COMMONWEALTH OF PENNSYLVANIA DRAFT May 12, 2015

PUBLIC EMPLOYEE RETIREMENT COMMISSION

ACTUARIAL NOTE TRANSMITTAL

Bill ID:	Senate Bill Number 1, Printer's Number 886
System:	Public School Employees' Retirement System and State Employees' Retirement System
Subject:	Retirement Benefit Reform

SYNOPSIS

Senate Bill Number 1, Printer's Number 886, would amend the Public School Employees' Retirement Code, the State Employees' Retirement Code and the Military Code. The bill would impose a series of significant retirement benefit changes upon the Public School Employees' Retirement System (PSERS) and the State Employees' Retirement System (SERS) as follows: 1) establish a Defined Contribution (DC) retirement benefit plan applicable to most new members of both PSERS and SERS; 2) add a Cash Balance retirement benefit tier to the existing Defined Benefit (DB) structure that will be mandatory for new members and optional for pre-2016 active members; and 3) modify the future benefit entitlements of current members of both PSERS and SERS.

DISCUSSION

The Retirement Codes and Systems

Currently, most full-time public school and State employees are members of either the Public School Employees' Retirement System (PSERS) or the State Employees' Retirement System (SERS). Both PSERS and SERS are governmental, cost-sharing, multiple-employer defined benefit (DB) pension plans. The designated purpose of the Public School Employees' Retirement System and the State Employees' Retirement System is to provide retirement allowances and other benefits, including disability and death benefits to public school and State employees. As of June 30, 2014, there were approximately 789 participating employers, generally school districts, area vocational-technical schools, and intermediate units in PSERS, and as of December 31, 2014, approximately 104 Commonwealth and other employers participating in SERS.

Membership in PSERS and SERS is mandatory for most school and State employees. Certain other employees are not required but are given the option to participate. As of June 30, 2014, there were 263,312 active members and 213,900 annuitant members of PSERS,

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and as of December 31, 2014, there were 104,431 active members and 122,249 annuitant members of SERS.

For most members of both Systems, the basic benefit formula used to determine the normal retirement benefit is equivalent to the product of 2.5% multiplied by the member's years of accumulated service credit ("eligibility points") multiplied by the member's final average (highest three years) salary. Since the passage of Act 9 of 2001 (which increased the accrual rate for most members from 2.0% to 2.5%), most members of PSERS are Class T-D members and contribute 7.5% of compensation to PSERS, while most members of SERS are Class AA members and contribute 6.25% of compensation to SERS. Within both Systems, there are a number of additional membership classes with corresponding benefit accrual and employee contribution rates that differ from the majority of school and State employees.

Act 120 of 2010 implemented major pension reforms, including the establishment of new benefit tiers applicable to most new members. Effective January 1, 2011, most new members (including members of the General Assembly), are required to become members of one of two membership classes, known as "Class A-3" and "Class A-4." Most new members of SERS, other than State Police officers or members employed in a position for which a class of service other than Class A or Class AA is credited or could be elected, become members of Class A-3 beginning January 1, 2011 (or if a member of the General Assembly, beginning December 1, 2010). Class A-3 members are eligible for an annuity based upon an annual benefit accrual rate of 2% and have a corresponding employee contribution requirement of 6.25% of compensation. As an alternative to Class A-3, an employee who becomes a member of SERS on or after January 1, 2011, may elect Class A-4 membership within 45 days of becoming a member of SERS. A Class A-4 member is eligible for an annuity based upon an annual benefit accrual rate of 2.5% with a corresponding employee contribution requirement equal to 9.3% of compensation.

Effective July 1, 2011, new members of PSERS are required to become members of one of two membership classes, known as "Class T-E" and "Class T-F." Most new members of PSERS are required to become members of Class T-E beginning July 1, 2011. Class T-E members are eligible for an annuity based upon an annual benefit accrual rate of 2% and have a corresponding employee contribution of 7.5% of compensation. As an alternative to Class T-E, an employee who becomes a member of PSERS on or after July 1, 2011, may elect Class T-F membership within 45 days of becoming a member of PSERS. A Class T-F member is eligible for an annuity based upon an annual benefit accrual rate of 2.5% with a corresponding employee contribution requirement equal to 10.3% of compensation.

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Under the Codes of both Systems, superannuation or normal retirement age is that date on which a member may terminate service with the public employer and receive a full retirement benefit without reduction. Under the Public School Employees' Retirement Code, superannuation or normal retirement age for most members is age 62 with at least one full year of service, age 60 with 30 or more years of service, or any age with 35 years of service. Under the State Employees' Retirement Code, superannuation or normal retirement age for most members is age 60 with three years of service or any age with 35 years of service, while age 50 is the normal retirement age for members of the General Assembly and certain public safety employees. For most members of the Systems who first became members after the effective dates of Act 120, the superannuation requirement is age 65 with a minimum of three years of service credit, or any combination of age and service that totals 92 with at least 35 years of credited service, and age 55 for members of the General Assembly and certain public safety employees.

Defined Benefit and Defined Contribution Retirement Systems

There are two predominate approaches to pension plan design employed in the public and private sectors to provide employee retirement benefits. In a traditional "defined benefit" (DB) plan, such as PSERS and SERS, the pension benefit to be provided at retirement is defined, while the contributions to be made over the period of employment are variable based on the experience of the pension fund. Upon retirement, a DB plan participant is entitled to receive a definitely determinable benefit that is calculated using a formulation that considers factors such as age, duration of service with the employer and compensation. Because the benefit is defined and calculated using a formula and is not dependent on an individual's account balance, members of DB plans are largely insulated from both negative and positive fluctuations of the investment markets.

By contrast, in a "defined contribution" (DC) pension plan, such as the plan proposed in the bill as amended for new or returning school and State employees, the contributions to be made over the period of employment are defined, while the pension benefit to be provided at retirement is variable based on the experience of the pension fund. Upon retirement or separation from the employer, a DC plan participant is generally entitled only to the balance standing to the credit of the individual's retirement account. Market performance directly impacts the value of an individual's retirement account.

The distinction between the DB and DC approaches is most significant in the placement of the risk associated with investment earnings over the period of employment. The fixed benefit in a DB pension plan means that the investment experience impacts the contribution requirements, increasing them when investment earnings are lower than anticipated and decreasing them when earnings are greater than anticipated. The fixed

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contributions in a DC pension plan mean that the investment experience impacts on the benefit amount, increasing it when earnings are higher and reducing it when earnings are lower. Therefore, the employer bears the investment risk in a DB plan, and the employee bears the investment risk in a DC pension plan.

For most employees, defined contribution plans are generally regarded as more valuable for those in the early stages of their careers or for those who are employed in careers that entail greater mobility. Defined contribution accounts are portable and can readily move with the employee as that employee moves from one employer to the next. In contrast, defined benefit plans are relatively more valuable for those employees who tend to remain with one employer and to long-service employees in the later stages of their careers, because the value and cost of the defined benefits earned each year increase as employees approach retirement age.

Cash Balance Retirement Benefit Plan

A cash balance plan is a type of defined benefit (DB) plan with a defined contribution-like (DC) portability component. A cash balance plan calculates benefits in a manner similar to a DC plan. Under a cash balance arrangement, benefits are accrued throughout a worker's years of employment. Similar to what tends to occur with DC plans, employees who move from employer to employer frequently or otherwise leave service early will tend to benefit more from a cash balance plan than a traditional DB plan, because the accrued benefits will tend to be greater than would be the case under a traditional DB plan. Conversely, long-service employees will tend to benefit less from a cash balance plan arrangement as compared with a traditional DB plan, because the portion of the benefit accrued in later years of service will tend to be less than under a traditional DB plan.

A cash balance plan is classified as a defined benefit plan because the employer bears the post-retirement investment risks and rewards along with the mortality risk if the employee elects to receive benefits in the form of an annuity and lives beyond the anticipated retired life expectancy. Unlike a traditional DB plan, a cash balance plan establishes allocations to a hypothetical individual account (the cash balance) for each participant (individual account balances are segregated for accounting purposes only). Benefits under cash balance plans may be paid as a lump sum or annuitized over the retiree's expected remaining lifetime.

The cash balance retirement benefit calculation would differ from the current traditional defined benefit formula. Rather than receiving an annuity based upon the current benefit formula (accrual rate x years of service x final average salary), the cash balance benefit

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would be equal to the value of all accumulated employee and employer contributions plus interest credited to the member's cash balance ledger account at the time of retirement. A member would be entitled to elect one of three benefit options at the time of separation: 1) a lifetime annuity based upon the total value of the member's account, plus interest (if superannuated); 2) delay receipt of benefits until superannuation age by vesting; or 3) elect to receive a lump-sum distribution of employee contributions and interest, but forfeiting the employer contribution and interest component and any entitlement to a future annuity.

Cash balance plans and other types of hybrid defined benefit plans have been replacing traditional retirement plans in the private sector for many years. Many employers, including some public employers, have moved to cash balance plans in an attempt to control plan costs, reduce employer contribution volatility, and shift some of the inherent risk associated with maintaining a defined benefit plan from the employer to the employee.

Benefit Modifications Affecting New School and State Employees

The bill would establish "side-by-side" hybrid retirement benefit plans applicable to most public employees hired by school or State employers within the Commonwealth beginning July 1, 2016, in the case of PSERS, and January 1, 2016, in the case of SERS. The hybrid retirement plans would be comprised of two components: 1) a defined contribution plan; and 2) a cash balance (CB) benefit tier added to the existing defined benefit structure. The new governmental defined contribution retirement plans, known as the School Employees' Defined Contribution Plan and the State Employees' Defined Contribution Plan ("Plans"), would supplement the defined benefit plans provided by PSERS and SERS for new school and State employees. Membership in both PSERS' and SERS' traditional defined benefit tiers would be closed to new entrants effective July 1, 2016, for PSERS, and January 1, 2016, for SERS, and replaced with new cash balance provisions. Current members of PSERS and SERS would retain membership in the Systems, with the exception of members of the General Assembly, as detailed below. Members who return following a break in service would still remain members of their respective classes in the Systems.

Current active member of PSERS or SERS may elect to become a participant in the components of the new hybrid plans of the respective Systems, in addition to their mandatory membership in the PSERS' and SERS' DB plans. Pre Act-120 members of PSERS and SERS would have the option to elect membership in the new cash balance plan. For post Act-120 members of PSERS and SERS, they would have the option to elect membership in both the cash balance plan and the defined contribution plan for compensation earned over the Social Security wage base. This would be, in effect, a

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"stacked" hybrid pension plan for these members, offering additional benefits on top of the traditional defined benefit plan already provided by the Systems.

The bill mandates the creation of the hybrid retirement plans, directs the PSERS and SERS Boards to administer or ensure the administration of the respective Plans, and sets forth the Boards' powers and duties. Most of the details governing the actual operation of the new Plans are delegated to the Boards which will be responsible for establishing the rules and regulations governing the Plans. These rules and regulations will presumably address the many specific details involved in the operation of a public pension plan. It also appears that most of the new Plans' investment and administrative functions may be handled by third-party administrators contracted by the Boards to provide the necessary services.

Defined Contribution Plan

New school employees shall be known as Class T-I members and would contribute 3% of compensation with an employer contribution of 2.59% of compensation to the DC plan. State employees who participate in the new DC plan would contribute 3% of compensation with an employer contribution of 4% of compensation. For hazardous duty employees (including Capitol Police and park rangers), the employer contribution rate would be 5.5% of compensation. For Pennsylvania State Police Officers, the employer contribution rate would be 12.2% of compensation. Members of the General Assembly who are re-elected to the General Assembly or a new member of the General Assembly first elected on or after January 1, 2016, would become mandatory members of the new side-by-side hybrid plan.

A participant in the Plans may make up to 3% additional contributions to the Plans. Contributions on behalf of the participant and the employer would be credited to an "individual investment account" for each participant of the new Plans, along with all interest and investment gains or losses. For investment purposes, the Board may pool the assets of the participants in the Plans.

A participant in the Plans would become fully vested in the employer-matching contributions after four years of employment (50% vested after 2 years and 75% vested after 3 years). The employee's contributions would vest immediately.

Cash Balance Plan

New school employees hired on or after July 1, 2016, and most new state employees hired on or after January 1, 2016, would also become mandatory participants in a new cash balance plan. As part of the new side-by-side hybrid plan, participants from PSERS would

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become members of Class T-I and participants from SERS would become members of Class CB. Mandatory participants in the cash balance plan would contribute 3% of compensation with no additional employer contributions.

The members' cash balance accounts will be credited with interest at the rate paid by 30-year Treasury bonds, but not more than 4%. In addition to the 30-year Treasury bond interest, starting in 2019, excess interest may be credited on the prior year-end balances in the members' cash balance accounts. One-half of the net returns on the cash balance accounts in excess of the investment return assumptions will be allocated to eligible cash balance tier members. PSERS and SERS will retain the remaining one-half of the net returns for funding benefits.

Upon termination of school or State service, members may receive a full or partial lump sum of the full cash balance value of their individual account (employee and credited employer contribution, 30-year Treasury bond interest and excess interest), which can be rolled over into another account to the extent the IRS allows, or a single life annuity actuarially equivalent to the value of all the employer and employee contributions and interest in their cash balance accounts, or the portion not withdrawn.

Although the new cash balance plans are different in structure from the traditional defined benefit plans already established in the Systems, the new members of Class T-I in PSERS and Class CB in SERS would continue to be a part of the existing defined benefit systems in PSERS and SERS, but as a new class of service with a different tier of benefits.

Treatment of Educational Employees

Under current law, "school employees" (employees and officers of the Pennsylvania State System of Higher Education [PASSHE] institutions and the Department of Education, most employees of the Pennsylvania State University, and community college employees) are eligible to choose coverage in an employer-approved, defined contribution "alternative retirement program" as an alternative option to membership in either the State Employees' Retirement System (SERS) or the Public School Employees' Retirement System (PSERS). Of the school employees who are eligible to choose membership in an alternative retirement program, approximately 50% elect membership in SERS, 45% elect membership in an alternative retirement program and 5% elect membership in PSERS. Section 5301(a)(12) of the SERS Code directs employers to contribute up to 9.29% of pay into the independent retirement program, and all affected employers currently contribute at that rate.

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Under the bill, eligible employees would continue to have the option of electing the alternative retirement plan rather than the new hybrid DC/CB plans offered by either of the Systems. Since the alternative defined contribution plan offered to school employees would have an employer contribution rate more than twice the amount of what would be offered under the side-by-side hybrid plans and significantly lower employee contributions (currently set at 5% by contract), it's likely that most future eligible employees would choose the more attractive plan.

Benefit Modifications Applicable to Current Members of PSERS

Class T-D members of PSERS (Pre Act-120 employees)

Current members of Class T-D in PSERS will become Class T-G members for all service performed or purchased on or after July 1, 2016. Class T-D members who now pay an employee contribution rate of 7.5% will contribute 10.5% of compensation as members of Class T-G. Class T-G members will retain the 2.5% benefit accrual rate and all other benefits of a Class T-D membership.

Alternatively, Class T-D members have 180 days from the effective date of the act to opt out of Class T-G and become a member of Class T-H. Class T-H members would instead contribute 6.25% of compensation and receive a 2% benefit accrual rate for all service performed or purchased on or after July 1, 2016, but would retain all other benefits of a class T-D membership. Class T-G would be the default selection for a member of Class T-D after July 1, 2016, and a member would be required to timely elect into Class T-H before the 180-day election period ends. Opting down to the lower benefit accrual rate would be a one-time irrevocable election.

Class T-G members would be subject to a shared risk provision, tying the member's contribution rate to the investment performance of the System. Every three years, the System would compare the actual investment rate of return, net of fees, to the actuarial assumed rate of return for the previous 10-year period. If the actual rate of return is less than the assumed rate by 1% or more, the total member contribution rate will increase by ½% per year. If the actual rate is equal to or more than the assumed rate, the total member contribution rate will decrease by ½%. The shared risk provision will have a 6% corridor, with the maximum rate set at 10.5% and the minimum rate set at 4.5%.

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Class T-E & T-F members of PSERS (Post Act-120 employees)

Current members of Class T-E and T-F in PSERS who exceed the Social Security taxable wage base ($118,500 as of 2015) can become optional members of the new DC and cash balance plans for compensation earned over the Social Security wage base. Optional members can contribute from 0% up to 3% of compensation. The affected members would default into the cash balance plan at the same time they default into the DC plan. They can elect out of the cash balance plan at the same time they opt out of the DC plan. They cannot be in the cash balance plan without also participating in the DC plan.

TABLE 1
Benefit Changes for Public School Employees' Retirement System Members
Under Senate Bill No. 1

	Traditional DB Plan	Cash Balance Plan	Defined Contribution Plan
Class T-D (Pre Act-120 employees)	Become a member of Class T-G (10.5% employee contribution) with a 2.5% accrual rate, or opt-down to Class T-H (6.25% employee contribution) with a 2% accrual rate.	Up to 3% optional employee contribution. No employer contribution.	Not applicable.
Classes T-E & T-F (Post Act-120 employees)	Limited to income earned below the Social Security limit. Shared Risk corridor of 4%.	Optional employee contribution for income earned over the Social Security limit. No employer contribution.	Optional employee contribution for income earned over the Social Security limit. Employer contribution of 2.59%.
Class T-I (new hires as of July 1, 2016)	Not applicable.	Mandatory 3% employee contribution. No employer contribution.	Mandatory 3% employee contribution (plus up to 3% optional contribution) and an employer contribution of 2.59%

DISCUSSION (CONT'D)

Benefit Modifications Applicable to Current Members of SERS

Class AA members of SERS (Pre Act-120 employees)

For all service performed or purchased on or after January 1, 2016, Class AA members in SERS who now pay an employee contribution rate of 6.25% will contribute 8.75% of compensation after the effective date of the act. Their 2.5% annual benefit accrual rate will remain the same for all future years of service.

Alternatively, Class AA members have 180 days from the effective date of the act to opt out of the contribution increase and instead contribute 5% of compensation and receive a 2% benefit accrual rate for all service performed or purchased on or after January 1, 2016. Future service with the higher employer contribution rate would be the default selection for a member of Class AA after January 1, 2016, unless a member elects to opt down into the lower contribution rate before the 180-day election period ends. Opting down to the lower benefit accrual rate would be a one-time irrevocable election.

Members of the General Assembly

Members of the General Assembly in Class D-4 would also be affected by the changes imposed upon current active members in the bill. For all service performed or purchased on or after January 1, 2016, Class D-4 members in SERS who now pay an employee contribution rate of 7.50% will contribute 10% of compensation after the effective date of the act. Their 3% annual benefit accrual rate would remain unchanged for all future years of service. Alternatively, Class D-4 members can make a one-time irrevocable election to opt down to a lower contribution rate of 5% of compensation with a corresponding benefit accrual rate of 2% of compensation.

Upon reelection, (after January 1, 2016) all current members of the General Assembly will cease to accrue benefits in SERS and instead will become mandatory participants in the defined contribution plan.

Class A-3 & A-4 members of SERS (Post Act-120 employees)

Current members of Class A-3 and A-4 in SERS who exceed the Social Security taxable wage base ($118,500 as of 2015) can become optional members of the new DC and cash balance plans for compensation earned over the Social Security wage base. Optional members can contribute from 0% up to 3% of compensation. The affected members would

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default into the cash balance plan at the same time they default into the DC plan. They can elect out of the cash balance plan at the same time they opt out of the DC plan. They cannot be in the cash balance plan without also participating in the DC plan.

TABLE 2
Benefit Changes for State Employees' Retirement System Members
Under Senate Bill No. 1

	Traditional DB Plan	Cash Balance Plan	Defined Contribution Plan
Class AA [1] (Pre Act-120 employees)	8.75% employee contribution with a 2.5% accrual rate, or opt-down to a 5% employee contribution with a 2% accrual rate.	Up to 3% optional employee contribution. No employer contribution.	Not applicable.
Classes A-3 & A-4 (Post Act-120 employees)	Limited to income earned below the Social Security limit. Shared Risk corridor of 4%.	Optional employee contribution for income earned over the Social Security limit. No employer contribution.	Optional employee contribution for income earned over the Social Security limit. Employer contribution of 4%. [2]
Class CB (new hires as of January 1, 2016)	Not applicable.	Mandatory 3% employee contribution. No employer contribution.	Mandatory 3% employee contribution and an employer contribution of 4%. [2]

Limitations on Final Average Salary

The bill proposes two new limits on compensation that may be used for purposes of calculating the retirement benefits for certain active members of PSERS and SERS. For members of Classes T-E and T-F in PSERS and Classes A-3 and A-4 in SERS, the bill proposes to limit the retirement compensation to be used in the calculation of the Final Average Salary to not exceed the Social Security taxable wage base ($118,500 as of 2015). The second change would apply only to active SERS members and would increase the period over which the member's final average salary may be calculated from three years to five years.

The Systems currently employ a member's "final average salary" as one of the components of the statutory formula that is used to compute a member's retirement benefit entitlement.

[1] Class D-4 will contribute 10% of compensation with a continued 3% accrual rate. Alternatively, Class D-4 members can opt down to a lower contribution rate of 5% of compensation with a corresponding benefit accrual rate of 2% of compensation. Class E-1 or Class E-2 members of the judiciary will not have any changes in their employee contribution rate or benefit accrual rate.

[2] For hazardous duty employees (including Capitol Police and park rangers), the employer contribution rate would be 5.5% of compensation. For Pennsylvania State Police Officers, the employer contribution rate would be 12.2% of compensation.

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Currently, a member's final average salary is calculated as the average of the highest three years of compensation. The bill would amend the SERS Code to change the final average salary calculation from the average of the highest three to the average of the highest five years of compensation for all service performed by current SERS members after the effective date of the bill.

Shared-Risk Provision

One of the major pension reforms imposed by Act 120 of 2010 was the implementation of a variable employee contribution rate, known as the "shared risk contribution rate" which is applicable to post-Act 120 members (Classes A-3, A-4, T-E, and T-F) of both Systems. The shared risk contribution rate is tied to the investment performance of each System's pension fund and would be added to the basic contribution rate of each membership class under certain conditions. Every three years, each System compares the actual investment rate of return, net of fees, to the actuarial assumed rate of return for the previous 10-year period. If the actual rate of return is less than the assumed rate by 1% or more, the total member contribution rate will increase by ½% per year, up to a maximum total increase of 2.0%. If the actual rate is equal to or more than the assumed rate, the total member contribution rate will decrease by ½%.

New members contribute at the rate in effect when they are hired. The additional shared risk contributions are used to reduce the unfunded accrued liabilities of the Systems. If the System is fully funded at the time of the comparison, then the shared- risk rate will be zero for that period. For any year in which the employer contribution rate is lower than the final contribution rate, the employee contribution rate would be the basic contribution rate. There would be no increase in the employee contribution rate where there has not been an equivalent increase to the employer contribution rate over the previous three-year period. Until there is a full 10-year "look back" period, the look back period will begin as of the effective date of the act. The bill would make members of Class T-G in PSERS and Class AA in SERS who elect to remain at the higher benefit accrual rate subject to the shared-risk provision as well, with a corridor of 6% for the employee contribution rate.

Shared Gain Provision

For members of Class T-E and T-F in PSERS and Class A-3 and A-4 in SERS, there will be the addition of a shared gain provision that will allow the member's contribution rate to be reduced by up to 2% below the member's initial rate, under the same conditions established under Act 120 that the employee contribution rates could increase. Every three years, each System compares the actual investment rate of return, net of fees, to the actuarial assumed

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rate of return for the previous 10-year period. If the actual rate of return is more than the assumed rate by 1% or more, the total member contribution rate will decrease by ½% per year, up to a maximum total increase of 2.0%. If the actual rate is equal to or less than the assumed rate, the total member contribution rate will decrease by ½%. The same calculations will be used by both the shared-risk and shared-gain features (except in reverse directions) to move away from the base contribution rates and to move towards the base contribution rates.

Actuarially Neutral Option 4

In both PSERS and SERS, the member's "accumulated deductions" are the total of the member's employee contributions to the retirement system that have accrued over the member's working lifetime, plus accumulated interest at the statutory rate of four percent.

Retirement Option 4 permits a retiring member to withdraw all or a portion of the member's accumulated deductions. A member may elect to receive this withdrawal in one lump sum or in up to four installment payments. The installments continue to earn interest at the statutory rate of four percent per year until they are paid to the member. A member who elects to withdraw his or her accumulated deductions is entitled to a lifetime monthly pension benefit that is smaller than under either the maximum single-life annuity or Options 1 thru 3, because the benefit will be computed on the present value of the member's benefit entitlement less the amount of the accumulated deductions that were withdrawn.

Under Act 120 of 2010, the election to withdraw the member's accumulated deductions under Option 4 was eliminated as an option for new members of PSERS and SERS who otherwise would be eligible to receive retirement benefits. Members of Classes T-E , T-F, A-3 and A-4 who terminate service before vesting continue to be entitled to withdraw their accumulated deductions plus the interest earned on those contributions upon termination of service, in lieu of any claim to other benefits.

Under the bill, the election to withdraw the member's accumulated deductions under Option 4 would remain available to pre-Act 120 members of PSERS and SERS. However, the manner in which the Option 4 withdrawal is computed would be changed to make Option 4 actuarially cost neutral to the Systems for all service credited after the year 2016. For all service performed and credited before the year 2016 by pre-Act 120 active members of the Systems, the accumulated deduction calculation will remain unchanged.

DISCUSSION (CONT'D)

Actuarial Funding Provisions

The bill would restructure the amortization period for SERS for the fiscal year beginning July 1, 2016. The bill would require the System to re-amortize all of the unfunded actuarial accrued liabilities of its pension trust fund. The liabilities would be reamortized over a 30-year period using level-dollar amortization payments. This "fresh start" of the amortization bases would have the effect of extending the amortization of the System's current pension liabilities, resulting in a reduction in the System's annual amortization contribution requirements.

For PSERS, the bill would require that beginning with the June 30, 2017, actuarial valuation, the 10-year asset averaging method be constrained to be within 30% of the market value of assets.

Normal Cost Calculation

Section 8328 of the PSERS Code and Section 5508 of the SERS Code specify similar methods to be used by the actuaries of the respective systems to determine the "employer normal contribution rate" or employer normal cost and the total employer contribution rate, which consists of both the normal cost and the contributions required to fund the accrued liabilities of each plan, plus any amortization contribution requirement.

Both the PSERS and SERS Codes require the normal cost to be determined using "... a level percentage of the compensation of the average new active member...." However, the Systems apply different interpretations to the language. Using the SERS interpretation, the current employer normal cost for the average new member, or entrant, to the System is 4.95% of payroll (based upon Class A-3 new entrants). However, if enacted, the bill would decrease the employer normal cost rate (based upon Class CB entrants) to 0% of payroll. This would result in a diminished normal cost calculation that would tend to understate the true cost of SERS, because in the early years of the reduced benefit tier, the majority of members would remain in benefit classes entitling them to higher annual benefit accruals. In the short term, the understated normal cost could generate an unfunded actuarial accrued liability in SERS. This would occur because reducing the benefit accrual rate for new members only would not affect the present value of benefits for current members, but would affect the normal cost calculation.

According to the Commission's consulting actuary, the version of Entry Age Normal method used by PSERS' consulting actuary is consistent with GASB 67, but may not be consistent with the version intended by the bill's drafters. An alternative version of Entry Age

DISCUSSION (CONT'D)

Normal, known as "replacement life," would result in virtually no change in the actuarial accrued liability with any decrease in prospective benefits only impacting the determination of the normal cost. Under the methodology used by the consulting actuary for PSERS, decreases in prospective benefits for current members are recognized more slowly as they are amortized over 24 years rather than over the average working lifetime, but the total dollar savings may be higher as more interest would be reflected. The Commission's consulting actuary suggests the method used by the consulting actuary for PSERS be reviewed for consistency with the language included in the bill and the drafter's intent.

The bill would codify this interpretation of the PSERS normal contribution rate determination effective for the fiscal year beginning on July 1, 2016. The Commission's consulting actuary notes that §8328(b)(1) describes the normal contribution rate for the fiscal years beginning on (or before) June 30, 2015 and that §8328(b)(2) describes the normal contribution rate for the fiscal years beginning on July 1, 2016. As a result, the normal contribution rate for the fiscal year beginning July 1, 2015 and ending June 30, 2016 is not described. This oversight should be corrected, as appropriate, prior to the bill's enactment.

The Commission's consulting actuary believes that the normal cost determined for both PSERS and SERS should reflect the prospective benefits to be earned by the members in the System as of the valuation date, which is more consistent with PSERS' method or using a replacement life version of Entry Age Normal. As noted above, this is especially important if the reduced benefit classes are adopted for new members in order to avoid having a larger decrease in the normal cost for current members than the value of decreases in the benefit and a corresponding increase in the actuarial accrued liability. If this approach is to be used by SERS, the Commission's consulting actuary suggests changing the SERS Code to reflect this approach in determining the normal cost rate. The Commission's consulting actuary strongly encourages consideration of a modification in the method used by SERS.

Special Membership Classes

Within SERS, there are a number of special membership classes entitled to enhanced retirement benefits, reduced superannuation requirements or both. These include all members of the judiciary, members of the General Assembly, certain enforcement officers and Pennsylvania State Police Officers. Additionally, certain highly compensated employees would be entitled to enhanced retirement benefits by virtue of their higher than normal final average salary calculations. Under the bill, there are no such special benefit provisions for these groups of employees.

DISCUSSION (CONT'D)

In 1974, an attempt was made to reform and make uniform the benefit provisions of the SERS Code. This attempt at reform prompted a series of lawsuits brought by members of the judiciary challenging the benefit changes as applied to members of the judicial branch. These court cases ultimately resulted in the preservation of the judiciary's entitlement to special membership status and enhanced benefits. The most salient of these cases were the "Goodheart" Supreme Court decisions (See *Goodheart v. Casey*, 521 Pa. 316 (1989); 523 Pa. 188 (1989), and *Klein v. State Employees' Retirement System*, 521 Pa. 330, 555 A.2d 1216, 1221 (1989)). Essentially, the Supreme Court of Pennsylvania ruled that the 1974 amendments to the Code, which eliminated the option to elect special class membership, were unconstitutional as applied to members of the judiciary. The Supreme Court ruled that, in order to preserve an independent judiciary, judges must be adequately compensated, pension benefits are part of compensation, and all members of a single-level court performing similar functions and exercising similar authority must be compensated at the same rate. As a result, all individuals who became members of the judiciary following the 1974 amendments to the SERS Code must be permitted to elect special class (Class E-1 or E-2) membership, make the required higher member contributions, and receive the higher pension benefit attributable to their membership class.

Based upon the independent status of the judiciary in Pennsylvania and the case law regarding the special status of its members, if enacted, the bill is likely to be challenged in the courts.

There is also case law concerning altering the benefit provisions for members of the General Assembly or other State office-holders after being re-elected to office. In *Shiomos v. State Employees' Retirement Board,* 533 Pa. 558, 626 A. 2d 158 (1993), the Supreme Court held that a public official, at every new term of employment, renews his pension contract to include his new public service and to place at risk that which was already earned. A public official's re-election to office renews the official's employment contract subject to the law as it stands at the time the new term of office commences. [3]

Potential Contract Impairment

By altering the benefit provisions for members in PSERS and SERS on or after July 1, 2016, and January 1, 2016, respectively, it appears that the bill would be subject to challenge for impairment of the retirement benefit rights of active members of the Systems. Historically, public employee retirement benefits are recognized as deferred compensation for work already performed, which confers upon public employees certain contractual rights

[3] *Berkhimer v. State Employees' Retirement Board*, 2031 C.D. 2011

DISCUSSION (CONT'D)

protected by the Pennsylvania Constitution (Article I section 17). [4] *McKenna v. State Employees' Retirement Board,* 495 Pa. 324, 433 A.2d 871 (1981); *Catania v. State Employees' Retirement Board,* 498 Pa. 684, 450 A.2d (1982). *Association of Pa. State College and University Faculties v. State System of Higher Education,* 505 Pa. 369, 479 A.2d 962 (1984). It is likely that affected employees will seek judicial action.

Ancillary Issues

Members of the Judiciary. There will not be any changes in the employee contribution rate or benefit accrual rate of Class E-1 or Class E-2 members of the judiciary. However, Class E-1 and Class E-2 members of the judiciary will be subject to the optional cash balance program participation, the change in the final average salary formula, and the actuarially neutral Option 4 withdrawal on post-December 31, 2015, member contributions and statutory interest on those contributions.

Death and Disability Benefits. Beyond payment of the participant's account balance to the designated beneficiary upon the death of an active participant, there are no special death benefit provisions to provide for the surviving spouse or children of a Plan participant. This includes a lack of disability benefits for work-related disabilities incurred by public safety employees.

Premium Assistance. Under the PSERS Code, premium assistance eligibility is determined based upon years of service credited in the System. New employees in Class T-I will remain eligible for post-retirement health insurance premium assistance now provided to eligible retired members. For purposes of eligibility, a Class T-I member will earn one eligibility point for each fiscal year in which the employee makes contributions.

Pension Forfeiture Act. Under Act 140 of 1978, known as the Public Employee Pension Forfeiture Act (43 P.S. §§ 1311-1315), a public official or public employee who is convicted or pleads guilty or no defense to a crime related to public office or public employment is disqualified to receive a retirement or other benefit or payment of any kind except a return without interest of the contributions paid into a retirement system. Under the bill, the accumulated contributions of a participant shall not be forfeited but will be made available for payment of any fines or restitution.

[4] The Pa. Constitution provides: "No ex post facto law, nor any law impairing the obligations of contract, … shall be passed."

DISCUSSION (CONT'D)

Miscellaneous Provisions

Public Pension Management and Asset Investment Review Commission. The bill would provide for the creation of a commission comprised of investment professionals and retirement advisors that would study, publish findings and make recommendations to the General Assembly and the Governor, as to: 1) the performance of current investment strategies and procedures of both state retirement systems as to realized rates of return against established benchmarks and associated fees paid for active and passive management; 2) the costs and benefits of active vs passive investment strategies in relation to future investment activities of both state retirement systems; 3) alternative future investment strategies of both state retirement systems which will maximize future realized net of fees rates of returns with available assets; and 4) extensive, detailed on-line publication of information about assets, returns, financial managers, all consultants, RFPs, and investment performance measured against benchmarks. The commission would include three members appointed by the Speaker of the House, the President Pro tempore of the Senate and the Governor. The commission would submit its recommendations to the Governor and the General Assembly within 6 months of its first organizational meeting.

Funding Protection Mandate. Each member of PSERS and SERS, after the current employer compensation schedule meets the full actuarial amount, will have a contractual right to the annual required contribution made by the employer or by any other public entity. The contractual right to the annual required contribution means that the employer or other public entity must make the annual required contribution on a timely basis and that the previously accrued retirement benefits to which the members have earned by statute will be paid upon retirement. The failure of the State or any other public employer to make the annually required contribution will be deemed to be an impairment of the contractual right of each employee. The Supreme Court will have jurisdiction over any action brought by a member of any system or fund or any board of trustees to enforce this contractual right. The State and other public employers will submit to the jurisdiction of the court and will not assert sovereign immunity in such an action. If a member or board prevails in such the court may award that party reasonable attorney's fees.

Contractual Benefit Rights of DC Plan Participants. Section 501 of Article 5 in the bill explicitly states that a participant in either the School Employees' Defined Contribution Plan or the State Employees' Defined Contribution Plan shall not have "an express or implied contractual right" in relation to requirements for any of the following provisions: 1) Qualification of the Plans as a qualified plan(s) under the Internal Revenue Code; 2) Contributions to, participation in, or benefits from the Plans; and 3) Domestic relations orders regarding alternate payees of participants in the Plans.

SUMMARY OF ACTUARIAL COST IMPACT

The Commission's consulting actuary has reviewed the bill, the actuarial cost estimate provided to the Commission by Buck Consultants, the consulting actuary for PSERS (see attachments), and the actuarial cost estimate provided to the Commission by Hay Group, the consulting actuary for SERS (see attachments). The actuarial cost impact is shown in the following tables.

Tables 3 and 4 show the impact of the proposal on PSERS and SERS, respectively, in comparison with existing law. As the tables show, there is a measurable savings under the proposed hybrid plan in comparison to existing law. According to the consulting actuary for PSERS, the total cost savings for PSERS is projected to be $16.2 billion through 2048 on a cash flow basis and $5.9 billion on a present value basis. For SERS, the total cost savings is projected to be approximately $2 billion through Fiscal Year 2051-2052.

The estimated savings for PSERS shown in Table 3 are presented on two bases: a cash flow basis and a present value basis. Savings shown on a cash flow basis are simply the sums of the dollar amounts of reductions in the projected contributions the Commonwealth would have to make in future years if the proposed changes in System provisions are enacted. The calculation of savings on this basis makes no distinction between a dollar of projected savings in one future year and a dollar of savings in some other year in the nearer or more distant future. The calculation of savings on a present value basis, on the other hand, takes account of the time value of money and involves discounting projected reductions in contributions from the times they are expected to occur to June 30, 2015, at a rate of 7.50% (the assumed interest rate presently used in the annual actuarial valuations of the System) to reflect the time value of money.

SUMMARY OF ACTUARIAL COST IMPACT (CONT'D)

TABLE 3
Public School Employees' Retirement System (PSERS)
Projection of Contribution Rates and Funded Ratios
Current PSERS vs. Senate Bill No. 1

	Total Employer Contribution Rate		Total Employer Contribution (Thousands)				Funded Ratio		Unfunded Accrued Liability (Millions)	
					Cost (Savings)					
Fiscal Year Ending June	Current	SB #1 DB + DC	Current	SB #1 DB + DC	Cash Flow Basis	Present Value as of June 30, 2015	Current	SB #1 DB + DC	Current	SB #1 DB + DC
2013	12.36%	12.36%					63.8%	63.8%	$32,598.6	$32,598.6
2014	16.93	16.93					62.0	62.0	35,121.2	35,121.2
2015	21.40	21.40	$2,885,148	$2,885,148	$0	$0	60.6	61.5	37,413.9	36,136.9
2016	25.84	25.84	3,456,100	3,456,100	0	0	59.6	60.5	39,412.8	38,040.0
2017	29.69	29.12	4,079,195	4,001,230	(77,965)	(67,466)	58.7	59.5	41,424.4	40,040.6
2018	30.62	26.85	4,316,593	3,784,891	(531,702)	(427,999)	58.4	59.0	42,871.0	41,478.6
2019	31.56	27.81	4,569,239	4,026,046	(543,194)	(406,744)	60.0	60.6	42,296.8	40,898.3
2020	32.23	28.51	4,794,454	4,241,735	(552,718)	(385,001)	61.7	62.2	41,603.7	40,202.2
2021	32.02	28.32	4,892,886	4,327,247	(565,639)	(366,512)	63.0	63.4	41,228.1	39,826.9
2022	31.90	28.21	5,005,091	4,425,785	(579,306)	(349,180)	64.7	64.9	40,395.1	38,998.0
2023	31.96	28.30	5,149,606	4,560,582	(589,025)	(330,267)	66.5	66.6	39,344.6	37,955.7
2024	31.90	28.29	5,276,635	4,679,381	(597,254)	(311,518)	68.1	68.1	38,382.2	37,006.1
2025	31.83	28.25	5,404,815	4,797,712	(607,103)	(294,563)	69.9	69.7	37,192.9	35,834.6
2026	31.90	28.36	5,555,781	4,939,375	(616,406)	(278,211)	71.8	71.5	35,741.5	34,406.5
2027	31.99	28.50	5,709,259	5,086,035	(623,223)	(261,663)	73.8	73.4	34,014.0	32,708.6
2028	32.10	28.65	5,865,715	5,234,596	(631,118)	(246,491)	75.9	75.4	31,999.5	30,730.3
2029	32.20	28.82	6,020,442	5,387,660	(632,783)	(229,898)	78.2	77.6	29,682.5	28,457.0
2030	32.31	28.99	6,178,835	5,543,276	(635,558)	(214,797)	80.6	79.9	27,032.1	25,858.4
2031	32.43	29.17	6,340,635	5,703,086	(637,549)	(200,437)	83.1	82.5	24,014.7	22,901.8
2032	32.58	29.37	6,509,681	5,868,979	(640,702)	(187,375)	85.8	85.2	20,597.9	19,555.4
2033	32.72	29.60	6,679,209	6,042,134	(637,075)	(173,316)	88.7	88.2	16,743.8	15,782.5
2034	32.88	29.82	6,856,314	6,217,348	(638,966)	(161,703)	91.8	91.4	12,411.6	11,543.2
2035	33.03	30.04	7,036,790	6,400,506	(636,285)	(149,790)	95.1	95.0	7,559.2	6,796.4
2036	18.12	15.20	3,943,950	3,308,710	(635,240)	(139,111)	96.6	96.5	5,418.8	4,775.5
2037	14.27	11.42	3,173,457	2,539,655	(633,801)	(129,112)	97.6	97.5	3,871.2	3,362.4
2038	12.46	9.69	2,831,765	2,202,016	(629,749)	(119,336)	98.4	98.4	2,529.3	2,171.7
2039	10.43	7.74	2,422,607	1,797,396	(625,211)	(110,211)	99.1	99.1	1,474.9	1,286.3
2040	8.80	6.17	2,090,021	1,464,510	(625,510)	(102,571)	99.6	99.5	654.8	654.8
2041	7.28	5.59	1,769,320	1,359,061	(410,258)	(62,580)	100.0	99.9	72.5	72.5
2042	5.93	4.33	1,476,104	1,078,904	(397,200)	(56,361)	100.2	100.2	(280.8)	(283.4)
2043	4.55	3.21	1,161,604	820,047	(341,556)	(45,084)	100.2	100.3	(362.3)	(418.1)
2044	4.14	3.04	1,085,716	798,382	(287,334)	(35,281)	100.2	100.4	(395.4)	(555.8)
2045	4.00	3.11	1,079,491	839,268	(240,224)	(27,439)	100.2	100.6	(428.1)	(753.3)
2046	3.88	3.17	1,079,385	881,100	(198,286)	(21,068)	100.2	100.7	(463.0)	(1,009.1)
2047	3.75	3.22	1,075,379	923,322	(152,057)	(15,029)	100.3	101.0	(500.9)	(1,326.7)
2048	3.62	3.27	1,070,100	966,091	(104,010)	(9,563)	100.3	101.2	(541.1)	(1,705.9)
			Total Cost/(Savings):		$(16,254,008)	$(5,915,676)				

SUMMARY OF ACTUARIAL COST IMPACT (CONT'D)

TABLE 4
State Employees' Retirement System (SERS)
Projection of Contribution Rates and Funded Ratios
Current SERS vs. Senate Bill No. 1

	Total Employer Contribution Rate		Total Employer Contribution* (Millions)		Funded Ratio		Unfunded Accrued Liability (Billions)	
Fiscal Year	Current	SB #1 DB + DC	Current	SB #1 DB + DC	Current	SB #1 DB + DC	Current	SB #1 DB + DC
2012/2013	11.50	11.50	677.4	-	65.3	65.3	14.69	14.69
2013/2014	16.00	16.00	933.8	-	58.8	58.7	17.78	17.78
2014/2015	20.50	20.50	1,209.0	-	59.2	59.2	17.90	17.90
2015/2016	25.00	24.99	1,505.4	(0.6)	59.4	59.4	18.17	18.17
2016/2017	29.50	27.71	1,830.6	(111.9)	59.7	57.6	18.42	20.10
2017/2018	30.41	26.75	1,944.5	(345.7)	61.4	59.3	18.01	19.65
2018/2019	29.40	25.76	1,937.1	(585.7)	63.2	60.9	17.53	19.12
2019/2020	28.82	25.27	1,957.0	(826.8)	64.2	61.8	17.35	18.96
2020/2021	28.15	24.69	1,970.0	(1,068.9)	65.4	62.7	17.07	18.70
2021/2022	27.52	24.14	1,984.4	(1,312.4)	66.6	63.6	16.77	18.43
2022/2023	26.92	23.63	2,000.2	(1,557.0)	67.8	64.5	16.45	18.15
2023/2024	26.34	23.13	2,016.9	(1,802.3)	68.9	65.3	16.12	17.86
2024/2025	25.78	22.66	2,034.0	(2,048.3)	70.0	66.1	15.76	17.54
2025/2026	25.23	22.20	2,051.7	(2,294.9)	71.2	67.0	15.37	17.21
2026/2027	24.70	21.75	2,070.0	(2,542.0)	72.3	67.8	14.94	16.84
2027/2028	24.19	21.32	2,089.0	(2,789.7)	73.5	68.6	14.48	16.45
2028/2029	23.69	20.91	2,108.5	(3,037.5)	74.8	69.4	13.98	16.03
2029/2030	23.21	20.51	2,128.6	(3,285.5)	76.0	70.3	13.44	15.58
2030/2031	22.74	20.12	2,149.3	(3,533.3)	77.3	71.2	12.85	15.10
2031/2032	22.29	19.75	2,170.7	(3,780.7)	78.7	72.1	12.22	14.57
2032/2033	21.85	19.39	2,192.8	(4,027.2)	80.1	73.1	11.54	14.01
2033/2034	21.42	19.05	2,215.6	(4,273.0)	81.6	74.2	10.79	13.41
2034/2035	21.01	18.71	2,239.0	(4,518.4)	83.1	75.3	9.99	12.76
2035/2036	20.61	18.38	2,263.2	(4,763.6)	84.7	76.5	9.13	12.07
2036/2037	20.22	18.05	2,288.2	(5,009.0)	86.4	77.8	8.19	11.32
2037/2038	19.84	17.74	2,314.0	(5,254.7)	88.2	79.2	7.18	10.51
2038/2039	19.48	17.43	2,340.5	(5,500.5)	90.1	80.7	6.09	9.65
2039/2040	19.12	17.13	2,367.9	(5,746.7)	92.1	82.4	4.91	8.72
2040/2041	15.06	16.84	1,921.8	(5,519.8)	94.2	84.2	3.63	7.72
2041/2042	12.13	16.54	1,595.7	(4,940.1)	95.7	86.3	2.73	6.64
2042/2043	8.86	16.25	1,200.8	(3,939.0)	96.7	88.5	2.11	5.48
2043/2044	6.85	15.96	957.1	(2,667.7)	97.2	91.0	1.87	4.24
2044/2045	6.67	15.67	959.9	(1,372.5)	97.2	93.7	1.87	2.91
2045/2046	6.42	15.39	952.1	(42.6)	97.2	96.8	1.89	1.47
2046/2047	6.18	4.29	944.6	(332.0)	97.1	100.2	1.95	(0.07)
2047/2048	6.30	4.33	992.4	(642.2)	97.0	100.1	2.06	(0.03)
2048/2049	6.44	4.37	1,045.5	(978.6)	96.9	100.1	2.14	(0.04)
2049/2050	6.42	4.40	1,072.9	(1,315.4)	96.8	100.1	2.21	(0.06)
2050/2051	6.43	4.44	1,108.6	(1,659.6)	96.8	100.1	2.29	(0.06)
2051/2052	6.44	4.47	1,144.4	(2,009.9)	96.7	100.2	2.37	(0.07)

*Savings shown are cumulative.

POLICY CONSIDERATIONS

In reviewing the bill, the Commission staff identified the following policy considerations:

Potential Contract Impairment. Historically, public employee retirement benefits are recognized as deferred compensation for work already performed, which confers upon public employees certain contractual rights protected by the Pennsylvania Constitution (Article I, section 17). As written, the active member benefit modifications proposed in the bill may be found to impair the benefit rights of the affected active members.

Benefit Value and Security. The hybrid plans proposed in the bill would provide new public school and State employees with a retirement income that is likely to be less valuable, predictable and secure than that provided by the traditional DB pension plans. Retirement planning based on projected DC/cash balance account balances is likely to be less predictable and involve greater individual attention to risk management than participation in a traditional DB plan. Policymakers must determine the appropriateness of such a change in the Commonwealth's public pension policy.

Delegation of Legislative Authority. The bill empowers the Boards of both Systems to develop the details of major DC and cash balance plan design elements and administrative details by rule or regulation. Policymakers must determine if the broad powers afforded the Boards constitutes an appropriate delegation of legislative authority.

Special Membership Classes. Under the SERS Code, there are a number of special categories of public employees entitled to enhanced benefits, reduced superannuation requirements, or both. These include members of the General Assembly, the judiciary, Pennsylvania State Police Officers and certain other hazardous duty personnel. Under the bill, there are no such special benefit provisions for these groups of employees. The uniform benefit level under the bill would result in a major reduction in the value of employer-provided benefits for these groups of employees in the future and would result in significant benefit disparities between similarly situated employees.

Judicial Benefits. The Supreme Court of the Commonwealth has ruled that, in order to preserve an independent judiciary, judges must be adequately compensated, pension benefits are part of compensation, and all members of a single-level court performing similar functions and exercising similar authority must be compensated at the same rate. Based upon the independent status of the judiciary in

POLICY CONSIDERATIONS (CONT'D)

Pennsylvania and the case law regarding the special status of its members, if enacted, the bill is likely to be challenged in the courts.

Renewal of Pension Contract. In *Shiomos v. State Employes' Retirement Board,* 533 Pa. 588, 626 A.2d 158 (1993), the Supreme Court held that a public official, at every new elected term of office, renews his pension contract subject to the law in effect when the new term of office commences. While this case, and the subsequent decisions that follow its holding, specifically relates to Section 3 of the Public Employee Pension forfeiture Act, 1978, July 8, P. L. 752, No. 140, 43 P.S. § 1313(c), the core of the court's analysis is that a statutory provision can alter otherwise protected benefits contingent upon a change in the nature of the employment. That analysis may apply equally to the statutory amendment proffered by this legislation.

COMMISSION RECOMMENDATION

The Commission voted to attach the actuarial note to the bill, recommending that the General Assembly and the Governor consider the policy issues identified above.

ATTACHMENTS

Actuarial note provided by Katherine Warren of Milliman, Inc., consulting actuary for the Public Employee Retirement Commission.

Actuarial cost estimates provided by Buck Consultants, consulting actuary for the Public School Employees' Retirement System.

Actuarial cost estimates provided by the Hay Group, consulting actuary for the State Employees' Retirement System.

Senate Bill Number 1, Printer's Number 886.

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May 11, 2015

Mr. James L. McAneny
Executive Director
Public Employee Retirement Commission
P.O. Box 1429
Harrisburg, PA 17105-1429

Re: Senate Bill 1, Printer's Number 886

Dear Mr. McAneny:

As you requested, we have prepared a preliminary actuarial note on Senate Bill 1, Printer's Number 886.

Due to time constraints dictated by the Commission for providing this actuarial note, we are providing this letter without a complete review of all facets of the legislation nor all actuarial cost projection information used by the system actuaries in their analyses. We are disclosing that the time available for preparing this letter was insufficient to perform a complete review and thus, this letter should be considered preliminary in nature. If additional time was available, along with additional information, our results and commentary may be revised and/or expanded. In particular, we were provided with preliminary design memos on Wednesday May 6, the actuarial analyses and draft legislation on Thursday May 7, the actual Bill at close of business on Friday May 8, and a revised actuarial analysis for SERS today.

Summary of the Bill

Senate Bill 1, Printer's Number 886, would amend both the Public School Employees' Retirement Code and the State Employees' Retirement Code to enact significant reforms applicable to both current and future members of the Public School Employees' Retirement System (PSERS) and the State Employees' Retirement System (SERS).

The primary provisions that would impact the actuarial valuations are briefly summarized below. Due to the lack of time available to complete this preliminary letter, we did not read the entire Bill nor include all the provisions contained in the Bill. The summary below

This analysis was prepared solely for the Pennsylvania Public Employee Retirement Commission and may not be appropriate for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work.

is based on our understanding of the primary provisions by reading the design memos (dated May 6, 2015 for PSERS and April 27, 2015 for SERS), the actuarial analyses performed by the Systems' actuaries (dated May 6, 2015), and select portions of the Bill.

Future members

Employees who join PSERS on or after July 1, 2016 and SERS on or after January 1, 2016 would become members of Class T-I and Class CB, respectively. The new benefit tier within each System for each would be a hybrid defined benefit plan commonly referred to as a Cash Balance Plan. Such members would also be enrolled in a defined contribution plan maintained by the Board of each System.

School employees would be eligible for PSERS membership on the first day of hire regardless of their status as per diem or hourly. Currently, per diem or hourly school employees must be employed for at least 80 full-day sessions or 500 hours in any fiscal year to join PSERS.

A cash balance plan establishes hypothetical member accounts that are credited with pay credits (e.g. a percent of compensation) and interest credits, similar to a defined contribution (DC) plan. Cash balance plans have the same look and feel of a DC plan. However, the annual interest is not based on individual investments selected by the employee, but rather is specified by the legislation. The new benefit tiers would differ from the traditional benefit structure in the determination of a member's retirement benefit. Rather than receiving a monthly annuity based upon a traditional defined benefit formula (accrual rate times final average salary for each year of service), the member's benefit will be determined based on the value of the member's cash balance account at retirement which would be comprised of accumulated member and employer, if any, contributions with interest. Note that the Bill does not provide for any employer credits to the cash balance account.

Cash Balance Portion for future members

The primary features of the new cash balance tiers are as follows:

- Mandatory member contributions of 3% of compensation, which would be credited to the member's hypothetical cash balance account.
- No employer credits to the hypothetical cash balance account.
- Accumulated balances in the hypothetical cash balance accounts of all non-annuitant members would be credited with interest at the rate on 30-year U.S. Treasury bonds, but not more than 4 percent annually.

- Excess interest, if any, would be credited to the hypothetical cash balance account for all eligible non-annuitant members.
  - Each year after the effective date, the amount potentially available from that year for distribution as excess interest shall be determined as:
    - One-half of the investment gains and losses, net of investment and administrative fees and costs, above or below a rate of return of the assumed investment return used in annual actuarial valuation, multiplied by
    - The ratio of the total amount in the hypothetical cash balance accounts to the sum of (i) the total amount in the hypothetical cash balance accounts and (ii) the accrued actuarial liability of all benefits derived from all the service of all member in all classes of service other than Class T-I or CB (as applicable).
  - Beginning after the June 30, 2019 valuation for PSERS and the December 31, 2018 for SERS and annually after each valuation thereafter, one-fifth of excess interest would be granted if the sum of the amounts potentially available from the prior five years is positive. A shorter averaging period is used until five years after the effective date.
  - If excess interest is to be granted, the percentage rate of excess interest shall be determined by dividing the above sum by the total amount in the hypothetical cash balance accounts as of the respective valuation date.
  - Excess interest shall be granted as of the respective valuation date to members with positive hypothetical cash balance accounts as of both the respective valuation date and the next following valuation date. Members who would no longer have a cash balance account at the next following valuation date would not be entitled to the excess interest granted as of the valuation date.
- Upon termination, a member could elect a lump sum distribution, any annuity option provided by the System, or a roll-over to the extent permitted by federal law.
- Annuity forms of distribution would be calculated using 120% of the Applicable Federal Midterm Rate in effect on the effective date of retirement.
- Class T-I and Class CB members would not be eligible for the special disability annuity available to other members.
- Class T-I and Class CB members would be prohibited from purchasing previous service, except for military service or an approved leave of absence.
- Class T-I members in PSERS would be eligible for premium assistance. For purposes of eligibility, a member would earn one eligibility point for each fiscal year the member makes contributions.

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Defined Contribution Plan Portion for future members

The primary features of the new defined contributions plans are as follows:

- Mandatory member contributions of 3% of compensation
- Voluntary member contributions of up to additional 3% of compensation for PSERS members and with no limit for SERS members
- Employer contributions as follows:
    - 2.59% of compensation for PSERS members
    - 5.5% of compensation for SERS members who are enforcement officers, psychiatric security aides, Delaware River Port Authority policemen, park rangers, and Capitol Police officers
    - 12.2% of compensation for SERS members who are state police
    - 4% of compensation for other SERS members
- Employer contributions and earnings thereon would vest over a four year time period: 25% after one year of service, 50% after two years of service, 75% after three years of service, and 100% after four years of service. For purposes of vesting, any contributions in a fiscal year would count as a year of service.
- Each members would have an individual investment account where all member and employer contributions would be accumulated and investment experience, fees, and costs are credited or charged.
- Upon termination of service, a member could elect a lump sum distribution of the accumulated member contributions. However, an eligible member who elects to receive a distribution of the vested accumulated employer contributions would be required to purchase an annuity with such funds.

Current members

The following changes for current active members would apply prospectively (i.e. no change to the value of the benefit earned for service accrued as of the effective date) effective July 1, 2016 for PSERS members and January 1, 2016 for SERS members.

- For current Class T-D members in PSERS and current Class AA and D4 members in SERS, the following changes would occur.
    - Increase in member contribution rates:
        - From 6.5% or 7.5%, as applicable, to 9.5% or 10.5%, respectively, for Class T-D members in PSERS
        - From 6.25% to 8.75% for Class AA members in SERS
        - From 7.5% to 10% for Class D-4 members in SERS
    - The benefit accrual rate (e.g. 2.5% for Class T-D and AA members and

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3% for Class D-4 members) would remain unchanged.

- One-time opportunity to make an “opt-down” election that would reset the benefit accrual rates and member contributions to pre-Act 9 levels on a prospective basis. Specifically, the benefit accrual rate is reduced to 2% prospectively and member contribution rates are reduced as follows.
  - From 6.5% or 7.5%, as applicable, to 5.25% or 6.25%, respectively, for Class T-D members in PSERS
  - From 6.25% to 5% for Class AA members in SERS
  - From 7.5% to 5% for Class D-4 members in SERS
- Shared-risk provision for Class T-D members in PSERS who do not “opt-down”:
  - 6% corridor on member contribution rate for Class T-D members (3.5% to 9.5% or 4.5% to 10.5%, as applicable)
  - Upon the effective date, the member contribution rate is set at the maximum rate in the corridor(9.5% or 10.5% as applicable)
  - Every three years beginning with the June 30, 2020 valuation, PSERS would calculate the difference between actual and assumed investment rates of return for the past 10 years (excluding years prior to July 1, 2016)
  - For each percentage point by which PSERS realizes a return in excess of the assumed return during the calculation period, the member’s contribution rate would be reduced by 0.5%
  - For each percentage point by which PSERS realizes a return below the assumed return during the calculation period, the member’s contribution rate would be increased by 0.5%
  - Note that the adjustment to the member contribution rate could be greater than 0.5% for any three-year period
- Contribution savings program for Class AA and D4 members in SERS who do not “opt-down”:
  - In early 2019, SERS would calculate the difference between actual and assumed investment rates of return from January 1, 2016 to December 31, 2019. Every three years thereafter, SERS would calculate the difference between actual and assumed investment rates of returns for the prior three calendar years.
  - Effective July 1, 2019 and every three years thereafter, for each percentage point by which SERS realizes a return in excess of the assumed return during the calculation period, the member’s maximum contribution rate would be reduced by 0.5%, but not reduced by more than 5%.
  - Note that the adjustment to the contribution rate could be greater

than 0.5% for any 3-year period.
  - Members who "opt-down" are not subject to the shared-risk provision in PSERS or the contribution savings program in SERS.

- For current Class T-E and T-F members in PSERS and current Class A-3 and A-4 members in SERS, the following changes would occur.
  - The current shared-risk provision would be modified to allow a member's contribution rate to be reduced by up to 2% below the member's initial rate, under the same conditions which current member contribution rates could increase under Act 120. The decrease in the member contribution rate could not exceed 0.5% at any one time.
  - For PSERS members, fiscal year compensation shall be limited to the Social Security Taxable Wage Base in effect at the beginning of the fiscal year.
  - For SERS members, calendar year compensation shall be limited to the Social Security Taxable Wage Base in effect for that calendar year.
  - Members with compensation in excess of the Social Security Taxable Wage Base can elect to participate in the defined contribution plan for the excess compensation amount.
- All member contributions made after the effective date and all statutory interest on those contributions, if withdrawn under Option 4, would be subject to an actuarially neutral Option 4 calculation. Member contributions made prior to the effective date and statutory interest on those contributions would be withdrawn first if an Option 4 election is made. Note that Class T-E, T-F, A-3, and A-4 members are not eligible to make Option 4 withdrawals.
- For all SERS members (except for State police officers who qualify for the DiLauro Award benefits), the final average salary determination for credited service earned after December 31, 2015 would be revised to be the greater of (a) a 3-year final average salary excluding overtime paid after December 31, 2015, (b) a 5-year final average salary, including overtime, or (c) final average salary as of December 31, 2015 under current provisions.
- All active SERS members who are "elected officers" (regardless of their membership class) would not be allowed to continue in their current membership class but would instead be treated as new members upon election, re-election or retention.
- All active members can voluntarily contribute up to 3% of compensation into the cash balance tier with such election made on an annual basis.

Funding

PSERS

The Bill, if enacted, would change the following two items with regard to the employer contribution rate determination for PSERS. First, the normal contribution rate in §8328(b) would be revised effective with fiscal year beginning July 1, 2016 to be determined "as a level percentage of the compensation of all active members, which percentage, if contributed on the basis of the member's prospective compensation through the entire period of active school service, would be sufficient to fund the liability for any prospective benefit payable to him, in excess of that portion funded by his prospective member contributions, excluding the shared-risk contributions." Previously the normal contribution rate was to be based on the "average new member". Second, beginning with the June 30, 2016 actuarial valuation, the actuarial value of assets cannot be less than 70% of the market value of assets nor more than 130% of the market value of assets.

In accordance with §8328(c)(4), any increases in the unfunded accrued liability due to increases in plan benefits determined on a total plan basis due to this Bill would be amortized beginning July 1, 2013 over a 10-year period using level percentage of pay amortization payments for PSERS. Such increases would be considered costs added by legislation for purposes of the collared contribution rate. Since the Bill would reduce the unfunded accrued liability for PSERS, a 10-year amortization period would not be used and the 24-year period used for experience gains or losses would be used. The change in the unfunded liability due to the Bill would be measured as of June 30, 2015.

SERS

The Bill, if enacted, would change the following three items with regard to the employer contribution rate determination for SERS. First, the employer normal contribution rate could not be less than zero. Second, a fresh start of the amortization of the unfunded accrued liability would occur, with the unfunded accrued liability as of December 31, 2015 reflecting changes due to the Bill being amortized beginning July 1, 2016 over a 30-year period using level annual dollar amortization payments. Subsequent changes in the accrued liability due to legislation enacted after December 31, 2015 would be amortized over a 10-year period using level annual dollar amortization payments. Third, the final contribution rate cannot be less than the higher of the employer normal contribution rate or 4%.

Also, §503(5) of the Bill indicates that the costs added by this Bill would not be considered costs added by legislation for purposes of the collared contribution rate.

Discussion of the Bill

Cash Balance Plans – General Information

Cash Balance Plans or other forms of hybrid defined benefit plans have been replacing traditional final average pay retirement plans in the private sector for many years. Many employers have been modifying their existing final average pay retirement plan to a cash balance plan in an attempt to control plan costs, reduce volatility, and shift some of the inherent risk associated with maintaining a defined benefit plan from the employer to the employee. The shift to cash balance plans is also a response to the changing relationship between employers and employees.

Costs under a cash balance plan are typically lower than a final average pay plan. Part of this cost difference is due to the investment arbitrage between the guaranteed investment rate credited on employee accounts and the rate that is expected to be earned on overall pension investments. For example, an employer may expect to actually pay only 80% of the promised employer provided compensation credits, if any, as a result of investment earnings exceeding the guaranteed interest crediting rate over an employee's career. Furthermore, employees who terminate employment prior to vesting allow an employer to re-direct the compensation credits forfeited, if any, to other employees which may reduce overall costs even more.

Cash balance plans shift inflation risk from the employer to the employee since the final retirement benefit is a function of earnings over the working lifetime of the employee instead of the final years when such earnings are typically the highest. Private sector cash balance plans also shift a portion of longevity risk from the employer to the employee. Employers typically took on the risk of paying a lifetime annuity if an employee lived to an advanced age. By allowing employees to receive their account balance as a single sum at retirement, employees who exercise this option bear the risk of outliving their retirement assets.

Many employers also shift away from a final average pay plan to cash balance plans as a response to the changing relationship between employers and employees. A final average pay plan rewards employees who stay with one employer for their entire career since benefits earned increase significantly as retirement approaches since all past service is a function of current salaries. However, the workforce is becoming more mobile. A cash balance plan is attractive for a younger, more mobile workforce since it is easier to understand and typically provides portability of benefits. A guaranteed investment return also provides employees with comfort that retirement income is safe and will not fluctuate with the market.

Defined Contribution Plans – General Information

Employers have also been replacing traditional final average pay plans in the private sector with defined contribution plans, for the same reasons for shifting to cash balance plans previously discussed. In addition, employers implementing a pension plan for their employees are more likely to choose a defined contribution plan rather than a defined benefit plan.

Defined contribution plans shift inflation, investment, and longevity risks from the employer to the employee as the account balance is a function of earnings over the working lifetime of the employee and the investment yield of the funds selected by the employee. As employees typically elect a lump sum upon retirement, they bear the risk of outliving their retirement assets.

With a defined contribution plan, the employer contributions are typically a percentage of member compensation, and can be easily budgeted each year. Forfeitures of non-vested employer contributions with interest from members who terminate employment prior to full vesting would serve to lower future employer contributions.

New Benefit Tiers

The benefit accrual rate applicable to new members in PSERS and for most new members in SERS is currently 2.0% with a member contribution rate of 7.50% in PSERS and 6.25% in SERS. This benefit structure is similar to benefits provided to other members of PSERS and SERS and provides retirement benefits in a traditional defined benefit formula reflecting a member's final average salary and years of service.

The Bill would establish new tiers of benefits and separate defined contribution plans for members entering PSERS and SERS. The new tiers would be designed as a cash balance plan which establishes hypothetical member accounts accumulated through employee and employer contributions that accrue with interest similar to a DC plan. Members would be required to contribute 3% of compensation. The hypothetical accounts would not be credited with any employer contributions. Contributions to the hypothetical account would be credited with yields on 30-year Treasury bonds, subject to a maximum annual rate of 4%. If System assets earn more than the assumed investment rate of return over a five year period, a portion of the excess earnings would be credited to the hypothetical account. These accounts are "hypothetical" or "notational" as separate accounts are not actually established for each member.

New members would also be enrolled in a defined contribution plan. Members would be required to contribute 3% of compensation with the opportunity to make additional voluntary contributions. Employer contributions would be 2.59% of compensation for PSERS members, 5.5% of compensation for certain hazardous duty SERS members, 12.2% of compensation for SERS members who are state police, and 4% of compensation for other SERS members. Members would be vested in the employer contributions and earnings thereon after 4 years of service, with the vesting percentage increasing by 25% for each year of service. Members who elect to withdraw the vested accumulated employer contribution account would be required to purchase an annuity with such monies; while members could elect a lump sum distribution of the accumulated member contribution account.

The higher employer contribution rates for certain hazardous duty SERS members are likely due to the shorter expected working career for these members as compared to other members. The higher employer contribution rates for state police SERS members are likely due to the shorter expected working career for state police and the higher DiLauro benefits provided to current state police, and because state police do not participate in Social Security.

If future employees are eligible to join either PSERS or SERS, eligible employees are likely to elect to join SERS instead of PSERS as the employer contribution rate to the defined contribution plan is higher for SERS members (4% of compensation) than PSERS members (2.59% of compensation). This difference in employer contribution rates to the defined contribution plan would also result in lower retirement benefits being provided to PSERS member than regular SERS members, all else being equal.

Note that a minimum benefit must be provided to members not enrolled in Social Security (e.g. state police). Because employer and employee contributions for the combined cash balance tier and defined contribution plan are higher than current Social Security contribution levels, the minimum benefit is likely to be satisfied, but we are not legal experts and strongly recommend this issue be reviewed by benefits attorneys and verified with Social Security before enactment.

Having differing benefit accrual rates (and resulting pension amounts) for different groups of employees results in additional administrative costs as well as the necessity for clear and consistent communication about the benefits provided. There is also a potential equity issue when two employees, one hired before the change and one after, have the exact same job but have different pension benefits. This situation already exists in PSERS and SERS.

The ratio used in the excess interest determination has a denominator of the sum of (i) the total amount in the hypothetical cash balance accounts and (ii) the accrued actuarial liability of all benefits derived from all the service of all member in all classes of service other than Class T-I or CB (as applicable). As Class T-I and CB members would be eligible to elect an annuity form of payment upon which the hypothetical cash balance account would be transferred to the annuitant reserve fund, the denominator of this ratio currently excludes the accrued actuarial liability of current annuitant benefits attributable to Class T-I and CB service. Prior to the Bill's enactment, we suggest this language be reviewed to ensure that this is the intent of the Bill's sponsors.

The cash balance account would be converted to an annuity form of payment using 120% of the Applicable Federal Midterm Rate in effect on the effective date of retirement. By reference to IRC §7520 in the SERS Code, this rate would be rounded to the nearest two-tenths of one percent. This rounding would not occur for PSERS members. The Federal mid-term rate changes each month. To simplify administration, consideration could be given to fixing this rate as of the beginning of the fiscal year or calendar year (as applicable) for retirements during that respective year. Also, currently this rate is about 2%, but has ranged from a low of 1.01% in September 2012 to a high of 9.59% in February 1995 during the past 20 years (since January 1, 1995). Based on current consensus expectations for key interest rates from leading economists, we estimate that the 120% of the Applicable Federal Midterm Rate would increase to about 4.9% by 2020. Given the volatility in this rate, the Bill's sponsors may wish to consider putting a minimum, a maximum, or both on this rate for purposes of determining annuity forms of payment prior to the Bill's enactment. Note that for a given account balance, a higher interest rate used for annuity conversion will generate a higher dollar amount of annuity, and vice versa.

Under the Bill, members who wish to withdraw the vested accumulated employer contributions from the defined contribution plan must purchase an annuity with such monies. As the cost of an individual member purchasing an annuity is higher than the cost of a group purchasing an annuity due to the pooling of longevity risk among many individuals, consideration could be given to members being required to purchase an annuity provided by the respective System based on assumptions set by the Systems' board, rather than an individual insurer. Such members would have the defined contribution plan monies transferred to the annuitant reserve. This would help maximize the benefits provided to the member, especially as the Systems are better able to manage longevity risk among many members than any one individual member. Of course, this would transfer the risk and result in potential additional costs to the System. We also note that there is no requirement to annuitize any of the accumulated member defined contribution contributions, nor the hypothetical cash balance account, although the employee has the option to have the cash balance accounts annuitized too.

New Member Benefit Adequacy

Depending on the level of employer contributions, projected retirement benefits expected to be received by members are typically lower under a combination cash balance/defined contribution plan than a traditional final average pay retirement plan. Most notably, the expected reduction in retirement benefits typically impacts members who enter the system at older ages since the time available to accumulate substantial account balances is limited. In a traditional final average pay plan, the value of the retirement benefit increases significantly as members approach retirement and past years of service are based on current higher earnings. In a hybrid plan, such as the combination cash balance/defined contribution plan, benefits are earned equitably over the working lifetime of a participant. Therefore, there is generally a decrease in the projected retirement benefits, depending on the relationship between past salary increases and the interest earned on the accounts.

Except for the higher employer contributions rates to the defined contribution plan for hazardous duty and state police members in SERS, there are no other enhanced benefits for the current special membership classes for hazardous duty members, judges, or legislators. These special membership classes currently receive higher benefits under SERS. Therefore, these members would receive a larger reduction in employer-provided benefits. Consideration may need to be given to provide enhanced benefits (e.g. upon in-service death or disability or upon retirement) to certain special membership classes, such as hazardous duty members.

It was beyond the scope of our assignment to provide a comparison of the two benefit designs and the value to members. We note that the PSERS' system actuary provided some benefit comparisons in the cost estimate referenced below. The cost estimate shows the current benefit as a percentage of the new benefit; we suggest that future comparisons show the new benefit as a percentage of the current benefit instead. Serious consideration should be given to having a more formal analysis prepared prior to any revision in benefits. Such analysis should reflect the impact of varying investment returns and annuity conversion rates. In addition, if the pension benefits are reduced, there may be pressure to increase other forms of compensation to provide for the same total compensation value as before.

Reform of Current Member Benefits on a Prospective Basis

The Bill would revise the prospective benefits for current members. The value of benefits earned as of the effective date of the Bill would not be impacted as these benefits would continue to increase based on increases in a member's final average salary after the effective date based on the current plan provisions.

Higher future member contributions would be required of members receiving the higher benefit accrual rates provided by Act 9. These members would have a one-time opportunity to "opt-down" to the pre-Act 9 benefit accrual levels in return for lower member contributions. As members will tend to select the option that has the best value for them, this opt-down election may result in increased costs to the System due to anti-selection. We recommend that the actuaries of each system review the costs and characteristics of potential members who may "opt-down".

"Act 9" members who do not "opt-down" would be subject to a shared-risk provision in PSERS and a contribution savings program in SERS that can reduce the member contributions depending on the System's investment performance. The determination of the member contribution reduction is different between the Systems and can also result in large swings in the member contribution rate (up to 6% in PSERS and up to 5% in SERS). Such large swings could result in a decrease in take home pay to the affected members from one three year period to the next. The member contribution rate as of the effective date would be set to the maximum rate. As a result, the rate can only decrease in a subsequent determination before potentially increasing back or further decreasing. The possibility that employee contribution rates could be lower than included in the actuarial analyses would result in less savings produced by the analyses. For PSERS, the shared-risk provision would reflect a ten-year averaging period for the investment gains and losses, with the member contribution rate being adjusted up or down every three years. For SERS, the contribution savings program would reflect a three-year averaging period for the investment gains and losses, with the member contribution rate being reset every three years. In other words, SERS would reset the member contribution rate to the maximum rate every three years and then determine any savings adjustments due to the investment experience over the prior three years period. We note that this resetting provision is not quite clear in the Bill and suggest that the language be reviewed for clarity. We would recommend that the value of the member contributions used in the actuarial valuation to determine the actuarial accrued liability reflects the probability that member contribution rates may be lower than the maximum rates set at the effective date. We also note that the shorter averaging period in SERS could produce more volatile results than using the longer averaging period in PSERS.

A shared-gain provision for current Class T-E, T-F, A-3, and A-4 members would be added in parallel to the current shared-risk contribution. As a result, member contributions could change within a 4% corridor (up from the current 2% corridor) in 0.5% increments every three years depending on the System's investment performance. Since a shared gain provision did not previously exist, adding this provision would potentially decrease the savings projected by the analyses. However, since the current rate is in the middle of the corridor, there would be an equal chance of increases and decreases in the contribution rate that are currently not reflected in the actuarial accrued liability. We believe that no further adjustment is necessary.

The following provisions impacting current members will reduce future employer costs (as compared to the current provisions).

- Prospective compensation for Class T-E, T-F, A-3 and A-4 members would be limited to the Social Security Taxable Wage Base.
- Prospective member contributions and statutory contributions could only be withdrawn by eligible members under Option 4 on an actuarially cost neutral basis.
- An "anti-spiking" provision was added for SERS members as the final average salary determination was revised to reduce the potential for overtime in the last years of employment to decrease the retirement benefits paid by the System.

Determination of Employer Cost for SERS and PSERS

Funding of the two Systems is currently based on the determination of employer normal cost and an amortization charge attributable to unfunded liabilities subject to contribution collars. The employer contribution is expressed as a percentage of active member payroll (i.e. appropriation payroll) and charged to the various employers. Additionally, under current law governing PSERS and SERS, the normal cost of the system is to reflect the cost of benefits provided to the average new member of the retirement system. However, the systems have interpreted the statute differently regarding the method used to determine the normal cost.

Under the SERS interpretation, the normal cost for SERS would decrease upon enactment of this Bill. However, the decrease is not due to changes in benefits for current members, but rather due to changes in benefits for future members. Because benefits provided to current members would be significantly higher than the benefits provided to members of the new Class CB without any change in employee contributions, the employer normal cost under SERS would be significantly lower than the average cost of the benefits provided to current members.

If this Bill is enacted, SERS' actuary would base the normal cost calculation on new members in Class CB because new members would be in this class. As a result, there would be an increase in the unfunded actuarial accrued liability attributable to this Bill. This would occur because reducing the benefit accrual rate for only new members would not affect the present value of benefits for current members, but would reduce the future normal costs payable on account of current members. Since the actuarial accrued liability is the difference between the total present value of benefits for all members and the present value of future normal costs, decreasing the normal cost for current members would generate an offsetting increase in the actuarial accrued liability. We do not believe this approach is preferable for determining costs under a tiered system. Furthermore due to the required calculations under GASB 67, an alternative version of the Entry Age Normal cost method must be used for employer accounting purposes. Although we would recommend a third version of the Entry Age Normal method be used (discussed further below), either of these variations would be preferable than the current SERS method, especially considering the fresh start approach.

The Bill provides for a fresh start amortization of the actuarial accrued liability for SERS as a level annual amount over 30 years. The Bill excludes the increase in the unfunded accrued liability as costs added by legislation for purposes of the collared contribution rate. This change in amortization from the current 10 years for legislative changes to 30 years lowers the initial annual funding costs of the Bill, but will increase the total funding costs over the long term. Furthermore the recognition of costs previously included in the determination of the normal cost are now reflected in the actuarial accrued liability. Since the amortization period used for the unfunded actuarial accrued liability of 30 years is longer than the average working lifetime of current employees, these costs would be deferred to future years which increases the amount of interest paid on these costs.

Under the PSERS interpretation of the statute, the normal cost rate reflects the actual Class of membership of each active member. This is the traditional way to calculate the normal cost under the entry age cost method. We understand that PSERS' actuary develops a normal cost rate based on current active members and the benefits to which each member is entitled. Thus, the PSERS normal cost rate is based on an average of each member reflecting the 2.0% and 2.5% benefit accrual rates and the cash balance plan and the various member contribution rates, depending on each member's date of hire and class of service. As a result, the PSERS normal cost rate will gradually decline as current members leave active service and are replaced by new members in Class T-I.

In Buck's analysis for PSERS, a decrease in the actuarial accrued liability is projected to occur, likely due to the change in treatment of Option 4 withdrawals and the compensation limit on Act 120 members although these changes would only be made for prospective contributions. Further changes in the actuarial accrued liability could occur (either increases or decreases) due to member elections to "opt down" and decrease the accrual rate for prospective service. One may not expect a decrease in the actuarial accrued liability if changes are only made to prospective service. We believe the version of Entry Age Normal method used by Buck is consistent with GASB 67, but may not be consistent with the version intended by the Bill's drafters. An alternative version of Entry Age

Normal, known as replacement life, would result in virtually no change in the actuarial accrued liability with any decrease in prospective benefits only impacting the determination of the normal cost. Under Buck's methodology, decreases in prospective benefits for current members are recognized more slowly as they are amortized over 24 years rather than over the average working lifetime, but the total dollar savings may be higher as more interest would be reflected. We suggest the method used by Buck be reviewed for consistency with the language included in the Bill and the drafter's intent.

The Bill would codify this interpretation of the PSERS normal contribution rate determination effective for the fiscal year beginning on July 1, 2016. We note that §8328(b)(1) describes the normal contribution rate for the fiscal years beginning on (or before) June 30, 2015 and that §8328(b)(2) describes the normal contribution rate for the fiscal years beginning on July 1, 2016. As a result, the normal contribution rate for the fiscal year beginning July 1, 2015 and ending June 30, 2016 is not described. This oversight should be corrected, as appropriate, prior to the Bill's enactment.

We believe that the normal cost determined for both PSERS and SERS should reflect the prospective benefits to be earned by the members in the System as of the valuation date, which is more consistent with PSERS' method or using a replacement life version of Entry Age Normal. As noted above, this is especially important if the reduced benefit classes are adopted for new members in order to avoid having a larger decrease in the normal cost for current members than the value of decreases in the benefit and a corresponding increase in the actuarial accrued liability. If this approach is to be used by SERS, we suggest changing the SERS Code to reflect this approach in determining the normal cost rate.

We strongly encourage consideration of a modification in the method used by SERS.

Based on the pay credits and interest credits included in the cash balance tier under the Bill in conjunction with the Entry Age Normal funding method and the current actuarial assumptions used by both systems, the aggregate employer normal cost rate for the cash balance tier for new Class T-I and Class CB members is 0% as determined by the system actuaries. This is primarily due to the lack of any employer-provided credits to the hypothetical cash balance accounts and the assumed investment return of 7.5% per year exceeding the assumed 30-year Treasury Bond yield of 3% per year plus any possible excess credits. As a result, the total normal cost rate is currently expected to be less than the member contribution rate for these members.

We also note that the actuarial analysis indicates that the PSERS employer contribution rate for the 2016-2017 would be determined assuming the member contribution rates in effect during 2015-2016 (the year after the valuation determining the contribution). However, the member contribution rates would be increased effective July 1, 2016 for the Act 9 members who do not "opt-down". Therefore any increase in the employee contribution rate effective July 1, 2016 would not impact the employer normal cost rate for the 2016-2017 fiscal year. This apparent contradiction should be reviewed to ensure compliance with the statute, as amended by the Bill, and the drafter's intent.

Potential Increased scrutiny regarding selected investment return assumption

Economists, investment professionals, actuaries, employee representatives, and retirement systems may all have different viewpoints related to the expected long-term return on plan assets. With the proposed excess interest credit for cash balance tiers and additional members subject to the shared-risk and shared-gain member contributions and the contribution savings program being based on the long-term investment return assumption used in the annual valuation, it would be expected that the selection of the System's investment return assumption and fiduciary responsibilities with regards to selection of investments could fall under heightened scrutiny as this assumption would have a direct impact on additional future member contributions and actual benefits. Any methodology currently in place that yields the current investment return assumption and selection of investments should be reviewed in light of this expected increased scrutiny. Consideration should also be given to the appropriateness of this long-term assumption impacting future member contributions and benefits prior the Bill's enactment. It was beyond the scope of this analysis to determine the reasonableness of the System's long-term investment return assumption or the appropriateness of this assumption for member contribution adjustments and benefit purposes.

Alternative Retirement Plan such as TIAA-CREF

Certain public employees hired by state or school employers within the Commonwealth have the opportunity to waive membership in SERS / PSERS and elect an alternative retirement plan such as TIAA-CREF. Depending on the differences between the benefits for Class T-I and CB members versus those provided by the alternative retirement plans, there could be a potential inequity for such eligible employees as the employer contribution rates could differ and potentially incent such eligible employees to join PSERS/SERS or the alternative retirement plan. If eligible new employees elect an alternative retirement plan, the anticipated membership within SERS and PSERS could slowly decline, impacting the appropriation payroll which could lead to increases in the employer unfunded liability rate, although not the dollar amount of the unfunded liability.

Estimated Actuarial Cost

You provided us with a copy of the May 6, 2015 estimate by Buck Consultants for PSERS and the May 11, 2015 estimate by Hay Group for SERS with the projected impact of this Bill. Both of these analyses were based on the design memos and draft legislation available at that time. Changes that occurred between the design memos and draft legislation and the final Bill could have an impact on these estimates.

Both estimates included multi-year projections of the employer contribution rate under the current law and if this Bill was enacted. These estimates show the projected appropriation payroll and the employer contribution rate. These projections are based on the latest actuarial valuations (June 30, 2014 for PSERS and December 31, 2014 for SERS), and assume that future experience will exactly match the actuarial assumptions used to prepare the valuation. Due to the limited time available to complete this preliminary letter, we have not been able to fully review these multi-year projections.

Please note that we are uncertain if the actuarial analysis for either PSERS or SERS reflects the potential decrease in the unfunded accrued liability over time if actual investment returns exceed the interest credited (base and any excess) to the cash balance accounts. We note that this is a conservative approach. If any reduction were to be included, we offer the following comments:

- Both actuaries indicate an assumption of 3% for estimating the 30-year Treasury bond yield, which is used to increase the hypothetical cash balance account. Current yields on 30-year Treasury bonds are about 3%.
- However based on current consensus expectations for key interest rates from leading economists, we estimate that the 30-year Treasury bond yield would increase to about 4.8% by 2020. Accordingly, we believe that the long-term assumption for the cash balance account crediting rate should be higher than 3%.
- Consideration should be given to phasing in from the current yield of 3% to no more than the maximum rate of 4% (as that is lower than the projected 30-year Treasury bond rate).
- As excess interest could be earned on the hypothetical cash balance accounts depending on future investment returns, consideration should also be given to using a rate higher than 4% for the cash balance account crediting rate. Stochastic modeling would be useful in determining such extra rate.

The multi-year projections reflect a single-point scenario assuming that all assumptions are exactly realized, including actual investment return on the market value of assets of 7.5% each and every year. In reality, actual investment returns will vary from year to year, which will have an impact on the future employer costs. We recommend that stochastic modeling be performed to analyze the impact of varying investment returns on the future employer costs, especially as member contributions are impacted by varying investment returns via the shared-risk and shared-gain provisions for Class T-E, T-F, A-3 and A-4 members, the shared-risk provision and contribution savings program for the "Act 9" members who do not "opt-down", and the excess interest that can be earned on the cash balance account.

Regarding the one-time "opt-down" election for the "Act 9" members, the PSERS estimate assumes that eligible members do not "opt-down" whereas the SERS estimate assumes that half of the eligible members elect to "opt-down". Because of the potential cost impact of this opt-down election, we recommend that estimates be performed assuming that all eligible members do not elect to "opt-down" and that all eligible members do elect to "opt-down" prior the Bill's enactment. Consideration should be given to investigating any potential for anti-selection such as shorter service members make the "opt-down" election and longer service members do not.

The PSERS estimate of this Bill included the year-by-year cash flow cost/(savings) and the present value of such cash flow cost/(savings) using the System's investment return assumption of 7.5% over the projection period. The present value reflects the time value of money. The interest rate used to discount any savings would vary based on the user's perspective. The Commonwealth may want to use an inflation rate consistent with budget growth as increases in costs above that rate decrease available dollars for other programs in future years, excluding any new revenue. The System would probably wish to use its expected return since that would be consistent with the development of its costs and liabilities.

For the projections of the Bill's impact, the actuaries of both systems continued to use the same actuarial assumptions adopted for use in the latest valuations. Please note that the actual cost of this Bill, if enacted, would depend on the actual experience for the new Class T-I in PSERS and the new Class CB in SERS. The actual costs could be higher or lower. It may be appropriate to have different assumptions for the new benefit classes.

Each of the system's assets is assumed to earn 7.5% each year of the projection. To the extent adverse (favorable) investment returns are experienced, the contribution rates would be higher (lower).

Basis for Analysis

As a reminder, due to time constraints dictated by the Commission for providing this actuarial note, we are providing this letter without a complete review of all facets of the legislation nor all actuarial cost projection information used by the system actuaries in their analyses. We are disclosing that the time available for preparing this letter was insufficient to perform a complete review and thus, this letter should be considered preliminary in nature. If additional time was available, along with additional information, our results and commentary may be revised and/or expanded. We would require about 2 to 3 weeks to complete our review and would request additional information from the System actuaries (such as additional details underlying the multi-year projections and the impact of individual changes and the PSERS normal cost determination).

In performing this analysis, we have relied on the information provided by the Commission, PSERS, SERS, Hay Group, and Buck Consultants. 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.

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.

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The consultants who worked on this assignment are pension actuaries. We have not explored any legal issues with respect to the proposed plan 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

Katherine A Warren

Katherine A. Warren

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This analysis was prepared solely for the Pennsylvania Public Employee Retirement Commission and may not be appropriate for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work.

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May 6, 2015

Mr. Glen R. Grell
Executive Director
Pennsylvania Public School Employees' Retirement System
5 North 5th Street
Harrisburg, PA 17101

Re: Draft Senate Bill No. 1

Dear Mr. Grell:

As requested, we have reviewed a preliminary draft version of Senate Bill No. 1, which would establish a cash balance (CB) plan and a defined contribution (DC) plan for school employees hired on or after July 1, 2016, as well as a supplemental design memorandum (dated May 6, 2015), and have had discussions of the bill with PSERS staff. Senate Bill No. 1 would also create new membership Classes T-G and T-H and make reforms to the benefit structure and funding provisions of the Pennsylvania Public School Employees’ Retirement System (PSERS) as of June 30, 2016.

Our understanding of Senate Bill No. 1 is as follows:

PSERS Benefit Reforms

a.   Class T-D members

- Class T-D members will become Class T-G members for all school service performed or purchased on or after July 1, 2016.
- Class T-D members who are currently contributing 7.50% of compensation will contribute 10.50% of compensation as a Class T-G member while Class T-D members who are currently contributing 6.50% of compensation will contribute 9.50% of compensation as a Class T-G member.
- Class T-G members will retain the 2.50% annual benefit accrual formula and all other System benefit provisions applicable to a Class T-D member.
- Class T-G members will be subject to the following shared-risk provisions:
    - The Class T-G maximum contribution rate is set to the initial Class T-G member’s contribution rate and the minimum contribution rate cannot be less than 6.00% below the member’s initial rate.
    - Every three years, the System will calculate the difference between actual and assumed rates of return for the past ten years. The first shared-risk measurement is to be performed during the June 30, 2020 valuation.
    - For every percentage by which PSERS realizes a return in excess of assumed return during the calculation period, the employee’s contribution rate will be reduced by 0.5%.

  - For every percentage by which PSERS realizes a return below the assumed return during the calculation period, the employee's contribution rate will be increased by 0.5%.
  - The look back period will be designed to correlate to the period used for Class T-E and Class T-F members.

- Class T-G members will have a one-time option to elect into Class T-H.
- Class T-D members who elect Class T-H membership and who are currently contributing 7.50% of compensation will contribute 6.25% of compensation as a Class T-H member while Class T-D members who are currently contributing 6.50% of compensation will contribute 5.25% of compensation as a Class T-H member.
- Class T-H members will be entitled to a 2.00% annual benefit accrual formula for service credited on or after July 1, 2016 but will retain all other System benefit provisions for a Class T-D member.
- Class T-H members are not subject to the shared-risk provisions.

b. Classes T-E and T-F members

- The current Act 120 shared-risk provision will be modified to allow a member's contribution rate to be reduced by up to 2.00% below the member's initial rate, under the same conditions which current Classes T-E and T-F employee rates could increase under Act 120. The decrease in member contribution rate cannot exceed 2.00%.
- Beginning July 1, 2016, retirement covered compensation for Classes T-E and T-F members cannot exceed the current Social Security taxable wage base (SSA Limit).

c. Cost neutral Option 4 elections

- Classes T-C, T-G and T-H members who elect a lump sum withdrawal of their contributions and interest related to service on or after July 1, 2016, at the time of retirement will have their annuities adjusted based on the System's assumed rate of return so that the withdrawal does not create an actuarial cost to PSERS.

d. Class T-I members

- Employees who first become a member on or after July 1, 2016 shall be enrolled as Class T-I members.
- Class T-I members will be enrolled in the newly established CB and DC plans.
- Current members or prior non-Class T-I members returning to service cannot opt into new Class T-I.
- Class T-I members will not be subject to shared risk provisions.
- No multiple service election for Class T-I members.
- Class T-I members cannot purchase service, except: (1) USERRA leave; and (2) contributing leaves (e.g., sabbatical; union service)
- Class T-I members who return to service will have their annuity stopped and present value put back into member's savings account.
- Class T-I members are eligible for premium assistance, under similar terms as current PSERS members. For purposes of eligibility, a member will earn one eligibility point for each fiscal year the employee makes contributions.

DC Plan provisions

- Class T-I members are automatically enrolled in the DC plan.
- Classes T-E and T-F members whose compensation exceeds the SSA Limit have the option to participate in the DC plan for the amounts in excess of the SSA Limit.
- DC plan mandatory participant contributions will be 3.00% of compensation with the option to contribute up to an additional 3.00% of compensation. The mandatory participant contributions are considered to be pre-tax “pickup” contributions, while the voluntary additional contributions will not be pickup contributions.
- The DC plan employer contribution rate will be 2.59% of compensation.
- Participant contributions to the DC plan would vest immediately.
- Employer contributions will vest over a 4-year time period: 25% after completion of the first year of service, 50% after completion of the second year of service, 75% after completion of the third year of service and 100% after completion of the fourth year of service. For purposes of vesting, any contributions in a fiscal year will count as a year of service.
- Each DC participant will have an individual investment account where all participant and employer contributions are accumulated and investment experience, fees and costs are credited or charged.
- Upon termination, a participant may elect to receive a lump sum or any other annuity option provided under PSERS. Spousal consent is not required when electing a form of payment.

CB Plan provisions

- Class T-I members are automatically enrolled in the CB plan.
- Mandatory Class T-I member contributions will be 3.00% of compensation. The mandatory member contributions are considered to be pre-tax “pickup” contributions.
- Classes T-C, T-G and T-H active members can voluntarily contribute up to 3% of compensation into the CB plan. Membership will commence prospectively only from date of election. The voluntary contributions are not considered to be pre-tax “pickup” contributions.
- T-E and T-F members can voluntarily contribute to the CB plan up to 3% of compensation not in excess of the SSA Limit. Membership will commence prospectively only from date of election. The voluntary contributions are not considered to be pre-tax “pickup” contributions.
- No employer credit will be provided.
- A member’s account will be credited with interest at the 30-year long term Treasury rate, or its equivalent, in effect on July 1 of each fiscal year. However, the interest crediting rate cannot exceed 4.00% per annum. (As instructed by PSERS staff, this cost note assumes an annual 3.00% interest credit rate, which approximates the current yield on 30-year long term Treasury bonds.)
- A member will vest immediately in the member’s account. In addition, there is no stated superannuation age.
- Upon termination, a member may elect to receive a lump sum, any other annuity option provided under PSERS or a roll-over to the extent permitted by federal law.
- The CB plan can accept roll-overs to the extent permitted by federal law.

- Annuity forms of distribution will be calculated using 120% of the Federal mid-term rate, or its equivalent, in effect on the effective date of retirement.
- Small accounts can be cashed out as provided by federal law.
- There are no disability provisions.
- Excess interest:
  - Applies to all monies in the account on the date used to calculate the amount.
  - One-half of earnings in excess of an assumed rate of return will be applied to the monies in the account as of the next June 30.
  - The System will use a five-year smoothing period to determine the fund's earnings. The investment return measurement period will begin on June 30, 2019 with a three-year average earnings determination. The averaging period will increase by one year each succeeding measurement date until a full five-year averaging period is available.
- Excess interest is in addition to the above noted interest credit and is not subject to the maximum 4.00% annual interest credit limit.

Funding reforms

- Effective with the June 30, 2017 actuarial valuation, the 10-year asset averaging method will be constrained to lie within 30% of the market value of assets.

Other miscellaneous provisions

- A commission of investment professionals and retirement advisors will be established.
- Beginning after the effective day of the act, the incremental increase in state general fund contribution to the schools for retirement contributions to PSERS will not include increases in covered payroll per member from the prior fiscal year above the annual increase in the statewide weekly wage. This provision has no actuarial cost impact to PSERS.
- Once current employers begin contributing the full actuarially determined contribution amount, PSERS members will have a contractual right: (1) to enforce the annual required contribution made by the employer or by any other public entity on a timely basis; and (2) to ensure that the previously accrued retirement benefits which the members have earned by statute will be paid upon retirement. The failure of the state or any other public employer to make the annually required contribution will be deemed to be an impairment of the contractual right of each employee.

The results reported in this cost note are based on the following assumptions on the proposed Senate Bill No. 1 provisions:

1. There is no available data to indicate the percentage of current active members who will elect to contribute to the CB and DC plans. Therefore, the results reported are based on the assumption that only employees hired on or after July 1, 2016 will participate under both plans.

2. There is no available data to indicate the percentage of current active T-D members who will elect T-H membership. Therefore, the results reported are based on the assumption that all T-D members will become T-G members.

3. Employer contributions under the DC plan do not reflect an offset for forfeitures from participants who terminate prior to completing four years of service.

4. The effect of the benefit changes made by the legislation on the System's accrued liability is to be measured in the June 30, 2015 valuation.

In reviewing the results, the reader should note:

1. The portion of the benefits provided to Class T-I members by the DC plan is subject to investment risk that would be fully borne by participants. Under PSERS, only Class T-E and T-F members share responsibility for the fund's investment risk through the Act 2010-120 "shared-risk" additional member contributions. Also, participants would bear the full cost associated with "longevity risk" (i.e., the chance of running out of money in retirement) for benefits provided by the DC plan, while under PSERS, longevity risk is covered by the System.

2. There will probably be some degree of "anti-selection" if Senate Bill No. 1 is enacted, in that we would expect that current members will elect to participate in the CB and/or DC plans or T-D members will elect to become T-H members only if it is favorable to them.

The potential financial impact of Senate Bill No. 1 is presented in the attached tables. These results may be used as estimates of the likely pattern of emerging costs and liabilities resulting from the 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, which will likely differ from the estimates provided in these analyses.

Table 1 compares projected employer contribution obligations under the current benefit and funding provisions of PSERS with those projected to arise under Senate Bill No. 1.

Table 2 allocates the total projected cost/(savings) among the components of Senate Bill No. 1 that affect System cost. The Table 2 cost allocation is dependent on the order in which the changes are implemented. If a different order is utilized, individual results will vary but the total savings will remain unchanged.

Generally, the savings due to the benefit reforms included in Senate Bill No. 1 are attributable to reductions in current members' prospective benefit entitlements. You should check with legal counsel to determine if the Senate Bill No. 1 reforms for current active members are consistent with applicable law.

In addition, attached as Table 3 are six benefit comparisons between the estimated current benefits provided under PSERS for Class T-E members and proposed CB/DC combined benefits under Senate Bill No. 1 for hypothetical members who are eligible for retirement.

The calculations presented here are based on the data, methods and assumptions used in the June 30, 2014 actuarial valuation of PSERS and the following assumptions for future valuations:

a. The active workforce size is assumed to remain constant over the projection period; and

b. Future new employees are assumed to be Class T-E members (before 7/1/2016) or T-I members (after 6/30/2016) and have similar characteristics (age/gender/salary) to new employees who entered the System in the period July 1, 2011 through June 30, 2014.

In this context, it should be noted that one difficulty in the estimation of liabilities arising under Senate Bill No. 1 is that we would expect a change in retirement patterns to result if the benefit entitlement is reduced. In general, decreasing benefits may postpone member retirements, since members may need to remain in service longer to earn sufficient benefits to meet their financial needs in retirement. However, the nature and extent of such postponements will not be identified until affected members retire under the new benefit design and a formal experience study is prepared. Therefore, for our cost estimates, we have assumed that there will be no immediate changes in members' retirement patterns.

The following are additional funding concerns which need to be addressed if Senate Bill No. 1 were to move forward:

This analysis is based on an assumed 7.50% annual discount rate. However, under Senate Bill No. 1, it is possible that liquidity considerations may arise due to the shift in liability towards retirees and the PSERS Board may change the asset allocation to reduce the risk of the portfolio and reflect the need to hold a growing proportion of its assets in more liquid, less volatile asset classes. In general, lowering the risk of the portfolio lowers the discount rate used in the System's valuation. This increases the accrued liabilities and contribution requirements of the System. Therefore, the cost analysis presented will change, potentially significantly, if there is a change in the asset allocation and expected asset return. However, due to time constraints, this analysis was not performed for this cost note.

The resulting contributions for each fiscal year may differ from actual results that will be determined in future actuarial valuations due to demographic and financial experience different from that assumed. This will certainly be the case if the workforce and/or payroll continue to decrease over the next few years. In addition, it is outside the scope of this assignment to determine if the assumptions used in the June 30, 2014 actuarial valuation are reasonable for future valuations. Accordingly, these results should not be used for any purpose other than providing an estimate of future employer pension cost obligations under Senate Bill No. 1.

This analysis only provides information with regards to future funding contributions of the System. It does not provide any information with regards to the impact any changes may have on financial disclosure and expense under applicable GASB standards.

This analysis was prepared by and 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.

Finally, care should be exercised in using the projection model and communicating any results to third parties to ensure that the above caveats and underlying bases of the projections are clearly communicated to any possible recipients.

Please let me know if you have any questions.

Respectfully submitted,

David L. Driscoll

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

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TABLE 1
Public School Employees' Retirement System of Pennsylvania
Projection of Contribution Rates and Funded Ratios
Current PSERS vs. Senate Bill No. 1 (SB#1)

Based on Buck's Senate Bill No. 1 cost note dated May 6, 2015. All statements of reliance included in that cost note continue to apply. Please refer to that cost note for more information.

				Pension Rate Floor		Employee Contribution Rate		Employer Normal Cost Rate			Employer Unfunded Liability Rate		Preliminary Employer Pension Rate			Total Employer Contribution Rate		Total Employer Contribution (thousands)				Funded Ratio		Unfunded Accrued Liability (millions)	
																				Cost/(Savings)					
Fiscal Year Ending June	Total Appropriation Payroll (thousands)	Compensation for DC Members Enrolled after 6/30/16	Fiscal Year Market Rate of Return	Current	SB#1 - DB	Current	SB#1 - DB	Current	SB#1 - DB	SB#1 - DC	Current	SB#1 - DB	Current	SB#1 - DB	Health Care Contribution	Current	SB#1 - DB + DC	Current	SB#1 - DB + DC	Cash Flow Basis	Present Value as of June 30, 2015	Current	SB#1 - DB + DC	Current	SB#1 - DB + DC
2013	$ 14,297,000		7.96 %	4.00 %	4.00 %	7.40 %	7.40 %	8.66 %	8.66 %		12.99 %	12.99 %	21.65 %	21.65 %	0.86 %	12.36 %	12.36 %					63.8 %	63.8 %	$ 32,598.6	$ 32,598.6
2014	13,720,000		14.91	4.00	4.00	7.43	7.43	8.57	8.57		15.25	15.25	23.82	23.82	0.93	16.93	16.93					**62.0**	**62.0**	**35,121.2**	**35,121.2**
2015	13,482,000		7.50	4.00	4.00	7.46	7.46	8.46	8.46		17.51	17.51	25.97	25.97	0.90	21.40	21.40	$ 2,885,148	$ 2,885,148	$ 0	$ 0	60.6	61.5	37,413.9	36,136.9
2016	**13,375,000**		7.50	4.00	4.00	**7.49**	**7.49**	**8.38**	**8.38**		**19.44**	**19.44**	**27.82**	**27.82**	**0.84**	**25.84**	**25.84**	**3,456,100**	**3,456,100**	**0**	**0**	59.6	60.5	39,412.8	38,040.0
2017	13,739,290	$ 543,937	7.50	8.21	8.21	7.50	7.50	8.21	8.21	0.10 %	20.64	19.97	28.85	28.18	0.84	29.69	29.12	4,079,195	4,001,230	(77,965)	(67,466)	58.7	59.5	41,424.4	40,040.6
2018	14,097,299	1,079,571	7.50	8.05	4.76	7.50	10.04	8.05	4.76	0.20	21.74	21.06	29.79	25.82	0.83	30.62	26.85	4,316,593	3,784,891	(531,702)	(427,999)	58.4	59.0	42,871.0	41,478.6
2019	14,477,945	1,610,623	7.50	7.89	4.53	7.51	9.79	7.89	4.53	0.29	22.85	22.17	30.74	26.70	0.82	31.56	27.81	4,569,239	4,026,046	(543,194)	(406,744)	60.0	60.6	42,296.8	40,898.3
2020	14,875,749	2,150,567	7.50	7.74	4.33	7.51	9.54	7.74	4.33	0.37	23.69	23.01	31.43	27.34	0.80	32.23	28.51	4,794,454	4,241,735	(552,718)	(385,001)	61.7	62.2	41,603.7	40,202.2
2021	15,280,718	2,704,203	7.50	7.60	4.13	7.51	9.31	7.60	4.13	0.46	23.64	22.95	31.24	27.08	0.78	32.02	28.32	4,892,886	4,327,247	(565,639)	(366,512)	63.0	63.4	41,228.1	39,826.9
2022	15,689,939	3,257,855	7.50	7.45	3.92	7.51	9.09	7.45	3.92	0.54	23.68	22.98	31.13	26.90	0.77	31.90	28.21	5,005,091	4,425,785	(579,306)	(349,180)	64.7	64.9	40,395.1	38,998.0
2023	16,112,661	3,821,856	7.50	7.29	3.73	7.52	8.87	7.29	3.73	0.61	23.92	23.21	31.21	26.94	0.75	31.96	28.30	5,149,606	4,560,582	(589,025)	(330,267)	66.5	66.6	39,344.6	37,955.7
2024	16,541,176	4,402,170	7.50	7.14	3.55	7.52	8.65	7.14	3.55	0.69	24.02	23.31	31.16	26.86	0.74	31.90	28.29	5,276,635	4,679,381	(597,254)	(311,518)	68.1	68.1	38,382.2	37,006.1
2025	16,980,255	5,013,119	7.50	6.99	3.36	7.52	8.44	6.99	3.36	0.76	24.12	23.41	31.11	26.77	0.72	31.83	28.25	5,404,815	4,797,712	(607,103)	(294,563)	69.9	69.7	37,192.9	35,834.6
2026	17,416,242	5,653,501	7.50	6.83	3.17	7.52	8.24	6.83	3.17	0.84	24.37	23.65	31.20	26.82	0.70	31.90	28.36	5,555,781	4,939,375	(616,406)	(278,211)	71.8	71.5	35,741.5	34,406.5
2027	17,847,011	6,325,471	7.50	6.67	2.99	7.52	8.02	6.67	2.99	0.92	24.62	23.89	31.29	26.88	0.70	31.99	28.50	5,709,259	5,086,035	(623,223)	(261,663)	73.8	73.4	34,014.0	32,708.6
2028	18,273,254	7,028,622	7.50	6.51	2.80	7.52	7.81	6.51	2.80	1.00	24.89	24.15	31.40	26.95	0.70	32.10	28.65	5,865,715	5,234,596	(631,118)	(246,491)	75.9	75.4	31,999.5	30,730.3
2029	18,697,025	7,764,664	7.50	6.33	2.61	7.52	7.59	6.33	2.61	1.08	25.17	24.43	31.50	27.04	0.70	32.20	28.82	6,020,442	5,387,660	(632,783)	(229,898)	78.2	77.6	29,682.5	28,457.0
2030	19,123,598	8,539,725	7.50	6.15	2.42	7.52	7.37	6.15	2.42	1.16	25.46	24.71	31.61	27.13	0.70	32.31	28.99	6,178,835	5,543,276	(635,558)	(214,797)	80.6	79.9	27,032.1	25,858.4
2031	19,551,758	9,354,434	7.50	5.96	2.22	7.53	7.14	5.96	2.22	1.24	25.77	25.01	31.73	27.23	0.70	32.43	29.17	6,340,635	5,703,086	(637,549)	(200,437)	83.1	82.5	24,014.7	22,901.8
2032	19,980,605	10,209,244	7.50	5.78	2.02	7.53	6.91	5.78	2.02	1.32	26.10	25.33	31.88	27.35	0.70	32.58	29.37	6,509,681	5,868,979	(640,702)	(187,375)	85.8	85.2	20,597.9	19,555.4
2033	20,413,230	11,105,968	7.50	5.58	1.83	7.53	6.67	5.58	1.83	1.41	26.44	25.66	32.02	27.49	0.70	32.72	29.60	6,679,209	6,042,134	(637,075)	(173,316)	88.7	88.2	16,743.8	15,782.5
2034	20,852,537	12,042,831	7.50	5.39	1.62	7.53	6.43	5.39	1.62	1.50	26.79	26.00	32.18	27.62	0.70	32.88	29.82	6,856,314	6,217,348	(638,966)	(161,703)	91.8	91.4	12,411.6	11,543.2
2035	21,304,240	13,023,897	7.50	5.19	1.42	7.53	6.19	5.19	1.42	1.58	27.14	26.34	32.33	27.76	0.70	33.03	30.04	7,036,790	6,400,506	(636,285)	(149,790)	95.1	95.0	7,559.2	6,796.4
2036	21,765,729	14,046,609	7.50	4.99	1.21	7.53	5.94	4.99	1.21	1.67	12.43	11.62	17.42	12.83	0.70	18.12	15.20	3,943,950	3,308,710	(635,240)	(139,111)	96.6	96.5	5,418.8	4,775.5
2037	22,238,659	15,112,004	7.50	4.79	1.00	7.53	5.70	4.79	1.00	1.76	8.78	7.96	13.57	8.96	0.70	14.27	11.42	3,173,457	2,539,655	(633,801)	(129,112)	97.6	97.5	3,871.2	3,362.4
2038	22,726,844	16,225,136	7.50	4.58	0.79	7.53	5.45	4.58	0.79	1.85	7.18	6.35	11.76	7.14	0.70	12.46	9.69	2,831,765	2,202,016	(629,749)	(119,336)	98.4	98.4	2,529.3	2,171.7
2039	23,227,294	17,382,733	7.50	4.38	0.59	7.53	5.20	4.38	0.59	1.94	5.35	4.51	9.73	5.10	0.70	10.43	7.74	2,422,607	1,797,396	(625,211)	(110,211)	99.1	99.1	1,474.9	1,286.3
2040	23,750,235	18,581,109	7.50	4.18	0.38	7.53	4.95	4.18	0.38	2.03	3.92	3.06	8.10	3.44	0.70	8.80	6.17	2,090,021	1,464,510	(625,510)	(102,571)	99.6	99.5	654.8	654.8
2041	24,303,842	19,818,055	7.50	3.98	0.18	7.53	4.71	3.98	0.18	2.11	2.60	2.60	6.58	2.78	0.70	7.28	5.59	1,769,320	1,359,061	(410,258)	(62,580)	100.0	99.9	72.5	72.5
2042	24,892,137	21,089,264	7.50	3.79	0.00	7.53	4.47	3.79	0.00	2.19	1.44	1.44	5.23	1.44	0.70	5.93	4.33	1,476,104	1,078,904	(397,200)	(56,361)	100.2	100.2	(280.8)	(283.4)
2043	25,529,749	22,396,441	7.50	3.61	0.00	7.53	4.25	3.61	0.00	2.27	0.24	0.24	3.85	0.24	0.70	4.55	3.21	1,161,604	820,047	(341,556)	(45,084)	100.2	100.3	(362.3)	(418.1)
2044	26,225,024	23,737,733	7.50	3.44	0.00	7.53	4.04	3.44	0.00	2.34	(0.64)	(0.64)	2.80	(0.64)	0.70	4.14	3.04	1,085,716	798,382	(287,334)	(35,281)	100.2	100.4	(395.4)	(555.8)
2045	26,987,280	25,110,295	7.50	3.30	0.00	7.52	3.86	3.30	0.00	2.41	(0.35)	(0.37)	2.95	(0.37)	0.70	4.00	3.11	1,079,491	839,268	(240,224)	(27,439)	100.2	100.6	(428.1)	(753.3)
2046	27,819,206	26,500,583	7.50	3.18	0.00	7.52	3.69	3.18	0.00	2.47	(0.20)	(0.24)	2.98	(0.24)	0.70	3.88	3.17	1,079,385	881,100	(198,286)	(21,068)	100.2	100.7	(463.0)	(1,009.1)
2047	28,676,777	27,899,018	7.50	3.05	0.00	7.52	3.53	3.05	0.00	2.52	(0.29)	(0.37)	2.76	(0.37)	0.70	3.75	3.22	1,075,379	923,322	(152,057)	(15,029)	100.3	101.0	(500.9)	(1,326.7)
2048	29,560,785	29,311,397	7.50	2.92	0.00	7.52	3.38	2.92	0.00	2.57	(0.19)	(0.32)	2.73	(0.32)	0.70	3.62	3.27	1,070,100	966,091	(104,010)	(9,563)	100.3	101.2	(541.1)	(1,705.9)
																		Total Cost/(Savings):		$ (16,254,008)	$ (5,915,676)				

Table 2

Public School Employees' Retirement System of Pennsylvania
Cost/(Savings) Allocation of Table 1 - Total Potential Projected Cost/(Savings)
Due to Senate Bill No. 1
(Amounts in millions)

	Cash Flow Basis	Present Value as of June 30, 2015
Benefit Reforms		
Members as of June 30, 2016		
Reclassification of Class T-D to Class T-G effective July 1, 2016	$ (7,027.5)	$ (2,982.9)
Cost neutral Option 4 withdrawals for service on or after July 1, 2016	(6,056.0)	(2,318.8)
Sub-total	$ (13,083.5)	$ (5,301.7)
Employees who first become a member on or after July 1, 2016		
Cash balance plan for school employees hired after June 30, 2016 in lieu of Class TE or TF membership under current PSERS	$ (13,345.1)	$ (2,730.3)
Defined contribution plan for school employees hired after June 30, 2016 in lieu of Class TE or TF membership under current PSERS	10,174.6	2,116.4
Sub-total	$ (3,170.5)	$ (613.9)
Total Senate Bill No. 1 Cost/(Savings)	$ (16,254.0)	$ (5,915.6)

Notes:

1 Cost allocation is dependent on the order in which the changes are implemented. If a different order is utilized, individual results will vary. The cost for the benefit reforms assumes that the funding reforms are reflected first.

2 Based on Buck's Senate Bill No. 1 cost note dated May 6, 2015. All statements of reliance included in that cost note continue to apply. Please refer to that cost note for more information.

3 The present value of the cost/(savings) is based upon the valuation discount rate of 7.5%. Changing that rate would modify the present value.

TABLE 3

Public School Employees' Retirement System of Pennsylvania

Comparison of Benefits
PSERS Class T-E members vs. Senate Bill No. 1 Class T- I Cash Balance & Defined Contribution Hybrid Design

Employee	A	B	C	D	E	F
Age at Hire	30	30	30	30	40	22
Age at Termination	65	65	65	65	65	57
Retirement Age	65	65	65	65	65	57
Salary at Termination	$ 31,111	$ 51,852	$ 72,592	$ 93,333	$ 51,852	$ 57,000
PSERS Benefit	$ 21,000	$ 35,000	$ 49,000	$ 63,000	$ 25,000	$ 29,232
Senate Bill No. 1 CB + DC Benefit	$ 6,361	$ 10,602	$ 14,843	$ 19,084	$ 7,669	$ 8,201
PSERS Benefit / Cash Balance Benefit	330%	330%	330%	330%	326%	356%

Cash Balance Design:		**Defined Contribution Design**	
Member Contribution	**3.00%**	**Member Contribution**	**3.00%**
Employer Credit	**0.00%**	**Employer Credit**	**2.59%**
Assumed 30 Year Treasury Bond Rate	**3.00%**	**Assumed Rate of Return**	**6.00%**
Assumed Conversion Rate	**2.00%**	**Assumed Conversion Rate**	**3.00%**
Mortality Table for Conversion	**PSERS Table**	**Mortality Table for Conversion**	**RP-2014 White Collar (75% female, 25% male)**

Actuarial Cost Note -
Projected Impact of Senate Bill No. 1

As requested, in connection with proposed pension reform legislation expected to be introduced by Senator Patrick Browne (hereafter, referred to as SB 1, since it is likely to be named Senate Bill No. 1 after introduction), we have performed cost projections to approximate the impact on the future funding of the Pennsylvania State Employees' Retirement System (SERS) under SB 1. If SB 1 were to become law, effective January 1, 2016, significant changes would occur to the provisions of both of Pennsylvania's statewide retirement systems. This note addresses only the changes applicable to SERS.

Summary

SB 1 proposes a combination of changes effective January 1, 2016, as follows:

- A new SERS Defined Contribution (DC) plan will be implemented and will replace the current SERS Defined Benefit (DB) system for those hired after December 31, 2015.
- A new cash balance benefit tier will be created within the DB system and membership (in a new Class CB) will be:
  - mandatory for active participants in the new DC plan and
  - optional for current (pre-2016) SERS members.
- Changes will occur to the future benefit rights of virtually all current (pre-2016) active SERS DB members. These changes will only affect benefits relating to post-December 31, 2015 service. Benefits relating to service through December 31, 2015 will continue as-is and not be impacted.

Descriptions of the key features of each of these changes proposed under SB 1 follow.

New Defined Contribution Plan

Under SB 1, all State employees who begin State service on or after January 1, 2016 would not be eligible to join the current SERS DB system, but rather, would mandatorily become participants in a new SERS DC plan. The bill calls for contributions to be made to the new SERS DC plan as follows:

- By participants at a rate of 3% of compensation,

- By employers of those who join upon hire (including corrections officers) at a rate of 4% of compensation, with limited exceptions as follows:
  - for other hazardous duty employees (including park rangers and capitol police), at a rate of 5.5% of compensation and
  - for state police, at a rate of 12.2% of compensation.

Employee contributions would vest immediately; employer contributions would be subject to 4-year graded vesting, whereby, in general, vesting would be 25% after 1 year of service, 50% after 2 years of service, 75% after 3 years of service and 100% after 4 years of service.

New Cash Balance Tier

SB 1 calls for a new cash balance tier of defined benefits and class of membership within the existent SERS defined benefit system. This new proposed benefit structure, though it may often be referred to as a cash balance plan, will not be a separate plan and will not have a separate trust fund. That is, the cash balance tier will be part of the larger DB system and cash balance tier assets will be commingled and invested with all the other SERS assets.

As is true for the new DC plan, under SB 1, all State employees who begin State service on or after January 1, 2016 would mandatorily become members of SERS' new cash balance tier. Current SERS members (in general, those hired prior to 2016, hereafter referred to as legacy DB system members) will continue in their legacy DB class of service; however, they will also have the option of becoming members of the new cash balance tier and, unlike the mandatory members, they will be able to elect into and out of Class CB membership during their SERS membership.

The key features of this new cash balance tier are as follows:

1. Employee Contributions: All mandatory cash balance tier members must contribute 3 percent of compensation; optional cash balance tier members may contribute between 0 percent and 3 percent of compensation.
2. Employer Credits: None
3. Interest: Accumulated balances in the cash balance accounts (including all past contributions and interest) of all non-annuitant members, would be credited with interest at the rate paid by 30-year U.S. Treasury bonds, but not more than 4 percent annually.
4. Excess Interest: Starting in 2019, accumulated balances in the cash balance accounts of active (and certain inactive) members would be eligible for excess interest credits approximately as follows:
    a. Beginning with calendar 2016 and annually thereafter, to the extent that actual investment returns earned by the SERS asset fund, net of investment and administrative fees and costs, are above or below the actuarially assumed investment return for the total fund (currently 7.5%), one half of the year's resulting excess (gain) or shortage (loss), adjusted downward in recognition of the remaining accrued actuarial liability for SERS legacy DB benefits, will potentially become allocable to eligible cash balance tier members.
    b. The annual determinations of excess interest will occur as follows:
        i. The first will occur in 2019, based upon the smoothed excess return, if any, resulting from the three calendar years 2016 through 2018;

ii. The second will occur in 2020, based upon the smoothed excess return, if any, resulting from the four calendar years 2016 through 2019;

iii. The third will occur in 2021, based upon the smoothed excess return, if any, resulting from the five calendar years 2016 through 2020 and

iv. Subsequent determinations will occur annually in 2022 and thereafter, based upon the smoothed excess return, if any, resulting from the preceding five calendar years.

v. At the time of each annual determination, excess interest will be granted only if the sum of the gains and losses for the years included in the determination is positive.

c. The adjustment described in 4a above allocates excess interest proportionally between cash balance accounts and pre-cash balance (legacy DB) liabilities. Therefore, over time, as the aggregate amount in cash balance accounts becomes larger relative to the legacy DB liabilities, excess interest will increasingly be allocated to cash balance accounts/members.

5. Vesting: Employees would vest immediately in their account balances, including all past employee contributions and all interest (30-year Treasury bond and excess) credited thereon.
6. Upon Separation From Service (except where small account balances would result in mandatory cash outs):
   a. Members would be eligible to receive a lump sum of their full cash balance account value or
   b. Members would be eligible to receive the value of their full cash balance account as a single life annuity or as an optional form of annuity based upon the same benefit payment options available to pre-Act 120 legacy class members (except that “Option 4” payments would be determined on an actuarially neutral basis), where the actuarial equivalence conversion would be determined using 120% of the mid-term Treasury rates, not the 4 percent statutory rate.
   c. Alternatively, members would be able to defer any distributions from their accounts, thereby leaving their fully vested cash balance accounts to continue to earn 30-year Treasury bond interest and excess interest, until some later date, upon which they choose to receive their benefits.
7. Upon Death (whether pre-separation or post-separation, but prior to becoming an annuitant): Members would receive a lump sum payment of the total value of their cash balance account including all contributions and interest.

Changes in Post-2015 Benefit Provisions Applicable to Legacy DB System Members

Under SB 1, changes would occur, effective January 1, 2016, to the future benefit rights of virtually all active legacy DB (pre-2016) system members. These changes will not affect benefits relating to service through December 31, 2015 all of which will continue as-is.

While most of the changes called for under SB 1 differ somewhat depending upon the membership class or group to which the legacy DB member belonged, these two SB 1 changes were applicable regardless of which class or group the legacy DB member belonged to:

- Effective January 1, 2016, all active SERS members have the option of becoming members of the new Cash Balance benefit tier, and
- Effective January 1, 2016, all active SERS members who are "elected officers" (regardless of their membership class) will not be allowed to continue active DB membership but will instead be required to join the new DC plan on election, re-election or retention.

As for the other benefit provision changes, that differ depending upon the membership class or group to which the legacy DB member belonged, these changes can be most readily summarized by presenting them in a table, which is presented below, and describing the four types of benefit provision changes which either (i) do apply to the specific class/group listed (as signified by Y for Yes) or (ii) do not apply to the specific class/group listed (as signified by N for No) or (iii) are not applicable to the specific class/group (as signified by N/A).

Member Class/Group	**Contribution & Accrual Rates (1)**	**Final Average Salary (FAS) (2)**	**SSWB Limit on Comp (3)**	**Neutral Option 4 (4)**
Class A3/A4	N	Y	Y	N/A
Class AA	Y	Y	N	Y
Class D-4	Y	Y	N	Y
Class A	N	Y	N	Y
Judiciary	N	Y	N	Y
State Police	N	N	N	Y

Our brief descriptions of the four types of benefit provision changes follow.

(1) Employee Contribution Rate and/or Accrual Rate Changes

SB 1 calls for changes effective January 1, 2016 to the rates applicable to certain legacy DB members as follows:

	Employee Contribution Rate/Annual Benefit Accrual Rate		
Member Class	Current Levels	Default Levels	Opt-Down Levels
Class AA	6.25%/2.5%	8.75%/2.5%	5.00%/2.0%
Class D-4	7.50%/3.0%	10.00%/3.0%	5.00%/2.0%

For each of the above legacy DB member classes, the member contribution rate will increase from the "Current Level" to the "Default Level" (8.75% of compensation for Class AA and 10.00% of compensation for Class D-4) effective January 1, 2016. For Class AA, the current 2.5% annual benefit accrual rate (applied to the final average salary [FAS]) will continue (as the default result); for Class D-4, the current 3.0% accrual rate will continue as the default result. Both Class AA members and Class D-4 members subject to these changes will have an opportunity to make an "Opt-Down" election whereby a member may elect to contribute at 5% of compensation to have an annual benefit accrual rate of 2% of their FAS.

(2) Revised Final Average Salary for Post-2015 Service

SB 1 calls for changes effective January 1, 2016 to the current (generally three-year) Final Average Salary calculation applicable to all legacy DB members other than state police who qualify for the "DiLauro Award" (who will continue to have their benefits based upon their highest year salary, inclusive of overtime). The new FAS will be the higher of (a) or (b) below, where:

(a) = Current 3-Year Final Average Salary, but excluding post-12/31/2015 overtime and

(b) = New 5-Year Final Average Salary, including post-12/31/2015 overtime,

but not less than the FAS would have been had the member separated from service 12/31/2015.

(3) Limit on Retirement Covered Compensation – Not to Exceed Current Year SSWB

SB 1 introduces a limit effective January 1, 2016 on compensation that may be recognized each year for Class A-3 and Class A-4 members (other than state police officers) under the SERS DB system. Such compensation may not exceed the Social Security wage base (SSWB) applicable in each year, and this limitation applies to: determination of employee contributions, calculation of the FAS, and all other compensation-based limits and calculations of benefits. It should be noted that, SB 1 includes a special rule applicable only to Class A-3 and Class A-4 members whose compensation exceeds the SSWB, namely, they will have the option to participate in the new DC plan under the same terms and conditions as apply to new employees, including a mandatory employee contribution of 3% of compensation.

(4) Actuarially Neutral Option 4 Relating to Post-2015 Member Contributions

SB 1 calls for a change to become applicable to all legacy DB members who, as of December 31, 2015, remain eligible for the "actuarially favorable (to the member)" Option 4 withdrawal. Specifically, all member contributions made on or after January 1, 2016 and all statutory interest on those contributions, if withdrawn under Option 4, will be subject to an actuarially neutral Option 4 calculation (which is less favorable to the member than the calculation relating to the pre-2016 contributions and statutory interest thereon).

Two other changes in the post-2015 benefit provisions applicable to legacy DB system members that are included in SB 1 are worthy of mention here:

- For Class A-3 and Class A-4 members, for whom a new Shared Risk provision became applicable under Act 120 (subjecting them to a potential increase in their employee contribution rate by as much as 2.0% in the event of underperformance of SERS investments), SB 1 has introduced a new Shared Gain provision. This Shared Gain provision mirrors the Shared Risk provision, in that it subjects these same classes of members to a potential decrease in their employee contribution rate by as much as 2%, in the event of over performance of SERS investments.
- For Class AA and Class D-4 members to whom the new SB 1 (default) contribution rate/accrual rate combination applies, SB 1 has introduced a new "Contribution Savings Provision", similar to the Shared Gain provision discussed above. Under this provision, the performance of SERS investments would be measured every three years. In the event of over performance during this period, the employee contribution rate could be reduced (in the extreme, potentially by as much as 5%). The downward-adjusted rate would then be in effect for the following three years, after which new performance measurements would govern contribution rate levels.

Given that the assumption used in our SB 1 cost analyses is that the SERS fund will consistently earn 7.5% annual investment returns in all years after December 31, 2014 (consistent with our current actuarial valuation assumptions), neither the Shared Gain nor the Contribution Savings Provision have any cost implications of relevance for this Cost Note.

Changes to Current SERS Financing Provisions Under SB 1

In accordance with our interpretation of the draft provisions of SB 1:

- We have performed a fresh start amortization of the December 31, 2015 unfunded actuarial accrued liability over 30 years using a level dollar amortization method.
- We have (i) determined the estimated change, as of December 31, 2015, in the unfunded actuarial accrued liability that results specifically from the SERS DB changes proposed under SB 1 and (ii) amortized that amount over 30 years using a level dollar amortization method, wherein this amortization was reflected in our costs before application of the Act 120 contribution rate collars.

Estimated Initial Cost Impact of SB 1 on the SERS DB System

Based upon the employer normal cost calculation rule mandated by the State Employees' Retirement Code (SERC), which would not change under SB 1, Hay Group estimates that the net employer normal cost for the initial cash balance tier expected to join SERS during calendar year 2016 will be 0 percent of payroll. Thereafter, this normal cost will be redetermined with each annual actuarial valuation, reflecting changes that may occur from year to year in both (i) the demographic characteristics of each year's new entrant population and (ii) the applicable actuarial valuation assumptions.

This 0 percent normal cost occurs primarily as a result of there being no employer credit included in the new cash balance tier provisions of SB 1. Given the SB 1 provisions relating to interest and excess interest on cash balance accounts, and given that 7.5 percent annual investment returns are assumed to be earned on SERS assets over future years, future member contributions to cash balance accounts will be sufficient to fully fund the cash balance tier (without a need for employer funding).

If SB 1 were to become law, effective in fiscal 2016/2017, the SERS employer normal cost would be based upon the new cash balance (Class CB) new entrant cohort and, as stated above, would decrease to 0 percent of payroll (down from the current 4.95 percent of payroll based upon Class A-3 new entrants). At the same time (in conjunction with the December 31, 2015 actuarial valuation), approximately $3.1 billion of SERS liability, previously scheduled to be funded via future employer normal cost payments, would be added to the unfunded actuarial accrued liability, thereby causing the SERS funded status to decrease by almost 4 percent. These changes are reflected (though masked by the impact of other changes) in our SB 1 funding projections attached to this note.

Projection of Future Costs Under SB 1

Starting with the census data, asset data and actuarial assumptions underlying our December 31, 2014 actuarial valuation (including an assumed investment return of 7.5 percent per year, compounded annually) and projecting our December 31, 2014 valuation results forward to December 31, 2015 and incorporating the new DC plan design outlined above for new hires on or after January 1, 2016 and incorporating the new cash balance plan design outlined above for new entrants to SERS on or after January 1, 2016 and incorporating the new benefit provisions applicable to legacy DB members of SERS as described above and reflecting the two changes to the current SERS financing provisions described above, Hay Group has projected the future employer contributions required to fund SERS and the new DC plan in accordance with SB 1.

Schedules Attached to This Cost Note

We have attached to this note the results of our funding projections and other relevant cost information, as follows:

- **SB 1 Projection:** That is, DC Plan and Cash Balance Tier For Post-2015 New Hires; Some Current/Some Revised SERS Benefit Provisions for Pre-2016 Hires; Revised SERS Financing Provisions (All as Fully Described Above): This table presents our projection of future SERS funding through fiscal year 2051/2052, all of which reflects the impact of the SB 1 Provisions.
- **Baseline Projection:** This table presents, for purposes of comparison, the results of our December 31, 2014 actuarial valuation and our projection of future funding through fiscal year 2051/2052, assuming no changes to any of the current SERS benefit provisions or financing methodologies.

Our Cost Results in Brief

Taking all the above-described aspects of SB 1 into account, we have determined that Senate Bill No. 1, if it became law, would generally result (depending upon the length of the future projection period considered) in fairly significant cumulative savings in future SERS funding. Specifically, our projections over our full projection period show estimated cumulative savings through fiscal year 2051/2052 of approximately $2 billion.

Important Notes

Please note the following regarding our handling of the attached funding projections:

1. Although the provisions of SB 1, especially the establishment of a new separate DC plan, will result in reduced future inflows of contributions and therefore lower future assets in the SERS DB system than would apply if there were no changes at all to the SERS provisions (consistent with the baseline scenario), we do not view the SB 1 changes as constituting a closure of the SERS DB system. Therefore, in our professional actuarial opinion, it is not necessary, as it generally would be in the event of legislation calling for a closure of the SERS DB system to new entrants, to anticipate lower future investment return assumptions (i.e., gradual reduction in the 7.5% annual return currently assumed by Hay Group in our SERS actuarial valuation). Nevertheless, we do feel it is important that there be, on an ongoing basis, close monitoring of SERS' liquidity needs and consideration of those needs each time investment policy updates occur. Such actions that result in a more conservative investment policy, of course, as always, may warrant downward adjustment to the actuarial investment return assumption.

2. The Hay Group's past convention of showing results for employer cost projections such as these as percentages of payroll to two decimal places may be somewhat misleading. This level of precision is not really possible for estimates of this nature.

3. All of these projections are based upon the expectation that (i) for all years after 2014, the actual economic and demographic experience of SERS will be consistent with the underlying actuarial valuation assumptions and (ii) all employer contribution amounts shown in the "Expected FY Contribution" columns will, in fact, be contributed.

4. The attached projection schedules include a particularly important column of information that may warrant further explanation: "Cumulative (Savings) / Cost Relative to Baseline" shows the projected cumulative cost or savings in employer contributions (in millions of dollars) that would result under SB 1 versus under the current law (Baseline).

Basis for Above Cost Estimates

The cost estimates included herein were based upon our December 31, 2014 actuarial valuation results, including the underlying census data, assets and actuarial assumptions. We have also assumed a future long-term 30-year Treasury bond rate of 3% per year, for purposes of crediting interest on cash balance account balances.

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.

Actuarial Certification

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,
Hay Group, Inc.

By:______________________________	By: ______________________________
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May 11, 2015

5/6/2015

SERS Projected Employer Contributions
(Based Upon Final December 31, 2014 Valuation)

					BASELINE PROJECTION - Current Entry Age Funding Method; Level Dollar Amortization; 5-Year Smoothing of Assets; 4.50% FY 15 Collar; 4.50% FY 16 Collar; 4.50% FY 17 Collar; 4.50% FY 18 Collar; 4.50% FY 19 Collar; 4.50% FY 20 Collar; 4.50% FY 21+ Collar; No Asset Fresh Start; Act 120 Benefit Provisions; 7.50% Liability Interest Rate Assumption; No Liability Fresh Start							
Year	Investment Return	Fiscal Year	Ceiling Contribution	Floor Contribution	Projected Percent Contribution	Expected FY Payroll ($ in millions)	Expected FY Contribution ($ in millions)	(Savings) / Cost Relative to Current Law Contribution	GASB Compliant (Fiscal Year Contribution)	Funded Ratio (AV%)	UAL ($ in billions)	Funded Ratio (MV%)
2008	approx -30%	2009/2010	NA	4.00%	4.00	5,660.3	226.4	-	N	89.0	3.80	66.2
2009	approx 9%	2010/2011	NA	4.00%	5.00	5,936.0	296.8	-	N	84.4	5.59	68.9
2010	approx 12%	2011/2012	NA	4.08%	8.00	5,851.7	468.1	-	N	75.2	9.76	66.1
2011	2.70%	2012/2013	NA	5.10%	11.50	5,890.7	677.4	-	N	65.3	14.69	57.6
2012	12.00%	2013/2014	NA	5.01%	16.00	5,836.4	933.8	-	N	58.8	17.78	59.0
2013	13.60%	2014/2015	NA	5.00%	20.50	5,897.6	1,209.0	-	N	59.2	17.90	62.4
2014	6.40%	2015/2016	NA	4.95%	25.00	6,021.7	1,505.4	-	Y	59.4	18.17	61.1
2015	7.50%	2016/2017	NA	4.95%	29.50	6,205.3	1,830.6	-	Y	59.7	18.42	61.3
2016	7.50%	2017/2018	NA	4.95%	30.41	6,394.6	1,944.5	-	Y	61.4	18.01	62.0
2017	7.50%	2018/2019	NA	4.95%	29.40	6,589.6	1,937.1	-	Y	63.2	17.53	63.1
2018	7.50%	2019/2020	NA	4.95%	28.82	6,790.6	1,957.0	-	Y	64.2	17.35	64.3
2019	7.50%	2020/2021	NA	4.95%	28.15	6,997.7	1,970.0	-	Y	65.4	17.07	65.5
2020	7.50%	2021/2022	NA	4.95%	27.52	7,211.2	1,984.4	-	Y	66.6	16.77	66.6
2021	7.50%	2022/2023	NA	4.95%	26.92	7,431.1	2,000.2	-	Y	67.8	16.45	67.8
2022	7.50%	2023/2024	NA	4.95%	26.34	7,657.8	2,016.9	-	Y	68.9	16.12	68.9
2023	7.50%	2024/2025	NA	4.95%	25.78	7,891.3	2,034.0	-	Y	70.0	15.76	70.0
2024	7.50%	2025/2026	NA	4.95%	25.23	8,132.0	2,051.7	-	Y	71.2	15.37	71.2
2025	7.50%	2026/2027	NA	4.95%	24.70	8,380.0	2,070.0	-	Y	72.3	14.94	72.3
2026	7.50%	2027/2028	NA	4.95%	24.19	8,635.6	2,089.0	-	Y	73.5	14.48	73.5
2027	7.50%	2028/2029	NA	4.95%	23.69	8,899.0	2,108.5	-	Y	74.8	13.98	74.8
2028	7.50%	2029/2030	NA	4.95%	23.21	9,170.4	2,128.6	-	Y	76.0	13.44	76.0
2029	7.50%	2030/2031	NA	4.95%	22.74	9,450.1	2,149.3	-	Y	77.3	12.85	77.3
2030	7.50%	2031/2032	NA	4.95%	22.29	9,738.4	2,170.7	-	Y	78.7	12.22	78.7
2031	7.50%	2032/2033	NA	4.95%	21.85	10,035.4	2,192.8	-	Y	80.1	11.54	80.1
2032	7.50%	2033/2034	NA	4.95%	21.42	10,341.5	2,215.6	-	Y	81.6	10.79	81.6
2033	7.50%	2034/2035	NA	4.95%	21.01	10,656.9	2,239.0	-	Y	83.1	9.99	83.1
2034	7.50%	2035/2036	NA	4.95%	20.61	10,981.9	2,263.2	-	Y	84.7	9.13	84.7
2035	7.50%	2036/2037	NA	4.95%	20.22	11,316.9	2,288.2	-	Y	86.4	8.19	86.4
2036	7.50%	2037/2038	NA	4.95%	19.84	11,662.0	2,314.0	-	Y	88.2	7.18	88.2
2037	7.50%	2038/2039	NA	4.95%	19.48	12,017.7	2,340.5	-	Y	90.1	6.09	90.1
2038	7.50%	2039/2040	NA	4.95%	19.12	12,384.3	2,367.9	-	Y	92.1	4.91	92.1
2039	7.50%	2040/2041	NA	4.95%	15.06	12,762.0	1,921.8	-	Y	94.2	3.63	94.2
2040	7.50%	2041/2042	NA	4.95%	12.13	13,151.2	1,595.7	-	Y	95.7	2.73	95.7
2041	7.50%	2042/2043	NA	4.95%	8.86	13,552.3	1,200.8	-	Y	96.7	2.11	96.7
2042	7.50%	2043/2044	NA	4.95%	6.85	13,965.7	957.1	-	Y	97.2	1.87	97.2
2043	7.50%	2044/2045	NA	4.95%	6.67	14,391.6	959.9	-	Y	97.2	1.87	97.2
2044	7.50%	2045/2046	NA	4.95%	6.42	14,830.6	952.1	-	Y	97.2	1.89	97.2
2045	7.50%	2046/2047	NA	4.95%	6.18	15,282.9	944.6	-	Y	97.1	1.95	97.1
2046	7.50%	2047/2048	NA	4.95%	6.30	15,749.0	992.4	-	Y	97.0	2.06	97.0
2047	7.50%	2048/2049	NA	4.95%	6.44	16,229.4	1,045.5	-	Y	96.9	2.14	96.9
2048	7.50%	2049/2050	NA	4.95%	6.42	16,724.4	1,072.9	-	Y	96.8	2.21	96.8
2049	7.50%	2050/2051	NA	4.95%	6.43	17,234.5	1,108.6	-	Y	96.8	2.29	96.8
2050	7.50%	2051/2052	NA	4.95%	6.44	17,760.1	1,144.4	-	Y	96.7	2.37	96.7

5/6/2015

SERS Projected Employer Contributions
(Based Upon Final December 31, 2014 Valuation)

				Senate Bill 1 = Legacy DB Plan With New Provisions, Including New Cash Balance Tier, Plus New DC Plan; Liabilities are Fresh Started Over 30 Years Effective December 31, 2015												Baseline	
Year	Investment Return	Fiscal Year	Floor Contribution	Projected DB Percent Contribution	Expected DB Plan FY Payroll ($ in millions)	Expected FY DB Contribution ($ in millions)	Expected DC/CB Plan FY Payroll ($ in millions)	Expected FY DC/CB Contribution ($ in millions)	Total DB+DC/CB Contribution ($ in millions)	Total DB+DC/CB Contribution as a % of DB+DC/CB Pay	Annual (Savings) / Cost Relative to Baseline	Cumulative (Savings) / Cost Relative to Baseline	Funded Ratio (AV%)	UAL ($ in billions)	Funded Ratio (MV%)	Baseline Percent	Baseline $ ($ in millions)
2011	2.70%	2012/2013	5.10%	11.50	5,890.7	677.4	-	-	677.4	11.50	-	-	65.3	14.69	57.6	11.50	677.4
2012	12.00%	2013/2014	4.95%	16.00	5,836.4	933.8	-	-	933.8	16.00	-	-	58.7	17.78	58.9	16.00	933.8
2013	13.60%	2014/2015	5.00%	20.50	5,897.6	1,209.0	-	-	1,209.0	20.50	-	-	59.2	17.90	62.4	20.50	1,209.0
2014	6.40%	2015/2016	4.95%	25.00	5,897.2	1,499.3	124.5	5.5	1,504.8	24.99	(0.6)	(0.6)	59.4	18.17	61.1	25.00	1,505.4
2015	7.50%	2016/2017	0.00%	27.43	5,822.3	1,702.2	383.0	17.1	1,719.3	27.71	(111.3)	(111.9)	57.6	20.10	59.1	29.50	1,830.6
2016	7.50%	2017/2018	0.00%	26.27	5,720.4	1,679.9	674.2	30.8	1,710.7	26.75	(233.8)	(345.7)	59.3	19.65	59.9	30.41	1,944.5
2017	7.50%	2018/2019	0.00%	25.08	5,629.3	1,652.9	960.3	44.3	1,697.2	25.76	(239.9)	(585.7)	60.9	19.12	60.9	29.40	1,937.1
2018	7.50%	2019/2020	0.00%	24.42	5,537.2	1,658.0	1,253.4	57.9	1,715.9	25.27	(241.1)	(826.8)	61.8	18.96	61.8	28.82	1,957.0
2019	7.50%	2020/2021	0.00%	23.66	5,440.3	1,655.8	1,557.4	72.0	1,727.8	24.69	(242.2)	(1,068.9)	62.7	18.70	62.8	28.15	1,970.0
2020	7.50%	2021/2022	0.00%	22.94	5,338.3	1,654.5	1,872.9	86.4	1,740.9	24.14	(243.5)	(1,312.4)	63.6	18.43	63.6	27.52	1,984.4
2021	7.50%	2022/2023	0.00%	22.26	5,227.0	1,654.0	2,204.1	101.6	1,755.6	23.63	(244.6)	(1,557.0)	64.5	18.15	64.5	26.92	2,000.2
2022	7.50%	2023/2024	0.00%	21.60	5,107.0	1,654.0	2,550.8	117.6	1,771.6	23.13	(245.3)	(1,802.3)	65.3	17.86	65.3	26.34	2,016.9
2023	7.50%	2024/2025	0.00%	20.96	4,980.1	1,653.9	2,911.2	134.1	1,788.0	22.66	(246.0)	(2,048.3)	66.1	17.54	66.1	25.78	2,034.0
2024	7.50%	2025/2026	0.00%	20.34	4,846.5	1,653.8	3,285.5	151.3	1,805.1	22.20	(246.6)	(2,294.9)	67.0	17.21	67.0	25.23	2,051.7
2025	7.50%	2026/2027	0.00%	19.74	4,708.8	1,653.8	3,671.2	169.1	1,822.9	21.75	(247.1)	(2,542.0)	67.8	16.84	67.8	24.70	2,070.0
2026	7.50%	2027/2028	0.00%	19.15	4,564.1	1,653.8	4,071.5	187.5	1,841.3	21.32	(247.7)	(2,789.7)	68.6	16.45	68.6	24.19	2,089.0
2027	7.50%	2028/2029	0.00%	18.58	4,410.2	1,653.8	4,488.8	206.9	1,860.7	20.91	(247.8)	(3,037.5)	69.4	16.03	69.4	23.69	2,108.5
2028	7.50%	2029/2030	0.00%	18.03	4,249.5	1,653.8	4,920.9	226.9	1,880.7	20.51	(247.9)	(3,285.5)	70.3	15.58	70.3	23.21	2,128.6
2029	7.50%	2030/2031	0.00%	17.50	4,080.4	1,653.8	5,369.7	247.7	1,901.5	20.12	(247.8)	(3,533.3)	71.2	15.10	71.2	22.74	2,149.3
2030	7.50%	2031/2032	0.00%	16.98	3,902.1	1,653.8	5,836.3	269.5	1,923.3	19.75	(247.4)	(3,780.7)	72.1	14.57	72.1	22.29	2,170.7
2031	7.50%	2032/2033	0.00%	16.48	3,716.2	1,653.8	6,319.2	292.5	1,946.3	19.39	(246.5)	(4,027.2)	73.1	14.01	73.1	21.85	2,192.8
2032	7.50%	2033/2034	0.00%	15.99	3,528.5	1,653.8	6,813.0	316.0	1,969.8	19.05	(245.8)	(4,273.0)	74.2	13.41	74.2	21.42	2,215.6
2033	7.50%	2034/2035	0.00%	15.52	3,339.8	1,653.8	7,317.1	339.8	1,993.6	18.71	(245.4)	(4,518.4)	75.3	12.76	75.3	21.01	2,239.0
2034	7.50%	2035/2036	0.00%	15.06	3,148.5	1,653.8	7,833.4	364.2	2,018.0	18.38	(245.2)	(4,763.6)	76.5	12.07	76.5	20.61	2,263.2
2035	7.50%	2036/2037	0.00%	14.61	2,955.5	1,653.8	8,361.4	389.0	2,042.8	18.05	(245.4)	(5,009.0)	77.8	11.32	77.8	20.22	2,288.2
2036	7.50%	2037/2038	0.00%	14.18	2,759.0	1,653.8	8,903.0	414.5	2,068.3	17.74	(245.7)	(5,254.7)	79.2	10.51	79.2	19.84	2,314.0
2037	7.50%	2038/2039	0.00%	13.76	2,558.9	1,653.8	9,458.8	441.0	2,094.8	17.43	(245.7)	(5,500.5)	80.7	9.65	80.7	19.48	2,340.5
2038	7.50%	2039/2040	0.00%	13.35	2,360.1	1,653.8	10,024.2	467.9	2,121.7	17.13	(246.2)	(5,746.7)	82.4	8.72	82.4	19.12	2,367.9
2039	7.50%	2040/2041	0.00%	12.96	2,165.2	1,653.8	10,596.8	494.9	2,148.7	16.84	226.9	(5,519.8)	84.2	7.72	84.2	15.06	1,921.8
2040	7.50%	2041/2042	0.00%	12.58	1,978.3	1,653.8	11,172.9	521.6	2,175.4	16.54	579.7	(4,940.1)	86.3	6.64	86.3	12.13	1,595.7
2041	7.50%	2042/2043	0.00%	12.20	1,800.9	1,653.8	11,751.4	548.0	2,201.8	16.25	1,001.0	(3,939.0)	88.5	5.48	88.5	8.86	1,200.8
2042	7.50%	2043/2044	0.00%	11.84	1,629.4	1,653.8	12,336.3	574.6	2,228.4	15.96	1,271.3	(2,667.7)	91.0	4.24	91.0	6.85	957.1
2043	7.50%	2044/2045	0.00%	11.49	1,465.4	1,653.8	12,926.2	601.3	2,255.1	15.67	1,295.2	(1,372.5)	93.7	2.91	93.7	6.67	959.9
2044	7.50%	2045/2046	0.00%	11.15	1,309.7	1,653.8	13,520.9	628.2	2,282.0	15.39	1,329.9	(42.6)	96.8	1.47	96.8	6.42	952.1
2045	7.50%	2046/2047	0.00%	-	1,165.1	-	14,117.8	655.2	655.2	4.29	(289.4)	(332.0)	100.2	(0.07)	100.2	6.18	944.6
2046	7.50%	2047/2048	0.00%	-	1,035.0	-	14,714.0	682.2	682.2	4.33	(310.2)	(642.2)	100.1	(0.03)	100.1	6.30	992.4
2047	7.50%	2048/2049	0.00%	-	919.5	-	15,309.9	709.1	709.1	4.37	(336.4)	(978.6)	100.1	(0.04)	100.1	6.44	1,045.5
2048	7.50%	2049/2050	0.00%	-	817.5	-	15,906.9	736.1	736.1	4.40	(336.8)	(1,315.4)	100.1	(0.06)	100.1	6.42	1,072.9
2049	7.50%	2050/2051	0.00%	-	696.1	-	16,538.4	764.5	764.5	4.44	(344.1)	(1,659.6)	100.1	(0.06)	100.1	6.43	1,108.6
2050	7.50%	2051/2052	0.00%	-	561.9	-	17,198.2	794.1	794.1	4.47	(350.3)	(2,009.9)	100.2	(0.07)	100.2	6.44	1,144.4