INDEPENDENT FISCAL OFFICE

TO:	Governor Josh Shapiro All Members of the General Assembly
FROM:	Matthew Knittel, Director Independent Fiscal Office
DATE:	June 30, 2023
RE:	Actuarial Note for House Bill 1415, Printer's Number 1583

The Independent Fiscal Office (IFO) submits an actuarial note for **House Bill 1415, Printer's Number 1583** in accordance with section 615-B of the Administrative Code of 1929. Due to the material cost impact of the bill, the IFO submitted a formal request to its contracted actuary (Milliman) for an actuarial note. A copy of the actuary's note is attached, along with responses prepared by the State Employees' Retirement System (SERS) and the Public School Employees' Retirement System (PSERS) in response to a data request made by the IFO on June 16, 2023.

Legislative Summary

The bill would amend Title 24 (Education) and Title 71 (State Government) to provide supplemental annuities to individuals who retired prior to July 2, 2001 for SERS and PSERS.

- The bill would provide for the supplemental annuity to begin on July 1, 2023 for eligible PSERS annuitants, and on January 1, 2024 for eligible SERS annuitants.
- To be eligible, annuitants must (1) receive an annuity by July 1, 2023 (PSERS) or January 1, 2024 (SERS); (2) be retired prior to July 2, 2001; and (3) have no credited service that qualifies as Class T-D, Class D-4, or Class AA.
- Beneficiaries and survivor annuitants of members who die prior to July 1, 2023 (PSERS) or January 1, 2024 (SERS) would not be eligible.
- The unfunded actuarial liability resulting from the benefit increase would be amortized through level dollar payments over a period of 10 years beginning July 1, 2024.
- The amount of the supplemental annuity is based on the most recent date of retirement for the individual. The full schedule is below.

Retirement Effective Date	Annuity Increase (%)	Retirement Effective Date	Annuity Increase (%)
7/2/2000 - 7/1/2001	10.0	7/2/1990 - 7/1/1991	15.0
7/2/1999 - 7/1/2000	10.5	7/2/1989 - 7/1/1990	15.5
7/2/1998 - 7/1/1999	11.0	7/2/1988 - 7/1/1989	16.0
7/2/1997 - 7/1/1998	11.5	7/2/1987 - 7/1/1988	16.5
7/2/1996 - 7/1/1997	12.0	7/2/1986 - 7/1/1987	17.0
7/2/1995 - 7/1/1996	12.5	7/2/1985 - 7/1/1986	17.5
7/2/1994 - 7/1/1995	13.0	7/2/1984 - 7/1/1985	18.0
7/2/1993 - 7/1/1994	13.5	7/2/1983 - 7/1/1984	18.5
7/2/1992 - 7/1/1993	14.0	7/2/1982 - 7/1/1983	19.0
7/2/1991 - 7/1/1992	14.5	Prior to 7/2/1982	20.0

Review of Findings

The bill would enact supplemental annuities for individuals who retired prior to July 2, 2001 for SERS and PSERS. Valuations for SERS occur on a calendar year (CY) basis, while PSERS occur on a fiscal year (FY) basis. Initial changes in the employer contribution rates for both systems would first occur in FY 2024-25. The projected impacts are as follows:

Impact on SERS:

- Individuals impacted: 25,334
- Average age of eligible retiree: 79.7
- Average increase in annuity for first year: $1,600 ($134 monthly)[1]
- Total projected benefit increases paid over lifetime: $404.6 million
- Initial change in unfunded actuarial liability (UAL): $265.3 million
- Initial change in funded ratio: -0.33% (69.35% to 69.02%)
- Initial change in employer contribution rate: 0.53% (34.12% to 34.65%)
- Annual amortized cost (10 years): $37.6 million

Impact on PSERS:

- Individuals impacted: 43,475
- Average age of eligible retiree: 82.8
- Average increase in annuity for first year: $2,175 ($181 monthly)[1]
- Total projected benefit increases paid over lifetime: $865.9 million
- Initial change in unfunded actuarial liability: $583.6 million
- Initial change in funded ratio: -0.31% (63.18% to 62.87%)
- Initial change in employer contribution rate: 0.58% (34.73% to 35.30%)
- Annual amortized cost (10 years): $88.9 million

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[1] Uses the number of identified individuals and the projected first year payments as provided by the systems. Does not take into account projected changes in annuitant demographics, including mortality.

In its analysis, Milliman notes the following issues:

- There are different commencement dates for SERS and PSERS retirees, while past supplemental annuities have commenced on the same date.
- The cost of the bill was determined independently of any other bill or amendment that may impact benefits paid to current retirees. To the extent that the increases proposed in this bill apply to benefits provided in other bills, additional costs for these changes may apply.
- The bill provides that the cost of supplemental annuities would be funded in equal dollar installments over a period of 10 years in §8348.8(f). However, §8328(d)(2) in the PSERS code indicates that increases in benefits due to supplemental annuities shall be funded as a level percentage of compensation over a period of 10 years from the July 1 second succeeding the date such legislation is enacted.

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Milliman

June 30, 2023

Mr. Matthew Knittel
Director
Pennsylvania Independent Fiscal Office
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Rachel Carson State Office Building
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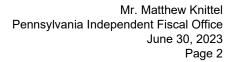Re: House Bill 1415, Printer's Number 1583

Dear Mr. Knittel:

As you requested, we have prepared an actuarial note on House Bill 1415, Printer's Number 1583. The Bill would amend both the Public School Employees' Retirement Code and the State Employees' Retirement Code to provide for an ad hoc cost-of-living-adjustment (COLA) (e.g. supplemental annuities) commencing July 1, 2023 and January 1, 2024, respectively, to retirees of both systems with an effective date of retirement prior to July 2, 2001.

Executive Summary

This Bill would provide a benefit increase to approximately 69,000 retirees in PSERS and SERS ranging from 10% to 20% of the member's benefit at the effective date based on the member's date of retirement. The effective date is July 1, 2023 for PSERS and January 1, 2024 for SERS. Based on the Systems' actuaries projections, such increase would result in an approximately 0.3% decrease in the funded ratio of both Systems as of the 2023 valuations and increase the FY 2024-2025 employer contribution rate by 0.6% for PSERS and by 0.5% for SERS based on the 10-year amortization period set forth in the Bill.

Although Milliman does not take a position in favor of or opposition to the proposed legislation, we concur with the statement made by the PSERS actuary Buck in their cost analysis. They noted that increasing benefits when the funded ratio of the plan is only at 61.6% based on the actuarial value of assets at June 30, 2022 and employer contribution levels are at a rate of 33.09% of payroll should be carefully considered. The change in asset values since the latest actuarial valuation should also be considered prior to enactment. SERS is in a similar funding situation. Furthermore, Act 5 of 2017 reduced benefits for future hires for both systems. In addition, as a result of actual investment returns falling below the assumed investment return, Class T-E, T-F, T-G and T-H members in PSERS are currently paying shared-risk contributions in addition to the basic member contribution rate.

If enacted as drafted, this Bill would have a negative cash flow impact on both Systems until FY 2030-2031 for PSERS and calendar year 2029 for SERS. Prior to enactment, consideration

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should be given to revising the funding of the increased benefits to mitigate the negative cash flow impact. See the discussion starting on page 3 for more information.

We note that there are different commencement dates for PSERS and SERS retirees while past supplemental annuities have commenced at the same dates for PSERS and SERS retirees.

The cost of this Bill was determined independently of any other bill or amendment that may impact benefits paid to current retirees. To the extent that the increases proposed in this Bill apply to benefits provided in other bills, additional costs for these changes may apply.

Summary of the Bill

The Bill would provide for an ad hoc COLA commencing July 1, 2023 for retirees in the Public School Employees' Retirement System (PSERS) and January 1, 2024 for retirees in the State Employees' Retirement System (SERS) with an effective date of retirement prior to July 2, 2001. Throughout this analysis, we refer to July 1, 2023 for PSERS and January 1, 2024 for SERS as the "applicable commencement date".

To be eligible for the COLA, superannuation, withdrawal, and disability annuitants must be receiving an annuity on the applicable commencement date, have an effective date of retirement prior to July 2, 2001, and whose credited service does not include any service credited as either Class T-D, Class D-4, or Class AA service. Withdrawal annuitants would not be eligible to receive the COLA until the July 1 coincident with or following attainment of superannuation age.

Beneficiaries and survivor annuitants of members who die prior to the applicable commencement date would not be eligible for the COLA.

The amount of the COLA is based on the annuitant's most recent effective date of retirement and would be paid in accordance with the schedule below as applied to the monthly annuity payment on the applicable commencement date. The COLA would be payable under the option in effect as of the applicable commencement date as selected by the member at retirement.

Most Recent Effective Date of Retirement	Percentage Increase
July 2, 2000, through July 1, 2001	10.0%
July 2, 1999, through July 1, 2000	10.5
July 2, 1998, through July 1, 1999	11.0
July 2, 1997, through July 1, 1998	11.5
July 2, 1996, through July 1, 1997	12.0
July 2, 1995, through July 1, 1996	12.5
July 2, 1994, through July 1, 1995	13.0
July 2, 1993, through July 1, 1994	13.5
July 2, 1992, through July 1, 1993	14.0
July 2, 1991, through July 1, 1992	14.5
July 2, 1990, through July 1, 1991	15.0

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Most Recent Effective Date of Retirement	Percentage Increase
July 2, 1989, through July 1, 1990	15.5
July 2, 1988, through July 1, 1989	16.0
July 2, 1987, through July 1, 1988	16.5
July 2, 1986 through July 1, 1987	17.0
July 2, 1985 through July 1, 1986	17.5
July 2, 1984 through July 1, 1985	18.0
July 2, 1983 through July 1, 1984	18.5
July 2, 1982 through July 1, 1983	19.0
Prior to July 2, 1982	20.0

The unfunded actuarial accrued liability resulting from the benefit increase would be amortized through level dollar payments over a period of 10 years beginning July 1, 2024.

Discussion of the Bill

This Bill would grant COLAs to retirees who retired prior to the 25% benefit increase under Act 9 of 2001. Such retirees last received a supplemental annuity effective July 1, 2002 if retired prior to July 2, 1990 and July 1, 2003 if retired after July 1, 1990.

Amortization period

In October 2014, the Conference of Consulting Actuaries Public Plans Community released a white paper titled *Actuarial Funding Policies and Practices for Public Pension Plans* ("CCA White Paper"), which is available at https://www.ccactuaries.org/docs/default-source/papers/cca-ppc_actuarial-funding-policies-and-practices-for-public-pension-plans.pdf?sfvrsn=6397cc76_6. This white paper provides "guidance to policymakers and other interested parties on the development of actuarially based funding policies for public pension plans", which could be helpful to the legislature.

This Bill would fund the increases due to these supplemental annuities in equal dollar installments over a 10-year period starting July 1, 2024. The CCA White Paper recommends that plan amendments impacting inactive member benefits (such as increases due to supplemental annuities) be amortized over the lesser of the average payment period of the expected increased benefits and 10 years. The CCA White Paper also recommends that the amortization period should also control for negative cash flow where additional amortization payments are less than additional benefit payments, thus reducing plan assets in the short-term.

While the estimated life expectancy of the eligible retirees is approximately 10 years as of June 30, 2022 for PSERS and 12 years as of December 31, 2022 for SERS as reported by the Systems' actuaries, this calculation does not take into account that older retirees would receive higher benefit increases, lost interest on the supplemental annuities, nor that the funding for this potential COLA would result in a projected negative cash flow. This Bill is projected to result in lower asset values until June 30, 2031 for PSERS and December 31, 2029 for SERS. Under the Bill, the increased benefits would begin immediately on the applicable commencement date

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but funding for the increased benefits would not begin until July 1, 2024 – one year later for PSERS and six months later for SERS. This funding delay is the primary reason for the negative cash flow impact.

To review the reasonableness of the 10-year amortization period, we estimated the duration of the supplemental annuities. Duration takes into account the weighting of additional projected benefits by the interest rate used in the actuarial values. While the estimated life expectancy is approximately 10 to 12 years, the duration of the increased benefits is approximately 5 to 6 years. We believe that it would be preferable to shorten the amortization period to 5 years for this Bill. This would also reduce the time until the projected asset values are higher than prior to adoption of the Bill by approximately 5 years for both PSERS and SERS. In addition, funding for the supplemental annuities could begin July 1, 2023 to coincide with the payment of the supplemental annuities to effectively eliminate any negative cash flow period. Alternatively, the applicable commencement date could be delayed to coincide with the date that funding begins for these supplemental annuities.

Different commencement date

The Bill would provide for COLAs starting July 1, 2023 for eligible PSERS retirees and January 1, 2024 for eligible SERS retirees. Past COLAs have generally commenced at the same date for both PSERS and SERS retirees.

In addition, the new §8348.8 for PSERS and §5708.9 for SERS indicate "Supplemental annuity commencing 2023".
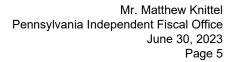
Potential Conflict in type of amortization in PSERS

As the PSERS' actuary indicates in their cost estimate, the Bill provides that the cost of these supplemental annuities would be funded in equal dollar installments over a period of 10 years in §8348.8(f). However, §8328(d)(2) in the PSERS code indicates that increases in benefits due to supplemental annuities shall be funded as a level percentage of compensation over a period of ten years from the July 1 second succeeding the date such legislation is enacted.

The cost estimate prepared by the System actuary reflects a 10-year level dollar amortization. We believe that the level dollar approach is more appropriate in this situation.

Review of Estimated Actuarial Cost Prepared by System Actuaries

The IFO provided us with a copy of the June 26, 2023 estimate by Buck Global, LLC (Buck) for PSERS and the June 26, 2023 estimate by Korn Ferry for SERS. In addition, Buck and Korn Ferry have provided us with additional details regarding their cost estimates. We appreciate their cooperation in providing this information on a timely basis.

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The estimates contain the estimated increase in the actuarial accrued liability and the corresponding 10-year amortization beginning July 1, 2024. We have reviewed the estimates for both PSERS and SERS and found that they appear to be reasonable.

Buck and Korn Ferry indicated that the number of eligible retirees is 43,475 in PSERS based on data as of June 30, 2022 and 25,334 in SERS based on data as of December 31, 2022, respectively. We have not been provided the underlying data files to review the accuracy of these calculations and have relied upon them in our analysis.

Based on these estimates for PSERS and SERS, the table below contains the estimated increase by year in the unfunded actuarial accrued liability and the first year of increased amortization payments due to this Bill. Since the Bill would only affect retired members, there would be no change in normal cost. For illustrative purposes only, we have also shown the impact of using a 5-year amortization period instead of the Bill's 10-year period that could be used to help mitigate the negative cash flow impact of this Bill.

Estimated Actuarial Cost of House Bill 1415, Printer's Number 1583
($ amounts in millions)

	10-year Amortization Period as specified in HB 1415	**Illustrative** 5-year Amortization Period
PSERS		
Increase in Unfunded Actuarial Accrued Liability as of June 30, 2023	$583.6	$583.6
Increase in First Year Amortization Payment		
2024/2025 Contribution Amount	88.9	152.3
2024/2025 Contribution Rate	0.57%	0.98%
SERS		
Increase in Unfunded Actuarial Accrued Liability as of December 31, 2023	$265.3	$265.3
Increase in First Year Amortization Payment		
2024/2025 Contribution Amount	37.6	64.4
2024/2025 Contribution Rate	0.53%	0.91%

Based on the information provided for PSERS and SERS, the Bill would result in a 0.3% decrease in the funded ratio. The projected PSERS' funded ratio as of June 30, 2023 would

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decline from 63.2% to 62.9%. The projected SERS' funded ratio as of December 31, 2023 would decline from 69.3% to 69.0%.

Both Systems' actuaries included information on the potential risks in their cost estimates. We encourage the legislature to consider these risks prior to enactment. In particular, the PSERS actuary Buck notes that granting benefit improvements may increase the impact of longevity risk due to larger benefits being paid for longer than expected. The SERS actuary Korn Ferry indicated that if the assumed mortality rates were lowered by 10% for a ten-year period, thereby increasing life expectancy, then the increase in the liability for the increased benefits would be 3.7% higher.

Basis for Analysis

In performing this analysis, we have relied on the information provided by the IFO, PSERS, SERS, Buck, and Korn Ferry. We have not audited or verified this data and other information. If the data or information is inaccurate or incomplete, the results of this analysis may likewise be inaccurate or incomplete.

We performed a limited review of the cost estimates prepared by Buck and Korn Ferry as provided by the IFO, PSERS, and SERS for reasonableness and consistency and have not found material defects. If there are material defects, it is possible that they would be uncovered by a detailed, systematic review and comparison to search for values that are questionable or for relationships that are materially inconsistent. Such a review was beyond the scope of our assignment.

Future actuarial measurements may differ significantly from the current measurements presented in this analysis due to actual plan experience deviating from the actuarial assumptions, the natural operation of the plan's actuarial cost method, and changes in plan provisions, actuarial assumptions, actuarial methods, and applicable law. An assessment of the potential range and cost effect of such differences is beyond the scope of this analysis.

As the reviewing actuary, Milliman is not required to provide a risk disclosure under Actuarial Standard of Practice No. 51 *Assessment and Disclosure of Risk Associated with Measuring Pension Obligations and Determining Pension Plan Contributions* nor the additional disclosures required for funding valuations under Actuarial Standard of Practice No. 4 *Measuring Pension Obligations and Determining Pension Plan Costs or Contributions*.

Milliman's work is prepared solely for the internal business use of the Pennsylvania Independent Fiscal Office. 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:

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- The IFO may provide a copy of Milliman's work, in its entirety, to its professional service providers who are subject to a duty of confidentiality and who agree to not use Milliman's work for any purpose other than to provide services to the IFO.
- The IFO may provide a copy of Milliman's work, in its entirety, any applicable regulatory or governmental agency, 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. We have not explored any legal issues with respect to the proposed changes. We are not attorneys and cannot give legal advice on such issues. We suggest that you review this proposal with counsel.

We are members of the American Academy of Actuaries and meet its Qualification Standards to render this actuarial opinion.

Please let us know if we can provide any additional information regarding this Bill.

Sincerely,

Timothy J. Nugent

Aaron Shapiro

Katherine A. Warren

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Actuarial Cost Note Regarding H.B. 1415, P.N. 1583
To Estimate the Cost Impact of a Proposed Cost of Living Adjustment
to the Pennsylvania State Employees Retirement System

June 26, 2023

The following is an actuarial cost note which describes, and presents the estimated cost impact of proposed legislation (under House Bill 1415, Printer's Number 1583 that would provide a Cost of Living Adjustment (COLA) to certain retired members of the Pennsylvania State Employees' Retirement System (SERS), commencing with the first monthly annuity payment after January 1, 2024.

Design of the COLA

If this bill became law, retired members meeting all three (3) of these conditions would be eligible for the COLA:

- The retired member must be either a retiree who has reached superannuation age or a disabled retiree or an early retiree (who would become eligible for the COLA upon reaching superannuation age) receiving an annuity on January 1, 2024;
- The retired member's most recent effective date of retirement would have to be prior to July 2, 2001, and
- The retired member's credited service may not include any service credited as Class AA or Class D-4 (or Class T-D).

If enacted, the amount of the COLA increase, which would commence with the first monthly annuity payment after January 1, 2024, will be determined as a percentage of the amount of the monthly annuity payment on January 1, 2024, such percentage being specifically prescribed on the basis of the eligible member's most recent effective date of retirement. Table 1 on the following page provides the specific COLA increase percentages and effective dates of retirement proposed under this bill.

Other noteworthy provisions relating to the design of this proposed COLA include:

- Beneficiaries or survivors of members who die before January 1, 2024 are not eligible and
- The COLA will be payable under the same terms and conditions as provided under the option plan in effect as of January 1, 2024.

Funding of the COLA

The bill states that "… the additional liability for the increase in benefits provided under this section shall be funded in equal dollar installments over a period of 10 years beginning July 1, 2024."

Actuarial Cost Note Regarding H.B. 1415, P.N. 1583
To Estimate the Cost Impact of a Proposed Cost of Living Adjustment
to the Pennsylvania State Employees Retirement System

June 26, 2023

Proposed COLA Increases

The proposed COLA increase percentages are presented in Table 1 below.

Table 1 Proposed COLA Increases Effective After January 1, 2024 & Payable to Eligible Retired Members Who Retired Prior to July 2, 2001	
Most Recent Effective Date of Retirement	**Proposed COLA Increase**
Prior to July 2, 1982	20.0%
July 2, 1982 - July 1, 1983	19.0%
July 2, 1983 - July 1, 1984	18.5%
July 2, 1984 - July 1, 1985	18.0%
July 2, 1985 - July 1, 1986	17.5%
July 2, 1986 - July 1, 1987	17.0%
July 2, 1987 - July 1, 1988	16.5%
July 2, 1988 - July 1, 1989	16.0%
July 2, 1989 - July 1, 1990	15.5%
July 2, 1990 - July 1, 1991	15.0%
July 2, 1991 - July 1, 1992	14.5%
July 2, 1992 - July 1, 1993	14.0%
July 2, 1993 - July 1, 1994	13.5%
July 2, 1994 - July 1, 1995	13.0%
July 2, 1995 - July 1, 1996	12.5%
July 2, 1996 - July 1, 1997	12.0%
July 2, 1997 - July 1, 1998	11.5%
July 2, 1998 - July 1, 1999	11.0%
July 2, 1999 - July 1, 2000	10.5%
July 2, 2000 - July 1, 2001	10.0%
July 2, 2001 and After	0.0%

Estimated COLA Impact and Costs

Table 2 on the following page presents some approximate statistics related to the impact if this proposed COLA were to become law, as well as the estimated additional liability and annual cost to SERS, based upon funding in equal dollar annual installments over a 10-year period beginning July 1, 2024.

The estimated number of retirees to receive the proposed COLA is based on the number eligible to receive the COLA as of December 31, 2022. The average increase is the overall average increase the eligible members (as of December 31, 2022) would receive.

Actuarial Cost Note Regarding H.B. 1415, P.N. 1583
To Estimate the Cost Impact of a Proposed Cost of Living Adjustment
to the Pennsylvania State Employees Retirement System

June 26, 2023

Table 2 Impact & Estimated Cost of Proposed COLA Increase (dollars in millions)	
Effective date of first COLA payment	After January 1, 2024
Funding date	July 1, 2024
Estimated number of retirees to receive COLA	25,334
Average COLA increase	12.79%
Expected payroll in fiscal year 2024/2025	$7,103.6
Increase in liability	$265.3
Level annual 10-year funding payment	$37.6
As a percent of projected payroll	0.53%

Methods and Assumptions Underlying Table 2 Results

The data used for this cost estimate is based on a special run provided by SERS that included all retirements through December 31, 2022. The data included age, gender, date of retirement, and both the initial and current monthly benefit for the retired population as of December 31, 2022. The estimated number of retirees to receive the COLA is based on the number of retirees in payment status as of December 31, 2022.

The liability was determined by using the actuarial assumptions and methods underlying the December 31, 2022 actuarial valuation. The expected payroll figure shown above is as of the first fiscal year in which the COLA will be funded. It is the December 31, 2022 valuation funding payroll projected forward one year.

The valuation results were produced using a proprietary actuarial valuation system, Pension Valuation Language (PVL). PVL has been actively used for over 40 years to perform annual funding/accounting valuations, gain and loss analyses, and cost studies for a wide variety of retirement systems. PVL was created specifically to value pension plan liabilities and uses the applicable assumptions and methods along with the pension plan census data to produce appropriate results. Test lives are generated to review the accuracy of both the input and output, allowing the users to confirm with a high degree of accuracy how the programmed benefit is applied to an individual along with the proposed decrements and other assumptions. The actuarial team loads the participant data, programs the benefit provisions, enters the applicable assumptions into the model, and reviews sample life output and results under the supervision of a credentialed actuary or actuaries who are proficient users of the software. We are not aware of any material limitations in the model nor any material inconsistencies in the assumptions used within the model.

Actuarial Cost Note Regarding H.B. 1415, P.N. 1583
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June 26, 2023

Potential Risks Related to the COLA

The liabilities and costs in this cost note are based upon actuarial assumptions utilized in the December 31, 2022 actuarial valuation of SERS. These measurements represent a single estimate of the future liabilities and costs of SERS. Since the actual liabilities and costs will be determined based upon (i) the future actuarial assumptions underlying such future measurements and (ii) the actual future experience of SERS, there is a risk that future measurements will differ from those presented in this cost note.

To provide readers of this cost note with a greater appreciation for the sensitivity of these results to potential future changes in both the underlying actuarial assumptions and future SERS experience, we have performed three additional liability calculations:

- One liability calculation, based upon a 5.875% underlying interest rate assumption (a full 1% lower than the 6.875% assumption currently applicable to SERS). This is for the purpose of showing the extent of increase that would occur in our liability result if a 1% lower interest rate assumption applied in the future. Our resulting liability (based on the 5.875% interest rate) was $279.5 million, or 5.4% greater than the Table 2 liability increase of $265.3 million.
- A second liability calculation, based upon the assumption that the actual future mortality rates experienced by the retirees eligible for the proposed COLA increases are 10% lower than those currently assumed for SERS annuitants for a 10-year period and then revert back to current mortality assumptions after. This is in order to show the extent of increase that would occur in our liability result if the COLA-eligible SERS retirees had favorable future longevity. Our resulting liability (based on the more favorable mortality rates) was $275.1 million, or 3.7% greater than the Table 2 liability increase of $265.3 million.
- A third liability calculation, based upon both of the two adjustments described above. Our resulting liability (based on the 5.875% interest rate and the 10% lower assumed mortality rates for 10 years) was $290.1 million, or 9.4% greater than the Table 2 liability increase of $265.3 million.

Again, we are presenting the above supplemental results to be responsive to ASOP 51, hoping to enhance understanding and appreciation of SERS' risk exposure for readers of this cost note.

Actuarial Cost Note Regarding H.B. 1415, P.N. 1583
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June 26, 2023

Actuarial Certification

To the best of our knowledge, the information we are presenting herein is complete and accurate and all costs and liabilities have been determined in conformance with generally accepted actuarial principles and on the basis of actuarial assumptions and methods which are reasonable (taking into account the past experience of SERS and reasonable expectations) and which represent our best estimate of anticipated experience under the plan.

The actuaries certifying to this valuation are members of the Society of Actuaries or other professional actuarial organizations and meet the General Qualification Standards of the American Academy of Actuaries for purposes of issuing Statements of Actuarial Opinion.

Please let us know if you have any questions on any of this.

Respectfully submitted,

Korn Ferry

By: _____

Kristopher E. Seets, F.S.A.
Member American Academy of Actuaries
Enrolled Actuary No. 23-8055

By: _____

Craig R. Graby
Member American Academy of Actuaries
Enrolled Actuary No. 23-7319

June 26, 2023

COMMONWEALTH OF PENNSYLVANIA
PUBLIC SCHOOL EMPLOYEES' RETIREMENT SYSTEM

PSERS
5 N 5th Street
Harrisburg PA 17101-1905

Toll-free: 1.888.773.7748 (1.888.PSERS4U)
Local: 717.787.8540
www.psers.pa.gov

June 26, 2023

Matthew Knittel, Director
Independent Fiscal Office
Rachel Carson State Office Building
400 Market Street Harrisburg, PA 17105

Dear Mr. Knittel,

This letter responds to your correspondence dated June 16, 2023, requesting "PSERS provide data that projects the impact" of House Bill 1415, PN 1583, and House Bill 1416, PN 1584. Your request was pursuant to the IFO's duty under section 615-B of the Administrative Code of 1929 to "review legislative changes that may affect public employee pension or retirement plans and to provide actuarial notes for such legislation."

As always, we are happy to assist the IFO with its statutory responsibility. Consistent with past practice, PSERS has not taken a position on HB 1415 or HB 1416.

As currently drafted, HB 1415 and HB 1416 propose monthly supplemental cost-of-living adjustments (COLAs) for members of PSERS and the State Employees' Retirement System (SERS) who retired prior to July 2, 2001. According to both bills, the COLAs would go into effect on July 1, 2023, and Jan. 1, 2024, respectively, for the eligible PSERS and SERS annuitants. Both bills would exclude COLAs to beneficiaries or survivors of annuitants who die before July 1, 2023. Both bills would fund the COLAs in equal dollar annual installments over 10 years. The bills differ in regard to the proposed supplemental rate increases. HB 1415's ranges are from 10% to 20%, and HB 1416's ranges are from 15% to 24.5% depending on the annuitant's retirement date.

Based on our review of the bills, there are no technical issues with the structure of the bills or conflicts with applicable state and federal laws. There is, however, a timing consideration to note for both bills. In order to implement the legislation, PSERS must make changes to its automated systems. Those changes cannot be completed by the effective date. This could be addressed by making retroactive supplemental annuity payments to the affected annuitants subsequently at the time the system changes are completed. In the event an eligible annuitant dies prior to PSERS making the payment, any retroactive payment would be payable to the estate of the annuitant.

In complying with your request under the Administrative Code, I present PSERS cost analyses of the two bills as written and computed by Buck, the Fund's contracted actuarial firm. Buck's analysis includes Microsoft Excel files for ease of your review.

Please note that Buck has taken a neutral position on the amendment while also acknowledging the actuarial impact the proposed benefit increase would place on PSERS, which currently has an actuarial-funded status of 61.6% and an employer pension contribution rate of 33.09% of payroll.

Buck's analysis of HB 1415 found:

- **43,475** eligible PSERS retirees.

- **82** is the average age of eligible annuitants, and their average life expectancy is about **9 years** as of June 30, 2022, the date of PSERS last valuation.
- **$889 million** is the total actuarial cost on a cashflow basis of the supplemental annuities through FY 2056 as detailed in Exhibit 1.
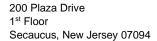
Buck's analysis of HB 1416 found:

- **43,475** eligible PSERS retirees.
- **82** is the average age of eligible annuitants, and their average life expectancy is about **9 years** as of June 30, 2022, the date of PSERS last valuation.
- **$1.25 billion** is the total actuarial cost on a cashflow basis of the supplemental annuities through FY 2056 as detailed in Exhibit 1.

If you have any questions or need additional information, please contact PSERS Press Secretary and acting Legislative Liaison Steve Esack at stesack@pa.gov or 717-720-4770.

Sincerely,

Terrill J. Sanchez
Executive Director
PSERS

June 26, 2023

Ms. Terrill J. Sanchez
Executive Director
Pennsylvania Public School Employees' Retirement System
5 North 5th Street
Harrisburg, PA 17101

Re: House Bill 1415, Printer's No. 1583

Dear Ms. Sanchez:

As requested, we have examined House Bill 1415, Printer's No. 1583 (HB1415). A copy of the Independent Fiscal Office's (IFO) request for analysis and the text of HB1415 are included in the Appendix to this letter. Our understanding of HB1415 is as follows:

- HB1415 would provide monthly supplemental annuities for Public School Employees' Retirement System (PSERS or System) retirees who meet the following conditions:

  (a) Retirees in receipt of a superannuation, withdrawal, or disability annuity from the System on July 1, 2023,
  (b) Retirees whose most recent effective date of retirement is prior to July 2, 2001, and
  (c) Retirees whose credited service does not include any service credited as either Class T-D, Class D-4, or Class AA.

- The amount of each eligible retiree's monthly supplemental annuity would be a percentage of the retiree's monthly annuity payment in effect on July 1, 2023. The applicable percentage is based on the retiree's most recent effective date of retirement, as follows:

Most recent effective date of retirement:	Percentage Factor:
July 2, 2000 through July 1, 2001	10.0%
July 2, 1999 through July 1, 2000	10.5%
July 2, 1998 through July 1, 1999	11.0%
July 2, 1997 through July 1, 1998	11.5%
July 2, 1996 through July 1, 1997	12.0%
July 2, 1995 through July 1, 1996	12.5%
July 2, 1994 through July 1, 1995	13.0%
July 2, 1993 through July 1, 1994	13.5%
July 2, 1992 through July 1, 1993	14.0%
July 2, 1991 through July 1, 1992	14.5%
July 2, 1990 through July 1, 1991	15.0%
July 2, 1989 through July 1, 1990	15.5%
July 2, 1988 through July 1, 1989	16.0%
July 2, 1987 through July 1, 1988	16.5%
July 2, 1986 through July 1, 1987	17.0%
July 2, 1985 through July 1, 1986	17.5%
July 2, 1984 through July 1, 1985	18.0%
July 2, 1983 through July 1, 1984	18.5%
July 2, 1982 through July 1, 1983	19.0%
Prior to July 2, 1982	20.0%

- No monthly supplemental annuity would be payable to any beneficiary or survivor of a retiree who dies prior to July 1, 2023.

- The monthly supplemental annuity for eligible retirees would commence with the first monthly annuity payment after July 1, 2023. However, no monthly supplemental annuity would be payable to an annuitant receiving a withdrawal annuity prior to the first day of July coincident with or next following the annuitant's attainment of superannuation age.

- The monthly supplemental annuity would be paid automatically unless the annuitant files a written notice with the Board requesting that the additional monthly supplemental annuity not be paid.

- The monthly supplemental annuity would be payable under the same optional form of payment as the July 1, 2023 annuity payment. It would also be subject to any subsequent modification of the July 1, 2023 annuity form of payment.

- The additional liability attributable to the increase in benefits provided under this legislation would be funded in equal installments over a 10-year period beginning July 1, 2024.

Estimates of the potential financial impact of HB1415 are presented in the attached Exhibit 1; HB1415's additional cost to the System through 2056 is estimated to be $889,116,000 on a cash flow basis.

It should be noted that increasing benefits at a time when the funded status of the System is only at 61.6% based on the actuarial value of assets at June 30, 2022, and employer pension contribution levels are at a rate of 33.09% of payroll should be carefully considered; particularly, the impact on the System's projected funded status and employer contribution rates. However, Buck does not take a position in favor of or in opposition to HB1415.

Exhibit 2 provides a distribution of the eligible benefit recipients based on HB1415's "most recent effective date of retirement" supplemental annuity subgroups.

Exhibit 3 provides the projected annual annuity cash flows for the eligible recipients with and without HB1415's supplemental annuity.

In addition, the IFO has requested the following supplemental information:

i) The total number of eligible recipients as of June 30, 2022, the most recent date as of which data is available, is 43,475.
ii) The average age of the eligible retirees as of June 30, 2022 was 82.78 years.
iii) The total annual annuities paid to the eligible recipients as of June 30, 2022 was $829,771,450.
iv) The total of annual annuities for the eligible recipients with the supplemental annuity increases is estimated to be $934,288,491. This includes $27,138 in prospective annual supplemental annuities for retirees receiving a withdrawal annuity who have not attained superannuation age; the supplemental annuities for these retirees are deferred to the first day of July coincident with or next following the annuitant's attainment of superannuation age. These amounts are based on the June 30, 2022 valuation data and assume mortality in accordance with the valuation mortality assumption to the first effective payment of the supplemental annuity. The estimates of HB1415's potential financial impact will be reduced by the cost of the supplemental annuity for contingent annuitants of any eligible

            member who dies prior to July 1, 2023, as they are not eligible; the expected impact of these deaths is minimal when compared with the overall cost impact of HB1415.

      v)   The expected annual increases in benefit payments due to the proposed supplemental annuity are reported in Exhibit 3.

     vi)   The average life expectancy for eligible retirees as of June 30, 2022 was 9.91 years.

The calculations presented here are based on the data, methods, and assumptions used in the June 30, 2022 actuarial valuation of PSERS, including an assumed annual rate of return on System assets of 7.00%, as well as the following assumptions for the projected future actuarial valuation results:

(a) The workforce size is assumed to remain constant over the projection period.

(b) Among new school employees hired on or after July 1, 2022, 98% will become Class T-G members, 1% will elect Class T-H membership, and 1% will elect Class DC participation.

(c) Future new employees are assumed to have similar demographic characteristics (age/gender/salary) to those of new members who entered PSERS in the period July 1, 2019 through June 30, 2022.

In addition:

- All eligible recipients were assumed to accept HB1415's supplemental annuity.
- The System's annual actuarial valuation does not anticipate subsequent modifications to current retirees' annuity form of payment. Therefore, this analysis does not consider future modifications to HB1415's supplemental annuity form of payment.
- HB1415 requires funding of the additional liability in equal payments over a 10-year period. However, this contradicts § 8328(d) of current statutes, which stipulates that the additional liability for increases in supplemental benefits due to legislation enacted after June 30, 2010, is to be funded as a level percentage of compensation over a 10-year period. We are not qualified to comment on possible conflicts in Pennsylvania law. This analysis is based on HB1415's provisions. The estimates of HB1415's potential financial impact, as presented in the attached Exhibit 1, will change if it is determined that § 8328(d) of current statutes takes precedence over the funding provisions of HB1415.

The information contained herein was developed at your request by Buck Global, LLC, using generally accepted actuarial principles and techniques in accordance with all applicable Actuarial Standards of Practice (ASOPs). The purpose of this analysis is to provide an estimate of HB1415's projected additional cost to the System. Use of this presentation for any other purpose, or by anyone other than the Board of Trustees or the staff of PSERS, may not be appropriate and may result in mistaken conclusions because of failure to understand applicable assumptions, methods, or inapplicability of the presentation for that purpose. Buck should be asked to review any statement to be made on the basis of the results contained herein. Buck will accept no liability for any such statement made without prior review by Buck. No third-party recipient of Buck's work product should rely upon Buck's work product absent involvement of Buck or without our approval.

Unless stated otherwise, references to "funded ratio" and "unfunded accrued liability" are measured using the actuarial value of assets. It should be noted that if the same measurements were made using the market value of assets, different funded ratios and unfunded accrued liabilities would result. Moreover, the funded ratio presented is appropriate for evaluating the need and level of future contributions but makes no assessment regarding the funded status of the System if the System were to settle (i.e., purchase annuities to cover) a portion or all of its liabilities.

These results may be used as estimates of the likely pattern of emerging costs and liabilities resulting from HB1415's proposed changes but should not be viewed as a guarantee of actual costs. Actual future funding obligations will be determined by actuarial valuations made on future valuation dates and will likely differ from the estimates provided in this analysis.

ASOP Nos. 27 and 35 ask the actuary to disclose the information and analysis used to support the actuary's determination that the assumptions selected by the Board do not significantly conflict with what, in the actuary's professional judgment, are reasonable for the purpose of the measurement. The Board adopted a new set of economic and demographic assumptions for the June 30, 2021 actuarial valuation based on the recommendations outlined by Buck in their 5-year experience study for the period July 1, 2015 to June 30, 2020. In the case of the Board's selection of an expected return on assets ("EROA"), we reviewed the analysis provided by the System's investment advisor as well as Buck's Financial Risk Management practice and determined the EROA assumption together with the System's other economic and demographic assumptions do not significantly conflict with what is reasonable for the purpose of the measurement.

The Appendix presents a discussion of risks of actual future measurements deviating from expected future measurements and models used in calculating the results shown in this analysis.

This cost analysis only provides information regarding future funding contributions of the System. It does not provide any information regarding the impact any changes may have on financial disclosures under applicable GASB standards.

This cost analysis was prepared under my supervision. I am a Fellow of the Society of Actuaries and a Member of the American Academy of Actuaries. I meet the Academy's qualification Standards to issue this Statement of Actuarial Opinion. This report has been prepared in accordance with all applicable Actuarial Standards of Practice and I am available to answer questions about it.

Please contact me if you have any questions concerning this report.

Sincerely,

David L. Driscoll, FSA, MAAA, EA, FCA
Principal, Consulting Actuary

Enc.
Pc: Brian Carl

Exhibit 1

Pennsylvania Public School Employees' Retirement System
Projection of Contribution Rates and Funded Ratios As of June 30, 2022
PSERS (Current) vs. House Bill 1415, Printer's No. 1583 (HB1415)

Fiscal Year Ending June 30	Total Payroll ($Thousands) Current	HB1415	Projected DC Payroll ($Thousands) Current	HB1415	FY Market Rate of Return Current	HB1415	Pension Rate Floor Current	HB1415	Member Contribution Rate Current	HB1415	Employer Normal Cost Rate Current	HB1415	Employer Unfunded Liability Rate Current	HB1415	Preliminary Employer Pension Rate Current	HB1415	Health Care Contribution Current	HB1415	Employer DC Contribution Rate Current	HB1415	Total Employer Contribution Rate Current	HB1415	Projected Total Employer Contribution ($Thousands) Current	HB1415	Cost/(Savings) Cash Flow Basis	Cost/(Savings) Present Value as of June 30, 2022 (7.00%)	Funded Ratio Current	HB1415	Unfunded Accrued Liability ($Millions) Current	HB1415	Actuarial Value of Assets ($Millions) Current	HB1415	Market Value of Assets ($Millions) Current	HB1415
2021	$14,078,000	$14,078,000			24.58%	24.58%	7.37%	7.37%	7.61%	7.61%	7.37%	7.37%	26.14%	26.14%	33.51%	33.51%	0.82%	0.82%			34.51%	34.51%					59.6%	59.6%	$45,534.7	45,534.7	$67,248.7	$67,248.7	$72,099.9	$72,099.9
2022	14,289,000	14,289,000	$953,207	$953,207	2.28	2.28	7.20	7.20	7.56	7.56	7.20	7.20	26.79	26.79	33.99	33.99	0.80	0.80			34.94	34.94					61.6	61.6	43,965.5	43,965.5	70,646.8	70,646.8	70,663.7	70,663.7
2023	14,497,000	14,497,000	1,294,059	1,294,059	7.00	7.00	6.07	6.07	7.52	7.52	6.07	6.07	28.24	28.24	34.31	34.31	0.75	0.75	0.20%	0.20%	35.26	35.26	$5,111,642	$5,111,642	$0	$0	63.2	62.9	43,061.4	43,645.0	73,900.3	73,900.3	74,054.2	74,054.2
2024	**15,260,000**	**15,260,000**	1,847,170	1,847,170	7.00	7.00	5.86	5.86	7.44	7.44	5.86	5.86	27.23	27.23	33.09	33.09	0.64	0.64	0.27	0.27	34.00	34.00	**5,188,400**	**5,188,400**	**0**	**0**	64.6	64.2	42,313.9	42,938.4	77,097.0	76,999.2	77,682.9	77,585.1
2025	15,372,913	15,372,913	2,349,025	2,349,025	7.00	7.00	5.66	5.66	7.37	7.37	5.66	5.66	27.96	28.53	33.62	34.19	0.77	0.77	0.34	0.34	34.73	35.30	5,338,384	5,427,296	88,912	72,578	66.3	65.9	41,103.5	41,682.8	80,731.5	80,628.0	81,483.6	81,380.0
2026	15,489,907	15,489,907	2,839,630	2,839,630	7.00	7.00	5.49	5.49	7.30	7.30	5.49	5.49	28.82	29.40	34.31	34.89	0.78	0.78	0.40	0.40	35.49	36.07	5,497,903	5,586,815	88,912	67,830	68.4	68.1	39,256.6	39,787.5	84,951.4	85,496.7	85,393.9	85,393.9
2027	15,610,679	15,610,679	3,322,675	3,322,675	7.00	7.00	5.32	5.32	7.23	7.23	5.32	5.32	29.59	30.16	34.91	35.48	0.77	0.77	0.47	0.47	36.15	36.72	5,642,624	5,731,536	88,912	63,393	70.6	70.3	37,207.5	37,686.6	89,310.9	89,215.7	89,715.9	89,620.7
2028	15,731,799	15,731,799	3,799,338	3,799,338	7.00	7.00	5.15	5.15	7.16	7.16	5.15	5.15	30.20	30.76	35.35	35.91	0.78	0.78	0.54	0.54	36.67	37.23	5,768,420	5,857,332	88,912	59,246	72.9	72.6	34,935.1	35,358.9	93,832.9	93,752.5	94,139.9	94,059.5
2029	15,854,223	15,854,223	4,268,320	4,268,320	7.00	7.00	4.97	4.97	7.10	7.10	4.97	4.97	30.86	31.42	35.83	36.39	0.77	0.77	0.61	0.61	37.21	37.77	5,899,255	5,988,167	88,912	55,370	75.3	75.1	32,299.6	32,664.1	98,621.0	98,563.0	98,761.0	98,703.0
2030	15,975,648	15,975,648	4,731,426	4,731,426	7.00	7.00	4.77	4.77	7.05	7.05	4.77	4.77	31.56	32.12	36.33	36.89	0.77	0.77	0.67	0.67	37.77	38.33	6,034,795	6,123,707	88,912	51,747	78.2	78.0	28,984.5	29,285.6	103,985.0	103,957.1	103,601.4	103,573.5
2031	16,094,737	16,094,737	5,208,681	5,208,681	7.00	7.00	4.58	4.58	6.99	6.99	4.58	4.58	32.27	32.82	36.85	37.40	0.77	0.77	0.73	0.73	38.35	38.90	6,172,011	6,260,922	88,912	48,362	80.5	80.4	26,300.8	26,534.1	108,609.5	108,619.9	108,680.0	108,690.3
2032	16,210,721	16,210,721	5,702,222	5,702,222	7.00	7.00	4.39	4.39	6.93	6.93	4.39	4.39	32.85	33.40	37.24	37.79	0.76	0.76	0.80	0.80	38.80	39.35	6,289,569	6,378,480	88,912	45,198	83.3	83.2	22,798.7	22,959.4	113,922.0	113,979.1	113,932.4	114,036.3
2033	16,323,673	16,323,673	6,212,890	6,212,890	7.00	7.00	4.18	4.18	6.87	6.87	4.18	4.18	33.89	34.43	38.07	38.61	0.76	0.76	0.86	0.86	39.69	40.23	6,478,411	6,567,323	88,912	42,241	86.4	86.3	18,844.5	18,927.6	119,521.9	119,634.3	119,564.7	119,677.1
2034	16,434,098	16,434,098	6,729,680	6,729,680	7.00	7.00	3.97	3.97	6.81	6.81	3.97	3.97	34.75	35.29	38.72	39.26	0.75	0.75	0.92	0.92	40.39	40.93	6,637,034	6,725,945	88,912	39,478	89.7	89.7	14,435.8	14,435.8	125,423.4	125,600.1	125,451.5	125,628.2
2035	16,531,409	16,531,409	7,252,431	7,252,431	7.00	7.00	3.76	3.76	6.75	6.75	3.76	3.76	35.66	35.66	39.42	39.42	0.75	0.75	0.99	0.99	41.16	41.16	6,803,672	6,803,672	0	0	93.2	93.3	9,538.1	9,538.1	131,639.4	131,798.1	131,656.2	131,814.4
2036	16,617,513	16,617,513	7,788,175	7,788,175	7.00	7.00	3.55	3.55	6.68	6.68	3.55	3.55	17.91	17.91	21.46	21.46	0.75	0.75	1.05	1.05	23.26	23.26	3,865,562	3,865,562	0	0	94.9	94.9	7,220.7	7,220.7	135,023.3	135,166.0	135,032.2	135,174.9
2037	16,696,491	16,696,491	8,338,062	8,338,062	7.00	7.00	3.33	3.33	6.62	6.62	3.33	3.33	13.60	13.60	16.93	16.93	0.75	0.75	1.12	1.12	18.80	18.80	3,139,593	3,139,593	0	0	97.3	97.3	5,449.9	5,449.9	137,638.4	137,768.4	137,643.1	137,773.1
2038	16,774,523	16,774,523	8,904,833	8,904,833	7.00	7.00	3.11	3.11	6.55	6.55	3.11	3.11	11.79	11.79	14.90	14.90	0.75	0.75	1.19	1.19	16.84	16.84	2,824,438	2,824,438	(0)	(0)	97.3	97.3	3,852.0	3,852.0	139,865.3	139,985.2	139,868.2	139,988.2
2039	16,850,631	16,850,631	9,487,405	9,487,405	7.00	7.00	2.88	2.88	6.48	6.48	2.88	2.88	9.63	9.63	12.51	12.51	0.75	0.75	1.26	1.26	14.52	14.52	2,447,489	2,447,489	(0)	(0)	98.3	98.3	2,498.3	2,498.3	141,608.5	141,720.8	141,611.7	141,724.1
2040	16,927,479	16,927,479	10,085,663	10,085,663	7.00	7.00	2.66	2.66	6.40	6.40	2.66	2.66	7.93	7.93	10.59	10.59	0.75	0.75	1.33	1.33	12.67	12.67	2,144,674	2,144,674	(0)	(0)	99.1	99.1	1,331.9	1,331.9	142,904.3	143,011.3	142,908.8	143,015.8
2041	17,006,109	17,006,109	10,698,945	10,698,945	7.00	7.00	2.43	2.43	6.33	6.33	2.43	2.43	6.40	6.40	8.83	8.83	0.75	0.75	1.41	1.41	10.99	10.99	1,868,927	1,868,927	(0)	(0)	99.8	99.8	335.1	335.1	143,827.3	143,930.9	143,830.5	143,934.1
2042	17,089,893	17,089,893	11,325,273	11,325,273	7.00	7.00	2.21	2.21	6.25	6.25	2.21	2.21	1.95	1.95	4.16	4.16	0.75	0.75	1.48	1.48	6.39	6.39	1,091,735	1,091,735	(0)	(0)	100.0	100.0	24.4	24.4	143,852.1	143,954.1	143,854.2	143,956.2
2043	17,185,219	17,185,219	11,963,321	11,963,321	7.00	7.00	1.98	1.98	6.18	6.18	1.98	1.98	0.74	0.74	2.72	2.72	0.75	0.75	1.56	1.56	5.03	5.03	863,858	863,858	(0)	(0)	100.1	100.1	(101.3)	(101.3)	143,524.4	143,626.6	143,525.9	143,628.1
2044	17,298,187	17,298,187	12,610,212	12,610,212	7.00	7.00	1.78	1.78	6.10	6.10	1.78	1.78	0.45	0.45	2.23	2.23	0.75	0.75	1.63	1.63	4.61	4.61	797,314	797,314	(0)	(0)	100.1	100.1	(186.7)	(186.7)	143,028.6	143,132.3	143,029.6	143,133.3
2045	17,434,238	17,434,238	13,264,654	13,264,654	7.00	7.00	1.59	1.59	6.02	6.02	1.59	1.59	0.92	0.92	2.51	2.51	0.75	0.75	1.71	1.71	4.97	4.97	866,112	866,112	(0)	(0)	100.3	100.3	(360.1)	(360.1)	142,574.6	142,681.2	142,575.5	142,682.1
2046	17,598,440	17,598,440	13,918,503	13,918,503	7.00	7.00	1.42	1.42	5.95	5.95	1.42	1.42	0.69	0.69	2.11	2.11	0.75	0.75	1.78	1.78	4.64	4.64	816,354	816,354	(0)	(0)	100.4	100.4	(506.7)	(506.7)	142,075.9	142,186.6	142,076.8	142,187.2
2047	17,796,447	17,796,447	14,570,226	14,570,226	7.00	7.00	1.27	1.27	5.88	5.88	1.27	1.27	(0.98)	(0.98)	0.29	0.29	0.75	0.75	1.85	1.85	3.87	3.87	688,722	688,722	0	0	100.4	100.4	(548.5)	(548.5)	141,586.0	141,701.8	141,586.5	141,702.3
2048	18,030,565	18,030,565	15,217,413	15,217,413	7.00	7.00	1.15	1.15	5.82	5.82	1.15	1.15	(0.13)	(0.13)	1.02	1.02	0.75	0.75	1.90	1.90	3.80	3.80	685,161	685,161	0	0	100.4	100.4	(587.8)	(587.8)	141,206.6	141,328.5	141,207.0	141,329.0
2049	18,310,281	18,310,281	15,863,300	15,863,300	7.00	7.00	1.05	1.05	5.76	5.76	1.05	1.05	(0.29)	(0.29)	0.76	0.76	0.75	0.75	1.95	1.95	3.75	3.75	686,636	686,636	0	0	100.4	100.4	(631.0)	(631.0)	140,940.0	141,069.0	140,940.3	141,069.3
2050	18,636,715	18,636,715	16,508,677	16,508,677	7.00	7.00	0.97	0.97	5.71	5.71	0.97	0.97	(0.62)	(0.62)	0.35	0.35	0.75	0.75	1.99	1.99	3.71	3.71	691,422	691,422	0	0	100.5	100.5	(679.3)	(679.3)	140,809.1	140,946.0	140,809.1	140,946.0
2051	19,006,112	19,006,112	17,155,285	17,155,285	7.00	7.00	0.92	0.92	5.66	5.66	0.92	0.92	(0.75)	(0.75)	0.17	0.17	0.75	0.75	2.03	2.03	3.70	3.70	703,226	703,226	0	0	100.5	100.5	(731.9)	(731.9)	140,818.9	140,964.4	140,818.9	140,964.4
2052	19,415,170	19,415,170	17,799,444	17,799,444	7.00	7.00	0.87	0.87	5.62	5.62	0.87	0.87	(0.60)	(0.60)	0.27	0.27	0.75	0.75	2.06	2.06	3.68	3.68	714,478	714,478	0	0	100.6	100.6	(787.3)	(787.3)	140,990.7	141,145.8	140,990.8	141,145.9
2053	19,856,094	19,856,094	18,444,660	18,444,660	7.00	7.00	0.83	0.83	5.59	5.59	0.83	0.83	(0.52)	(0.52)	0.31	0.31	0.75	0.75	2.09	2.09	3.67	3.67	728,719	728,719	0	0	100.6	100.6	(846.1)	(846.1)	141,371.1	141,536.6	141,371.2	141,536.7
2054	20,330,830	20,330,830	19,088,442	19,088,442	7.00	7.00	0.80	0.80	5.56	5.56	0.80	0.80	(0.47)	(0.47)	0.33	0.33	0.75	0.75	2.11	2.11	3.66	3.66	744,108	744,108	0	0	100.6	100.6	(908.7)	(908.7)	141,917.8	142,094.5	141,917.9	142,094.5
2055	20,835,805	20,835,805	19,723,385	19,723,385	7.00	7.00	0.77	0.77	5.54	5.54	0.77	0.77	(0.38)	(0.38)	0.39	0.39	0.75	0.75	2.13	2.13	3.65	3.65	760,507	760,507	0	0	100.7	100.7	(975.1)	(975.1)	142,657.4	142,846.2	142,657.4	142,846.2
2056	21,359,598	21,359,598	20,350,727	20,350,727	7.00	7.00	0.76	0.76	5.52	5.52	0.76	0.76	(0.04)	(0.04)	0.72	0.72	0.75	0.75	2.14	2.14	3.65	3.65	779,625	779,625	0	0	100.7	100.7	(1,043.7)	(1,043.7)	143,624.9	143,826.7	143,625.0	143,826.8

Total $104,770,784 | $105,659,899 | $889,116 | $545,443

This is an attachment to Buck's June 26, 2023 cost analysis on House Bill 1415, Printer's No. 1583. Please refer to that cost analysis for more information.

Exhibit 2
Eligible Benefit Recipients
Distributed on Most Recent Effective Date of Retirement

Most recent effective date of retirement	Percentage Factor	Number of Eligible Benefit Recipients
July 2, 2000 through July 1, 2001	10.00%	1,338
July 2, 1999 through July 1, 2000	10.50%	3,249
July 2, 1998 through July 1, 1999	11.00%	6,652
July 2, 1997 through July 1, 1998	11.50%	3,739
July 2, 1996 through July 1, 1997	12.00%	5,139
July 2, 1995 through July 1, 1996	12.50%	3,143
July 2, 1994 through July 1, 1995	13.00%	1,851
July 2, 1993 through July 1, 1994	13.50%	1,698
July 2, 1992 through July 1, 1993	14.00%	4,259
July 2, 1991 through July 1, 1992	14.50%	1,511
July 2, 1990 through July 1, 1991	15.00%	1,466
July 2, 1989 through July 1, 1990	15.50%	1,275
July 2, 1988 through July 1, 1989	16.00%	1,168
July 2, 1987 through July 1, 1988	16.50%	864
July 2, 1986 through July 1, 1987	17.00%	889
July 2, 1985 through July 1, 1986	17.50%	1,027
July 2, 1984 through July 1, 1985	18.00%	827
July 2, 1983 through July 1, 1984	18.50%	715
July 2, 1982 through July 1, 1983	19.00%	554
Prior to July 2, 1982	20.00%	2,111
Total		**43,475**

This is an attachment to Buck's June 26, 2023 cost analysis on House Bill 1415, Printer's No. 1583. Please refer to that cost analysis for more information.

Exhibit 3
Projected Annual Benefit Cash Flows for the Eligible Benefit Recipients

Fiscal Year Ending June 30	Current	Reflecting HB1415 Supplemental Annuity	Increase in Benefit Payments due to HB1415 Supplemental Annuity
2023	805,173,809	805,173,809	0
2024	755,544,731	850,086,073	94,541,342
2025	705,328,281	793,174,314	87,846,033
2026	654,897,552	736,086,880	81,189,328
2027	604,622,725	679,237,353	74,614,628
2028	554,869,477	623,033,863	68,164,386
2029	505,997,868	567,885,833	61,887,965
2030	458,359,290	514,181,632	55,822,342
2031	412,289,584	462,297,720	50,008,136
2032	368,101,456	412,577,981	44,476,525
2033	326,079,184	365,336,509	39,257,325
2034	286,473,469	320,848,034	34,374,565
2035	249,496,369	279,343,639	29,847,270
2036	215,316,583	241,005,556	25,688,973
2037	184,054,097	205,961,571	21,907,474
2038	155,773,993	174,278,395	18,504,402
2039	130,484,737	145,959,853	15,475,116
2040	108,140,725	120,949,973	12,809,248
2041	88,646,138	99,137,349	10,491,211
2042	71,859,476	80,360,191	8,500,715
2043	57,598,659	64,412,175	6,813,516
2044	45,650,176	51,052,414	5,402,238
2045	35,781,196	40,019,059	4,237,863
2046	27,749,043	31,039,741	3,290,698
2047	21,308,327	23,839,449	2,531,122
2048	16,219,479	18,150,050	1,930,571
2049	12,256,394	13,718,658	1,462,264
2050	9,212,333	10,314,221	1,101,888
2051	6,903,962	7,731,909	827,947
2052	5,173,162	5,795,097	621,935
2053	3,887,417	4,355,792	468,375
2054	2,938,749	3,293,402	354,653
2055	2,241,421	2,512,160	270,739
2056	1,728,992	1,937,838	208,846
2057	1,351,169	1,514,229	163,060
2058	1,070,706	1,199,691	128,985
2059	860,521	963,927	103,406
2060	701,152	785,152	84,000
2061	578,728	647,829	69,101

Exhibit 3
Projected Annual Benefit Cash Flows for the Eligible Benefit Recipients

Fiscal Year Ending June 30	Current	Reflecting HB1415 Supplemental Annuity	Increase in Benefit Payments due to HB1415 Supplemental Annuity
2062	483,439	540,959	57,520
2063	408,352	456,763	48,411
2064	348,535	389,705	41,170
2065	300,416	335,774	35,358
2066	261,344	291,990	30,646
2067	229,317	256,106	26,789
2068	202,814	226,416	23,602
2069	180,663	201,603	20,940
2070	161,926	180,617	18,691
2071	145,853	162,617	16,764
2072	131,862	146,951	15,089
2073	119,506	133,120	13,614
2074	108,442	120,740	12,298
2075	98,410	109,520	11,110
2076	89,215	99,241	10,026
2077	80,717	89,747	9,030
2078	72,823	80,933	8,110
2079	65,472	72,731	7,259
2080	58,623	65,094	6,471
2081	52,245	57,987	5,742
2082	46,323	51,392	5,069
2083	40,845	45,296	4,451
2084	35,803	39,689	3,886
2085	31,192	34,564	3,372
2086	27,008	29,917	2,909
2087	23,238	25,732	2,494
2088	19,864	21,988	2,124
2089	16,868	18,666	1,798
2090	14,229	15,741	1,512
2091	11,923	13,187	1,264
2092	9,920	10,969	1,049
2093	8,189	9,053	864
2094	6,701	7,407	706
2095	5,431	6,002	571
2096	4,355	4,812	457
2097	3,450	3,812	362
2098	2,696	2,979	283
2099	2,073	2,290	217
2100	1,567	1,731	164

Exhibit 3

Projected Annual Benefit Cash Flows for the Eligible Benefit Recipients

Fiscal Year Ending June 30	Current	Reflecting HB1415 Supplemental Annuity	Increase in Benefit Payments due to HB1415 Supplemental Annuity
2101	1,161	1,283	122
2102	842	930	88
2103	596	658	62
2104	411	454	43
2105	275	304	29
2106	178	197	19
2107	112	124	12
2108	68	75	7
2109	39	43	4
2110	22	24	2
2111	12	13	1
2112	6	7	1
2113	3	3	0
2114	1	1	0
2115	1	1	0
2116	-	-	0
2117	-	-	0

This is an attachment to Buck's June 26, 2023 cost analysis on House Bill 1415, Printer's No. 1583. Please refer to that cost analysis for more information.

Appendix

Actuarial Standard of Practice No. 56

ASOP No. 56 provides guidance to actuaries when performing actuarial services with respect to designing, developing, selecting, modifying, using, reviewing, or evaluating models. Buck uses the following:

- third-party software in the performance of annual actuarial valuations and projections to calculate the liabilities associated with the provisions of the plan using data and assumptions as of the measurement date under the funding methods specified in this report.
- an internally developed model that applies applicable funding methods and policies to the liabilities derived from the output of the third-party software and other inputs, such as plan assets and contributions, to generate many of the exhibits found in this report.

Buck has an extensive review process whereby the results of the liability calculations are checked using detailed sample output, changes from year to year are summarized by source, and significant deviations from expectations are investigated. Other outputs and the internal model are similarly reviewed in detail and at a high level for accuracy, reasonability, and consistency with prior results. Buck also reviews the third-party model when significant changes are made to the software or model. The review is performed by experts within the company who are familiar with applicable funding methods as well as the manner in which the model generates its output. If significant changes are made to the internal model, extra checking and review are completed. Significant changes to the internal model that are applicable to multiple clients are generally developed, checked, and reviewed by multiple experts within the company who are familiar with the details of the required changes.

Actuarial Standard of Practice No. 51

Funding future retirement benefits prior to when those benefits become due involves assumptions regarding future economic and demographic experience. These assumptions are applied to calculate actuarial liabilities, current contribution requirements and the funded status of the plan. However, to the extent future experience deviates from the assumptions used, variations will occur in these calculated values. These variations create risk to the plan. Understanding the risks to the funding of the plan is important. ASOP 51 requires certain disclosures of potential risks to the plan and provides useful information for intended users of actuarial reports that determine plan contributions or evaluate the adequacy of specified contribution levels to support benefit provisions.

Under ASOP 51, risk is defined as the potential of actual future measurements deviating from expected future measurements resulting from actual future experience deviating from actuarially assumed experience.

It is important to note that not all risk is negative, but all risk should be understood and accepted based on knowledge, judgement and educated decisions. Future measurements may deviate in ways that produce positive or negative financial impacts to the Retirement System.

In the actuary's professional judgment, the following risks may reasonably be anticipated to significantly affect the Retirement System's future financial condition:

- Investment risk – potential that the investment return will differ from the 7.00% expected in the actuarial valuation
- Salary increases – potential that salary increases will be different from that assumed for the actuarial valuation

- Longevity risk – potential that participants live longer than expected from the valuation mortality assumptions
- Declining workforce – potential that future employer contribution rates will be different from expected
- Contribution risk – potential that the contribution will be different than the recommended contribution in the actuarial valuation

The following information is provided to comply with ASOP 51 and furnish beneficial information on potential risks to the plan. This list is not all-inclusive; it is an attempt to identify the most significant risks and how those risks might affect the results shown in this report.

Note that ASOP 51 does not require the actuary to evaluate the ability or willingness of the Retirement System employers to make contributions to the Retirement System when due, or to assess the likelihood or consequences of potential future changes in law. In addition, this valuation report is not intended to provide investment advice or to provide guidance on the management or reduction of risk. Buck welcomes the opportunity to assist in such matters as part of a separate project or projects utilizing the appropriate staff and resources for those objectives.

Investment Risk: Retirement System costs are very sensitive to the market return. Returns on assets below those assumed will increase costs.

- Investment returns at less than expected levels will cause the assets to be lower than expected. This decrease in assets will increase the Retirement System cost.
- The Retirement System uses an actuarial value of assets that smooths gains and losses on market returns over a ten-year period to help control some of the volatility in costs due to investment risk.

Salary increases: Retirement System costs are sensitive to salary increases since benefits at retirement are pay related.

- Salary increases above those expected would lead to higher liabilities, larger unfunded liabilities, and larger employer contributions.
- Salaries below those expected would lead to lower liabilities but may increase employer contribution rates due to lower employer payroll.

Longevity Risk: Retirement System costs will increase as participants are expected to live longer. This is because:

- Benefits are paid over a longer lifetime when life expectancy is expected to increase. The longer duration of payments leads to higher liabilities.
- Health care has been improving, which increases the life expectancy of participants. As health care improves, Retirement System costs will increase.
- The mortality assumption used in the actuarial valuation of the Retirement System incorporates assumed future improvement in longevity. Future longevity improvements exceeding those reflected in the current mortality assumption would lead to increased Retirement System costs.
- Granting benefit improvements may increase the impact of this risk due to larger benefits being paid over a longer period than is presently expected. Because the benefit increases are an ad hoc, one-time improvement, the increase in longevity risk may be mitigated.

Declining workforce: Employer contributions are based on a percentage of participants' salaries. If the required dollar amount of contributions remains level or increases, a declining active workforce will result in higher contribution rates in order to meet required contribution levels.

Contribution Risk: The Retirement System contribution is a budgeted amount. There is a risk associated with the employer's contribution when the budgeted amount and recommended amount differ. This is because:

- When the budgeted contribution is lower than the recommended contribution the Retirement System may not be sustainable in the long term.
- Any underpayment of the contribution will increase future contribution amounts to help pay off the additional Unfunded Actuarial Accrued Liability associated with any lower than recommended contribution amounts.