



California Public Employees' Retirement System

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July 2022

**PEPRA Miscellaneous Plan of the Sanitary District No. 5 of Marin County (CalPERS ID: 4163206459)
Annual Valuation Report as of June 30, 2021**

Dear Employer,

Attached to this letter, you will find the June 30, 2021 actuarial valuation report for the rate plan noted above. **Provided in this report is the determination of the minimum required employer contributions for fiscal year (FY) 2023-24.** In addition, the report contains important information regarding the current financial status of the plan as well as projections and risk measures to aid in planning for the future.

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, 2021.

Section 2 can be found on the CalPERS website (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 Risk Pool Actuarial Valuation Report for June 30, 2021.

Your June 30, 2021 actuarial valuation report contains important actuarial information about your pension plan at CalPERS. The plan actuary whose signature is in the Actuarial Certification is available to discuss.

Actuarial valuations are based on assumptions regarding future plan experience including investment return and payroll growth, eligibility for the types of benefits provided, and longevity among retirees. The CalPERS Board of Administration (board) adopts these assumptions after considering the advice of CalPERS actuarial and investment teams and other professionals. Each actuarial valuation reflects all prior differences between actual and assumed experience and adjusts the contribution requirements as needed. This valuation is based on an investment return assumption of 6.8%, which was adopted by the board in November 2021. Other assumptions used in this report are those recommended in the CalPERS Experience Study and Review of Actuarial Assumptions report from November 2021.

Required Contribution

The table below shows the minimum required employer contributions and the Employee PEPRA Rate for FY 2023-24 along with estimates of the required contributions for FY 2024-25. Employee 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 between the agency and the employees.**

Fiscal Year	Employer Normal Cost Rate	Employer Amortization of Unfunded Accrued Liability	PEPRA Member Rate
2023-24	7.68%	\$0	7.75%
<i>Projected Results</i>			
2024-25	7.7%	\$0	TBD

The actual investment return for FY 2021-22 was not known at the time this report was prepared. The projections above assume the investment return for that year would be 6.8%. ***To the extent the actual investment return for FY 2021-22 differs from 6.8%, the actual contribution requirements for FY 2024-25 will differ from those shown above.*** For additional details regarding the assumptions and methods used for these projections, please refer to the "Projected Employer Contributions" in the "Highlights and Executive Summary" section. This section also contains projected required contributions through FY 2028-29.

Changes from Previous Year's Valuation

On July 12, 2021, CalPERS reported a preliminary 21.3% net return on investments for FY 2020-21. Since the return exceeded the 7.00% discount rate sufficiently, the CalPERS Funding Risk Mitigation policy allows CalPERS to use a portion of the investment gain to offset the cost of reducing the expected volatility of future investment returns. Based on the thresholds specified in the policy, the excess return of 14.3% prescribes a reduction in investment volatility that corresponds to a reduction in the discount rate of 0.20%, from 7.00% to 6.80%.

On November 17, 2021, the board adopted new actuarial assumptions based on the recommendations in the November 2021 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 2023-24. In addition, the board adopted a new strategic asset allocation as part of its Asset Liability Management process. The new asset allocation along with the new capital market assumptions and economic assumptions support a discount rate of 6.80%. This includes a reduction in the price inflation assumption from 2.50% to 2.30%.

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

Questions

We understand that you might have questions about these results, and the plan actuary whose signature is on the valuation report is available to discuss. If you have other questions, you may call the Customer Contact Center at (888)-CalPERS or **(888-225-7377)**.

Sincerely,

SCOTT TERANDO, ASA, EA, MAAA, FCA, CFA
Chief Actuary



**Actuarial Valuation
as of June 30, 2021**

**for the
PEPRA Miscellaneous Plan
of the
Sanitary District No. 5 of Marin County
(CalPERS ID: 4163206459)**

**Required Contributions
for Fiscal Year
July 1, 2023 - June 30, 2024**

Table of Contents

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 Miscellaneous Plan
of the
Sanitary District No. 5 of Marin County**

(CalPERS ID: 4163206459)

(Rate Plan ID: 27151)

Table of Contents

Actuarial Certification	1
Highlights and Executive Summary	
Introduction	3
Purpose of Section 1	3
Required Contributions	4
Additional Discretionary Employer Contributions	5
Plan's Funded Status	6
Projected Employer Contributions	6
Other Pooled Miscellaneous Risk Pool Rate Plans	7
Cost	8
Changes Since the Prior Year's Valuation	9
Subsequent Events	9
Assets and Liabilities	
Breakdown of Entry Age Accrued Liability	11
Allocation of Plan's Share of Pool's Experience/Assumption Change	11
Development of Plan's Share of Pool's Market Value of Assets	11
Schedule of Plan's Amortization Bases	12
Amortization Schedule and Alternatives	13
Employer Contribution History	15
Funding History	15
Risk Analysis	
Future Investment Return Scenarios	17
Discount Rate Sensitivity	18
Mortality Rate Sensitivity	18
Maturity Measures	19
Maturity Measures History	20
Hypothetical Termination Liability	21
Participant Data	22
List of Class 1 Benefit Provisions	22
Plan's Major Benefit Options	23
PEPRA Member Contribution Rates	24

Actuarial Certification

To the best of our knowledge, this report, comprising of Sections 1 and 2, is complete and accurate and contains sufficient information to disclose, fully and fairly, the funded condition of the PEPRA Miscellaneous Plan of the Sanitary District No. 5 of Marin County and satisfies the actuarial valuation requirements of Government Code section 7504. This valuation is based on the member and financial data as of June 30, 2021 provided by the various CalPERS databases and the benefits under this plan with CalPERS as of the date this report was produced. Section 1 of this report is based on the member and financial data for Sanitary District No. 5 of Marin County, while Section 2 is based on the corresponding information for all agencies participating in the Miscellaneous Risk Pool to which the plan belongs.

As set forth in Section 2 of this report, the pool actuaries have certified that, in their opinion, the valuation of the Miscellaneous Risk Pool 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 rate plan, it is my opinion as the plan actuary that the Unfunded Accrued Liability amortization bases as of June 30, 2021 and employer contribution as of July 1, 2023 have been properly and accurately determined in accordance with the principles and standards stated above.

The undersigned is an actuary who satisfies the Qualification Standards for Actuaries Issuing Statements of Actuarial Opinion in the United States with regard to pensions.

SHELLY CHU, ASA, MAAA
Senior Pension Actuary, CalPERS

Highlights and Executive Summary

- **Introduction**
- **Purpose of Section 1**
- **Required Contributions**
- **Additional Discretionary Employer Contributions**
- **Plan's Funded Status**
- **Projected Employer Contributions**
- **Other Pooled Miscellaneous Risk Pool Rate Plans**
- **Cost**
- **Changes Since the Prior Year's Valuation**
- **Subsequent Events**

Introduction

This report presents the results of the June 30, 2021 actuarial valuation of the PEPRA Miscellaneous Plan of the Sanitary District No. 5 of Marin County of the California Public Employees' Retirement System (CalPERS). This actuarial valuation sets the required employer contributions for (FY) 2023-24.

Purpose of Section 1

This Section 1 report for the PEPRA Miscellaneous Plan of the Sanitary District No. 5 of Marin County of CalPERS was prepared by the plan actuary in order to:

- Set forth the assets and accrued liabilities of this plan as of June 30, 2021;
- Determine the minimum required employer contribution for this plan for the FY July 1, 2023 through June 30, 2024; and
- Provide actuarial information as of June 30, 2021 to the CalPERS Board of Administration (board) and other interested parties.

The pension funding information presented in this report should not be used in financial reports subject to Governmental Accounting Standards Board (GASB) Statement No. 68 for a Cost Sharing Employer Defined Benefit Pension Plan. A separate accounting valuation report for such purposes is available on the CalPERS website (www.calpers.ca.gov).

The measurements shown in this actuarial valuation may not be applicable for other purposes. The agency should contact the plan 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; changes in plan provisions or applicable law; and differences between the required contributions determined by the valuation and the actual contributions made by the agency.

Assessment and Disclosure of Risk

This report includes the following risk disclosures consistent with the recommendations of Actuarial Standards of Practice No. 51 and recommended by the California Actuarial Advisory Panel (CAAP) in the Model Disclosure Elements document:

- A "Scenario Test," projecting future results under different investment income returns.
- A "Sensitivity Analysis," showing the impact on current valuation results using alternative discount rates of 5.8% and 7.8%.
- A "Sensitivity Analysis," showing the impact on current valuation results assuming rates of mortality are 10% lower or 10% higher than our current post-retirement mortality assumptions adopted in 2021.
- Plan maturity measures indicating how sensitive a plan may be to the risks noted above.

Required Contributions

	Fiscal Year 2023-24
Required Employer Contributions	
Employer Normal Cost Rate	7.68%
<i>Plus</i>	
Required Payment on Amortization Bases¹	\$0
<i>Paid either as</i>	
1) Monthly Payment	\$0.00
<i>Or</i>	
2) Annual Prepayment Option*	\$0
Required PEPRA Member Contribution Rate	7.75%
<i>The total minimum required employer contribution is the sum of the Plan's Employer Normal Cost Rate (expressed as a percentage of payroll and paid as payroll is reported) plus the Employer Unfunded Accrued Liability (UAL) Contribution Amount (billed monthly (1) or prepaid annually (2) in dollars).</i>	
<i>* Only the UAL portion of the employer contribution can be prepaid (which must be received in full no later than July 31).</i>	
<i>For additional detail regarding the determination of the required PEPRA member contribution rate see section on PEPRA Member Contribution Rates.</i>	

	Fiscal Year 2022-23	Fiscal Year 2023-24
Development of Normal Cost as a Percentage of Payroll		
Base Total Normal Cost for Formula	14.22%	15.43%
Surcharge for Class 1 Benefits ²		
None	0.00%	0.00%
Phase out of Normal Cost Difference ³	0.00%	0.00%
Plan's Total Normal Cost	14.22%	15.43%
Plan's Employee Contribution Rate	6.75%	7.75%
Employer Normal Cost Rate	7.47%	7.68%

¹ The required payment on amortization bases does not take into account any additional discretionary payment made after April 29, 2022.

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

³ The normal cost change is phased out over a five-year period in accordance with the CalPERS contribution allocation policy.

Additional Discretionary Employer Contributions

The minimum required employer contribution towards the Unfunded Accrued Liability (UAL) for this rate plan for the 2023-24 FY is \$0. CalPERS allows agencies to make additional discretionary payments (ADPs) at any time and in any amount. These optional payments serve to reduce the UAL and future required contributions and can result in significant long-term savings. Agencies can also use ADPs to stabilize annual contributions as a fixed dollar amount, percent of payroll or percent of revenue.

Provided below are select ADP options for consideration. Making such an ADP during FY 2023-24 does not require an ADP be made in any future year, nor does it change the remaining amortization period of any portion of unfunded liability. For information on permanent changes to amortization periods, see the "Amortization Schedule and Alternatives" section of the report.

Agencies considering making an ADP should contact CalPERS for additional information.

Minimum Required Employer Contribution for Fiscal Year 2023-24

Estimated Normal Cost	Minimum UAL Payment	ADP	Total UAL Contribution	Estimated Total Contribution
\$32,164	\$0	\$0	\$0	\$32,164

Alternative Fiscal Year 2023-24 Employer Contributions for Greater UAL Reduction

Funding Target	Estimated Normal Cost	Minimum UAL Payment	ADP ¹	Total UAL Contribution	Estimated Total Contribution
N/A	N/A	N/A	N/A	N/A	N/A

¹ The ADP amounts are assumed to be made in the middle of the fiscal year. A payment made earlier or later in the fiscal year would have to be less or more than the amount shown to have the same effect on the UAL amortization.

Note that the calculations above are based on the projected Unfunded Accrued Liability as of June 30, 2023 as determined in the June 30, 2021 actuarial valuation. New unfunded liabilities can emerge in future years due to assumption or method changes, changes in plan provisions, and actuarial experience different than assumed. Making an ADP illustrated above for the indicated number of years will not result in a plan that is exactly 100% funded in the indicated number of years. Valuation results will vary from one year to the next and can diverge significantly from projections over a period of several years.

Plan's Funded Status

	June 30, 2020	June 30, 2021
1. Present Value of Projected Benefits (PVB)	\$975,548	\$1,122,379
2. Entry Age Accrued Liability (AL)	372,715	484,456
3. Plan's Market Value of Assets (MVA)	360,407	531,564
4. Unfunded Accrued Liability (UAL) [(2) - (3)]	12,308	(47,108)
5. Funded Ratio [(3) / (2)]	96.7%	109.7%

The UAL and funded ratio are assessments of the need for future employer contributions based on the 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. The funded ratio, on the other hand, is a relative measure of funded status that allows for comparison between plans of different sizes. For measures of funded status that are 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. The projection assumes that all actuarial assumptions will be realized and that no further changes to assumptions, contributions, benefits, or funding will occur during the projection period. In particular, the investment return beginning with FY 2021-22 is assumed to be 6.80% per year, net of investment and administrative expenses. Actual contribution rates during this projection period could be significantly higher or lower than the projection shown below. Future contribution requirements may differ significantly from those shown below. The actual long-term cost of the plan will depend on the actual benefits and expenses paid and the actual investment experience of the fund.

Fiscal Year	Required Contribution	Projected Future Employer Contributions (Assumes 6.80% Return for Fiscal Year 2021-22 and Beyond)				
	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29
	Rate Plan 27151 Results					
Normal Cost %	7.68%	7.7%	7.7%	7.7%	7.7%	7.7%
UAL Payment	\$0	\$0	\$0	\$0	\$0	\$0

For some sources of UAL, the change in UAL is 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 the Section 2 Report. This method phases in the impact of the change in UAL over a 5-year period in order to reduce 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 when there is a large increase in UAL, the relatively small amortization payments during the ramp up period could result in a funded ratio that is projected to decrease initially while the contribution impact of the increase in the UAL is phased in.

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

Our online pension plan projection tool, Pension Outlook, is available in the Employers section of the CalPERS website. Pension Outlook can help plan and budget pension costs under various scenarios.

Other Pooled Miscellaneous Risk Pool Rate Plans

All of the results presented in this Section 1 report, except those shown below, correspond to rate plan 27151. In many cases, employers have additional rate plans within the same risk pool. For cost analysis and budgeting it is useful to consider contributions for these rate plans as a whole rather than individually. The estimated contribution amounts and rates for all of the employer's rate plans in the Miscellaneous Risk Pool are shown below and assume that the payroll for each rate plan will grow according to the overall payroll growth assumption of 2.80% per year for three years.

	Fiscal Year	Fiscal Year
	2022-23	2023-24
Estimated Combined Employer Contributions for all Pooled Miscellaneous Rate Plans		
Projected Payroll for the Contribution Year	\$1,187,148	\$1,189,021
Estimated Employer Normal Cost	\$136,755	\$155,013
Required Payment on Amortization Bases	\$9,503	\$0
Estimated Total Employer Contributions	\$146,258	\$155,013
Estimated Total Employer Contribution Rate (illustrative only)	12.32%	13.04%

Cost

Actuarial Determination of Plan Cost

Contributions to fund the plan are comprised of two components:

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

For fiscal years prior to 2016-17, the Amortization of UAL component was expressed as a percentage of total active payroll. Starting with FY 2016-17, 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 is 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 (e.g., mortality rates, retirement rates, employment termination rates, disability rates)
- Economic assumptions (e.g., future investment earnings, inflation, salary growth rates)

These assumptions reflect CalPERS' best estimate of future experience of the plan and are long term in nature. We recognize that all assumptions will not be realized in any given year. For example, the investment earnings at CalPERS have averaged 6.9% over the 20 years ending June 30, 2021, yet individual fiscal year returns have ranged from -23.6% to +21.3%. In addition, CalPERS reviews all actuarial assumptions by conducting in-depth experience studies every four years, with the most recent experience study completed in 2021.

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 of the Section 2 Report for a summary of the plan provisions used in this valuation.

Actuarial Methods and Assumptions

On November 17, 2021, the board adopted new actuarial assumptions based on the recommendations in the 2021 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 2023-24. In addition, the board adopted a new asset portfolio as part of its Asset Liability Management process. The new asset mix supports a 6.80% discount rate, which reflects a change in the price inflation assumption to 2.30%.

Subsequent Events

The contribution requirements determined in this actuarial valuation report are based on demographic and financial information as of June 30, 2021. Changes subsequent to that date are not reflected. Investment returns below the assumed rate of return may increase future required contributions while investment returns above the assumed rate of return may decrease future required contributions.

The projected employer contributions on Page 6 are calculated under the assumption that the discount rate remains at 6.8% going forward and that the realized rate of return on assets for FY 2021-22 is 6.8%.

This actuarial valuation report reflects statutory changes, regulatory changes and board actions through January 2022. Any subsequent changes or actions are not reflected.

Assets and Liabilities

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

Breakdown of Entry Age Accrued Liability

Active Members	\$466,669
Transferred Members	7,818
Terminated Members	9,969
Members and Beneficiaries Receiving Payments	0
Total	\$484,456

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	\$484,456
2. Projected UAL balance at 6/30/2021	10,350
3. Pool's Accrued Liability ¹	20,794,529,023
4. Sum of Pool's Individual Plan UAL Balances at 6/30/2021 ¹	4,597,734,264
5. Pool's 2020/21 Investment (Gain)/Loss ¹	(2,338,185,055)
6. Pool's 2020/21 Non-Investment (Gain)/Loss ¹	(84,077,623)
7. Plan's Share of Pool's Investment (Gain)/Loss: $[(1) - (2)] \div [(3) - (4)] \times (5)$	(68,442)
8. Plan's Share of Pool's Non-Investment (Gain)/Loss: $(1) \div (3) \times (6)$	(1,959)
9. Plan's New (Gain)/Loss as of 6/30/2021: $(7) + (8)$	(70,401)
10. Increase in Pool's Accrued Liability due to Change in Assumptions ¹	60,407,898
11. Plan's Share of Pool's Change in Assumptions: $(1) \div (3) \times (10)$	1,407
12. Increase in Pool's Accrued Liability due to Funding Risk Mitigation ¹	495,172,731
13. Plan's Share of Pool's Change due to Funding Risk Mitigation: $(1) \div (3) \times (12)$	11,536
14. Offset due to Funding Risk Mitigation	(17,183)
15. Plan's Net Investment (Gain): $(7) - (14)$	(51,259)

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

16. Plan's UAL: $(2) + (9) + (11) + (13)$	(\$47,108)
17. Plan's Share of Pool's MVA: $(1) - (16)$	\$531,564

Schedule of Plan's Amortization Bases

Note that there is a two-year lag between the valuation date and the start of the contribution fiscal year.

- The assets, liabilities, and funded status of the plan are measured as of the valuation date: June 30, 2021.
- The required employer contributions determined by the valuation are for the fiscal year beginning two years after the valuation date: FY 2023-24.

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 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 Est.	Ramp Level 2023-24	Ramp Shape	Escalation Rate	Amort. Period	Balance 6/30/21	Expected Payment 2021-22	Balance 6/30/22	Expected Payment 2022-23	Balance 6/30/23	Minimum Required Payment 2023-24
Fresh Start	6/30/21				N/A	(47,108)	(5,901)	(44,213)	(5,731)	(41,297)	0
Total						(47,108)	(5,901)	(44,213)	(5,731)	(41,297)	0

The (gain)/loss bases are the plan's allocated share of the risk pool's (gain)/loss for the fiscal year as disclosed in "Allocation of Plan's Share of Pool's Experience/Assumption Change" earlier in this section. These (gain)/loss bases will be amortized in accordance with the CalPERS amortization policy in effect at the time the base was established.

Amortization Schedule and Alternatives

The amortization schedule on the previous page(s) shows the minimum contributions required according to the CalPERS amortization policy. Many agencies have expressed a desire for a more stable pattern of payments or have indicated interest in paying off the unfunded accrued liabilities more quickly than required. As such, we have provided alternative amortization schedules to help analyze the current amortization schedule and illustrate the potential savings 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) alternative "fresh start" amortization schedules using two sample periods that would both result in interest savings relative to the current amortization schedule. To initiate a Fresh Start, please contact the plan actuary.

The Current Amortization Schedule typically contains both positive and negative bases. Positive bases result from plan changes, assumption changes, method changes or plan experience that increase unfunded liability. Negative bases result from plan changes, assumption changes, method changes, or plan experience that decrease 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:

- When a negative payment would be required on a positive unfunded actuarial liability; or
- When the payment would completely amortize the total unfunded liability in a very short time period, and results in a large change in the employer contribution requirement.

In any year when 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 an appropriate 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 (continued)

Date	<u>Current Amortization Schedule</u>		<u>Alternate Schedules</u>			
	Balance	Payment	N/A Year Amortization		N/A Year Amortization	
			Balance	Payment	Balance	Payment
6/30/2023	N/A	N/A	N/A	N/A	N/A	N/A
6/30/2024						
6/30/2025						
6/30/2026						
6/30/2027						
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6/30/2029						
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6/30/2047						
6/30/2048						
6/30/2049						
6/30/2050						
6/30/2051						
6/30/2052						
Total		N/A		N/A		N/A
Interest Paid		N/A		N/A		N/A
Estimated Savings				N/A		N/A

Employer Contribution History

The table below provides a recent history of the required employer contributions for the plan. The amounts are based on the actuarial valuation from two years prior and does not account for prepayments or benefit changes made during a fiscal year. Additional discretionary payments before July 1, 2019 or after June 30, 2021 are not included.

Fiscal Year	Employer Normal Cost	Unfunded Liability Payment (\$)	Additional Discretionary Payments
2016 - 17	6.555%	\$0	N/A
2017 - 18	6.533%	29	N/A
2018 - 19	6.842%	2,414	N/A
2019 - 20	6.985%	665	10,888
2020 - 21	7.732%	2,569	2,676
2021 - 22	7.59%	665	
2022 - 23	7.47%	335	
2023 - 24	7.68%	0	

Funding History

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

Valuation Date	Accrued Liability (AL)	Share of Pool's Market Value of Assets (MVA)	Unfunded Accrued Liability (UAL)	Funded Ratio	Annual Covered Payroll
06/30/2013	\$6,346	\$8,514	(\$2,168)	134.2%	\$121,212
06/30/2014	31,160	35,083	(3,923)	112.6%	133,674
06/30/2015	64,286	64,522	(236)	100.4%	154,016
06/30/2016	106,798	98,456	8,342	92.2%	168,222
06/30/2017	160,216	153,810	6,406	96.0%	241,457
06/30/2018	231,317	226,198	5,119	97.8%	260,318
06/30/2019	287,584	275,704	11,880	95.9%	344,756
06/30/2020	372,715	360,407	12,308	96.7%	418,798
06/30/2021	484,456	531,564	(47,108)	109.7%	385,510

Risk Analysis

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

Future Investment Return Scenarios

Analysis using the investment return scenarios from the Asset Liability Management process completed in 2021 was performed to determine the effects of various future investment returns on required employer contributions. The projections below reflect the impact of the CalPERS Funding Risk Mitigation policy. The projections also assume that all other actuarial assumptions will be realized and that no further changes in assumptions, contributions, benefits, or funding will occur.

The first table shows projected contribution requirements if the fund were to earn either 3.0% or 10.8% annually. These alternate investment returns were chosen because 90% of long-term average returns are expected to fall between them over the 20-year period ending June 30, 2041.

Assumed Annual Return FY 2021-22 through 2040-41	Projected Employer Contributions				
	2024-25	2025-26	2026-27	2027-28	2028-29
3.0% (5th percentile)					
Normal Cost Rate	7.7%	7.7%	7.7%	7.7%	7.7%
UAL Contribution	\$0	\$29	\$580	\$1,700	\$3,300
10.8% (95th percentile)					
Normal Cost Rate	7.9%	8.1%	8.3%	8.5%	8.7%
UAL Contribution	\$0	\$0	\$0	\$0	\$0

Required contributions outside of this range are also possible. In particular, whereas it is unlikely that investment returns will average less than 3.0% or greater than 10.8% over a 20-year period, the likelihood of a single investment return less than 3.0% or greater than 10.8% in any given year is much greater. The following analysis illustrates the effect of an extreme, single year investment return.

The portfolio has an expected volatility (or standard deviation) of 12.0% per year. Accordingly, in any given year there is a 16% probability that the annual return will be -5.2% or less and a 2.5% probability that the annual return will be -17.2% or less. These returns represent one and two standard deviations below the expected return of 6.8%.

The following table shows the effect of a one or two standard deviation investment loss in FY 2021-22 on the FY 2024-25 contribution requirements. Note that a single-year investment gain or loss decreases or increases the required UAL contribution amount incrementally for each of the next five years, not just one, due to the 5-year ramp in the amortization policy. However, the contribution requirements beyond the first year are also impacted by investment returns beyond the first year. Historically, significant downturns in the market are often followed by higher than average returns. Such investment gains would offset the impact of these single year negative returns in years beyond FY 2024-25.

Assumed Annual Return for Fiscal Year 2021-22	Required Employer Contributions	Projected Employer Contributions
	2023-24	2024-25
(17.2)% (2 standard deviation loss)		
Normal Cost Rate	7.68%	7.7%
UAL Contribution	\$0	\$2,200
(5.2)% (1 standard deviation loss)		
Normal Cost Rate	7.68%	7.7%
UAL Contribution	\$0	\$620

- Without investment gains (returns higher than 6.8%) in year FY 2022-23 or later, projected contributions rates would continue to rise over the next four years due to the continued phase-in of the impact of the illustrated investment loss in FY 2021-22.
- The Pension Outlook Tool can be used to model projected contributions for these scenarios beyond FY 2024-25 as well as to model other investment return scenarios.

Discount Rate Sensitivity

The discount rate assumption is calculated as the sum of the assumed real rate of return and the assumed annual price inflation, currently 4.5% and 2.3%, respectively. Changing either the price inflation assumption or the real rate of return assumption will change the discount rate. The sensitivity of the valuation results to the discount rate assumption depends on which component of the discount rate is changed. Shown below are various valuation results as of June 30, 2021 assuming alternate discount rates by changing the two components independently. Results are shown using the current discount rate of 6.8% as well as alternate discount rates of 5.8% and 7.8%. The rates of 5.8% and 7.8% were selected since they illustrate the impact of a 1.0% increase or decrease to the 6.8% assumption.

Sensitivity to the Real Rate of Return Assumption

As of June 30, 2021	1% Lower Real Return Rate	Current Assumptions	1% Higher Real Return Rate
Discount Rate	5.8%	6.8%	7.8%
Inflation	2.3%	2.3%	2.3%
Real Rate of Return	3.5%	4.5%	5.5%
a) Total Normal Cost	19.32%	15.43%	12.47%
b) Accrued Liability	\$577,967	\$484,456	\$408,666
c) Market Value of Assets	\$531,564	\$531,564	\$531,564
d) Unfunded Liability/(Surplus) [(b) - (c)]	\$46,403	(\$47,108)	(\$122,898)
e) Funded Ratio	92.0%	109.7%	130.1%

Sensitivity to the Price Inflation Assumption

As of June 30, 2021	1% Lower Inflation Rate	Current Assumptions	1% Higher Inflation Rate
Discount Rate	5.8%	6.8%	7.8%
Inflation	1.3%	2.3%	3.3%
Real Rate of Return	4.5%	4.5%	4.5%
a) Total Normal Cost	16.27%	15.43%	14.03%
b) Accrued Liability	\$505,638	\$484,456	\$442,397
c) Market Value of Assets	\$531,564	\$531,564	\$531,564
d) Unfunded Liability/(Surplus) [(b) - (c)]	(\$25,926)	(\$47,108)	(\$89,167)
e) Funded Ratio	105.1%	109.7%	120.2%

Mortality Rate Sensitivity

The following table looks at the change in the June 30, 2021 plan costs and funded status under two different longevity scenarios, namely assuming post-retirement rates of mortality are 10% lower or 10% higher than our current mortality assumptions adopted in 2021. This type of analysis highlights the impact on the plan of improving or worsening mortality over the long-term.

As of June 30, 2021	10% Lower Mortality Rates	Current Assumptions	10% Higher Mortality Rates
a) Total Normal Cost	15.71%	15.43%	15.18%
b) Accrued Liability	\$494,417	\$484,456	\$475,257
c) Market Value of Assets	\$531,564	\$531,564	\$531,564
d) Unfunded Liability/(Surplus) [(b) - (c)]	(\$37,147)	(\$47,108)	(\$56,307)
e) Funded Ratio	107.5%	109.7%	111.8%

Maturity Measures

As pension plans mature they become more sensitive to risks. Understanding plan maturity and how it affects the ability of a pension plan sponsor to tolerate risk is important in understanding how the pension plan is impacted by investment return volatility, other economic variables and changes in longevity or other demographic assumptions. Since it is the employer that bears the risk, it is appropriate to perform this analysis on a pension plan level considering all rate plans. The following measures are for one rate plan only.

One way to look at the maturity level of CalPERS and its plans is to look at the ratio of a plan's retiree liability to its total liability. A pension plan in its infancy will have a very low ratio of retiree liability to total liability. As the plan matures, the ratio starts increasing. A mature plan will often have a ratio above 60%-65%.

Ratio of Retiree Accrued Liability to Total Accrued Liability	June 30, 2020	June 30, 2021
1. Retired Accrued Liability	\$0	\$0
2. Total Accrued Liability	372,715	484,456
3. Ratio of Retiree AL to Total AL [(1) / (2)]	0.00	0.00

Another measure of maturity level of CalPERS and its plans is to look at the ratio of actives to retirees, also called the support ratio. A pension plan in its infancy will have a very high ratio of active to retired members. As the plan matures and members retire, the ratio declines. A mature plan will often have a ratio near or below one.

To calculate the support ratio for the rate plan, retirees and beneficiaries receiving a continuance are each counted as one, even though they may have only worked a portion of their careers as an active member of this rate plan. For this reason, the support ratio, while intuitive, may be less informative than the ratio of retiree liability to total accrued liability above. For comparison, the support ratio for all CalPERS public agency plans is 0.82 and is calculated consistently with how it is for the individual rate plan. Note that to calculate the support ratio for all public agency plans, a retiree with service from more than one CalPERS agency is counted as a retiree more than once.

Support Ratio	June 30, 2020	June 30, 2021
1. Number of Actives	5	4
2. Number of Retirees	0	0
3. Support Ratio [(1) / (2)]	N/A	N/A

Maturity Measures (Continued)

The actuarial calculations supplied in this communication are based on various assumptions about long-term demographic and economic behavior. Unless these assumptions (e.g., terminations, deaths, disabilities, retirements, salary growth, 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

Shown in the table below is the asset volatility ratio (AVR), which is the ratio of market value of assets to payroll. Plans that have higher AVR 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. 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

Also shown in the table below is the liability volatility ratio (LVR), which is the ratio of accrued liability to payroll. Plans that have a higher LVR experience more volatile employer contributions (as a percentage of payroll) due to changes in liability. For example, a plan with LVR ratio of 8 is expected to have twice the contribution volatility of a plan with LVR of 4. It should be noted that this ratio indicates a longer-term potential for contribution volatility, since the AVR, described above, will tend to move closer to the LVR as the funded ratio approaches 100%.

Contribution Volatility	June 30, 2020	June 30, 2021
1. Market Value of Assets	\$360,407	\$531,564
2. Payroll	418,798	385,510
3. Asset Volatility Ratio (AVR) [(1) / (2)]	0.9	1.4
4. Accrued Liability	\$372,715	\$484,456
5. Liability Volatility Ratio (LVR) [(4) / (2)]	0.9	1.3

Maturity Measures History

Valuation Date	Ratio of Retiree Accrued Liability to Total Accrued Liability	Support Ratio	Asset Volatility Ratio	Liability Volatility Ratio
06/30/2017	0.00	N/A	0.6	0.7
06/30/2018	0.00	N/A	0.9	0.9
06/30/2019	0.00	N/A	0.8	0.8
06/30/2020	0.00	N/A	0.9	0.9
06/30/2021	0.00	N/A	1.4	1.3

Hypothetical Termination Liability

The hypothetical termination liability is an estimate of the financial position of the plan had the contract with CalPERS been terminated as of June 30, 2021. 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 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 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 19-month period from 12 months before the valuation date to seven months after.

Market Value of Assets (MVA)	Hypothetical Termination Liability^{1,2} at 1.00%	Funded Ratio	Unfunded Termination Liability at 1.00%	Hypothetical Termination Liability^{1,2} at 2.25%	Funded Ratio	Unfunded Termination Liability at 2.25%
\$531,564	\$1,141,398	46.6%	\$609,834	\$868,163	61.2%	\$336,599

¹ The hypothetical liabilities calculated above include a 5% contingency load. The contingency load and other actuarial assumptions can be found in Appendix A.

² The discount rate 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 2.00% on June 30, 2021, the valuation date.

In order to terminate the plan, first contact our Pension Contract Services unit to initiate a Resolution of Intent to Terminate. The completed Resolution will allow the plan actuary to provide a preliminary termination valuation with a more up-to-date estimate of the plan liabilities. Before beginning this process, please consult with the plan actuary.

Participant Data

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

	June 30, 2020	June 30, 2021
Active Members		
Counts	5	4
Average Attained Age	43.29	45.79
Average Entry Age to Rate Plan	39.74	40.70
Average Years of Credited Service	3.59	5.12
Average Annual Covered Pay	\$83,760	\$96,378
Annual Covered Payroll	\$418,798	\$385,510
Present Value of Future Payroll	\$4,014,946	\$3,918,297
Transferred Members	1	1
Separated Members	1	1
Retired Members and Beneficiaries		
Counts*	0	0
Average Annual Benefits*	\$0	\$0

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.

* Values include community property settlements.

List of Class 1 Benefit Provisions

This plan has the additional Class 1 Benefit Provisions:

- None

Plan's Major Benefit Options

Shown below is a summary of the major optional benefits for which the agency has contracted. A description of principal standard and optional plan provisions is in Section 2.

	Benefit Group	
Member Category	Misc	
Demographics		
Actives	Yes	
Transfers/Separated	Yes	
Receiving	No	
Benefit Provision		
Benefit Formula	2% @ 62	
Social Security Coverage	Yes	
Full/Modified	Full	
Employee Contribution Rate	6.75%	
Final Average Compensation Period	Three Year	
Sick Leave Credit	Yes	
Non-Industrial Disability	Standard	
Industrial Disability	No	
Pre-Retirement Death Benefits		
Optional Settlement 2	Yes	
1959 Survivor Benefit Level	No	
Special	No	
Alternate (firefighters)	No	
Post-Retirement Death Benefits		
Lump Sum	\$500	
Survivor Allowance (PRSA)	No	
COLA	2%	

PEPRA Member Contribution Rates

The California Public Employees’ Pension Reform Act of 2013 (PEPRA) established new benefit formulas, final compensation period, and contribution requirements for “new” employees (generally those first hired into a CalPERS-covered position on or after January 1, 2013). In accordance with Government Code Section 7522.30(b), “new members ... shall have an initial contribution rate of at least 50% of the normal cost rate.” The normal cost rate is dependent on the plan of retirement benefits, actuarial assumptions, and demographics of the risk pool, particularly members’ entry age. Should the total normal cost rate change by more than 1% from the base total normal cost rate, the new member rate shall be 50% of the new normal cost rate rounded to the nearest quarter percent.

The table below shows the determination of the PEPRA member contribution rates effective July 1, 2023, based on 50% of the total normal cost rate as of the June 30, 2021 valuation.

Rate Plan Identifier	Benefit Group Name	Basis for Current Rate		Rates Effective July 1, 2023			
		Total Normal Cost	Member Rate	Total Normal Cost	Change	Change Needed	Member Rate
27151	Miscellaneous PEPRA Level	13.735%	6.75%	15.43%	1.695%	Yes	7.75%

Section 2

CALIFORNIA PUBLIC EMPLOYEES' RETIREMENT SYSTEM

Risk Pool Actuarial Valuation Information

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