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February 17, 2022

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

Re: Analysis of Potential SBMA Plan Changes Proposed in SB 868

Dear Members of the Board:

As requested, we have performed a cost analysis of a potential revision in benefits paid from the Supplemental Benefit Maintenance Account (SBMA). The SBMA provides purchasing power benefits to CalSTRS retirees and beneficiaries. This letter summarizes the estimated impact of increases in SBMA benefits as proposed in SB 868.

One-Time Permanent Increase in Benefits based on Year of Retirement

SB 868 would provide a one-time permanent increase in benefits 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 will be based on the member's original retirement date. The adjustment would apply to the sum of the monthly allowance, which reflects the 2% annual benefit adjustment, and the purchasing power payments to date.

As specified in the legislation, these additional benefits would be paid from the SBMA. The future 2% annual benefit adjustments and purchasing power payments would apply to the resulting additional benefits based on the effective date of the increase. That is, if the retiree receives a $100 additional payment effective July 1, 2023, they would receive additional $2 increases (2% of $100) effective July of 2024 and each July thereafter. Any potential future purchasing power benefits on the increase under SB 868 would be based on a July 1, 2023 commencement date.

The following schedule details the percentage increases in the benefits for retirees and beneficiaries as specified in SB 868:

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%

SBMA Funding

For purposes of this analysis, we assumed that there would be no change to the annual appropriation to cover benefits paid from the SBMA. This funding equals 2.5% of pensionable payroll from the fiscal year two years prior, less $72 million.

Projection Results

The present value of the estimated increase in payments as of June 30, 2023 due to SB 868 is $592 million.

To estimate the impact on the SBMA, we reviewed the probability of sufficiency by modeling 200 different scenarios of inflation. The probability of sufficiency decreases from 66% to 65% if these additional payments are reflected. This is the probability the SBMA is not depleted prior to 2089 and assumes no future reductions in the 85% purchasing power level. Based on this analysis, adding the proposed benefit increase does not materially affect the probability of sufficiency. However, it should be noted that if ultimately the SBMA is insufficient to provide the benefits at the current level, the purchasing power level would need to be reduced below 85%. If this were to occur, the amount provided under this benefit proposal could affect how much the benefit level would need to be reduced.

This analysis only models varying inflation. It does not vary other assumptions such as mortality and the SBMA investment credit (which would only change if the investment return assumption for the DB Program were changed). Note that although results are based on the June 30, 2021 actuarial valuation of the DB Program, we have reflected actual inflation from June 30, 2021 to December 31, 2021 in our analysis.

Analysis

These cost estimates are based on a July 1, 2023 effective date. If the effective date is either before or after this date, there will be some difference in the estimated cost. If the effective date were earlier than July 1, 2023, the estimated cost for the one-time permanent increase would be higher due to an increase in the number of expected future payments for the closed population.

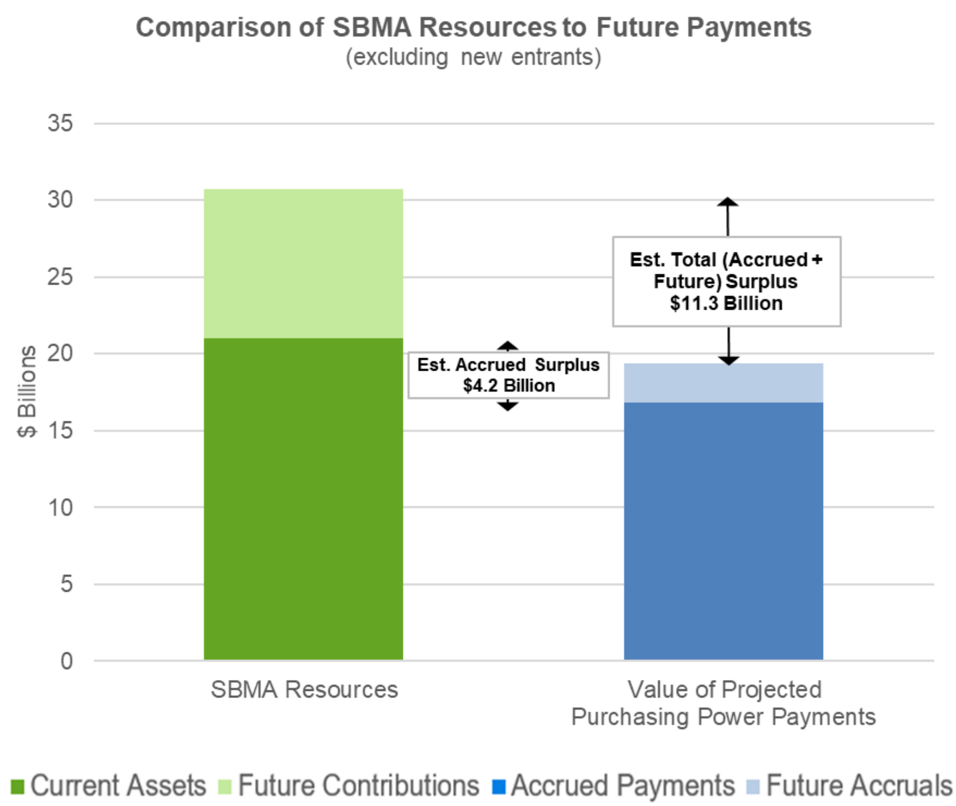
Before any changes to the SBMA are adopted, we recommend the following be considered:

- **Future variability** – As noted, the future health of the SBMA is dependent on a number of assumptions, with inflation, mortality, and future investment return likely having the greatest impact. The balance between the security of the current 85% purchasing power level and the value of providing additional benefits should be considered. As shown in our analysis, there is only about a 65% probability of sufficiency at the 85% purchasing power level when variable inflation is considered. Another way to look at this is there is about a one-third chance the purchasing power level will need to be reduced below 85%.

- **Current DB Program** – Members, employers, and the state have experienced significant increases in their contribution rates to the DB Program. Therefore, it may not seem appropriate to consider an increase in the SBMA benefits. However, based on discussions with CalSTRS staff, it is our understanding that it is well defined that the funding of the SBMA is independent of the funding of the DB Program. CalSTRS staff also indicated that current DB Program members are effectively vested in the SBMA funding, and therefore, future SBMA contributions for current members could not be used for other purposes unless the DB Program assets were depleted, in which cases SBMA assets could be used to pay DB Program benefits. We recommend legal counsel confirm the uses of SBMA assets before any changes to the SBMA are considered.

Comparison of Current Resources and Liabilities

Reflecting the potential impact of SB 868, the SBMA has a projected funded surplus of $11.3 billion for current DB Program members as of June 30, 2021 based on an assumed inflation of 2.75%. That is, the value of the current resources (current assets plus projected future contributions on current member payroll) of $30.7 billion exceeds the projected value of future purchasing power benefits for current members of $19.4 billion, as shown in the following graph. This represents a decrease in the surplus of $0.6 billion from $11.9 billion without the additional benefit.



Note that over half of the estimated surplus relies on projected future contributions related to active member payroll. That is, the value of projected future contributions ($9.7 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 ($2.6 billion represented by the light blue bar). This $7.1 billion excess of future contributions over future benefit accruals (light green bar in excess of light blue bar) is over half of the estimated $11.3 billion surplus. That means the estimated surplus based on current assets and service accrued as of the projection date is $4.2 billion, which is less than half of the total surplus and is a $0.6 billion decrease from the $4.8 billion without the increased benefits.

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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 future DB Program members. Future results will be sensitive to future experience, in particular future inflation experience.

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 key factors which could potentially impact future SBMA Program funding, as well as the ultimate cost of providing the additional benefits, are as follows:

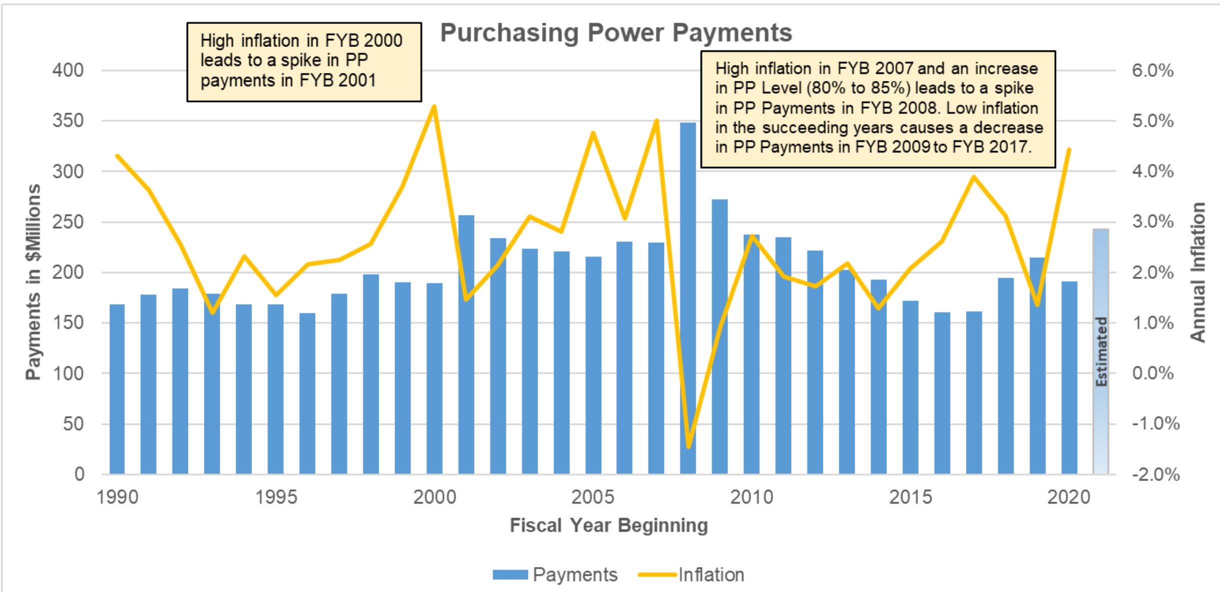
- **Inflation** – Low price inflation tends to have a positive impact on the SBMA Program's funded position. Short-term forecasts project inflation less than the 2.75% assumption; however, recent inflation has materially exceeded the assumption. Looking at long-term forecasts, the inflation assumption used by the Social Security actuary is 2.4%, and the implied inflation for 30-year Treasury Inflation-Protected Securities is about 2.2% as of February 2022.

- **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. 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 values; however, the impact would be much smaller than a similar change in the inflation assumption. An increase in the return assumption would improve future projections.

- **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.

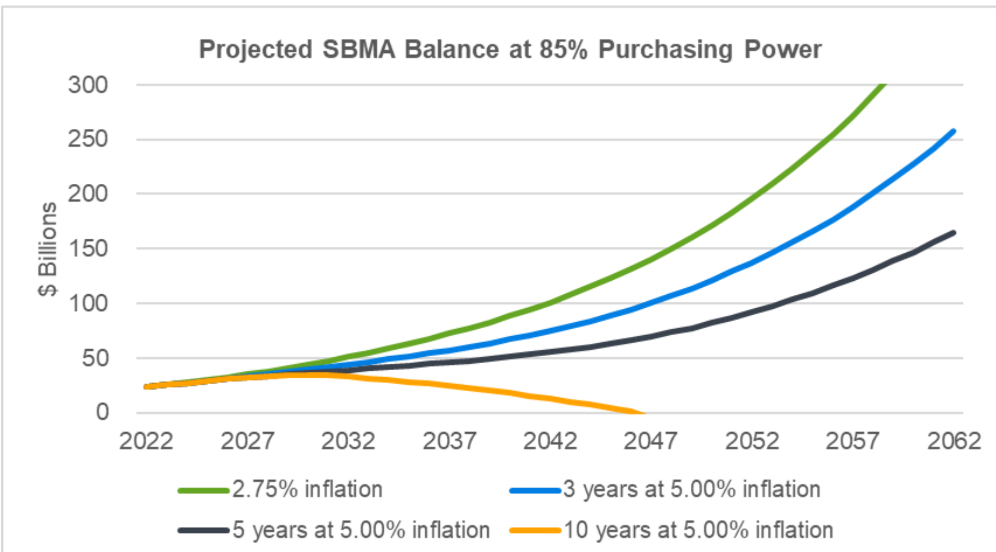
One way to assess future risks is to look at historical measurements. The following graph shows the historical purchasing power payments and how they can vary from year to year, particularly due to inflation.



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

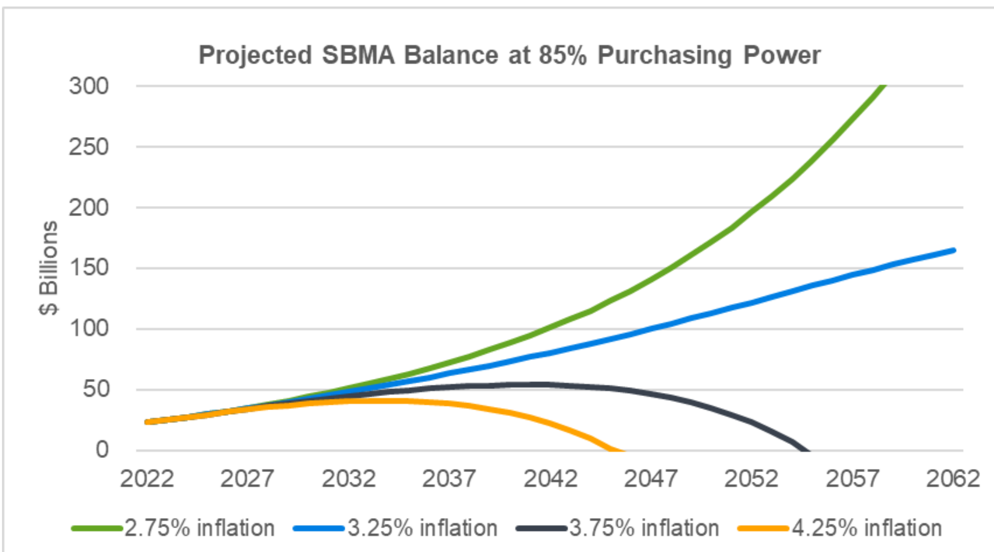
Risk of short-term high inflation exceeding the assumption

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. Each of the scenarios includes the proposed increase in the retiree benefits. 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.



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 35 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. The following graph shows these projections along with two additional scenarios. Each of the scenarios includes the proposed increase in the retiree benefits.



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, there was estimated to be a 35% 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 35%.

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 not been updated since the last analysis and were adopted by the Teachers' Retirement Board in January 2020. They are the same as those used in the June 30, 2021 DB Program valuation, except for the following modifications:

- **Treatment of Benefit Increases** – Additional benefits under the legislation would be paid entirely from the SBMA. Future 2% annual benefit adjustments and purchasing power payments would apply to the additional benefits based on the effective date of the increase, as previously discussed. A 1% load is applied to projected benefits to account for potential future purchasing power payments.
- **Participant Data** – Actual purchasing power benefits for existing retirees and beneficiaries was not provided, so they 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 that occurred in 2000 and 2001, such as the minimum guaranteed benefit and the ad-hoc COLA under AB 429, 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 providing the estimated cost of the proposed benefit increase, we have assumed annual inflation of 2.75% after June 30, 2021, with the exception that we have assumed 4.32% inflation in the fiscal year ended June 30, 2022. The 4.32% figure represents actual California CPI for the first half of the fiscal year ended June 30, 2022 and a rate of 2.75% in the second half. Similarly, when illustrating alternative future inflation scenarios, we reflected actual California CPI for the first half of the fiscal year ended June 30, 2022 and the assumed level of inflation beginning in the second half.
- **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 assumed payroll 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 and salaries used in the projected benefits to be 1.00% higher than the corresponding assumption.
- **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 23,000 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 3.50% each year starting in 50 years. This increase is equivalent to the assumed annual increase in payroll 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 3.50% 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. 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 17.6% 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, 2021 to June 30, 2022 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, 2021 (23% of retirements) – The first 2% benefit adjustment would be received September of 2022; CPI would be based on the year 2021. 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, 2021 (8% of retirements) – The first 2% benefit adjustment would be received September of 2022; CPI would be based on the year 2020. 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, 2022 (69% of retirements) – The first 2% benefit adjustment would be received September of 2023; CPI would be based on the year 2021. 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%, an annual reversion to the mean of 25%, and 200 different inflation scenarios.

Actuarial Certification

The cost estimates presented in this letter reflect the SBMA benefit provisions in effect as of June 30, 2021 and the actuarial assumptions and methods used in the June 30, 2021 DB Program valuation, except where noted. Note that the June 30, 2021 DB Program valuation is preliminary and has not had final peer review completed by Milliman and has not yet been submitted to the board for adoption.

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, 2021 actuarial valuation upon which this letter is based, we relied, without audit, on information (some oral and some 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 experience affecting CalSTRS. 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 results were developed using models intended for valuations that use standard actuarial techniques.

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.

Milliman's work is prepared solely for the internal business use of CalSTRS. To the extent that Milliman's work is not subject to disclosure under applicable public records laws, Milliman's work may not be provided to third parties without Milliman's prior written consent. Milliman does not intend to benefit or create a legal duty to any third party recipient of its work product. Milliman's consent to release its work product to any third party may be conditioned on the third party signing a Release, subject to the following exceptions:

(a) CalSTRS may provide a copy of Milliman's work, in its entirety, to CalSTRS' professional service advisors who are subject to a duty of confidentiality and who agree to not use Milliman's work for any purpose other than to benefit CalSTRS.

(b) CalSTRS may provide a copy of Milliman's work, in its entirety, to other governmental entities, as required by law.

No third party recipient of Milliman's work product should rely upon Milliman's work product. Such recipients should engage qualified professionals for advice appropriate to their own specific needs.

The consultants who worked on this assignment are retirement 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 letter is complete and accurate and has been prepared in accordance with generally recognized and accepted actuarial principles and practices, including the relevant Actuarial Standards of Practice. We are members of the American Academy of Actuaries and meet the Qualification Standards of the American Academy of Actuaries 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

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Consulting Actuary

Julie D. Smith, FSA, EA, MAAA
Consulting Actuary

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cc: Jordan Fassler
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Rick Reed