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April 11, 2024

Teachers' Retirement Board
CalSTRS
P. O. Box 15275
Sacramento, CA 95851-0275

Re: Actuarial Projection of SBMA Funding Sufficiency

Dear Members of the Board:

The purpose of this letter is to analyze whether the Supplemental Benefit Maintenance Account (SBMA) is projected to have sufficient funds, along with expected future contributions, to pay purchasing power benefits in the future. At the current 85% purchasing power level, the current SBMA assets plus expected future contributions are projected to be sufficient to pay all expected purchasing power benefits through June 30, 2089. Based on the relevant sections of the Education Code and the SBMA regulations, the calculated purchasing power level remains at 85% for payments in the fiscal year beginning July 1, 2024.

Background

Sections 22954, 22954.1, 24415, 24415.5 and 24416 of the Education Code apply to the SBMA and purchasing power benefits:

- **Purchasing Power Level** – The benefits paid from the SBMA maintain the purchasing power of current benefits to at least 80% of the member's original benefit. Currently the purchasing power level is set at 85%.
- **Flexible Purchasing Power Level** – The Board has the authority to adjust the percentage of purchasing power protection maintained by the SBMA within a range of 80% to 85%. This adjustment is based on an actuarial projection adopted by the Board that evaluates the sufficiency of resources available to pay the benefit over a period of time established by the Board. Board regulations regarding the actuarial projection of the SBMA include a period of sufficiency through 2089.
- **Increases in Benefits based on Year of Retirement** – Senate Bill 868 was enacted in 2022, which added Section 24410.8 of the Education code and provided a one-time permanent increase in benefits first payable July 1, 2023, for retirees and beneficiaries with an initial retirement commencement year before 1999, with the adjustment being greater for those who have been retired the longest. Note that for beneficiaries of deceased retirees, the retirement date is based on the member's original retirement date. The adjustment applies to the sum of the monthly allowance, which reflects the 2% annual benefit adjustment, and the purchasing power payments to date. These additional payments are paid from the SBMA.



The following schedule details the percentage increases in the benefits for retirees and beneficiaries as specified in Section 24410.8:

Retirement Date	Increase
After December 31, 1998	0%
January 1, 1990 to December 31, 1998	5%
January 1, 1980 to December 31, 1989	10%
Prior to January 1, 1980	15%

- **State Contributions** – The annual state appropriation to the SBMA is 2.5% of payroll in the fiscal year preceding the prior calendar year, reduced by \$72,000,000.

Projection Results

Based on the assumptions used in this analysis, current funds and future contributions are projected to be sufficient to pay all purchasing power benefits at the 85% level through the fiscal year ending in 2089 without depleting the SBMA. Based on these projections, the relevant sections of the Education Code and the SBMA regulations, the calculated purchasing power level remains at 85% for payments in the fiscal year beginning July 1, 2024. The projection results are sensitive to future experience and changes in the assumptions as discussed later in this report.

The projected SBMA funding provides some margin over the expected purchasing power benefits at the 85% level. This margin is approximately equivalent to an additional 5% purchasing power benefit. In other words, the current SBMA balance plus expected future contributions would be projected to sufficiently pay purchasing power benefits at approximately a 90% level (although that is not allowed under current law) through the fiscal year ending in 2089 based on the assumptions used in this analysis.

The results are consistent with the previous study in that the current funding level is projected to be sufficient to maintain an 85% purchasing power level. The margin decreased from 7% in the prior analysis to 5% in this analysis; that is, the prior study showed the program was projected to be sufficient at a 92% purchasing power level and the current study projects the program to be sufficient at a 90% purchasing power level. Thus, the funding position of the SBMA is not as strong as the previous projection, although there is still some margin at the current 85% level.

The reason the margin reflected in this year’s study is less than the results of the study completed in 2022 is that the total inflation for the last two years (8.27% for 2022 and 3.10% for 2023 for a combined actual inflation of 11.63%) was greater than the assumed inflation over the two-year period (2.75% per year for a combined assumed inflation of 5.58%), additional SBMA benefits were granted under Section 24410.8, and the assumption for future payroll growth was lowered with the 2024 Experience Analysis. Note that the payroll growth assumption was lowered to reflect a potential reduction in the number of teachers in the future caused by an anticipated decline in K-12 enrollment. These factors increased the projected purchasing power benefits to be paid or reduced projected contributions expected to be collected and therefore reduced the margin. This was partially offset by the payroll increasing more than expected, which resulted in a significant increase in projected contributions to the SBMA, and slightly lower life expectancies due to the new mortality assumptions adopted with

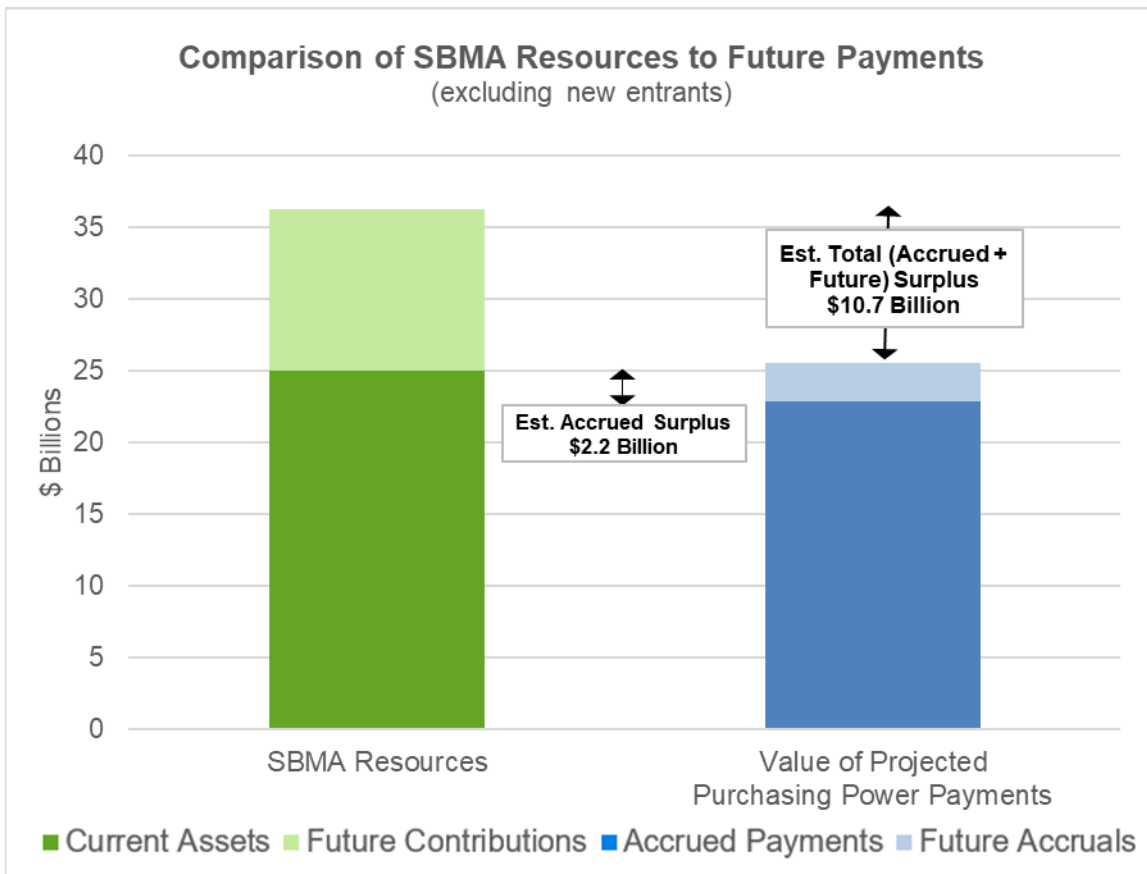
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the 2024 Experience Analysis, which somewhat moderated the increase in benefits. In total these factors caused the reduction in the margin.

Comparison of Current Resources and Liabilities

Currently the SBMA has a projected funded surplus of \$10.7 billion for current DB Program members as of June 30, 2023 based on assumed inflation of 2.75%. That is, the value of the current resources (current assets plus projected future contributions on current member payroll) of \$36.2 billion exceeds the projected value of future purchasing power benefits for current members of \$25.5 billion (accrued value of \$22.8 billion plus \$2.7 billion value of future accruals), as shown in the following graph.



Note that the majority of the estimated surplus relies on projected future contributions related to active member payroll. That is, the value of projected future contributions (\$11.2 billion represented by the light green bar) is greater than the value of purchasing power benefits expected to be earned by current active members based on service after the valuation date (\$2.7 billion represented by the light blue bar). This \$8.5 billion excess of future contributions over future benefit accruals (light green bar in excess of light blue bar) is the majority of the estimated \$10.7 billion surplus. That means the estimated surplus based on current assets and service accrued as of the projection date is \$2.2 billion, down from \$4.8 billion in the prior analysis. As noted above, this decrease is due to the high inflation over the past two years and increased benefits granted pursuant to Section 24410.8.

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As with the projection of sufficiency, this estimate is based on the current actuarial assumptions and an 85% purchasing power level, except that this estimate does not reflect DB Program members expected to join CalSTRS in the future. Future results will be sensitive to future experience, in particular future inflation experience.

Purchasing Power Benefits

Purchasing power is defined as the ratio of the June California CPI at the date of benefit commencement over the most recent June California CPI, adjusted for the 2% annual benefit adjustment provided by the DB Program. The purchasing power adjustments apply once a retiree's benefit falls below the indicated purchasing power level of 80% - 85% of this cumulative CPI offset by the DB Program benefit adjustment. Once a purchasing power adjustment applies, the retiree's benefit would increase each year in the future to maintain the purchasing power level (if inflation exceeds the 2% benefit adjustment). Periods of low (high) inflation will result in a longer (shorter) delay until a retiree receives their first purchasing power increase as well as a lower (higher) dollar increase. Therefore, if inflation is higher than expected for a short period of time, not only will the dollar amount of the purchasing power benefit increase but the delay to receive an adjustment would decrease.

Additional payments not related to the purchasing power level are also paid from the SBMA. These benefits primarily include the ad-hoc COLA (Section 24410.7) and minimum guaranteed benefits (Sections 24410.5 & 24410.6) that began in 2000 and 2001 and the one-time permanent increase (Section 24410.8) that began in 2023. Note that these benefits are eligible for future purchasing power increases, but the loss of purchasing power is calculated based on the effective date of the benefit, not the member's original date of retirement.

Sensitivity to Future Experience and Risk Discussion

The results of any actuarial valuation or study are based on a set of assumptions. Although we believe the current assumptions provide a reasonable estimate of future expectations, it is almost certain that future experience will differ from the assumptions to some extent. The following provides a general discussion of the potential risks to the SBMA funding sufficiency as well as some specific examples of sensitivity to future experience. It is not intended to be a comprehensive analysis of all potential risks.

There are a number of factors that may affect future results. Future results may differ from those projected due to future experience deviating from the assumptions or changes to the assumptions themselves. Three of the various key factors which could potentially impact future SBMA Program funding are as follows:

- **Inflation** – Low price inflation tends to have a positive impact on the SBMA Program's funded position. Recent inflation has exceeded the assumption although most forecasts are expecting inflation to moderate.
- **Investment Return** – The SBMA Program is credited with interest based on the DB Program return assumption, so the actual CalSTRS investment return in a given year has no direct impact on the SBMA funding as the actual return will equal the expected return. If the DB Program return assumption remains at 7.0%, there will be no impact on the SBMA Program funding projections. If the return assumption were lowered, this would reduce projected SBMA asset values; however, the impact would be smaller than a similar change in the inflation assumption. An increase in the return assumption would improve future projections as it would increase projected SBMA values.

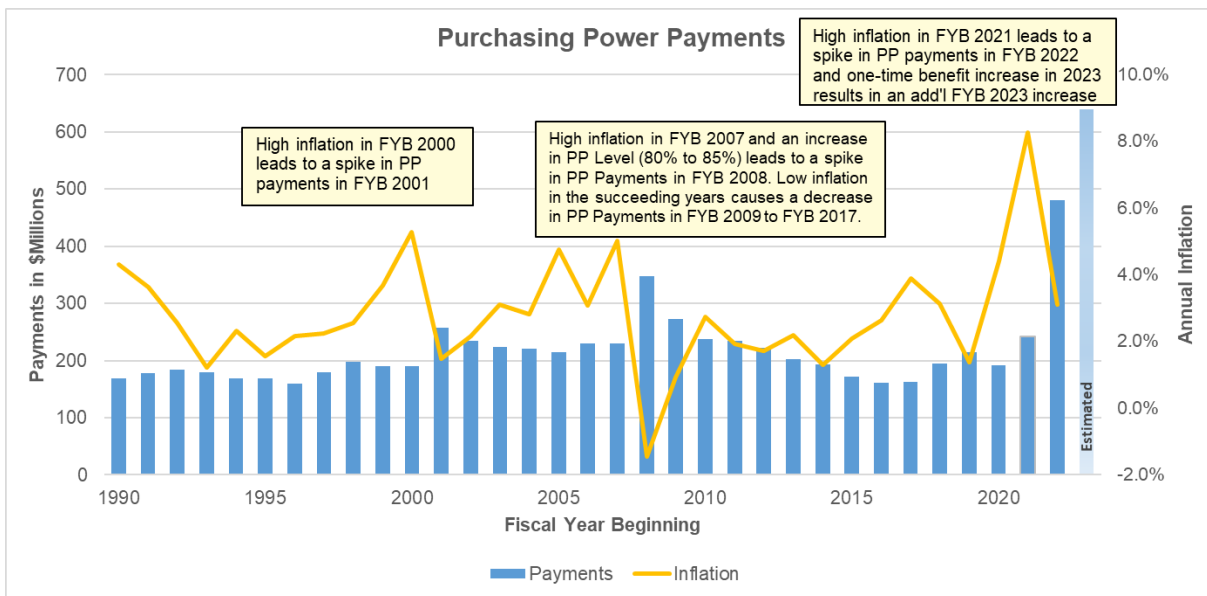
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- **Payroll** – Based on the current assumptions, the annual contributions being received have a greater value than the purchasing power benefits being earned each year. Therefore, if the payroll is less than projected, this would have a negative impact on the SBMA Program funding, as less-than-expected contributions would be received.

Variations in inflation, followed by rates of mortality and changes in the investment return assumption, are likely to have the greatest impact on the ultimate level of funding sufficiency. Variance in other demographic assumptions (such as termination, disability, and retirement from employment) could also impact future results.

One way to assess future risks is to look at historical measurements. The following graph shows the historical purchasing power payments and how they can vary from year to year, particularly due to inflation.



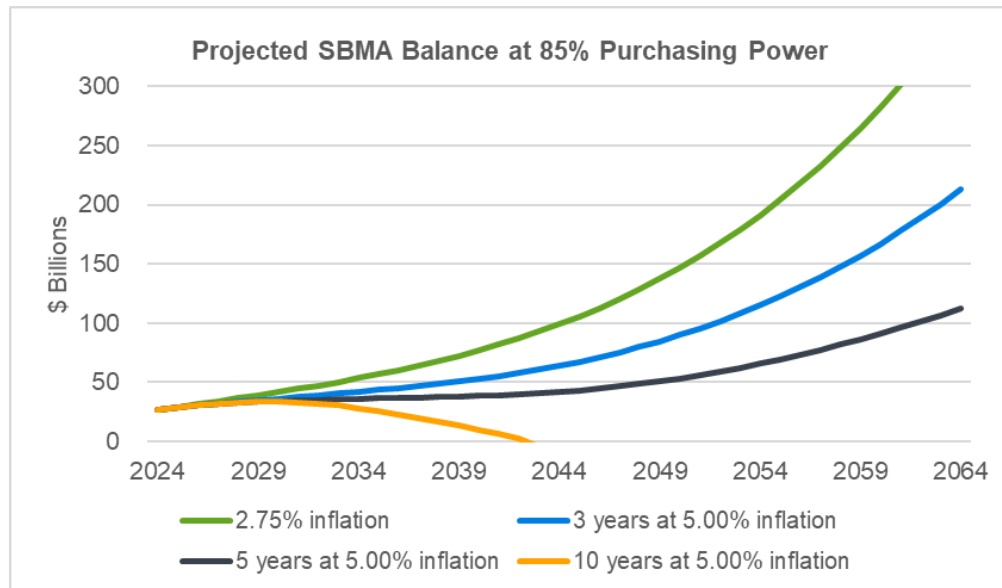
Risks specific to the DB Program are discussed in Milliman’s 2023 DB Program valuation report and the “Review of Funding Level and Risks” produced each fall by CalSTRS actuarial staff.

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Risk of short-term high inflation exceeding the assumption

As an example of the potential impact of inflation on the sufficiency of SBMA funding, the following graph shows the projected SBMA balance at the baseline (the current inflation assumption of 2.75%) as well as under various inflation shocks, represented by future inflation of 5.00% for the next three, five, and ten years before returning to 2.75% for years after that. As shown, the SBMA balance is projected to increase if future inflation is 2.75% for all future years and for the two scenarios with short-term inflation shocks of five years or less. This indicates the current assets plus future SBMA contributions are projected to be sufficient to pay all purchasing power benefits at these levels of inflation and 85% purchasing power. This is not the case if 5.00% inflation occurs for the next ten years before returning to 2.75% for all future years; however, under this scenario the purchasing power level could be reduced below 85% and the SBMA would be projected to be sufficient at the lower purchasing power level. This analysis assumes that there is no change in the investment return assumption which might occur in periods of prolonged high inflation.



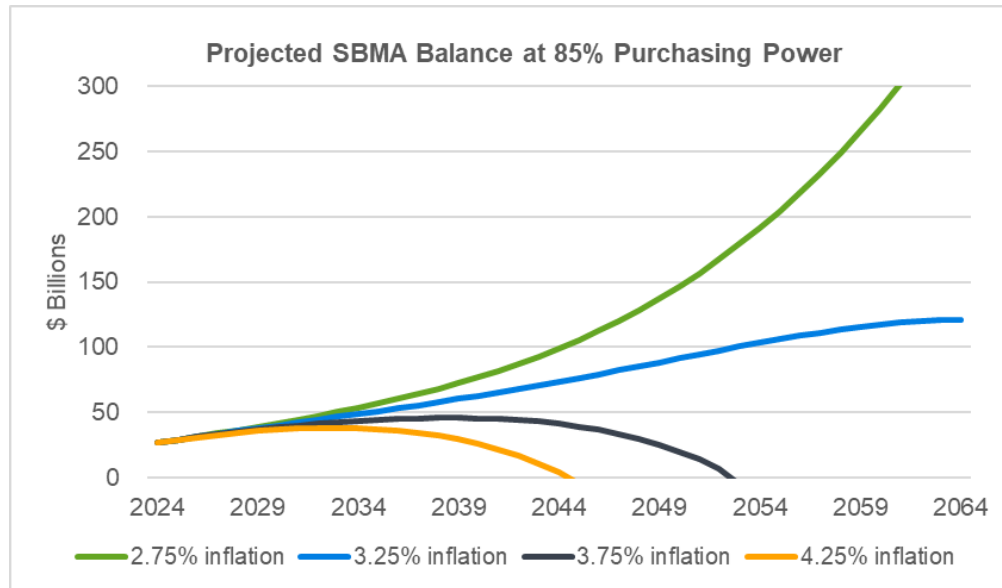
Risk of long-term inflation exceeding the assumption

Under the SBMA program, a rate of inflation that is higher than the 2.75% assumption will result in purchasing power allowances that exceed our projections. On the other hand, a lower-than-expected rate of inflation will result in lower purchasing power allowances. For example, if inflation is 2.75% each year in the future (as currently assumed), the balance of the SBMA is not projected to be depleted. If inflation is 3.75% each year in the future and the purchasing power level remained at 85%, the balance in the SBMA is projected to be depleted in about 30 years. In accordance with the board’s purchasing power policy, if the date of depletion is determined to occur prior to 2089, a reduction in the purchasing power level would be recommended. This analysis assumes that there is no change in the investment return assumption which might occur in periods of prolonged high inflation.

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The following graph shows these projections along with two additional scenarios.



As another measurement of the sensitivity to future inflation, we used a stochastic model to assess the likelihood of the SBMA paying all benefits at the 85% purchasing power level through 2089. Based on this analysis, the estimated probability of sufficiency is 68%. That means there is a 32% probability of the funding being insufficient. This does not factor in the ability of the board to lower the purchasing power level to as low as 80%. Therefore, the probability of insufficiency at the minimum 80% purchasing power level would be less than 32%.

Low-Default Risk Obligation Measure (LDRM)

Effective for measurement dates February 15, 2023 or later, Actuarial Standard of Practice 4 (ASOP 4) states that when performing a funding valuation, the actuary should calculate and disclose a low-default-risk obligation measure (LDRM) of the benefits accrued under the actuarial cost method used as of the measurement date. The actuary should select a discount rate derived from low-default-risk fixed income securities. We have used the Bond Buyer General Obligation 20-Bond Municipal Bond Index. The index is a 20-year high quality AA municipal bond rate. Based on Section 3.11.c. of ASOP 4, we believe this index meets the requirements for a discount rate for the LDRM, and the 20-year period is a reasonable approximation for the duration of the plan liabilities. The index was 3.65% as of June 30, 2023. Based on a discount rate of 3.65%, the accrued liability for the purchasing power benefits as of June 30, 2023 would increase from \$22.8 billion using the investment return assumption of 7.0% to \$48.7 billion at 3.65%.

The LDRM provides the plan sponsors and other interested parties with an additional funding metric for the SBMA Program for informational purposes, but does not impact the funding of the SBMA Program which is based on the valuation assumptions. The difference between the SBMA Program present value of accrued purchasing power payments and the LDRM can be viewed as the additional cost to significantly lower risk by investing in low-default-risk securities. Alternatively, this difference could be viewed as representing the estimated savings gained by investing in a diversified portfolio compared to investing only in low-default-risk securities.

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CalSTRS's investment policy and its target asset allocation reflect a balance of risk and return. CalSTRS analyzes the merits of different asset allocations every four years as part of the asset-liability-modeling process. The board has determined that investing in a diversified portfolio best serves its members and other stakeholders. The expected return based on CalSTRS's target allocation, and consequently the investment return assumption, is significantly higher than the discount rate based on the Bond Buyer Index.

Investing in asset classes with a low default risk would be expected to reduce future investment returns and therefore increase future contributions needed (or reduce future SBMA payments) and lower the current surplus. A portfolio with a lower default risk might provide more benefit security for member benefits that have already been earned, but only if the associated liabilities could be adequately funded, which would require additional contributions not currently in place, and it would most likely reduce future accruals. If additional funding were not secured, the purchasing power benefits currently projected would be significantly reduced.

Additional Comments on SBMA Funding

The current SBMA assets exceed the accrued present value of the purchasing power benefits under the actuarial assumptions, and the annual contributions required under the Education Code exceed the value of purchasing benefits expected to be earned. Therefore, the current contribution rate is projected to provide sufficient assets to fully fund the purchasing power benefits. Given the uncertainty regarding future purchasing power level, we believe the current contribution is reasonable. Although the analysis contained in this letter indicates the current SBMA assets exceed the accrued present value of the purchasing power benefits, this is not an appropriate measurement for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's obligations.

Assumptions and Methods

Please note that certain simplified modeling techniques and assumptions were used to produce the results of this analysis, which include estimating purchasing power benefits for current and future retirees and beneficiaries, including for people who are expected to become members of CalSTRS in the future and then retire and ultimately receive a purchasing power benefit. We believe these techniques are reasonable for purposes of this analysis (i.e., determining the sufficiency of the purchasing power between 80% and 85% levels) but may need to be modified if the purpose of the analysis is expanded beyond these levels.

The actuarial assumptions and methods have been updated since the last analysis and were adopted by the Teachers' Retirement Board in January 2024. They are the same as those used in the June 30, 2023 DB Program valuation, except for the following modifications:

- **Participant Data** – Actual purchasing power benefits for existing retirees and beneficiaries were estimated based on historical CPI information provided by CalSTRS.
- **Historical Benefit Increases** – In the calculation of an individual's purchasing power benefit, the only previous post-retirement increases (outside of purchasing power benefits) are assumed to have been the 2% annual benefit adjustments. Certain retiree benefit increases, such as the minimum guaranteed benefit, the ad-hoc COLA and the recent one-time permanent increase, are treated as separate benefits with an effective date of the date of the increase. For current and future retirees, only the 2% annual benefit adjustment is assumed to occur in the future.



- **Projected Inflation** – In the comparison of SBMA resources to future payments, we have assumed an annual inflation of 2.75% after June 30, 2023, unless otherwise noted.
- **Projected Payroll and Salary Growth** – In projections where the inflation is varied from the assumption, such as the stochastic modeling, we have assumed that projected salary and payroll are greater than or less than the payroll assumption of 3.25% and general wage growth assumption of 3.5% by the difference between actual and projected inflation. This affects the projected contributions to the SBMA and benefits payable to future retirees. For example, if, in a given year, projected inflation was 3.75% (1.00% greater than the assumed 2.75%), we have adjusted payroll growth used in projected contributions to be 4.25% and salaries used in the projected benefits to be 4.50% (1.00% higher than the corresponding assumptions).
- **New Entrants** – The projection of future purchasing power benefits includes anticipated new active members replacing those active members who are expected to leave active employment each year. This expected number of new entrants is based on the average number of new entrants over the last 10 years and is approximately 27,000 new active members each year.
- **Equilibrium** – After 50 years, the population receiving purchasing power benefits is assumed to reach an equilibrium; that is, expected deaths from the group are replaced by the same number of new retirees eligible for the benefit. This is reflected in the projection with an increase in the purchasing power benefits paid of 3.25% each year starting in 50 years. This increase is equivalent to the assumed annual increase in wages and therefore the annual increase in the average DB Program benefit.
- **Mortality Improvement** – After 50 years, the mortality of the retired population is assumed to improve over current levels; that is, retirees and beneficiaries are assumed to live longer. This is reflected in an annual increase in purchasing power benefits of 0.25%, in addition to the 3.25% increase described above. Note that prior to 50 years, a projection scale is included with the base mortality assumptions to reflect expected future mortality improvement.
- **Form of Payment Adjustment** – In the DB Program valuation, all members who have not yet retired are assumed to receive their benefit in the unmodified (member's life only) form upon retirement. Since optional forms are assumed to be reduced on an actuarial equivalent basis, this assumption does not have a material impact on the DB Program valuation as the present value of an optional form would be similar to the present value of a life annuity. However, this is not true for the actuarial projection of the SBMA. The value of a purchasing power benefit with a survivor continuance and an actuarial reduction made on the basis of the DB Program is usually greater than the value of a purchasing power benefit under the unmodified form. We have increased the projected purchasing power benefits for future retirements by 17.4% to account for the increased value of optional forms of payment. Similar to the DB Program, we have used the actual form of payment elected for current retirees and beneficiaries.



- **Retirement Timing** – Retirement from active status is assumed to occur at the middle of the year in the DB Program valuation. For purposes of calculating eligibility for the purchasing power benefit, retirement is assumed to occur on July 1 of the applicable year. There are three possible periods that affect the purchasing power calculation differently. The July 1 retirement assumption approximates actual experience and is the middle-cost option of the three, which is why we selected it. The three periods using July 1, 2023 to June 30, 2024 retirement dates are shown as an example. The percentage of the total service retirements based on current retirees is also shown.
 1. July 1 to August 31, 2023 (23% of retirements) – The first 2% benefit adjustment would be received September of 2024; CPI would be based on the year 2023. Under this approach, the first 85% Purchasing Power payment is projected to be made after 17 years (from the valuation date).
 2. September 1 to December 31, 2023 (9% of retirements) – The first 2% benefit adjustment would be received September of 2025; CPI would be based on the year 2023. Under this approach, the first 85% Purchasing Power payment is projected to be made after 16 years (from the valuation date). If this assumption were used, it would result in the highest estimated cost.
 3. January 1 to June 30, 2024 (68% of retirements) – The first 2% benefit adjustment would be received September of 2025; CPI would be based on the year 2024. Under this approach, the first 85% Purchasing Power payment is projected to be made after 18 years (from the valuation date). If this assumption were used, it would result in the lowest estimated cost.
- **School Lands Revenue** – The projection does not assume any additional revenues from school lands in the future. Currently this makes up less than 1% of the total contributions received by the SBMA. If this were included, it would not materially impact the results of the actuarial projection.
- **Stochastic Model** – The model varies actual inflation in the future, based on a geometric average inflation of 2.75% with an annual standard deviation of 2.0% and an annual reversion to the mean of 25%.
- **Accrued Benefits** – For purposes of determining the accrued present value of purchasing power payments shown in the Comparison of Current Resources and Liabilities section, all benefits for current inactives, retirees and beneficiaries are valued as fully accrued. For current active members, the accrued portion of the total present value is equal to the ratio of the accrued Actuarial Obligation divided by the total Actuarial Obligation for active members in the DB Program.

Actuarial Certification

The cost estimates presented in this letter reflect the SBMA benefit provisions in effect as of June 30, 2023 and the actuarial assumptions and methods used in the June 30, 2023 DB Program valuation, except where noted. These projections are subject to the uncertainties of a regular actuarial valuation; the projections are inexact because they are based on assumptions that are themselves necessarily inexact, even though we consider them reasonable. Thus, the emerging costs may vary from those presented in this letter to the extent actual experience differs from that projected by the actuarial assumptions.



In preparing the June 30, 2023 actuarial valuation upon which this letter is based, we relied, without audit, on information (oral and in writing) supplied by CalSTRS staff. This information includes, but is not limited to, statutory provisions, employee data, and financial information. We found this information to be reasonably consistent and comparable with information used for other purposes. The valuation results depend on the integrity of this information. If any of this information is inaccurate or incomplete, our results may be different and our calculations may need to be revised.

All costs, liabilities, rates of interest, and other factors for CalSTRS have been determined on the basis of actuarial assumptions and methods which are individually reasonable (taking into account the experience of CalSTRS and reasonable expectations); and which, in combination, offer a reasonable estimate of anticipated CalSTRS experience and are expected to have no significant bias. Further, in our opinion, each actuarial assumption used is reasonably related to the experience of the plan and to reasonable expectations which, in combination, represent a reasonable estimate of anticipated experience under CalSTRS.

The valuation results were developed using models employing standard actuarial techniques. We have reviewed the models, including their inputs, calculations, and outputs for consistency, reasonableness, and appropriateness to the intended purpose and in compliance with generally accepted actuarial practice and relevant actuarial standards of practice. We have incorporated other sources of economic data in assessing the reasonableness of the assumptions. Reliance on other experts is reflected in Milliman's capital market assumptions, and in Milliman's expected return model maintained by Milliman investment consultants. We have also considered CalSTRS investment policy, capital market assumptions, and expected return model in our assessment of the investment return assumption.

Future actuarial measurements may differ significantly from the current measurements presented in this letter 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; increases or decreases expected as part of the natural operation of the methodology used for these measurements; and changes in plan provisions or applicable law. Due to the limited scope of our assignment, we did not perform an analysis of the potential range of future measurements. The Teachers' Retirement Board has the final decision regarding the appropriateness of the assumptions and adopted them as indicated in Appendix B of the DB Program valuation report. Modified assumptions specific to this actuarial projection are discussed in the "Assumptions and Methods" section of this letter.

Actuarial computations presented in this letter are for purposes of determining the projected funding sufficiency of the SBMA. The calculations in this letter have been made on a basis consistent with our understanding of CalSTRS' current funding requirements. Determinations for purposes other than meeting these requirements may be significantly different from the results contained in this letter. Accordingly, additional determinations may be needed for other purposes.

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The consultants who worked on this assignment are actuaries. Milliman's advice is not intended to be a substitute for qualified legal or accounting counsel.


The signing actuaries are independent of the plan sponsor. We are not aware of any relationship that would impair the objectivity of our work.


On the basis of the foregoing, we hereby certify that to the best of our knowledge and belief, this report is complete and accurate and has been prepared in accordance with generally recognized and accepted actuarial principles and practices which are consistent with the principles prescribed by the Actuarial Standards Board and the *Code of Professional Conduct and Qualification Standards for Actuaries Issuing Statements of Actuarial Opinion* in the United States promulgated by the American Academy of Actuaries. We are members of the American Academy of Actuaries and meet its Qualification Standards to render the actuarial opinion contained herein.

We respectfully submit this letter and we look forward to discussing it with you.

Sincerely,


Nick J. Collier, ASA, EA, MAAA
Consulting Actuary


Scott D. Preppernau, FSA, EA, MAAA
Consulting Actuary


Julie D. Smith, FSA, EA, MAAA
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Rick Reed

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