

January 31, 2014

CONFIDENTIAL

Mr. Dave Bergstrom  
Executive Director  
Minnesota State Retirement System  
60 Empire Drive, Suite 300  
St. Paul, MN 55103

**Re: Projection of Contributions and Funding Status – State Employees Retirement Fund**

Dear Dave:

Attached are 30-year projections of estimated funded status, required contributions, and statutory contributions under three asset return scenarios for the State Employees Retirement Fund (SERF). Unless noted otherwise, the estimates are based on participant data, assumptions, methods, and plan provisions as of July 1, 2013 as detailed in the State Employees Retirement Fund Actuarial Valuation Report as of July 1, 2013.

As required by the State of Minnesota Standards for Actuarial Work, the projections reflect three asset return scenarios. The statutory investment return assumption is a 4-year select and ultimate approach with rates of 8.0% for the period July 1, 2013 to June 30, 2017 and 8.5% thereafter. The scenarios assume future investment returns of 1.5% more than the assumed rate, the assumed rate, and 1.5% less than the assumed rate. Note that we believe the 10.0% rate of return assumption is outside of the range of reasonable expected rates of return for this plan.

The estimates are based on the market value of assets with no smoothing of investment gains or losses. The projection is an open group projection; meaning, active members projected to retire or otherwise terminate in the future are replaced with new active members so that the total active membership of the SERF remains at 49,121 members. The profile of these new members is the same as new members of SERF hired between July 1, 2010 and July 1, 2012:

- Average age at hire is 37 years
- Average salary at hire is \$39,000
- Approximately 55% female, 45% male

If actuarial accrued liability exceeds assets, the unfunded actuarial accrued liability is amortized through June 30, 2040 per Minnesota Statute 356.215, Subdivision 11. As directed by MSRS, the statutory amortization date is assumed to be changed to June 30, 2070 once the current period expires in 2040. Per Minnesota Statute 356.215, Subdivision 11 (l), a negative unfunded actuarial accrued liability (i.e., when assets exceed liability) is amortized over a rolling 30-year period.

As directed by MSRS, we have shown projection results with and without the contribution stabilizer defined in Minnesota Statute 352.045, summarized in the attached Exhibit A. Projections that include the contribution stabilizer also include the following proposed contribution increases: member and employer contribution rates proposed to increase from 5.00% to 5.50%, both effective July 1, 2014.

Based on the operations of the stabilizer, the projected highest annual statutory contribution rate is:

<b>Assumed Investment Return</b>	<b>Maximum Statutory Contribution (percent of pay)</b>
6.5%/7.0%	28.00%
8.0%/8.5%	11.00%
9.5%/10.0%	11.00%

The rates in the lowest investment return scenario are significantly higher than the current rate of 10.00% of pay.

Please see Exhibit A for details on the contribution stabilizer.

### **Postretirement Benefit Increases**

A very significant assumption affecting the projected estimates is the expectation of annual increases in the benefits being paid to retirees and beneficiaries. If the plan reaches a funding ratio of 90% (on a market value of assets basis), postretirement increases will revert to the 2.5% level.

Under the 7.0% and 8.5% rate of return scenarios without a contribution stabilizer, the funded status of the plan is not expected to improve. We assumed a 2.0% postretirement benefit increase for all years for these scenarios. If the postretirement benefit increase was assumed to be 2.5% instead of 2.0%, the liabilities would be significantly greater than the liabilities shown in this report.

Under all other rate of return scenarios, assuming all future postretirement benefit increases equal 2.0%, the funded status of the plan is expected to exceed 90% in the year shown in the first column of the table on the following page. However, if at that time future postretirement increases are assumed to be 2.5%, the funded ratio would be less than 90%. If the plan continued to pay postretirement increases of 2.0% per year, our projections indicate that the plan would reach a funding status of 90% (assuming future postretirement increases of 2.5%) around the year shown in the second column of the table on the following page. Without further guidance, we cannot determine the date the postretirement increase would change to 2.5% and have not shown values for this scenario beyond the years shown in the second column of the table on the following page. Different results would be obtained if our projected liabilities for years prior to reaching 90% anticipated a switch to the 2.5% postretirement benefit increase.

<b>Assumed Investment Return</b>	<b>Estimated Date Expected to Reach 90% Funding Ratio</b>	
	<b>Assuming 2.0% COLA</b>	<b>Assuming 2.5% COLA</b>
6.5% investment return for four years, 7.0% thereafter; without stabilizer	N/A	N/A
6.5% investment return for four years, 7.0% thereafter; with stabilizer	2040	2041
8.0% investment return for four years, 8.5% thereafter; without stabilizer	N/A	N/A
8.0% investment return for four years, 8.5% thereafter; with stabilizer	2023	2032
9.5% investment return for four years, 10.0% thereafter; without stabilizer	2015	2019
9.5% investment return for four years, 10.0% thereafter; with stabilizer	2015	2018

**Comments**

To the best of our knowledge and belief, the calculations were completed in accordance with the requirements of Minnesota Statutes, Section 356.215, and the requirements of the Standards for Actuarial Work established by the Legislative Commission on Pensions and Retirement.

This report should not be relied upon for any purpose other than the purpose described herein. Determinations of the financial results associated with the benefits described in this report in a manner other than the intended purpose may produce significantly different results. GRS is not responsible for the consequences of any unauthorized use.

The valuation was based upon information furnished by the Minnesota State Retirement System (MSRS), concerning benefits, financial transactions, plan provisions and active members, terminated members, retirees and beneficiaries.

Actuarial assumptions, including discount rates, mortality tables and others identified in this report, are prescribed by Minnesota Statutes Section 356.215 the Legislative Commission on Pensions and Retirement (LCPR), and the Board of Directors. These parties are responsible for selecting the plan’s funding policy, actuarial valuation methods, asset valuation methods, and assumptions. The policies, methods and assumptions used in this valuation are those that have been so prescribed and are described in the Actuarial Basis of the valuation report. MSRS is solely responsible for communicating to GRS any changes required thereto.

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 or applicable law.

### **Professional Qualifications**

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


Brian B. Murphy and Bonita J. Wurst are Members of the American Academy of Actuaries and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein. In addition, Mr. Murphy meets the requirements of “approved actuary” under Minnesota Statutes Section 356.215, Subdivision 1, Paragraph (c).

This report has been prepared by actuaries who have substantial experience valuing public employee retirement systems. To the best of our knowledge and belief the information contained in this report is accurate and fairly presents the actuarial position of the State Employees Retirement Fund as of the valuation date and was performed in accordance with the requirements of Minnesota Statutes Section 356.215, and the requirements of the Standards for Actuarial Work established by the LCPR. All calculations have been made in conformity with generally accepted actuarial principles and practices, and with the Actuarial Standards of Practice issued by the Actuarial Standards Board and with applicable statutes.

Sincerely,



Bonita J. Wurst, ASA, EA, MAAA



Brian B. Murphy, FSA, EA, MAAA, FCA

BJW/BBM:ah  
Enclosures

# Exhibit A

## State Employees Retirement Fund Contribution Stabilizer

The following is a summary of Minnesota Statute 352.045:

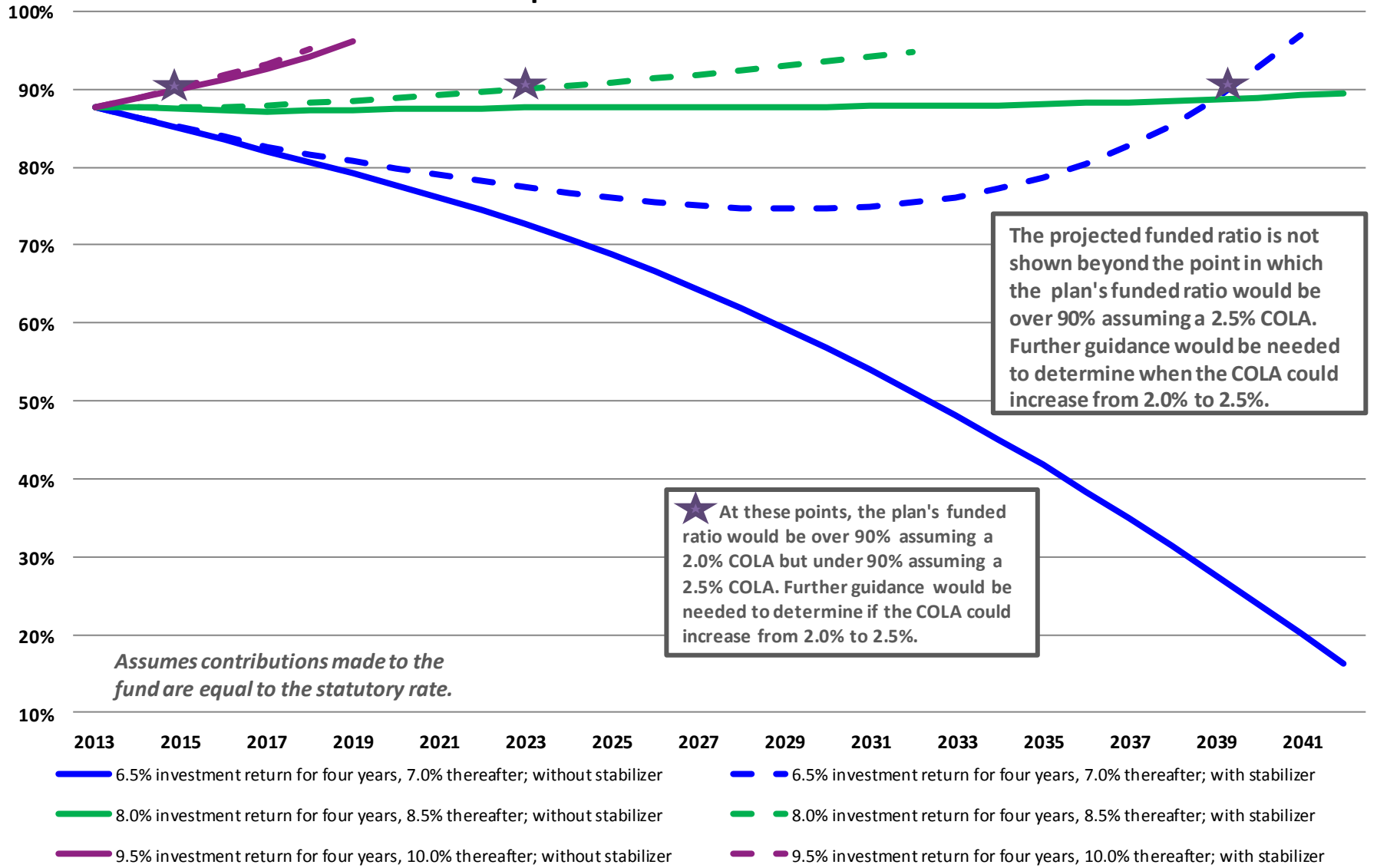
- If a contribution sufficiency of at least 1.0% has existed for two consecutive years, the member and employer contribution rates are decreased 0.25% as long as the contribution rate has been in place for two consecutive years.
- If a contribution deficiency of at least 0.5% has existed for two consecutive years, the member and employer contribution rates are increased by rates of pay shown in table below.

<b>Contribution Deficiency (based on Actuarial Value of Assets)</b>	<b>Allowable Increase in Member and Employer Contribution Rates</b>
<2% of pay	0.25% of pay
2% to 4% of pay	0.50% of pay
>4% of pay	0.75% of pay

- Contribution stabilizer adjustments become effective on July 1<sup>st</sup>.
- Projections that include the contribution stabilizer also include the following proposed contribution increases: member and employer contribution rates proposed to increase from 5.00% to 5.50%, both effective July 1, 2014.

*This exhibit should only be viewed in conjunction with GRS' January 31, 2014 letter to MSRS.*

## State Employees Retirement Fund Estimated Funding Ratio Assumes postretirement increases of 2.0%



This exhibit should only be viewed in conjunction with GRS' January 31, 2014 letter to MSRS.

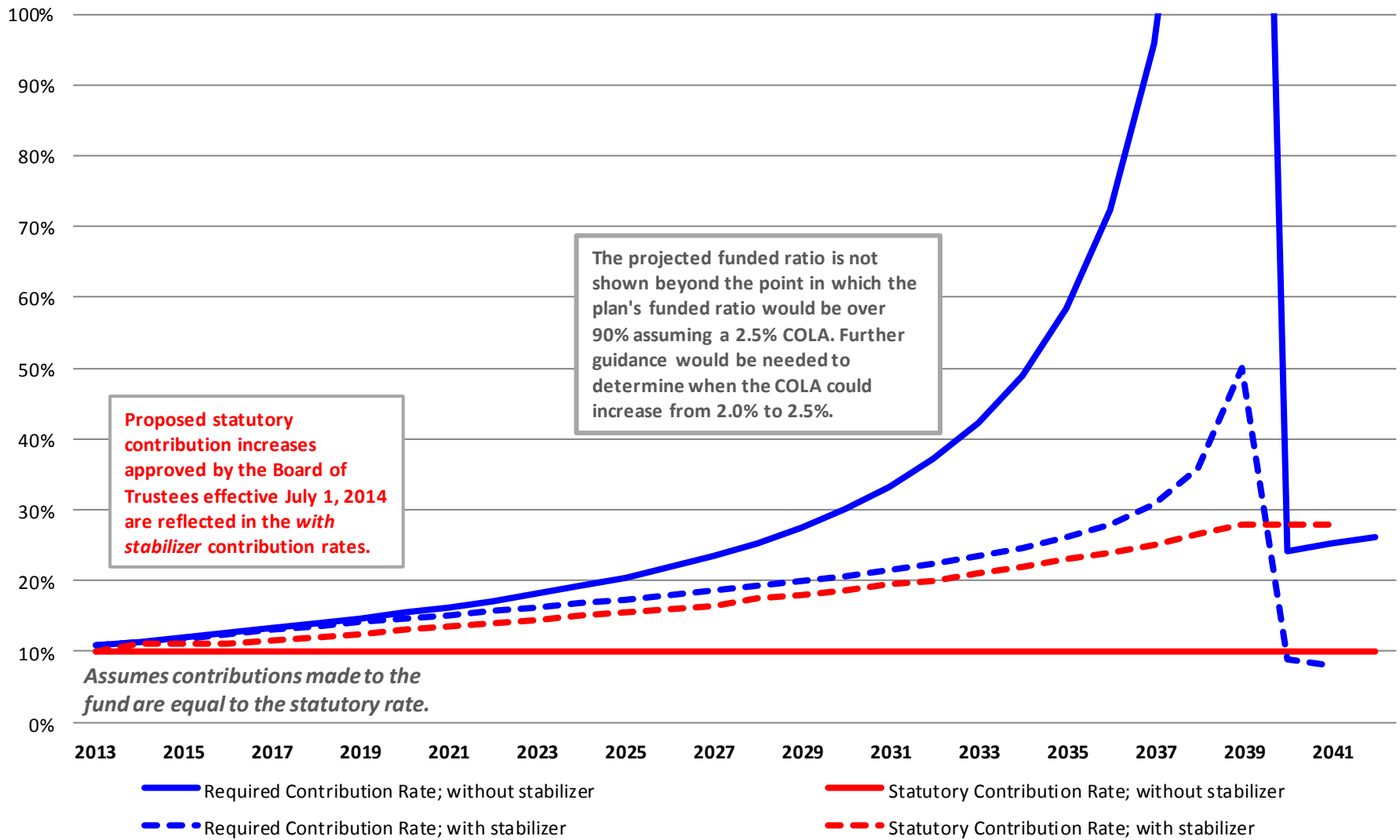
# State Employees Retirement Fund

## Estimated Contribution Rates

Investment return of 6.5% for four years; 7.0% thereafter

Assumes postretirement increases of 2.0%

Rates briefly exceed 100% of payroll at the end of the current amortization period. For details, refer to attached exhibits.



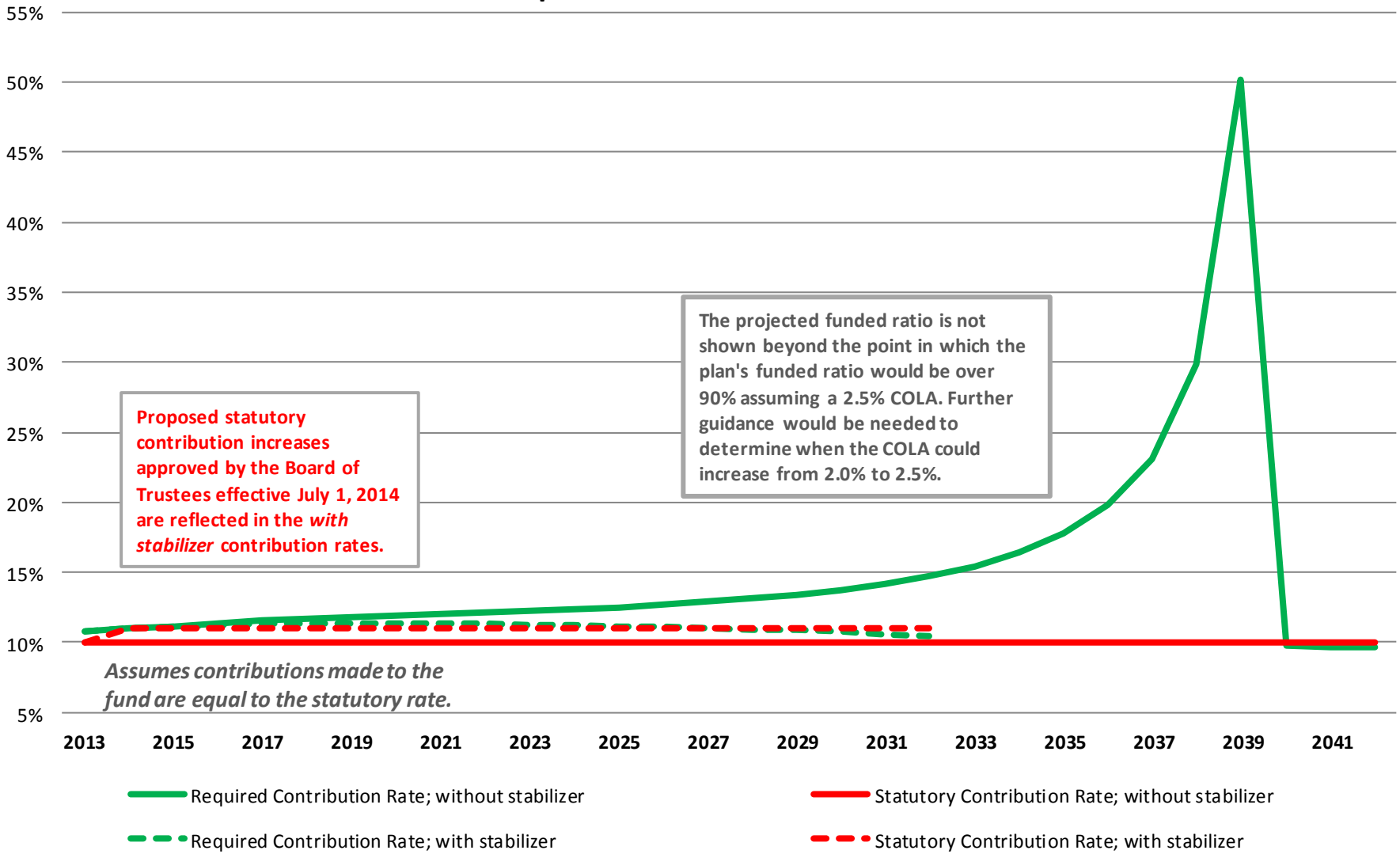
*This exhibit should only be viewed in conjunction with GRS' January 31, 2014 letter to MSRS.*

## State Employees Retirement Fund

### Estimated Contribution Rates

**Investment return of 8.0% for four years; 8.5% thereafter**

**Assumes postretirement increases of 2.0%**





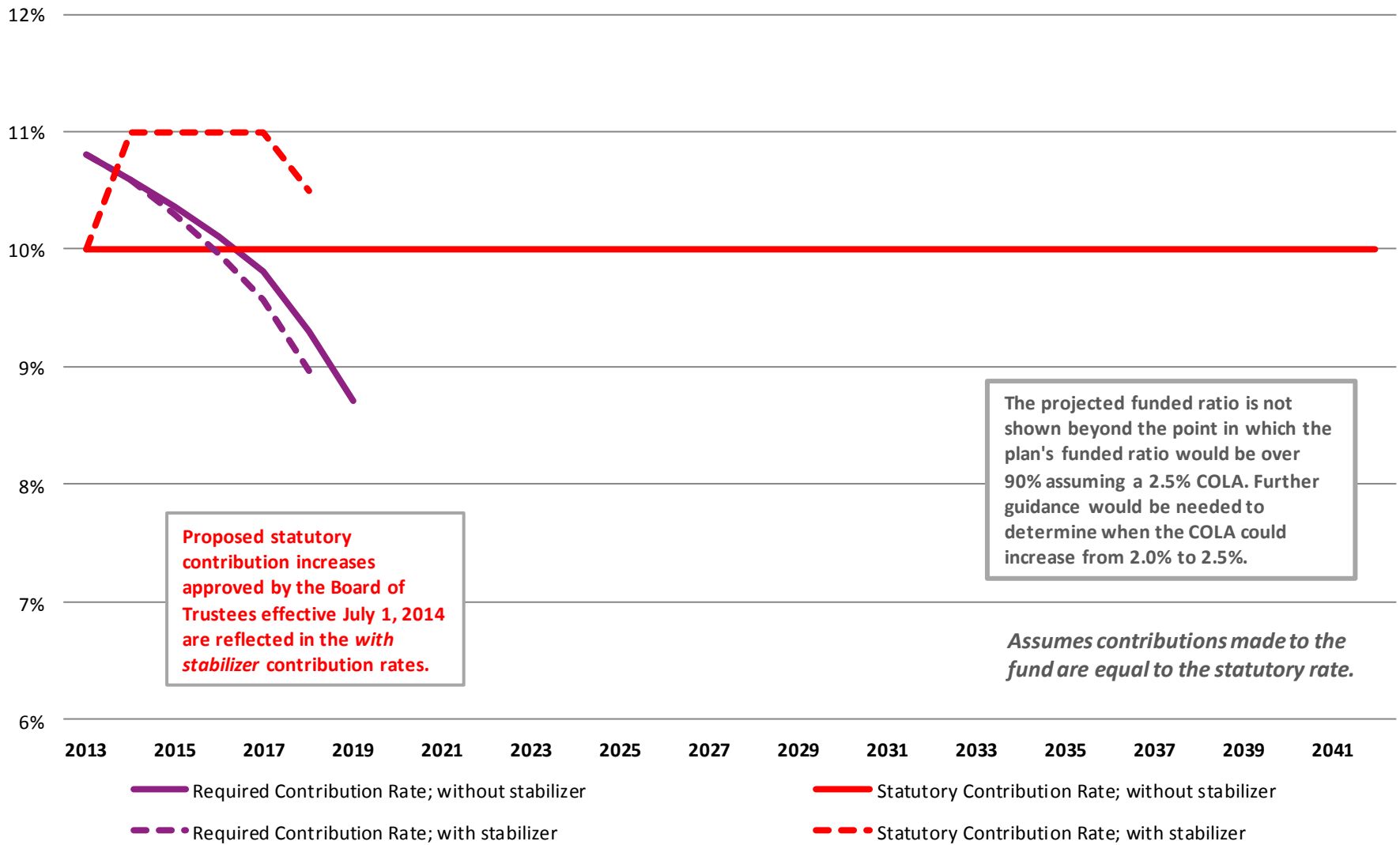
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## State Employees Retirement Fund

### Estimated Contribution Rates

Investment return of 9.5% for four years; 10.0% thereafter

Assumes postretirement increases of 2.0%



Proposed statutory contribution increases approved by the Board of Trustees effective July 1, 2014 are reflected in the with stabilizer contribution rates.

The projected funded ratio is not shown beyond the point in which the plan's funded ratio would be over 90% assuming a 2.5% COLA. Further guidance would be needed to determine when the COLA could increase from 2.0% to 2.5%.

*Assumes contributions made to the fund are equal to the statutory rate.*

*This exhibit should only be viewed in conjunction with GRS' January 31, 2014 letter to MSRS.*

**State Employees Retirement Fund**  
**Scenario: 6.5% for Four Years, 7.0% thereafter WITHOUT CONTRIBUTION STABILIZER**  
**Fiscal year beginning July 1**

<b>\$ in Thousands</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>
<b>Contributions (% of Payroll)</b>										
Statutory - Chapter 352	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%
Required - Chapter 356	10.8%	11.3%	11.9%	12.6%	13.3%	14.0%	14.7%	15.4%	16.2%	17.1%
Sufficiency / (Deficiency)	(0.8)%	(1.3)%	(1.9)%	(2.6)%	(3.3)%	(4.0)%	(4.7)%	(5.4)%	(6.2)%	(7.1)%
<b>Contributions</b>										
Statutory - Chapter 352	255,316	263,547	269,585	275,934	282,843	290,289	298,442	307,234	316,653	326,720
Required - Chapter 356	275,741	298,599	321,345	347,401	376,746	405,243	437,217	473,140	513,611	559,345
Sufficiency / (Deficiency)	(20,425)	(35,052)	(51,760)	(71,467)	(93,903)	(114,954)	(138,775)	(165,906)	(196,958)	(232,625)
<b>Funding Ratios</b>										
Current Assets (MVA)	10,033,499	10,281,773	10,498,201	10,678,940	10,822,851	10,981,118	11,103,906	11,190,600	11,242,587	11,258,468
Actuarial Accrued Liability (AAL)	11,428,641	11,897,688	12,349,245	12,786,142	13,208,846	13,617,111	14,011,084	14,391,379	14,760,663	15,118,920
Unfunded AAL	1,395,142	1,615,915	1,851,044	2,107,202	2,385,995	2,635,993	2,907,178	3,200,779	3,518,076	3,860,452
Funding Ratio	88%	86%	85%	84%	82%	81%	79%	78%	76%	74%
<b>Benefit Payments</b>	637,569	691,986	746,004	799,177	852,009	904,177	955,223	1,003,104	1,050,594	1,094,056

*Assumes annual postretirement increases of 2.0% for all years.*

*Numbers may not add due to rounding.*

*This exhibit should only be viewed in conjunction with GRS' January 31, 2014 letter to MSRS.*

**State Employees Retirement Fund**  
**Scenario: 6.5% for Four Years, 7.0% thereafter WITHOUT CONTRIBUTION STABILIZER**  
**Fiscal year beginning July 1**

<b>\$ in Thousands</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>	<b>2026</b>	<b>2027</b>	<b>2028</b>	<b>2029</b>	<b>2030</b>	<b>2031</b>	<b>2032</b>
<b>Contributions (% of Payroll)</b>										
Statutory - Chapter 352	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%
Required - Chapter 356	18.1%	19.2%	20.5%	21.9%	23.5%	25.3%	27.5%	30.1%	33.3%	37.2%
Sufficiency / (Deficiency)	(8.1)%	(9.2)%	(10.5)%	(11.9)%	(13.5)%	(15.3)%	(17.5)%	(20.1)%	(23.3)%	(27.2)%
<b>Contributions</b>										
Statutory - Chapter 352	337,409	348,680	360,532	372,939	385,899	399,453	413,574	428,236	443,495	459,350
Required - Chapter 356	611,047	670,163	737,648	815,245	905,320	1,011,414	1,137,742	1,289,847	1,476,396	1,710,160
Sufficiency / (Deficiency)	(273,638)	(321,483)	(377,116)	(442,306)	(519,421)	(611,961)	(724,168)	(861,611)	(1,032,901)	(1,250,810)
<b>Funding Ratios</b>										
Current Assets (MVA)	11,240,532	11,187,279	11,099,500	10,975,179	10,814,503	10,617,422	10,384,632	10,114,847	9,808,435	9,464,740
Actuarial Accrued Liability (AAL)	15,469,907	15,813,664	16,152,671	16,486,724	16,817,976	17,148,553	17,481,455	17,817,871	18,160,931	18,512,901
Unfunded AAL	4,229,375	4,626,385	5,053,171	5,511,545	6,003,473	6,531,131	7,096,823	7,703,024	8,352,496	9,048,161
Funding Ratio	73%	71%	69%	67%	64%	62%	59%	57%	54%	51%
<b>Benefit Payments</b>	1,137,281	1,177,914	1,218,721	1,257,411	1,294,225	1,328,476	1,362,103	1,393,394	1,423,418	1,451,760

*Assumes annual postretirement increases of 2.0% for all years.*

*Numbers may not add due to rounding.*

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**State Employees Retirement Fund**  
**Scenario: 6.5% for Four Years, 7.0% thereafter WITHOUT CONTRIBUTION STABILIZER**  
**Fiscal year beginning July 1**

<b>\$ in Thousands</b>	<b>2033</b>	<b>2034</b>	<b>2035</b>	<b>2036</b>	<b>2037</b>	<b>2038</b>	<b>2039</b>	<b>2040</b>	<b>2041</b>	<b>2042</b>
<b>Contributions (% of Payroll)</b>										
Statutory - Chapter 352	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%
Required - Chapter 356	42.3%	49.0%	58.4%	72.5%	95.8%	142.5%	282.4%	24.2%	25.2%	26.2%
Sufficiency / (Deficiency)	(32.3)%	(39.0)%	(48.4)%	(62.5)%	(85.8)%	(132.5)%	(272.4)%	(14.2)%	(15.2)%	(16.2)%
<b>Contributions</b>										
Statutory - Chapter 352	475,826	492,928	510,706	529,175	548,372	568,302	589,014	610,494	632,811	656,002
Required - Chapter 356	2,012,268	2,415,839	2,982,524	3,833,876	5,254,503	8,098,303	16,635,524	1,477,396	1,591,521	1,716,757
Sufficiency / (Deficiency)	(1,536,442)	(1,922,911)	(2,471,818)	(3,304,701)	(4,706,131)	(7,530,001)	(16,046,510)	(866,902)	(958,710)	(1,060,755)
<b>Funding Ratios</b>										
Current Assets (MVA)	9,083,488	8,663,880	8,204,797	7,704,483	7,161,914	6,576,912	5,948,721	5,275,141	4,552,882	3,778,025
Actuarial Accrued Liability (AAL)	18,876,675	19,254,858	19,650,025	20,064,373	20,501,155	20,964,798	21,459,529	21,988,476	22,554,161	23,158,917
Unfunded AAL	9,793,187	10,590,978	11,445,228	12,359,890	13,339,241	14,387,886	15,510,808	16,713,335	18,001,279	19,380,892
Funding Ratio	48%	45%	42%	38%	35%	31%	28%	24%	20%	16%
<b>Benefit Payments</b>	1,478,932	1,505,197	1,531,141	1,555,952	1,578,779	1,600,175	1,621,529	1,643,734	1,667,241	1,691,431

*Assumes annual postretirement increases of 2.0% for all years.*

*Numbers may not add due to rounding.*

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**State Employees Retirement Fund**  
**Scenario: 6.5% for Four Years, 7.0% thereafter WITH CONTRIBUTION STABILIZER**  
**Fiscal year beginning July 1**

<b>\$ in Thousands</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>
<b>Contributions (% of Payroll)</b>										
Statutory - Chapter 352	10.0%	11.0%	11.0%	11.0%	11.5%	12.0%	12.5%	13.0%	13.5%	14.0%
Required - Chapter 356	10.8%	11.3%	11.9%	12.4%	13.1%	13.6%	14.1%	14.6%	15.2%	15.7%
Sufficiency / (Deficiency)	(0.8)%	(0.3)%	(0.8)%	(1.4)%	(1.6)%	(1.6)%	(1.6)%	(1.6)%	(1.7)%	(1.7)%
<b>Contributions</b>										
Statutory - Chapter 352	255,316	289,902	296,543	303,528	325,269	348,347	373,052	399,404	427,481	457,408
Required - Chapter 356	275,741	298,599	319,458	343,262	370,524	395,083	421,400	449,791	480,362	512,951
Sufficiency / (Deficiency)	(20,425)	(8,697)	(22,915)	(39,734)	(45,255)	(46,736)	(48,348)	(50,387)	(52,881)	(55,543)
<b>Funding Ratios</b>										
Current Assets (MVA)	10,033,499	10,281,773	10,525,413	10,735,754	10,911,849	11,120,256	11,312,874	11,491,418	11,659,858	11,819,656
Actuarial Accrued Liability (AAL)	11,428,641	11,897,688	12,349,245	12,786,142	13,208,846	13,617,111	14,011,084	14,391,379	14,760,663	15,118,920
Unfunded AAL	1,395,142	1,615,915	1,823,832	2,050,388	2,296,997	2,496,855	2,698,210	2,899,961	3,100,805	3,299,264
Funding Ratio	88%	86%	85%	84%	83%	82%	81%	80%	79%	78%
<b>Benefit Payments</b>	637,569	691,986	746,004	799,177	852,009	904,177	955,223	1,003,104	1,050,594	1,094,056

*Assumes annual postretirement increases of 2.0% for all years.*

*Numbers may not add due to rounding.*

*In approximately the year 2040, the plan's funded ratio would be over 90% assuming a 2.0% COLA but under 90% assuming a 2.5% COLA. In approximately the year 2041, the plan's funded ratio would be over 90% assuming a 2.5% COLA. Further guidance would be needed to determine when the COLA could increase from 2.0% to 2.5%.*

*This exhibit should only be viewed in conjunction with GRS' January 31, 2014 letter to MSRS.*

**State Employees Retirement Fund**  
**Scenario: 6.5% for Four Years, 7.0% thereafter WITH CONTRIBUTION STABILIZER**  
**Fiscal year beginning July 1**

<b>\$ in Thousands</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>	<b>2026</b>	<b>2027</b>	<b>2028</b>	<b>2029</b>	<b>2030</b>	<b>2031</b>	<b>2032</b>
<b>Contributions (% of Payroll)</b>										
Statutory - Chapter 352	14.5%	15.0%	15.5%	16.0%	16.5%	17.5%	18.0%	18.5%	19.5%	20.0%
Required - Chapter 356	16.2%	16.8%	17.4%	18.0%	18.6%	19.3%	19.9%	20.7%	21.5%	22.4%
Sufficiency / (Deficiency)	(1.7)%	(1.8)%	(1.9)%	(2.0)%	(2.1)%	(1.8)%	(1.9)%	(2.2)%	(2.0)%	(2.4)%
<b>Contributions</b>										
Statutory - Chapter 352	489,242	523,020	558,824	596,703	636,734	699,042	744,433	792,237	864,816	918,700
Required - Chapter 356	547,951	585,434	626,244	669,799	717,387	769,346	824,253	884,736	952,628	1,027,107
Sufficiency / (Deficiency)	(58,709)	(62,414)	(67,420)	(73,096)	(80,653)	(70,304)	(79,820)	(92,499)	(87,812)	(108,407)
<b>Funding Ratios</b>										
Current Assets (MVA)	11,976,265	12,131,661	12,290,431	12,454,708	12,629,195	12,818,756	13,050,134	13,309,374	13,603,319	13,961,333
Actuarial Accrued Liability (AAL)	15,469,907	15,813,664	16,152,671	16,486,724	16,817,976	17,148,553	17,481,455	17,817,871	18,160,931	18,512,901
Unfunded AAL	3,493,642	3,682,003	3,862,240	4,032,016	4,188,781	4,329,797	4,431,321	4,508,497	4,557,612	4,551,568
Funding Ratio	77%	77%	76%	76%	75%	75%	75%	75%	75%	75%
<b>Benefit Payments</b>										
	1,137,281	1,177,914	1,218,721	1,257,411	1,294,225	1,328,476	1,362,103	1,393,394	1,423,418	1,451,760

*Assumes annual postretirement increases of 2.0% for all years.*

*Numbers may not add due to rounding.*

*In approximately the year 2040, the plan's funded ratio would be over 90% assuming a 2.0% COLA but under 90% assuming a 2.5% COLA. In approximately the year 2041, the plan's funded ratio would be over 90% assuming a 2.5% COLA. Further guidance would be needed to determine when the COLA could increase from 2.0% to 2.5%.*

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**State Employees Retirement Fund**  
**Scenario: 6.5% for Four Years, 7.0% thereafter WITH CONTRIBUTION STABILIZER**  
**Fiscal year beginning July 1**

<b>\$ in Thousands</b>	<b>2033</b>	<b>2034</b>	<b>2035</b>	<b>2036</b>	<b>2037</b>	<b>2038</b>	<b>2039</b>	<b>2040</b>	<b>2041</b>
<b>Contributions (% of Payroll)</b>									
Statutory - Chapter 352	21.0%	22.0%	23.0%	24.0%	25.0%	26.5%	28.0%	28.0%	28.0%
Required - Chapter 356	23.4%	24.6%	26.0%	28.0%	30.8%	36.0%	50.1%	8.9%	7.9%
Sufficiency / (Deficiency)	(2.4)%	(2.6)%	(3.0)%	(4.0)%	(5.8)%	(9.5)%	(22.1)%	19.1%	20.1%
<b>Contributions</b>									
Statutory - Chapter 352	999,234	1,084,441	1,174,624	1,270,021	1,370,931	1,506,000	1,649,239	1,709,384	1,771,872
Required - Chapter 356	1,113,433	1,212,110	1,329,879	1,479,045	1,688,438	2,044,182	2,949,193	542,119	502,452
Sufficiency / (Deficiency)	(114,199)	(127,669)	(155,255)	(209,024)	(317,507)	(538,182)	(1,299,954)	1,167,265	1,269,420
<b>Funding Ratios</b>									
Current Assets (MVA)	14,370,270	14,862,464	15,449,499	16,143,469	16,958,404	17,910,504	19,046,182	20,386,758	21,859,663
Actuarial Accrued Liability (AAL)	18,876,675	19,254,858	19,650,025	20,064,373	20,501,155	20,964,798	21,459,529	21,988,476	22,554,161
Unfunded AAL	4,506,405	4,392,394	4,200,526	3,920,904	3,542,751	3,054,294	2,413,347	1,601,718	694,498
Funding Ratio	76%	77%	79%	80%	83%	85%	89%	93%	97%
<b>Benefit Payments</b>	1,478,932	1,505,197	1,531,141	1,555,952	1,578,779	1,600,175	1,621,529	1,643,734	1,667,241

*Assumes annual postretirement increases of 2.0% for all years.*

*Numbers may not add due to rounding.*

*In approximately the year 2040, the plan's funded ratio would be over 90% assuming a 2.0% COLA but under 90% assuming a 2.5% COLA. In approximately the year 2041, the plan's funded ratio would be over 90% assuming a 2.5% COLA. Further guidance would be needed to determine when the COLA could increase from 2.0% to 2.5%.*

*This exhibit should only be viewed in conjunction with GRS' January 31, 2014 letter to MSRS.*

**State Employees Retirement Fund**  
**Scenario: 8.0% for Four Years, 8.5% thereafter WITHOUT CONTRIBUTION STABILIZER**  
**Fiscal year beginning July 1**

<b>\$ in Thousands</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>
<b>Contributions (% of Payroll)</b>										
Statutory - Chapter 352	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%
Required - Chapter 356	10.8%	11.0%	11.2%	11.4%	11.6%	11.7%	11.8%	11.9%	12.0%	12.1%
Sufficiency / (Deficiency)	(0.8)%	(1.0)%	(1.2)%	(1.4)%	(1.6)%	(1.7)%	(1.8)%	(1.9)%	(2.0)%	(2.1)%
<b>Contributions</b>										
Statutory - Chapter 352	255,316	263,547	269,585	275,934	282,843	290,289	298,442	307,234	316,653	326,720
Required - Chapter 356	275,741	288,847	300,587	313,461	328,097	339,638	351,863	365,301	379,667	395,331
Sufficiency / (Deficiency)	(20,425)	(25,300)	(31,002)	(37,527)	(45,254)	(49,349)	(53,421)	(58,067)	(63,014)	(68,611)
<b>Funding Ratios</b>										
Current Assets (MVA)	10,033,499	10,429,342	10,808,520	11,167,913	11,507,129	11,881,559	12,240,921	12,585,816	12,918,956	13,240,379
Actuarial Accrued Liability (AAL)	11,428,641	11,897,688	12,349,245	12,786,142	13,208,846	13,617,111	14,011,084	14,391,379	14,760,663	15,118,920
Unfunded AAL	1,395,142	1,468,346	1,540,725	1,618,229	1,701,717	1,735,552	1,770,163	1,805,563	1,841,707	1,878,541
Funding Ratio	88%	88%	88%	87%	87%	87%	87%	87%	88%	88%
<b>Benefit Payments</b>	637,569	691,986	746,004	799,177	852,009	904,177	955,223	1,003,104	1,050,594	1,094,056

*Assumes annual postretirement increases of 2.0% for all years.*

*Numbers may not add due to rounding.*



*This exhibit should only be viewed in conjunction with GRS' January 31, 2014 letter to MSRS.*

**State Employees Retirement Fund**  
**Scenario: 8.0% for Four Years, 8.5% thereafter WITHOUT CONTRIBUTION STABILIZER**  
**Fiscal year beginning July 1**

<b>\$ in Thousands</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>	<b>2026</b>	<b>2027</b>	<b>2028</b>	<b>2029</b>	<b>2030</b>	<b>2031</b>	<b>2032</b>
<b>Contributions (% of Payroll)</b>										
Statutory - Chapter 352	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%
Required - Chapter 356	12.2%	12.4%	12.5%	12.7%	12.9%	13.1%	13.4%	13.8%	14.2%	14.7%
Sufficiency / (Deficiency)	(2.2)%	(2.4)%	(2.5)%	(2.7)%	(2.9)%	(3.1)%	(3.4)%	(3.8)%	(4.2)%	(4.7)%
<b>Contributions</b>										
Statutory - Chapter 352	337,409	348,680	360,532	372,939	385,899	399,453	413,574	428,236	443,495	459,350
Required - Chapter 356	412,651	430,969	451,025	473,260	497,424	524,481	555,016	589,681	629,763	677,082
Sufficiency / (Deficiency)	(75,242)	(82,289)	(90,493)	(100,321)	(111,525)	(125,028)	(141,442)	(161,445)	(186,268)	(217,732)
<b>Funding Ratios</b>										
Current Assets (MVA)	13,553,942	13,859,849	14,160,737	14,456,582	14,749,722	15,042,438	15,337,964	15,637,759	15,945,166	16,262,754
Actuarial Accrued Liability (AAL)	15,469,907	15,813,664	16,152,671	16,486,724	16,817,976	17,148,553	17,481,455	17,817,871	18,160,931	18,512,901
Unfunded AAL	1,915,965	1,953,815	1,991,934	2,030,142	2,068,254	2,106,115	2,143,491	2,180,112	2,215,765	2,250,147
Funding Ratio	88%	88%	88%	88%	88%	88%	88%	88%	88%	88%
<b>Benefit Payments</b>	1,137,281	1,177,914	1,218,721	1,257,411	1,294,225	1,328,476	1,362,103	1,393,394	1,423,418	1,451,760

*Assumes annual postretirement increases of 2.0% for all years.*

*Numbers may not add due to rounding.*

*This exhibit should only be viewed in conjunction with GRS' January 31, 2014 letter to MSRS.*

**State Employees Retirement Fund**  
**Scenario: 8.0% for Four Years, 8.5% thereafter WITHOUT CONTRIBUTION STABILIZER**  
**Fiscal year beginning July 1**

<b>\$ in Thousands</b>	<b>2033</b>	<b>2034</b>	<b>2035</b>	<b>2036</b>	<b>2037</b>	<b>2038</b>	<b>2039</b>	<b>2040</b>	<b>2041</b>	<b>2042</b>
<b>Contributions (% of Payroll)</b>										
Statutory - Chapter 352	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%
Required - Chapter 356	15.5%	16.4%	17.7%	19.8%	23.1%	29.9%	50.2%	9.7%	9.7%	9.6%
Sufficiency / (Deficiency)	(5.5)%	(6.4)%	(7.7)%	(9.8)%	(13.1)%	(19.9)%	(40.2)%	0.3%	0.3%	0.4%
<b>Contributions</b>										
Statutory - Chapter 352	475,826	492,928	510,706	529,175	548,372	568,302	589,014	610,494	632,811	656,002
Required - Chapter 356	735,151	808,402	905,993	1,045,651	1,268,385	1,699,223	2,958,618	593,400	611,929	631,074
Sufficiency / (Deficiency)	(259,325)	(315,474)	(395,287)	(516,476)	(720,013)	(1,130,921)	(2,369,604)	17,094	20,882	24,928
<b>Funding Ratios</b>										
Current Assets (MVA)	16,593,740	16,941,108	17,307,826	17,696,554	18,111,038	18,556,268	19,037,088	19,557,352	20,120,299	20,729,041
Actuarial Accrued Liability (AAL)	18,876,675	19,254,858	19,650,025	20,064,373	20,501,155	20,964,798	21,459,529	21,988,476	22,554,161	23,158,917
Unfunded AAL	2,282,935	2,313,750	2,342,199	2,367,819	2,390,117	2,408,530	2,422,441	2,431,124	2,433,862	2,429,876
Funding Ratio	88%	88%	88%	88%	88%	89%	89%	89%	89%	90%
<b>Benefit Payments</b>										
	1,478,932	1,505,197	1,531,141	1,555,952	1,578,779	1,600,175	1,621,529	1,643,734	1,667,241	1,691,431

*Assumes annual postretirement increases of 2.0% for all years.*

*Numbers may not add due to rounding.*

*This exhibit should only be viewed in conjunction with GRS' January 31, 2014 letter to MSRS.*

**State Employees Retirement Fund**  
**Scenario: 8.0% for Four Years, 8.5% thereafter WITH CONTRIBUTION STABILIZER**  
**Fiscal year beginning July 1**

<b>\$ in Thousands</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>
<b>Contributions (% of Payroll)</b>										
Statutory - Chapter 352	10.0%	11.0%	11.0%	11.0%	11.0%	11.0%	11.0%	11.0%	11.0%	11.0%
Required - Chapter 356	10.8%	11.0%	11.1%	11.2%	11.4%	11.4%	11.4%	11.4%	11.3%	11.3%
Sufficiency / (Deficiency)	(0.8)%	0.0%	(0.1)%	(0.2)%	(0.4)%	(0.4)%	(0.4)%	(0.4)%	(0.3)%	(0.3)%
<b>Contributions</b>										
Statutory - Chapter 352	255,316	289,902	296,543	303,528	311,127	319,318	328,286	337,957	348,318	359,392
Required - Chapter 356	275,741	288,847	298,700	309,598	321,592	330,059	339,030	348,711	358,451	368,867
Sufficiency / (Deficiency)	(20,425)	1,055	(2,157)	(6,070)	(10,465)	(10,741)	(10,744)	(10,754)	(10,133)	(9,475)
<b>Funding Ratios</b>										
Current Assets (MVA)	10,033,499	10,429,342	10,835,929	11,225,551	11,598,076	12,009,722	12,410,241	12,800,641	13,184,069	13,561,039
Actuarial Accrued Liability (AAL)	11,428,641	11,897,688	12,349,245	12,786,142	13,208,846	13,617,111	14,011,084	14,391,379	14,760,663	15,118,920
Unfunded AAL	1,395,142	1,468,346	1,513,316	1,560,591	1,610,770	1,607,389	1,600,843	1,590,738	1,576,594	1,557,881
Funding Ratio	88%	88%	88%	88%	88%	88%	89%	89%	89%	90%
<b>Benefit Payments</b>	637,569	691,986	746,004	799,177	852,009	904,177	955,223	1,003,104	1,050,594	1,094,056

*Assumes annual postretirement increases of 2.0% for all years.*

*Numbers may not add due to rounding.*

*In approximately the year 2023 the plan's funded ratio would be over 90% assuming a 2.0% COLA but under 90% assuming a 2.5% COLA. In approximately the year 2032, the plan's funded ratio would be over 90% assuming a 2.5% COLA. Further guidance would be needed to determine when the COLA could increase from 2.0% to 2.5%.*

*This exhibit should only be viewed in conjunction with GRS' January 31, 2014 letter to MSRS.*

**State Employees Retirement Fund**  
**Scenario: 8.0% for Four Years, 8.5% thereafter WITH CONTRIBUTION STABILIZER**  
**Fiscal year beginning July 1**

<b>\$ in Thousands</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>	<b>2026</b>	<b>2027</b>	<b>2028</b>	<b>2029</b>	<b>2030</b>	<b>2031</b>	<b>2032</b>
<b>Contributions (% of Payroll)</b>										
Statutory - Chapter 352	11.0%	11.0%	11.0%	11.0%	11.0%	11.0%	11.0%	11.0%	11.0%	11.0%
Required - Chapter 356	11.3%	11.2%	11.2%	11.1%	11.0%	10.9%	10.8%	10.7%	10.6%	10.4%
Sufficiency / (Deficiency)	(0.3)%	(0.2)%	(0.2)%	(0.1)%	(0.0)%	0.1%	0.2%	0.3%	0.4%	0.6%
<b>Contributions</b>										
Statutory - Chapter 352	371,149	383,548	396,585	410,233	424,489	439,398	454,932	471,060	487,845	505,285
Required - Chapter 356	379,585	390,870	401,993	413,590	425,261	437,001	448,314	459,497	470,105	479,561
Sufficiency / (Deficiency)	(8,436)	(7,322)	(5,408)	(3,357)	(772)	2,397	6,618	11,563	17,740	25,724
<b>Funding Ratios</b>										
Current Assets (MVA)	13,935,918	14,309,468	14,684,923	15,062,910	15,446,467	15,838,636	16,243,481	16,663,361	17,102,587	17,564,791
Actuarial Accrued Liability (AAL)	15,469,907	15,813,664	16,152,671	16,486,724	16,817,976	17,148,553	17,481,455	17,817,871	18,160,931	18,512,901
Unfunded AAL	1,533,989	1,504,196	1,467,748	1,423,814	1,371,509	1,309,917	1,237,974	1,154,510	1,058,344	948,110
Funding Ratio	90%	90%	91%	91%	92%	92%	93%	94%	94%	95%
<b>Benefit Payments</b>	1,137,281	1,177,914	1,218,721	1,257,411	1,294,225	1,328,476	1,362,103	1,393,394	1,423,418	1,451,760

*Assumes annual postretirement increases of 2.0% for all years.*

*Numbers may not add due to rounding.*

*In approximately the year 2023, the plan's funded ratio would be over 90% assuming a 2.0% COLA but under 90% assuming a 2.5% COLA. In approximately the year 2032, the plan's funded ratio would be over 90% assuming a 2.5% COLA. Further guidance would be needed to determine when the COLA could increase from 2.0% to 2.5%.*

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**State Employees Retirement Fund**  
**Scenario: 9.5% for Four Years, 10.0% thereafter WITHOUT CONTRIBUTION STABILIZER**  
**Fiscal year beginning July 1**

<b>\$ in Thousands</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>
<b>Contributions (% of Payroll)</b>							
Statutory - Chapter 352	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%
Required - Chapter 356	10.8%	10.6%	10.4%	10.1%	9.8%	9.3%	8.7%
Sufficiency / (Deficiency)	(0.8)%	(0.6)%	(0.4)%	(0.1)%	0.2%	0.7%	1.3%
<b>Contributions</b>							
Statutory - Chapter 352	255,316	263,547	269,585	275,934	282,843	290,289	298,442
Required - Chapter 356	275,741	279,096	279,290	278,693	277,469	269,969	259,943
Sufficiency / (Deficiency)	(20,425)	(15,549)	(9,705)	(2,759)	5,374	20,320	38,499
<b>Funding Ratios</b>							
Current Assets (MVA)	10,033,499	10,576,910	11,123,265	11,671,043	12,221,579	12,835,717	13,464,038
Actuarial Accrued Liability (AAL)	11,428,641	11,897,688	12,349,245	12,786,142	13,208,846	13,617,111	14,011,084
Unfunded AAL	1,395,142	1,320,778	1,225,980	1,115,099	987,267	781,394	547,046
Funding Ratio	88%	89%	90%	91%	93%	94%	96%
<b>Benefit Payments</b>							
	637,569	691,986	746,004	799,177	852,009	904,177	955,223

*Assumes annual postretirement increases of 2.0% for all years.*

*Numbers may not add due to rounding.*

*In approximately the year 2015, the plan's funded ratio would be over 90% assuming a 2.0% COLA but under 90% assuming a 2.5% COLA. In approximately the year 2019, the plan's funded ratio would be over 90% assuming a 2.5% COLA. Further guidance would be needed to determine when the COLA could increase from 2.0% to 2.5%.*

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**State Employees Retirement Fund**  
**Scenario: 9.5% for Four Years, 10.0% thereafter WITH CONTRIBUTION STABILIZER**  
**Fiscal year beginning July 1**

<b>\$ in Thousands</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>
<b>Contributions (% of Payroll)</b>						
Statutory - Chapter 352	10.0%	11.0%	11.0%	11.0%	11.0%	10.5%
Required - Chapter 356	10.8%	10.6%	10.3%	10.0%	9.6%	9.0%
Sufficiency / (Deficiency)	(0.8)%	0.4%	0.7%	1.0%	1.4%	1.5%
<b>Contributions</b>						
Statutory - Chapter 352	255,316	289,902	296,543	303,528	311,127	304,803
Required - Chapter 356	275,741	279,096	277,403	274,830	270,680	260,099
Sufficiency / (Deficiency)	(20,425)	10,806	19,140	28,698	40,447	44,704
<b>Funding Ratios</b>						
Current Assets (MVA)	10,033,499	10,576,910	11,150,871	11,729,511	12,314,505	12,967,635
Actuarial Accrued Liability (AAL)	11,428,641	11,897,688	12,349,245	12,786,142	13,208,846	13,617,111
Unfunded AAL	1,395,142	1,320,778	1,198,374	1,056,631	894,341	649,476
Funding Ratio	88%	89%	90%	92%	93%	95%
<b>Benefit Payments</b>						
	637,569	691,986	746,004	799,177	852,009	904,177

*Assumes annual postretirement increases of 2.0% for all years.*

*Numbers may not add due to rounding.*

*In approximately the year 2015, the plan's funded ratio would be over 90% assuming a 2.0% COLA but under 90% assuming a 2.5% COLA. In approximately the year 2018, the plan's funded ratio would be over 90% assuming a 2.5% COLA. Further guidance would be needed to determine when the COLA could increase from 2.0% to 2.5%.*