Pool's 2016/17 Other (Gain)/Loss		13,232,897
7. Plan's Share of Pool's Asset (Gain)/Loss $[(1) - (2)] / [(3) - (4)] * (5)$		(9,177)
8. Plan's Share of Pool's Other (Gain)/Loss $[(1)] / [(3)] * (6)$		180
9. Plan's New (Gain)/Loss as of 6/30/2017 $[(7) + (8)]$	\$	(8,997)
10. Increase in Pool's Accrued Liability due to Change in Assumptions ¹		390,935,533
11. Plan's Share of Pool's Change in Assumptions $[(1)] / [(3)] * (10)$	\$	5,307

¹ Does not include plans that transferred to Pool on the valuation date.

Development of the Plan's Share of Pool's Market Value of Assets

12. Plan's UAL $[(2) + (9) + (11)]$	\$	12,370
13. Plan's Share of Pool's MVA $[(1) - (12)]$	\$	272,242

Schedule of Plan's 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 employer contribution determined by the valuation is 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 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 payment on the UAL for the fiscal year and adjusting for interest. 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	Amortization Period	Balance 6/30/17	Payment 2017-18	Balance 6/30/18	Payment 2018-19	Amounts for Fiscal 2019-20	
								Balance 6/30/19	Scheduled Payment for 2019-20
FRESH START	06/30/13	No Ramp	26	\$(549)	\$(34)	\$(554)	\$(35)	\$(558)	\$(36)
ASSET (GAIN)/LOSS	06/30/14	80% ↗	27	\$(2,638)	\$(72)	\$(2,755)	\$(110)	\$(2,841)	\$(150)
NON-ASSET (GAIN)/LOSS	06/30/14	80% ↗	27	\$26	\$1	\$27	\$1	\$28	\$1
ASSUMPTION CHANGE	06/30/14	80% ↗	17	\$4,688	\$175	\$4,847	\$267	\$4,922	\$365
ASSET (GAIN)/LOSS	06/30/15	60% ↗	28	\$3,206	\$45	\$3,392	\$92	\$3,543	\$141
NON-ASSET (GAIN)/LOSS	06/30/15	60% ↗	28	\$(10)	\$0	\$(11)	\$0	\$(12)	\$0
ASSET (GAIN)/LOSS	06/30/16	40% ↗	29	\$6,636	\$0	\$7,117	\$99	\$7,530	\$203
NON-ASSET (GAIN)/LOSS	06/30/16	40% ↗	29	\$(889)	\$0	\$(953)	\$(13)	\$(1,009)	\$(27)
ASSUMPTION CHANGE	06/30/16	40% ↗	19	\$5,590	\$(3,960)	\$10,096	\$190	\$10,631	\$391
ASSET (GAIN)/LOSS	06/30/17	20% ↗	30	\$(9,177)	\$0	\$(9,842)	\$0	\$(10,556)	\$(146)
NON-ASSET (GAIN)/LOSS	06/30/17	20% ↗	30	\$180	\$0	\$193	\$0	\$207	\$3
ASSUMPTION CHANGE	06/30/17	20% ↗	20	\$5,307	\$(7,927)	\$13,901	\$(8,155)	\$23,355	\$440
TOTAL				\$12,370	\$(11,772)	\$25,458	\$(7,664)	\$35,240	\$1,185

The (gain)/loss bases are the plan's allocated share of the risk pool's (gain)/loss for the fiscal year as disclosed on the previous page. These (gain)/loss bases will be amortized according to Board policy over 30 years with a 5-year ramp-up.

If the total Unfunded Liability is negative (i.e., plan has a surplus), the scheduled payment is \$0, because the minimum required contribution under PEPRA must be at least equal to the normal cost.

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 for each year into the future. **The schedules do not attempt to reflect any experience after June 30, 2017 that may deviate from the actuarial assumptions. Therefore, future amortization payments displayed in the Current Amortization Schedule may 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

Date	<u>Current Amortization Schedule</u>		<u>Alternate Schedules</u>			
	Balance	Payment	15 Year Amortization		10 Year Amortization	
			Balance	Payment	Balance	Payment
6/30/2019	35,241	1,185	35,241	3,204	35,241	4,371
6/30/2020	36,568	1,920	34,477	3,297	33,269	4,496
6/30/2021	37,231	2,639	33,563	3,391	31,025	4,625
6/30/2022	37,197	3,347	32,484	3,489	28,484	4,758
6/30/2023	36,428	3,775	31,226	3,589	25,622	4,895
6/30/2024	35,160	3,884	29,773	3,692	22,410	5,036
6/30/2025	33,687	3,995	28,107	3,799	18,819	5,181
6/30/2026	31,992	4,110	26,211	3,908	14,818	5,330
6/30/2027	30,054	4,228	24,065	4,020	10,373	5,483
6/30/2028	27,854	4,350	21,646	4,136	5,447	5,641
6/30/2029	25,369	4,475	18,932	4,255		
6/30/2030	22,574	4,604	15,899	4,377		
6/30/2031	19,443	4,736	12,519	4,503		
6/30/2032	15,947	4,740	8,763	4,632		
6/30/2033	12,195	4,741	4,601	4,765		
6/30/2034	8,169	4,438				
6/30/2035	4,165	3,421				
6/30/2036	924	957				
6/30/2037						
6/30/2038						
6/30/2039						
6/30/2040						
6/30/2041						
6/30/2042						
6/30/2043						
6/30/2044						
6/30/2045						
6/30/2046						
6/30/2047						
6/30/2048						
Totals		65,546		59,056		49,816
Interest Paid		30,305		23,816		14,575
Estimated Savings				6,489		15,730

* 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.

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 Liability Payment (\$)
2016 - 17	13.782%	\$17
2017 - 18	13.690%	\$114
2018 - 19	13.754%	\$490
2019 - 20	14.381%	\$1,185

Funding History

The funding history below shows the plan's actuarial accrued liability, share of the pool's market value of assets, share of the pool's unfunded liability, funded ratio, and annual covered payroll.

Valuation Date		Accrued Liability (AL)		Share of Pool's Market Value of Assets (MVA)		Plan's Share of Pool's Unfunded Liability	Funded Ratio		Annual Covered Payroll
06/30/2013	\$	934	\$	1,371	\$	(437)	146.8%	\$	93,711
06/30/2014		23,294		24,795		(1,501)	106.5%		143,605
06/30/2015		53,424		50,761		2,663	95.0%		69,195
06/30/2016		97,680		86,418		11,262	88.5%		474,530
06/30/2017		284,612		272,242		12,370	95.7%		572,021

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	14.5%	14.5%	14.5%	14.5%
UAL Contribution	\$2,400	\$3,900	\$5,600	\$7,500
4.0%				
Normal Cost	14.5%	14.5%	14.5%	14.5%
UAL Contribution	\$2,400	\$3,700	\$5,200	\$6,700
7.0%				
Normal Cost	14.5%	14.5%	14.5%	14.5%
UAL Contribution	\$2,400	\$3,600	\$4,800	\$5,800
9.0%				
Normal Cost	14.5%	14.9%	15.3%	15.1%
UAL Contribution	\$2,400	\$3,500	\$4,600	\$5,400
12.0%				
Normal Cost	14.5%	14.9%	15.3%	15.1%
UAL Contribution	\$2,400	\$3,400	\$4,200	\$4,500

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. In addition, the projections above do not reflect the recent changes to the new 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 Total Normal Cost	Accrued Liability	Unfunded Accrued Liability	Funded Status
7.25% (current discount rate)	28.131%	\$284,612	\$12,370	95.7%
6.0%	36.482%	\$383,805	\$111,563	70.9%
7.0%	29.291%	\$294,580	\$22,338	92.4%
8.0%	23.801%	\$228,158	\$(44,084)	119.3%

Volatility Ratios

Actuarial calculations are based on a number of assumptions about long-term demographic and economic behavior. Unless these assumptions (terminations, deaths, disabilities, retirements, salary growth, and investment return) are exactly realized each year, there will be differences on a year-to-year basis. The year-to-year differences between actual experience and the assumptions are called actuarial gains and losses and serve to lower or raise 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 contribution 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 shown 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).

Rate Volatility	As of June 30, 2017	
1. Market Value of Assets	\$	272,242
2. Payroll		572,021
3. Asset Volatility Ratio (AVR) [(1) / (2)]		0.5
4. Accrued Liability	\$	284,612
5. Liability Volatility Ratio (LVR) [(4) / (2)]		0.5
6. Accrued Liability (7.00% discount rate)		294,580
7. Projected Liability Volatility Ratio [(6) / (2)]		0.5

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 compared to the plan's ongoing funding liability. For the 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 funding risk is limited. However, this asset allocation has a lower expected rate of return than the PERF and consequently, a lower discount rate is assumed. 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%
\$272,242	\$671,215	40.6%	\$398,972	\$460,938	59.1%	\$188,696

¹ The hypothetical liabilities calculated above include a 5 percent mortality 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.

Participant Data

The table below shows a summary of your plan's member data upon which this valuation is based:

	June 30, 2016	June 30, 2017
Reported Payroll	\$ 474,530	\$ 572,021
Projected Payroll for Contribution Purposes	\$ 518,532	\$ 622,790
Number of Members		
Active	10	9
Transferred	2	3
Separated	0	0
Retired	0	0

List of Class 1 Benefit Provisions

This plan has the additional Class 1 Benefit Provisions:

- Post-Retirement Survivor Allowance (PRSA)
- 3% Annual Cost-of-Living Allowance Increase (3% COLA)

Plan's Major Benefit Options

SECTION 1 – Plan Specific Information for the PEPR Safety Fire Plan of the City of Yuba City

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 Appendix B within Section 2 of this report.

Benefit Provision	Contract package	
	Active Fire	
Benefit Formula	2.7% @ 57	
Social Security Coverage	No	
Full/Modified	Full	
Employee Contribution Rate	13.75%	
Final Average Compensation Period	Three Year	
Sick Leave Credit	Yes	
Non-Industrial Disability	Standard	
Industrial Disability	Yes	
Pre-Retirement Death Benefits		
Optional Settlement 2	Yes	
1959 Survivor Benefit Level	Indexed	
Special	Yes	
Alternate (firefighters)	No	
Post-Retirement Death Benefits		
Lump Sum	\$500	
Survivor Allowance (PRSA)	Yes	
COLA	3%	

Section 2

CALIFORNIA PUBLIC EMPLOYEES' RETIREMENT SYSTEM

**Section 2 may be found on the CalPERS website
(www.calpers.ca.gov) in the Forms and
Publications section**



1201 Civic Center Blvd.
Yuba City California 95993
Phone (530) 822-4618 • Fax (530) 822-4694

MEMORANDUM

To: Steven Kroeger, City Manager
From: Robin Bertagna, C.P.A., Finance Director
Date: August 10, 2018
Re: CalPERS Unfunded Liabilities from 6/30/17 Actuarial Reports

CalPERS released the 6/30/17 Actuarial Reports for Yuba City on August 6, 2018. Attached is a summary of the change in the City's Unfunded Liabilities for each plan with CalPERS. In summary, the net pension liabilities decreased by \$3.0 million between the 6/30/16 and 6/30/17 valuation reports. This decrease is reduced further by the increase in the City's set aside in a Pension Stabilization Trust Fund last fiscal year for a total net decrease of \$3.6 million.

Pension Liabilities FYE 6-30-16, Actuarials Dated August 2017

	Safety Tier 1	Safety Tier 2	Safety Tier 3-Fire	Safety Tier 3-Police	Safety PEPRA-Fire	Safety PEPRA-Police	Miscellaneous	Pension Stabilization Trust Fund
Assets	\$ 49,680,999	\$ 43,616,966	\$ 167,529	\$ 454,054	\$ 86,418	\$ 119,750	\$ 77,745,445	\$ 2,000,000
Liabilities	\$ 71,805,762	\$ 57,372,863	\$ 176,086	\$ 487,794	\$ 97,680	\$ 134,551	\$ 115,131,252	
Unfunded Liability	\$ (22,124,763)	\$ (13,755,897)	\$ (8,557)	\$ (33,740)	\$ (11,262)	\$ (14,801)	\$ (37,385,807)	
% Funded	69.2%	76.0%	95.1%	93.1%	88.5%	89.0%	67.5%	
Total Unfunded Pension Liabilities 6-30-16								\$ 73,334,827

Pension Liabilities FYE 6-30-17, Actuarials Dated August 2018

	Safety Tier 1	Safety Tier 2	Safety Tier 3-Fire	Safety Tier 3-Police	Safety PEPRA-Fire	Safety PEPRA-Police	Miscellaneous	Pension Stabilization Trust Fund
Assets	\$ 49,508,910	\$ 51,587,742	\$ 436,863	\$ 795,991	\$ 272,242	\$ 326,688	\$ 84,981,656	\$ 2,615,658
Liabilities	\$ 72,115,503	\$ 65,491,485	\$ 443,479	\$ 827,552	\$ 284,612	\$ 342,019	\$ 118,775,214	
Unfunded Liability	\$ (22,606,593)	\$ (13,903,743)	\$ (6,616)	\$ (31,561)	\$ (12,370)	\$ (15,331)	\$ (33,793,558)	
% Funded	68.7%	78.8%	98.5%	96.2%	95.7%	95.5%	71.5%	
Total Unfunded Pension Liabilities 6-30-17								\$ 70,369,772

Changes in Values 6-30-16 to 6-30-17 Valuation Reports

	Safety Tier 1	Safety Tier 2	Safety Tier 3-Fire	Safety Tier 3-Police	Safety PEPRA-Fire	Safety PEPRA-Police	Miscellaneous	Pension Stabilization Trust Fund
Assets	\$ (172,089)	\$ 7,970,776	\$ 269,334	\$ 341,937	\$ 185,824	\$ 206,938	\$ 7,236,211	\$ 615,658
Liabilities	\$ 309,741	\$ 8,118,622	\$ 267,393	\$ 339,758	\$ 186,932	\$ 207,468	\$ 3,643,962	
Unfunded Liability	\$ 481,830	\$ 147,846	\$ (1,941)	\$ (2,179)	\$ 1,108	\$ 530	\$ (3,592,249)	
% Funded	-0.5%	2.7%	3.4%	3.1%	7.2%	6.5%	4.0%	

Total Net Increase in Pension Liabilities Before Pension Trust Offset **\$ (2,965,055)**

Total Net Increase in Pension Liabilities After Pension Trust Offset **\$ (3,580,713)**

CalPERS - Summary of Funded Status as of 6-30-18

	Safety	Miscellaneous	Total
Assets	\$ 102.9	\$ 85.0	\$ 187.9
Liabilities	(139.4)	(118.8)	(258.2)
Unfunded Liability	\$ (36.5)	\$ (33.8)	\$ (70.3)
Percentage Funded	73.8%	71.5%	72.8%

Less Pension Stabilization Trust Fund Available	\$ (2.6)
Net Unfunded Pension Liability	\$ 67.7

CITY OF YUBA CITY
STAFF REPORT

Date: September 18, 2018

To: Honorable Mayor & Members of the City Council

From: Finance/IT Department

Presented by: Robin Bertagna, CPA, Finance Director

Summary

Subject: CalPERS Unfunded Liabilities and Funding Strategy

Recommendation: Advance an additional \$750,000 to CalPERS to lower the City's Unfunded Actuarial Liabilities and save interest cost long-term

Fiscal Impact: Paying an additional \$750,000 will save the City just under \$200,000 in interest charges in the next six years.

Purpose:

To address the City's unfunded liabilities with CalPERS.

Background:

The City receives annual actuarial reports from CalPERS for each of the City's retirement plan tiers. There are currently seven separate tiers. Staff carefully reviews these each year to evaluate the increasing or decreasing liabilities (Unfunded Actuarial Liabilities or UAL), evaluates the assets on hand, and the funded status for each plan tier. The funded status is a percentage which compares the market value of the assets on hand to the projected future benefit payments to retirees. For the Miscellaneous Plan, the funded status increased to 71.5 percent with the June 30, 2017 actuarial reports. For the two largest safety plans, they averaged 73.75 percent funding in the June 30, 2017 actuarial reports.

Analysis:

The table below compares the City's CalPERS assets to liabilities for the two most recent actuarial reports:

	6/30/2016	6/30/2017	Change
Assets	\$ 171,871,161	\$ 187,910,092	\$ 16,038,931
Liabilities	\$ (245,205,988)	\$ (258,279,864)	\$ (13,073,876)
UAL	<u>\$ (73,334,827)</u>	<u>\$ (70,369,772)</u>	<u>\$ 2,965,055</u>

The 6/30/16 actuarial reports included a total unfunded actuarial liability (UAL) of \$73.3 million. In the 6/30/17 actuarial reports, the UAL was reduced to \$70.4 million. The total reduction was

\$2,965,055. With the change in the discount rate implemented by the CalPERS Board, City staff expected that the UAL would increase again, not decline. In reviewing the details regarding the reduction, it is entirely attributable to the Miscellaneous Plan. The UAL increased for four out of six of the City's Safety plans and had a total overall net increase of \$627,194. For the Miscellaneous plan, the decline was attributable to three items:

- 1) There was a gain in net assets due to the 11.2% return CalPERS made on its investments for the year;
- 2) There was a gain in the liabilities because the retiree COLA was less than expected; and
- 3) The average salary increase was less than expected for City staff.

Attached is an exhibit that compares the City's Normal Cost, UAL Cost, and Total Cost from the 6/30/16 Actuarial Reports to the 6/30/17 Actuarial Reports. This detailed information shows the dramatic shift shown in the total expected retirement payments from the City to CalPERS from FY 16/17 through FY 24/25. With last year's 6/30/16 Actuarial Reports, the total annual payments were expected to be \$12.3 million by FY 24/25. Now, with the updated 6/30/17 Actuarial Reports received in August, 2018, the total payments projected by FY 24/25 are just under \$11.3 million.

These latest Actuarial Reports show that the City is scheduled to pay CalPERS just over \$5.3 million in FY 19-20 towards unfunded liabilities. The interest charged by CalPERS to the City on these liabilities is just over \$5.1 million.

Actions To Date:

The City has been aware of this situation and has taken several actions to date to minimize CalPERS costs when and where possible. Actions taken to date include:

- Established a Pension Stabilization Trust Fund in June, 2016, with a balance of \$2,454,682 as of June 30, 2018; and
- Prepaying CalPERS annual UAL payments to receive interest savings as authorized by CalPERS for the past four fiscal years has saved in excess of \$300,000; and
- Employees now pay the Employee share of CalPERS, saving the City just under \$2,000,000 annually; and, it wasn't in exchange for a salary increase like some agencies negotiated, which would have exacerbated the problem further; and
- The City has considered CalPERS impacts when negotiating bargaining unit contracts with employee groups and come to agreements where a combination of one-time money payments were provided in combination with on-going salary increases in order to control escalating retirement costs from compounding.

Short-Term Actions:

The City has evaluated potential options to paying more to CalPERS in order to reduce the UAL in total. Solutions evaluated include:

- Pay additional contributions annually in excess of required contributions;
- Negotiate a lower tier benefit to Classic employees who are new to the City;
- Send a lump-sum, one-time payment to CalPERS and evaluate continuing this on an annual basis in future years when sufficient one-time funds are available.

It is notable that if the City, or any contracting agency, pays more into CalPERS and then CalPERS has a bad year of investment losses (potentially losing 30% of their assets in the market

again), the City loses the value of some of the additional dollars contributed and ends up having some of the liability come back to us. However, if we don't pay additional contributions, the interest charges keep adding up; similar to a loan where one makes interest only payments and is not paying off the principal. If the City negotiates a lower tier benefit to Classic employees who are new to the City, it could potentially create recruitment problems for hiring qualified candidates.

Long-Term Actions:

Moving towards a defined contribution plan instead of a defined benefit plan has often been suggested by some members of the public. A **defined benefit plan**, is a retirement account for which your employer contributes money and promises you a payout based upon a specific formula when you retire. A **defined contribution plan**, is a retirement account where the employer contributes a specified amount or percentage. The City is contracted with CalPERS to provide a defined benefit plan to its employees and is required to enroll all permanent employees into CalPERS upon employment. Failure to follow the City's contract exposes the City to penalties and legal action.

Currently, in order to move to a defined contribution plan, the City would need to negotiate this change with all the City's employee unions and bargaining units. Furthermore, due to the contractual obligation of the CalPERS contract with the City, we would need to find the monetary resources to exit the system. CalPERS includes an estimated hypothetical termination liability in the City's actuarial reports. For the June 30, 2017 actuarial reports, the total estimated termination liability for the City's plans exceeded \$490 million dollars. The enormous expense causes plan termination to be a nonviable option.

Long-term, a statewide solution must be implemented; pension reform is necessary as the current system is unsustainable for some member agencies. Another potential long-term, statewide solution could include converting all classic employees within the CalPERS system to some lesser benefit formula for future years of service. There are currently lawsuits pending in this regard that will likely be resolved in the next year and will give some insight as to how retirement programs can be changed to be more cost effective and sustainable on a statewide basis.

The City has been planning for the large increases in CalPERS cost that are coming. We have negotiated bargaining unit agreements that pay one-time monies to our employees in lieu of an on-going raise in order to not further compound the already monumental problem.

In summary, we have built into our budget model the ability to pay more to CalPERS. The more funding that we are fiscally able to advance to CalPERS, the more interest savings there will be over time. This will also serve to increase the City's percentage funded status and create a more secure pension system for our employees, a retirement they can count on being there for them when the time comes.

Fiscal Impact:

\$750,000; \$600,000 from the pension stabilization trust fund and \$150,000 allocated between Water, Wastewater and Fleet Maintenance funds for FY 18-19. This additional expense in the current year will save almost \$200,000 in interest expense over the next six years.

Alternatives:

- A. Do not proceed with paying CalPERS any additional sums of money in FY 18-19 and instead pay only the required contributions.
- B. Increase the amount paid to CalPERS by using additional funds saved in the pension stabilization trust fund.

Recommendation:

Authorize City staff to pay an additional \$750,000 to CalPERS to lower unfunded actuarial liabilities and save interest cost long-term. This includes related supplemental appropriations.

Attachments:

1. CalPERS Comparison of Projected City Retirement Costs by Actuarial Year
2. Comparison of Normal Cost, UAL Cost, and Total Cost from the 6/30/16 Actuarial Reports to the 6/30/17 Actuarial Reports

Prepared By:

/s/ Robin Bertagna

Robin Bertagna, CPA
Finance Director

Submitted By:

/s/ Steven C. Kroeger

Steven C. Kroeger
City Manager

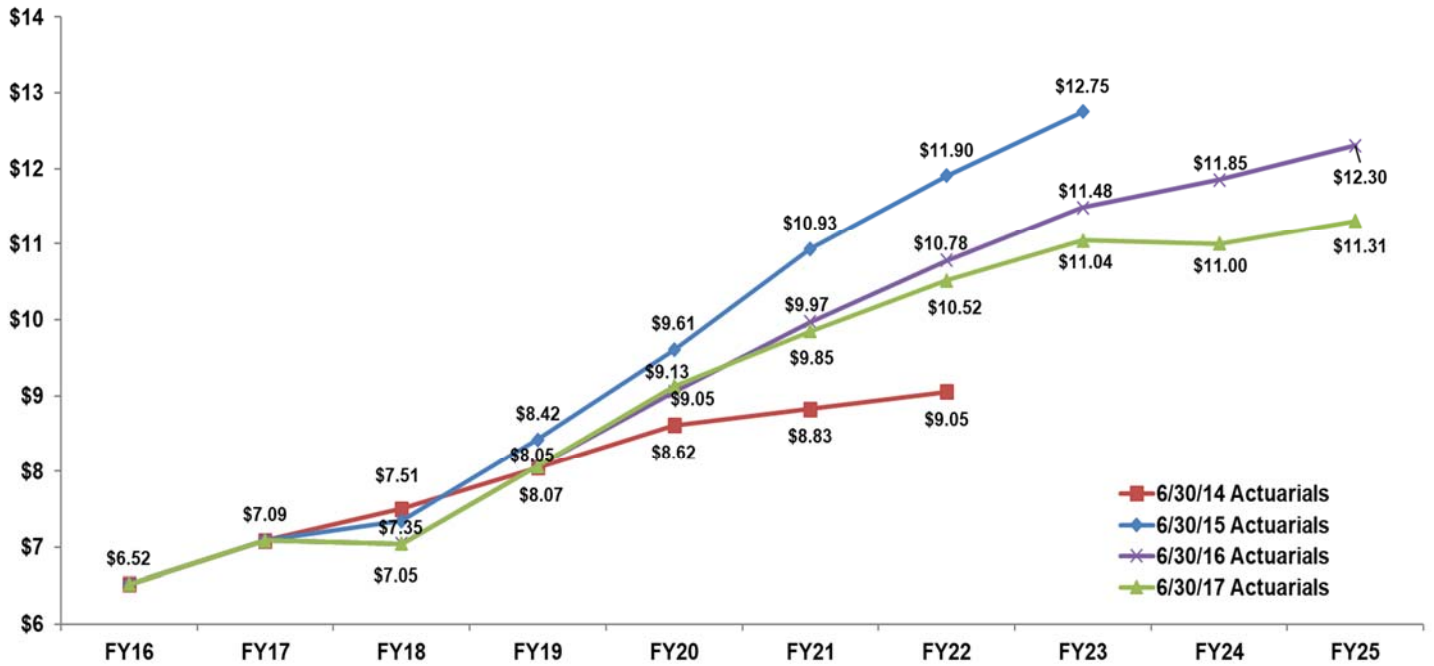
Reviewed By:

City Attorney

[TH via email](#)

ATTACHMENT 1

City of Yuba City
CalPERS Comparison of Projected City Retirement Costs by Actuarial Year



ATTACHMENT 2

Normal Cost

<i>As of August, 2017</i>	<i>FY 16/17</i>	<i>FY 17/18</i>	<i>FY 18/19</i>	<i>FY 19/20</i>	<i>FY 20/21</i>	<i>FY 21/22</i>	<i>FY 22/23</i>	<i>FY 23/24</i>	<i>FY 24/25</i>
Miscellaneous	\$ 3,300,064	\$ 1,181,142	\$ 1,211,065	\$ 1,279,294	\$ 1,402,735	\$ 1,402,735	\$ 1,402,735	\$ 1,402,735	\$ 1,402,735
Safety Fire-PEPRA	86,802	10,351	71,319	73,113	77,261	77,261	77,261	77,261	77,261
Safety Police-PEPRA	95,456	23,648	69,821	71,577	75,639	75,639	75,639	75,639	75,639
Safety-Tier 1	159,229	244,601	185,873	193,215	208,369	208,369	208,369	208,369	208,369
Safety-Tier 2	1,556,726	1,762,935	1,575,092	1,643,036	1,770,977	1,770,977	1,770,977	1,770,977	1,770,977
Safety-Tier 3 Police	131,888	129,491	172,569	179,372	193,916	193,916	193,916	193,916	193,916
Safety-Tier 3 Fire	139,132	23,023	99,957	103,898	112,322	112,322	112,322	112,322	112,322
Totals	<u>\$ 5,469,297</u>	<u>\$ 3,375,191</u>	<u>\$ 3,385,696</u>	<u>\$ 3,543,505</u>	<u>\$ 3,841,218</u>	<u>\$ 3,841,218</u>	<u>\$ 3,841,218</u>	<u>\$ 3,841,218</u>	<u>\$ 3,841,218</u>
<i>As of August, 2018</i>	<i>FY 16/17</i>	<i>FY 17/18</i>	<i>FY 18/19</i>	<i>FY 19/20</i>	<i>FY 20/21</i>	<i>FY 21/22</i>	<i>FY 22/23</i>	<i>FY 23/24</i>	<i>FY 24/25</i>
Miscellaneous	\$ 3,300,064	\$ 1,181,142	\$ 1,211,065	\$ 1,321,652	\$ 1,400,227	\$ 1,400,227	\$ 1,400,227	\$ 1,400,227	\$ 1,400,227
Safety Fire-PEPRA	86,802	10,351	71,319	89,563	90,304	90,304	90,304	90,304	90,304
Safety Police-PEPRA	95,456	23,648	69,821	150,774	152,022	152,022	152,022	152,022	152,022
Safety-Tier 1	159,229	244,601	185,873	193,215	208,369	208,369	208,369	208,369	208,369
Safety-Tier 2	1,556,726	1,762,935	1,575,092	1,643,036	1,770,977	1,770,977	1,770,977	1,770,977	1,770,977
Safety-Tier 3 Police	131,888	129,491	172,569	179,372	193,916	193,916	193,916	193,916	193,916
Safety-Tier 3 Fire	139,132	23,023	99,957	110,272	116,604	116,604	116,604	116,604	116,604
Totals	<u>\$ 5,469,297</u>	<u>\$ 3,375,191</u>	<u>\$ 3,385,696</u>	<u>\$ 3,687,884</u>	<u>\$ 3,932,419</u>	<u>\$ 3,932,419</u>	<u>\$ 3,932,419</u>	<u>\$ 3,932,419</u>	<u>\$ 3,932,419</u>
<i>Net Change Aug 17 vs Aug 18</i>	<i>FY 16/17</i>	<i>FY 17/18</i>	<i>FY 18/19</i>	<i>FY 19/20</i>	<i>FY 20/21</i>	<i>FY 21/22</i>	<i>FY 22/23</i>	<i>FY 23/24</i>	<i>FY 24/25</i>
Miscellaneous	\$ -	\$ -	\$ -	\$ 42,358	\$ (2,508)	\$ (2,508)	\$ (2,508)	\$ (2,508)	\$ (2,508)
Safety Fire-PEPRA	-	-	-	16,450	13,043	13,043	13,043	13,043	13,043
Safety Police-PEPRA	-	-	-	79,197	76,383	76,383	76,383	76,383	76,383
Safety-Tier 1	-	-	-	-	-	-	-	-	-
Safety-Tier 2	-	-	-	-	-	-	-	-	-
Safety-Tier 3 Police	-	-	-	-	-	-	-	-	-
Safety-Tier 3 Fire	-	-	-	6,374	4,282	4,282	4,282	4,282	4,282
Totals	<u>\$ -</u>	<u>\$ -</u>	<u>\$ -</u>	<u>\$ 144,379</u>	<u>\$ 91,200</u>	<u>\$ 91,200</u>	<u>\$ 91,200</u>	<u>\$ 91,200</u>	<u>\$ 91,200</u>

UAL

<i>As of August, 2017</i>	<i>FY 16/17</i>	<i>FY 17/18</i>	<i>FY 18/19</i>	<i>FY 19/20</i>	<i>FY 20/21</i>	<i>FY 21/22</i>	<i>FY 22/23</i>	<i>FY 23/24</i>	<i>FY 24/25</i>
Miscellaneous	\$ -	\$ 2,098,803	\$ 2,479,328	\$ 2,917,000	\$ 3,265,000	\$ 3,692,000	\$ 4,065,000	\$ 4,000,000	\$ 4,220,000
Safety Fire-PEPRA	17	114	490	1,100	2,100	3,100	4,200	5,000	5,600
Safety Police-PEPRA	42	139	557	1,200	2,300	3,400	4,600	5,400	6,100
Safety-Tier 1	833,853	1,017,949	1,268,454	1,553,000	1,755,000	2,012,000	2,232,000	2,384,000	2,514,000
Safety-Tier 2	419,403	537,791	717,865	927,000	1,099,000	1,307,000	1,487,000	1,607,000	1,706,000
Safety-Tier 3 Police	-	-	11,683	12,000	14,000	16,000	18,000	6,300	7,500
Safety-Tier 3 Fire	-	-	3,919	4,200	5,000	5,800	6,700	3,100	3,700
Totals	\$ 1,253,315	\$ 3,654,796	\$ 4,482,296	\$ 5,415,500	\$ 6,142,400	\$ 7,039,300	\$ 7,817,500	\$ 8,010,800	\$ 8,462,900
<i>As of August, 2018</i>	<i>FY 16/17</i>	<i>FY 17/18</i>	<i>FY 18/19</i>	<i>FY 19/20</i>	<i>FY 20/21</i>	<i>FY 21/22</i>	<i>FY 22/23</i>	<i>FY 23/24</i>	<i>FY 24/25</i>
Miscellaneous	\$ -	\$ 2,098,803	\$ 2,479,328	\$ 2,828,711	\$ 3,039,000	\$ 3,292,000	\$ 3,478,000	\$ 3,215,000	\$ 3,353,000
Safety Fire-PEPRA	17	114	490	1,185	2,400	3,600	4,800	5,800	6,500
Safety Police-PEPRA	42	139	557	1,513	3,200	5,000	6,800	8,300	9,400
Safety-Tier 1	833,853	1,017,949	1,268,454	1,545,867	1,733,000	1,957,000	2,139,000	2,250,000	2,362,000
Safety-Tier 2	419,403	537,791	717,865	915,312	1,075,000	1,258,000	1,410,000	1,498,000	1,587,000
Safety-Tier 3 Police	-	-	11,683	12,394	14,000	16,000	18,000	6,400	7,700
Safety-Tier 3 Fire	-	-	3,919	4,230	5,000	5,900	6,800	3,400	4,000
Totals	\$ 1,253,315	\$ 3,654,796	\$ 4,482,296	\$ 5,309,212	\$ 5,871,600	\$ 6,537,500	\$ 7,063,400	\$ 6,986,900	\$ 7,329,600
<i>Net Change Aug 17 vs Aug 18</i>	<i>FY 16/17</i>	<i>FY 17/18</i>	<i>FY 18/19</i>	<i>FY 19/20</i>	<i>FY 20/21</i>	<i>FY 21/22</i>	<i>FY 22/23</i>	<i>FY 23/24</i>	<i>FY 24/25</i>
Miscellaneous	\$ -	\$ -	\$ -	\$ (88,289)	\$ (226,000)	\$ (400,000)	\$ (587,000)	\$ (785,000)	\$ (867,000)
Safety Fire-PEPRA	-	-	-	85	300	500	600	800	900
Safety Police-PEPRA	-	-	-	313	900	1,600	2,200	2,900	3,300
Safety-Tier 1	-	-	-	(7,133)	(22,000)	(55,000)	(93,000)	(134,000)	(152,000)
Safety-Tier 2	-	-	-	(11,688)	(24,000)	(49,000)	(77,000)	(109,000)	(119,000)
Safety-Tier 3 Police	-	-	-	394	-	-	-	100	200
Safety-Tier 3 Fire	-	-	-	30	-	100	100	300	300
Totals	\$ -	\$ -	\$ -	\$ (106,288)	\$ (270,800)	\$ (501,800)	\$ (754,100)	\$ (1,023,900)	\$ (1,133,300)

Total

<i>As of August, 2017</i>	<i>FY 16/17</i>	<i>FY 17/18</i>	<i>FY 18/19</i>	<i>FY 19/20</i>	<i>FY 20/21</i>	<i>FY 21/22</i>	<i>FY 22/23</i>	<i>FY 23/24</i>	<i>FY 24/25</i>
Miscellaneous	\$ 3,300,064	\$ 3,279,945	\$ 3,690,393	\$ 4,196,294	\$ 4,667,735	\$ 5,094,735	\$ 5,467,735	\$ 5,402,735	\$ 5,622,735
Safety Fire-PEPRA	86,819	10,465	71,809	74,213	79,361	80,361	81,461	82,261	82,861
Safety Police-PEPRA	95,498	23,787	70,378	72,777	77,939	79,039	80,239	81,039	81,739
Safety-Tier 1	993,082	1,262,550	1,454,327	1,746,215	1,963,369	2,220,369	2,440,369	2,592,369	2,722,369
Safety-Tier 2	1,976,129	2,300,726	2,292,957	2,570,036	2,869,977	3,077,977	3,257,977	3,377,977	3,476,977
Safety-Tier 3 Police	131,888	129,491	184,252	191,372	207,916	209,916	211,916	200,216	201,416
Safety-Tier 3 Fire	139,132	23,023	103,876	108,098	117,322	118,122	119,022	115,422	116,022
Totals	\$ 6,722,612	\$ 7,029,987	\$ 7,867,992	\$ 8,959,005	\$ 9,983,618	\$ 10,880,518	\$ 11,658,718	\$ 11,852,018	\$ 12,304,118
Projected Annual Increase		\$ 307,375	\$ 838,005	\$ 1,091,013	\$ 1,024,613	\$ 896,900	\$ 778,200	\$ 193,300	\$ 452,100
<i>As of August, 2018</i>	<i>FY 16/17</i>	<i>FY 17/18</i>	<i>FY 18/19</i>	<i>FY 19/20</i>	<i>FY 20/21</i>	<i>FY 21/22</i>	<i>FY 22/23</i>	<i>FY 23/24</i>	<i>FY 24/25</i>
Miscellaneous	\$ 3,300,064	\$ 3,279,945	\$ 3,690,393	\$ 4,150,363	\$ 4,439,227	\$ 4,692,227	\$ 4,878,227	\$ 4,615,227	\$ 4,753,227
Safety Fire-PEPRA	86,819	10,465	71,809	90,748	92,704	93,904	95,104	96,104	96,804
Safety Police-PEPRA	95,498	23,787	70,378	152,287	155,222	157,022	158,822	160,322	161,422
Safety-Tier 1	993,082	1,262,550	1,454,327	1,739,082	1,941,369	2,165,369	2,347,369	2,458,369	2,570,369
Safety-Tier 2	1,976,129	2,300,726	2,292,957	2,558,348	2,845,977	3,028,977	3,180,977	3,268,977	3,357,977
Safety-Tier 3 Police	131,888	129,491	184,252	191,766	207,916	209,916	211,916	200,316	201,616
Safety-Tier 3 Fire	139,132	23,023	103,876	114,502	121,604	122,504	123,404	120,004	120,604
Totals	\$ 6,722,612	\$ 7,029,987	\$ 7,867,992	\$ 8,997,096	\$ 9,804,019	\$ 10,469,919	\$ 10,995,819	\$ 10,919,319	\$ 11,262,019
Projected Annual Increase		\$ 307,375	\$ 838,005	\$ 1,129,104	\$ 806,923	\$ 665,900	\$ 525,900	\$ (76,500)	\$ 342,700
Prior Projection Aug 17			\$ 838,005	\$ 1,091,013	\$ 1,024,613	\$ 896,900	\$ 778,200	\$ 193,300	\$ 452,100
Net Difference			\$ -	\$ 38,091	\$ (217,691)	\$ (231,000)	\$ (252,300)	\$ (269,800)	\$ (109,400)
Net Change Aug 17 vs Aug 18	<i>FY 16/17</i>	<i>FY 17/18</i>	<i>FY 18/19</i>	<i>FY 19/20</i>	<i>FY 20/21</i>	<i>FY 21/22</i>	<i>FY 22/23</i>	<i>FY 23/24</i>	<i>FY 24/25</i>
Miscellaneous	\$ -	\$ -	\$ -	\$ (45,931)	\$ (228,508)	\$ (402,508)	\$ (589,508)	\$ (787,508)	\$ (869,508)
Safety Fire-PEPRA	-	-	-	16,535	13,343	13,543	13,643	13,843	13,943
Safety Police-PEPRA	-	-	-	79,510	77,283	77,983	78,583	79,283	79,683
Safety-Tier 1	-	-	-	(7,133)	(22,000)	(55,000)	(93,000)	(134,000)	(152,000)
Safety-Tier 2	-	-	-	(11,688)	(24,000)	(49,000)	(77,000)	(109,000)	(119,000)
Safety-Tier 3 Police	-	-	-	394	-	-	-	100	200
Safety-Tier 3 Fire	-	-	-	6,404	4,282	4,382	4,382	4,582	4,582
Totals	\$ -	\$ -	\$ -	\$ 38,091	\$ (179,600)	\$ (410,600)	\$ (662,900)	\$ (932,700)	\$ (1,042,100)



CalPERS Unfunded Liabilities and Funding Strategy



Robin Bertagna, CPA, Finance Director
September 18, 2018

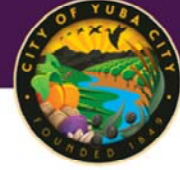
Tonight I'd like to review the City's CalPERS unfunded liabilities and discuss a funding strategy to address them.

First I'll provide an overview update of the most recent actuarial reports received by the City.

Next, I'll show you the projected future citywide CalPERS retirement costs.

I'll talk about Actions we have taken to date to address rising CalPERS costs and then discuss both short-term and long-term actions that have been evaluated.

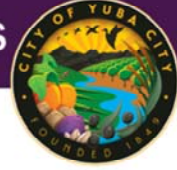
Unfunded Liabilities Update



	6/30/2016	6/30/2017	Change
Assets	\$ 171,871,161	\$ 187,910,092	\$ 16,038,931
Liabilities	\$ (245,205,988)	\$ (258,279,864)	\$ (13,073,876)
UAL	<u>\$ (73,334,827)</u>	<u>\$ (70,369,772)</u>	<u>\$ 2,965,055</u>

This compares the June 30, 2016 to the June 30, 2017 actuarial reports. There is a lag in time between when the reports are dated and when they are received by the City. The 6/30/17 Reports were received by the City on August 6, 2018. The City has a total of 7 retirement plan tiers with CalPERS. This is an aggregation of all of the Assets for all 7 plans, along with all of the actuarial determined liabilities. The assets are the City's share of what has been paid by the City for employee retirements, along with the amounts contributed by employees, and the investment earnings over time that have accumulated within the plan. The liabilities are the actuarial determined cost of the future benefits estimated by CalPERS staff. In order to calculate the estimated liabilities, actuaries evaluate expected future salary increases, anticipated retirement dates, along with the estimated life expectancy of City staff. The net of these two amounts, is a negative number. The City's plans have more in estimated liabilities than in assets available. This is what is considered an "Unfunded Actuarial Liability", or UAL. More simply stated, the City owes more than it currently has available to pay out. We are not unique in this, this is common among California agencies that contract with CalPERS for retirement benefits. In looking at this you can see the City's UAL actually declined by just under \$3.0 million. This was not expected. Due to the changes in CalPERS assumptions, and the lowering of the discount rate, City staff actually expected this amount to increase, not decline. I will explain why and how this decline occurred in a few slides.

Funded Status 6/30/17 Actuarial Reports



- 71.5% for Miscellaneous Plan
- 73.75% avg for two largest Safety Plans

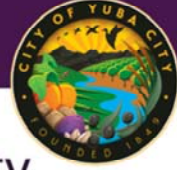
The funded status is a percentage which compares the market value of the assets on hand as of an actuarial date to the projected future benefit payments (liabilities) for retirees. If the percentage is less than 100%, it indicates the agency has a net UAL, or Unfunded Actuarial Liability.

For Yuba City the funded status percentage was:

71.5% for the Miscellaneous plan; and

A 73.75% averaged for the 2 largest Safety plans

In Total, Decline in UAL



- The UAL increased in 4 out of 6 Safety Plans
- Total Safety Plan UAL increased \$628,200
- Miscellaneous Plan UAL declined \$3,592,200

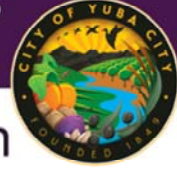
Citywide, the total UAL declined.

However, the UAL increased in 4 out of 6 of the safety plans

Overall, the UAL increased by \$628,200 in safety plans

The UAL for the Miscellaneous plan declined just under \$3.6 million

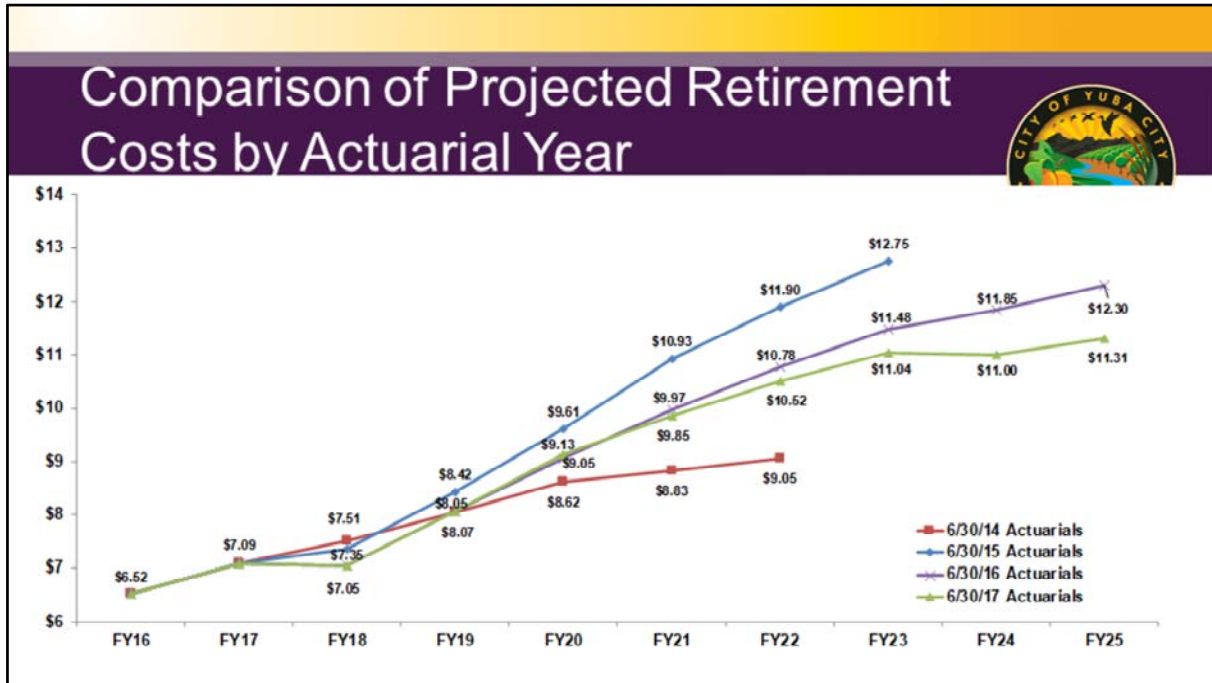
Reasons for Decline in Miscellaneous UAL



- Gain in net assets due to 11.2% return CalPERS made on investments for the yr
- Gain in liabilities because retiree COLA was less than expected
- Average salary increase less than expected for City staff

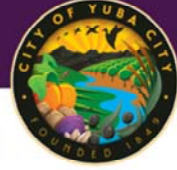
The decline in the Miscellaneous Plan UAL was attributable to 3 things:

- A gain in net assets due to the 11.2% return CalPERS made on investments for the year
- A gain in liabilities because the COLA received by retirees was less than expected
- The average salary increase was less than expected for City staff. CalPERS actuarial reports assume a 3% increase each year for City staff. For Yuba City, we have negotiated employee bargaining unit contracts which combine one-time monies with some on-going money in the past two negotiation cycles. For most City staff, during the past four fiscal years, the City has provided two 2% on-going raises. This means that CalPERS projected a 3% increase each year, which compounded over a 4 year period equals an estimated increase of 12.55%. Instead, Yuba City provided two 2% increases, or the equivalent of 4.04% compounded over the same four year period. There are exceptions to this for hard to recruit or hard to retain positions, but overall this was the case. This resulted in 'actuarial gains' causing the City's UAL to decline. We didn't further exacerbate our already existing problem and make it worse by providing on-going salary increases each year.



This shows you the City's projected retirement costs by actuarial year. The red line represents projected costs from the 6/30/14 actuarial reports, the blue is the 6/30/15 reports, purple is 6/30/16 and green is 6/30/18. You can see that the 6/30/15 reports indicated that the City's costs were expected to grow from \$6.5 million in FY 15/16 to \$12.75 million by FY 22/23. This improved with last year's actuarial reports and has once again improved with the 6/30/17 reports. We are now expecting to grow to just over \$11 million by FY 22/23. The City's projections change from year to year based upon the actuarial reports provided by CalPERS and the assumptions used along with their investment returns.

FY 2019/20 Interest on UAL



- Interest charged on UAL \$5.1 million
- UAL payment \$5.3

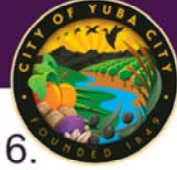
The 6/30/17 Actuarial Reports provide the rates that the City will pay for CalPERS retirements and the UAL payments required for the FY 19/20 budget year.

CalPERS charges agencies interest on the unfunded liabilities. Computing the interest on the City's UAL to CalPERS results in an interest expense of \$5.1 million for FY 19/20. Our UAL payment for FY 19/20 will be \$5.3 million. This means the City would be paying only \$200,000 towards the principal.

If we don't pay additional contributions, the interest charges keep adding up; similar to a loan where one makes mostly interest only payments and is making only minor payments towards the principal.

Next, I'd like to discuss what we've done to date to address this situation.

Actions to Date



- Established Stabilization Trust Fund in June, 2016. Balance just under \$2.5 Million
- Prepaid annual UAL costs for past 4 years saving an estimated \$300,000
- Employees now pay employee share of PERS saving \$2 million annually (not in exchange for a raise)
- PERS impacts always considered when negotiating employee contracts. One-time money given in conjunction with on-going raises to not further compound problem

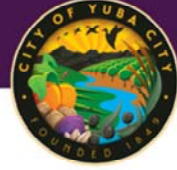
In June, 2016, City Council had the foresight to establish a Pension Stabilization Trust. Currently, the balance is just under \$2.5 million.

The City has prepaid our annual UAL costs for the past 4 years saving an estimated \$300,000 to date.

Employees now pay the employee's share of PERS. This saves the City \$2 million annually and this wasn't negotiated in exchange for a raise which would further increase the cost of retirement payments.

PERS impacts are always considered when negotiating employee contracts. As already discussed, the past 2 contract cycles have included one-time money payments in conjunction with on-going raises to not further increase the problem.

Short-Term Actions



- Pay additional contributions annually in excess of required contributions
- Negotiate a lower tier benefit to Classic employees who are new to the City
- Pay lump-sum, one-time payment to CalPERS and evaluate continuing on an annual basis if sufficient funds are available

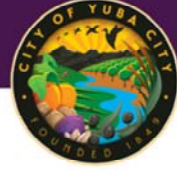
The City has evaluated potential options to paying more to CalPERS in order to reduce the UAL in total. Included are:

- 1) Pay additional contributions annually in excess of required contributions.
- 2) Negotiate a lower tier benefit to Classic (pre-PEPRA) employees who are new hires to the City.
- 3) Send a lump-sum, one-time payment to CalPERS and evaluate continuing this on an annual basis if sufficient funds are available.

Rather than committing to annual contributions, staff recommends the more conservative approach of evaluating annually if sufficient funds are available. As the City Council is well aware, there are many competing budgetary needs and this is a big priority, but staff recommends maintaining maximum flexibility.

There is a concern worth mentioning in that if the City, or any contracting agency, pay more into CalPERS and then a downturn in the market occurs... CalPERS has a bad year of investment losses for example... Then, the City, or any agency, would lose some of the value of the additional dollars contributed and have some of the liability come back to us. This is something I wanted to be sure to mention, but the risk is mitigated by the interest charges that are a certainty if we don't pay additional contributions.

Long-Term Actions

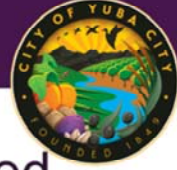


- Change type of retirement plan from Defined Benefit Plan to Defined Contribution Plan
 - \$490 Million Termination Payment to CalPERS
 - Change would have to be negotiated with all employee unions and bargaining units

Long-Term there are many different things that can happen to address CalPERS expense.

- 1) The retirement benefit plan could be changed from a Defined Benefit Plan to a Defined Contribution Plan as has been recommended by many. CalPERS requires the City to enroll all permanent employees into CalPERS upon employment. Failure to follow the City's contract exposes the City to financial penalties and legal action.
- 2) In order to move to a defined contribution plan, the City would need to do two things:
 - A) First, negotiate this change with all of the City's employee unions and bargaining units; and
 - B) Second, find the monetary resources to exit the system. CalPERS provides an estimated hypothetical termination liability in the City's actuarial reports. For 6/30/17, it totaled in excess of \$490 million.

Summary

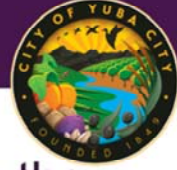


- Statewide solution must be implemented
- Pension reform is necessary as the current system is unsustainable for some member agencies
- The City has planned for large cost increases and has built them into the budget model

In Summary:

- A statewide solution must be implemented, Yuba City is not unique in addressing this problem
- Pension reform is necessary as the current system is unsustainable for some member agencies
- The City has planned for large cost increases and has built them into our budget model

Recommendation



Pay an additional \$750,000 to CalPERS in the current year from:

- \$600,000 pension stabilization trust fund
- \$150,000 Water, Wastewater and Fleet Maintenance

Doing so will save almost \$200,000 in interest expense over the next 6 years

Recommendation:

To pay an additional \$750,000 to CalPERS in the current year with:

\$600,000 from the pension stabilization trust fund; and

\$150,000 from water, wastewater and fleet maintenance.

Doing so will save the City almost \$200,000 in interest expense over the next 6 years

Questions?



CalPERS Prepayment Option Analysis
for Fixed Dollar Contribution to Unfunded Liability after ADP in September, 2018
FY 19-20

<-- equals input field from actuarial reports

	Miscellaneous	Fire PEPRA Tier	Police PEPRA Tier	Police Third Tier	Fire Third Tier	Safety Second Tier	Safety First Tier	Total
Monthly \$	\$ 223,048	\$ 98.76	\$ 126.06	\$ 1,032.83	\$ 352.49	\$ 76,276.00	\$ 128,822.29	\$ 429,756
x 12 Months	\$ 2,676,576	\$ 1,185	\$ 1,513	\$ 12,394	\$ 4,230	\$ 915,312	\$ 1,545,867	\$ 5,157,077
Annual Prepayment per Actuarial	\$ 2,584,524	\$ 1,144	\$ 1,461	\$ 11,968	\$ 4,084	\$ 883,834	\$ 1,492,704	\$ 4,979,719
Discount for Prepayment	\$ 92,052	\$ 41	\$ 52	\$ 426	\$ 146	\$ 31,478	\$ 53,163	\$ 177,358
Discount for Prepayment %	3.562%	3.594%	3.540%	3.559%	3.572%	3.562%	3.562%	3.562%

Assumed Investment Rate	2.2500%	Investment
All Tiers	Monthly	Earnings
7/1/2019	\$ 429,756	\$ -
8/1/2019	\$ 429,756	\$ 806
9/1/2019	\$ 429,756	\$ 1,612
10/1/2019	\$ 429,756	\$ 2,417
11/1/2019	\$ 429,756	\$ 3,223
12/1/2019	\$ 429,756	\$ 4,029
1/1/2020	\$ 429,756	\$ 4,835
2/1/2020	\$ 429,756	\$ 5,641
3/1/2020	\$ 429,756	\$ 6,446
4/1/2020	\$ 429,756	\$ 7,252
5/1/2020	\$ 429,756	\$ 8,058
6/1/2020	\$ 429,756	\$ 8,864
Total Est Investment Earnings		<u>\$ 53,182</u>

Net Total Estimated Savings in Excess of Lost Earnings **\$ 124,176**

CalPERS Prepayment Option Analysis
for Fixed Dollar Contribution to Unfunded Liability
FY 19-20

<-- equals input field from actuarial reports

	Miscellaneous	Fire PEPRA Tier	Police PEPRA Tier	Police Third Tier	Fire Third Tier	Safety Second Tier	Safety First Tier	Total
Monthly \$	\$ 235,726	\$ 98.76	\$ 126.06	\$ 1,032.83	\$ 352.49	\$ 76,276.00	\$ 128,822.29	\$ 442,434
x 12 Months	\$ 2,828,712	\$ 1,185	\$ 1,513	\$ 12,394	\$ 4,230	\$ 915,312	\$ 1,545,867	\$ 5,309,213
Annual Prepayment per Actuarial	\$ 2,731,429	\$ 1,144	\$ 1,461	\$ 11,968	\$ 4,084	\$ 883,834	\$ 1,492,704	\$ 5,126,624
Discount for Prepayment	\$ 97,283	\$ 41	\$ 52	\$ 426	\$ 146	\$ 31,478	\$ 53,163	\$ 182,589
Discount for Prepayment %	3.562%	3.594%	3.540%	3.559%	3.572%	3.562%	3.562%	3.562%

Assumed Investment Rate	2.1250%	Investment
All Tiers	Monthly	Earnings
7/1/2019	\$ 442,434	\$ -
8/1/2019	\$ 442,434	\$ 783
9/1/2019	\$ 442,434	\$ 1,567
10/1/2019	\$ 442,434	\$ 2,350
11/1/2019	\$ 442,434	\$ 3,134
12/1/2019	\$ 442,434	\$ 3,917
1/1/2020	\$ 442,434	\$ 4,701
2/1/2020	\$ 442,434	\$ 5,484
3/1/2020	\$ 442,434	\$ 6,268
4/1/2020	\$ 442,434	\$ 7,051
5/1/2020	\$ 442,434	\$ 7,835
6/1/2020	\$ 442,434	\$ 8,618
Total Est Investment Earnings		<u>\$ 51,710</u>

Net Total Estimated Savings in Excess of Lost Earnings **\$ 130,880**

PERS COST PROJECTIONS USING JULY 2018 ACTUARIAL REPORTS

SUMMARY (0% salary escalation)

Current Discount Rate - 7.25%								
	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25
Miscellaneous		3,873,171	4,332,511	4,630,274	4,883,274	5,069,274	4,806,274	4,944,274
Safety - Tier 1		1,422,992	1,708,037	1,895,170	2,119,170	2,301,170	2,412,170	2,524,170
Safety - Tier 2		2,075,769	2,351,994	2,592,948	2,775,948	2,927,948	3,015,948	3,104,948
Safety - Tier 3 Police		270,670	283,786	300,637	302,637	304,637	293,037	294,337
Safety - Tier 3 Fire		100,888	107,489	114,189	115,089	115,989	112,589	112,589
Safety - Police PEPR		190,236	199,839	203,167	204,967	206,767	208,267	209,367
Safety - Fire PEPR		133,903	142,887	145,275	146,475	147,675	148,675	149,375
Projected Annual Total		\$ 7,047,796	\$ 8,067,631	\$ 9,126,544	\$ 9,881,660	\$ 10,547,560	\$ 11,073,460	\$ 11,339,060
Annual Rate Increase		1,019,835	1,058,913	755,116	665,900	525,900	(76,500)	342,100
General Fund	\$	5,683,398	830,452	862,273	614,891	542,242	428,240	278,572
Other	\$	1,364,398	189,383	196,640	140,225	123,658	97,660	63,528

Per 6/30/17 Actuarial Reports

FY 19/20 Contributions--30 Year Amortization Schedule

	Safety Tier 1	Safety Tier 2	Safety Tier 3 Fire	Safety Tier 3 Police	Safety PEPRA-Fire	Safety PEPRA-Police	Miscellaneous	TOTAL	% Increase
Total UAL	\$ 22,606,593	\$ 13,903,743	\$ 6,616	\$ 31,561	\$ 12,370	\$ 15,331	\$ 33,793,558	\$ 70,369,772	
Interest on UAL @ 7.25%	\$ 1,638,978	\$ 1,008,021	\$ 480	\$ 2,288	\$ 897	\$ 1,111	\$ 2,450,033	\$ 5,101,808	
UAL Payment 19/20	\$ 1,545,867	\$ 915,312	\$ 4,230	\$ 12,394	\$ 1,185	\$ 1,513	\$ 2,828,711	\$ 5,309,212	
UAL Payment 20/21	\$ 1,733,000	\$ 1,075,000	\$ 5,000	\$ 14,000	\$ 2,400	\$ 3,200	\$ 3,039,000	\$ 5,871,600	10.6%
UAL Payment 21/22	\$ 1,957,000	\$ 1,258,000	\$ 5,900	\$ 16,000	\$ 3,600	\$ 5,000	\$ 3,292,000	\$ 6,537,500	11.3%
UAL Payment 22/23	\$ 2,139,000	\$ 1,410,000	\$ 6,800	\$ 18,000	\$ 4,800	\$ 6,800	\$ 3,478,000	\$ 7,063,400	8.0%
UAL Payment 23/24	\$ 2,250,000	\$ 1,498,000	\$ 3,400	\$ 6,400	\$ 5,800	\$ 8,300	\$ 3,215,000	\$ 6,986,900	-1.1%
UAL Payment 24/25	\$ 2,362,000	\$ 1,587,000	\$ 4,000	\$ 7,700	\$ 6,500	\$ 9,400	\$ 3,353,000	\$ 7,329,600	4.9%

Per 6/30/17 Actuarial Reports

FY 19/20 Contributions--1st Optional Amortization Period

	20 Year Safety Tier 1	20 Year Safety Tier 2	11 Year Safety Tier 3 Fire	11 Year Safety Tier 3 Police	20 Year Safety PEPRA-Fire	15 Year Safety PEPRA-Police	15 Year Miscellaneous	TOTAL	% Increase
Total UAL	\$ 22,606,593	\$ 13,903,743	\$ 6,616	\$ 31,561	\$ 12,370	\$ 15,331	\$ 33,793,558	\$ 70,369,772	
Interest on UAL @ 7.25%	\$ 1,638,978	\$ 1,008,021	\$ 480	\$ 2,288	\$ 897	\$ 1,111	\$ 2,450,033	\$ 5,101,808	
UAL Payment 19/20	\$ 1,762,859	\$ 1,111,519	\$ 4,230	\$ 12,394	\$ 3,204	\$ 4,569	\$ 3,109,889	\$ 6,008,664	
UAL Payment 20/21	\$ 1,813,541	\$ 1,143,475	\$ 4,563	\$ 13,162	\$ 3,297	\$ 4,701	\$ 3,199,299	\$ 6,182,038	2.9%
UAL Payment 21/22	\$ 1,865,680	\$ 1,176,350	\$ 4,912	\$ 13,963	\$ 3,393	\$ 4,836	\$ 3,291,279	\$ 6,360,413	2.9%
UAL Payment 22/23	\$ 1,919,319	\$ 1,210,170	\$ 5,278	\$ 14,800	\$ 3,489	\$ 4,975	\$ 3,385,903	\$ 6,543,934	2.9%
UAL Payment 23/24	\$ 1,974,499	\$ 1,244,962	\$ 1,153	\$ 2,239	\$ 3,589	\$ 5,118	\$ 3,483,247	\$ 6,714,807	2.6%
UAL Payment 24/25	\$ 2,031,266	\$ 1,280,755	\$ 1,186	\$ 2,304	\$ 3,692	\$ 5,265	\$ 3,583,391	\$ 6,907,859	2.9%

Per 6/30/17 Actuarial Reports

FY 19/20 Contributions--1st Optional Amortization Period Comparison Difference

	Safety Tier 1	Safety Tier 2	Safety Tier 3 Fire	Safety Tier 3 Police	Safety PEPRA-Fire	Safety PEPRA-Police	Miscellaneous	TOTAL
UAL Payment 19/20	\$ 216,992	\$ 196,207	\$ -	\$ -	\$ 2,019	\$ 3,056	\$ 281,178	\$ 699,452
UAL Payment 20/21	\$ 80,541	\$ 68,475	\$ (437)	\$ (838)	\$ 897	\$ 1,501	\$ 160,299	\$ 310,438
UAL Payment 21/22	\$ (91,320)	\$ (81,650)	\$ (988)	\$ (2,037)	\$ (207)	\$ (164)	\$ (721)	\$ (177,087)
UAL Payment 22/23	\$ (219,681)	\$ (199,830)	\$ (1,522)	\$ (3,200)	\$ (1,311)	\$ (1,825)	\$ (92,097)	\$ (519,466)
UAL Payment 23/24	\$ (275,501)	\$ (253,038)	\$ (2,247)	\$ (4,161)	\$ (2,211)	\$ (3,182)	\$ 268,247	\$ (272,093)
UAL Payment 24/25	\$ (330,734)	\$ (306,245)	\$ (2,814)	\$ (5,396)	\$ (2,808)	\$ (4,135)	\$ 230,391	\$ (421,741)

Per 6/30/17 Actuarial Reports

FY 19/20 Contributions--2nd Optional Amortization Period

	15 Year Safety Tier 1	15 Year Safety Tier 2	5 Year Safety Tier 3 Fire	5 Year Safety Tier 3 Police	10 Year Safety PEPRA-Fire	10 Year Safety PEPRA-Police	10 Year Miscellaneous	TOTAL	% Increase
Total UAL	\$ 22,606,593	\$ 13,903,743	\$ 6,616	\$ 31,561	\$ 12,370	\$ 15,331	\$ 33,793,558	\$ 70,369,772	
Interest on UAL @ 7.25%	\$ 1,638,978	\$ 1,008,021	\$ 480	\$ 2,288	\$ 897	\$ 1,111	\$ 2,450,033	\$ 5,101,808	
UAL Payment 19/20	\$ 2,144,774	\$ 1,352,324	\$ 4,753	\$ 12,760	\$ 4,371	\$ 6,232	\$ 4,241,532	\$ 7,766,746	
UAL Payment 20/21	\$ 2,206,436	\$ 1,391,203	\$ 4,890	\$ 13,127	\$ 4,496	\$ 6,411	\$ 4,363,476	\$ 7,990,039	2.9%
UAL Payment 21/22	\$ 2,269,871	\$ 1,431,200	\$ 5,030	\$ 13,505	\$ 4,625	\$ 6,595	\$ 4,488,926	\$ 8,219,752	2.9%
UAL Payment 22/23	\$ 2,335,130	\$ 1,472,347	\$ 5,175	\$ 13,893	\$ 4,758	\$ 6,785	\$ 4,617,982	\$ 8,456,070	2.9%
UAL Payment 23/24	\$ 2,402,265	\$ 1,514,677	\$ 5,324	\$ 14,292	\$ 4,895	\$ 6,980	\$ 4,750,749	\$ 8,699,182	2.9%
UAL Payment 24/25	\$ 2,471,330	\$ 1,558,224	\$ -	\$ -	\$ 5,036	\$ 7,181	\$ 4,887,333	\$ 8,929,104	2.6%

Per 6/30/17 Actuarial Reports

FY 19/20 Contributions--2nd Optional Amortization Period Comparison Difference

	Safety Tier 1	Safety Tier 2	Safety Tier 3 Fire	Safety Tier 3 Police	Safety PEPRA-Fire	Safety PEPRA-Police	Miscellaneous	TOTAL
UAL Payment 19/20	\$ 598,907	\$ 437,012	\$ 523	\$ 366	\$ 3,186	\$ 4,719	\$ 1,412,821	\$ 2,457,534
UAL Payment 20/21	\$ 473,436	\$ 316,203	\$ (110)	\$ (873)	\$ 2,096	\$ 3,211	\$ 1,324,476	\$ 2,118,439
UAL Payment 21/22	\$ 312,871	\$ 173,200	\$ (870)	\$ (2,495)	\$ 1,025	\$ 1,595	\$ 1,196,926	\$ 1,682,252
UAL Payment 22/23	\$ 196,130	\$ 62,347	\$ (1,625)	\$ (4,107)	\$ (42)	\$ (15)	\$ 1,139,982	\$ 1,392,670
UAL Payment 23/24	\$ 152,265	\$ 16,677	\$ 1,924	\$ 7,892	\$ (905)	\$ (1,320)	\$ 1,535,749	\$ 1,712,282
UAL Payment 24/25	\$ 109,330	\$ (28,776)	\$ (4,000)	\$ (7,700)	\$ (1,464)	\$ (2,219)	\$ 1,534,333	\$ 1,599,504