Gabriel Roeder Smith & Company
Consultants & Actuaries

# STATE UNIVERSITIES RETIREMENT SYSTEM OF ILLINOIS

## ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2016

GRS
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November 4, 2016

Board of Trustees
State Universities Retirement System of Illinois
1901 Fox Drive
Champaign, Illinois 61820

Dear Members of the Board:

At your request, we present the report of the actuarial valuation of the State Universities Retirement System of Illinois ("SURS") as of June 30, 2016. GRS has prepared this report exclusively for the Trustees of the State Universities Retirement System; GRS is not responsible for reliance upon this report by any other party. This report may be provided to parties other than SURS only in its entirety and only with the permission of the Trustees.

This actuarial valuation provides information on the funding status and the contribution requirements of SURS. This actuarial valuation includes a determination of the State contribution level (the "Statutory Contribution") for the fiscal year ending June 30, 2018, under Section 15-155 of the SURS Article of the Illinois Pension Code and provides estimates of Statutory contributions for subsequent years. Information required by Governmental Accounting Standards Board ("GASB") Statement Nos. 67 and 68 is provided in a separate report. This report should not be relied on for any purpose other than the purpose described.

This actuarial valuation is based on the provisions of SURS in effect as of June 30, 2016, data on the SURS membership and information on the asset value of the trust fund as of that date. Due to the court ruling recent pension reform unconstitutional, this valuation does not reflect the provisions of Public Act 98-0599. The valuation was based upon the information furnished by SURS staff, concerning SURS benefits, financial transactions, plan provisions and active members, terminated members, retirees and beneficiaries. We checked for internal and year-to-year consistency, but did not audit the data. We are not responsible for the accuracy or completeness of the information provided by SURS.

The benefit provisions for members hired on or after January 1, 2011, were changed under Public Act 96-0889. Members hired on or after this date and the assumed new hires in the projections were valued under Public Act 96-0889 benefit provisions.

The actuarial cost method (Projected Unit Credit, as required by statute) and the asset smoothing method (as required by statute) and all other assumptions and method used in this valuation are unchanged from the prior June 30, 2015, actuarial valuation of SURS.

To the best of our knowledge, this actuarial statement is complete and accurate, fairly presents the actuarial position of SURS as of June 30, 2016, and has been prepared in accordance with generally accepted actuarial principles and practices, with the Actuarial Standards of Practice issued by the Actuarial Standards Board, and with applicable statutes.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period or additional cost or contribution requirements based on the plan's funded status); and changes in plan provisions, contribution amounts or applicable law. Due to the limited scope of the actuary's assignment, the actuary did not perform an analysis of the potential range of such future measurements in this report.

Actuarial valuations do not affect the ultimate cost of the Plan, only the timing of contributions into the Plan. Plan funding occurs over time. Contribution shortfalls (the difference between the actual contributions and the annual required contributions) remain the responsibility of the Plan sponsor and can be made in later years. If the contribution levels over a period of years are lower or higher than necessary, it is normal and expected practice for adjustments to be made to future contribution levels to take account of this variance, with a view to funding the plan over time.

Although the statutory contribution requirements were met, the statutory funding method generates a contribution requirement that is less than a reasonable actuarially determined contribution. Meeting the statutory requirement does not mean that the undersigned agree that adequate actuarial funding has been achieved; we recommend the development and adherence to a funding policy that funds the normal cost of the plan as well as an amortization payment that would seek to pay off the total unfunded accrued liability over a closed period of no less than 15 years (to limit contribution volatility) and no more than the period of time in order to attain 100% funding by 2045 (28 years remaining in the actuarial valuation as of June 30, 2016).

The signing actuaries are independent of the plan sponsor.

Amy Williams, Lance J. Weiss and David Kausch are Members of the American Academy of Actuaries ("MAAA") and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion herein.

Respectfully submitted,

Amy Williams — Lance J. Weiss — David T Kausch

| | | |
|---|---|---|
| Amy Williams, ASA, MAAA | Lance J. Weiss, EA, MAAA | David Kausch, FSA, EA, MAAA |
| Consultant | Senior Consultant | Senior Consultant |

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# SUMMARY OF THE VALUATION

# PURPOSES OF THE ACTUARIAL VALUATION

At your request we have performed an actuarial valuation of the State Universities Retirement System of Illinois ("SURS") as of June 30, 2016.

The purposes of this actuarial valuation are as follows:

- To determine the funding status of SURS as of the valuation date based on the market value of assets and the actuarial value of assets; and
- To develop the level of contributions required under Section 15-155 of the SURS Article of the Illinois Pension Code for the fiscal year ending June 30, 2018, and to estimate contributions required under that Section for subsequent years of the funding period ending in the year 2045.

Accounting information required under Governmental Accounting Standards Board ("GASB") Statement Nos. 67 and 68 is presented in a separate report.

# REPORT HIGHLIGHTS

The Statutory contribution for FY 2018 is $1.800 billion, and includes the State's projected normal cost of $424.9 million and the Self Managed Plan ("SMP") contribution of $73.0 million. The 2015 actuarial valuation had projected the Statutory contribution would increase, from $1.719 billion for FY 2017 to $1.754 billion for FY 2018. The key reasons for the increase in the Statutory contribution over the projected amount from the prior actuarial valuation are 1) adverse demographic experience and 2) actual fiscal year 2016 investment rate of return lower than the assumed rate of 7.25%.

In the past 10 years, SURS experienced investment gains on a market value basis (compared to the actuarial assumption) in fiscal years 2007, 2010, 2011, 2013 and 2014. However, SURS incurred investment losses (or shortfalls in return compared to the actuarial assumption) in fiscal years 2008, 2009, 2012, 2015 and 2016. The market return for the year ending June 30, 2016, was approximately 0.22% compared to a return of 2.90% in FY 2015. The average market value investment return over the most recent 10 years has been approximately 5.9%.

The funded ratio decreased from 44.2% as of June 30, 2015, to 41.6% as of June 30, 2016, based on the market value of assets, and remained at 43.3% as of June 30, 2016, based on the actuarial value of assets. The net deferred asset losses will be recognized in the actuarial value of assets over the next four years.

The funded ratio and unfunded actuarial accrued liability are appropriate for assessing the need for and amount of future contributions other than normal cost contributions. They are not appropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations.

# ACTUARIAL ASSUMPTIONS

The Board voted to decrease the investment return assumption from 7.75% to 7.25% as of June 30, 2014, and to decrease the Effective Rate of Interest (“ERI”) assumption from 7.75% to 7.00% as of June 30, 2013. The asset valuation method was changed from market value of assets to actuarial value of assets effective with the actuarial valuation as of June 30, 2009, as required by statute.

All other actuarial assumptions were first adopted by the Board for use with the actuarial valuation as of June 30, 2015, and were based on the recommendations from the experience review performed for the period from June 30, 2010, through June 30, 2014.

The assumptions can be found in Appendix G of the report.

In addition, we have assumed that the Statutory contribution will be calculated as a level percentage of pensionable payroll. Pensionable payroll for members hired on or after January 1, 2011, is limited by the pay cap. The basis for this assumption comes from 40 ILCS 5/1-160 (b-5).

# SURS BENEFITS

The benefit provisions valued in this June 30, 2016 actuarial valuation are identical to those valued in the prior valuation as of June 30, 2015. Due to the court ruling recent pension reform unconstitutional, this valuation does not reflect the provisions of Public Act 98-0599.

# EXPERIENCE DURING 2016

The System assets earned approximately 0.22% on a market value basis during FY 2016 which was less than the investment return assumption of 7.25% for FY 2016. However, the System assets earned 6.35% on an actuarial value of assets basis during FY 2016, due to recognition of net deferred investment gains under the asset smoothing method. Because 6.35% is less than the assumed rate of investment return of 7.25% for FY 2016, there was an asset loss of $151.8 million on the actuarial value of assets.

There was also a net loss of $190.2 million from actuarial liabilities, which is comprised of a loss of about $325.2 million from demographic experience, which was partially offset by a gain of $135.0 million from lower than expected pay increases.

The total gain or loss from liabilities for the system is calculated as follows (dollars in millions):

| | | |
|---|---|---|
| 1. | Actuarial Accrued Liability ("AAL") - Prior Year | $ 39,520.7 |
| 2. | Total Normal Cost - Prior Year [1] | 739.6 |
| 3. | Benefits and Administrative Expenses Paid in FY 2016 | (2,335.6) |
| 4. | Interest on the above items 1, 2 and 3 | 2,808.4 |
| 5. | Expected AAL 6/30/2016 (1+2+3+4) | 40,733.1 |
| 6. | Impact of Change in Actuarial Assumptions and Methods | 0.0 |
| 7. | Expected AAL 6/30/2016 After Assumption Changes (5+6) | 40,733.1 |
| 8. | Actual AAL 6/30/2016 | 40,923.3 |
| 9. | Actuarial (Gain)/Loss on Liabilities (8-7) | $ 190.2 |

[1] *Total Normal Cost from the previous valuation which includes both employee and employer portion.*

The SURS defined benefit programs experienced an overall actuarial loss of $342.0 million. The total net actuarial loss is the total of the loss from assets and the net loss from liabilities. The total actuarial loss for the year is as follows (dollars in millions):

| | | | |
|---|---|---|---|
| 1. | Actuarial (Gain)/Loss on Assets | $ | 151.8 |
| 2. | Actuarial (Gain)/Loss on Liabilities | | 190.2 |
| 3. | Total Actuarial (Gain)/Loss (1+2) | $ | 342.0 |

The “behavior” of the population determines the liability gain or loss for the year. There was a gain on salaries, due to lower salary increases than assumed. From last year to this year, there were losses on retirement, disability and termination. Active mortality experience was about as expected and there was a retiree mortality loss, and, as always, there was a new entrant loss. The new entrant loss occurs each year, but is offset by additional contributions to the assets. The other assumptions were so close that they generated very little actuarial gain or loss.

See Table 10 (page 22), Appendix C, for detail of the gains and losses by source.

# STATUTORY APPROPRIATIONS FOR THE 2018 FISCAL YEAR AND BEYOND

Section 15-155, which governs the development of Employer/State contributions to SURS, provides that:

1. Employer/State contributions are determined under the following process:

   a) The overall objective of the statute is to achieve a funding ratio of 90% by the end of fiscal year ("FY") 2045.

   b) The Employer/State contribution for FY 2012 and each year thereafter to and including FY 2045 is to be based on a (theoretically) constant percentage of the payroll[1] of active members of SURS based on the actuarial value of assets at the valuation date and assuming the actuarial value of assets earns the assumed investment return in the future.

   c) After 2045, the Employer/State contribution rate is to be sufficient to maintain the funding level at 90%.

   [1] *We have assumed the contribution would be based on pensionable payroll. Pensionable payroll for the members hired on or after January 1, 201l, is limited by the pay cap.*

2. During the period of amortization of the 2003 bond issue, the Employer/State contribution in any fiscal year may not exceed the excess of:

   a) the contribution, as developed in 1. above, assuming that the special contribution (from the bond proceeds) has not been made, over

   b) the debt service on the bond issue for the fiscal year.

3. Pursuant to Public Act 97-0694, Section 15-165, the dollar amount of the proposed Employer/State contribution required for a fiscal year shall be certified to the Governor no later than November 1 for the fiscal year commencing on the following July 1. The required amounts are budgeted pursuant to the continuing appropriations process. The State Actuary is required to review the actuarial assumptions and actuarial valuation and issue a preliminary report. After the Board considers the State Actuary's report, the certification is finalized no later than January 15.

Based on the actuarial value of assets, Employer/State contributions for FY 2018 and estimates of the required contributions for the subsequent five fiscal years follow. The estimates for fiscal years 2019-2023 are calculated based on the expected actuarial value of assets at each of the future corresponding actuarial valuations, including the recognition of deferred gains and losses in future years as shown in Table 7 (page 19). In addition, the following table shows the certified Employer/State contributions for FY 2017 for comparison purposes, as calculated in the actuarial valuation as of June 30, 2015.

| Fiscal Year[1] | Estimated Statutory Contribution (in Millions) 30% of New Members to SMP SURS | SMP[2] | Total |
|---|---|---|---|
| 2017 | $ 1,649.249 | $ 69.677 | $ 1,718.926 |
| 2018 | 1,727.163 | 73.022 | 1,800.185 |
| 2019 | 1,765.754 | 76.726 | 1,842.480 |
| 2020 | 1,818.658 | 81.226 | 1,899.884 |
| 2021 | 1,898.155 | 85.560 | 1,983.715 |
| 2022 | 1,963.693 | 90.107 | 2,053.800 |
| 2023 | 2,010.413 | 94.675 | 2,105.088 |
| Seven year total | $ 12,833.085 | $ 570.993 | $ 13,404.078 |

[1]*Total FY 2017 Contribution based on June 30, 2015, actuarial valuation. FY 2018 Contribution and projected FY 2019-2023 contributions based on June 30, 2016, actuarial valuation. The Statutory contribution does not include debt service.*

[2]*Projected Self Managed Plan ("SMP") contribution is based on projection of current SMP members and assumption that 30% of new members elect SMP, which is the defined contribution plan option.*

The Statutory contribution for FY 2018 is $1,800,185,000. This is equal to a gross Statutory contribution of $1,805,469,000 less $5,284,000 in SMP forfeitures. The projected SMP contributions for FY 2019-2023 are net of assumed projected SMP forfeitures.

The Statutory contribution increased from $1.719 billion for fiscal year 2017 to $1.800 billion for fiscal year 2018.

Estimates of Statutory contributions through 2045, assuming that 30% of future new members elect SMP and all other actuarial assumptions are realized, are set out in Table 14 (page 29).

The Statutory contributions set out in this report represent the contribution amount determined consistent with the state Statute. The net State appropriation certified to the Governor is the total shown in this report, adjusted by contributions from federal and trust funds.

## ASSET INFORMATION

Prior to the actuarial valuation as of June 30, 2009, it was agreed that market value, without adjustment, would be used for all actuarial purposes. Legislation in 2009 determined that first effective for the actuarial valuation as of June 30, 2009, contribution projections would be calculated based on the actuarial value of assets. Funding status determinations and the contribution requirements were calculated based on the actuarial value of assets.

The market value of the assets of the System that is available for benefits decreased from $17,463.0 million as of June 30, 2015, to $17,005.6 million as of June 30, 2016. The actuarial value of assets as of June 30, 2016 is $17,701.6 million, which is $696.0 million higher than the market value of assets. This difference is due to the continuing recognition of deferred investment gains and losses. Twenty percent of these gains and losses are recognized each year. The $696.0 million, which is the value of net deferred losses, will be smoothed into the actuarial value of assets over the next four years. The remaining unrecognized net asset gains from FY 2013 and FY 2014 will be smoothed in over the next one and two years, respectively, and the remaining asset loss from FY 2015 and FY 2016 will be smoothed in over the next three and four years, respectively.

The detailed determinations of asset values utilized in this valuation and asset growth in the last year are set out in Appendix A and Table 7 (page 19) of Appendix C.

## FUNDING STATUS

The funding status of SURS is measured by the Funding Ratio. The Funding Ratio is the ratio of the assets available for benefits compared to the actuarial accrued liability of the System. Thus, it reflects the portion of benefits earned to date by SURS members, which are covered by current System assets.

A funding ratio of 100% means that all of the benefits earned to date by SURS members are covered by assets. By monitoring changes in the funding ratio each year we can determine whether or not funding progress is being made.

As shown below, the SURS funding ratio decreased from 44.2% as of June 30, 2015, to 41.6% as of June 30, 2016, based on the market value of assets, and remained at 43.3% at June 30, 2016, based on the actuarial value of assets. There are net deferred losses that will be smoothed into the actuarial value of assets over the next four years. As a result of the net deferred losses and the funding policy, the funded ratio is projected to remain relatively flat over the next four years if all assumptions are realized and all employer contributions are made on a timely basis.

| Fiscal | Funded Ratio | |
|---|---|---|
| Year | AVA | MVA |
| 2012 | 42.1 % | 41.3 % |
| 2013 | 41.5 | 43.7 |
| 2014 | 42.3 | 46.5 |
| 2015 | 43.3 | 44.2 |
| 2016 | 43.3 | 41.6 |

The following table shows a comparison for fiscal years 2008 through 2016 of the percentage of benefits that are covered by the actuarial value of assets. The employer financed liabilities for current active and inactive members are 0% funded by the assets. Only a portion of the retiree liabilities are funded by current assets and the percentage covered increased from 41.9% as of June 30, 2015, to 42.3% as of June 30, 2016.

**Percentage of Benefits Covered by Net Assets**
**(in Millions)**

| Fiscal Year | Member Acc Contrib. (1) | Members Receiving Benefits (2) | Act/Inact Employer Portion (3) | Net Actuarial Value of Assets | % of Benefits Covered by Assets (1) | (2) | (3) |
|---|---|---|---|---|---|---|---|
| 2008 | $ 5,426.8 | $ 13,978.1 | $ 5,512.8 | $ 14,586.3 | 100.0% | 65.5% | 0.0% |
| 2009 | 5,688.9 | 14,802.6 | 5,824.7 | 14,282.0 | 100.0% | 58.1% | 0.0% |
| 2010 | 5,916.3 | 16,834.4 | 7,369.7 | 13,966.6 | 100.0% | 47.8% | 0.0% |
| 2011 | 6,007.4 | 18,918.1 | 6,588.8 | 13,945.7 | 100.0% | 42.0% | 0.0% |
| 2012 | 5,962.4 | 20,651.4 | 6,556.4 | 13,949.9 | 100.0% | 38.7% | 0.0% |
| 2013 | 5,830.1 | 22,099.9 | 6,443.1 | 14,262.6 | 100.0% | 38.2% | 0.0% |
| 2014 | 6,094.9 | 24,388.6 | 6,946.0 | 15,844.7 | 100.0% | 40.0% | 0.0% |
| 2015 | 6,196.6 | 26,042.4 | 7,281.7 | 17,104.6 | 100.0% | 41.9% | 0.0% |
| 2016 | 6,145.8 | 27,342.2 | 7,435.3 | 17,701.6 | 100.0% | 42.3% | 0.0% |

# Actuarial Funding and Statutory Funding

Measuring the Statutory Contribution against a funding policy under which the sum of the normal cost and amortization of the unfunded accrued liability is contributed helps evaluate the funding adequacy of the current Statutory funding method. The reason for the accrual pattern of normal cost plus amortization of the unfunded liability is to have benefits accrued within the same generation that has earned them as well as to ensure that all benefit obligations will be met. Table 14 illustrates an "alternative policy contribution" which is the sum of the employer normal cost and a 30-year closed from June 30, 2015 (28 years remaining as of June 30, 2017) period level percentage of capped payroll amortization payment. The alternative funding policy would require higher contributions in the near term compared to the Statutory funding policy. However, as shown in Graph 1 (page 25) and Graph 4 (page 30), the funded ratio would increase more quickly and require lower contributions than under the Statutory policy after approximately 15 years.

The actual SURS contribution (excluding SMP) for FY 2016 was $1.582 billion, which compares to the projected statutory SURS contribution of $1.590 billion determined in the valuation as of June 30, 2014, and the FY 2016 contribution calculated in a manner consistent with the GASB 25 ARC of $1.666 billion. Graph 5 (page 31) compares the Statutory contribution and contributions based on normal cost plus amortization of the unfunded liability. The Statutory contributions are projected to continue to rise in order to meet the ultimate funding objective of a 90% funded ratio in 2045.

Based on projections assuming that the Statutory contributions are made every year (as shown in Table 12, page 24) and an investment return of 7.25% each year, the funded ratio is projected to begin to increase from about 43% funded to 90% funded at 2045. The funded ratio is not projected to exceed 50% until 2030, 70% until 2041, and is projected to increase to 90% during the four year period from 2041 until 2045. If the Statutory contributions are not made or investment return is less than the assumption of 7.25%, the funded ratio will be lower and the cash flow strain will be higher. If another significant market downtown occurred while the System's funded ratio is low, the System could be required to liquidate a large amount of assets in order to pay benefits which could have a further adverse effect on the funded status of the System.

The projected actuarial accrued liability of current retirees, current active and inactive members and future members is expected to increase from $40.923 billion as of the end of FY 2016 to $53.788 billion as of the end of FY 2045 (as shown in Graph 2, page 26, and Table 21, page 38). Total benefit payments are projected to increase from $2.321 billion in fiscal year 2016 to $4.537 billion in fiscal year 2045. Graph 3 (page 27, and Table 21, page 38) shows projected benefit payments separately for retirees as of June 30, 2016, active and inactive members as of June 30, 2016, and future members.

# Additional Projection Details

At the request of the State Actuary, we have included exhibits with additional projection details that can be found in Appendix E. The additional projections illustrate the impact on contributions and funded status if deferred asset gains and losses are not recognized.

# RECOMMENDATIONS

The calculations in this report were prepared based on the methods required by the Statutory funding policy including the asset smoothing method that was adopted for the first time in the June 30, 2009, actuarial valuation. GRS does not endorse this funding policy because the Statutory funding policy defers funding for these benefits into the future and places a higher burden on future generations of taxpayers.

We recommend the following changes:

1. Implementing a funding policy that contributes normal cost plus closed period amortization as a level percentage of capped payroll amortization of the unfunded liability. (Policy which recognizes unfunded liability at the valuation date and not projected liability in the year 2045)
2. Eliminating the maximum contribution cap if the current Statutory funding policy is retained
3. Implementing an asset corridor to constrain the actuarial value of assets within a certain percentage of the market value of assets (for example, 20 percent)
4. Changing the actuarial cost method for calculating liabilities from the Projected Unit Credit to the Entry Age Normal method

<u>Change Funding Policy to a More Standard Actuarial Method</u>

We recommend a funding policy that contributes normal cost plus closed period amortization as a level percentage of capped payroll for paying off the current unfunded accrued liability (i.e., the amortization period declines by one year with each actuarial valuation) such that the funded ratio is projected to be 100 percent funded by 2045 or earlier. A 30-year closed amortization period (at the actuarial valuation as of June 30, 2014) methodology pays off the unfunded accrued liability in full by the end of the 30-year period in 2045. The fiscal year 2018 contribution would be $2,067.909 ($1,994.887 million for the SURS contribution and $73.022 million for SMP) under this funding policy. The current Statutory contribution does not comply with this recommendation. Underfunding the System creates the risk that ultimately benefit obligations cannot be met from the trust, and will require a greater amount of funding from other State resources. In addition, continually underfunding the System also creates more of a funding need from contributions and less is available from investment return – thereby creating a more expensive plan. Projected contributions under the current Statutory policy and the recommended policy are shown in Graph 4 on page 30 and projected funded ratios are shown in Graph 1 on page 25.

<u>Eliminate Maximum Contribution Cap</u>

If the current statutory funding policy is not changed, we recommend that the provision that establishes a maximum contribution cap be eliminated. The contribution cap is based on the projected hypothetical contributions if the proceeds from the 2003 bond issue had not been received. The cap is projected to lower contributions during fiscal years 2022 through 2033 compared to if no maximum contribution methodology was in place.

<u>Implement an Asset Corridor</u>

In addition, we recommend that an asset corridor on the actuarial value of assets be implemented, in the event that there is another significant market downturn similar to fiscal year 2009. The table on the following page compares the ratio of the actuarial value of assets to the market value of assets since fiscal year 2009. Using an actuarial value of assets that is significantly higher than the market value of assets delays funding to the system by further deferring contributions into the future. The plan is already in serious funding jeopardy, and we cannot recommend an asset valuation method that does not include a corridor because it could add additional risk to the funding of the benefit obligations if another downturn occurred.

($ in Millions)

| Year | Actuarial Value of Assets | Market Value of Assets | Ratio of Actuarial Value to Market Value |
|---|---|---|---|
| 2009 | $ 14,281.998 | $ 11,032.973 | 129 % |
| 2010 | 13,966.643 | 12,121.542 | 115 |
| 2011 | 13,945.680 | 14,274.003 | 98 |
| 2012 | 13,949.905 | 13,705.143 | 102 |
| 2013 | 14,262.621 | 15,037.102 | 95 |
| 2014 | 15,844.714 | 17,391.323 | 91 |
| 2015 | 17,104.607 | 17,462.968 | 98 |
| 2016 | 17,701.646 | 17,005.630 | 104 |

Change the Actuarial Cost Method to the Entry Age Normal Method

The current actuarial cost method is the Projected Unit Credit method, which is required by statute. The Projected Unit Credit method recognizes costs such that the normal cost for an individual member increases as a percentage of payroll throughout his/her career. The Entry Age Normal cost method is the most commonly used method in the public sector. It is also the method required to be used for financial reporting under GASB 67 and 68. The Entry Age Normal method recognizes costs as a level percentage of payroll over a member's career. We recommend a change to the Entry Age Normal method.

**We recognize that the State Statute governs the funding policy of the System. The purpose of these comments is to highlight the difference between the Statutory appropriation and the recommended actuarially sound funding policy and to highlight the risks and additional costs of continuing to underfund the System.**

# GASB DISCLOSURE

Prior to fiscal year ending June 30, 2014, the accounting policies of the State of Illinois relative to its retirement systems were based on the terms of GASB Statement Nos. 25 and 27.

GASB Statement No. 67 and 68 are new accounting standards which replaced Statement Nos. 25 and 27. GASB Statement No. 67 was first effective for fiscal year 2014 and GASB Statement No. 68 was first effective for fiscal year 2015. A separate GASB 67 and 68 report has been provided.

The significant provisions of GASB Statement No. 67 and 68 include:

1. Recognizing the entire Net Pension Liability (similar to the unfunded liability) on the balance sheet (compared with the Net Pension Obligation which was previously recognized).
2. Use of a blended discount rate to calculate liabilities for accounting purposes.
3. Use of market value of assets to calculate the Net Pension Liability.
4. Elimination of the Annual Required Contribution (ARC) and replacing it with a pension expense that requires a much shorter amortization period than 30 years.

# FUTURE CONSIDERATIONS

Changes (such as five-year asset smoothing and the addition of the new benefit tier) have had the effect of reducing the Statutory contribution amounts that would have otherwise been made. However, the change in the investment return assumption and other changes to align the actuarial assumptions with current market expectations have increased the contribution amounts that would otherwise have been made. Assuming the statutory contributions are received (and the actuarial assumptions are met (including a 7.25% investment rate of return, each year through 2045) SURS is currently projected to have contributions sufficient to increase the funded ratio from the current level of 43.3% to 90.0% by 2045.

**This is a severely underfunded plan and the ability of the plan to reach 90% funding by 2045 is heavily dependent on the plan sponsor contributing the statutory contributions each and every year until 2045. We are not able to assess the plan sponsor's ability to make contributions when due.**

# APPENDICES

# APPENDIX A

## ASSET INFORMATION

# TABLE 1
## STATEMENT OF PLAN NET POSITION
## AS OF JUNE 30, 2016 AND JUNE 30, 2015

| | Defined Benefit Plan | Self Managed Plan | Reporting Entity Totals 2016 | Reporting Entity Totals 2015 |
|---|---|---|---|---|
| Assets | | | | |
| Cash and short-term investments | $ 731,633,307 | - | $ 731,633,307 | $ 749,161,649 |
| Receivables | | | | |
| Members | 8,634,589 | $ 3,267,042 | 11,901,631 | 14,124,665 |
| Non-employer contributing entity | 229,869,588 | 1,910,439 | 231,780,027 | 183,687,997 |
| Federal, trust funds, and other | 1,655,088 | (184,537) | 1,470,551 | 1,815,690 |
| Pending investment sales | 433,893,516 | - | 433,893,516 | 422,748,331 |
| Interest and dividends | 42,366,778 | - | 42,366,778 | 42,333,100 |
| Total receivables | 716,419,559 | 4,992,944 | 721,412,503 | 664,709,783 |
| Prepaid expenses | 133,157 | - | 133,157 | 158,059 |
| Investments, at fair value | | | | |
| Equity investments | 8,953,569,340 | 65,509,892 | 9,019,079,232 | 11,307,523,098 |
| Fixed income investments | 4,660,679,286 | 29,270,615 | 4,689,949,901 | 4,590,860,760 |
| Real estate investments | 987,031,542 | 1,817,422 | 988,848,964 | 874,605,561 |
| Alternative investments | 1,833,655,377 | 260,950 | 1,833,916,327 | |
| Mutual fund and variable annuities | | 1,723,653,945 | 1,723,653,945 | 1,654,146,781 |
| Total investments | 16,434,935,545 | 1,820,512,824 | 18,255,448,369 | 18,427,136,200 |
| Securities lending collateral | 602,404,484 | - | 602,404,484 | 752,561,440 |
| Capital assets, at cost, net of accum deprec $ 19,100,014 and $ 18,627,220 respectively | 6,249,153 | - | 6,249,153 | 6,169,023 |
| Total assets | 18,491,775,205 | 1,825,505,768 | 20,317,280,973 | 20,599,896,154 |
| Liabilities | | | | |
| Benefits payable | 9,645,900 | - | 9,645,900 | 8,689,007 |
| Refunds payable | 6,459,653 | - | 6,459,653 | 4,639,366 |
| Securities lending collateral | 602,089,896 | - | 602,089,896 | 752,410,673 |
| Payable to brokers for unsettled trades | 853,366,668 | - | 853,366,668 | 600,790,779 |
| Administrative expenses payable | 14,583,115 | - | 14,583,115 | 16,844,459 |
| Total liabilities | 1,486,145,232 | - | 1,486,145,232 | 1,383,374,284 |
| Plan Net Position | $ 17,005,629,973 | $ 1,825,505,768 | $ 18,831,135,741 | $ 19,216,521,870 |

# TABLE 2
## STATEMENT OF CHANGES IN PLAN NET POSITION
## FOR YEARS ENDED JUNE 30, 2016 AND JUNE 30, 2015

| | Defined Benefit Plan | Self Managed Plan | Reporting Entity Totals 2016 | Reporting Entity Totals 2015 |
|---|---|---|---|---|
| Additions | | | | |
| Contributions | | | | |
| Employer | $ 39,348,478 | $ 6,836,109 | $ 46,184,587 | $ 46,658,889 |
| Non-employer contributing entity | 1,542,946,474 | 58,533,526 | 1,601,480,000 | 1,544,200,000 |
| Member | 278,883,776 | 76,457,324 | 355,341,100 | 340,010,444 |
| Total Contributions | 1,861,178,728 | 141,826,959 | 2,003,005,687 | 1,930,869,333 |
| Investment Income | | | | |
| Net appreciation | | | | |
| in fair value of investments | (259,899,961) | 3,191,609 | (256,708,352) | 315,741,290 |
| Interest | 113,996,822 | - | 113,996,822 | 111,077,945 |
| Dividends | 220,725,192 | - | 220,725,192 | 218,278,974 |
| Securities lending | 4,215,195 | - | 4,215,195 | 4,690,554 |
| Gross Investment Income | 79,037,248 | 3,191,609 | 82,228,857 | 649,788,763 |
| Less investment expense | | | | |
| Asset management expense | 61,614,201 | - | 61,614,201 | 55,705,026 |
| Securities lending expense | 379,368 | - | 379,368 | 422,320 |
| Net investment income | 17,043,679 | 3,191,609 | 20,235,288 | 593,661,417 |
| Total additions | 1,878,222,407 | 145,018,568 | 2,023,240,975 | 2,524,530,750 |
| Deductions | | | | |
| Benefits | 2,235,812,995 | 45,956,700 | 2,281,769,695 | 2,160,843,600 |
| Refunds of contributions | 85,015,923 | 26,630,943 | 111,646,866 | 108,644,121 |
| Administrative expense | 14,731,372 | 479,171 | 15,210,543 | 14,535,656 |
| Total deductions | 2,335,560,290 | 73,066,814 | 2,408,627,104 | 2,284,023,377 |
| Net increase | (457,337,883) | 71,951,754 | (385,386,129) | 240,507,373 |
| Plan Net Position | | | | |
| Beginning of year | 17,462,967,856 | 1,753,554,014 | 19,216,521,870 | 18,976,014,497 |
| End of Year | $ 17,005,629,973 | $ 1,825,505,768 | $ 18,831,135,741 | 19,216,521,870 |

# APPENDIX B

## MEMBERSHIP DATA

# TABLE 3A
## SUMMARY OF DATA CHARACTERISTICS
### ($ IN MILLIONS)

| | June 30, 2015 | | June 30, 2016 | |
|---|---|---|---|---|
| | Number | Earnings | Number | Earnings |
| **Active Members** | | | | |
| Full time | | | | |
| Traditional SURS | 45,866 | $2,284.5 | 43,721 | $2,213.5 |
| Portable SURS | 18,595 | 1,154.8 | 17,993 | 1,138.8 |
| SMP | 11,320 | 798.5 | 11,348 | 827.3 |
| Total Full Time [1] | 75,781 | $4,237.9 | 73,062 | $4,179.6 |
| Part time | | | | |
| Traditional SURS | 4,214 | $ 30.6 | 3,874 | $ 28.3 |
| Portable SURS | 706 | 6.3 | 657 | 5.5 |
| SMP | 608 | 5.8 | 532 | 5.0 |
| Total Part Time | 5,528 | $ 42.6 | 5,063 | $ 38.8 |
| Total | 81,309 | $4,280.5 | 78,125 | $4,218.4 |
| **Inactive Members** | | | | |
| Traditional SURS | 66,208 | | 67,946 | |
| Portable SURS | 10,776 | | 11,549 | |
| SMP | 8,476 | | 9,041 | |
| Total | 85,460 | | 88,536 | |

[1] *Includes 688 police officers and firefighters (including SMP) as of June 30, 2015 and 685 as of June 30, 2016.*

| | Number | Annual Benefits | Number | Annual Benefits |
|---|---|---|---|---|
| **Benefit Recipients** | | | | |
| Retirement | | | | |
| Traditional SURS | 46,964 | $ 1,820.7 | 48,318 | $ 1,905.5 |
| Portable SURS | 4,667 | 144.9 | 5,278 | 169.3 |
| Total Retirement | 51,631 | $ 1,965.6 | 53,596 | $ 2,074.8 |
| Survivor | | | | |
| Traditional SURS | 8,194 | $ 139.6 | 8,308 | $ 147.7 |
| Portable SURS | 148 | 2.5 | 173 | 2.8 |
| Total Survivor | 8,342 | $ 142.1 | 8,481 | $ 150.5 |
| Disability | | | | |
| Traditional SURS | 870 | $ 17.0 | 880 | $ 17.7 |
| Portable SURS | 177 | 4.2 | 189 | 4.6 |
| Total Disability | 1,047 | $ 21.2 | 1,069 | $ 22.2 |
| Total | 61,020 | $ 2,128.8 | 63,146 | $ 2,247.6 |
| **Total Participants** | | | | |
| Total Traditional SURS | 172,316 | | 173,047 | |
| Total Portable SURS | 35,069 | | 35,839 | |
| Total SMP | 20,404 | | 20,921 | |
| Total | 227,789 | | 229,807 | |

*Values may not add due to rounding.*

# TABLE 3B
## SUMMARY OF DATA CHARACTERISTICS
### ($ IN MILLIONS)

| | June 30, 2015 | | June 30, 2016 | |
|---|---|---|---|---|
| | Number | Earnings | Number | Earnings |
| **Active Members** | | | | |
| Full time | | | | |
| Continuing Actives - Tier 1 | | | | |
| Traditional SURS | 34,753 | $1,914.5 | 31,787 | $1,793.1 |
| Portable SURS | 13,474 | 920.6 | 12,336 | 866.9 |
| SMP | 6,961 | 511.9 | 6,481 | 492.6 |
| Total | 55,188 | $3,347.0 | 50,604 | $3,152.6 |
| Continuing Actives - Tier 2 | | | | |
| Traditional SURS | 7,474 | $293.1 | 8,927 | $354.0 |
| Portable SURS | 3,752 | 189.0 | 4,551 | 233.9 |
| SMP | 3,255 | 230.1 | 3,961 | 288.0 |
| Total | 14,481 | $712.3 | 17,439 | $875.9 |
| New Actives - Tier 1 | | | | |
| Traditional SURS | 508 | $11.1 | 378 | $8.6 |
| Portable SURS | 122 | 3.6 | 94 | 2.7 |
| SMP | 76 | 2.7 | 61 | 2.9 |
| Total | 706 | $17.4 | 533 | $14.1 |
| New Actives - Tier 2 | | | | |
| Traditional SURS | 3,131 | $65.8 | 2,629 | $57.8 |
| Portable SURS | 1,247 | 41.6 | 1,012 | 35.3 |
| SMP | 1,028 | 53.8 | 845 | 43.7 |
| Total | 5,406 | $161.2 | 4,486 | $136.9 |
| Total Actives - Tier 1 | | | | |
| Traditional SURS | 35,261 | $1,925.6 | 32,165 | $1,801.7 |
| Portable SURS | 13,596 | 924.2 | 12,430 | 869.6 |
| SMP | 7,037 | 514.6 | 6,542 | 495.5 |
| Total | 55,894 | $3,364.4 | 51,137 | $3,166.8 |
| Total Actives - Tier 2 | | | | |
| Traditional SURS | 10,605 | $358.9 | 11,556 | $411.8 |
| Portable SURS | 4,999 | 230.6 | 5,563 | 269.2 |
| SMP | 4,283 | 283.9 | 4,806 | 331.8 |
| Total | 19,887 | $873.5 | 21,925 | $1,012.8 |
| Total Actives - Tier 1 and Tier 2 | | | | |
| Traditional SURS | 45,866 | $2,284.5 | 43,721 | $2,213.5 |
| Portable SURS | 18,595 | 1,154.8 | 17,993 | 1,138.8 |
| SMP | 11,320 | 798.5 | 11,348 | 827.3 |
| Total | 75,781 | $4,237.9 | 73,062 | $4,179.6 |

*Values may not add due to rounding.*

## TABLE 3C
## SUMMARY OF DATA CHARACTERISTICS
### ($ IN MILLIONS)

| | June 30, 2015 | | June 30, 2016 | |
|---|---|---|---|---|
| | Number | Earnings | Number | Earnings |
| **Active Members** | | | | |
| Part time | | | | |
| Total Actives - Tier 1 | | | | |
| Traditional SURS | 1,514 | $10.4 | 1,309 | $9.0 |
| Portable SURS | 267 | 2.2 | 240 | 1.8 |
| SMP | 182 | 1.4 | 146 | 1.0 |
| Total | 1,963 | $14.0 | 1,695 | $11.8 |
| Total Actives - Tier 2 | | | | |
| Traditional SURS | 2,700 | $20.2 | 2,565 | $19.4 |
| Portable SURS | 439 | 4.1 | 417 | 3.7 |
| SMP | 426 | 4.4 | 386 | 4.0 |
| Total | 3,565 | $28.6 | 3,368 | $27.0 |
| Total Actives - Tier 1 and Tier 2 | | | | |
| Traditional SURS | 4,214 | $30.6 | 3,874 | $28.3 |
| Portable SURS | 706 | 6.3 | 657 | 5.5 |
| SMP | 608 | 5.8 | 532 | 5.0 |
| Total | 5,528 | $42.6 | 5,063 | $38.8 |
| **Inactive Members** | | | | |
| Total Inactives - Tier 1 | | | | |
| Traditional SURS | 60,164 | $33.0 | 59,746 | $37.8 |
| Portable SURS | 9,388 | 17.3 | 9,535 | 20.6 |
| SMP | 7,297 | 62.5 | 7,368 | 60.2 |
| Total | 76,849 | $112.8 | 76,649 | $118.6 |
| Total Inactives - Tier 2 | | | | |
| Traditional SURS | 6,044 | $16.7 | 8,200 | $22.4 |
| Portable SURS | 1,388 | 9.2 | 2,014 | 12.5 |
| SMP | 1,179 | 12.5 | 1,673 | 17.5 |
| Total | 8,611 | $38.4 | 11,887 | $52.4 |
| Total Inactives - Tier 1 and Tier 2 | | | | |
| Traditional SURS | 66,208 | $49.6 | 67,946 | $60.2 |
| Portable SURS | 10,776 | 26.5 | 11,549 | 33.0 |
| SMP | 8,476 | 75.0 | 9,041 | 77.7 |
| Total | 85,460 | $151.2 | 88,536 | $171.0 |

*Values may not add due to rounding.*

# TABLE 4

## DISTRIBUTION OF FULL-TIME ACTIVE MEMBERS BY AGE AND YEARS OF SERVICE

## AS OF JUNE 30, 2016

| Age | Years of Service | | | | | | | | Totals |
|---|---|---|---|---|---|---|---|---|---|
| | Under 1 | 1-4 | 5-9 | 10-14 | 15-19 | 20-24 | 25-29 | 30 & Over | |
| Under 20 | 15 | 8 | - | - | - | - | - | - | 23 |
| | $ 81,373 | $ 138,888 | $ - | $ - | $ - | $ - | $ - | $ - | $ 220,260 |
| 20-24 | 299 | 692 | 15 | - | - | - | - | - | 1,006 |
| | $ 2,650,677 | $ 17,883,880 | $ 322,241 | $ - | $ - | $ - | $ - | $ - | $ 20,856,799 |
| 25-29 | 530 | 3,526 | 566 | 13 | - | - | - | - | 4,635 |
| | $ 7,190,057 | $ 137,286,879 | $ 23,051,837 | $ 621,873 | $ - | $ - | $ - | $ - | $ 168,150,645 |
| 30-34 | 438 | 4,331 | 2,383 | 512 | 28 | - | - | - | 7,692 |
| | $ 6,720,246 | $ 210,915,592 | $ 117,287,268 | $ 26,194,037 | $ 1,276,426 | $ - | $ - | $ - | $ 362,393,568 |
| 35-39 | 327 | 3,363 | 2,794 | 1,685 | 513 | 16 | - | - | 8,698 |
| | $ 5,109,786 | $ 176,546,866 | $ 157,933,448 | $ 102,827,931 | $ 29,970,486 | $ 875,966 | $ - | $ - | $ 473,264,484 |
| 40-44 | 263 | 2,337 | 2,417 | 2,030 | 1,375 | 327 | 14 | - | 8,763 |
| | $ 4,640,652 | $ 120,902,771 | $ 147,996,511 | $ 140,250,195 | $ 94,378,624 | $ 21,620,364 | $ 706,610 | $ - | $ 530,495,727 |
| 45-49 | 231 | 2,030 | 2,224 | 2,131 | 1,892 | 948 | 383 | 16 | 9,855 |
| | $ 3,856,850 | $ 100,336,323 | $ 122,216,628 | $ 146,305,070 | $ 140,504,460 | $ 72,067,037 | $ 26,002,029 | $ 956,015 | $ 612,244,413 |
| 50-54 | 181 | 1,782 | 2,023 | 1,918 | 2,064 | 1,315 | 990 | 189 | 10,462 |
| | $ 3,476,000 | $ 84,367,378 | $ 101,997,649 | $ 119,871,216 | $ 149,192,173 | $ 102,719,645 | $ 77,015,013 | $ 14,170,644 | $ 652,809,718 |
| 55-59 | 159 | 1,482 | 1,770 | 1,816 | 1,928 | 1,288 | 1,025 | 405 | 9,873 |
| | $ 2,957,666 | $ 68,947,327 | $ 87,023,982 | $ 108,162,899 | $ 129,446,562 | $ 104,040,200 | $ 93,192,322 | $ 38,214,178 | $ 631,985,134 |
| 60-64 | 56 | 987 | 1,369 | 1,365 | 1,448 | 874 | 757 | 375 | 7,231 |
| | $ 1,375,462 | $ 44,019,021 | $ 64,373,344 | $ 75,998,621 | $ 91,490,631 | $ 64,365,875 | $ 70,631,618 | $ 44,145,331 | $ 456,399,903 |
| 65 & Over | 28 | 463 | 991 | 1,022 | 913 | 622 | 426 | 359 | 4,824 |
| | $ 541,742 | $ 14,791,281 | $ 34,783,941 | $ 48,083,187 | $ 56,175,854 | $ 38,386,878 | $ 32,032,552 | $ 45,942,543 | $ 270,737,978 |
| Total Count | 2,527 | 21,001 | 16,552 | 12,492 | 10,161 | 5,390 | 3,595 | 1,344 | 73,062 |
| Total Payroll | $ 38,600,509 | $ 976,136,206 | $ 856,986,848 | $ 768,315,028 | $ 692,435,216 | $ 404,075,965 | $ 299,580,143 | $ 143,428,711 | $ 4,179,558,628 |

# TABLE 5
# DISTRIBUTION OF BENEFIT RECIPIENTS BY AGE
# AS OF JUNE 30, 2016

| Age | Number | Annual Benefit |
|---|---|---|
| **Retirees and Survivors** | | |
| Under 50 | 453 | $ 3,732,265 |
| 50-54 | 512 | 19,450,408 |
| 55-59 | 4,076 | 141,148,544 |
| 60-64 | 9,523 | 332,321,292 |
| 65-69 | 14,161 | 496,682,714 |
| 70-74 | 11,736 | 460,283,889 |
| 75-79 | 8,675 | 340,637,200 |
| 80-84 | 6,124 | 228,238,883 |
| 85-89 | 4,198 | 134,731,454 |
| 90 & Over | 2,619 | 68,100,488 |
| Total | 62,077 | $ 2,225,327,137 |
| **Disabilitants** | | |
| Under 50 | 158 | $ 3,480,229 |
| 50-54 | 166 | 3,495,026 |
| 55-59 | 209 | 4,519,362 |
| 60-64 | 240 | 4,945,517 |
| 65-69 | 169 | 3,663,811 |
| 70-74 | 58 | 962,238 |
| 75-79 | 38 | 741,980 |
| 80-84 | 15 | 235,600 |
| 85-89 | 14 | 177,277 |
| 90 & Over | 2 | 21,218 |
| Total | 1,069 | $ 22,242,258 |

# APPENDIX C

## ACTUARIAL DETERMINATIONS

# TABLE 6
## SUMMARY OF ACTUARIAL VALUES
## AS OF JUNE 30, 2016
## ($ IN MILLIONS)

| | Actuarial Present Value of Projected Benefits (APV) | Projected Unit Credit Values: Actuarial Accrued Liability (AAL) | Projected Unit Credit Values: Gross Normal Cost (NC) [1] | Gross NC % of Pay [1] |
|---|---|---|---|---|
| **1. Active Members** | | | | |
| a. Retirement | $14,158.8 | $ 9,352.7 | $531.8 | 15.13% |
| b. Death | 228.2 | 148.4 | 9.5 | 0.27% |
| c. Disability | 437.8 | 269.2 | 26.1 | 0.74% |
| d. Termination | 1,981.6 | 1,250.4 | 135.7 | 3.86% |
| Total - Active Members | $16,806.5 | $ 11,020.7 | $703.1 | 20.00% |
| **2. Benefit Recipients** | | | | |
| a. Retirement | $25,684.7 | $25,684.7 | $ 0.0 | |
| b. Survivor | 1,387.1 | 1,387.1 | 0.0 | |
| c. Disability | 270.4 | 270.4 | 0.0 | |
| Total - Benefit Recipients | $27,342.2 | $27,342.2 | $ 0.0 | |
| **3. Other Inactive** | $ 2,560.4 | $ 2,560.4 | | |
| **4. Grand Total** | $46,709.1 | $40,923.3 | $703.1 | 20.00% |
| **5. Operating Expense** | | | $ 16.1 | 0.46% |
| **6. Total Normal Cost** [2] | | | $719.2 | 20.46% |
| **7. Expected Pay During Fiscal Year 2017 for Defined Benefit Plans**[1] | | | | $ 3,515.9 |
| **8. Present Value of Future Salaries (PVFS)** [1] | | | | $ 27,348.6 |

*[1] For members currently active as of June 30, 2016, in the Traditional and Portable defined benefit plans and includes the use of capped payroll for members hired on or after January 1, 2011.*
*[2] The normal cost as a percent of pay is 23.31% for Tier 1 members and 10.52% for Tier 2 members.*

*Values may not add due to rounding.*

# TABLE 7

# DEFINED BENEFIT PLAN DEVELOPMENT OF THE ACTUARIAL VALUE OF ASSETS

# FOR THE YEAR ENDING JUNE 30, 2016

| | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|---|---|---|---|---|---|---|
| Beginning of Year: | | | | | | |
| (1) Market Value of Assets | $ 17,391,323,132 | $ 17,462,967,856 | | | | |
| (2) Actuarial Value of Assets | 15,844,713,727 | 17,104,606,665 | | | | |
| End of Year: | | | | | | |
| (3) Market Value of Assets | 17,462,967,856 | 17,005,629,973 | | | | |
| (4) Net of Contributions and Disbursements | (431,555,233) | (474,381,562) | | | | |
| (5) Total Investment Income | | | | | | |
| =(3)-(1)-(4) | 503,199,957 | 17,043,679 | | | | |
| (6) Projected Rate of Return | 7.25% | 7.25% | | | | |
| (7) Projected Investment Income | | | | | | |
| =(1)x(6)+([1+(6)]^.5-1)x(4) | 1,245,500,760 | 1,249,169,710 | | | | |
| (8) Investment Income in | | | | | | |
| Excess of Projected Income | (742,300,803) | (1,232,126,031) | | | | |
| (9) Excess Investment Income Recognized | | | | | | |
| This Year (5 year recognition) | | | | | | |
| (9a) From This Year | (148,460,161) | (246,425,206) | | | | |
| (9b) From One Year Ago | 302,890,656 | (148,460,161) | $ (246,425,206) | | | |
| (9c) From Two Years Ago | 129,284,034 | 302,890,656 | (148,460,161) | $ (246,425,206) | | |
| (9d) From Three Years Ago | (215,038,203) | 129,284,034 | 302,890,656 | (148,460,161) | $ (246,425,206) | |
| (9e) From Four Years Ago | 377,271,085 | (215,038,203) | 129,284,035 | 302,890,655 | (148,460,159) | $ (246,425,207) |
| (9f) Total Recognized Investment Gain/(Loss) | 445,947,411 | (177,748,880) | 37,289,324 | (91,994,712) | (394,885,365) | (246,425,207) |
| (10) Change in Actuarial Value of Assets | | | | | | |
| =(4)+(7)+9[f] | 1,259,892,938 | 597,039,268 | | | | |
| End of Year: | | | | | | |
| **(3) Market Value of Assets** | **17,462,967,856** | **17,005,629,973** | | | | |
| **(11) Final Actuarial Value of Assets** | **17,104,606,665** | **17,701,645,933** | | | | |
| (12) Difference Between Market & Actuarial Values | 358,361,191 | (696,015,960) | | | | |
| (13) Actuarial Value Rate of Return | 10.82 % | 6.35 % | | | | |
| (14) Estimated Market Value Rate of Return | 2.93 % | 0.10 % | | | | |
| (15) Ratio of Actuarial Value to Market Value | 98 % | 104 % | | | | |
| (16) SURS Reported Market Value Rate of Return | 2.90 % | 0.22 % | | | | |

# TABLE 8
# ANALYSIS OF CHANGE IN
# ACTUARIAL ACCRUED LIABILITY AND ACTUARIAL VALUE OF ASSETS
# FOR THE YEAR ENDING JUNE 30, 2016
## ($ IN MILLIONS)

| | | |
|---|---|---|
| 1. Actuarial (Gain)/Loss on Actuarial Accrued Liability ("AAL") | | |
| (a) AAL 6/30/2015 | | $ 39,520.7 |
| (b) Normal Cost FY 2016 | $ 739.6 | |
| (c) Benefits and Admin Expenses Paid FY 2016 | (2,335.6) | |
| (d) Interest on (a), (b), and (c) at 7.25% | 2,808.4 | |
| (e) Expected AAL 6/30/2016 (a+b+c+d) | | 40,733.1 |
| (f) Actual AAL 6/30/2016 Before Assumption and Method Changes | | 40,923.3 |
| (g) Actuarial (Gain)/Loss on AAL (f-e) | | $ 190.2 |
| (h) Impact of Benefit Changes | | 0.0 |
| (i) Impact of Change in Actuarial Assumptions and Methods | | 0.0 |
| (j) Actual AAL After Changes (f+h+i) | | $ 40,923.3 |
| 2. Actuarial (Gain)/Loss on Assets | | |
| (a) Actuarial Value of Assets 6/30/2015 | | $ 17,104.6 |
| (b) Contributions FY 2016 | 1,861.2 | |
| (c) Benefits and Administrative Expenses | (2,335.6) | |
| (d) Interest on (a), (b), and (c) at 7.25% | 1,223.2 | |
| (e) Expected Assets 6/30/2016 (a+b+c+d) | | $ 17,853.4 |
| (f) Actual Actuarial Value of Assets 6/30/2016 | | 17,701.6 |
| (g) Actuarial (Gain)/Loss on Assets (e-f) | | $ 151.8 |
| 3. Total Actuarial (Gain)/Loss | | |
| (a) (Gain)/Loss on AAL | | $ 190.2 |
| (b) (Gain)/Loss on Assets | | 151.8 |
| (c) Net (Gain)/Loss (a+b) | | $ 342.0 |

*Values may not add due to rounding.*

# TABLE 9
# ANALYSIS OF CHANGE IN
# UNFUNDED ACTUARIAL ACCRUED LIABILITY
# FOR THE YEAR ENDING JUNE 30, 2016
## ($ IN MILLIONS)

| | | | |
|---|---|---|---|
| 1. | Unfunded Actuarial Accrued Liability (UAAL) at 06/30/2015 | $ | 22,416.1 |
| | | | |
| 2. | Contributions | | |
| | a. Contributions due | | |
| | i Interest on 1) | $ | 1,625.2 |
| | ii Member contributions | | 278.9 |
| | iii Employer/State normal cost | | 460.7 |
| | iv Interest on ii and iii | | 26.3 |
| | v Total due | $ | 2,391.1 |
| | | | |
| | b. Contributions paid | | |
| | i Member contributions | $ | 278.9 |
| | ii Employer/State contributions | | 1,582.3 |
| | iii Interest on i and ii | | 66.3 |
| | iv Total paid | $ | 1,927.5 |
| | | | |
| | c. Expected increase in UAAL | | 463.6 |
| | | | |
| 3. | Expected UAAL at 06/30/2016 | | 22,879.7 |
| | | | |
| 4. | (Gains)/Losses | | |
| | a. Investment income | $ | 151.8 |
| | b. Salary increases | | (135.0) |
| | c. Demographic | | 325.2 |
| | d. Total | $ | 342.0 |
| | | | |
| 5. | Plan Provision Changes | | - |
| | | | |
| 6. | Assumption Changes | | - |
| | | | |
| 7. | Total Change in UAAL (2c + 4d + 5 + 6) | | 805.6 |
| | | | |
| 8. | UAAL at 06/30/2016 (1 + 7) | $ | 23,221.7 |

# TABLE 10
## ANALYSIS OF ACTUARIAL (GAINS) AND LOSSES
### ($ IN MILLIONS)

| | Amount of (Gain) or Loss | | | |
|---|---|---|---|---|
| | FY 2013 | FY 2014 | FY 2015 | FY 2016 |
| Investment Return[1] | $ 391.8 | $ (802.4) | $ (558.1) | $ 151.8 |
| Salary Increase | (53.6) | (94.3) | (45.3) | (135.0) |
| Age and Service Retirement | 14.3 | 105.2 | (17.0) | 59.3 |
| General Employment Termination | 9.1 | 21.2 | 8.0 | 5.7 |
| Disability Incidence | 2.3 | (8.3) | (3.4) | 3.0 |
| In Service Mortality | 4.2 | 1.7 | 1.4 | (3.7) |
| Benefit Recipient[2] | 31.2 | 1.4 | (2.0) | 68.2 |
| New Entrants | 77.4 | 79.0 | 82.9 | 63.2 |
| Other[3] | 63.8 | (47.2) | (68.8) | 129.5 |
| Total Actuarial (Gain)/Loss | $ 540.5 | $ (743.7) | $ (602.3) | $ 342.0 |
| BOY Actuarial Accrued Liability (AAL) | $ 33,170.2 | $ 34,373.1 | $ 37,429.5 | $ 39,520.7 |
| (Gain)/Loss as a % of BOY AAL | 1.6% | (2.2)% | (1.6)% | 0.9% |
| Total Non-Investment (Gain)/Loss | $ 148.7 | $ 58.7 | $ (44.2) | $ 190.2 |
| (Gain)/Loss as a % of BOY AAL | 0.4% | 0.2% | (0.1)% | 0.5% |

[1]*Gain/Loss is based on actuarial value of assets.*

[2]*Benefit recipient (gain)/loss includes mortality gains and losses as well as gains and losses due to unexpected changes in benefit amounts from year to year. Unexpected changes may occur when benefits that are initially paid as preliminary estimates are finalized. Mortality gains and losses include deviations in the assumed demographic of future beneficiaries compared to the actual demographics of new beneficiaries.*

*Beginning with the valuation as of June 30, 2011, there is an additional load of 10% on the liabilities of those retirees who are currently receiving benefits as a preliminary estimate. Beginning with the valuation as of June 30, 2013, Staff provided additional data fields for members whose benefits are paid as preliminary estimates in order to better measure the liabilities for these retirees whose benefits have not been finalized.*

*Beginning with the valuation as of June 30, 2015, the load of 10% was reduced to 5% for retirees for whom Staff provided a best formula benefit.*

[3]*Includes other experience such as deviations between actual and expected benefit payments and refunds that were not easily attributable to one of the categories above.*

# TABLE 11

## FUNDED RATIO AND ILLUSTRATIVE CONTRIBUTIONS UNDER FUNDING POLICY OF NET NORMAL COST PLUS LEVEL PERCENTAGE OF PAYROLL AMORTIZATION OF UNFUNDED LIABILITY

### ($ IN MILLIONS)

| Fiscal Year | DB Payroll [1] | Actuarial Value of Assets (AVA) | Actuarial Accrued Liability (AAL) | Unfunded Actuarial Accrued Liability (UAAL) | Funded Ratio | Total Normal Cost | Member Contributions [2] | Amortization of UAAL (30-year open) [3] | Net State Contribution (30-year open) [3] | Amortization of UAAL (30-year closed)[4] | Net State Contribution (30-year closed) [4] | Net State 30-year closed with 1 year Interest Adjustment [4] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2015 | $3,606.537 | $17,104.607 | $39,520.687 | $22,416.080 | 43.28 % | $730.020 | $267.682 | $1,160.318 | $1,622.656 | | | |
| 2016 | 3,513.108 | 17,701.646 | 40,923.301 | 23,221.655 | 43.26 | 739.549 | 278.884 | 1,205.004 | 1,665.669 | $1,350.394 | $1,811.060 | $1,942.361 |
| 2017 | | | | | | 719.225 | 283.452 | 1,248.309 | 1,684.082 | 1,424.261 | 1,860.034 | 1,994.887 |

[1] *Defined Benefit Plan payroll is rolled forward with one year of salary scale at 3.75% and uses capped payroll for members hired on and after January 1, 2011.*
[2] *Projected for FY 2017 and actual for years prior.*
[3] *A 30-year open period amortization policy is not a funding policy recommended by GRS. This illustrative contribution was included at the request of the Governor's Office. The amortization payment was calculated as a level percentage of total uncapped payroll.*
[4] *GRS recommends a 30-year (or shorter) closed amortization period beginning with fiscal year 2015, 28 years remaining at fiscal year 2017. (The statutory contribution would apply to fiscal year 2018; therefore a one year interest adjustment was applied). The amortization payment was calculated as a level percentage of pensionable (capped) payroll.*

# APPENDIX D

## ACTUARIAL PROJECTIONS

# TABLE 12

## BASELINE PROJECTIONS – ACTUARIAL VALUATION JUNE 30, 2016

## ASSUMES CONTRIBUTIONS BASED ON TABLE 14 & INVESTMENT RETURN OF 7.25% EACH YEAR

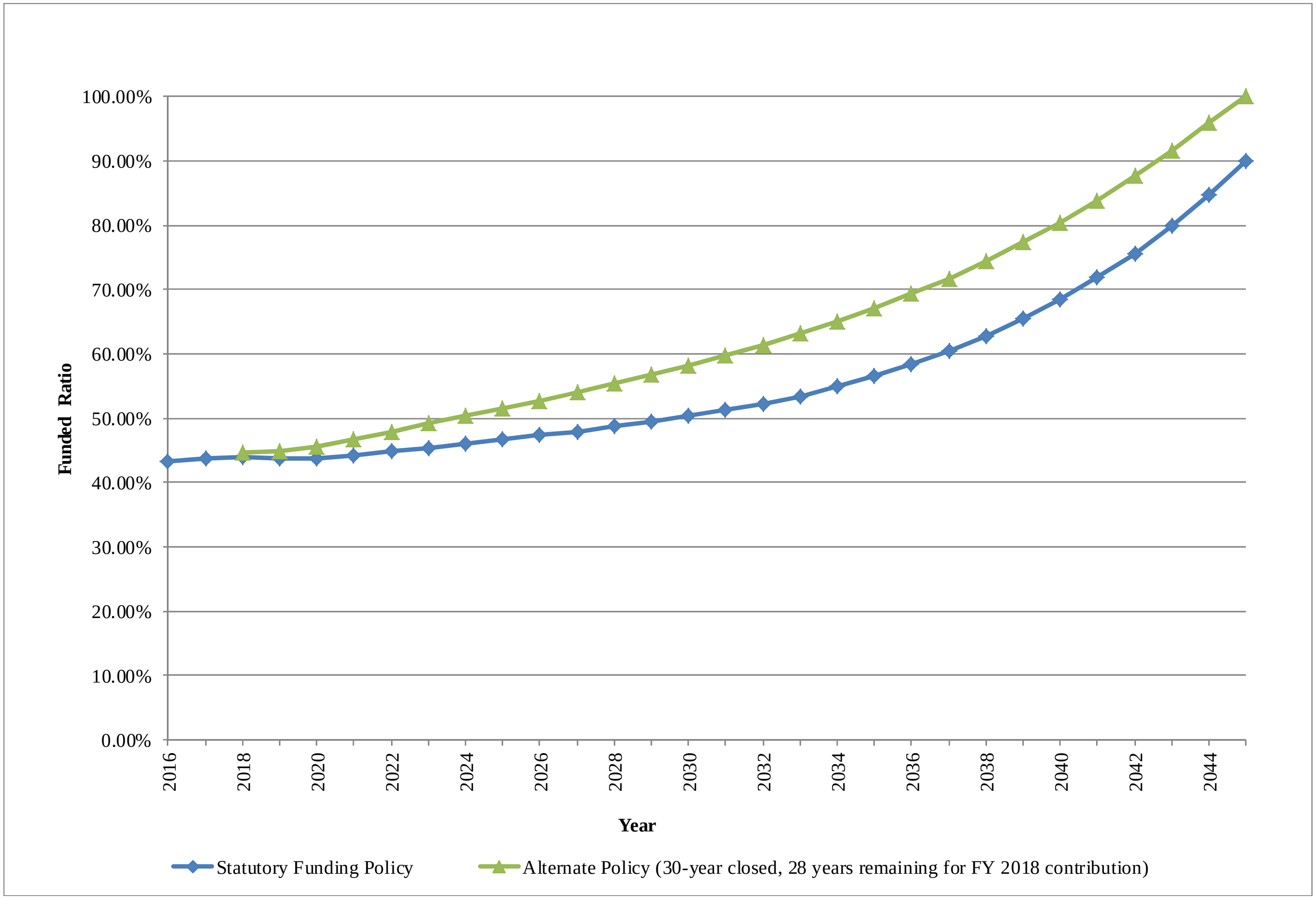
## ($ IN MILLIONS)

| Fiscal Year Ending | Total Payroll [1] | SMP Payroll | DB Payroll [1] | SURS Contributions [2] | Member Contributions | Benefits | Expenses | Assets EOY | AAL | Funding Ratio | Debt Service | Maximum Contribution[3] | SURS Contribution % of Total Payroll |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2016 | $ 4,218.369 | $ 832.241 | $ 3,386.128 | $ 1,582.295 | $ 278.884 | $ 2,320.829 | $ 14.731 | $ 17,701.646 | $ 40,923.301 | 43.26 % | $ 112.435 | $ 1,599.757 | 37.51% |
| 2017 | 4,504.820 | 966.098 | 3,538.722 | 1,649.249 | 283.452 | 2,443.278 | 16.087 | 18,426.422 | 42,088.124 | 43.78 | 116.476 | 1,674.082 | 36.61% |
| 2018 | 4,587.731 | 1,023.748 | 3,563.983 | 1,727.163 | 285.475 | 2,543.118 | 16.690 | 19,050.521 | 43,224.186 | 44.07 | 120.304 | 1,750.874 | 37.65% |
| 2019 | 4,688.014 | 1,084.619 | 3,603.395 | 1,765.754 | 288.632 | 2,653.015 | 17.316 | 19,352.420 | 44,319.679 | 43.67 | 123.920 | 1,789.196 | 37.67% |
| 2020 | 4,799.410 | 1,148.440 | 3,650.970 | 1,818.658 | 292.443 | 2,766.016 | 17.966 | 19,794.333 | 45,369.558 | 43.63 | 132.009 | 1,835.532 | 37.89% |
| 2021 | 4,915.765 | 1,209.908 | 3,705.857 | 1,898.155 | 296.839 | 2,879.734 | 18.639 | 20,500.991 | 46,370.278 | 44.21 | 139.615 | 1,902.995 | 38.61% |
| 2022 | 5,038.629 | 1,274.388 | 3,764.242 | 1,963.693 | 301.516 | 2,995.054 | 19.338 | 21,211.448 | 47,318.093 | 44.83 | 146.736 | 1,963.693 | 38.97% |
| 2023 | 5,166.016 | 1,339.165 | 3,826.852 | 2,010.413 | 306.531 | 3,112.241 | 20.063 | 21,904.877 | 48,208.404 | 45.44 | 153.373 | 2,010.413 | 38.92% |
| 2024 | 5,300.699 | 1,406.699 | 3,894.000 | 2,055.780 | 311.909 | 3,227.993 | 20.816 | 22,580.479 | 49,039.449 | 46.05 | 164.417 | 2,055.780 | 38.78% |
| 2025 | 5,438.496 | 1,474.065 | 3,964.431 | 2,103.310 | 317.551 | 3,346.822 | 21.596 | 23,236.258 | 49,804.454 | 46.65 | 174.604 | 2,103.310 | 38.67% |
| 2026 | 5,579.920 | 1,541.169 | 4,038.750 | 2,158.000 | 323.504 | 3,463.115 | 22.406 | 23,881.110 | 50,502.434 | 47.29 | 179.149 | 2,158.000 | 38.67% |
| 2027 | 5,727.461 | 1,611.361 | 4,116.100 | 2,215.751 | 329.700 | 3,574.282 | 23.246 | 24,522.943 | 51,134.715 | 47.96 | 183.195 | 2,215.751 | 38.69% |
| 2028 | 5,879.540 | 1,681.267 | 4,198.273 | 2,271.010 | 336.282 | 3,680.572 | 24.118 | 25,164.372 | 51,702.541 | 48.67 | 191.634 | 2,271.010 | 38.63% |
| 2029 | 6,038.001 | 1,754.751 | 4,283.250 | 2,329.691 | 343.088 | 3,784.935 | 25.023 | 25,811.109 | 52,203.706 | 49.44 | 199.325 | 2,329.691 | 38.58% |
| 2030 | 6,200.876 | 1,831.190 | 4,369.686 | 2,386.076 | 350.012 | 3,888.635 | 25.961 | 26,461.933 | 52,634.030 | 50.28 | 211.160 | 2,386.076 | 38.48% |
| 2031 | 6,367.129 | 1,909.261 | 4,457.868 | 2,444.874 | 357.075 | 3,989.680 | 26.934 | 27,122.496 | 52,990.932 | 51.18 | 221.997 | 2,444.874 | 38.40% |
| 2032 | 6,538.222 | 1,990.043 | 4,548.179 | 2,511.590 | 364.309 | 4,029.080 | 27.945 | 27,865.685 | 53,333.017 | 52.25 | 226.944 | 2,511.590 | 38.41% |
| 2033 | 6,714.108 | 2,071.486 | 4,642.622 | 2,585.955 | 371.874 | 4,113.890 | 28.992 | 28,658.686 | 53,612.964 | 53.45 | 226.249 | 2,585.955 | 38.52% |
| 2034 | 6,898.566 | 2,158.160 | 4,740.406 | 2,695.757 | 379.707 | 4,191.323 | 30.080 | 29,549.688 | 53,835.007 | 54.89 | NA | 2,889.463 | 39.08% |
| 2035 | 7,090.432 | 2,249.928 | 4,840.505 | 2,770.733 | 387.724 | 4,263.239 | 31.208 | 30,515.592 | 54,001.158 | 56.51 | NA | 2,969.827 | 39.08% |
| 2036 | 7,287.327 | 2,344.140 | 4,943.187 | 2,847.674 | 395.949 | 4,329.297 | 32.378 | 31,570.100 | 54,113.695 | 58.34 | NA | 3,052.296 | 39.08% |
| 2037 | 7,489.659 | 2,441.657 | 5,048.002 | 2,926.739 | 404.345 | 4,389.892 | 33.592 | 32,727.625 | 54,174.620 | 60.41 | NA | 3,137.043 | 39.08% |
| 2038 | 7,696.731 | 2,540.709 | 5,156.021 | 3,007.656 | 412.997 | 4,443.828 | 34.852 | 34,004.669 | 54,187.734 | 62.75 | NA | 3,223.775 | 39.08% |
| 2039 | 7,910.447 | 2,642.251 | 5,268.196 | 3,091.170 | 421.983 | 4,488.370 | 36.159 | 35,422.611 | 54,160.651 | 65.40 | NA | 3,313.289 | 39.08% |
| 2040 | 8,132.638 | 2,747.879 | 5,384.759 | 3,177.996 | 431.319 | 4,523.085 | 37.515 | 37,005.585 | 54,102.367 | 68.40 | NA | 3,406.354 | 39.08% |
| 2041 | 8,359.868 | 2,851.612 | 5,508.257 | 3,266.791 | 441.211 | 4,546.761 | 38.922 | 38,779.551 | 54,024.838 | 71.78 | NA | 3,501.530 | 39.08% |
| 2042 | 8,598.501 | 2,961.946 | 5,636.555 | 3,360.042 | 451.488 | 4,556.250 | 40.381 | 40,778.006 | 53,944.450 | 75.59 | NA | 3,601.481 | 39.08% |
| 2043 | 8,845.743 | 3,077.672 | 5,768.071 | 3,456.657 | 462.022 | 4,558.209 | 41.895 | 43,028.717 | 53,871.034 | 79.87 | NA | 3,705.038 | 39.08% |
| 2044 | 9,101.284 | 3,199.939 | 5,901.344 | 3,556.514 | 472.698 | 4,551.566 | 43.466 | 45,562.326 | 53,815.536 | 84.66 | NA | 3,812.071 | 39.08% |
| 2045 | 9,362.156 | 3,325.503 | 6,036.653 | 3,658.456 | 483.536 | 4,537.408 | 45.096 | 48,409.394 | 53,788.215 | 90.00 | NA | 3,921.338 | 39.08% |

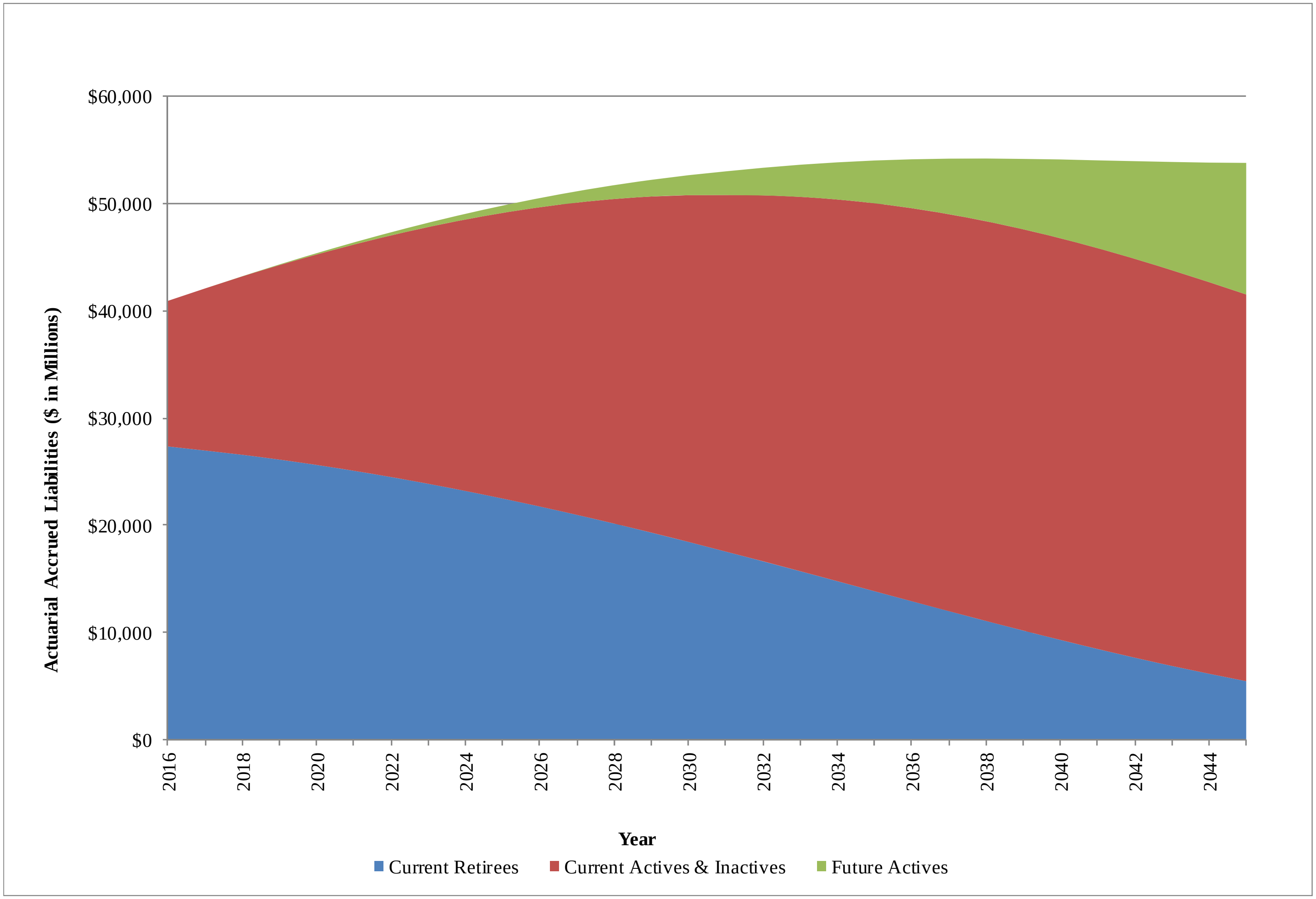
[1] *Payroll shown is pensionable pay. It does not include amounts in excess of the pay cap that is applicable to members hired on or after January 1, 2011, participating in the Traditional and Portable plans.*
[2] *Excludes SMP contributions.*
[3] *Maximum contribution after impact of debt service.*

## GRAPH 1
## PROJECTED FUNDED RATIO BASED ON STATUTORY CONTRIBUTIONS
## ACTUARIAL VALUATION AS OF JUNE 30, 2016

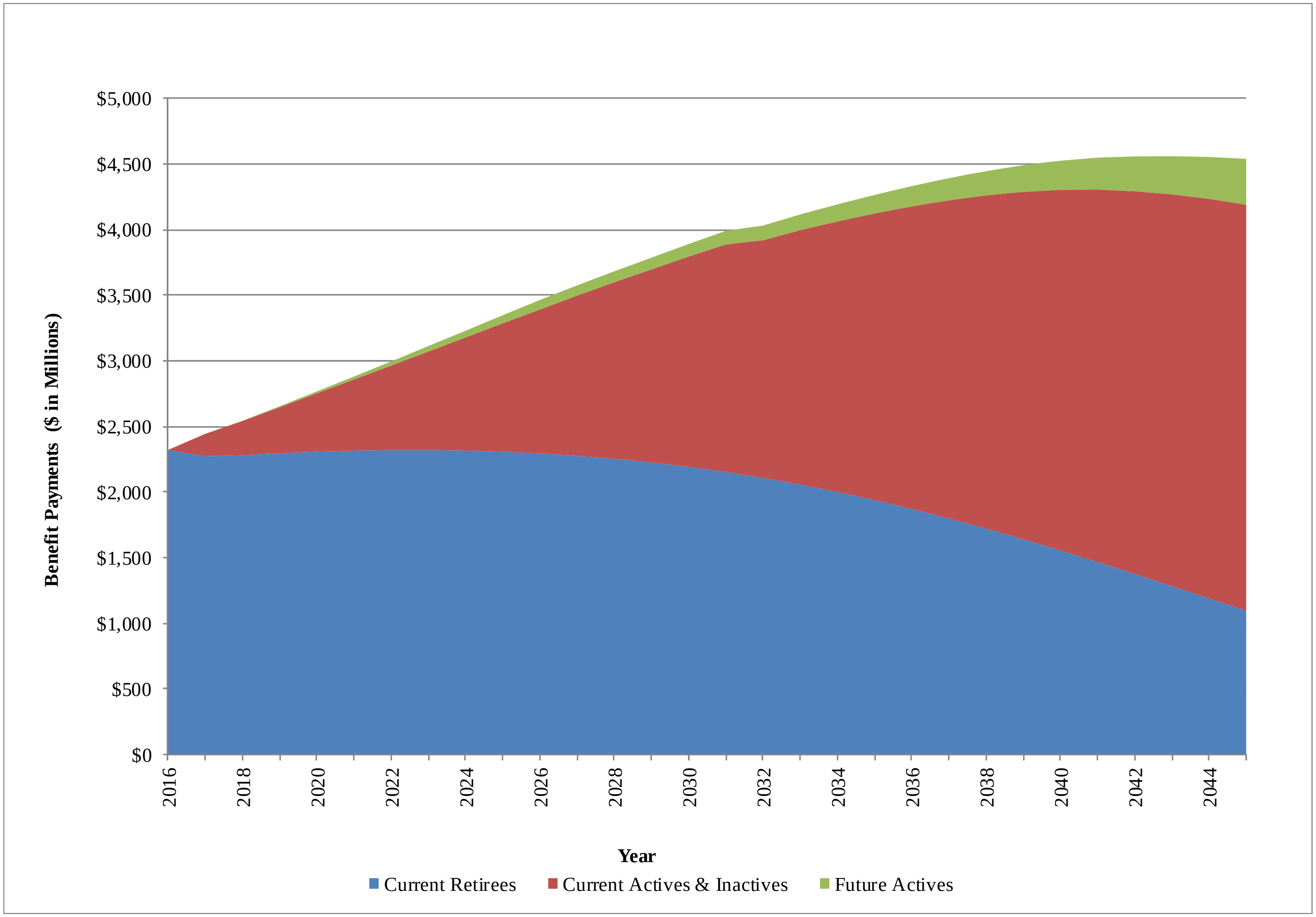
**($ IN MILLIONS)**



# GRAPH 2
## PROJECTED ACTUARIAL ACCRUED LIABILITIES
## ACTUARIAL VALUATION AS OF JUNE 30, 2016
### ($ IN MILLIONS)



# GRAPH 3
# PROJECTED BENEFIT PAYMENTS
# ACTUARIAL VALUATION AS OF JUNE 30, 2016
## ($ IN MILLIONS)



# TABLE 13
## PROJECTED STATUTORY CONTRIBUTIONS
## ACTUARIAL VALUATION AS OF JUNE 30, 2016
## BEFORE IMPACT OF BONDS ISSUED IN 2004
### ($ IN MILLIONS)

| | 30% of New Members to SMP | | | |
|---|---|---|---|---|
| | | | Total Contribution | |
| FYE | SURS Cont. | SMP Cont. | $ | % of Pay [1] |
| 2017 [2] | $ 1,790.557 | $ 69.677 | $ 1,860.234 | 41.29 % |
| 2018 | 1,871.178 | 73.022 | 1,944.200 | 42.38 |
| 2019 | 1,913.115 | 76.726 | 1,989.841 | 42.45 |
| 2020 | 1,967.542 | 81.226 | 2,048.768 | 42.69 |
| 2021 | 2,042.610 | 85.560 | 2,128.170 | 43.29 |
| 2022 | 2,110.429 | 90.107 | 2,200.536 | 43.67 |
| 2023 | 2,163.785 | 94.675 | 2,258.460 | 43.72 |
| 2024 | 2,220.197 | 99.437 | 2,319.634 | 43.76 |
| 2025 | 2,277.913 | 104.188 | 2,382.101 | 43.80 |
| 2026 | 2,337.149 | 108.921 | 2,446.070 | 43.84 |
| 2027 | 2,398.946 | 113.871 | 2,512.817 | 43.87 |
| 2028 | 2,462.644 | 118.802 | 2,581.446 | 43.91 |
| 2029 | 2,529.016 | 123.985 | 2,653.001 | 43.94 |
| 2030 | 2,597.236 | 129.376 | 2,726.612 | 43.97 |
| 2031 | 2,666.871 | 134.882 | 2,801.753 | 44.00 |
| 2032 | 2,738.533 | 140.579 | 2,879.112 | 44.04 |
| 2033 | 2,812.203 | 146.323 | 2,958.526 | 44.06 |
| 2034 | 2,889.463 | 152.435 | 3,041.898 | 44.09 |
| 2035 | 2,969.827 | 158.906 | 3,128.733 | 44.13 |
| 2036 | 3,052.296 | 165.550 | 3,217.846 | 44.16 |
| 2037 | 3,137.043 | 172.426 | 3,309.469 | 44.19 |
| 2038 | 3,223.775 | 179.411 | 3,403.186 | 44.22 |
| 2039 | 3,313.289 | 186.571 | 3,499.860 | 44.24 |
| 2040 | 3,406.354 | 194.019 | 3,600.373 | 44.27 |
| 2041 | 3,501.530 | 201.335 | 3,702.865 | 44.29 |
| 2042 | 3,601.481 | 209.115 | 3,810.596 | 44.32 |
| 2043 | 3,705.038 | 217.275 | 3,922.313 | 44.34 |
| 2044 | 3,812.071 | 225.896 | 4,037.967 | 44.37 |
| 2045 | 3,921.338 | 234.749 | 4,156.087 | 44.39 |
| Total | $79,433.429 | $4,089.045 | $83,522.474 | |

*[1] Percent of pay amounts are calculated based on pensionable pay. Pensionable pay does not include amounts in excess of the pay cap that is applicable to members hired on or after January 1, 2011, participating in the Traditional and Portable plans.*
*[2] Fiscal Year 2017 contribution amounts as determined in the actuarial valuation as of June 30, 2015.*

# TABLE 14
## PROJECTED STATUTORY CONTRIBUTIONS
## ACTUARIAL VALUATION AS OF JUNE 30, 2016
## INCLUDING IMPACT OF BONDS ISSUED IN 2004
### ($ IN MILLIONS)

| | 30% of New Members to SMP | | | | | | SURS | Projected % of |
|---|---|---|---|---|---|---|---|---|
| | | | Total Contribution | | Debt Service | | Alternate Policy | Alternate Policy |
| FYE | SURS Cont. | SMP Cont. | $ | % of Pay [1] | $ | % of Pay [1] | Contribution [2] | Contributed [3] |
| 2017 [4] | $ 1,649.249 | $ 69.677 | $ 1,718.926 | 38.16 % | $ 116.476 | 2.59 % | $ 1,649.249 | |
| 2018 | 1,727.163 | 73.022 | 1,800.185 | 39.24 | 120.304 | 2.62 | 1,994.887 | 86.58 % |
| 2019 | 1,765.754 | 76.726 | 1,842.480 | 39.30 | 123.920 | 2.64 | 2,025.007 | 87.20 |
| 2020 | 1,818.658 | 81.226 | 1,899.884 | 39.59 | 132.009 | 2.75 | 2,063.643 | 88.13 |
| 2021 | 1,898.155 | 85.560 | 1,983.715 | 40.35 | 139.615 | 2.84 | 2,126.268 | 89.27 |
| 2022 | 1,963.693 | 90.107 | 2,053.800 | 40.76 | 146.736 | 2.91 | 2,177.613 | 90.18 |
| 2023 | 2,010.413 | 94.675 | 2,105.088 | 40.75 | 153.373 | 2.97 | 2,210.908 | 90.93 |
| 2024 | 2,055.780 | 99.437 | 2,155.217 | 40.66 | 164.417 | 3.10 | 2,243.170 | 91.65 |
| 2025 | 2,103.310 | 104.188 | 2,207.498 | 40.59 | 174.604 | 3.21 | 2,276.601 | 92.39 |
| 2026 | 2,158.000 | 108.921 | 2,266.921 | 40.63 | 179.149 | 3.21 | 2,311.055 | 93.38 |
| 2027 | 2,215.751 | 113.871 | 2,329.622 | 40.67 | 183.195 | 3.20 | 2,346.909 | 94.41 |
| 2028 | 2,271.010 | 118.802 | 2,389.812 | 40.65 | 191.634 | 3.26 | 2,383.859 | 95.27 |
| 2029 | 2,329.691 | 123.985 | 2,453.676 | 40.64 | 199.325 | 3.30 | 2,419.805 | 96.28 |
| 2030 | 2,386.076 | 129.376 | 2,515.452 | 40.57 | 211.160 | 3.41 | 2,456.343 | 97.14 |
| 2031 | 2,444.874 | 134.882 | 2,579.756 | 40.52 | 221.997 | 3.49 | 2,492.979 | 98.07 |
| 2032 | 2,511.590 | 140.579 | 2,652.169 | 40.56 | 226.944 | 3.47 | 2,529.399 | 99.30 |
| 2033 | 2,585.955 | 146.323 | 2,732.278 | 40.69 | 226.249 | 3.37 | 2,565.705 | 100.79 |
| 2034 | 2,695.757 | 152.435 | 2,848.192 | 41.29 | | | 2,602.246 | 103.59 |
| 2035 | 2,770.733 | 158.906 | 2,929.639 | 41.32 | | | 2,639.172 | 104.98 |
| 2036 | 2,847.674 | 165.550 | 3,013.224 | 41.35 | | | 2,675.612 | 106.43 |
| 2037 | 2,926.739 | 172.426 | 3,099.165 | 41.38 | | | 2,710.849 | 107.96 |
| 2038 | 3,007.656 | 179.411 | 3,187.067 | 41.41 | | | 2,744.265 | 109.60 |
| 2039 | 3,091.170 | 186.571 | 3,277.741 | 41.44 | | | 2,775.313 | 111.38 |
| 2040 | 3,177.996 | 194.019 | 3,372.015 | 41.46 | | | 2,803.330 | 113.37 |
| 2041 | 3,266.791 | 201.335 | 3,468.126 | 41.49 | | | 2,826.617 | 115.57 |
| 2042 | 3,360.042 | 209.115 | 3,569.157 | 41.51 | | | 2,842.464 | 118.21 |
| 2043 | 3,456.657 | 217.275 | 3,673.932 | 41.53 | | | 2,844.330 | 121.53 |
| 2044 | 3,556.514 | 225.896 | 3,782.410 | 41.56 | | | 2,814.211 | 126.38 |
| 2045 | 3,658.456 | 234.749 | 3,893.205 | 41.58 | | | 2,683.804 | 136.32 |
| Total | $ 73,711.307 | $4,089.045 | $ 77,800.352 | | $ 2,911.106 | | $ 71,235.613 | |

*[1] Percent of pay amounts are calculated based on pensionable pay. Pensionable pay does not include amounts in excess of the pay cap that is applicable to members hired on or after January 1, 2011, participating in the Traditional and Portable plans.*

*[2] Alternate funding policy of normal cost plus 30-year closed period amortization of the unfunded liability as a level percentage of capped payroll beginning in FY 2016 with 28 years remaining as of FY 2018. Statutory Contribution is shown for FY 2017. Excludes SMP.*

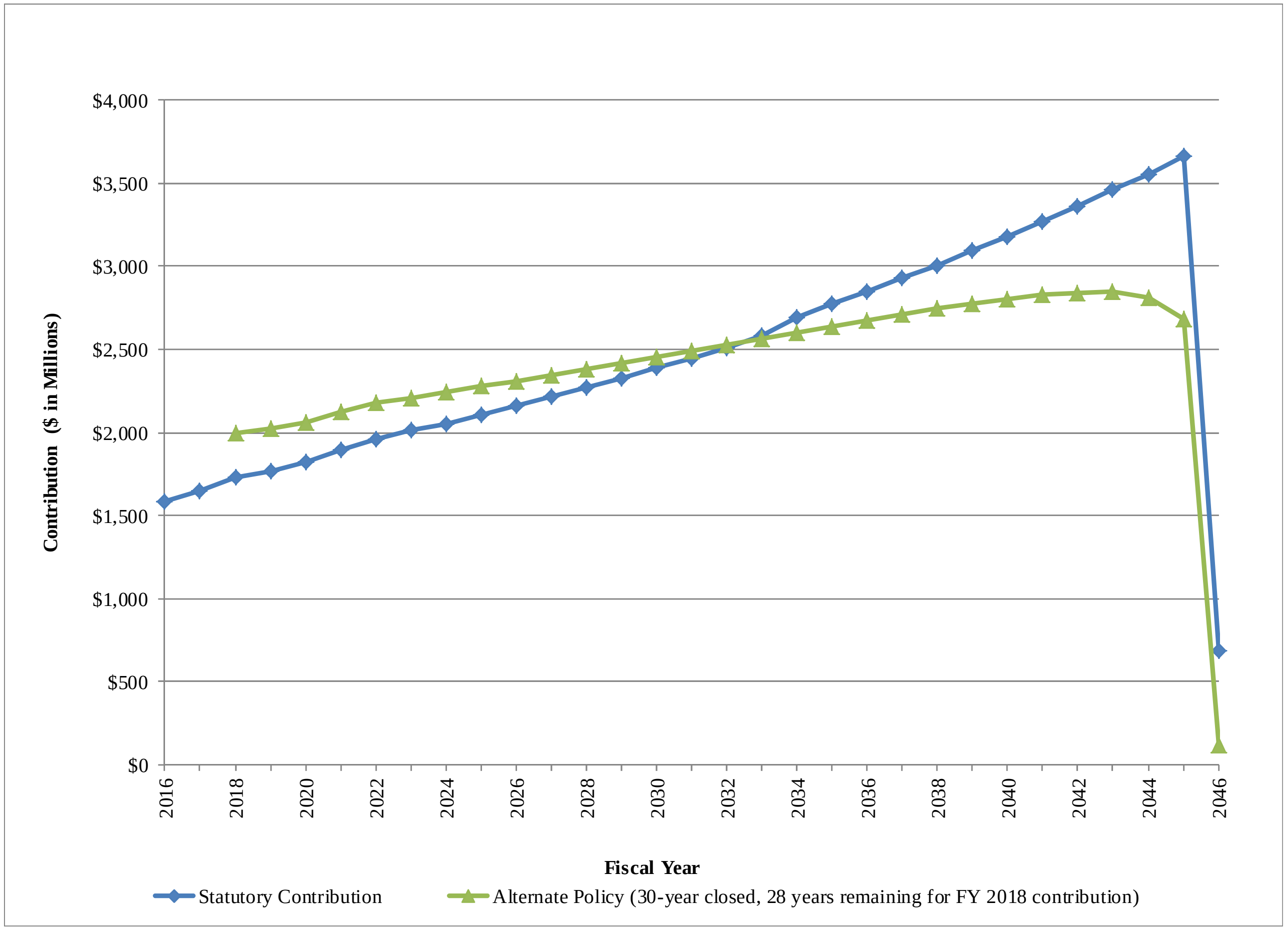
*[3] Compares the SURS Statutory contribution, which targets a funded ratio of 90% in 2045, against an alternate funding policy, which targets a funded ratio of 100% in 2045. Excludes SMP contribution.*

*[4] Total fiscal Year 2017 contribution amount as determined in the actuarial valuation as of June 30, 2015.*

# GRAPH 4

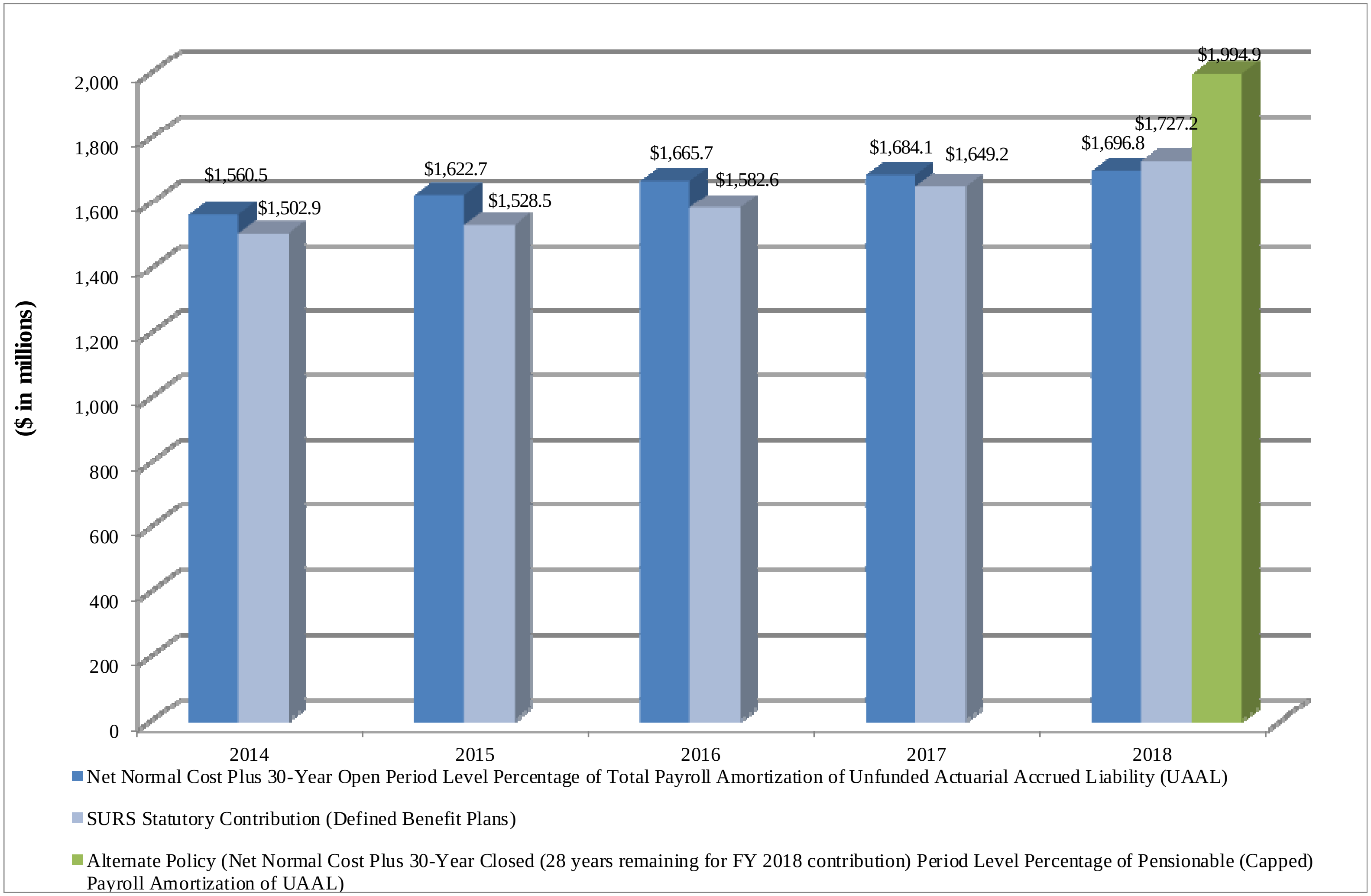
## PROJECTED STATUTORY CONTRIBUTIONS VS. CONTRIBUTIONS UNDER ALTERNATE POLICY (NORMAL COST PLUS 30-YEAR CLOSED PERIOD LEVEL PERCENT OF PAY AMORTIZATION) (28 YEARS REMAINING IN AMORTIZATION PERIOD FOR FY 2018 CONTRIBUTION)

## ($ IN MILLIONS)




*Alternate funding policy of normal cost plus 30-year closed period amortization of the unfunded liability as a level percentage of capped payroll beginning in FY 2016 and 28 years remaining in FY 2018 Alternate funding policy contributions based on actual assets as of the current valuation date, the certified statutory contribution in the year following the current valuation date and the alternate policy contribution being made thereafter.*

## GRAPH 5
## STATUTORY CONTRIBUTIONS VS. NET NORMAL COST PLUS LEVEL PERCENTAGE OF PAYROLL AMORTIZATION OF UNFUNDED LIABILITY AND ALTERNATE POLICY
### ($ IN MILLIONS)




*Amounts prior to fiscal year 2016 are based on the Annual Required Contribution ("ARC"). Beginning in fiscal year 2015, a contribution equal to normal cost plus 30-year closed period amortization of the unfunded liability as a level percentage of capped payroll is used. Amounts are projected for fiscal years 2017 and 2018. Consistent underfunding compared to the ARC is a primary cause of the current low funded status.*

# APPENDIX E

## Additional Projection Details

# TABLE 15

## PROJECTIONS – DOES NOT REFLECT RECOGNITION OF DEFERRED ASSET GAINS AND LOSSES IN PROJECTED ACTUARIAL VALUE OF ASSETS (IMPACT OF BONDS ISSUED IN 2004 INCLUDED)

## ASSUMES INVESTMENT RETURN OF 7.25% EACH YEAR ON ACTUARIAL VALUE OF ASSETS

## ($ IN MILLIONS)

| Fiscal Year Ending | Total Payroll [1] | SMP Payroll | DB Payroll [1] | SURS Contributions [2] | Member Contributions | Benefits | Expenses | Assets EOY | AAL | Funding Ratio | Debt Service | Maximum Contribution[3] | SURS Contribution % of Total Payroll |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2016 | $ 4,218.369 | $ 832.241 | $ 3,386.128 | $ 1,582.295 | $ 278.884 | $ 2,320.829 | $ 14.731 | $ 17,701.646 | $ 40,923.301 | 43.26 % | $ 112.435 | $ 1,599.757 | 37.51% |
| 2017 | 4,504.820 | 966.098 | 3,538.722 | 1,649.249 | 283.452 | 2,443.278 | 16.087 | 18,439.594 | 42,088.124 | 43.81 | 116.476 | 1,674.082 | 36.61% |
| 2018 | 4,587.731 | 1,023.748 | 3,563.983 | 1,727.163 | 285.475 | 2,543.118 | 16.690 | 19,209.807 | 43,224.186 | 44.44 | 120.304 | 1,750.874 | 37.65% |
| 2019 | 4,688.014 | 1,084.619 | 3,603.395 | 1,764.917 | 288.632 | 2,653.015 | 17.316 | 19,963.768 | 44,319.679 | 45.04 | 123.920 | 1,788.160 | 37.65% |
| 2020 | 4,799.410 | 1,148.440 | 3,650.970 | 1,806.855 | 292.443 | 2,766.016 | 17.966 | 20,702.073 | 45,369.558 | 45.63 | 132.009 | 1,825.505 | 37.65% |
| 2021 | 4,915.765 | 1,209.908 | 3,705.857 | 1,850.660 | 296.839 | 2,879.734 | 18.639 | 21,425.355 | 46,370.278 | 46.20 | 139.615 | 1,865.357 | 37.65% |
| 2022 | 5,038.629 | 1,274.388 | 3,764.242 | 1,896.915 | 301.516 | 2,995.054 | 19.338 | 22,133.671 | 47,318.093 | 46.78 | 146.736 | 1,908.348 | 37.65% |
| 2023 | 5,166.016 | 1,339.165 | 3,826.852 | 1,944.873 | 306.531 | 3,112.241 | 20.063 | 22,826.088 | 48,208.404 | 47.35 | 153.373 | 1,953.668 | 37.65% |
| 2024 | 5,300.699 | 1,406.699 | 3,894.000 | 1,995.578 | 311.909 | 3,227.993 | 20.816 | 23,506.131 | 49,039.449 | 47.93 | 164.417 | 1,997.556 | 37.65% |
| 2025 | 5,438.496 | 1,474.065 | 3,964.431 | 2,043.572 | 317.551 | 3,346.822 | 21.596 | 24,167.154 | 49,804.454 | 48.52 | 174.604 | 2,043.572 | 37.58% |
| 2026 | 5,579.920 | 1,541.169 | 4,038.750 | 2,096.709 | 323.504 | 3,463.115 | 22.406 | 24,816.023 | 50,502.434 | 49.14 | 179.149 | 2,096.709 | 37.58% |
| 2027 | 5,727.461 | 1,611.361 | 4,116.100 | 2,152.840 | 329.700 | 3,574.282 | 23.246 | 25,460.485 | 51,134.715 | 49.79 | 183.195 | 2,152.840 | 37.59% |
| 2028 | 5,879.540 | 1,681.267 | 4,198.273 | 2,206.428 | 336.282 | 3,680.572 | 24.118 | 26,103.004 | 51,702.541 | 50.49 | 191.634 | 2,206.428 | 37.53% |
| 2029 | 6,038.001 | 1,754.751 | 4,283.250 | 2,263.368 | 343.088 | 3,784.935 | 25.023 | 26,749.107 | 52,203.706 | 51.24 | 199.325 | 2,263.368 | 37.49% |
| 2030 | 6,200.876 | 1,831.190 | 4,369.686 | 2,317.964 | 350.012 | 3,888.635 | 25.961 | 27,397.398 | 52,634.030 | 52.05 | 211.160 | 2,317.964 | 37.38% |
| 2031 | 6,367.129 | 1,909.261 | 4,457.868 | 2,374.936 | 357.075 | 3,989.680 | 26.934 | 28,053.353 | 52,990.932 | 52.94 | 221.997 | 2,374.936 | 37.30% |
| 2032 | 6,538.222 | 1,990.043 | 4,548.179 | 2,439.773 | 364.309 | 4,029.080 | 27.945 | 28,789.654 | 53,333.017 | 53.98 | 226.944 | 2,439.773 | 37.32% |
| 2033 | 6,714.108 | 2,071.486 | 4,642.622 | 2,512.205 | 371.874 | 4,113.890 | 28.992 | 29,573.268 | 53,612.964 | 55.16 | 226.249 | 2,512.205 | 37.42% |
| 2034 | 6,898.566 | 2,158.160 | 4,740.406 | 2,597.133 | 379.707 | 4,191.323 | 30.080 | 30,428.440 | 53,835.007 | 56.52 | NA | 2,813.688 | 37.65% |
| 2035 | 7,090.432 | 2,249.928 | 4,840.505 | 2,669.366 | 387.724 | 4,263.239 | 31.208 | 31,353.077 | 54,001.158 | 58.06 | NA | 2,891.944 | 37.65% |
| 2036 | 7,287.327 | 2,344.140 | 4,943.187 | 2,743.492 | 395.949 | 4,329.297 | 32.378 | 32,360.411 | 54,113.695 | 59.80 | NA | 2,972.250 | 37.65% |
| 2037 | 7,489.659 | 2,441.657 | 5,048.002 | 2,819.665 | 404.345 | 4,389.892 | 33.592 | 33,464.346 | 54,174.620 | 61.77 | NA | 3,054.775 | 37.65% |
| 2038 | 7,696.731 | 2,540.709 | 5,156.021 | 2,897.622 | 412.997 | 4,443.828 | 34.852 | 34,680.849 | 54,187.734 | 64.00 | NA | 3,139.232 | 37.65% |
| 2039 | 7,910.447 | 2,642.251 | 5,268.196 | 2,978.081 | 421.983 | 4,488.370 | 36.159 | 36,030.696 | 54,160.651 | 66.53 | NA | 3,226.399 | 37.65% |
| 2040 | 8,132.638 | 2,747.879 | 5,384.759 | 3,061.730 | 431.319 | 4,523.085 | 37.515 | 37,537.349 | 54,102.367 | 69.38 | NA | 3,317.024 | 37.65% |
| 2041 | 8,359.868 | 2,851.612 | 5,508.257 | 3,147.276 | 441.211 | 4,546.761 | 38.922 | 39,226.097 | 54,024.838 | 72.61 | NA | 3,409.703 | 37.65% |
| 2042 | 8,598.501 | 2,961.946 | 5,636.555 | 3,237.116 | 451.488 | 4,556.250 | 40.381 | 41,129.622 | 53,944.450 | 76.24 | NA | 3,507.033 | 37.65% |
| 2043 | 8,845.743 | 3,077.672 | 5,768.071 | 3,330.196 | 462.022 | 4,558.209 | 41.895 | 43,274.860 | 53,871.034 | 80.33 | NA | 3,607.875 | 37.65% |
| 2044 | 9,101.284 | 3,199.939 | 5,901.344 | 3,426.400 | 472.698 | 4,551.566 | 43.466 | 45,691.567 | 53,815.536 | 84.90 | NA | 3,712.101 | 37.65% |
| 2045 | 9,362.156 | 3,325.503 | 6,036.653 | 3,524.612 | 483.536 | 4,537.408 | 45.096 | 48,409.393 | 53,788.215 | 90.00 | NA | 3,818.502 | 37.65% |

[1] *Payroll shown is pensionable pay. It does not include amounts in excess of the pay cap that is applicable to members hired on or after January 1, 2011, participating in the Traditional and Portable plans.*
[2] *Excludes SMP contributions.*
[3] *Maximum contribution after impact of debt service.*

# TABLE 16

## DEVELOPMENT OF MARKET AND ACTUARIAL VALUE OF ASSETS AS OF JUNE 30, 2016
## AFTER BONDS (VALUATION BASIS) AND BEFORE BONDS (HYPOTHETICAL BASIS)

| | | After Bonds (Valuation Basis) | Before Bonds (Hypothetical) |
|---|---|---|---|
| 1 | Market Value at 6/30/2015 | $17,462,967,856 | $15,126,950,233 |
| 2a | Employer and Non-Employer Contributing Entity Contributions | 1,582,294,952 | 1,712,191,365 |
| 2b | Member Contributions | 278,883,776 | 278,883,776 |
| 2c | Benefits and Expenses | 2,335,560,290 | 2,335,560,290 |
| 2d | Net Non-Investment Cash Flow | (474,381,562) | (344,485,149) |
| 3 | Investment Return<br>(Based on Estimated Rate of 0.1%) | 17,043,679 | 14,796,660 |
| 4 | Expected Return<br>(Based on Estimated Rate of 7.25%) | 1,249,169,710 | 1,084,434,792 |
| 5 | Market Value at 6/30/2016 (1+2d+3) | 17,005,629,973 | 14,797,261,744 |
| 6 | Expected Market Value at 6/30/2016 (1+2d+4) | 18,237,756,004 | 15,866,899,876 |
| 7a | Actuarial Gain/(Loss) Current Year | (1,232,126,031) | (1,069,638,132) |
| 7b | Actuarial Gain/(Loss) 1 Year Prior | (742,300,803) | (641,546,753) |
| 7c | Actuarial Gain/(Loss) 2 Years Prior | 1,514,453,279 | 1,303,474,812 |
| 7d | Actuarial Gain/(Loss) 3 Years Prior | 646,420,171 | 553,235,951 |
| 7e | Actuarial Gain/(Loss) 4 Years Prior | (1,075,191,015) | (915,795,790) |
| 8 | Actuarial Value at 6/30/2015 | 17,104,606,665 | 14,819,967,506 |
| 9 | Actuarial Value at 6/30/2016 (8+2d+4+.2*(7a+7b+7c+7d+7e)) | 17,701,645,933 | 15,405,863,166 |

# TABLE 17

## HYPOTHETICAL ASSETS TO DETERMINE MAXIMUM CONTRIBUTION

## PROJECTIONS – REFLECTS RECOGNITION OF DEFERRED ASSET GAINS AND LOSSES IN PROJECTED ACTUARIAL VALUE OF ASSETS (BEFORE IMPACT OF BONDS ISSUED IN 2004)

### ($ IN MILLIONS)

| Fiscal Year Ending | Total Payroll [1] | SMP Payroll | DB Payroll [1] | SURS Contributions [2] | Member Contributions | Benefits | Expenses | Assets EOY | AAL | Funding Ratio | Debt Service | SURS Contribution % of Total Payroll |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2016 | $ 4,218.369 | $ 832.241 | $ 3,386.128 | $ 1,712.191 | $ 278.884 | $ 2,320.829 | $ 14.731 | $ 15,405.863 | $ 40,923.301 | 37.65 % | NA | 40.59% |
| 2017 | 4,504.820 | 966.098 | 3,538.722 | 1,790.557 | 283.452 | 2,443.278 | 16.087 | 16,108.689 | 42,088.124 | 38.27 | NA | 39.75% |
| 2018 | 4,587.731 | 1,023.748 | 3,563.983 | 1,871.178 | 285.475 | 2,543.118 | 16.690 | 16,731.280 | 43,224.186 | 38.71 | NA | 40.79% |
| 2019 | 4,688.014 | 1,084.619 | 3,603.395 | 1,913.115 | 288.632 | 2,653.015 | 17.316 | 17,076.465 | 44,319.679 | 38.53 | NA | 40.81% |
| 2020 | 4,799.410 | 1,148.440 | 3,650.970 | 1,967.542 | 292.443 | 2,766.016 | 17.966 | 17,542.412 | 45,369.558 | 38.67 | NA | 41.00% |
| 2021 | 4,915.765 | 1,209.908 | 3,705.857 | 2,042.610 | 296.839 | 2,879.734 | 18.639 | 18,235.406 | 46,370.278 | 39.33 | NA | 41.55% |
| 2022 | 5,038.629 | 1,274.388 | 3,764.242 | 2,110.429 | 301.516 | 2,995.054 | 19.338 | 18,933.569 | 47,318.093 | 40.01 | NA | 41.88% |
| 2023 | 5,166.016 | 1,339.165 | 3,826.852 | 2,163.785 | 306.531 | 3,112.241 | 20.063 | 19,620.687 | 48,208.404 | 40.70 | NA | 41.88% |
| 2024 | 5,300.699 | 1,406.699 | 3,894.000 | 2,220.197 | 311.909 | 3,227.993 | 20.816 | 20,300.959 | 49,039.449 | 41.40 | NA | 41.88% |
| 2025 | 5,438.496 | 1,474.065 | 3,964.431 | 2,277.913 | 317.551 | 3,346.822 | 21.596 | 20,972.294 | 49,804.454 | 42.11 | NA | 41.88% |
| 2026 | 5,579.920 | 1,541.169 | 4,038.750 | 2,337.149 | 323.504 | 3,463.115 | 22.406 | 21,638.539 | 50,502.434 | 42.85 | NA | 41.88% |
| 2027 | 5,727.461 | 1,611.361 | 4,116.100 | 2,398.946 | 329.700 | 3,574.282 | 23.246 | 22,307.505 | 51,134.715 | 43.62 | NA | 41.88% |
| 2028 | 5,879.540 | 1,681.267 | 4,198.273 | 2,462.644 | 336.282 | 3,680.572 | 24.118 | 22,986.774 | 51,702.541 | 44.46 | NA | 41.88% |
| 2029 | 6,038.001 | 1,754.751 | 4,283.250 | 2,529.016 | 343.088 | 3,784.935 | 25.023 | 23,682.060 | 52,203.706 | 45.36 | NA | 41.88% |
| 2030 | 6,200.876 | 1,831.190 | 4,369.686 | 2,597.236 | 350.012 | 3,888.635 | 25.961 | 24,397.209 | 52,634.030 | 46.35 | NA | 41.88% |
| 2031 | 6,367.129 | 1,909.261 | 4,457.868 | 2,666.871 | 357.075 | 3,989.680 | 26.934 | 25,137.983 | 52,990.932 | 47.44 | NA | 41.88% |
| 2032 | 6,538.222 | 1,990.043 | 4,548.179 | 2,738.533 | 364.309 | 4,029.080 | 27.945 | 25,972.320 | 53,333.017 | 48.70 | NA | 41.88% |
| 2033 | 6,714.108 | 2,071.486 | 4,642.622 | 2,812.203 | 371.874 | 4,113.890 | 28.992 | 26,862.360 | 53,612.964 | 50.10 | NA | 41.88% |
| 2034 | 6,898.566 | 2,158.160 | 4,740.406 | 2,889.463 | 379.707 | 4,191.323 | 30.080 | 27,823.733 | 53,835.007 | 51.68 | NA | 41.88% |
| 2035 | 7,090.432 | 2,249.928 | 4,840.505 | 2,969.827 | 387.724 | 4,263.239 | 31.208 | 28,870.690 | 54,001.158 | 53.46 | NA | 41.88% |
| 2036 | 7,287.327 | 2,344.140 | 4,943.187 | 3,052.296 | 395.949 | 4,329.297 | 32.378 | 30,017.853 | 54,113.695 | 55.47 | NA | 41.88% |
| 2037 | 7,489.659 | 2,441.657 | 5,048.002 | 3,137.043 | 404.345 | 4,389.892 | 33.592 | 31,280.634 | 54,174.620 | 57.74 | NA | 41.88% |
| 2038 | 7,696.731 | 2,540.709 | 5,156.021 | 3,223.775 | 412.997 | 4,443.828 | 34.852 | 32,676.587 | 54,187.734 | 60.30 | NA | 41.88% |
| 2039 | 7,910.447 | 2,642.251 | 5,268.196 | 3,313.289 | 421.983 | 4,488.370 | 36.159 | 34,228.272 | 54,160.651 | 63.20 | NA | 41.88% |
| 2040 | 8,132.638 | 2,747.879 | 5,384.759 | 3,406.354 | 431.319 | 4,523.085 | 37.515 | 35,961.148 | 54,102.367 | 66.47 | NA | 41.88% |
| 2041 | 8,359.868 | 2,851.612 | 5,508.257 | 3,501.530 | 441.211 | 4,546.761 | 38.922 | 37,902.491 | 54,024.838 | 70.16 | NA | 41.88% |
| 2042 | 8,598.501 | 2,961.946 | 5,636.555 | 3,601.481 | 451.488 | 4,556.250 | 40.381 | 40,087.397 | 53,944.450 | 74.31 | NA | 41.88% |
| 2043 | 8,845.743 | 3,077.672 | 5,768.071 | 3,705.038 | 462.022 | 4,558.209 | 41.895 | 42,545.267 | 53,871.034 | 78.98 | NA | 41.88% |
| 2044 | 9,101.284 | 3,199.939 | 5,901.344 | 3,812.071 | 472.698 | 4,551.566 | 43.466 | 45,308.485 | 53,815.536 | 84.19 | NA | 41.88% |
| 2045 | 9,362.156 | 3,325.503 | 6,036.653 | 3,921.338 | 483.536 | 4,537.408 | 45.096 | 48,409.393 | 53,788.215 | 90.00 | NA | 41.88% |

[1] *Payroll shown is pensionable pay. It does not include amounts in excess of the pay cap that is applicable to members hired on or after January 1, 2011, participating in the Traditional and Portable plans.*
[2] *Excludes SMP contributions.*

# TABLE 18

## HYPOTHETICAL ASSETS TO DETERMINE MAXIMUM CONTRIBUTION

## PROJECTIONS – DOES NOT REFLECT RECOGNITION OF DEFERRED ASSET GAINS AND LOSSES IN PROJECTED ACTUARIAL VALUE OF ASSETS (BEFORE IMPACT OF BONDS ISSUED IN 2004)

## ASSUMES INVESTMENT RETURN OF 7.25% EACH YEAR ON ACTUARIAL VALUE OF ASSETS

## ($ IN MILLIONS)

| Fiscal Year Ending | Total Payroll [1] | SMP Payroll | DB Payroll [1] | SURS Contributions [2] | Member Contributions | Benefits | Expenses | Assets EOY | AAL | Funding Ratio | Debt Service | SURS Contribution % of Total Payroll |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2016 | $ 4,218.369 | $ 832.241 | $ 3,386.128 | $ 1,712.191 | $ 278.884 | $ 2,320.829 | $ 14.731 | $ 15,405.863 | $ 40,923.301 | 37.65 % | NA | 40.59% |
| 2017 | 4,504.820 | 966.098 | 3,538.722 | 1,790.557 | 283.452 | 2,443.278 | 16.087 | 16,123.708 | 42,088.124 | 38.31 | NA | 39.75% |
| 2018 | 4,587.731 | 1,023.748 | 3,563.983 | 1,871.178 | 285.475 | 2,543.118 | 16.690 | 16,875.163 | 43,224.186 | 39.04 | NA | 40.79% |
| 2019 | 4,688.014 | 1,084.619 | 3,603.395 | 1,912.080 | 288.632 | 2,653.015 | 17.316 | 17,612.266 | 44,319.679 | 39.74 | NA | 40.79% |
| 2020 | 4,799.410 | 1,148.440 | 3,650.970 | 1,957.515 | 292.443 | 2,766.016 | 17.966 | 18,336.112 | 45,369.558 | 40.42 | NA | 40.79% |
| 2021 | 4,915.765 | 1,209.908 | 3,705.857 | 2,004.972 | 296.839 | 2,879.734 | 18.639 | 19,047.670 | 46,370.278 | 41.08 | NA | 40.79% |
| 2022 | 5,038.629 | 1,274.388 | 3,764.242 | 2,055.084 | 301.516 | 2,995.054 | 19.338 | 19,747.406 | 47,318.093 | 41.73 | NA | 40.79% |
| 2023 | 5,166.016 | 1,339.165 | 3,826.852 | 2,107.041 | 306.531 | 3,112.241 | 20.063 | 20,434.762 | 48,208.404 | 42.39 | NA | 40.79% |
| 2024 | 5,300.699 | 1,406.699 | 3,894.000 | 2,161.973 | 311.909 | 3,227.993 | 20.816 | 21,113.756 | 49,039.449 | 43.05 | NA | 40.79% |
| 2025 | 5,438.496 | 1,474.065 | 3,964.431 | 2,218.176 | 317.551 | 3,346.822 | 21.596 | 21,782.155 | 49,804.454 | 43.74 | NA | 40.79% |
| 2026 | 5,579.920 | 1,541.169 | 4,038.750 | 2,275.858 | 323.504 | 3,463.115 | 22.406 | 22,443.640 | 50,502.434 | 44.44 | NA | 40.79% |
| 2027 | 5,727.461 | 1,611.361 | 4,116.100 | 2,336.034 | 329.700 | 3,574.282 | 23.246 | 23,105.823 | 51,134.715 | 45.19 | NA | 40.79% |
| 2028 | 5,879.540 | 1,681.267 | 4,198.273 | 2,398.062 | 336.282 | 3,680.572 | 24.118 | 23,776.089 | 51,702.541 | 45.99 | NA | 40.79% |
| 2029 | 6,038.001 | 1,754.751 | 4,283.250 | 2,462.693 | 343.088 | 3,784.935 | 25.023 | 24,459.915 | 52,203.706 | 46.85 | NA | 40.79% |
| 2030 | 6,200.876 | 1,831.190 | 4,369.686 | 2,529.124 | 350.012 | 3,888.635 | 25.961 | 25,160.921 | 52,634.030 | 47.80 | NA | 40.79% |
| 2031 | 6,367.129 | 1,909.261 | 4,457.868 | 2,596.933 | 357.075 | 3,989.680 | 26.934 | 25,884.635 | 52,990.932 | 48.85 | NA | 40.79% |
| 2032 | 6,538.222 | 1,990.043 | 4,548.179 | 2,666.716 | 364.309 | 4,029.080 | 27.945 | 26,698.730 | 53,333.017 | 50.06 | NA | 40.79% |
| 2033 | 6,714.108 | 2,071.486 | 4,642.622 | 2,738.454 | 371.874 | 4,113.890 | 28.992 | 27,565.059 | 53,612.964 | 51.41 | NA | 40.79% |
| 2034 | 6,898.566 | 2,158.160 | 4,740.406 | 2,813.688 | 379.707 | 4,191.323 | 30.080 | 28,498.904 | 53,835.007 | 52.94 | NA | 40.79% |
| 2035 | 7,090.432 | 2,249.928 | 4,840.505 | 2,891.944 | 387.724 | 4,263.239 | 31.208 | 29,514.153 | 54,001.158 | 54.65 | NA | 40.79% |
| 2036 | 7,287.327 | 2,344.140 | 4,943.187 | 2,972.250 | 395.949 | 4,329.297 | 32.378 | 30,625.071 | 54,113.695 | 56.59 | NA | 40.79% |
| 2037 | 7,489.659 | 2,441.657 | 5,048.002 | 3,054.775 | 404.345 | 4,389.892 | 33.592 | 31,846.677 | 54,174.620 | 58.79 | NA | 40.79% |
| 2038 | 7,696.731 | 2,540.709 | 5,156.021 | 3,139.232 | 412.997 | 4,443.828 | 34.852 | 33,196.115 | 54,187.734 | 61.26 | NA | 40.79% |
| 2039 | 7,910.447 | 2,642.251 | 5,268.196 | 3,226.399 | 421.983 | 4,488.370 | 36.159 | 34,695.481 | 54,160.651 | 64.06 | NA | 40.79% |
| 2040 | 8,132.638 | 2,747.879 | 5,384.759 | 3,317.024 | 431.319 | 4,523.085 | 37.515 | 36,369.718 | 54,102.367 | 67.22 | NA | 40.79% |
| 2041 | 8,359.868 | 2,851.612 | 5,508.257 | 3,409.703 | 441.211 | 4,546.761 | 38.922 | 38,245.585 | 54,024.838 | 70.79 | NA | 40.79% |
| 2042 | 8,598.501 | 2,961.946 | 5,636.555 | 3,507.033 | 451.488 | 4,556.250 | 40.381 | 40,357.554 | 53,944.450 | 74.81 | NA | 40.79% |
| 2043 | 8,845.743 | 3,077.672 | 5,768.071 | 3,607.875 | 462.022 | 4,558.209 | 41.895 | 42,734.386 | 53,871.034 | 79.33 | NA | 40.79% |
| 2044 | 9,101.284 | 3,199.939 | 5,901.344 | 3,712.101 | 472.698 | 4,551.566 | 43.466 | 45,407.784 | 53,815.536 | 84.38 | NA | 40.79% |
| 2045 | 9,362.156 | 3,325.503 | 6,036.653 | 3,818.502 | 483.536 | 4,537.408 | 45.096 | 48,409.393 | 53,788.215 | 90.00 | NA | 40.79% |

[1] *Payroll shown is pensionable pay. It does not include amounts in excess of the pay cap that is applicable to members hired on or after January 1, 2011, participating in the Traditional and Portable plans.*
[2] *Excludes SMP contributions.*

# TABLE 19
# ADDITIONAL DETAILS
## ($ IN MILLIONS)

| Fiscal Year Ending | Total Normal Cost [1] | | | | Normal Cost with Admin Expense | | | | Expected Defined Benefit Plan Pay [2] | | | | Normal Cost Rate [2] | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Tier 2 | | | | Tier 2 | | | | Tier 2 | | | | Tier 2 | | |
| | Tier 1 | Current | Future | Total | Tier 1 | Current | Future | Total | Tier 1 | Current | Future | Total | Tier 1 | Current | Future | Total |
| 2017 | $ 624.170 | $ 78.968 | $ 0.000 | $ 703.138 | $ 636.667 | $ 82.558 | $ 0.000 | $ 719.225 | $ 2,731.381 | $ 784.519 | $ 0.000 | $ 3,515.900 | 23.31% | 10.52% | | 20.46% |
| 2018 | 596.352 | 73.829 | 23.479 | 693.660 | 608.568 | 77.191 | 24.592 | 710.351 | 2,585.212 | 711.424 | 235.467 | 3,532.103 | 23.54% | 10.85% | 10.44% | 20.11% |
| 2019 | 569.480 | 69.681 | 45.692 | 684.853 | 581.388 | 72.842 | 47.939 | 702.169 | 2,447.261 | 649.816 | 461.769 | 3,558.846 | 23.76% | 11.21% | 10.38% | 19.73% |
| 2020 | 542.945 | 66.943 | 67.227 | 677.115 | 554.490 | 69.965 | 70.626 | 695.081 | 2,314.788 | 605.841 | 681.471 | 3,602.100 | 23.95% | 11.55% | 10.36% | 19.30% |
| 2021 | 517.165 | 65.200 | 87.503 | 669.868 | 528.345 | 68.146 | 92.016 | 688.507 | 2,188.248 | 576.720 | 883.303 | 3,648.271 | 24.14% | 11.82% | 10.42% | 18.87% |
| 2022 | 492.555 | 63.817 | 107.672 | 664.044 | 503.363 | 66.715 | 113.304 | 683.382 | 2,067.747 | 554.440 | 1,077.483 | 3,699.670 | 24.34% | 12.03% | 10.52% | 18.47% |
| 2023 | 468.522 | 62.630 | 128.201 | 659.353 | 478.942 | 65.488 | 134.986 | 679.416 | 1,951.015 | 535.198 | 1,270.430 | 3,756.643 | 24.55% | 12.24% | 10.63% | 18.09% |
| 2024 | 444.829 | 61.607 | 149.113 | 655.549 | 454.841 | 64.431 | 157.093 | 676.365 | 1,837.322 | 518.201 | 1,464.570 | 3,820.093 | 24.76% | 12.43% | 10.73% | 17.71% |
| 2025 | 421.492 | 60.713 | 170.225 | 652.430 | 431.086 | 63.507 | 179.433 | 674.026 | 1,726.397 | 502.799 | 1,656.952 | 3,886.148 | 24.97% | 12.63% | 10.83% | 17.34% |
| 2026 | 398.691 | 60.019 | 191.738 | 650.448 | 407.859 | 62.788 | 202.206 | 672.853 | 1,618.704 | 489.042 | 1,848.479 | 3,956.225 | 25.20% | 12.84% | 10.94% | 17.01% |
| 2027 | 376.317 | 59.563 | 213.432 | 649.312 | 385.051 | 62.315 | 225.193 | 672.559 | 1,513.856 | 476.937 | 2,038.518 | 4,029.311 | 25.44% | 13.07% | 11.05% | 16.69% |
| 2028 | 354.376 | 59.362 | 235.362 | 649.100 | 362.665 | 62.100 | 248.453 | 673.218 | 1,411.921 | 466.317 | 2,229.744 | 4,107.982 | 25.69% | 13.32% | 11.14% | 16.39% |
| 2029 | 332.616 | 59.405 | 257.322 | 649.343 | 340.456 | 62.135 | 271.775 | 674.366 | 1,312.552 | 456.965 | 2,419.491 | 4,189.008 | 25.94% | 13.60% | 11.23% | 16.10% |
| 2030 | 310.445 | 59.535 | 279.573 | 649.553 | 317.823 | 62.257 | 295.433 | 675.513 | 1,214.177 | 447.998 | 2,609.801 | 4,271.976 | 26.18% | 13.90% | 11.32% | 15.81% |
| 2031 | 287.660 | 59.680 | 302.236 | 649.576 | 294.560 | 62.394 | 319.555 | 676.509 | 1,116.267 | 439.045 | 2,801.722 | 4,357.034 | 26.39% | 14.21% | 11.41% | 15.53% |
| 2032 | 264.516 | 59.814 | 325.353 | 649.683 | 270.926 | 62.517 | 344.185 | 677.628 | 1,019.533 | 430.001 | 2,995.509 | 4,445.043 | 26.57% | 14.54% | 11.49% | 15.24% |
| 2033 | 241.861 | 59.916 | 348.766 | 650.543 | 247.781 | 62.606 | 369.149 | 679.536 | 926.246 | 420.794 | 3,189.225 | 4,536.265 | 26.75% | 14.88% | 11.57% | 14.98% |
| 2034 | 220.034 | 60.034 | 372.398 | 652.466 | 225.473 | 62.708 | 394.364 | 682.545 | 837.420 | 411.592 | 3,381.845 | 4,630.857 | 26.92% | 15.24% | 11.66% | 14.74% |
| 2035 | 198.305 | 60.219 | 396.343 | 654.867 | 203.263 | 62.877 | 419.935 | 686.075 | 751.147 | 402.710 | 3,574.208 | 4,728.065 | 27.06% | 15.61% | 11.75% | 14.51% |
| 2036 | 176.389 | 60.435 | 420.698 | 657.522 | 180.861 | 63.077 | 445.963 | 689.901 | 666.731 | 393.938 | 3,767.323 | 4,827.992 | 27.13% | 16.01% | 11.84% | 14.29% |
| 2037 | 154.459 | 60.532 | 445.412 | 660.403 | 158.443 | 63.151 | 472.400 | 693.994 | 584.719 | 384.461 | 3,960.612 | 4,929.792 | 27.10% | 16.43% | 11.93% | 14.08% |
| 2038 | 132.799 | 60.523 | 470.585 | 663.907 | 136.300 | 63.114 | 499.344 | 698.758 | 505.825 | 374.352 | 4,154.821 | 5,034.998 | 26.95% | 16.86% | 12.02% | 13.88% |
| 2039 | 112.193 | 60.442 | 496.081 | 668.716 | 115.231 | 62.999 | 526.645 | 704.875 | 432.113 | 363.877 | 4,348.438 | 5,144.428 | 26.67% | 17.31% | 12.11% | 13.70% |
| 2040 | 93.190 | 60.204 | 521.805 | 675.199 | 95.794 | 62.720 | 554.199 | 712.713 | 364.983 | 352.701 | 4,540.491 | 5,258.175 | 26.25% | 17.78% | 12.21% | 13.55% |
| 2041 | 76.884 | 59.747 | 547.742 | 684.373 | 79.106 | 62.212 | 581.976 | 723.294 | 307.076 | 340.630 | 4,730.840 | 5,378.546 | 25.76% | 18.26% | 12.30% | 13.45% |
| 2042 | 63.881 | 58.986 | 573.660 | 696.527 | 65.786 | 61.388 | 609.734 | 736.908 | 259.691 | 327.405 | 4,917.237 | 5,504.333 | 25.33% | 18.75% | 12.40% | 13.39% |
| 2043 | 53.278 | 57.883 | 599.686 | 710.847 | 54.915 | 60.210 | 637.618 | 752.743 | 220.133 | 312.901 | 5,100.983 | 5,634.017 | 24.95% | 19.24% | 12.50% | 13.36% |
| 2044 | 44.464 | 56.314 | 625.867 | 726.645 | 45.870 | 58.551 | 665.691 | 770.112 | 186.531 | 296.664 | 5,282.708 | 5,765.903 | 24.59% | 19.74% | 12.60% | 13.36% |
| 2045 | 37.120 | 54.238 | 652.223 | 743.581 | 38.327 | 56.368 | 693.982 | 788.677 | 157.907 | 278.669 | 5,462.974 | 5,899.550 | 24.27% | 20.23% | 12.70% | 13.37% |
| 2046 | 31.001 | 51.619 | 678.699 | 761.319 | 32.036 | 53.627 | 722.443 | 808.106 | 133.536 | 259.009 | 5,641.749 | 6,034.294 | 23.99% | 20.70% | 12.81% | 13.39% |

[1] *Normal Cost excludes expense portion.*
[2] *Expected pay for members in the defined benefit plans at June 30. Used to develop normal cost as a percent of pay.*

# TABLE 20
## ADDITIONAL DETAILS
### ($ IN MILLIONS)

| Fiscal | SMP Total | Number of Active Members | | | | Defined Benefit Plan Payroll [1] | | | | Member Contributions | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | Active | | Tier 2 | | | | Tier 2 | | | | Tier 2 | | |
| Ending | Members | Tier 1 | Current | Future | Total | Tier 1 | Current | Future | Total | Tier 1 | Current | Future | Total |
| 2016 | 11,880 | 46,144 | 20,101 | 0 | 66,245 | $ 2,682.049 | $ 704.079 | $ 0.000 | $ 3,386.128 | | | | $ 278.884 |
| 2017 | 13,321 | 41,402 | 16,789 | 6,613 | 64,804 | 2,592.718 | 718.619 | 227.386 | 3,538.723 | 207.677 | 57.561 | 18.214 | 283.452 |
| 2018 | 14,628 | 37,106 | 13,903 | 12,488 | 63,497 | 2,456.684 | 655.205 | 452.094 | 3,563.983 | 196.780 | 52.482 | 36.213 | 285.475 |
| 2019 | 15,791 | 33,266 | 11,589 | 17,479 | 62,334 | 2,326.866 | 605.428 | 671.100 | 3,603.394 | 186.382 | 48.495 | 53.755 | 288.632 |
| 2020 | 16,619 | 30,106 | 10,302 | 21,099 | 61,507 | 2,200.143 | 573.501 | 877.326 | 3,650.970 | 176.231 | 45.937 | 70.274 | 292.442 |
| 2021 | 17,267 | 27,372 | 9,426 | 24,058 | 60,856 | 2,080.906 | 550.980 | 1,073.971 | 3,705.857 | 166.681 | 44.133 | 86.025 | 296.839 |
| 2022 | 17,845 | 24,882 | 8,680 | 26,720 | 60,282 | 1,965.415 | 531.602 | 1,267.224 | 3,764.241 | 157.430 | 42.581 | 101.505 | 301.516 |
| 2023 | 18,364 | 22,597 | 8,034 | 29,129 | 59,760 | 1,853.175 | 514.806 | 1,458.871 | 3,826.852 | 148.439 | 41.236 | 116.856 | 306.531 |
| 2024 | 18,833 | 20,492 | 7,470 | 31,330 | 59,292 | 1,743.278 | 499.666 | 1,651.055 | 3,893.999 | 139.637 | 40.023 | 132.250 | 311.910 |
| 2025 | 19,252 | 18,557 | 6,974 | 33,343 | 58,874 | 1,636.344 | 485.743 | 1,842.344 | 3,964.431 | 131.071 | 38.908 | 147.572 | 317.551 |
| 2026 | 19,627 | 16,774 | 6,541 | 35,182 | 58,497 | 1,532.569 | 473.656 | 2,032.526 | 4,038.751 | 122.759 | 37.940 | 162.805 | 323.504 |
| 2027 | 19,972 | 15,120 | 6,156 | 36,878 | 58,154 | 1,431.082 | 462.702 | 2,222.316 | 4,116.100 | 114.630 | 37.062 | 178.008 | 329.700 |
| 2028 | 20,281 | 13,599 | 5,817 | 38,429 | 57,845 | 1,332.992 | 453.337 | 2,411.945 | 4,198.274 | 106.773 | 36.312 | 193.197 | 336.282 |
| 2029 | 20,559 | 12,182 | 5,508 | 39,876 | 57,566 | 1,236.429 | 444.700 | 2,602.121 | 4,283.250 | 99.038 | 35.620 | 208.430 | 343.088 |
| 2030 | 20,818 | 10,854 | 5,219 | 41,236 | 57,309 | 1,140.206 | 435.971 | 2,793.509 | 4,369.686 | 91.330 | 34.921 | 223.760 | 350.011 |
| 2031 | 21,060 | 9,611 | 4,944 | 42,508 | 57,063 | 1,044.540 | 427.273 | 2,986.055 | 4,457.868 | 83.668 | 34.225 | 239.183 | 357.076 |
| 2032 | 21,295 | 8,463 | 4,683 | 43,684 | 56,830 | 950.662 | 418.306 | 3,179.210 | 4,548.178 | 76.148 | 33.506 | 254.655 | 364.309 |
| 2033 | 21,509 | 7,425 | 4,435 | 44,755 | 56,615 | 861.879 | 409.279 | 3,371.464 | 4,642.622 | 69.036 | 32.783 | 270.054 | 371.873 |
| 2034 | 21,710 | 6,474 | 4,202 | 45,740 | 56,416 | 776.689 | 400.346 | 3,563.370 | 4,740.405 | 62.213 | 32.068 | 285.426 | 379.707 |
| 2035 | 21,896 | 5,586 | 3,986 | 46,658 | 56,230 | 692.831 | 391.936 | 3,755.737 | 4,840.504 | 55.496 | 31.394 | 300.835 | 387.725 |
| 2036 | 22,065 | 4,770 | 3,778 | 47,512 | 56,060 | 611.322 | 383.240 | 3,948.626 | 4,943.188 | 48.967 | 30.697 | 316.285 | 395.949 |
| 2037 | 22,225 | 4,011 | 3,574 | 48,315 | 55,900 | 532.171 | 373.503 | 4,142.328 | 5,048.002 | 42.627 | 29.918 | 331.800 | 404.345 |
| 2038 | 22,376 | 3,322 | 3,379 | 49,048 | 55,749 | 456.821 | 363.652 | 4,335.549 | 5,156.022 | 36.591 | 29.129 | 347.277 | 412.997 |
| 2039 | 22,512 | 2,718 | 3,189 | 49,706 | 55,613 | 387.930 | 353.056 | 4,527.210 | 5,268.196 | 31.073 | 28.280 | 362.630 | 421.983 |
| 2040 | 22,630 | 2,193 | 3,003 | 50,297 | 55,493 | 325.489 | 341.796 | 4,717.474 | 5,384.759 | 26.072 | 27.378 | 377.870 | 431.320 |
| 2041 | 22,728 | 1,780 | 2,817 | 50,800 | 55,397 | 274.874 | 329.376 | 4,904.007 | 5,508.257 | 22.017 | 26.383 | 392.811 | 441.211 |
| 2042 | 22,806 | 1,450 | 2,631 | 51,238 | 55,319 | 232.947 | 315.782 | 5,087.825 | 5,636.554 | 18.659 | 25.294 | 407.535 | 451.488 |
| 2043 | 22,874 | 1,182 | 2,443 | 51,626 | 55,251 | 197.587 | 300.817 | 5,269.667 | 5,768.071 | 15.827 | 24.095 | 422.100 | 462.022 |
| 2044 | 22,934 | 964 | 2,249 | 51,978 | 55,191 | 167.265 | 283.791 | 5,450.288 | 5,901.344 | 13.398 | 22.732 | 436.568 | 472.698 |
| 2045 | 22,986 | 788 | 2,053 | 52,298 | 55,139 | 141.644 | 265.391 | 5,629.618 | 6,036.653 | 11.346 | 21.258 | 450.932 | 483.536 |

[1] *Payroll shown is pensionable pay at the valuation date. It does not include amounts in excess of the pay cap that is applicable to members hired on or after January 1, 2011, participating in the Traditional and Portable plans.*

# TABLE 21
## ADDITIONAL DETAILS
### ($ IN MILLIONS)

| Fiscal Year Ending | Present Value of Future Benefits | | | | | |
|---|---|---|---|---|---|---|
| | Current Retirees | Current Inactives | Tier 1 Actives | Tier 2 Actives Current | Tier 2 Actives Future | Total |
| 2016 | $ 27,342.202 | $ 2,560.410 | $ 15,733.687 | $ 1,072.789 | $ 0.000 | $ 46,709.088 |
| 2017 | 26,970.776 | 2,694.671 | 16,779.256 | 1,120.496 | 198.118 | 47,763.317 |
| 2018 | 26,564.267 | 2,824.031 | 17,829.305 | 1,164.572 | 419.365 | 48,801.540 |
| 2019 | 26,113.128 | 2,952.026 | 18,875.122 | 1,209.937 | 666.744 | 49,816.957 |
| 2020 | 25,617.444 | 3,077.867 | 19,908.917 | 1,259.241 | 934.790 | 50,798.259 |
| 2021 | 25,077.643 | 3,199.737 | 20,925.109 | 1,317.775 | 1,224.300 | 51,744.564 |
| 2022 | 24,494.293 | 3,314.130 | 21,918.848 | 1,387.229 | 1,537.403 | 52,651.903 |
| 2023 | 23,868.320 | 3,419.838 | 22,885.533 | 1,467.099 | 1,872.945 | 53,513.735 |
| 2024 | 23,200.959 | 3,515.170 | 23,821.245 | 1,557.604 | 2,232.110 | 54,327.088 |
| 2025 | 22,493.792 | 3,600.088 | 24,718.989 | 1,657.418 | 2,614.534 | 55,084.821 |
| 2026 | 21,748.833 | 3,673.787 | 25,577.424 | 1,764.075 | 3,020.519 | 55,784.638 |
| 2027 | 20,968.392 | 3,737.030 | 26,388.192 | 1,875.528 | 3,459.859 | 56,429.001 |
| 2028 | 20,155.142 | 3,787.794 | 27,149.003 | 1,992.000 | 3,933.449 | 57,017.388 |
| 2029 | 19,312.195 | 3,823.905 | 27,855.476 | 2,113.728 | 4,443.746 | 57,549.050 |
| 2030 | 18,443.035 | 3,843.884 | 28,500.213 | 2,240.786 | 4,992.964 | 58,020.882 |
| 2031 | 17,551.530 | 3,846.318 | 29,076.926 | 2,373.236 | 5,582.791 | 58,430.801 |
| 2032 | 16,641.913 | 3,891.021 | 29,578.493 | 2,511.028 | 6,214.418 | 58,836.873 |
| 2033 | 15,718.758 | 3,925.968 | 30,003.474 | 2,654.089 | 6,888.554 | 59,190.843 |
| 2034 | 14,786.998 | 3,950.804 | 30,349.168 | 2,802.421 | 7,607.692 | 59,497.083 |
| 2035 | 13,851.764 | 3,965.738 | 30,610.324 | 2,956.093 | 8,374.443 | 59,758.362 |
| 2036 | 12,918.332 | 3,970.872 | 30,782.111 | 3,115.097 | 9,190.960 | 59,977.372 |
| 2037 | 11,992.128 | 3,964.676 | 30,861.668 | 3,279.009 | 10,059.808 | 60,157.289 |
| 2038 | 11,078.656 | 3,946.796 | 30,846.146 | 3,447.391 | 10,981.834 | 60,300.823 |
| 2039 | 10,183.319 | 3,917.713 | 30,734.993 | 3,619.808 | 11,958.285 | 60,414.118 |
| 2040 | 9,311.356 | 3,876.842 | 30,529.721 | 3,795.854 | 12,991.406 | 60,505.179 |
| 2041 | 8,467.740 | 3,824.584 | 30,233.570 | 3,974.724 | 14,081.320 | 60,581.938 |
| 2042 | 7,657.079 | 3,761.693 | 29,854.318 | 4,155.064 | 15,230.757 | 60,658.911 |
| 2043 | 6,883.509 | 3,688.440 | 29,394.945 | 4,335.423 | 16,441.951 | 60,744.268 |
| 2044 | 6,150.660 | 3,605.511 | 28,860.587 | 4,514.023 | 17,717.504 | 60,848.285 |
| 2045 | 5,461.543 | 3,513.355 | 28,257.614 | 4,688.555 | 19,059.372 | 60,980.439 |

| Fiscal Year Ending | Benefit Payments | | | | | |
|---|---|---|---|---|---|---|
| | Current Retirees | Current Inactives | Tier 1 Actives | Tier 2 Actives Current | Tier 2 Actives Future | Total |
| 2016 | | | | | | $ 2,320.829 |
| 2017 | 2,272.788 | 49.602 | 91.852 | 29.036 | 0.000 | 2,443.278 |
| 2018 | 2,280.663 | 63.734 | 160.723 | 35.881 | 2.117 | 2,543.118 |
| 2019 | 2,295.299 | 74.107 | 238.320 | 37.723 | 7.566 | 2,653.015 |
| 2020 | 2,306.730 | 85.148 | 323.143 | 37.095 | 13.899 | 2,766.015 |
| 2021 | 2,314.628 | 97.793 | 412.512 | 31.635 | 23.166 | 2,879.734 |
| 2022 | 2,318.890 | 113.544 | 505.334 | 25.188 | 32.098 | 2,995.054 |
| 2023 | 2,319.209 | 129.938 | 601.025 | 19.992 | 42.077 | 3,112.241 |
| 2024 | 2,315.351 | 147.358 | 698.608 | 15.314 | 51.361 | 3,227.992 |
| 2025 | 2,307.068 | 164.087 | 800.776 | 12.661 | 62.231 | 3,346.823 |
| 2026 | 2,294.055 | 180.866 | 901.582 | 13.041 | 73.571 | 3,463.115 |
| 2027 | 2,276.164 | 196.122 | 1,007.704 | 15.877 | 78.415 | 3,574.282 |
| 2028 | 2,253.208 | 212.599 | 1,112.703 | 18.833 | 83.229 | 3,680.572 |
| 2029 | 2,224.952 | 230.301 | 1,218.434 | 21.912 | 89.335 | 3,784.934 |
| 2030 | 2,191.250 | 248.406 | 1,327.506 | 25.287 | 96.185 | 3,888.634 |
| 2031 | 2,151.981 | 266.748 | 1,438.325 | 28.975 | 103.651 | 3,989.680 |
| 2032 | 2,107.059 | 226.102 | 1,551.261 | 33.089 | 111.570 | 4,029.081 |
| 2033 | 2,056.451 | 238.652 | 1,660.326 | 37.647 | 120.813 | 4,113.889 |
| 2034 | 2,000.133 | 250.862 | 1,766.638 | 42.574 | 131.117 | 4,191.324 |
| 2035 | 1,938.260 | 262.162 | 1,872.469 | 47.800 | 142.548 | 4,263.239 |
| 2036 | 1,871.046 | 272.671 | 1,977.047 | 53.410 | 155.123 | 4,329.297 |
| 2037 | 1,798.720 | 283.970 | 2,078.132 | 59.803 | 169.267 | 4,389.892 |
| 2038 | 1,721.586 | 294.819 | 2,175.510 | 66.962 | 184.951 | 4,443.828 |
| 2039 | 1,640.126 | 304.385 | 2,266.766 | 74.852 | 202.241 | 4,488.370 |
| 2040 | 1,554.875 | 313.732 | 2,349.866 | 83.420 | 221.192 | 4,523.085 |
| 2041 | 1,466.460 | 321.865 | 2,423.249 | 93.016 | 242.170 | 4,546.760 |
| 2042 | 1,375.580 | 328.474 | 2,482.760 | 104.119 | 265.316 | 4,556.249 |
| 2043 | 1,283.013 | 334.077 | 2,533.576 | 116.726 | 290.816 | 4,558.208 |
| 2044 | 1,189.537 | 338.293 | 2,573.823 | 131.050 | 318.862 | 4,551.565 |
| 2045 | 1,096.005 | 341.397 | 2,602.669 | 147.482 | 349.856 | 4,537.409 |

| Fiscal Year Ending | Actuarial Accrued Liability | | | | | |
|---|---|---|---|---|---|---|
| | Current Retirees | Current Inactives | Tier 1 Actives | Tier 2 Actives Current | Tier 2 Actives Future | Total |
| 2016 | $ 27,342.202 | $ 2,560.410 | $ 10,779.979 | $ 240.710 | $ 0.000 | $ 40,923.301 |
| 2017 | 26,970.776 | 2,694.671 | 12,112.805 | 309.872 | 0.000 | 42,088.124 |
| 2018 | 26,564.267 | 2,824.031 | 13,442.128 | 371.637 | 22.123 | 43,224.186 |
| 2019 | 26,113.128 | 2,952.026 | 14,759.638 | 431.676 | 63.211 | 44,319.679 |
| 2020 | 25,617.444 | 3,077.867 | 16,057.343 | 493.884 | 123.021 | 45,369.559 |
| 2021 | 25,077.643 | 3,199.737 | 17,329.879 | 564.451 | 198.569 | 46,370.279 |
| 2022 | 24,494.293 | 3,314.130 | 18,573.062 | 645.378 | 291.230 | 47,318.093 |
| 2023 | 23,868.320 | 3,419.838 | 19,782.387 | 736.325 | 401.535 | 48,208.405 |
| 2024 | 23,200.959 | 3,515.170 | 20,953.792 | 837.650 | 531.879 | 49,039.450 |
| 2025 | 22,493.792 | 3,600.088 | 22,080.150 | 948.143 | 682.280 | 49,804.453 |
| 2026 | 21,748.833 | 3,673.787 | 23,160.159 | 1,065.534 | 854.121 | 50,502.434 |
| 2027 | 20,968.392 | 3,737.030 | 24,185.396 | 1,188.027 | 1,055.870 | 51,134.715 |
| 2028 | 20,155.142 | 3,787.794 | 25,153.501 | 1,316.132 | 1,289.972 | 51,702.541 |
| 2029 | 19,312.195 | 3,823.905 | 26,059.762 | 1,450.380 | 1,557.465 | 52,203.707 |
| 2030 | 18,443.035 | 3,843.884 | 26,895.811 | 1,590.999 | 1,860.301 | 52,634.030 |
| 2031 | 17,551.530 | 3,846.318 | 27,654.110 | 1,738.145 | 2,200.829 | 52,990.932 |
| 2032 | 16,641.913 | 3,891.021 | 28,326.460 | 1,891.837 | 2,581.786 | 53,333.017 |
| 2033 | 15,718.758 | 3,925.968 | 28,911.143 | 2,052.058 | 3,005.037 | 53,612.964 |
| 2034 | 14,786.998 | 3,950.804 | 29,405.513 | 2,218.915 | 3,472.777 | 53,835.007 |
| 2035 | 13,851.764 | 3,965.738 | 29,803.622 | 2,392.647 | 3,987.388 | 54,001.159 |
| 2036 | 12,918.332 | 3,970.872 | 30,099.595 | 2,573.389 | 4,551.507 | 54,113.695 |
| 2037 | 11,992.128 | 3,964.676 | 30,289.630 | 2,760.715 | 5,167.471 | 54,174.620 |
| 2038 | 11,078.656 | 3,946.796 | 30,370.164 | 2,954.198 | 5,837.920 | 54,187.734 |
| 2039 | 10,183.319 | 3,917.713 | 30,340.691 | 3,153.454 | 6,565.474 | 54,160.651 |
| 2040 | 9,311.356 | 3,876.842 | 30,203.342 | 3,358.037 | 7,352.791 | 54,102.368 |
| 2041 | 8,467.740 | 3,824.584 | 29,963.151 | 3,567.040 | 8,202.323 | 54,024.838 |
| 2042 | 7,657.079 | 3,761.693 | 29,630.450 | 3,778.910 | 9,116.318 | 53,944.450 |
| 2043 | 6,883.509 | 3,688.440 | 29,210.021 | 3,991.942 | 10,097.122 | 53,871.034 |
| 2044 | 6,150.660 | 3,605.511 | 28,708.303 | 4,203.960 | 11,147.102 | 53,815.536 |
| 2045 | 5,461.543 | 3,513.355 | 28,132.733 | 4,412.181 | 12,268.403 | 53,788.215 |

# APPENDIX F

## HISTORICAL SCHEDULES

# TABLE 22
## HISTORICAL SCHEDULE OF FUNDING STATUS
### ($ IN 000S)

| As of June 30 | Actuarial Value of Assets | AAL | UAAL | Funding Ratio | Payroll/DB* | UAAL as % of Payroll |
|---|---|---|---|---|---|---|
| 2001 | $ 10,753,297 | $ 14,915,317 | $4,162,020 | 72.10 % | $2,474,631 | 168.19 % |
| 2002 | 9,814,677 | 16,654,041 | 6,839,364 | 58.93 | 2,607,155 | 262.33 |
| 2003 | 9,714,547 | 18,025,032 | 8,310,485 | 53.89 | 2,763,428 | 300.73 |
| 2004 | 12,586,305 | 19,078,583 | 6,492,278 | 65.97 | 2,814,071 | 230.71 |
| 2005 | 13,350,278 | 20,349,922 | 6,999,644 | 65.60 | 2,939,185 | 238.15 |
| 2006 | 14,175,147 | 21,688,935 | 7,513,788 | 65.36 | 3,054,100 | 246.02 |
| 2007 | 15,985,730 | 23,362,079 | 7,376,349 | 68.43 | 3,180,985 | 231.89 |
| 2008 | 14,586,325 | 24,917,678 | 10,331,353 | 58.54 | 3,303,220 | 312.77 |
| 2009 | 11,032,973 | 26,316,231 | 15,283,258 | 41.92 | 3,463,922 | 441.21 |
| 2009 ** | 14,281,998 | 26,316,231 | 12,034,233 | 54.27 | 3,463,922 | 347.42 |
| 2010 *** | 13,966,643 | 30,120,427 | 16,153,784 | 46.37 | 3,491,071 | 462.72 |
| 2011 | 13,945,680 | 31,514,336 | 17,568,656 | 44.25 | 3,460,838 | 507.64 |
| 2012 | 13,949,905 | 33,170,216 | 19,220,311 | 42.06 | 3,477,166 | 552.76 |
| 2013 | 14,262,621 | 34,373,104 | 20,110,483 | 41.49 | 3,533,858 | 569.08 |
| 2014 *** | 15,844,714 | 37,429,515 | 21,584,801 | 42.33 | 3,522,246 | 612.81 |
| 2015 | 17,104,607 | 39,520,687 | 22,416,080 | 43.28 | 3,606,537 | 621.54 |
| 2016 | 17,701,646 | 40,923,301 | 23,221,655 | 43.26 | 3,513,108 | 661.00 |

*AAL - Actuarial Accrued Liability.*
*UAAL - Unfunded Actuarial Accrued Liability.*
** Payroll is rolled forward with salary scale for one year and uses capped payroll for members hired on and after January 1, 2011.*
*** Assets at Actuarial Value (Market Value through first 2009, then Actuarial Value).*
**** Investment rate of return assumption decreased from 8.50 percent to 7.75 percent in plan year 2010, and decreased from 7.75 percent to 7.25 percent in plan year 2014.*

# TABLE 23
## HISTORICAL SCHEDULE OF CONTRIBUTIONS
### ($ IN MILLIONS)

| Fiscal Year | (1) Total Normal Cost | (2) Amortization of UAAL | (3) (1) + (2) Total ADC | (4) Member Contributions | (5) (3) - (4) Net State ARC* | (6) Actual State Contribution | (7) (6) / (5) State Cont. as Percent of Net ARC |
|---|---|---|---|---|---|---|---|
| 2002 | | | $ 686.9 | $ 251.6 | $ 435.3 | $ 256.1 | 58.84 % |
| 2003 | | | 843.8 | 246.3 | 597.5 | 285.3 | 47.74 |
| 2004 | | | 934.8 | 243.8 | 691.0 | 1,757.5 | 254.36 |
| 2005 | | | 859.7 | 251.9 | 607.8 | 285.4 | 46.96 |
| 2006 | | | 914.9 | 252.9 | 662.0 | 180.0 | 27.19 |
| 2007 | | | 968.3 | 262.4 | 705.9 | 261.1 | 36.99 |
| 2008 | | | 971.6 | 264.1 | 707.5 | 344.9 | 48.75 |
| 2009 | | | 1,147.3 | 273.3 | 874.0 | 451.6 | 51.67 |
| 2010 ** | | | 1,278.3 | 275.0 | 1,003.3 | 696.6 | 69.43 |
| 2011 *** | $ 723.798 | $ 795.427 | 1,519.2 | 260.2 | 1,259.0 | 773.6 | 61.44 |
| 2012 | 700.972 | 1,000.612 | 1,701.584 | 258.236 | 1,443.348 | 985.815 | 68.30 |
| 2013 | 699.747 | 1,094.681 | 1,794.428 | 245.141 | 1,549.287 | 1,401.481 | 90.46 |
| 2014 | 698.225 | 1,145.380 | 1,843.605 | 283.081 | 1,560.524 | 1,502.864 | 96.31 |

**　ARC - Annual Required Contribution as defined in GASB Statements No. 25 and 27. The ARC is the Actuarially Determined Contribution ("ADC") net of member contributions.*
***　Assets at Actuarial Value (Market Value through 2009, then Actuarial Value beginning with fiscal year 2010).*
****　Investment rate of return assumption decreased from 8.50 percent to 7.75 percent in fiscal year 2011.*
*Beginning in fiscal year 2011, dollars are shown rounded to three decimal places.*

***Information beginning with fiscal year 2015 can be found in Table 11 of the report.***

# APPENDIX G

## Actuarial Methods and Assumptions

# PROJECTED UNIT CREDIT METHOD

The Projected Unit Credit Method is mandated under Section 15-155 as the funding method to be used for all purposes under SURS.

The concept of this method is that funding of benefits should occur as benefits are accrued (earned) by active members of SURS.

The Normal Cost ("NC") for a fiscal year under this method is the actuarial present value of all benefits expected to be accrued during the fiscal year adjusted for future expected salary increases. The Actuarial Accrued Liability ("AAL") under this method is the actuarial present value of all benefits accrued to the valuation date. To the extent that the assets of the fund are insufficient to cover the AAL, an Unfunded Actuarial Accrued Liability ("UAAL") develops. Under the classical application of this method, the contribution for a year is the NC for that year plus an amount to amortize the UAAL.

Under Section 15-155, the employer/State contribution is determined such that the assets of SURS reach 90% of the AAL by the end of FY 2045.

This contribution is determined as a level percentage of pay for all years except that the contribution rates through 2010 shall grade in equal steps to the desired level contribution rate. *We have assumed the contribution would be based on pensionable (capped) payroll for members hired on or after January 1, 2011 ("Tier 2 members").* Pensionable pay does not include amounts in excess of the pay cap ($111,572 in 2016, increased by the lesser of 3% and 1/2 of the increase in CPI-U as measured in the preceding 12-month calendar year) that is applicable to members hired on or after January 1, 2011, participating in the defined benefit plans.

# ASSET VALUATION METHOD

Prior to the valuation as of June 30, 2009, market value of assets was used. Under statue 15-155(l), beginning with the June 30, 2009, valuation, the asset value is the actuarial value of assets which is calculated by recognizing 20% of the investment gain or loss (the difference between the actual investment return and the expected investment return) on the market value of assets for each of the five following fiscal years. This method was not applied retroactively to recognize a portion of investment gains or losses from previous fiscal years.

Following is a table with the recent investment return assumptions.

| Valuation Date | Investment Return Assumption |
|---|---|
| Prior to June 30, 2010 | 8.50% |
| June 30, 2010 through June 30, 2013 | 7.75% |
| June 30, 2014 and after | 7.25% |

# ACTUARIAL ASSUMPTIONS (MOST ADOPTED EFFECTIVE WITH THE JUNE 30, 2015 ACTUARIAL VALUATION)

Under statute 15-155(a), the Board adopts the assumptions after consultation with the actuary. All actuarial assumptions are expectations of future experience and are not market measures. The rationale for the assumption may be found in the 2010-2014 experience study report issued to the Board of Trustees on January 16, 2015.

***Rate of Investment Return.*** For all purposes under the system the rate of investment return is assumed to be 7.25% per annum beginning with the **June 30, 2014**, valuation. This assumption is net of investment expenses.

***Price Inflation (Increase in Consumer Price Index "CPI").*** The assumed rate is 2.75% per annum.

***Effective Rate of Interest.*** The actuarial valuation assumed rate credited to member accounts is 7.00% per annum, beginning with the June 30, 2013, actuarial valuation.

***Cost of Living Adjustment "COLA."*** The assumed rate is 3.00% per annum for members hired before January 1, 2011, based on the benefit provision of 3.00% annual compound increases. The assumed rate is 1.375% for members hired on or after January 1, 2011, based on the benefit provision of increases equal to ½ of the increase in CPI with a maximum increase of 3.00%.

***Annual Compensation Increases.*** Each member's compensation is assumed to increase by 3.75% each year, 2.75% reflecting salary inflation and 1.00% reflecting standard of living increases. That rate is increased for members with less than 34 years of service. The total assumed increase follows:

| Service Year | Total Increase |
|---|---|
| 0 | 15.00% |
| 1 | 12.00% |
| 2 | 9.00% |
| 3 | 7.25% |
| 4 | 6.50% |
| 5 | 6.00% |
| 6 | 5.75% |
| 7 | 5.50% |
| 8 | 5.25% |
| 9 | 5.00% |
| 10 | 4.75% |
| 11 | 4.50% |
| 12-13 | 4.25% |
| 14-33 | 4.00% |
| 34+ | 3.75% |

***Payroll Growth.*** The assumed rate of total payroll growth is 3.75%.

# ACTUARIAL ASSUMPTIONS
# (MOST ADOPTED EFFECTIVE WITH THE JUNE 30, 2015 ACTUARIAL VALUATION)
# (CONTINUED)

***Mortality.*** The mortality assumptions are as follows:

| Base Table with 2014 Base Year | Male Set Forward | Female Set Forward | Male Multiplier | Female Multiplier |
|---|---|---|---|---|
| RP-2014 White Collar Employee, sex distinct (pre-retirement) | None | None | 110% pre 60, 80% at ages 60+ | 90% pre 60, 90% at ages 60+ |
| RP-2014 White Collar Healthy Annuitant, sex distinct (non-disabled post-retirement) | 1 year | 1 year | 100% | 100% |
| RP-2014 Disabled Annuitant, sex distinct (disabled post-retirement) | 9 years | 10 years | 100% | 100% |

The provision for future mortality improvement is based on the generational application of the MP-2014 improvement scales.

| | Future Life Expectancy (years) in 2016 | | | | Future Life Expectancy (years) in 2030 | | | |
|---|---|---|---|---|---|---|---|---|
| | Postretirement | | Disabled - Retiree | | Postretirement | | Disabled - Retiree | |
| Age | Male | Female | Male | Female | Male | Female | Male | Female |
| 35 | 51.99 | 54.08 | 29.64 | 34.42 | 53.33 | 55.36 | 31.72 | 36.32 |
| 40 | 46.75 | 48.86 | 26.21 | 30.34 | 48.08 | 50.14 | 28.14 | 32.12 |
| 45 | 41.61 | 43.71 | 23.01 | 26.55 | 42.91 | 44.97 | 24.74 | 28.18 |
| 50 | 36.57 | 38.63 | 19.95 | 22.89 | 37.84 | 39.86 | 21.50 | 24.37 |
| 55 | 31.67 | 33.63 | 16.96 | 19.26 | 32.90 | 34.82 | 18.33 | 20.61 |
| 60 | 26.91 | 28.71 | 14.06 | 15.74 | 28.07 | 29.87 | 15.25 | 16.97 |
| 65 | 22.29 | 23.99 | 11.28 | 12.51 | 23.38 | 25.09 | 12.34 | 13.60 |
| 70 | 17.89 | 19.49 | 8.72 | 9.70 | 18.91 | 20.53 | 9.63 | 10.65 |
| 75 | 13.82 | 15.29 | 6.49 | 7.35 | 14.76 | 16.25 | 7.24 | 8.13 |

# ACTUARIAL ASSUMPTIONS
# (MOST ADOPTED EFFECTIVE WITH THE JUNE 30, 2015
# ACTUARIAL VALUATION)
# (CONTINUED)

***Disability.*** A table of disability incidence with rates follows:

| Age | Male | Female | Age | Male | Female |
|---|---|---|---|---|---|
| 20 | 0.042% | 0.060% | 50 | 0.206% | 0.249% |
| 21 | 0.043% | 0.064% | 51 | 0.219% | 0.257% |
| 22 | 0.044% | 0.067% | 52 | 0.231% | 0.264% |
| 23 | 0.045% | 0.071% | 53 | 0.244% | 0.272% |
| 24 | 0.046% | 0.074% | 54 | 0.256% | 0.279% |
| 25 | 0.047% | 0.078% | 55 | 0.264% | 0.287% |
| 26 | 0.048% | 0.081% | 56 | 0.271% | 0.294% |
| 27 | 0.049% | 0.085% | 57 | 0.279% | 0.302% |
| 28 | 0.050% | 0.088% | 58 | 0.286% | 0.309% |
| 29 | 0.051% | 0.092% | 59 | 0.294% | 0.317% |
| 30 | 0.054% | 0.099% | 60 | 0.301% | 0.324% |
| 31 | 0.056% | 0.107% | 61 | 0.309% | 0.332% |
| 32 | 0.059% | 0.114% | 62 | 0.316% | 0.339% |
| 33 | 0.061% | 0.122% | 63 | 0.324% | 0.347% |
| 34 | 0.064% | 0.129% | 64 | 0.331% | 0.354% |
| 35 | 0.067% | 0.137% | 65 | 0.339% | 0.362% |
| 36 | 0.071% | 0.144% | 66 | 0.346% | 0.369% |
| 37 | 0.074% | 0.152% | 67 | 0.354% | 0.377% |
| 38 | 0.078% | 0.159% | 68 | 0.361% | 0.384% |
| 39 | 0.081% | 0.167% | 69 | 0.369% | 0.392% |
| 40 | 0.091% | 0.174% | 70 | 0.369% | 0.392% |
| 41 | 0.101% | 0.182% | 71 | 0.369% | 0.392% |
| 42 | 0.111% | 0.189% | 72 | 0.369% | 0.392% |
| 43 | 0.121% | 0.197% | 73 | 0.369% | 0.392% |
| 44 | 0.131% | 0.204% | 74 | 0.369% | 0.392% |
| 45 | 0.144% | 0.212% | 75 | 0.369% | 0.392% |
| 46 | 0.156% | 0.219% | 76 | 0.369% | 0.392% |
| 47 | 0.169% | 0.227% | 77 | 0.369% | 0.392% |
| 48 | 0.181% | 0.234% | 78 | 0.369% | 0.392% |
| 49 | 0.194% | 0.242% | 79 | 0.369% | 0.392% |

Disability rates apply during the retirement eligibility period.

# ACTUARIAL ASSUMPTIONS (MOST ADOPTED EFFECTIVE WITH THE JUNE 30, 2015 ACTUARIAL VALUATION) (CONTINUED)

***Retirement.*** Upon eligibility, active members are assumed to retire as follows:

| Age | Members Hired Before January 1, 2011 and Eligible for Normal Retirement | Members Hired Before January 1, 2011 and Eligible for Early Retirement | Members Hired on or after January 1, 2011 and Eligible for Normal Retirement | Members Hired on or after January 1, 2011 and Eligible for Early Retirement |
|---|---|---|---|---|
| Under 50 | 50.0% | - | - | - |
| 50 | 45.0 | - | - | - |
| 51 | 45.0 | - | - | - |
| 52 | 45.0 | - | - | - |
| 53 | 40.0 | - | - | - |
| 54 | 40.0 | - | - | - |
| 55 | 38.0 | 7.5% | - | - |
| 56 | 36.0 | 6.0 | - | - |
| 57 | 30.0 | 4.5 | - | - |
| 58 | 30.0 | 5.5 | - | - |
| 59 | 30.0 | 6.0 | - | - |
| 60 | 11.0 | - | - | - |
| 61 | 11.0 | - | - | - |
| 62 | 13.0 | - | - | 35.0% |
| 63 | 13.0 | - | - | 15.0 |
| 64 | 13.0 | - | - | 15.0 |
| 65 | 17.0 | - | - | 15.0 |
| 66 | 17.0 | - | - | 15.0 |
| 67 | 15.0 | - | 50.0% | - |
| 68 | 15.0 | - | 35.0 | - |
| 69 | 15.0 | - | 30.0 | - |
| 70-74 | 15.0 | - | 15.0 | - |
| 75-79 | 20.0 | - | 20.0 | - |
| 80+ | 100.0 | - | 100.0 | - |

Members that retire are assumed to elect the most valuable option on a present value basis – refund of contributions (or portable lump sum retirement, if applicable) or a retirement annuity.

# ACTUARIAL ASSUMPTIONS (MOST ADOPTED EFFECTIVE WITH THE JUNE 30, 2015 ACTUARIAL VALUATION) (CONTINUED)

***General Turnover.*** A table of termination rates based on experience in the 2010-2014 period. The assumption is a table of turnover rates by years of service. A sample of these rates follows:

| Years of Service | All Members |
|---|---|
| 0 | 20.00% |
| 1 | 20.00 |
| 2 | 15.00 |
| 3 | 14.00 |
| 4 | 12.00 |
| 5 | 10.00 |
| 6 | 9.00 |
| 7 | 7.50 |
| 8 | 6.75 |
| 9 | 6.00 |
| 10 | 5.25 |
| 11 | 4.50 |
| 12 | 4.00 |
| 13 | 3.70 |
| 14 | 3.20 |
| 15 | 3.00 |
| 16 | 3.00 |
| 17 | 3.00 |
| 18 | 3.00 |
| 19 | 3.00 |
| 20 | 2.50 |
| 21 | 2.50 |
| 22 | 2.50 |
| 23 | 2.50 |
| 24 | 2.50 |
| 25 | 2.00 |
| 26 | 2.00 |
| 27 | 2.00 |
| 28 | 2.00 |
| 29 | 2.00 |

Part-time members with less than 3 years of service (all members classified as part time for valuation purposes) are assumed to terminate at the valuation date.

Members that terminate with at least 5 years of service (10 years of service for Tier 2 members) are assumed to elect the most valuable option on a present value basis – refund of contributions or a deferred benefit.

Termination rate for 29 years of service used for Tier 2 members until retirement eligibility is met.

# ACTUARIAL ASSUMPTIONS (MOST ADOPTED EFFECTIVE WITH THE JUNE 30, 2015 ACTUARIAL VALUATION) (CONTINUED)

***Operational Expenses.*** The amount of operational expenses for administration incurred in the latest fiscal year are supplied by SURS staff and incorporated in the Normal Cost.

***Marital Status.*** Members are assumed to be married in the following proportions:

| Age | Males | Females |
|---|---|---|
| 20 | 25 % | 40 % |
| 30 | 70 | 75 |
| 40 | 80 | 80 |
| 50 | 85 | 80 |
| 60 | 85 | 70 |

***Spouse Age.*** The female spouse is assumed to be 3 years younger than the male spouse.

***Benefit Commencement Age.*** Inactive members eligible for a deferred benefit are assumed to commence benefits at their earliest normal retirement age. For Tier 1 members this is age 62 with at least 5 years of service, age 60 with at least 8 years of service, or immediately if at least 30 years of service. For Tier 2 members, this is age 67 with 10 or more years of service.

***Load on Final Average Salary.*** No load is assumed to account for higher than assumed pay increases in final years of employment before retirement.

***Load on Liabilities for Service Retirees With Non-finalized Benefits.*** A load of 10% on liabilities for service retirees whose benefits have not been finalized as of the valuation date is assumed to account for finalized benefits that on average are 10% higher than 100% of the preliminary estimated benefit. A load of 5% is used if a “best formula” benefit was provided in the data by Staff.

***Valuation of Inactives.*** An annuity benefit is estimated based on information provided by staff for Tier 1 inactive members with five or more years of service and Tier 2 members with 10 or more years of service.

***Assumption for Missing Data.*** Members with an unknown gender are assumed to be female. Active and inactive members with an unknown date of birth are assumed to be 37 years old at the valuation. An assumed spouse date of birth is calculated for current service retirees in the traditional plan for purposes of calculating future survivor benefits. The female spouse is assumed to be 3 years younger than the male spouse. 70% of current total male retirees and 80% of current total female retirees in the traditional plan that have not elected a survivor refund are assumed to have a spouse at the valuation date.

# ACTUARIAL ASSUMPTIONS (MOST ADOPTED EFFECTIVE WITH THE JUNE 30, 2015 ACTUARIAL VALUATION) (CONTINUED)

***Reciprocal Service.*** Reciprocal service is included for current inactive members for purposes of determining vesting eligibility and eligibility age to commence benefits.

The recently updated actuarial assumptions (including retirement and termination rates) were based on SURS service only. Therefore, reciprocal service was not included for current active members. Reciprocal service will be collected and analyzed in the future and will be considered in the next experience review.

***Projection Assumptions.*** The number of total active members throughout the projection period will remain the same as the total number of active members in the defined benefit plans and the SMP in the current valuation.

30% of total future hires will elect to participate in the Self Managed Plan.

New entrants have an average age of 37.1 and average capped pay of $37,154 and average uncapped pay of $38,672 (2016 dollars). These values are based on the average age and average pay of current members. The range profile is based on the age at hire and assumed pay at hire (using the actuarial assumptions, inflated to 2016 dollars) of current active members with service between one and four years.

| | | Average Pay | | | Average Pay | | | Average Pay | |
|---|---|---|---|---|---|---|---|---|---|
| Age | Number Males | Capped Male | Uncapped Male | Number Females | Capped Female | Uncapped Female | Total Number | Capped Total | Uncapped Total |
| <20 | 59 | $16,107 | $16,107 | 60 | $13,789 | $13,789 | 119 | $14,938 | $14,938 |
| 20 - 24 | 767 | 27,799 | 27,799 | 1,220 | 26,320 | 26,320 | 1,987 | 26,891 | 26,891 |
| 25 - 29 | 1,786 | 37,574 | 38,109 | 2,383 | 34,770 | 34,912 | 4,169 | 35,971 | 36,282 |
| 30 - 34 | 1,661 | 44,499 | 46,305 | 2,149 | 38,199 | 39,143 | 3,810 | 40,946 | 42,265 |
| 35 - 39 | 1,082 | 45,535 | 48,736 | 1,465 | 37,749 | 38,783 | 2,547 | 41,057 | 43,011 |
| 40 - 44 | 770 | 45,334 | 48,078 | 1,165 | 35,853 | 37,082 | 1,935 | 39,626 | 41,457 |
| 45 - 49 | 677 | 41,933 | 45,689 | 966 | 34,100 | 35,173 | 1,643 | 37,328 | 39,506 |
| 50 - 54 | 664 | 40,479 | 45,533 | 826 | 31,392 | 32,777 | 1,490 | 35,442 | 38,462 |
| 55 - 59 | 463 | 38,280 | 44,087 | 578 | 32,982 | 35,007 | 1,041 | 35,338 | 39,045 |
| 60 - 64 | 277 | 35,870 | 41,096 | 271 | 30,569 | 33,360 | 548 | 33,249 | 37,271 |
| 65 - 69 | 11 | 22,899 | 22,899 | 10 | 17,973 | 17,973 | 21 | 20,553 | 20,553 |
| Total | 8,217 | 40,239 | 42,621 | 11,093 | 34,378 | 35,227 | 19,310 | 36,872 | 38,373 |

***SMP Contribution Assumptions.*** The projected SMP contributions are equal to 7.6% of SMP payroll, plus estimated SMP expenses minus SMP employer forfeitures. Estimated SMP expenses for FY 2017 are $488,530 and actual FY 2016 SMP employer forfeitures used to reduce the certified contributions for FY 2018 are $5,284,434. Estimated SMP expenses for FY 2018 and after are assumed to increase by 2.75%. Estimated SMP employer forfeitures used to reduce the certified contributions for FY 2019 and after are assumed to be 7.5% of the gross SMP employer contribution.

# ACTUARIAL ASSUMPTIONS
# (MOST ADOPTED EFFECTIVE WITH THE JUNE 30, 2015 ACTUARIAL VALUATION)
# (CONTINUED)

***Pensionable Earnings Greater than 6%.*** No additional assumption was made for earnings used in the calculation of the final average compensation. The participant's employer is required to pay the present value of the increase in benefits resulting from the portion of the increase in excess of 6.00%.

# APPENDIX H

## SUMMARY OF BENEFIT PROVISIONS OF TRADITIONAL SURS

**It should be noted that the purpose of this Appendix is to describe the benefit structures of SURS for which actuarial values have been generated. There is no description of the Self Managed Plan (SMP) and many portions of the defined plans are described in a manner which is not legally complete or precise.**

**It is not our intent to provide an exhaustive description of all benefits provided under SURS or the policies and procedures utilized by SURS staff. A more precise description of the provisions of SURS is contained in the Member's Guide, published by SURS staff. Of course, the statute is controlling.**

# GENERAL

## Plans

There are two defined benefit plans available under SURS, the Traditional Plan and the Portable Plan, and one defined contribution plan, the Self Managed Plan (SMP). A Member must select one of these plans within the first six months of participation. If no choice is made in that time, the Traditional Plan is deemed chosen. A new tier of benefits was established for members hired on or after January 1, 2011. Members hired before January 1, 2011, ("Tier 1 members") are not subject to a pay cap. Members hired on or after January 1, 2011, ("Tier 2 members") are eligible to choose one of the benefit plans. Tier 2 members that participate in the Traditional and Portable Plans are subject to the pay cap established under Public Act 96-0889. The pay cap history is as follows:

| Year | CPI-U | ½ CPI-U | Pensionable Pay Cap |
|---|---|---|---|
| 2011 | | | $106,800.00 |
| 2012 | 3.90% | 1.95% | $108,882.60 |
| 2013 | 2.00% | 1.00% | $109,971.43 |
| 2014 | 1.20% | 0.60% | $110,631.26 |
| 2015 | 1.70% | 0.85% | $111,571.63 |
| 2016 | 0.00% | 0.00% | $111,571.63 |

The pay cap is calculated annually by the Illinois Department of Insurance.

The Self Managed Plan is a defined contribution plan under which members contribute 8.0% of compensation and the State contributes 7.6% of compensation. A portion of the employer contribution is used to fund disability benefits for SMP participants. Members hired on or after January 1, 2011, who participate in the SMP are not subject to the pay cap established under Public Act 96-0889.

The provisions of the defined benefit plans are identical in many areas. The description below is primarily of the Traditional Plan. Where different, the Portable plan provisions will be described in *italics.*

## Member Contributions

Most members contribute a total of 8% of compensation. Police officers and firefighters contribute a total of 9.5% of compensation, with the additional 1.5% allocated to the retirement annuity.

The total contribution is broken down as follows:

| | Police/Fire | All Others |
|---|---|---|
| Retirement Annuity | 8.0% | 6.5% |
| Survivor Benefits | 1.0% | 1.0% |
| Annual Increases in Retirement Benefits | 0.5% | 0.5% |
| Total Contribution | 9.5% | 8.0% |

*Portable Plan members contribute a total of 8% of compensation, but the breakdown set out above does not apply.*

The retirement annuity portion of the total contribution (8.0% of compensation for police officers and firefighters and 6.5% of compensation for all others) is annuitized for the money purchase formula (Rule 2) calculation.

Contributions for members hired on or after January 1, 2011, are assumed not to be made on pay in excess of $106,800 in 2011 ($111,572 in 2016), increased by the lesser of 3% and 1/2 of the increase in CPI-U as measured in the preceding 12-month calendar year.

Since January 1, 1981, the member contributions under SURS have been “picked up” by employers.

## Effective Rate of Interest

The Effective Rate of Interest (“ERI”) is the interest rate that is applied to member contribution balances. Effective for the 2006 fiscal year, the ERI for the purpose of determining the money purchase benefit is established by the State Comptroller annually. The ERI for other purposes such as the calculation of purchases of service credit, refunds for excess contributions, portable plan refunds and lump sum portable retirements is determined by the SURS Board annually and certified to the Governor. For purposes of the actuarial valuation, the assumed ERI is 7.00%.

For the purposes of withdrawal of contributions at termination or death by Traditional Plan Members, this rate is not greater than 4.5% by statute.

# RETIREMENT BENEFITS

## Normal Retirement:

### Eligibility

For police officers and firefighters, separation from service on or after the attainment of the earlier of:

1. Age 55 with 20 years of service, or
2. Age 50 with 25 years of service.

For other members hired before January 1, 2011, separation from service on or after attainment of the earlier of:

1. Age 62 with 5 years of service,
2. Age 60 with 8 years of service, and
3. 30 years of service regardless of age.

For members hired on or after January 1, 2011, separation from service on or after attainment age 67 with 10 years of service.

**Initial Benefit Amount**

There are 3 alternate formulae. The initial benefit is the largest produced by one of the three:

1. General Formula: The following percentages of high four consecutive year average compensation for each year of service:

| Year of Service | General | Police/Fire |
|---|---|---|
| 1st 10 Years | 2.20 % | 2.25 % |
| Next 10 Years | 2.20 | 2.50 |
| Over 20 | 2.20 | 2.75 |

   For members hired on or after January 1, 2011, the above percentages of high final eight consecutive year average compensation within the last 10 years of service for each year of service. The pay cap for 2010 through 2013 is shown in the table on the previous page. We have assumed the limit applies to individual pay amounts that are used to develop the final average compensation.

2. Money Purchase Formula:

   a) The member contributions for retirement benefits (8.0% of compensation for police officers and firefighters and 6.5% of compensation for all others) accumulated with interest at the ERI, plus

   b) An imputed employer contribution match at $1.40 per dollar of member contribution accumulated with interest at the ERI.

   c) The total of the accumulations in (a) and (b) is converted into an annuity using a life annuity factor that takes into account neither the automatic 50% spousal survivor benefit nor the automatic annual increases.

   Members hired on or after July 1, 2005, no longer receive the Money Purchase Formula under the plan.

3. Minimum Benefit – A benefit for each year of service, up to 30, based on final annual pay, as follows:

| | |
|---|---|
| Under 3,500 | $ 8 |
| $3,500 - $4,500 | 9 |
| $4,500 - $5,500 | 10 |
| $5,500 - $6,500 | 11 |
| $6,500 - $7,500 | 12 |
| $7,500 - $8,500 | 13 |
| $8,500 - $9,500 | 14 |
| Over $9,500 | 15 |

Minimum Retirement Annuity – No retiree shall receive a retirement annuity less than $25 per month for each year of service up to 30. The comparable benefit for survivor benefit recipients is $17.50 per month for each year of service up to 30.

**Maximum Benefit**

80% of high four-year average compensation for members hired before January 1, 2011, and 80% of final eight-year average for members hired on or after January 1, 2011.

Contribution waivers are applicable to members whose benefits are capped at 80% of final average compensation. Member contributions made once the maximum benefit is achieved are refunded to the member with interest (at the Effective Rate of Interest).

The present value of the benefits for pay increases in excess of 6% during the last four years prior to retirement will be paid by the employer. The employer will pay this amount in a lump sum to the Retirement System.

**Benefit Duration**

The Normal Retirement benefit is payable for the lifetime of the retired member. If the retiree under the Traditional Plan has a spouse at date of retirement and if that spouse survives the retiree the spouse will receive, upon the death of the retiree, a survivor benefit equal to 50% of the monthly benefit being paid to the retiree as of the date of death. Such benefit will continue for the lifetime of the surviving spouse.

The survivor benefit for members hired on or after January 1, 2011, is equal to 66 2/3% of the monthly benefit being paid to the retiree as of the date of death.

*For retirees under the Portable Plan, the normal form of benefit is a single-life annuity for unmarried participants and a reduced 50% joint and survivor benefit for married participants. With spousal consent, a member may designate a contingent annuitant to receive a joint and survivor annuity or elect a single-life annuity or lump sum distribution. Those providing a joint and survivor annuity will have their benefit reduced to cover the cost of the option. The available joint and survivor options are 50%, 75% and 100%. A member may elect the 75% or 100% spousal joint and survivor annuity without consent.*

*Portable Plan members may also elect to receive their retirement benefit as a lump sum equal to member contributions with an equal employer match (if have at least five years of service), accumulated with interest (at the Effective Rate of Interest that is certified annually by the SURS Board).*

**Annual Increases**

For members hired before January 1, 2011, each January 1 subsequent to retirement date the monthly benefit being paid each retiree shall be increased by 3%. The adjustment for the first January after retirement shall be proportional based on the portion of the year retired.

For members hired on or after January 1, 2011, each January 1 subsequent to retirement date the monthly benefit being paid each retiree shall be increased fifty percent of the Consumer

Price Index ("CPI") up to a maximum of 3% applied to the original benefit. The first increase will be granted upon the later of the attainment of age 67 or the first anniversary of the commencement of the annuity.

The historical development of the Annual Increase as determined by the Illinois Department of Insurance for members hired on or after January 1, 2011 can be found in the following table.

| Year | CPI-U | ½ CPI-U | Annual Increase |
|---|---|---|---|
| 2011 | | | 3.00% |
| 2012 | 3.90% | 1.95% | 1.95% |
| 2013 | 2.00% | 1.00% | 1.00% |
| 2014 | 1.20% | 0.60% | 0.60% |
| 2015 | 1.70% | 0.85% | 0.85% |
| 2016 | 0.00% | 0.00% | 0.00% |

## Early Retirement

### Eligibility

For members hired before January 1, 2011, other than police and fire employees, separation from service on or after attainment of age 55 with 8 years of service but not eligible for Normal Retirement. For members hired on or after January 1, 2011, separation from service on or after attainment of age 62 with 10 years of service but not eligible for Normal Retirement.

### Benefits

The benefit amounts and all terms of benefit payment are the same as that for Normal Retirement, except that the benefit amounts calculated under the General Formula and the Minimum Formula shall be reduced by .5% for each month by which the retirement date precedes the 60$^{th}$ birthday for members hired before January 1, 2011. The Minimum Formula shall be reduced by .5% for each month by which the retirement date precedes the 67$^{th}$ birthday for members hired on or after January 1, 2011.

# BENEFITS ON DEATH BEFORE RETIREMENT

## Survivor Benefits

## Traditional Plan

### Eligibility

Payable to eligible survivor(s) (spouse, child or dependent parent) for the death of an active member with at least 1.5 years of service or a terminated member with at least 10 years of service. For this purpose, service under the State Employees' Retirement System, the Teachers' Retirement System of the State of Illinois and the Public School Teachers' Pension Fund of Chicago is recognized.

### Benefits

For members hired before January 1, 2011, an annuity to the eligible survivor(s) equal to the greater of:

1. 50% of the benefit accrued to the date of the death of the member, and
2. The lowest applicable benefit from the following list:
   a) $400 per month to a single eligible survivor or $600 per month to two or more eligible survivors.
   b) 30% (one survivor), or 60% (two survivors), or 80% (three or more survivors) of the member's final rate of earnings.
   c) If member inactive, 80% of base retirement annuity.

For members hired on or after January1, 2011, an annuity to the survivor(s) equal to 66 2/3% of the benefit accrued to the date of the death of the member.

### Benefit Duration

*Surviving spouse*
May receive a lifetime benefit commencing at the later of the member's date of death and the spouse's attainment of age 50. May be payable at the date of death if a dependent child in their care is also receiving benefits.

*Dependent child*
Payable to unmarried child(ren) under age 18 (over 18 if disabled prior to age 18), and children age 18-22 if a qualified full-time student.

*Dependent parent*
Payable until dependency conditions are not met, so long as they were dependent upon the member at the time of their death.

### Annual Increases

For members hired before January 1, 2011, each January 1 subsequent to retirement date the monthly benefit being paid each survivor annuity recipient shall be increased by 3%. The adjustment for the first January after retirement shall be proportional.

For members hired on or after January 1, 2011, each January 1 subsequent to retirement date the monthly benefit being paid each survivor annuity recipient shall be increased fifty percent of the Consumer Price Index ("CPI") up to a maximum of 3% of the originally granted survivor annuity. The first increase will be granted upon January 1 following the first anniversary of the commencement of the annuity.

## Portable Plan

### Eligibility

Payable to an eligible spouse for the death of an active or inactive member with at least 1.5 years of SURS service.

### Benefits

An annuity to the eligible spouse equal to 50% of the member's earned retirement benefit after the reductions to pay for the cost of providing the pre-retirement survivor annuity. (Applicable to both Tier 1 and Tier 2 members.)

### Benefit Duration

*Surviving spouse*
May receive a lifetime benefit commencing at the member's earliest retirement age.

### Annual Increases

For members hired before January 1, 2011, each January 1 subsequent to retirement date the monthly benefit being paid each survivor annuity recipient shall be increased by 3%. The adjustment for the first January after retirement shall be proportional.

For members hired on or after January 1, 2011, each January 1 subsequent to retirement date the monthly benefit being paid each survivor annuity recipient shall be increased fifty percent of the Consumer Price Index ("CPI") up to a maximum of 3% of the originally granted survivor annuity. The first increase will be granted upon January 1 following the first anniversary of the commencement of the annuity.

## Lump Sum Death Benefit

### Eligibility

Death of member prior to retirement.

## Traditional Plan

### Benefit

With Eligible Survivor

- Refund of accumulated member contributions for retirement and annual adjustment at 4.5% interest

Without Eligible Survivor

- Refund of the total accumulated member contribution at 4.5% interest, and
- $5,000 to a dependent beneficiary or $2,500 to a non-dependent beneficiary

## Portable Plan

### Benefit

With Eligible Spouse

- Refund of total accumulated member contributions at the full Effective Rate of Interest, plus, if the member has at least 1.5 years of service at death, a like amount of imputed employer contributions – less the actuarial equivalent of the Pre-Retirement Survivor Annuity.

Without Eligible Spouse

- Refund of total accumulated member contributions at the full Effective Rate of Interest, plus, if the member has at least 1.5 years of service at death, a like amount of imputed employer contributions.

# BENEFITS ON DEATH AFTER RETIREMENT

In addition to survivor/spouse benefits payable from the System, the following death benefit is payable if a member does not have an eligible survivor/spouse/contingent annuitant:

- The greater of the total accumulated member contributions or $1,000.

# BENEFITS FOR DISABILITY

## Disability Benefit

### Eligibility

Disablement after completing 2 years of service. The service requirement is waived if the disablement is accidental.

Disability definition – inability to perform the duties of “own occupation.”

Pregnancy and childbirth are, by definition, disablement.

### Benefit

50% of the basic compensation paid at date of disablement. This base benefit level is offset dollar for dollar by each of the following:

1. Earnings while disabled in excess of the disability benefit.
2. Other disability insurance either fully or partially employer provided.
3. Worker’s compensation benefits.

### Duration of Benefit

Benefits become payable on the later of the termination of salary and sick leave, or the 61st day after disablement and continue to the earlier of the following:

1. Recovery or death.
2. Benefits paid equal 50% of total compensation during the period of SURS service.
3. If disablement occurs prior to age 65, the disability benefit may not continue past the August 31 following 70th birthday.
4. If disablement occurs at or after attainment of age 65, completion of 5 years in disablement.

Survivor and death benefits are payable if a member dies while receiving disability benefits.

If, at discontinuance of the disability benefit, the member is eligible for a retirement benefit (based on service, which includes the period of disability and may also include time receiving a disability retirement annuity), the member may retire and receive that benefit. The member may commence the retirement benefit once age and service requirements are met. The early retirement reduction does not apply for members that began first participating prior to January 1, 2011 (Tier 1). The benefit is based on the greatest of 3 formulas (General Formula, Money Purchase and Minimum Benefit), subject to applicable maximums. Contributions are not made during the disability period. However, accumulated contributions continue to accrue interest.

### Annual Increases

Each January 1 subsequent to retirement date the monthly benefit being paid each retiree shall be increased by 3%. The adjustment for the first January after retirement shall be proportional.

## Disability Retirement Annuity

### Eligibility

Continuing disablement after discontinuation of the disability benefit as a result of reaching the "50% of total earnings" limitation. Disability is defined in accordance with the Social Security disability definition.

### Benefit

35% of the compensation being earned at disablement.

### Duration of Benefit

Benefits become payable upon discontinuance of the disability benefit and continue to the earlier of the following:

1. Recovery or death
2. Election to receive a retirement benefit

Survivor and death benefits are payable if a member dies while receiving a disability retirement annuity.

### Annual Increases

Each January 1 subsequent to retirement date the monthly benefit being paid each retiree shall be increased by 3%. The adjustment for the first January after retirement shall be proportional.

For members hired on or after January 1, 2011, if the member converts to a service retirement annuity (item 2 above), each January 1 subsequent to retirement date the monthly benefit being paid each retiree shall be increased fifty percent of the Consumer Price Index (“CPI”) up to a maximum of 3% of the originally granted benefit. The first increase will be granted upon the later of the attainment of age 67 or the first anniversary of the commencement of the annuity.

## BENEFITS FOR DEFERRED MEMBERS

### Eligibility

For members hired before January 1, 2011, separation from employment with at least 5 years of service and separation from employment with at least 10 years of service for members hired on or after January 1, 2011.

### Benefit

Benefit as defined for normal retirement purposes, but calculated based on final average compensation and service at date of termination.

### Commencement of Benefit

Benefits commence when member reaches the age condition for either normal or early retirement.

### Annual Increases

For members hired before January 1, 2011, each January 1 subsequent to retirement date the monthly benefit being paid each retiree shall be increased by 3%. The adjustment for the first January after retirement shall be proportional.

For members hired on or after January 1, 2011, each January 1 subsequent to retirement date the monthly benefit being paid each retiree shall be increased fifty percent of the Consumer Price Index (“CPI”) up to a maximum of 3% applied to the original benefit. The first increase will be granted upon the later of the attainment of age 67 or the first anniversary of the commencement of the annuity.

# APPENDIX I

## GLOSSARY OF TERMS

# GLOSSARY OF TERMS

***Actuarial Accrued Liability ("AAL").*** The difference between (i) the actuarial present value of future plan benefits, and (ii) the actuarial present value of future normal cost. Sometimes referred to as "accrued liability" or "past service liability."

***Actuarial Assumptions.*** Estimates of future plan experience such as investment return, expected lifetimes and the likelihood of receiving a pension from the Pension Plan. Demographic, or "people" assumptions, include rates of mortality, retirement and separation. Economic, or "money" assumptions, include expected investment return, inflation and salary increases.

***Actuarial Cost Method.*** A mathematical budgeting procedure for allocating the dollar amount of the "actuarial present value of future plan benefits" between the actuarial present value of future normal cost and the actuarial accrued liability. Sometimes referred to as the "actuarial funding method."

***Actuarial Present Value of Future Plan Benefits ("APV").*** The amount of funds presently required to provide a payment or series of payments in the future. It is determined by discounting the future payments at a predetermined rate of interest, taking into account the probability of payment.

***Actuarial Value of Assets ("AVA").*** Smoothed value of assets that recognizes the difference between the expected investment return using the valuation assumption of 8.0 percent and the actual investment return over a five-year period. Dampens volatility of asset value over time.

***Actuarially Determined Contribution ("ADC").*** The sum of the gross normal cost (including employee contributions) and amortization of the unfunded actuarial accrued liability over a period not to exceed 30 years.

***Amortization.*** Paying off an interest-bearing liability by means of periodic payments of interest and principal, as opposed to paying it off with a lump sum payment.

***Annual Required Contribution ("ARC").*** The sum of the normal cost (net of employee contributions) and amortization of the unfunded actuarial accrued liability over a period not to exceed 30 years. Currently required for accounting purposes by the Governmental Accounting Standards Board (GASB).

***Asset Return.*** The net investment return for the asset divided by the mean asset value. Example: if $1.00 is invested and yields $1.08 after a year, the asset return is 8.00 percent.

***Funded Ratio.*** The actuarial value of assets divided by the actuarial accrued liability. Measures the portion of the actuarial accrued liability that is currently funded.

# Glossary of Terms (Continued)

***Market Value of Assets ("MVA").*** The value of assets currently held in the trust available to pay for benefits of the Pension Plan. Each of the investments in the trust is valued at market price which is the price at which buyers and sellers trade similar items in the open market

***Net Pension Obligation ("NPO").*** The accumulated value of contribution variances (the difference between the Annual Pension Contribution and the actual employer contributions). Currently required for accounting purposes by the Governmental Accounting Standards Board (GASB).

***Normal Cost ("NC").*** The annual cost assigned, under the actuarial funding method, to current and subsequent plan years. Sometimes referred to as "current service cost." Any payment toward the unfunded actuarial accrued liability is not part of the normal cost.

***Unfunded Actuarial Accrued Liability ("UAAL").*** The difference between the actuarial accrued liability and valuation assets. Sometimes referred to as "unfunded accrued liability."