

January 30, 2015

CONFIDENTIAL

Mr. Dave DeJonge  
Assistant Executive Director  
Public Employees Ret. Assoc. of MN  
60 Empire Drive, Suite 200  
St. Paul, MN 55103

**Re: Projection of Contributions and Funding Status – Police & Fire Plan**

Dear Dave:

Attached are 30-year projections of estimated funded status, required contributions, and statutory contributions under three asset return scenarios for the Public Employees Police & Fire Plan. The estimates are based on participant data, assumptions, methods, and plan provisions as detailed in the Police & Fire Plan Actuarial Valuation Report for funding purposes as of July 1, 2014.

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 select and ultimate approach with rates of 8.0% for the 5-year period ending 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% rate of return assumption is outside of the range of reasonable expected returns for this plan.

Note that as funding ratios decline, as they are expected to in some of the investment return scenarios shown in this letter, it will be increasingly difficult for the plan to attain the assumed investment return. Each year, a larger proportion of assets is paid out in benefits, and less capital is available to invest.

The estimates are based on the market value of assets with no smoothing of investment gains or losses. In all scenarios, the valuation interest rate used to discount liabilities was the single effective interest rate used in the July 1, 2014 valuation of 8.41%, which produces a similar liability stream as trending to a liability that reflects the expiration of the 5-year select period on June 30, 2017.

Payroll is assumed to increase approximately 3.75% a year over the long-term, consistent with the valuation assumption for total payroll growth.

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 fund remains at 10,879 members. The profile of these new members is the same as new members of each fund hired between July 1, 2010 and July 1, 2013:

- Average age at hire is 29.8
- Average salary at hire is \$50,300
- Approximately 12% female, 88% male

If actuarial accrued liability exceeds assets, the unfunded actuarial accrued liability is amortized through June 30, 2041 per Minnesota Statute 356.215, Subdivision 11. As directed by PERA, the statutory amortization date is assumed to be changed to June 30, 2071 once the current period expires in 2041. 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.

The State of Minnesota provides a \$9,000,000 contribution to the fund each October 1 until both the State Patrol Fund and the PERA Police and Fire plan become 90% funded (on a Market Value basis). For purposes of this projection, the \$9,000,000 contribution is assumed to continue until the Police and Fire plan reaches the threshold required to pay a 2.5% benefit increase.

### **Post-retirement 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) for two consecutive years in the future, post-retirement increases will revert to the 2.5% level.

For the actuarial valuation as of July 1, 2014, an actuarial projection was performed to estimate when this plan is expected to attain the threshold required to pay a 2.5% post-retirement benefit increase. The projection indicated that if all assumptions were met, the threshold is expected to be attained in the year 2023, and that the plan would begin paying 2.5% benefit increases on January 1, 2024. This assumption is reflected in our valuation calculations and in the 8.5% ultimate rate of return projection scenario.

Under the 10% ultimate rate of return scenario, the funded status of the plan is expected to improve. As the plan experiences greater than expected investment return each year, the assumed 2.5% benefit increase date of January 1, 2024 is accelerated. We performed a projection to estimate when the plan is expected to attain the threshold required to pay a 2.5% post-retirement benefit increase if future investment returns are 9.5% through June 30, 2017 and 10.0% thereafter. This projection indicated the plan would begin paying a 2.5% benefit increase on January 1, 2020 under this investment return scenario. To approximate the acceleration of the assumed 2.5% benefit increase date from 2024 to 2020, we assumed the accrued liability and normal cost would increase a proportionate amount between 2014 and 2020.

Under the 7% ultimate rate of return scenario, the funded status of the plan is expected to deteriorate. As the plan experiences lower than expected investment returns each year, the assumed 2.5% benefit increase date becomes later each year until it is no longer projected to be attained. We assumed for purposes of this projection that this transition from the current assumption that the benefit increase will change from 1.0% to 2.5% on January 1, 2024 to an assumption that the benefit increase will remain at 1.0% for all years would occur by July 1, 2043.

## **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 Public Employees Retirement Association of Minnesota (PERA), 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 Trustees. 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. PERA is solely responsible for communicating to GRS any changes required thereto.

Guidance regarding the selection of economic assumptions for measuring pension obligations is provided by Actuarial Standards of Practice (ASOP) No. 27. A revision of ASOP No. 27, applicable to valuation dates on or after September 30, 2014, will guide assumption setting for future valuations. A recent review of inflation and investment return assumptions for accounting and financial reporting purposes resulted in a recommended range of 7% to 8% for the assumed investment return. Additional review and discussion will be required before the next valuation.

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.

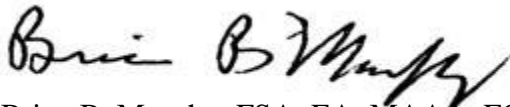
Bonita J. Wurst and Brian B. Murphy are Members of the American Academy of Actuaries (MAAA) and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein. In addition, Mr. Murphy meets the requirements of “approved actuary” under Minnesota 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 Public Employees Police & Fire Plan 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

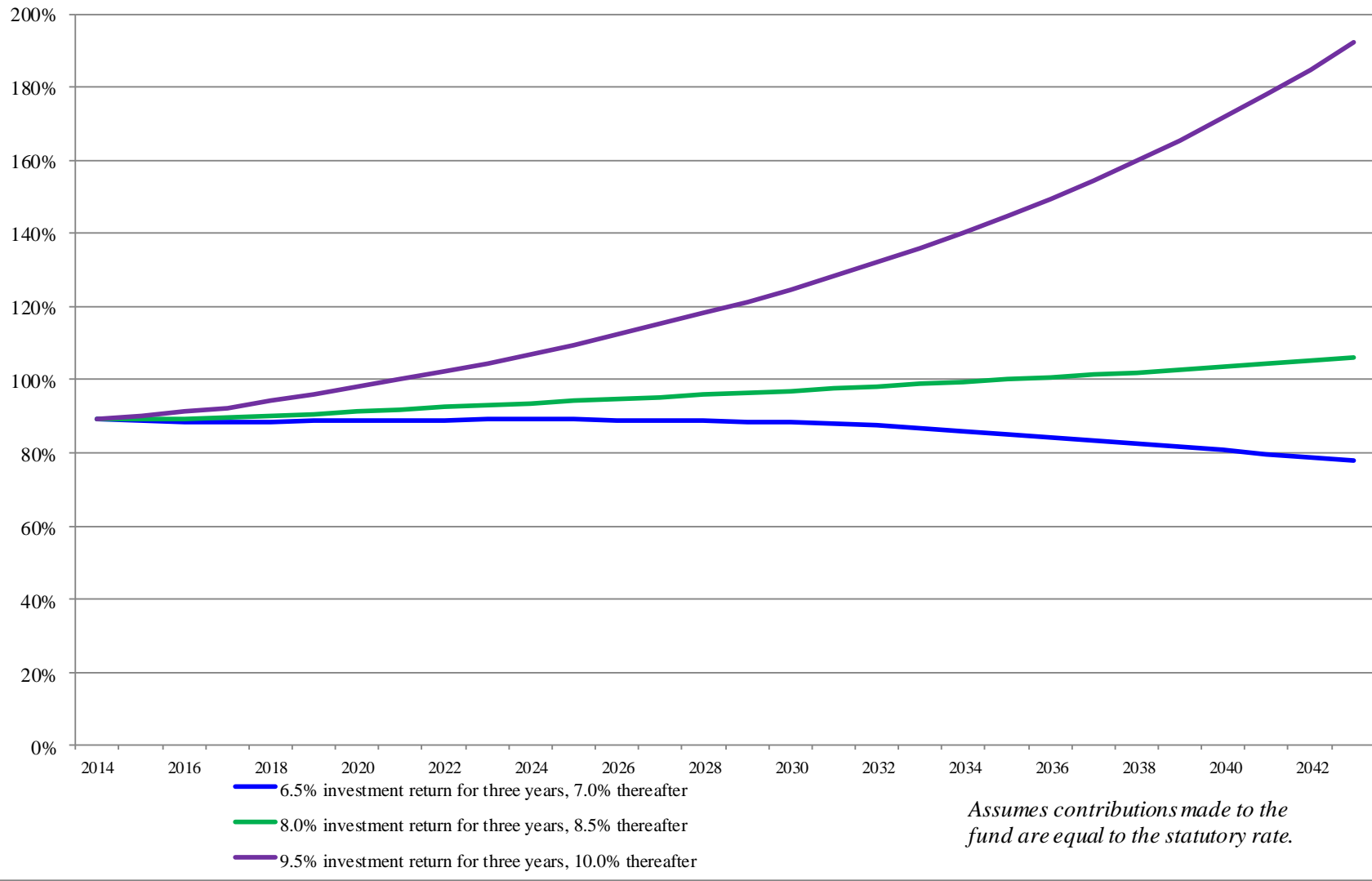


Brian B. Murphy, FSA, EA, MAAA, FCA

BJW/BBM:sc  
Enclosures

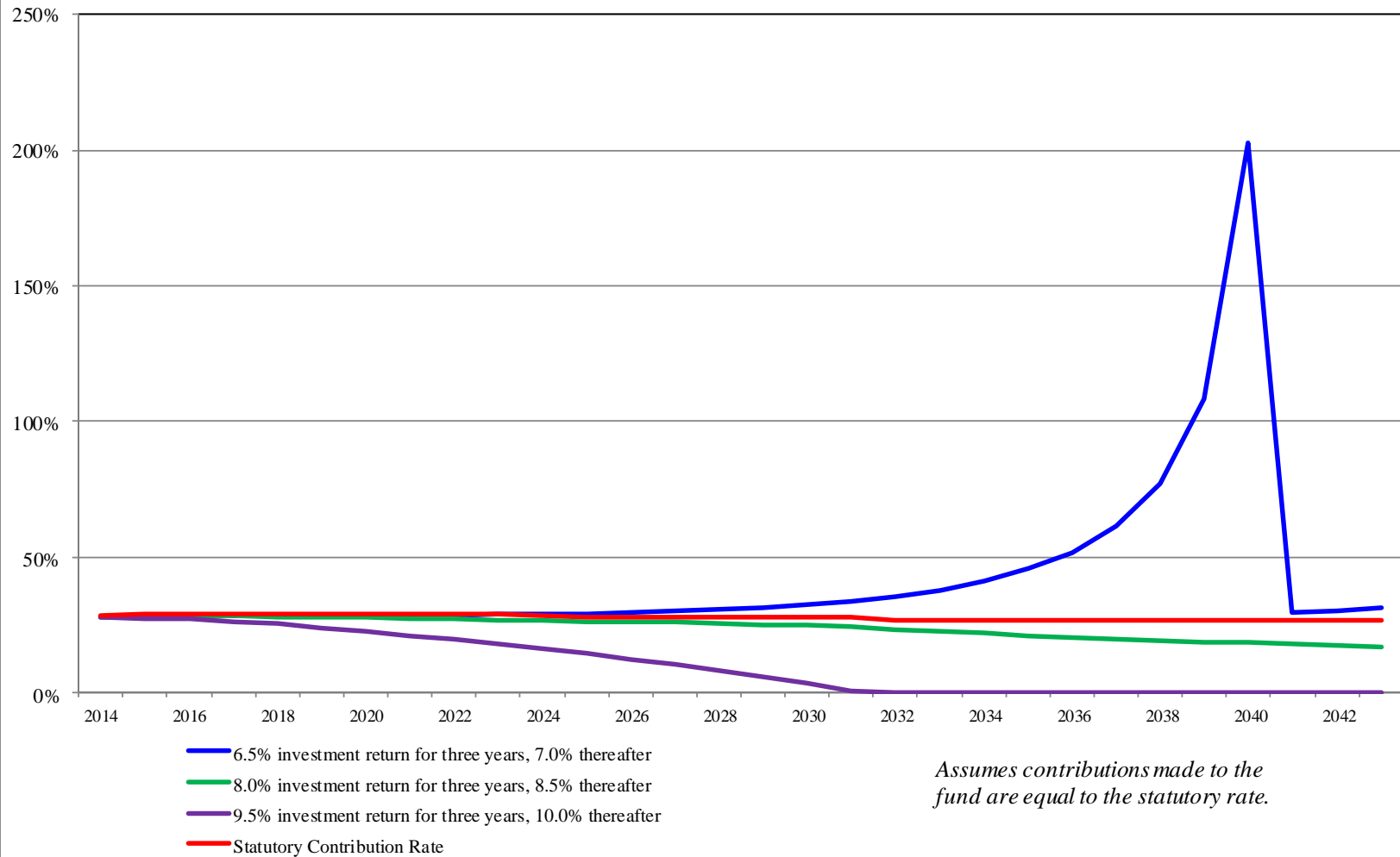
*This exhibit should only be viewed in conjunction with GRS' January 30, 2015 letter to PERA.*

## Public Employees Police & Fire Plan Estimated Funded Ratio



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## Public Employees Police & Fire Plan Estimated Required Contribution Rates



*This exhibit should only be viewed in conjunction with GRS' January 30, 2015 letter to PERA.*

**Public Employees Police & Fire Plan**  
**Scenario: 6.5% for Three Years, 7.0% thereafter**

**Fiscal year beginning July 1**

| <b>\$ in Thousands</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>2023</b> |
|-------------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| <b>Contributions (% of Payroll)</b> |             |             |             |             |             |             |             |             |             |             |
| Statutory - Chapter 353             | 28.7%       | 29.3%       | 29.3%       | 29.2%       | 29.2%       | 29.1%       | 29.0%       | 29.0%       | 28.9%       | 28.8%       |
| Required - Chapter 356 (MVA)        | 28.1%       | 28.2%       | 28.4%       | 28.7%       | 28.6%       | 28.6%       | 28.6%       | 28.6%       | 28.7%       | 28.9%       |
| Sufficiency / (Deficiency)          | 0.7%        | 1.1%        | 0.9%        | 0.6%        | 0.5%        | 0.5%        | 0.4%        | 0.3%        | 0.2%        | (0.0)%      |
| <b>Contributions</b>                |             |             |             |             |             |             |             |             |             |             |
| Statutory - Chapter 353             | 238,269     | 252,257     | 261,185     | 269,705     | 278,314     | 287,165     | 296,183     | 305,448     | 315,047     | 325,062     |
| Required - Chapter 356 (MVA)        | 232,639     | 242,930     | 253,420     | 264,635     | 273,302     | 282,326     | 291,919     | 302,200     | 313,318     | 325,440     |
| Sufficiency / (Deficiency)          | 5,630       | 9,327       | 7,765       | 5,070       | 5,012       | 4,839       | 4,264       | 3,248       | 1,729       | (378)       |
| <b>Funding Ratios</b>               |             |             |             |             |             |             |             |             |             |             |
| Current Assets (MVA)                | 7,273,100   | 7,473,178   | 7,685,609   | 7,905,419   | 8,170,573   | 8,445,366   | 8,727,738   | 9,017,210   | 9,313,156   | 9,615,083   |
| Actuarial Accrued Liability (AAL)   | 8,151,328   | 8,409,312   | 8,675,461   | 8,950,034   | 9,233,296   | 9,525,524   | 9,827,001   | 10,138,019  | 10,458,880  | 10,789,897  |
| Unfunded AAL                        | 878,228     | 936,134     | 989,852     | 1,044,615   | 1,062,723   | 1,080,158   | 1,099,263   | 1,120,809   | 1,145,724   | 1,174,814   |
| Funding Ratio                       | 89%         | 89%         | 89%         | 88%         | 88%         | 89%         | 89%         | 89%         | 89%         | 89%         |
| <b>Benefit Payments</b>             |             |             |             |             |             |             |             |             |             |             |
|                                     | 501,532     | 516,118     | 531,243     | 547,261     | 564,459     | 584,538     | 605,761     | 628,314     | 652,115     | 677,326     |

*Numbers may not add due to rounding.*

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**Public Employees Police & Fire Plan**  
**Scenario: 6.5% for Three Years, 7.0% thereafter**

**Fiscal year beginning July 1**

| <b>\$ in Thousands</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>2033</b> |
|-------------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| <b>Contributions (% of Payroll)</b> |             |             |             |             |             |             |             |             |             |             |
| Statutory - Chapter 353             | 28.8%       | 28.7%       | 28.7%       | 28.6%       | 28.5%       | 28.5%       | 28.4%       | 28.4%       | 27.6%       | 27.6%       |
| Required - Chapter 356 (MVA)        | 29.1%       | 29.3%       | 29.7%       | 30.2%       | 30.7%       | 31.5%       | 32.4%       | 33.6%       | 35.4%       | 38.0%       |
| Sufficiency / (Deficiency)          | (0.3)%      | (0.6)%      | (1.0)%      | (1.6)%      | (2.2)%      | (3.0)%      | (4.0)%      | (5.2)%      | (7.9)%      | (10.4)%     |
| <b>Contributions</b>                |             |             |             |             |             |             |             |             |             |             |
| Statutory - Chapter 353             | 335,351     | 346,061     | 357,240     | 368,915     | 381,188     | 393,818     | 406,968     | 420,651     | 423,330     | 438,101     |
| Required - Chapter 356 (MVA)        | 338,777     | 353,579     | 370,195     | 389,042     | 410,561     | 435,293     | 464,087     | 498,133     | 543,909     | 603,560     |
| Sufficiency / (Deficiency)          | (3,426)     | (7,518)     | (12,955)    | (20,127)    | (29,373)    | (41,475)    | (57,119)    | (77,482)    | (120,579)   | (165,459)   |
| <b>Funding Ratios</b>               |             |             |             |             |             |             |             |             |             |             |
| Current Assets (MVA)                | 9,922,378   | 10,234,501  | 10,550,521  | 10,869,702  | 11,192,255  | 11,518,803  | 11,849,035  | 12,182,603  | 12,519,334  | 12,847,010  |
| Actuarial Accrued Liability (AAL)   | 11,131,390  | 11,483,691  | 11,847,142  | 12,222,096  | 12,608,917  | 13,007,981  | 13,419,675  | 13,844,399  | 14,317,302  | 14,814,656  |
| Unfunded AAL                        | 1,209,012   | 1,249,190   | 1,296,621   | 1,352,394   | 1,416,662   | 1,489,178   | 1,570,640   | 1,661,796   | 1,797,968   | 1,967,646   |
| Funding Ratio                       | 89%         | 89%         | 89%         | 89%         | 89%         | 89%         | 88%         | 88%         | 87%         | 87%         |
| <b>Benefit Payments</b>             |             |             |             |             |             |             |             |             |             |             |
|                                     | 703,696     | 731,711     | 761,167     | 791,129     | 821,310     | 852,420     | 884,632     | 917,770     | 951,918     | 987,186     |

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**Public Employees Police & Fire Plan**  
**Scenario: 6.5% for Three Years, 7.0% thereafter**

**Fiscal year beginning July 1**

| <b>\$ in Thousands</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>2043</b> |
|-------------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| <b>Contributions (% of Payroll)</b> |             |             |             |             |             |             |             |             |             |             |
| Statutory - Chapter 353             | 27.6%       | 27.5%       | 27.5%       | 27.5%       | 27.5%       | 27.5%       | 27.4%       | 27.4%       | 27.4%       | 27.4%       |
| Required - Chapter 356 (MVA)        | 41.3%       | 45.7%       | 51.9%       | 61.2%       | 76.9%       | 108.2%      | 202.6%      | 29.7%       | 30.4%       | 31.2%       |
| Sufficiency / (Deficiency)          | (13.7)%     | (18.2)%     | (24.4)%     | (33.8)%     | (49.4)%     | (80.8)%     | (175.1)%    | (2.3)%      | (3.0)%      | (3.8)%      |
| <b>Contributions</b>                |             |             |             |             |             |             |             |             |             |             |
| Statutory - Chapter 353             | 453,434     | 469,464     | 486,203     | 503,745     | 522,112     | 541,305     | 561,405     | 582,348     | 604,186     | 626,887     |
| Required - Chapter 356 (MVA)        | 679,259     | 778,977     | 917,035     | 1,122,073   | 1,460,898   | 2,133,934   | 4,144,754   | 630,990     | 670,945     | 714,212     |
| Sufficiency / (Deficiency)          | (225,825)   | (309,513)   | (430,832)   | (618,328)   | (938,786)   | (1,592,629) | (3,583,349) | (48,642)    | (66,759)    | (87,325)    |
| <b>Funding Ratios</b>               |             |             |             |             |             |             |             |             |             |             |
| Current Assets (MVA)                | 13,176,352  | 13,506,596  | 13,836,951  | 14,167,054  | 14,496,684  | 14,825,631  | 15,153,567  | 15,480,798  | 15,807,257  | 16,133,031  |
| Actuarial Accrued Liability (AAL)   | 15,327,619  | 15,856,499  | 16,401,586  | 16,963,664  | 17,543,711  | 18,142,831  | 18,762,110  | 19,403,340  | 20,068,113  | 20,758,283  |
| Unfunded AAL                        | 2,151,267   | 2,349,903   | 2,564,635   | 2,796,610   | 3,047,027   | 3,317,200   | 3,608,543   | 3,922,542   | 4,260,856   | 4,625,252   |
| Funding Ratio                       | 86%         | 85%         | 84%         | 84%         | 83%         | 82%         | 81%         | 80%         | 79%         | 78%         |
| <b>Benefit Payments</b>             |             |             |             |             |             |             |             |             |             |             |
|                                     | 1,023,866   | 1,062,065   | 1,101,328   | 1,141,588   | 1,182,841   | 1,225,187   | 1,268,072   | 1,311,816   | 1,356,314   | 1,401,759   |

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**Public Employees Police & Fire Plan**  
**Scenario: 8.0% for Three Years, 8.5% thereafter**

**Fiscal year beginning July 1**

| <b>\$ in Thousands</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>2023</b> |
|-------------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| <b>Contributions (% of Payroll)</b> |             |             |             |             |             |             |             |             |             |             |
| Statutory - Chapter 353             | 28.7%       | 29.3%       | 29.3%       | 29.2%       | 29.2%       | 29.1%       | 29.0%       | 29.0%       | 28.9%       | 28.8%       |
| Required - Chapter 356 (MVA)        | 28.1%       | 28.1%       | 28.2%       | 28.3%       | 28.2%       | 28.0%       | 27.8%       | 27.5%       | 27.3%       | 27.0%       |
| Sufficiency / (Deficiency)          | 0.7%        | 1.2%        | 1.1%        | 0.9%        | 1.0%        | 1.1%        | 1.3%        | 1.4%        | 1.6%        | 1.8%        |
| <b>Contributions</b>                |             |             |             |             |             |             |             |             |             |             |
| Statutory - Chapter 353             | 238,269     | 252,257     | 261,185     | 269,705     | 278,314     | 287,165     | 296,183     | 305,448     | 315,047     | 325,062     |
| Required - Chapter 356 (MVA)        | 232,639     | 241,634     | 251,253     | 261,441     | 268,713     | 276,024     | 283,284     | 290,531     | 297,755     | 304,962     |
| Sufficiency / (Deficiency)          | 5,630       | 10,623      | 9,932       | 8,264       | 9,601       | 11,141      | 12,899      | 14,917      | 17,292      | 20,100      |
| <b>Funding Ratios</b>               |             |             |             |             |             |             |             |             |             |             |
| Current Assets (MVA)                | 7,273,100   | 7,580,294   | 7,911,407   | 8,262,532   | 8,674,534   | 9,112,568   | 9,576,096   | 10,066,265  | 10,584,209  | 11,131,336  |
| Actuarial Accrued Liability (AAL)   | 8,151,328   | 8,482,582   | 8,842,288   | 9,222,529   | 9,624,266   | 10,048,178  | 10,493,313  | 10,960,435  | 11,450,226  | 11,963,579  |
| Unfunded AAL                        | 878,228     | 902,288     | 930,881     | 959,997     | 949,732     | 935,610     | 917,217     | 894,170     | 866,017     | 832,243     |
| Funding Ratio                       | 89%         | 89%         | 89%         | 90%         | 90%         | 91%         | 91%         | 92%         | 92%         | 93%         |
| <b>Benefit Payments</b>             |             |             |             |             |             |             |             |             |             |             |
|                                     | 501,532     | 516,118     | 531,243     | 547,261     | 564,459     | 584,538     | 605,761     | 628,314     | 652,115     | 680,840     |

*Numbers may not add due to rounding.*

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**Public Employees Police & Fire Plan**  
**Scenario: 8.0% for Three Years, 8.5% thereafter**

**Fiscal year beginning July 1**

| <b>\$ in Thousands</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>2033</b> |
|-------------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| <b>Contributions (% of Payroll)</b> |             |             |             |             |             |             |             |             |             |             |
| Statutory - Chapter 353             | 28.0%       | 28.0%       | 27.9%       | 27.9%       | 27.9%       | 27.8%       | 27.8%       | 27.8%       | 27.0%       | 27.0%       |
| Required - Chapter 356 (MVA)        | 26.8%       | 26.5%       | 26.2%       | 25.9%       | 25.6%       | 25.2%       | 24.8%       | 24.2%       | 23.6%       | 22.9%       |
| Sufficiency / (Deficiency)          | 1.2%        | 1.5%        | 1.7%        | 2.0%        | 2.3%        | 2.6%        | 3.1%        | 3.6%        | 3.4%        | 4.1%        |
| <b>Contributions</b>                |             |             |             |             |             |             |             |             |             |             |
| Statutory - Chapter 353             | 335,351     | 337,061     | 348,240     | 359,915     | 372,188     | 384,818     | 397,968     | 411,651     | 414,330     | 429,101     |
| Required - Chapter 356 (MVA)        | 311,858     | 318,972     | 326,755     | 334,363     | 341,710     | 348,400     | 354,273     | 358,905     | 361,691     | 363,574     |
| Sufficiency / (Deficiency)          | 23,493      | 18,089      | 21,485      | 25,552      | 30,478      | 36,418      | 43,695      | 52,746      | 52,639      | 65,527      |
| <b>Funding Ratios</b>               |             |             |             |             |             |             |             |             |             |             |
| Current Assets (MVA)                | 11,705,426  | 12,297,283  | 12,901,861  | 13,528,228  | 14,177,835  | 14,852,644  | 15,553,788  | 16,282,491  | 17,040,290  | 17,816,736  |
| Actuarial Accrued Liability (AAL)   | 12,496,515  | 13,045,212  | 13,609,255  | 14,188,457  | 14,783,608  | 15,395,898  | 16,025,806  | 16,673,719  | 17,340,269  | 18,026,056  |
| Unfunded AAL                        | 791,089     | 747,929     | 707,394     | 660,229     | 605,773     | 543,254     | 472,018     | 391,228     | 299,979     | 209,320     |
| Funding Ratio                       | 94%         | 94%         | 95%         | 95%         | 96%         | 96%         | 97%         | 98%         | 98%         | 99%         |
| <b>Benefit Payments</b>             |             |             |             |             |             |             |             |             |             |             |
|                                     | 720,856     | 758,581     | 798,112     | 838,522     | 879,539     | 921,882     | 965,715     | 1,010,854   | 1,057,379   | 1,105,394   |

*Numbers may not add due to rounding.*

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**Public Employees Police & Fire Plan**  
**Scenario: 8.0% for Three Years, 8.5% thereafter**

**Fiscal year beginning July 1**

| <b>\$ in Thousands</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>2043</b> |
|-------------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| <b>Contributions (% of Payroll)</b> |             |             |             |             |             |             |             |             |             |             |
| Statutory - Chapter 353             | 27.0%       | 27.0%       | 27.0%       | 27.0%       | 27.0%       | 27.0%       | 27.0%       | 27.0%       | 27.0%       | 27.0%       |
| Required - Chapter 356 (MVA)        | 22.0%       | 20.9%       | 20.4%       | 20.0%       | 19.5%       | 19.0%       | 18.4%       | 17.9%       | 17.3%       | 16.7%       |
| Sufficiency / (Deficiency)          | 5.0%        | 6.1%        | 6.6%        | 7.1%        | 7.5%        | 8.0%        | 8.6%        | 9.1%        | 9.7%        | 10.3%       |
| <b>Contributions</b>                |             |             |             |             |             |             |             |             |             |             |
| Statutory - Chapter 353             | 444,434     | 460,464     | 477,203     | 494,745     | 513,112     | 532,305     | 552,405     | 573,348     | 595,186     | 617,887     |
| Required - Chapter 356 (MVA)        | 361,906     | 355,685     | 360,761     | 365,517     | 369,864     | 373,705     | 377,001     | 379,584     | 381,362     | 382,175     |
| Sufficiency / (Deficiency)          | 82,528      | 104,779     | 116,442     | 129,228     | 143,248     | 158,600     | 175,404     | 193,764     | 213,824     | 235,712     |
| <b>Funding Ratios</b>               |             |             |             |             |             |             |             |             |             |             |
| Current Assets (MVA)                | 18,624,466  | 19,464,878  | 20,339,523  | 21,250,562  | 22,200,492  | 23,192,035  | 24,228,017  | 25,312,151  | 26,448,072  | 27,639,856  |
| Actuarial Accrued Liability (AAL)   | 18,731,658  | 19,457,436  | 20,203,737  | 20,971,408  | 21,761,476  | 22,575,086  | 23,413,348  | 24,278,066  | 25,170,846  | 26,093,539  |
| Unfunded AAL                        | 107,192     | (7,442)     | (135,786)   | (279,154)   | (439,016)   | (616,949)   | (814,669)   | (1,034,085) | (1,277,226) | (1,546,317) |
| Funding Ratio                       | 99%         | 100%        | 101%        | 101%        | 102%        | 103%        | 103%        | 104%        | 105%        | 106%        |
| <b>Benefit Payments</b>             |             |             |             |             |             |             |             |             |             |             |
|                                     | 1,155,179   | 1,206,836   | 1,259,915   | 1,314,369   | 1,370,204   | 1,427,542   | 1,485,848   | 1,545,433   | 1,606,221   | 1,668,406   |

*Numbers may not add due to rounding.*

*This exhibit should only be viewed in conjunction with GRS' January 30, 2015 letter to PERA.*

**Public Employees Police & Fire Plan**  
**Scenario: 9.5% for Three Years, 10.0% thereafter**

**Fiscal year beginning July 1**

| <b>\$ in Thousands</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>2023</b> |
|-------------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| <b>Contributions (% of Payroll)</b> |             |             |             |             |             |             |             |             |             |             |
| Statutory - Chapter 353             | 28.7%       | 29.3%       | 29.3%       | 29.2%       | 29.2%       | 29.1%       | 28.1%       | 28.1%       | 28.1%       | 28.0%       |
| Required - Chapter 356 (MVA)        | 28.1%       | 27.6%       | 27.1%       | 26.5%       | 25.4%       | 24.1%       | 22.7%       | 21.0%       | 19.6%       | 18.0%       |
| Sufficiency / (Deficiency)          | 0.7%        | 1.7%        | 2.2%        | 2.8%        | 3.8%        | 4.9%        | 5.4%        | 7.1%        | 8.5%        | 10.1%       |
| <b>Contributions</b>                |             |             |             |             |             |             |             |             |             |             |
| Statutory - Chapter 353             | 238,269     | 252,257     | 261,185     | 269,705     | 278,314     | 287,165     | 287,183     | 296,448     | 306,047     | 316,062     |
| Required - Chapter 356 (MVA)        | 232,639     | 237,655     | 241,465     | 244,257     | 242,388     | 238,316     | 231,733     | 221,972     | 213,199     | 202,511     |
| Sufficiency / (Deficiency)          | 5,630       | 14,602      | 19,720      | 25,448      | 35,926      | 48,849      | 55,450      | 74,476      | 92,848      | 113,551     |
| <b>Funding Ratios</b>               |             |             |             |             |             |             |             |             |             |             |
| Current Assets (MVA)                | 7,273,100   | 7,687,410   | 8,140,418   | 8,629,938   | 9,200,530   | 9,819,128   | 10,487,763  | 11,197,661  | 11,955,342  | 12,764,350  |
| Actuarial Accrued Liability (AAL)   | 8,151,328   | 8,528,998   | 8,924,166   | 9,337,643   | 9,770,278   | 10,222,957  | 10,696,610  | 11,183,943  | 11,685,993  | 12,202,652  |
| Unfunded AAL                        | 878,228     | 841,588     | 783,748     | 707,705     | 569,748     | 403,829     | 208,847     | (13,718)    | (269,349)   | (561,698)   |
| Funding Ratio                       | 89%         | 90%         | 91%         | 92%         | 94%         | 96%         | 98%         | 100%        | 102%        | 105%        |
| <b>Benefit Payments</b>             |             |             |             |             |             |             |             |             |             |             |
|                                     | 501,532     | 516,118     | 531,243     | 547,261     | 564,459     | 584,538     | 608,903     | 640,236     | 673,076     | 707,862     |

*Numbers may not add due to rounding.*

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**Public Employees Police & Fire Plan**  
**Scenario: 9.5% for Three Years, 10.0% thereafter**

**Fiscal year beginning July 1**

| <b>\$ in Thousands</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>2033</b> |
|-------------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| <b>Contributions (% of Payroll)</b> |             |             |             |             |             |             |             |             |             |             |
| Statutory - Chapter 353             | 28.0%       | 28.0%       | 27.9%       | 27.9%       | 27.9%       | 27.8%       | 27.8%       | 27.8%       | 27.0%       | 27.0%       |
| Required - Chapter 356 (MVA)        | 16.3%       | 14.5%       | 12.5%       | 10.5%       | 8.3%        | 6.0%        | 3.6%        | 1.0%        | 0.0%        | 0.0%        |
| Sufficiency / (Deficiency)          | 11.7%       | 13.5%       | 15.4%       | 17.4%       | 19.6%       | 21.8%       | 24.3%       | 26.8%       | 27.0%       | 27.0%       |
| <b>Contributions</b>                |             |             |             |             |             |             |             |             |             |             |
| Statutory - Chapter 353             | 326,351     | 337,061     | 348,240     | 359,915     | 372,188     | 384,818     | 397,968     | 411,651     | 414,330     | 429,101     |
| Required - Chapter 356 (MVA)        | 189,557     | 174,190     | 156,159     | 135,162     | 110,929     | 82,898      | 50,769      | 14,069      | -           | -           |
| Sufficiency / (Deficiency)          | 136,794     | 162,871     | 192,081     | 224,753     | 261,259     | 301,920     | 347,199     | 397,582     | 414,330     | 429,101     |
| <b>Funding Ratios</b>               |             |             |             |             |             |             |             |             |             |             |
| Current Assets (MVA)                | 13,628,211  | 14,551,091  | 15,537,355  | 16,591,984  | 17,721,568  | 18,933,790  | 20,236,095  | 21,636,601  | 23,144,545  | 24,757,845  |
| Actuarial Accrued Liability (AAL)   | 12,733,453  | 13,278,375  | 13,837,291  | 14,409,973  | 14,997,428  | 15,601,138  | 16,221,808  | 16,859,947  | 17,516,490  | 18,192,287  |
| Unfunded AAL                        | (894,758)   | (1,272,716) | (1,700,064) | (2,182,011) | (2,724,140) | (3,332,652) | (4,014,287) | (4,776,654) | (5,628,055) | (6,565,558) |
| Funding Ratio                       | 107%        | 110%        | 112%        | 115%        | 118%        | 121%        | 125%        | 128%        | 132%        | 136%        |
| <b>Benefit Payments</b>             | 744,177     | 782,374     | 822,333     | 863,019     | 904,124     | 946,362     | 989,969     | 1,034,661   | 1,080,562   | 1,127,958   |

*Numbers may not add due to rounding.*

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**Public Employees Police & Fire Plan**  
**Scenario: 9.5% for Three Years, 10.0% thereafter**

**Fiscal year beginning July 1**

| <b>\$ in Thousands</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>2043</b>  |
|-------------------------------------|-------------|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| <b>Contributions (% of Payroll)</b> |             |             |              |              |              |              |              |              |              |              |
| Statutory - Chapter 353             | 27.0%       | 27.0%       | 27.0%        | 27.0%        | 27.0%        | 27.0%        | 27.0%        | 27.0%        | 27.0%        | 27.0%        |
| Required - Chapter 356 (MVA)        | 0.0%        | 0.0%        | 0.0%         | 0.0%         | 0.0%         | 0.0%         | 0.0%         | 0.0%         | 0.0%         | 0.0%         |
| Sufficiency / (Deficiency)          | 27.0%       | 27.0%       | 27.0%        | 27.0%        | 27.0%        | 27.0%        | 27.0%        | 27.0%        | 27.0%        | 27.0%        |
| <b>Contributions</b>                |             |             |              |              |              |              |              |              |              |              |
| Statutory - Chapter 353             | 444,434     | 460,464     | 477,203      | 494,745      | 513,112      | 532,305      | 552,405      | 573,348      | 595,186      | 617,887      |
| Required - Chapter 356 (MVA)        | -           | -           | -            | -            | -            | -            | -            | -            | -            | -            |
| Sufficiency / (Deficiency)          | 444,434     | 460,464     | 477,203      | 494,745      | 513,112      | 532,305      | 552,405      | 573,348      | 595,186      | 617,887      |
| <b>Funding Ratios</b>               |             |             |              |              |              |              |              |              |              |              |
| Current Assets (MVA)                | 26,498,160  | 28,376,785  | 30,406,258   | 32,600,985   | 34,976,973   | 37,551,886   | 40,345,069   | 43,378,667   | 46,676,626   | 50,265,357   |
| Actuarial Accrued Liability (AAL)   | 18,887,874  | 19,603,371  | 20,339,036   | 21,095,813   | 21,874,831   | 22,677,404   | 23,504,863   | 24,359,536   | 25,243,541   | 26,159,186   |
| Unfunded AAL                        | (7,610,286) | (8,773,414) | (10,067,222) | (11,505,172) | (13,102,142) | (14,874,482) | (16,840,206) | (19,019,131) | (21,433,085) | (24,106,171) |
| Funding Ratio                       | 140%        | 145%        | 149%         | 155%         | 160%         | 166%         | 172%         | 178%         | 185%         | 192%         |
| <b>Benefit Payments</b>             |             |             |              |              |              |              |              |              |              |              |
|                                     | 1,177,255   | 1,228,478   | 1,281,054    | 1,334,923    | 1,390,054    | 1,446,530    | 1,503,605    | 1,561,613    | 1,620,536    | 1,680,642    |

*Numbers may not add due to rounding.*