GRS Gabriel Roeder Smith & Company
Consultants & Actuaries

MINNESOTA STATE RETIREMENT SYSTEM

STATE EMPLOYEES RETIREMENT FUND

GASB STATEMENT NOS. 67 AND 68 ACCOUNTING AND FINANCIAL REPORTING FOR PENSIONS

JUNE 30, 2016

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December 1, 2016

Minnesota State Retirement System
State Employees Retirement Fund
St. Paul, Minnesota

Dear Board of Directors:

This report provides accounting and financial reporting information that is intended to comply with the Governmental Accounting Standards Board (GASB) Statements No. 67 and No. 68 for the State Employees Retirement Fund ("SERF"), as amended by Statement No. 82. These calculations have been made on a basis that is consistent with our understanding of these accounting standards.

GASB Statement No. 67 is the accounting standard that applies to the financial reports issued by retirement systems. GASB Statement No. 68 establishes accounting and financial reporting for state and local government employers who provide their employees (including former employees) pension benefits through a trust. GASB Statement No. 82 is an amendment to Statements No. 67, No. 68, and No. 73, intended to improve consistency in the application of the accounting statements.

Our calculation of the liability associated with the benefits described in this report was performed for the purpose of providing financial reporting and disclosure information that satisfies the requirements of GASB Statements No. 67 and No. 68. The calculation of the plan's liability for this report may not be applicable for funding purposes of the plan. A calculation of the plan's liability for purposes other than satisfying the requirements of GASB Statement No. 67 may produce significantly different results. The information in this report is calculated on a total plan basis. MSRS is responsible for preparing the Schedule of Employer Allocations and the Schedule of Pension Amounts by Employer, as applicable. This report may be provided to parties other than the Minnesota State Retirement System (MSRS) only in its entirety and only with the permission of MSRS. GRS is not responsible for unauthorized use of this report.

This report is based upon information, furnished to us by MSRS, concerning retirement and ancillary benefits, active members, deferred vested members, retirees and beneficiaries, and financial data. If your understanding of this information is different, please let us know. This information was checked for internal consistency, but it was not audited.

This report complements the actuarial valuation report for funding purposes that was or will be provided to the System and should be considered in conjunction with that report. Please see the actuarial valuation report as of June 30, 2016 for additional discussion of the nature of actuarial calculations and more information related to participant data, economic and demographic assumptions, and benefit provisions.

To the best of our knowledge, the information contained within this report is accurate and fairly represents the actuarial position of the State Employees Retirement Fund as of the measurement date. All calculations have been made in conformity with generally accepted actuarial principles and practices as well as with the Actuarial Standards of Practice issued by the Actuarial Standards Board.

The signing actuaries are independent of the plan sponsor.

Brian B. Murphy and Bonita J. Wurst 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.

Respectfully submitted,

By Bonita J. Wurst
Bonita J. Wurst, ASA, EA, FCA, MAAA

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

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SECTION A

EXECUTIVE SUMMARY

EXECUTIVE SUMMARY
AS OF JUNE 30, 2016 (DOLLARS IN THOUSANDS)

	2016
Actuarial Valuation Date	June 30, 2016
Measurement Date of the Net Pension Liability	June 30, 2016
Membership	
Number of	
- Service Retirements	32,241
- Survivors	3,868
- Disability Retirements	1,843
- Deferred Retirements	17,019
- Terminated other non-vested	7,571
- Active Members	49,472
- Total	112,014
Covered-employee Payroll	$ 2,797,345 [1]
Net Pension Liability	
Total Pension Liability	$ 23,621,950
Plan Fiduciary Net Position	11,223,065
Net Pension Liability	$ 12,398,885
Plan Fiduciary Net Position as a Percentage of Total Pension Liability	47.51%
Net Pension Liability as a Percentage of Covered-employee Payroll	443.24%
Development of the Single Discount Rate	
Single Discount Rate	4.17%
Long-Term Expected Rate of Investment Return	7.50%
Long-Term Municipal Bond Rate[2]	2.85%
Last year ending June 30 in the 2017 to 2116 projection period for which projected benefit payments are fully funded	2042
Total Pension Expense/ (Income)	$ 1,799,612

Deferred Outflows and Deferred Inflows by Source Arising from Current and Prior Periods to be Recognized in Future Pension Expenses

	Deferred Outflows of Resources	Deferred Inflows of Resources
Difference between expected and actual experience in the measurement of the Total Pension Liability	$ 16,967	$ 313,527
Changes in assumptions	7,929,055	590,922
Net difference between projected and actual earnings on pension plan investments	966,187	420,551
Totals	$ 8,912,209	$ 1,325,000

(1) *Assumed equal to actual member contributions divided by employee contribution rate*

(2) *Based on the Bond Buyer 20-Bond Index of general obligation municipal bonds as of June 30, 2016*

DISCUSSION

Accounting Standard

For pension plans that are administered through trusts or equivalent arrangements, Governmental Accounting Standards Board (GASB) Statement No. 67, *Financial Reporting for Pension Plans*, establishes standards of financial reporting for separately issued financial reports and specifies the required approach for measuring the pension liability. Similarly, GASB Statement No. 68, *Accounting and Financial Reporting for Pensions,* establishes standards for state and local government employers (as well as non-employer contributing entities) to account for and disclose the net pension liability, pension expense, and other information associated with providing retirement benefits to their employees (and former employees) on their basic financial statements. Governmental Accounting Standards Board (GASB) Statement No. 82, Pension Issues, is an amendment to Statements No. 67, No. 68, and No. 73, intended to improve consistency in the application of the accounting standards.

The following discussion provides a summary of the information that is required to be disclosed under these accounting standards. A number of these disclosure items are provided in this report. However, certain information, such as notes regarding accounting policies and investments, is not included in this report and the retirement system and/or plan sponsor will be responsible for preparing and disclosing that information to comply with these accounting standards.

Financial Statements

GASB Statement No. 68 requires state and local governmental employers to recognize the net pension liability and the pension expense on their financial statements. The net pension liability is the difference between the total pension liability and the plan's fiduciary net position. In traditional actuarial terms, this is analogous to the accrued liability less the market value of assets (not the smoothed actuarial value of assets that is often encountered in actuarial valuations performed to determine the employer's contribution requirement).

Paragraph 57 of GASB Statement No. 68 states, "Contributions to the pension plan from the employer subsequent to the measurement date of the collective net pension liability and before the end of the employer's reporting period should be reported as a deferred outflow of resources related to pensions." The information contained in this report does not incorporate any contributions made to SERF subsequent to the measurement date of June 30, 2016.

The pension expense or income recognized each fiscal year is equal to the change in the net pension liability from the beginning of the year to the end of the year, adjusted for deferred recognition of the difference between expected and actual experience in the measurement of the total pension liability, assumption changes, and investment experience.

Pension plans that prepare their own, stand-alone financial statements are required to present two financial statements – a Statement of Fiduciary Net Position and a Statement of Changes in Fiduciary Net Position in accordance with GASB Statement No. 67. The *Statement of Fiduciary Net Position* presents the assets and liabilities of the pension plan at the end of the pension plan's reporting period. The *Statement of Changes in Fiduciary Net Position* presents the additions, such as contributions and investment income, and deductions, such as benefit payments and expenses, and net increase or decrease in the fiduciary net position.

Notes to Financial Statements

GASB Statement No. 68 requires the notes of the employer's financial statements to disclose the total pension expense, the pension plan's liabilities and assets, and deferred outflows and inflows of resources related to pensions.

GASB Statement Nos. 67 and 68 require the notes of the financial statements for the employers and pension plans to include certain descriptive information about the pension plans through which the pension benefits are provided. The list of disclosure items should include:

- a description of benefits provided by the plan;
- the classes of employees and number of members covered by the pension plan;
- a description of the plan's funding policy, which includes member and employer contribution requirements;
- the pension plan's investment policies;
- the pension plan's fiduciary net position, net pension liability, and the pension plan's fiduciary net position as a percentage of the total pension liability;
- the net pension liability using a discount rate that is 1% higher and 1% lower than the current discount rate used to calculate the total pension liability and net pension liability for financial reporting purposes;
- significant assumptions and methods used to calculate the total pension liability;
- inputs to the discount rates; and
- certain information about mortality assumptions and the dates of experience studies.

Retirement systems that issue stand-alone financial statements are required to disclose additional information in accordance with GASB Statement No. 67. This information includes:

- the composition of the pension plan's Board and the authority under which benefit terms may be amended;
- a description of how fair value is determined;
- information regarding certain reserves and investments, which include concentrations of investments greater than or equal to 5%, receivables, and insurance contracts excluded from plan assets; and
- annual money-weighted rate of return.

MSRS' comprehensive annual financial report, which contains the basic financial statements and related note disclosures for the State Employees Retirement Fund can be found online at www.msrs.state.mn.us/financial-information or obtained from MSRS at 60 Empire Drive, Suite 300, St. Paul, MN, 55103 or requested via email at info@msrs.us or telephone at 1-800-657-5757.

Required Supplementary Information

GASB Statement No. 67 requires a 10-year fiscal history of:

- sources of changes in the net pension liability;
- information about the components of the net pension liability and related ratios, including the pension plan's fiduciary net position as a percentage of the total pension liability, and the net pension liability as a percent of covered-employee payroll; and
- a comparison of the actual employer contributions to the actuarially determined contributions based on the plan's funding policy.

Measurement of the Net Pension Liability

The net pension liability is to be measured as the total pension liability, less the amount of the pension plan's fiduciary net position. In actuarial terms, this will be the accrued liability less the market value of assets (not the smoothed actuarial value of assets that is often encountered in actuarial valuations performed to determine the employer's contribution requirement).

General Implications of Contribution Allocation Procedure or Funding Policy on Future Expected Plan Contributions and Funded Status

Given the plan's contribution allocation procedure, if all actuarial assumptions are met (including the assumption of the plan earning 7.50% on the actuarial value of assets), then the following outcomes are expected:

1. The employer normal cost as a percentage of pay is expected to remain approximately level as a percentage of payroll.
2. The unfunded actuarial accrued liabilities will increase and not be eliminated.
3. The funded status of the plan will decrease.
4. The plan may eventually become insolvent and unable to pay benefits.

The projections in this report are strictly for the purpose of determining the GASB single discount rate and are different from a funding projection for the ongoing plan.

Limitations of Funded Status Measurements

Unless otherwise indicated, a funded status measurement presented in this report is based upon the actuarial accrued liability and the actuarial value of assets. Unless otherwise indicated, with regard to any funded status measurements presented in this report:

(1) The measurement is inappropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations, in other words of transferring the obligations to an unrelated third party in an arm's length market value type transaction.

(2) The measurement is dependent upon the actuarial cost method which, in combination with the plan's amortization policy, affects the timing and amounts of future contributions. The amounts of future contributions will most certainly differ from those assumed in this report due to future actual experience differing from assumed experience based upon the actuarial assumptions. A funded status measurement in this report of 100% is not synonymous with no required future contributions. If the funded status were 100%, the plan would still require

future normal cost contributions (i.e., contributions to cover the cost of the active membership accruing an additional year of service credit).

(3) The measurement would produce a different result if the market value of assets were used instead of the actuarial value of assets, unless the market value of assets is used in the measurement.

Limitation of Project Scope

Actuarial standards do not require the actuary to evaluate the ability of the plan sponsor or other contributing entity to make required contributions to the plan when due. Such an evaluation was not within the scope of this project and is not within the actuary's domain of expertise. Consequently, the actuary performed no such evaluation.

Timing of the Valuation

GASB Statements Nos. 67 and 68 require that an actuarial valuation to determine the total pension liability be performed at least every two years. The net pension liability and pension expense should be measured as of the pension plan's fiscal year end (measurement date) on a date that is within the employer's prior fiscal year. If the actuarial valuation used to determine the total pension liability is not calculated as of the measurement date, the total pension liability is required to be rolled forward from the actuarial valuation date to the measurement date.

The total pension liability shown in this report is based on an actuarial valuation performed as of June 30, 2016 and a measurement date of June 30, 2016.

Single Discount Rate

Projected benefit payments are required to be discounted to their actuarial present values using a Single Discount Rate that reflects (1) a long-term expected rate of return on pension plan investments (to the extent that the plan's fiduciary net position is projected to be sufficient to pay benefits) and (2) tax-exempt municipal bond rate based on an index of 20-year general obligation bonds with an average AA credit rating (which is published by the Federal Reserve Board) as of the measurement date (to the extent that the contributions for use with the long-term expected rate of return are not met).

For the purpose of this valuation, the long-term expected rate of return on pension plan investments is 7.50%; the municipal bond rate is 2.85% (based on the weekly rate closest to but not later than the measurement date of the "20-Bond GO Index"); and the resulting single discount rate is 4.17%. The long-term expected rate of return is based on a review of inflation and investment assumptions, dated September 11, 2014, and a recent asset liability study obtained by the Minnesota State Board of Investment.

Effective Date and Transition

GASB Statements No. 67 and No. 68 are effective for fiscal years beginning after June 15, 2013, and June 15, 2014 respectively. Earlier application is encouraged by the GASB. MSRS first implemented GASB Statement No. 67 for fiscal year 2014.

SECTION B

FINANCIAL STATEMENTS

PENSION EXPENSE UNDER GASB STATEMENT NO. 68
FISCAL YEAR ENDED JUNE 30, 2016 (DOLLARS IN THOUSANDS)

A. Expense/(Income)		
1.	Service Cost	$ 211,491
2.	Interest on the Total Pension Liability	1,020,925
3.	Current-Period Benefit Changes	-
4.	Employee Contributions (made negative for addition here)	(153,854)
5.	Projected Earnings on Plan Investments (made negative for addition here)	(903,405)
6.	Pension Plan Administrative Expense	10,196
7.	Other Changes in Plan Fiduciary Net Position	(20,259)
8.	Recognition of Outflow (Inflow) of Resources due to differences between expected and actual experience in the measurement of the Total Pension Liability	
	Arising from Current Reporting Period	4,242
9.	Recognition of Outflow (Inflow) of Resources due to assumption changes	
	Arising from Current Reporting Period	1,982,264
10.	Recognition of Outflow (Inflow) of Resources due to the difference between projected (7.90%) and actual earnings on Pension Plan Investments	
	Arising from Current Reporting Period	182,608
11.	**Increases/(Decreases) from Experience in the Current Reporting Period**	**$ 2,334,208**
12.	Recognition of Outflow (Inflow) of Resources due to differences between expected and actual experience in the measurement of the Total Pension Liability	
	Arising from Prior Reporting Periods	(107,444)
13.	Recognition of Outflow (Inflow) of Resources due to assumption changes	
	Arising from Prior Reporting Periods	(295,462)
14.	Recognition of Outflow (Inflow) of Resources due to the difference between projected (7.90%) and actual earnings on Pension Plan Investments	
	Arising from Prior Reporting Periods	(131,690)
15.	**Total Pension Expense/ (Income)**	**$ 1,799,612**

STATEMENT OF OUTFLOWS AND INFLOWS ARISING FROM CURRENT REPORTING PERIOD
FISCAL YEAR ENDED JUNE 30, 2016 (DOLLARS IN THOUSANDS)

A. Outflows (Inflows) of Resources due to Liabilities		
1. Difference between expected and actual experience of the Total Pension Liability (gains) or losses	$	21,209
2. Assumption Changes (gains) or losses		9,911,319
3. Recognition period for Liabilities: Average of the expected remaining service lives of all employees {in years, rounded to the nearest whole number}		5.0000
4. Outflow (Inflow) of Resources to be recognized in the current pension expense for the difference between expected and actual experience in the measurement of the Total Pension Liability*	$	4,242
5. Outflow (Inflow) of Resources to be recognized in the current pension expense for Assumption Changes		1,982,264
6. Outflow (Inflow) of Resources to be recognized in the current pension expense due to Liabilities	$	1,986,506
7. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses for the difference between expected and actual experience of the Total Pension Liability	$	16,967
8. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses for Assumption Changes		7,929,055
9. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses due to Liabilities	$	7,946,022
B. Outflows (Inflows) of Resources due to Assets		
1. Net difference between projected and actual earnings on pension plan investments (gains) or losses	$	913,038
2. Recognition period for Assets {in years}		5.0000
3. Outflow (Inflow) of Resources to be recognized in the current pension expense due to Assets	$	182,608
4. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses due to Assets	$	730,430

* *Includes impact of changes in expected timing of future COLA increases.*

STATEMENT OF OUTFLOWS AND INFLOWS ARISING FROM CURRENT AND PRIOR REPORTING PERIODS

FISCAL YEAR ENDED JUNE 30, 2016 (DOLLARS IN THOUSANDS)

A. Outflows and Inflows of Resources due to Liabilities and Assets to be Recognized in Current Pension Expense

	Outflows of Resources	Inflows of Resources	Net Outflows/(Inflows) of Resources
1. Due to Liabilities	$ 1,986,506	$ 402,906	$ 1,583,600
2. Due to Assets	261,193	210,275	50,918
3. Total	$ 2,247,699	$ 613,181	$ 1,634,518

B. Outflows and Inflows of Resources by Source to be Recognized in Current Pension Expense

	Outflows of Resources	Inflows of Resources	Net Outflows/(Inflows) of Resources
1. Differences between expected and actual experience	$ 4,242	$ 107,444	$ (103,202)
2. Assumption Changes	1,982,264	295,462	1,686,802
3. Net Difference between projected and actual earnings on pension plan investments	261,193	210,275	50,918
4. Total	$ 2,247,699	$ 613,181	$ 1,634,518

C. Deferred Outflows and Deferred Inflows of Resources by Source to be Recognized in Future Pension Expenses

	Deferred Outflows of Resources	Deferred Inflows of Resources	Net Deferred Outflows/ (Inflows) of Resources
1. Differences between expected and actual experience	$ 16,967	$ 313,527	$ (296,560)
2. Assumption Changes	7,929,055	590,922	7,338,133
3. Net Difference between projected and actual earnings on pension plan investments	966,187	420,551	545,636
4. Total	$ 8,912,209	$ 1,325,000	$ 7,587,209

D. Deferred Outflows and Deferred Inflows of Resources by Year to be Recognized in Future Pension Expenses

Year Ending June 30	Net Deferred Outflows/ (Inflows) of Resources
2017	$ 1,634,518
2018	1,634,521
2019	2,149,060
2020	2,169,110
2021	-
Thereafter	-
Total	$ 7,587,209

STATEMENT OF FIDUCIARY NET POSITION AS OF JUNE 30, 2016 (DOLLARS IN THOUSANDS)

Assets		**June 30, 2016**
Cash & Short-term Investments	$	252,758
Receivables		22,232
Investment Pools (at fair value)		10,939,870
Securities Lending Collateral		1,586,006
Capital Assets		19,604
Total Assets	**$**	**12,820,470**
Total Deferred Outflows of Resources	**$**	**-**
Total Liabilities	**$**	**(1,597,405)**
Total Deferred Inflows of Resources	**$**	**-**
Net Position Restricted for Pensions	**$**	**11,223,065**

STATEMENT OF CHANGES IN FIDUCIARY NET POSITION FOR YEAR ENDED JUNE 30, 2016 (DOLLARS IN THOUSANDS)

1.	**Net Position at market value at beginning of year**	**$**	**11,638,319**
Additions			
2.	Contributions		
	a. Employee	$	153,854
	b. Employer		151,168
	c. Other sources		-
	d. Total contributions	$	305,022
3.	Investment income		
	a. Investment income/(loss)	$	5,356
	b. Investment expenses		(14,989)
	c. Net investment income/(loss)	$	(9,633)
4.	Other Additions		20,281
5.	**Total Additions (2.d.) + (3.c.) + (4.)**	**$**	**315,670**
Deductions			
6.	Benefits Paid		
	a. Annuity benefits	$	(707,361)
	b. Refunds		(13,345)
	c. Total benefits paid	$	(720,706)
7.	Expenses		
	a. Other deductions	$	(22)
	b. Administrative		(10,196)
	c. Total expenses	$	(10,218)
8.	**Total deductions (6.c.) + (7.c.)**	**$**	**(730,924)**
9.	**Net increase/(decrease) in fiduciary net position (5.) + (8.)**	**$**	**(415,254)**
10.	**Net position at market value at end of year (1.) + (9.)**	**$**	**11,223,065**
11.	State Board of Investment calculated annual investment return		-0.1%

SECTION C

REQUIRED SUPPLEMENTARY INFORMATION

SCHEDULE OF CHANGES IN NET PENSION LIABILITY AND RELATED RATIOS CURRENT PERIOD

FISCAL YEAR ENDED JUNE 30, 2016 (DOLLARS IN THOUSANDS)

A. Total pension liability		
1. Service Cost	$	211,491
2. Interest on the Total Pension Liability		1,020,925
3. Changes of benefit terms		-
4. Difference between expected and actual experience of the Total Pension Liability[1]		21,209
5. Changes of assumptions		9,911,319
6. Benefit payments, including refunds of employee contributions		(720,706)
7. Net change in total pension liability	$	10,444,238
8. Total pension liability – beginning		13,177,712
9. Total pension liability – ending	**$**	**23,621,950**
B. Plan fiduciary net position		
1. Contributions – employer	$	151,168
2. Contributions – employee		153,854
3. Net investment income		(9,633)
4. Benefit payments, including refunds of employee contributions		(720,706)
5. Pension Plan Administrative Expense		(10,196)
6. Other changes		20,259
7. Net change in plan fiduciary net position	$	(415,254)
8. Plan fiduciary net position – beginning		11,638,319
9. Plan fiduciary net position – ending	**$**	**11,223,065**
C. Net pension liability, *A.9. - B.9.*	**$**	**12,398,885**
D. Plan fiduciary net position as a percentage of the total pension liability, *B.9. / A.9.*		**47.51%**
E. Covered-employee payroll	**$**	**2,797,345** [2]
F. Net pension liability as a percentage of covered-employee payroll, *C. / E.*		**443.24%**

(1) *Includes impact of changes in expected timing of future COLA increases.*

(2) *Assumed equal to actual member contributions divided by employee contribution rate.*

SCHEDULES OF REQUIRED SUPPLEMENTARY INFORMATION

SCHEDULE OF CHANGES IN NET PENSION LIABILITY AND RELATED RATIOS MULTIYEAR (DOLLARS IN THOUSANDS)

Last 10 Fiscal Years (which will be built prospectively)

Fiscal year ending June 30,	2016	2015	2014	2013	2012	2011	2010	2009	2008	2007
Total Pension Liability										
Service Cost	$ 211,491	$ 210,545	$ 256,155							
Interest on the Total Pension Liability	1,020,925	1,018,035	922,181							
Benefit Changes	-	-	-							
Difference between Expected and Actual Experience	21,209	(493,197)	(44,023)							
Assumption Changes	9,911,319	-	(1,477,308)							
Benefit Payments	(707,361)	(665,821)	(623,942)							
Refunds	(13,345)	(12,026)	(11,986)							
Net Change in Total Pension Liability	$ 10,444,238	$ 57,536	(978,923)							
Total Pension Liability - Beginning	13,177,712	13,120,176	14,099,099							
Total Pension Liability - Ending (a)	**$23,621,950**	**$13,177,712**	**$13,120,176**							
Plan Fiduciary Net Position										
Employer Contributions	$ 151,168	$ 146,333	$ 128,037							
Employee Contributions	153,854	149,293	131,033							
Pension Plan Net Investment Income	(9,633)	501,185	1,829,621							
Benefit Payments	(707,361)	(665,821)	(623,942)							
Refunds	(13,345)	(12,026)	(11,986)							
Pension Plan Administrative Expense	(10,196)	(8,719)	(8,125)							
Other Changes	20,259	29,470	20,528							
Net Change in Plan Fiduciary Net Position	$ (415,254)	$ 139,715	1,465,166							
Plan Fiduciary Net Position - Beginning	11,638,319	11,498,604	10,033,438							
Plan Fiduciary Net Position - Ending (b)	**$11,223,065**	**$11,638,319**	**$11,498,604**							
Net Pension Liability - Ending (a) - (b)	**$12,398,885**	**$ 1,539,393**	**$ 1,621,572**							
Plan Fiduciary Net Position as a Percentage of Total Pension Liability	**47.51 %**	**88.32 %**	**87.64 %**							
Covered-Employee Payroll [1]	**$ 2,797,345**	**$ 2,714,418**	**$ 2,620,660**							
Net Pension Liability as a Percentage of Covered-Employee Payroll	**443.24 %**	**56.71 %**	**61.88 %**							

Notes to Schedule:

(1) Assumed equal to actual member contribution divided by employee contribution rate.

SCHEDULES OF REQUIRED SUPPLEMENTARY INFORMATION
SCHEDULE OF NET PENSION LIABILITY MULTIYEAR
(DOLLARS IN THOUSANDS)

Last 10 Fiscal Years (which will be built prospectively)

Fiscal Year Ending June 30,	Total Pension Liability	Plan Net Position	Net Pension Liability	Plan Net Position as a % of Total Pension Liability	Covered-employee Payroll	Net Pension Liability as a % of Covered-employee Payroll
	(a)	(b)	(a) - (b) = (c)	(b) / (a)	(d)	(c) / (d)
2007						
2008						
2009						
2010						
2011						
2012						
2013						
2014	$ 13,120,176	$ 11,498,604	$ 1,621,572	87.64%	$ 2,620,660	61.88%
2015	13,177,712	11,638,319	1,539,393	88.32%	2,714,418	56.71%
2016	23,621,950	11,223,065	12,398,885	47.51%	2,797,345	443.24%

SCHEDULE OF CONTRIBUTIONS MULTIYEAR (DOLLARS IN THOUSANDS)

Last 10 Fiscal Years

Fiscal Year Ending June 30,	Actuarially Determined Contribution (1)	Actual Contributions	Contribution Deficiency (Excess)	Covered-employee Payroll	Actual Contribution as a % of Covered-employee Payroll
	(a)	(b)	(a) - (b) = (c)	(d)	(b) / (d)
2007	$ 122,389	$ 86,492	$ 35,897	$ 2,095,310	4.13%
2008	166,088	96,746	69,342	2,256,528	4.29
2009	179,759	107,211	72,548	2,329,499	4.60
2010	230,439	113,716	116,723	2,327,398	4.89
2011	146,191	118,563	27,628	2,440,580	4.86
2012	142,740	115,159	27,581	2,367,160	4.86
2013	181,756	121,673	60,083	2,483,000 (2)	4.90
2014	195,239	128,037	67,202	2,620,660 (2)	4.89
2015	198,695	146,333	52,362	2,714,418 (2)	5.39
2016	194,136	151,168	42,968	2,797,345 (2)	5.40

NOTES TO SCHEDULE OF CONTRIBUTIONS

Valuation Date:	June 30, 2016
Notes	(1) Actuarially determined contribution rates are calculated as of each June 30 and apply to the fiscal year beginning on the day after the measurement date. (2) Assumed equal to actual member contributions divided by employee contribution rate.

Methods and Assumptions Used to Determine Contribution Rates Reported in this Schedule:

Actuarial Cost Method	Entry Age Normal
Amortization Method	Level Percentage of Payroll, Closed
Remaining Amortization Period	26 years
Asset Valuation Method	5-Year smoothed market; no corridor
Inflation	2.75%
Payroll Growth	3.50%
Salary Increases	Service based table of rates ranging from 14.00% with one year of service to 3.50% with 25 or more years of service, including inflation
Investment Rate of Return	8.00%
Retirement Age	Experience-based table of rates that are specific to the type of eligibility condition.
Healthy Post-retirement Mortality	RP-2014 annuitant generational mortality table, projected with mortality improvement scale MP-2015 from a base year of 2014, white collar adjustment, set forward 2-years for males and no age adjustment for females.

Other Information:

Benefit Increases After Retirement	The post-retirement increase is assumed to remain at 2.00% indefinitely. See separate funding actuarial valuation report as of July 1, 2016 for additional detail. To obtain this report, contact MSRS at 60 Empire Drive, Suite 300, St. Paul, MN, 55103 or request via email at info@msrs.us or telephone at 1-800-651-5757. This report can be found online at www.msrs.state.mn.us/actuarial-reports.

SCHEDULE OF INVESTMENT RETURNS MULTIYEAR

Last 10 Fiscal Years

Fiscal Year Ending June 30,	Annual Return[1]
2007	
2008	
2009	
2010	
2011	
2012	
2013	
2014	18.67 %
2015	4.45
2016	(0.08)

[1] *Annual money-weighted rate of return, net of investment expenses.*

The Minnesota State Board of Investment (SBI) compiled this data and the related investment notes and provided it to MSRS for GASB-compliance purposes. MSRS furnished this information to us for inclusion within this report. We did not audit this information. We are not responsible for its accuracy or completeness.

Rate of Return

For the fiscal year ended June 30, 2016, the annual money-weighted rate of return for the State Employees Retirement Fund was (0.08)%. The money-weighted rate of return is a method of calculating period-by-period returns on pension plan investments that adjusts for the changing amounts actually invested. For purposes of this schedule, the money-weighted rate of return is calculated as the internal rate of return on pension plan investments, net of pension plan investment expense.

10-Year Schedule of Money-Weighted Investment Return

Ten-year data is not available. Additional years will be provided when they become available.

To request additional information about the computation of the annual money-weighted rate of return and the investments for the Minnesota Retirement Systems (including the investments for MSRS' defined benefit retirement funds), contact SBI at 60 Empire Drive, Suite 355, St. Paul, Minnesota, 55103, via email at minn.sbi@state.mn.us or telephone at (651) 296-3328.

SECTION D

ADDITIONAL FINANCIAL STATEMENT DISCLOSURES

ASSET ALLOCATION

Long-Term Expected Return on Plan Assets

The long-term expected rate of return on pension plan investments was determined using a building-block method. Best estimates for expected future real rates of return (expected returns, net of inflation) were developed for each asset class using both long-term historical returns and long-term capital market expectation from a number of investment management and consulting organizations. The asset class estimates and the target allocations were then combined to produce a geometric, long-term expected rate of return for the portfolio. Inflation expectations were applied to derive the nominal rate of return for the portfolio. For each major asset class that is included in the pension fund's target asset allocation as of June 30, 2016, these best estimates are summarized in the following table:

Asset Class	Target Allocation	Long-Term Expected Real Rate of Return (Geometric)
Domestic Stocks	45.00%	5.50%
International Stocks	15.00%	6.00%
Bonds	18.00%	1.45%
Alternative Assets	20.00%	6.40%
Unallocated Cash	2.00%	0.50%
Total	100.00%	

The Minnesota State Board of Investment (SBI) compiled this data and the related investment notes and provided it to MSRS for GASB-compliance purposes. MSRS furnished this information to us for inclusion within this report. We did not audit this information. We are not responsible for its accuracy or completeness.

At MSRS' direction, for purposes of this valuation, the long-term expected rate of return assumption is 7.50%. This assumption is based on a review of inflation and investment return assumptions dated September 11, 2014, and a recent asset liability study obtained by the SBI.

Single Discount Rate

A Single Discount Rate of 4.17% was used to measure the total pension liability. This Single Discount Rate was based on an expected rate of return on pension plan investments of 7.50% and a municipal bond rate of 2.85%. The projection of cash flows used to determine this Single Discount Rate assumed that employee and employer contributions will be made at the current statutory contribution rates. Based on these assumptions, the pension plan's fiduciary net position and future contributions were sufficient to finance the benefit payments through the year ending June 30, 2042. As a result, the long-term expected rate of return on pension plan investments was applied to projected benefit payments through the year ending June 30, 2042, and the municipal bond rate was applied to all benefit payments after the point of asset depletion.

Regarding the sensitivity of the net pension liability to changes in the Single Discount Rate, the following presents the plan's net pension liability, calculated using a Single Discount Rate of 4.17%, as well as what the fund's net pension liability would be if it were calculated using a single discount rate that is 1-percentage-point lower (3.17%) or 1-percentage-point higher (5.17%) than the current rate.

Sensitivity of Net Pension Liability to the Single Discount Rate Assumption

(Dollars in Thousands)

	1% Decrease 3.17%	Current Single Discount Rate Assumption 4.17%	1% Increase 5.17%
Total Pension Liability	$ 27,570,358	$ 23,621,950	$ 20,447,506
Net Position Restricted for Pensions	11,223,065	11,223,065	11,223,065
Net Pension Liability	**$ 16,347,293**	**$ 12,398,885**	**$ 9,224,441**

For more information on the calculation of the single discount rate, refer to Section G of this report.

GASB STATEMENT NO. 68 RECONCILIATION (DOLLARS IN THOUSANDS)

	Total Pension Liability (a)	Plan Fiduciary Net Position (b)	Net Pension Liability (a) - (b)	Deferred Outflows	Deferred Inflows	Total Pension Expense
Balance Beginning of Year	**$ 13,177,712**	**$ 11,638,319**	**$ 1,539,393**	**$ 314,342**	**$ 1,938,181**	
Changes for the Year:						
Service Cost	$ 211,491		$ 211,491			$ 211,491
Interest on Total Pension Liability	1,020,925		1,020,925			1,020,925
Interest on Fiduciary Net Position [1]		$ 903,405	(903,405)			(903,405)
Changes in Benefit Terms	-		-			-
Liability Experience Gains and Losses	21,209		21,209	$ 16,967	$ -	4,242
Changes in Assumptions	9,911,319		9,911,319	7,929,055	-	1,982,264
Recognition of Deferred Outflows/(Inflows) of Resources Arising from Prior Reporting Periods						
Liability Experience Gains/(Losses)				-	(107,444)	(107,444)
Assumption Changes				-	(295,462)	(295,462)
Investment Gains/(Losses)				(78,585)	(210,275)	(131,690)
Contributions - Employer		151,168	(151,168)			
Contributions - Employees		153,854	(153,854)			(153,854)
Asset Gain/(Loss) [1]		(913,038)	913,038	730,430	-	182,608
Benefit Payments and Refunds	(720,706)	(720,706)	-			
Administrative Expenses		(10,196)	10,196			10,196
Other changes		20,259	(20,259)			(20,259)
Net Changes	**$ 10,444,238**	**$ (415,254)**	**$ 10,859,492**	**$ 8,597,867**	**$ (613,181)**	**$ 1,799,612**
Balance End of Year	**$ 23,621,950**	**$ 11,223,065**	**$ 12,398,885**	**$ 8,912,209**	**$ 1,325,000**	

[1] *The sum of these items equals the net investment income of $(9,633).*

SUMMARY OF POPULATION STATISTICS

		Terminated*		Recipients**			
	Actives	Deferred Retirement	Other Non-Vested	Service Retirement	Disability Retirement	Survivor	Total
Members on July 1, 2015	**49,037**	**16,787**	**6,941**	**30,871**	**1,819**	**3,786**	**109,241**
New members	5,431	0	0	0	0	0	**5,431**
Return to active	348	(185)	(163)	0	0	0	**0**
Terminated non-vested	(1,772)	0	1,772	0	0	0	**0**
Service retirements	(1,426)	(648)	0	2,074	0	0	**0**
Terminated deferred	(1,132)	1,132	0	0	0	0	**0**
Terminated refund/transfer	(896)	(155)	(1,335)	0	0	0	**(2,386)**
Deaths	(67)	(26)	(9)	(835)	(49)	(165)	**(1,151)**
New beneficiary	0	0	0	0	0	270	**270**
Disabled	(51)	0	0	0	51	0	**0**
Data adjustments	0	114	365	131	22	(23)	**609**
Net change	435	232	630	1,370	24	82	**2,773**
Members on July 1, 2016	**49,472**	**17,019**	**7,571**	**32,241**	**1,843**	**3,868**	**112,014**

* *Includes members in the General or Military Affairs Plans.*

** *Includes members in the General, Military Affairs or Unclassified Plans.*

SECTION E

SUMMARY OF BENEFITS

SUMMARY OF PLAN PROVISIONS

Following is a summary of the major plan provisions used in the valuation of this report. MSRS is solely responsible for the validity, accuracy and comprehensiveness of this information. If any of the plan provisions shown below are not accurate and complete, the valuation results may differ significantly from those shown in this report and may require a revision of this report.

Plan Year	July 1 through June 30
Eligibility	State employees, non-academic staff of the University of Minnesota and employees of certain Metro level government units, unless excluded by law.
Contributions	Shown as a percent of salary:
Effective date	**Member** / **Employer**
July 1, 2014	5.50% / 5.50%
	Member contributions are "picked up" according to the provisions of Internal Revenue Code 414(h).
Allowable Service	Service during which member contributions were made. May also include certain leaves of absence, military service and periods while temporary Worker's Compensation is paid. Excludes lump sum vacation and severance pay at termination.
Average Salary	Average of the five highest successive years of Salary. Average Salary is based on all Allowable Service if less than five years.
Salary	Includes wages, allowances and fees. Excludes lump sum payments at separation, employer contributions to deferred compensation and tax-sheltered annuity plans and benevolent vacation and sick leave donation programs.
Retirement	
Normal retirement benefit	
Age/Service requirement	First hired before July 1, 1989: (a.) Age 65 and three years of Allowable Service. (b.) Proportionate Retirement Annuity is available at age 65 and one year of Allowable Service. First hired after June 30, 1989: (a.) The greater of age 65 or the age eligible for full Social Security retirement benefits (but not higher than age 66) and three years of Allowable Service (five years if hired after June 30, 2010). (b.) Proportionate Retirement Annuity is available at normal retirement age and one year of Allowable Service.
Amount	1.70% of Average Salary for each year of Allowable Service.

SUMMARY OF PLAN PROVISIONS (CONTINUED)

Retirement (Continued)

Early retirement

Age/Service requirement	First hired before July 1, 1989: (a.) Age 55 and three years of Allowable Service. (b.) Any age with 30 years of Allowable Service. (c.) Rule of 90: Age plus Allowable Service totals 90. First hired after June 30, 1989: (a.) Age 55 and three years (five years if hired after June 30, 2010) of Allowable Service.
Amount	First hired before July 1, 1989: The greater of (a) or (b): (a.) 1.20% of Average Salary for each of the first ten years of Allowable Service and 1.70% of Average Salary for each subsequent year with reduction of 0.25% for each month the member is under age 65 at time of retirement or under age 62 if 30 or more years of Allowable Service. No reduction if age plus years of Allowable Service totals 90. (b.) 1.70% of Average Salary for each year of Allowable Service assuming augmentation to age 65 at 3.00% per year and actuarial reduction for each month the member is under age 65. First hired after June 30, 1989: 1.70% of Average Salary for each year of Allowable Service assuming augmentation to the age eligible for full Social Security retirement benefit (but not higher than age 66) at 3.00% (2.50% if hired after June 30, 2006) per year and actuarial reduction for each month the member is under the normal retirement age.
Form of payment	Life annuity with return on death of any balance of member contributions over aggregate monthly payments. Actuarially equivalent options are: (a.) 50%, 75%, or 100% Joint and Survivor with bounce back feature without additional reduction. (b.) 15-year Certain and Life.
Benefit increases	Since 2011, benefit recipients have received annual 2.00% benefit increases. When the funding ratio reaches 90% (actuarial accrued liability ratio on a market value of assets basis) for two consecutive years, the benefit increase will revert to 2.50%. If, after reverting to a 2.50% increase, the funding ratio (determined on a market value of assets basis) declines to less than 80% for the most recent actuarial valuation year or 85% for two consecutive years, the benefit increase will decrease to 2.00%. A benefit recipient who has been receiving a benefit for at least 12 full months as of the June 30 of the calendar year immediately before the adjustment will receive a full increase. Members receiving benefits for at least one month but less than 12 full months as of the June 30 of the calendar year immediately before the adjustment will receive a pro rata increase.

SUMMARY OF PLAN PROVISIONS (CONTINUED)

Retirement (Continued)	
Benefit increases (Continued)	Prior to 2002, members who retired under the laws in effect before July 1, 1973 received an additional lump sum payment each year. In 1989, this lump sum payment was the greater of $25 times each full year of Allowable Service or $400 per full year of service less any Social Security benefits received or annuity from a Minnesota public employee pension plan. In each following year, the lump sum payment was increased by the same percentage increase that was applied to regular annuities paid from the Minnesota Post Retirement Investment Fund. Effective January 1, 2002, the annual lump sum payment was divided by 12 and paid as a monthly life annuity in the annuity form elected.
Disability	
Disability benefit	
Age/Service requirement	Total and permanent disability before normal retirement age with three years of Allowable Service (five years if hired after June 30, 2010).
Amount	Normal Retirement benefit based on Allowable Service and Average Salary at disability without reduction for commencement before normal retirement age. Payments stop if disability ceases or death occurs. Payments revert to a retirement annuity at normal retirement age. Benefits may be reduced on resumption of partial employment.
Retirement after disability	
Age/Service requirement	Normal retirement age with continued disability.
Amount	Any optional annuity continues. Otherwise, a normal retirement benefit equal to the disability benefit paid before normal retirement age, or an actuarially equivalent optional annuity.
Form of payment	Same as for retirement.
Benefit Increases	Same as for retirement.
Death	
Surviving spouse optional benefit	
Age/Service requirement	Member or former member who dies before retirement or disability benefits commence with three years of Allowable Service (five years if hired after June 30, 2010). If a former member dies before age 55 and has less than 30 years of Allowable Service, benefits commence when the former member would have been age 55. If an active member dies, benefits may commence immediately, regardless of age.
Amount	Surviving spouse receives the 100% joint and survivor benefits using the Normal Retirement formula above. If commencement is prior to age 55, the appropriate early retirement formula described above applies except that one-half the monthly reduction factor is used from age 55 to the commencement age and the Rule of 90 does not apply. In lieu of this benefit, the surviving spouse may elect a refund of member contributions with interest or an actuarially equivalent term certain annuity.

SUMMARY OF PLAN PROVISIONS (CONTINUED)

Death (Continued)	
Amount (Continued)	If a member dies prior to July 1, 1997 and the beneficiary was not eligible to commence a survivor benefit as of July 1, 1997, an actuarial increase shall be made for the change in the post-retirement interest rates from 5.00% to 6.00%.
Benefit increases	Same as for retirement.
<u>Surviving dependent children's benefit</u>	
Age/Service requirement	If no surviving spouse, all children (biological or adopted) below age 20 who are dependent for more than half of their support on deceased member.
Amount	Actuarially equivalent 100% joint and survivor annuity to surviving spouse payable to the later of age 20 or five years. The amount is proportionally divided among surviving children.
Benefit increases	Same as for retirement.
<u>Refund of contributions</u>	
Age/Service requirement	Active member dies and survivor benefits are not payable or a former member dies before annuity begins or former member who is not entitled to an annuity dies.
Amount	Member's contributions with 6.00% interest through June 30, 2011 compounded daily. Beginning July 1, 2011, a member's contributions increase at 4.00% interest compounded daily.
Age/Service requirement	Retired or disabled annuitant who did not select an optional annuity dies, or the remaining recipient of an option dies.
Amount	The excess of the member's contributions over all benefits paid.
Unclassified Plan Provision	Eligible members credited with employee shares in the Unclassified Plan may elect to terminate participation in the Unclassified Plan and be covered by the State Employees Retirement Fund prior to termination of covered employment assuming that the member has acquired at least 10 years of allowable state service (no more than seven years of service if hired after June 30, 2010).
Termination	
<u>Refund of contributions</u>	
Age/Service requirement	Termination of state service.
Amount	Member's contributions with 6.00% interest through June 30, 2011 compounded daily. Beginning July 1, 2011 a member's contributions increase at 4.00% interest compounded daily. If a member is vested, a deferred annuity may be elected in lieu of a refund.

SUMMARY OF PLAN PROVISIONS (CONTINUED)

Termination (Continued) Deferred benefit	
Age/Service requirement	Three years of Allowable Service if hired prior to June 30, 2010, five years of Allowable Service if hired after June 30, 2010.
Amount	Benefit computed under law in effect at termination and increased by the following annual augmentation percentage: (a.) 0.00% before July 1, 1971; (b.) 5.00% from July 1, 1971 to January 1, 1981; (c.) 3.00% thereafter (2.50% if hired after June 30, 2006) until January 1 of the year following attainment of age 55 or January 1, 2012, whichever is earlier; (d.) 5.00% thereafter until the annuity begins (2.50% if hired after June 30, 2006), but before January 1, 2012. Amount is payable as a normal or early retirement; (e.) 2.00% from January 1, 2012 thereafter. Amount is payable at normal or early retirement. If a member terminated employment prior to July 1, 1997 but was not eligible to commence their pension before July 1, 1997, an actuarial increase shall be made for the change in the post-retirement interest rates from 5.00% to 6.00%.
Combined Service Annuity	Members are eligible for combined service benefits if they: (a.) Have sufficient allowable service in total that equals or exceeds the applicable service credit vesting requirement of the retirement plan with the longest applicable service credit vesting requirement; (b.) Have at least six months of allowable service credit in each plan worked under; (c.) Are not in receipt of a benefit from another plan, or have applied for benefits with an effective date within one year. Members who meet the above requirements must have their benefit based on the following: (a.) Allowable service in all covered plans are combined in order to determine eligibility for early retirement. (b.) Average salary is based on the high five consecutive years during their entire service in all covered plans.
Actuarial Equivalent Factors	Actuarially equivalent factors based on RP-2000 mortality for healthy annuitants, white collar adjustment, projected to 2025 using scale AA, blended 55% males, 8.50% pre-retirement interest, and 6.50% post-retirement interest. Effective January 1, 2017, factors based on RP-2014 mortality will be used.

SUMMARY OF PLAN PROVISIONS (CONCLUDED)

Contribution Stabilizer	The following is a summary of the contribution stabilizer provisions in Minnesota Statute 352.045: • If a contribution sufficiency of at least 1.00% of covered payroll exists, member and employer contributions may be adjusted by the MSRS Board of Directors to a level necessary to maintain a 1.00% sufficiency. Member and employer contributions may not be less than the sum of normal cost and administrative expenses. • If a contribution deficiency of at least 0.5% of covered payroll exists, the member and employer contribution rates may be increased equally by the MSRS Board of Directors to eliminate the deficiency. • Any adjustment to the contribution rates must be reported to the Legislative Commission on Pensions and Retirement (LCPR) by January 15 following the most recent valuation report. If the LCPR does not recommend against or alter the change in rates, the adjustment becomes effective on the first day of the first full payroll period of the fiscal year following receipt of the actuarial valuation that gave rise to the adjustment.
Changes in Plan Provisions	There have been no changes in plan provisions since the previous valuation.

SECTION F

ACTUARIAL COST METHOD AND ACTUARIAL ASSUMPTIONS

ACTUARIAL METHODS USED FOR THE DETERMINATION OF TOTAL PENSION LIABILITY AND RELATED VALUES

Actuarial Cost Method

Normal cost and the allocation of benefit values between service rendered before and after the valuation date were determined using an **Individual Entry-Age Actuarial Cost Method** having the following characteristics:

(i) the annual normal cost for each individual active member, payable from the date of employment to the date of retirement, is sufficient to accumulate the value of the member's benefit at the time of retirement;

(ii) each annual normal cost is a constant percentage of the member's year by year projected covered pay.

Actuarial gains/(losses), as they occur, reduce (increase) the Total Pension Liability.

Valuation of Future Post-Retirement Benefit Increases

Benefit recipients receive a future annual 2.00% post-retirement benefit increase. If the funding ratio (determined on a market value of assets basis) reaches 90% (based on a 2.50% post-retirement benefit increase assumption) for two consecutive years, the benefit increase will revert to 2.50%. If, after reverting to a 2.50% benefit increase, the funding ratio declines to less than 80% for one year or less than 85% for two consecutive years, the benefit increase will decrease to 2.00%.

To determine an assumption regarding a future change in the post-retirement benefit increase, we performed a projection of liabilities and assets based on the following methods and assumptions:

- Future investment returns of 7.50%
- Liabilities and normal cost based on statutory funding assumptions
  - Discount rate of 8.00%
  - Statutory salary increases (rate of 14.00% at year 1 declining to 3.50% at years 25 and later)
- Open group; stable active population (new member profile based on average new members hired in recent years)
- The postretirement benefit increase rate is assumed to be 2.00% per year until the funding ratio threshold required to pay a 2.50% postretirement benefit increase is reached
- Current statutory contributions (i.e. not including potential contribution increases under the contribution stabilizer statutes) as directed by MSRS

Based on these assumptions and methods, the projection indicates that this plan is not expected to attain the funding ratio threshold required to pay a 2.50% postretirement benefit increase. This assumption is reflected in our calculations.

Asset Valuation Method

Fair value of assets.

SUMMARY OF ACTUARIAL ASSUMPTIONS USED FOR THE DETERMINATION OF TOTAL PENSION LIABILITY AND RELATED VALUES

The following assumptions were used in valuing the liabilities and benefits under the plan. The assumptions are based on the last experience study, dated June 30, 2015, a review of inflation and investment return assumptions dated September 11, 2014, and a recent asset liability study obtained by the SBI.

The Allowance for Combined Service Annuity was also based on a recommendation by a former actuary. We are unable to judge the reasonableness of this assumption without performing a substantial amount of additional work beyond the scope of the assignment. We note that the LCPR actuary has recently completed a review of this assumption. This review recommended changes to this assumption, expected to be effective at a future date.

Investment return	7.50% per annum.
Single discount rate	4.17% per annum.
Benefit increases after retirement	2.00% per annum.
Salary increases	In the valuation year, equal to prior year administrative expenses expressed as a percentage of prior year projected payroll. In each subsequent year, equal to the initial administrative expense percentage applied to payroll for the closed group.
Inflation	2.50% per year.
Payroll growth	3.25% per year.
Mortality rates	
Healthy Pre-retirement	RP-2014 employee generational mortality table projected with mortality improvement Scale MP-2015 from a base year of 2014, white collar adjustment, set forward one year for males and no age adjustment for females.
Healthy Post-retirement	RP-2014 annuitant generational mortality table projected with mortality improvement Scale MP-2015 from a base year of 2014, white collar adjustment, set forward two years for males and no age adjustment for females.
Disabled	RP-2014 disabled mortality table projected with mortality improvement Scale MP-2015 from a base year of 2014, set forward two years for males and four years for females.
Retirement	Members retiring from active status are assumed to retire according to the age related rates shown in the rate table. Members who have attained the highest assumed retirement age are assumed to retire in one year.

SUMMARY OF ACTUARIAL ASSUMPTIONS (CONTINUED)

Withdrawal	Service-related rates based on experience; see table of sample rates.
Disability	Age-related rates based on experience; see table of sample rates.
Allowance for Combined Service Annuity	Liabilities for active members are increased by 1.20% and liabilities for former members are increased by 40.00% to account for the effect of some participants having eligibility for a Combined Service Annuity.
Administrative expenses	In the valuation year, equal to prior year administrative expenses expressed as a percentage of prior year projected payroll. In each subsequent year, equal to the initial administrative expense percentage applied to payroll for the closed group.
Refund of contributions	Account balances accumulate interest until normal retirement date and are discounted back to the valuation date. All employees withdrawing after becoming eligible for a deferred benefit take the larger of their contributions accumulated with interest or the value of their deferred benefit.
Commencement of deferred benefits	Members receiving deferred annuities (including current terminated deferred members) are assumed to begin receiving benefits at normal retirement age.
Percentage married	80% of active male members and 65% of female members are assumed to be married. Actual marital status is used for members in payment status.
Age of spouse	Male members are assumed to have a beneficiary three years younger and female members are assumed to have a beneficiary two years older.
Form of payment	Married members retiring from active status are assumed to elect subsidized joint and survivor form of annuity as follows: Males: 15% elect 50% Joint & Survivor option 15% elect 75% Joint & Survivor option 50% elect 100% Joint & Survivor option Females: 15% elect 50% Joint & Survivor option 10% elect 75% Joint & Survivor option 30% elect 100% Joint & Survivor option Remaining married members and unmarried members are assumed to elect the Straight Life option. Members receiving deferred annuities (including current terminated deferred members) are assumed to elect a life annuity.
Eligibility testing	Eligibility for benefits is determined based upon the age nearest birthday and service nearest whole year on the date the decrement is assumed to occur.
Decrement operation	Withdrawal decrements do not operate during retirement eligibility. Decrements are assumed to occur mid-fiscal year.
Service credit accruals	It is assumed that members accrue one year of service credit per year.
Pay Increases	Pay increases are assumed to happen at the beginning of the fiscal year. This is equivalent to assuming that reported earnings are pensionable earnings for the year ending on the valuation date.
Unclassified Plan Reversion	Liabilities for active members are increased by 0.26% (0.21% as of July 1, 2015) to account for the effect of Unclassified members who elect coverage under the State Employees Retirement Fund.

SUMMARY OF ACTUARIAL ASSUMPTIONS (CONTINUED)

Unknown data for certain members	To prepare this report, GRS has used and relied on participant data supplied by the Fund. Although GRS has reviewed the data in accordance with Actuarial Standards of Practice No. 23, GRS has not verified or audited any of the data or information provided. In cases where submitted data was missing or incomplete, the following assumptions were applied: <u>Data for active members:</u> There were 130 members reported with zero or invalid salary. We used prior year salary (70 members), if available, otherwise, high five salary with a 10% load to account for salary increases (54 members). If neither pay nor high five salary was available, we assumed a value of $35,000 (6 members). There were 22 members reported with zero or negative service. Due to the small number of members with zero service, and based on direction from MSRS, we used service of 0 years for these members. There were also 142 members reported without a gender and 82 members reported with an invalid date of birth. We assumed the member was hired at age 37 and female gender. <u>Data for terminated members:</u> There were 540 members reported with a missing or invalid benefit. If available, we calculated benefits for these members using the reported Average Salary, Credited Service and Termination Date provided. If Average Salary was not reported (521 members), we assumed a value of $30,000. If termination date was not reported (13 members), we assumed the member terminated at age 40 (or current age if younger than 40). If credited service was either not reported or invalid (15 members), we assumed a value of 7.5 years. There was 1 member with an invalid gender, and no members with an invalid date of birth. We assumed the member was female. <u>Data for members receiving benefits:</u> There were 14 members reported without a gender. We assumed female gender for the valuation. No retired members were reported with an invalid date of birth. There were 4 members reported without a benefit. Due to the small number of members with missing benefits, we made no adjustment to the reported data for members receiving benefits. There were 6 survivor members reported with a certain end date prior to the valuation date. These members were excluded from the valuation. There were 377 retirees reported with a survivor option and a survivor date of death. We assumed no benefit was payable to the survivor, and the member benefit already reflected the increase to the life annuity value (i.e., “bounce back”), if applicable. There were 257 retirees reported with a bounce back annuity but were not reported with a reasonable reduction factor. A factor of 0.80, 0.85 and 0.90 was assumed for the 100%, 75% and 50% joint and survivor annuity, respectively.

SUMMARY OF ACTUARIAL ASSUMPTIONS (CONTINUED)

Unknown data for certain members	Data for members receiving benefits: There were retired members reported with a survivor option and an invalid or missing survivor gender (4,500 members) and/or survivor date of birth (3,984 members). We used the valuation assumptions if the survivor gender or date of birth was missing or invalid.
Changes in actuarial assumptions	Assumed salary increase rates were changed as recommended in the June 30, 2015 experience study. The net effect is proposed rates that average 0.2% greater than the previous rates. These rates were decreased by 0.25% at all years for this valuation. Assumed rates of retirement were changed as recommended in the June 30, 2015 experience study. The changes result in fewer unreduced (Normal) retirements and fewer Rule of 90 retirements. In addition, distinct rates for reduced (Early) retirements were adopted for members hired prior to July 1, 1989, and members hired after June 30, 1989. Assumed rates of termination were changed as recommended in the June 30, 2015 experience study. The new rates are based on service and are generally greater than the previous rates for years 3 – 9 and less than the previous rates after 15 years. Assumed rates of disability were changed as recommended in the June 30, 2015 experience study. The new rates are 75% of previous rates for females and rates for male members were lowered by utilizing the same disability rates as for females. The base mortality table for healthy annuitants and employees was changed from the RP-2000 fully generational table to the RP-2014 fully generational table (with a base year of 2014), white collar adjustments, with age adjustments. The mortality improvement scale was changed from Scale AA to Scale MP-2015. The base mortality table for disabled annuitants was changed from the RP-2000 disabled mortality table (no projection for future mortality improvement) to the RP-2014 disabled annuitant mortality table (with future mortality improvement according to Scale MP-2015), with age adjustments. The percent married assumption was changed from 85% of active male members and 70% of female members to 80% of active members and 65% of active female members. The assumed number of married male new retirees electing the 75% Joint & Survivor option changed from 10% to 15%. The assumed number of married female new retirees electing the 75% and 100% Joint & Survivor options changed from 0% to 10% and from 25% to 30%, respectively. The corresponding number of married new retirees electing the Life annuity option was adjusted accordingly. The assumed post-retirement benefit increase rate was changed from 2.00% per year through 2043 and 2.50% per year thereafter to 2.00% per year for all future years. The long-term expected rate of return on pension plan investments has been reduced from 7.90% to 7.50% as of July 1, 2016. The single discount rate changed from 7.90% as of July 1, 2015 to 4.17% as of July 1, 2016. The inflation assumption has been reduced from 2.75% to 2.50%, and the payroll growth assumption was reduced from 3.50% to 3.25%.

SUMMARY OF ACTUARIAL ASSUMPTIONS (CONTINUED)

	Percent of Members Dying Each Year*					
	Healthy Post-Retirement Mortality**		Healthy Pre-Retirement Mortality**		Disability Mortality**	
Age in 2014	Male	Female	Male	Female	Male	Female
20	0.03%	0.01%	0.03%	0.01%	0.09%	0.07%
25	0.05	0.03	0.03	0.01	0.30	0.20
30	0.07	0.05	0.03	0.02	0.63	0.38
35	0.10	0.08	0.04	0.02	1.02	0.61
40	0.15	0.11	0.05	0.03	1.44	0.87
45	0.22	0.16	0.08	0.06	1.83	1.14
50	0.32	0.21	0.13	0.09	2.16	1.40
55	0.44	0.27	0.22	0.14	2.46	1.64
60	0.60	0.39	0.37	0.21	2.83	1.99
65	0.91	0.65	0.65	0.31	3.46	2.63
70	1.54	1.06	1.15	0.54	4.52	3.80

* *Generally, mortality rates are expected to increase as age increases. These standard mortality rates have been adjusted slightly to prevent decreasing mortality rates. If the rates were not adjusted as described, we would not expect the valuation results to be materially different.*

** *These rates were adjusted for mortality improvements using projection Scale MP-2015 from a base year of 2014.*

	Percent of Members Decrementing Each Year	
	Disability Retirement	
Age	Male	Female
20	0.00%	0.00%
25	0.01	0.01
30	0.01	0.01
35	0.02	0.02
40	0.06	0.06
45	0.11	0.11
50	0.22	0.22
55	0.32	0.32
60	0.47	0.47
65	0.00	0.00

SUMMARY OF ACTUARIAL ASSUMPTIONS (CONTINUED)

	Percent Retiring Each Year		
Age	**Rule of 90 Eligible**	**Hired prior to 7/1/1989**	**Hired after 6/30/1989**
55	15.0%	4.0%	4.0%
56	15.0	4.0	4.0
57	12.5	4.0	4.0
58	12.5	4.0	4.0
59	15.0	6.0	5.0
60	15.0	8.0	5.0
61	20.0	10.0	10.0
62	30.0	20.0	15.0
63	25.0	18.0	15.0
64	25.0	18.0	15.0
65	35.0	35.0	20.0
66	30.0	30.0	30.0
67	25.0	25.0	25.0
68	25.0	25.0	25.0
69	22.0	22.0	22.0
70	30.0	30.0	30.0
71+	100.0	100.0	100.0

SUMMARY OF ACTUARIAL ASSUMPTIONS (CONCLUDED)

Salary Scale			Percent of Members Terminating (Withdrawing) Each Year		
Year	Increase		Year	Males	Females
1	13.75%		1	20.00%	24.00%
2	11.25		2	15.00	18.00
3	6.00		3	11.00	13.00
4	5.25		4	8.50	11.00
5	5.00		5	7.75	9.00
6	4.90		6	6.50	8.50
7	4.75		7	5.75	7.50
8	4.50		8	5.00	5.75
9	4.25		9	4.00	5.00
10	4.00		10	3.25	4.50
11	3.95		11	3.00	4.00
12	3.90		12	2.75	4.00
13	3.85		13	2.50	3.00
14	3.80		14	2.50	2.75
15	3.75		15	2.50	2.50
16	3.70		16	2.00	2.25
17	3.65		17	2.00	2.25
18	3.60		18	2.00	2.25
19	3.55		19	2.00	2.25
20	3.50		20	1.50	2.25
21	3.45		21	1.50	2.00
22	3.40		22	1.50	2.00
23	3.35		23	1.00	1.50
24	3.30		24	1.00	1.50
25+	3.25		25	1.00	1.50
			26	1.00	1.50
			27	1.00	1.25
			28	1.00	1.25
			29	1.00	1.25
			30+	1.00	1.00

SECTION G

CALCULATION OF THE SINGLE DISCOUNT RATE

CALCULATION OF THE SINGLE DISCOUNT RATE

GASB Statement No. 67 includes a specific requirement for the discount rate that is used for the purpose of the measurement of the Total Pension Liability. This rate considers the ability of the fund to meet benefit obligations in the future. To make this determination, employer contributions, employee contributions, benefit payments, expenses and investment returns are projected into the future. The Plan Fiduciary Net Position (assets) in future years can then be determined and compared to its obligation to make benefit payments in those years. As long as assets are projected to be on hand in a future year, the long-term expected rate of return is used as the discount rate. In years where assets are not projected to be sufficient to meet benefit payments, the use of a "risk-free" municipal bond rate is required, as described in the following paragraph.

The Single Discount Rate (SDR) is equivalent to applying these two rates to the benefits that are projected to be paid during the different time periods. The SDR reflects (1) the long-term expected rate of return on pension plan investments (during the period in which the fiduciary net position is projected to be sufficient to pay benefits) and (2) tax-exempt municipal bond rate based on an index of 20-year general obligation bonds with an average AA credit rating (which is published by the Federal Reserve Board (FRB)) as of the measurement date (to the extent that the contributions for use with the long-term expected rate of return are not met).

For the purpose of this valuation, the expected rate of return on pension plan investments is 7.50%; the municipal bond rate is 2.85% (based on the FRB rate as of June 30, June 30, 2016). **The resulting single discount rate as of July 1, 2016 is 4.17%.**

Benefit payments projected to occur up through June 30, 2041 were fully funded and benefit payments projected to occur in the year ended June 30, 2042 were partially funded. Assets were projected to be fully depleted by the fiscal year ending June 30, 2042. Benefit payments were discounted using 7.50%, the long-term expected rate of return on pension plan investments, as long as assets were sufficient to fund the benefit payments. Beginning in the July 1, 2041 to June 30, 2042 fiscal year, when benefit payments exceed the Plan's Fiduciary Net Position, benefit payments were discounted at 2.85%, the municipal bond rate. An equivalent single discount rate was determined that produced approximately the same present value of projected benefits when applied to all years of projected benefits as the present value of projected benefits using 7.50% through the point of asset depletion and 2.85% after. For more information on the calculation of the equivalent present value of projected benefits, see pages 39 through 40 of this report.

The tables in this section provide background for the development of the Single Discount Rate.

The **Projection of Contributions** table shows the development of expected contributions in future years. Normal Cost contributions for future hires are not included (nor are their liabilities).

The **Projection of Plan Fiduciary Net Position** table shows the development of expected asset levels in future years.

The **Present Values of Projected Benefit Payments** table shows the development of the Single Discount Rate. It breaks down the benefit payments into present values for funded and unfunded portions and shows the equivalent total at the SDR.

SINGLE DISCOUNT RATE DEVELOPMENT
PROJECTION OF CONTRIBUTIONS (DOLLARS IN THOUSANDS)

	Projected Covered-Employee Payroll			Projected Contributions			
Fiscal Year Ending	Payroll for Current Employees	Payroll for New Employees	Total Employee Payroll	Contributions from Current Employees	Employer Contributions for Current Employees	Contributions on Future Payroll toward current UAL*	Total Contributions
	(a)	(b)	(c) = (a) + (b)	(d) = (a) * 5.5%	(e) = (a) * 5.5%	(f)	(g) = (d) + (e) + (f)
2016	$ 2,797,345		$ 2,797,345				
2017	2,882,573		2,882,573	$ 158,542	$ 158,542		$ 317,084
2018	2,727,267	$ 248,990	2,976,257	150,000	150,000	$ 4,233	304,233
2019	2,580,816	492,169	3,072,985	141,945	141,945	8,367	292,257
2020	2,454,186	718,671	3,172,857	134,980	134,980	12,217	282,177
2021	2,336,774	939,201	3,275,975	128,523	128,523	15,966	273,012
2022	2,226,952	1,155,492	3,382,444	122,482	122,482	19,643	264,607
2023	2,124,641	1,367,732	3,492,373	116,855	116,855	23,251	256,961
2024	2,029,182	1,576,693	3,605,875	111,605	111,605	26,804	250,014
2025	1,938,982	1,784,084	3,723,066	106,644	106,644	30,329	243,617
2026	1,853,291	1,990,775	3,844,066	101,931	101,931	33,843	237,705
2027	1,772,036	2,196,962	3,968,998	97,462	97,462	37,348	232,272
2028	1,695,231	2,402,760	4,097,991	93,238	93,238	40,847	227,323
2029	1,622,206	2,608,969	4,231,175	89,221	89,221	44,352	222,794
2030	1,551,529	2,817,160	4,368,689	85,334	85,334	47,892	218,560
2031	1,482,671	3,028,000	4,510,671	81,547	81,547	51,476	214,570
2032	1,415,606	3,241,662	4,657,268	77,858	77,858	55,108	210,824
2033	1,350,147	3,458,482	4,808,629	74,258	74,258	58,794	207,310
2034	1,285,962	3,678,947	4,964,909	70,728	70,728	62,542	203,998
2035	1,222,962	3,903,307	5,126,269	67,263	67,263	66,356	200,882
2036	1,160,967	4,131,906	5,292,873	63,853	63,853	70,242	197,948
2037	1,100,004	4,364,887	5,464,891	60,500	60,500	74,203	195,203
2038	1,040,218	4,602,282	5,642,500	57,212	57,212	78,239	192,663
2039	980,983	4,844,898	5,825,881	53,954	53,954	82,363	190,271
2040	921,441	5,093,781	6,015,222	50,679	50,679	86,594	187,952
2041	860,899	5,349,818	6,210,717	47,349	47,349	90,947	185,645
2042	799,744	5,612,821	6,412,565	43,986	43,986	95,418	183,390
2043	738,856	5,882,118	6,620,974	40,637	40,637	99,996	181,270
2044	678,143	6,158,012	6,836,155	37,298	37,298	104,686	179,282
2045	617,397	6,440,934	7,058,331	33,957	33,957	109,496	177,410
2046	556,588	6,731,138	7,287,726	30,612	30,612	114,429	175,653
2047	496,220	7,028,357	7,524,577	27,292	27,292	119,482	174,066
2048	437,537	7,331,589	7,769,126	24,065	24,065	124,637	172,767
2049	380,932	7,640,691	8,021,623	20,951	20,951	129,892	171,794
2050	326,502	7,955,823	8,282,325	17,958	17,958	135,249	171,165
2051	275,129	8,276,372	8,551,501	15,132	15,132	140,698	170,962
2052	227,886	8,601,539	8,829,425	12,534	12,534	146,226	171,294
2053	185,363	8,931,018	9,116,381	10,195	10,195	151,827	172,217
2054	147,940	9,264,724	9,412,664	8,137	8,137	157,500	173,774
2055	115,349	9,603,226	9,718,575	6,344	6,344	163,255	175,943
2056	87,516	9,946,913	10,034,429	4,813	4,813	169,098	178,724
2057	64,656	10,295,892	10,360,548	3,556	3,556	175,030	182,142
2058	46,511	10,650,755	10,697,266	2,558	2,558	181,063	186,179
2059	32,516	11,012,411	11,044,927	1,788	1,788	187,211	190,787
2060	21,888	11,381,999	11,403,887	1,204	1,204	193,494	195,902
2061	13,985	11,760,528	11,774,513	769	769	199,929	201,467
2062	8,428	12,148,757	12,157,185	464	464	206,529	207,457
2063	4,756	12,547,537	12,552,293	262	262	213,308	213,832
2064	2,433	12,957,810	12,960,243	134	134	220,283	220,551
2065	1,119	13,380,332	13,381,451	62	62	227,466	227,590
2066	486	13,815,862	13,816,348	27	27	234,870	234,924

**Contributions related to future employees in excess of normal cost and expenses of 9.30% of pay.*

SINGLE DISCOUNT RATE DEVELOPMENT
PROJECTION OF CONTRIBUTIONS (DOLLARS IN THOUSANDS)

	Projected Covered-Employee Payroll			Projected Contributions			
Fiscal Year Ending	Payroll for Current Employees	Payroll for New Employees	Total Employee Payroll	Contributions from Current Employees	Employer Contributions for Current Employees	Contributions on Future Payroll toward current UAL*	Total Contributions
	(a)	(b)	(c) = (a) + (b)	(d) = (a) * 5.5%	(e) = (a) * 5.5%	(f)	(g) = (d) + (e) + (f)
2067	228	14,265,151	14,265,379	$ 13	$ 13	$ 242,508	$ 242,534
2068	106	14,728,898	14,729,004	6	6	250,391	250,403
2069	40	15,207,657	15,207,697	2	2	258,530	258,534
2070	15	15,701,932	15,701,947	1	1	266,933	266,935
2071	3	16,212,257	16,212,260	-	-	275,608	275,608
2072	-	16,739,158	16,739,158	-	-	284,566	284,566
2073	-	17,283,181	17,283,181	-	-	293,814	293,814
2074	-	17,844,885	17,844,885	-	-	303,363	303,363
2075	-	18,424,843	18,424,843	-	-	313,222	313,222
2076	-	19,023,651	19,023,651	-	-	323,402	323,402
2077	-	19,641,919	19,641,919	-	-	333,913	333,913
2078	-	20,280,282	20,280,282	-	-	344,765	344,765
2079	-	20,939,391	20,939,391	-	-	355,970	355,970
2080	-	21,619,921	21,619,921	-	-	367,539	367,539
2081	-	22,322,569	22,322,569	-	-	379,484	379,484
2082	-	23,048,052	23,048,052	-	-	391,817	391,817
2083	-	23,797,114	23,797,114	-	-	404,551	404,551
2084	-	24,570,520	24,570,520	-	-	417,699	417,699
2085	-	25,369,062	25,369,062	-	-	431,274	431,274
2086	-	26,193,556	26,193,556	-	-	445,290	445,290
2087	-	27,044,847	27,044,847	-	-	459,762	459,762
2088	-	27,923,804	27,923,804	-	-	474,705	474,705
2089	-	28,831,328	28,831,328	-	-	490,133	490,133
2090	-	29,768,346	29,768,346	-	-	506,062	506,062
2091	-	30,735,817	30,735,817	-	-	522,509	522,509
2092	-	31,734,731	31,734,731	-	-	539,490	539,490
2093	-	32,766,110	32,766,110	-	-	557,024	557,024
2094	-	33,831,009	33,831,009	-	-	575,127	575,127
2095	-	34,930,517	34,930,517	-	-	593,819	593,819
2096	-	36,065,758	36,065,758	-	-	613,118	613,118
2097	-	37,237,896	37,237,896	-	-	633,044	633,044
2098	-	38,448,127	38,448,127	-	-	653,618	653,618
2099	-	39,697,691	39,697,691	-	-	674,861	674,861
2100	-	40,987,866	40,987,866	-	-	696,794	696,794
2101	-	42,319,972	42,319,972	-	-	719,440	719,440
2102	-	43,695,371	43,695,371	-	-	742,821	742,821
2103	-	45,115,471	45,115,471	-	-	766,963	766,963
2104	-	46,581,723	46,581,723	-	-	791,889	791,889
2105	-	48,095,629	48,095,629	-	-	817,626	817,626
2106	-	49,658,737	49,658,737	-	-	844,199	844,199
2107	-	51,272,646	51,272,646	-	-	871,635	871,635
2108	-	52,939,007	52,939,007	-	-	899,963	899,963
2109	-	54,659,525	54,659,525	-	-	929,212	929,212
2110	-	56,435,960	56,435,960	-	-	959,411	959,411
2111	-	58,270,128	58,270,128	-	-	990,592	990,592
2112	-	60,163,907	60,163,907	-	-	1,022,786	1,022,786
2113	-	62,119,234	62,119,234	-	-	1,056,027	1,056,027
2114	-	64,138,110	64,138,110	-	-	1,090,348	1,090,348
2115	-	66,222,598	66,222,598	-	-	1,125,784	1,125,784
2116	-	68,374,833	68,374,833	-	-	1,162,372	1,162,372

**Contributions related to future employees in excess of normal cost and expenses of 9.30% of pay.*

SINGLE DISCOUNT RATE DEVELOPMENT
PROJECTION OF PLAN FIDUCIARY NET POSITION (DOLLARS IN THOUSANDS)

Fiscal Year Ending	Projected Beginning Plan Net Fiduciary Position	Projected Total Contributions	Projected Benefit Payments	Projected Administrative Expenses	Projected Investment Earnings at 7.50%	Projected Ending Plan Fiduciary Net Position
	(a)	(b)	(c)	(d)	(e)	(f)=(a)+(b)-(c)-(d)+(e)
2017	$ 11,223,065	$ 317,084	$ 774,408	$ 10,666	$ 824,497	$ 11,579,572
2018	11,579,572	304,233	831,564	10,091	848,679	11,890,828
2019	11,890,828	292,257	887,872	9,549	869,529	12,155,192
2020	12,155,192	282,177	943,123	9,080	886,968	12,372,134
2021	12,372,134	273,012	996,341	8,646	900,957	12,541,115
2022	12,541,115	264,607	1,052,627	8,240	911,264	12,656,120
2023	12,656,120	256,961	1,105,328	7,861	917,681	12,717,574
2024	12,717,574	250,014	1,157,959	7,508	920,109	12,722,229
2025	12,722,229	243,617	1,208,061	7,174	918,390	12,669,002
2026	12,669,002	237,705	1,256,662	6,857	912,403	12,555,590
2027	12,555,590	232,272	1,302,687	6,557	902,013	12,380,632
2028	12,380,632	227,323	1,346,122	6,272	887,120	12,142,680
2029	12,142,680	222,794	1,386,745	6,002	867,621	11,840,349
2030	11,840,349	218,560	1,425,815	5,741	843,361	11,470,714
2031	11,470,714	214,570	1,461,828	5,486	814,175	11,032,145
2032	11,032,145	210,824	1,496,017	5,238	779,895	10,521,610
2033	10,521,610	207,310	1,527,511	4,996	740,324	9,936,737
2034	9,936,737	203,998	1,557,296	4,758	695,249	9,273,930
2035	9,273,930	200,882	1,585,185	4,525	644,405	8,529,508
2036	8,529,508	197,948	1,611,382	4,296	587,509	7,699,289
2037	7,699,289	195,203	1,635,282	4,070	524,270	6,779,410
2038	6,779,410	192,663	1,655,916	3,849	454,434	5,766,742
2039	5,766,742	190,271	1,672,639	3,630	377,788	4,658,533
2040	4,658,533	187,952	1,686,496	3,409	294,085	3,450,666
2041	3,450,666	185,645	1,699,024	3,185	202,957	2,137,059
2042	2,137,059	183,390	1,709,477	2,959	103,977	711,989
2043	711,989	181,270	1,717,453	2,734	-	-
2044	-	179,282	1,722,986	2,509	-	-
2045	-	177,410	1,726,651	2,284	-	-
2046	-	175,653	1,728,768	2,059	-	-
2047	-	174,066	1,729,585	1,836	-	-
2048	-	172,767	1,727,497	1,619	-	-
2049	-	171,794	1,722,546	1,409	-	-
2050	-	171,165	1,715,639	1,208	-	-
2051	-	170,962	1,705,696	1,018	-	-
2052	-	171,294	1,692,810	843	-	-
2053	-	172,217	1,676,099	686	-	-
2054	-	173,774	1,655,113	547	-	-
2055	-	175,943	1,630,837	427	-	-
2056	-	178,724	1,603,290	324	-	-
2057	-	182,142	1,572,002	239	-	-
2058	-	186,179	1,537,010	172	-	-
2059	-	190,787	1,498,342	120	-	-
2060	-	195,902	1,456,252	81	-	-
2061	-	201,467	1,411,569	52	-	-
2062	-	207,457	1,365,088	31	-	-
2063	-	213,832	1,317,549	18	-	-
2064	-	220,551	1,269,421	9	-	-
2065	-	227,590	1,220,907	4	-	-
2066	-	234,924	1,172,237	2	-	-

SINGLE DISCOUNT RATE DEVELOPMENT
PROJECTION OF PLAN FIDUCIARY NET POSITION (DOLLARS IN THOUSANDS)

Fiscal Year Ending	Projected Beginning Plan Net Fiduciary Position	Projected Total Contributions	Projected Benefit Payments	Projected Administrative Expenses	Projected Investment Earnings at 7.50%	Projected Ending Plan Fiduciary Net Position
	(a)	(b)	(c)	(d)	(e)	(f)=(a)+(b)-(c)-(d)+(e)
2067	$ -	$ 242,534	$ 1,123,559	$ 1	$ -	$ -
2068	-	250,403	1,074,986	-	-	-
2069	-	258,534	1,026,521	-	-	-
2070	-	266,935	978,120	-	-	-
2071	-	275,608	929,760	-	-	-
2072	-	284,566	881,414	-	-	-
2073	-	293,814	833,082	-	-	-
2074	-	303,363	784,784	-	-	-
2075	-	313,222	736,570	-	-	-
2076	-	323,402	688,517	-	-	-
2077	-	333,913	640,737	-	-	-
2078	-	344,765	593,373	-	-	-
2079	-	355,970	546,605	-	-	-
2080	-	367,539	500,639	-	-	-
2081	-	379,484	455,701	-	-	-
2082	-	391,817	412,036	-	-	-
2083	-	404,551	369,894	-	-	-
2084	-	417,699	329,524	-	-	-
2085	-	431,274	291,165	-	-	-
2086	-	445,290	255,032	-	-	-
2087	-	459,762	221,309	-	-	-
2088	-	474,705	190,145	-	-	-
2089	-	490,133	161,646	-	-	-
2090	-	506,062	135,875	-	-	-
2091	-	522,509	112,848	-	-	-
2092	-	539,490	92,534	-	-	-
2093	-	557,024	74,857	-	-	-
2094	-	575,127	59,697	-	-	-
2095	-	593,819	46,892	-	-	-
2096	-	613,118	36,249	-	-	-
2097	-	633,044	27,553	-	-	-
2098	-	653,618	20,574	-	-	-
2099	-	674,861	15,078	-	-	-
2100	-	696,794	10,835	-	-	-
2101	-	719,440	7,626	-	-	-
2102	-	742,821	5,253	-	-	-
2103	-	766,963	3,538	-	-	-
2104	-	791,889	2,327	-	-	-
2105	-	817,626	1,493	-	-	-
2106	-	844,199	934	-	-	-
2107	-	871,635	570	-	-	-
2108	-	899,963	338	-	-	-
2109	-	929,212	195	-	-	-
2110	-	959,411	110	-	-	-
2111	-	990,592	60	-	-	-
2112	-	1,022,786	32	-	-	-
2113	-	1,056,027	16	-	-	-
2114	-	1,090,348	8	-	-	-
2115	-	1,125,784	4	-	-	-
2116	-	1,162,372	3	-	-	-

SINGLE DISCOUNT RATE DEVELOPMENT
PRESENT VALUES OF PROJECTED BENEFITS (DOLLARS IN THOUSANDS)

Fiscal Year Ending	Projected Beginning Plan Fiduciary Net Position	Projected Benefit Payments	Funded Portion of Benefit Payments	Unfunded Portion of Benefit Payments	Present Value of Funded Benefit Payments using Expected Return Rate (v)	Present Value of Unfunded Benefit Payments using Municipal Bond Rate (vf)	Present Value of Benefit Payments using Single Discount Rate (sdr)
(a)	(b)	(c)	(d)	(e)	(f)=(d)*v^((a)-.5)	(g)=(e)*vf ^((a)-.5)	(h)=((c)/(1+sdr)^(a-.5)
2017	$ 11,223,065	$ 774,408	$ 774,408	$ -	$ 746,906	$ -	$ 758,746
2018	11,579,572	831,564	831,564	-	746,076	-	782,122
2019	11,890,828	887,872	887,872	-	741,019	-	801,645
2020	12,155,192	943,123	943,123	-	732,216	-	817,434
2021	12,372,134	996,341	996,341	-	719,565	-	828,982
2022	12,541,115	1,052,627	1,052,627	-	707,177	-	840,745
2023	12,656,120	1,105,328	1,105,328	-	690,774	-	847,488
2024	12,717,574	1,157,959	1,157,959	-	673,178	-	852,291
2025	12,722,229	1,208,061	1,208,061	-	653,307	-	853,565
2026	12,669,002	1,256,662	1,256,662	-	632,176	-	852,351
2027	12,555,590	1,302,687	1,302,687	-	609,609	-	848,189
2028	12,380,632	1,346,122	1,346,122	-	585,986	-	841,376
2029	12,142,680	1,386,745	1,386,745	-	561,553	-	832,060
2030	11,840,349	1,425,815	1,425,815	-	537,092	-	821,247
2031	11,470,714	1,461,828	1,461,828	-	512,240	-	808,276
2032	11,032,145	1,496,017	1,496,017	-	487,647	-	794,058
2033	10,521,610	1,527,511	1,527,511	-	463,175	-	778,311
2034	9,936,737	1,557,296	1,557,296	-	439,261	-	761,715
2035	9,273,930	1,585,185	1,585,185	-	415,933	-	744,310
2036	8,529,508	1,611,382	1,611,382	-	393,309	-	726,315
2037	7,699,289	1,635,282	1,635,282	-	371,295	-	707,574
2038	6,779,410	1,655,916	1,655,916	-	349,749	-	687,813
2039	5,766,742	1,672,639	1,672,639	-	328,633	-	666,940
2040	4,658,533	1,686,496	1,686,496	-	308,238	-	645,539
2041	3,450,666	1,699,024	1,699,024	-	288,863	-	624,294
2042	2,137,059	1,709,477	1,709,477	-	270,363	-	602,984
2043	711,989	1,717,453	711,989	1,005,463	104,749	477,477	581,540
2044	-	1,722,986	-	1,722,986	-	795,543	560,053
2045	-	1,726,651	-	1,726,651	-	775,143	538,772
2046	-	1,728,768	-	1,728,768	-	754,588	517,833
2047	-	1,729,585	-	1,729,585	-	734,025	497,333
2048	-	1,727,497	-	1,727,497	-	712,823	476,843
2049	-	1,722,546	-	1,722,546	-	691,085	456,438
2050	-	1,715,639	-	1,715,639	-	669,240	436,405
2051	-	1,705,696	-	1,705,696	-	646,924	416,503
2052	-	1,692,810	-	1,692,810	-	624,246	396,805
2053	-	1,676,099	-	1,676,099	-	600,956	377,156
2054	-	1,655,113	-	1,655,113	-	576,988	357,521
2055	-	1,630,837	-	1,630,837	-	552,771	338,172
2056	-	1,603,290	-	1,603,290	-	528,375	319,148
2057	-	1,572,002	-	1,572,002	-	503,708	300,390
2058	-	1,537,010	-	1,537,010	-	478,849	281,943
2059	-	1,498,342	-	1,498,342	-	453,867	263,845
2060	-	1,456,252	-	1,456,252	-	428,894	246,165
2061	-	1,411,569	-	1,411,569	-	404,214	229,058
2062	-	1,365,088	-	1,365,088	-	380,071	212,645
2063	-	1,317,549	-	1,317,549	-	356,670	197,022
2064	-	1,269,421	-	1,269,421	-	334,119	182,224
2065	-	1,220,907	-	1,220,907	-	312,446	168,243
2066	-	1,172,237	-	1,172,237	-	291,677	155,068

SINGLE DISCOUNT RATE DEVELOPMENT
PRESENT VALUES OF PROJECTED BENEFITS (CONTINUED)
(DOLLARS IN THOUSANDS)

Fiscal Year Ending	Projected Beginning Plan Fiduciary Net Position	Projected Benefit Payments	Funded Portion of Benefit Payments	Unfunded Portion of Benefit Payments	Present Value of Funded Benefit Payments using Expected Return Rate (v)	Present Value of Unfunded Benefit Payments using Municipal Bond Rate (vf)	Present Value of Benefit Payments using Single Discount Rate (sdr)
(a)	(b)	(c)	(d)	(e)	(f)=(d)*v^((a)-.5)	(g)=(e)*vf ^((a)-.5)	(h)=((c)/(1+sdr)^(a-.5)
2067	$ -	$ 1,123,559	$ -	1,123,559	$ -	271,819	$ 142,677
2068	-	1,074,986	-	1,074,986	-	252,861	131,043
2069	-	1,026,521	-	1,026,521	-	234,770	120,125
2070	-	978,120	-	978,120	-	217,502	109,877
2071	-	929,760	-	929,760	-	201,019	100,263
2072	-	881,414	-	881,414	-	185,286	91,243
2073	-	833,082	-	833,082	-	170,273	82,787
2074	-	784,784	-	784,784	-	155,956	74,865
2075	-	736,570	-	736,570	-	142,319	67,452
2076	-	688,517	-	688,517	-	129,348	60,527
2077	-	640,737	-	640,737	-	117,036	54,071
2078	-	593,373	-	593,373	-	105,381	48,069
2079	-	546,605	-	546,605	-	94,385	42,507
2080	-	500,639	-	500,639	-	84,053	37,374
2081	-	455,701	-	455,701	-	74,388	32,657
2082	-	412,036	-	412,036	-	65,396	28,345
2083	-	369,894	-	369,894	-	57,081	24,427
2084	-	329,524	-	329,524	-	49,442	20,890
2085	-	291,165	-	291,165	-	42,476	17,719
2086	-	255,032	-	255,032	-	36,174	14,899
2087	-	221,309	-	221,309	-	30,521	12,411
2088	-	190,145	-	190,145	-	25,496	10,236
2089	-	161,646	-	161,646	-	21,074	8,354
2090	-	135,875	-	135,875	-	17,224	6,741
2091	-	112,848	-	112,848	-	13,908	5,374
2092	-	92,534	-	92,534	-	11,089	4,230
2093	-	74,857	-	74,857	-	8,722	3,285
2094	-	59,697	-	59,697	-	6,763	2,515
2095	-	46,892	-	46,892	-	5,165	1,896
2096	-	36,249	-	36,249	-	3,882	1,407
2097	-	27,553	-	27,553	-	2,869	1,027
2098	-	20,574	-	20,574	-	2,083	736
2099	-	15,078	-	15,078	-	1,484	518
2100	-	10,835	-	10,835	-	1,037	357
2101	-	7,626	-	7,626	-	710	241
2102	-	5,253	-	5,253	-	475	160
2103	-	3,538	-	3,538	-	311	103
2104	-	2,327	-	2,327	-	199	65
2105	-	1,493	-	1,493	-	124	40
2106	-	934	-	934	-	76	24
2107	-	570	-	570	-	45	14
2108	-	338	-	338	-	26	8
2109	-	195	-	195	-	15	4
2110	-	110	-	110	-	8	2
2111	-	60	-	60	-	4	1
2112	-	32	-	32	-	2	1
2113	-	16	-	16	-	1	-
2114	-	8	-	8	-	1	-
2115	-	4	-	4	-	-	-
2116	-	3	-	3	-	-	-
				Totals	$ 14,070,087	15,924,977	$ 29,995,064

SECTION H

GLOSSARY OF TERMS

GLOSSARY OF TERMS

Actuarial Accrued Liability (AAL)	The AAL is the difference between the actuarial present value of all benefits and the actuarial value of future normal costs. The definition comes from the fundamental equation of funding which states that the present value of all benefits is the sum of the Actuarial Accrued Liability and the present value of future normal costs. The AAL may also be referred to as "accrued liability" or "actuarial liability."
Actuarial Assumptions	These assumptions are estimates of future experience with respect to rates of mortality, disability, turnover, retirement, rate or rates of investment income and compensation increases. Actuarial assumptions are generally based on past experience, often modified for projected changes in conditions. Economic assumptions (compensation increases, payroll growth, inflation and investment return) consist of an underlying real rate of return plus an assumption for a long-term average rate of inflation.
Accrued Service	Service credited under the system which was rendered before the date of the actuarial valuation.
Actuarial Equivalent	A single amount or series of amounts of equal actuarial value to another single amount or series of amounts, computed on the basis of appropriate actuarial assumptions.
Actuarial Cost Method	A mathematical budgeting procedure for allocating the dollar amount of the actuarial present value of the pension trust benefits between future normal cost and actuarial accrued liability. The actuarial cost method may also be referred to as the actuarial funding method.
Actuarial Gain (Loss)	The difference in liabilities between actual experience and expected experience during the period between two actuarial valuations is the gain (loss) on the accrued liabilities.
Actuarial Present Value (APV)	The amount of funds currently required to provide a payment or series of payments in the future. The present value is determined by discounting future benefit payments at predetermined rates of interest to reflect the expected effects of the time value (present value) of money and the probabilities of payment.
Actuarial Valuation	The actuarial valuation report determines, as of the actuarial valuation date, the service cost, total pension liability, and related actuarial present value of projected benefit payments for pensions performed in conformity with Actuarial Standards of Practice unless otherwise specified by the GASB.
Actuarial Valuation Date	The date as of which an actuarial valuation is performed.
Actuarially Determined Contribution (ADC)	A calculated contribution into a defined benefit pension plan for the reporting period, most often determined based on the funding policy of the plan. Typically the Actuarially Determined Contribution has a normal cost payment and an amortization payment.

GLOSSARY OF TERMS

Amortization Payment	The amortization payment is the periodic payment required to pay off an interest-discounted amount with payments of interest and principal.
Amortization Method	The method used to determine the periodic amortization payment may be a level dollar amount, or a level percent of pay amount. The period will typically be expressed in years, and the method will either be "open" (meaning, reset each year) or "closed" (the number of years remaining will decline each year).
Cost-of-Living Adjustments	Postemployment benefit changes intended to adjust benefit payments for the effects of inflation.
Cost-Sharing Multiple-Employer Defined Benefit Pension Plan (cost-sharing pension plan)	A multiple-employer defined benefit pension plan in which the pension obligations to the employees of more than one employer are pooled and pension plan assets can be used to pay the benefits of the employees of any employer that provides pensions through the pension plan.
Covered-Employee Payroll	The payroll of covered employees, which is typically only the pensionable pay (meets the statutory salary definition) and does not include pay above any pay cap.
Deferred Inflows and Outflows of Resources	The deferred inflows and outflows of pension resources are amounts used under GASB Statement No. 68 in developing the annual pension expense. Deferred inflows and outflows arise with differences between expected and actual experiences; changes of assumptions. The portion of these amounts not included in pension expense should be included in the deferred inflows or outflows of resources.
Discount Rate or Single Discount Rate	For GASB purposes, the discount rate is the single rate of return that results in the present value of all projected benefit payments to be equal to the sum of the funded and unfunded projected benefit payments, specifically: 1. The benefit payments to be made while the pension plans' fiduciary net position is projected to be greater than the benefit payments that are projected to be made in the period and; 2. The present value of the benefit payments not in (1) above, discounted using the municipal bond rate.
Entry Age Actuarial Cost Method or Entry Age Normal (EAN)	The EAN is a funding method for allocating the costs of the plan between the normal cost and the accrued liability. The actuarial present value of the projected benefits of each individual included in an actuarial valuation is allocated on a level basis (either level dollar or level percent of pay) over the earnings or service of the individual between entry age and assumed exit ages(s). The portion of the actuarial present value allocated to a valuation year is the normal cost. The portion of this actuarial present value not provided for at a valuation date by the actuarial present value of future normal costs is the actuarial accrued liability. The sum of the accrued liability plus the present value of all future normal costs is the present value of all benefits.

GLOSSARY OF TERMS

Fiduciary Net Position	The fiduciary net position is the value of the net assets of the trust restricted for pension benefits.
GASB	The Governmental Accounting Standards Board is an organization that exists with authority to promulgate accounting standards for state and local governmental entities.
Long-Term Expected Rate of Return	The long-term rate of return is the expected return to be earned over the entire trust portfolio based on the asset allocation of the portfolio.
Money-Weighted Rate of Return	The money-weighted rate of return is a method of calculating the returns that adjusts for the changing amounts actually invested. For purposes of GASB Statement No. 67, money-weighted rate of return is calculated as the internal rate of return on pension plan investments, net of pension plan investment expense.
Multiple-Employer Defined Benefit Pension Plan	A multiple-employer plan is a defined benefit pension plan that is used to provide pensions to the employees of more than one employer.
Municipal Bond Rate	The Municipal Bond Rate is the discount rate to be used for those benefit payments that occur after the assets of the trust have been depleted.
Net Pension Liability (NPL)	The NPL is the liability of employers and non-employer contributing entities to plan members for benefits provided through a defined benefit pension plan.
Non-Employer Contributing Entities	Non-employer contributing entities are entities that make contributions to a pension plan that is used to provide pensions to the employees of other entities. For purposes of the GASB Accounting Statements No. 67 and No. 68 plan members are not considered non-employer contributing entities.
Normal Cost	The actuarial present value of the pension trust benefits allocated to the current year by the actuarial cost method.
Other Postemployment Benefits (OPEB)	All postemployment benefits other than retirement income (such as death benefits, life insurance, disability, and long-term care) that are provided separately from a pension plan, as well as postemployment healthcare benefits regardless of the manner in which they are provided. Other post-employment benefits do not include termination benefits.
Real Rate of Return	The real rate of return is the rate of return on an investment after adjustment to eliminate inflation.
Service Cost	The service cost is the portion of the actuarial present value of projected benefit payments that is attributed to a valuation year.

Glossary of Terms

Total Pension Expense

The total pension expense is the sum of the following items that are recognized at the end of the employer's fiscal year:

1. Service Cost
2. Interest on the Total Pension Liability
3. Current-Period Changes in Benefit Terms
4. Employee Contributions
5. Projected Earnings on Plan Investments
6. Pension Plan Administrative Expense
7. Other Changes in Plan Fiduciary Net Position
8. Recognition of Outflow (Inflow) of Resources due to the difference between expected and actual experience in measurement of the Total Pension Liability
9. Recognition of Outflow (Inflow) of Resources due to assumption changes
10. Recognition of Outflow (Inflow) of Resources due to the difference between projected and actual earnings on pension plan investments

Total Pension Liability (TPL)

The TPL is the portion of the actuarial present value of projected benefit payments that is attributed to past periods of member service.

Unfunded Actuarial Accrued Liability (UAAL)

The UAAL is the difference between actuarial accrued liability and valuation assets.

Valuation Assets

The valuation assets are the plan fiduciary net position used in determining the net pension liability of the fund. For purposes of the GASB Statement No. 67, the asset valuation method is equal to the market value of assets.

Gabriel Roeder Smith & Company
Consultants & Actuaries

MINNESOTA STATE RETIREMENT SYSTEM
CORRECTIONAL EMPLOYEES RETIREMENT FUND

GASB STATEMENT NOS. 67 AND 68 ACCOUNTING AND FINANCIAL REPORTING FOR PENSIONS

JUNE 30, 2016

GRS
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December 1, 2016

Minnesota State Retirement System
Correctional Employees Retirement Fund
St. Paul, Minnesota

Dear Board of Directors:

This report provides accounting and financial reporting information that is intended to comply with the Governmental Accounting Standards Board (GASB) Statements No. 67 and No. 68 for the Correctional Employees Retirement Fund ("CERF"), as amended by Statement No. 82. These calculations have been made on a basis that is consistent with our understanding of these accounting standards.

GASB Statement No. 67 is the accounting standard that applies to the financial reports issued by retirement systems. GASB Statement No. 68 establishes accounting and financial reporting for state and local government employers who provide their employees (including former employees) pension benefits through a trust. GASB Statement No. 82 is an amendment to Statements No. 67, No. 68, and No. 73, intended to improve consistency in the application of the accounting statements.

Our calculation of the liability associated with the benefits described in this report was performed for the purpose of providing financial reporting and disclosure information that satisfies the requirements of GASB Statements No. 67 and No. 68. The calculation of the plan's liability for this report may not be applicable for funding purposes of the plan. A calculation of the plan's liability for purposes other than satisfying the requirements of GASB Statement No. 67 may produce significantly different results. The information in this report is calculated on a total plan basis. MSRS is responsible for preparing the Schedule of Employer Allocations and the Schedule of Pension Amounts by Employer, as applicable. This report may be provided to parties other than the Minnesota State Retirement System (MSRS) only in its entirety and only with the permission of MSRS. GRS is not responsible for unauthorized use of this report.

This report is based upon information, furnished to us by MSRS, concerning retirement and ancillary benefits, active members, deferred vested members, retirees and beneficiaries, and financial data. If your understanding of this information is different, please let us know. This information was checked for internal consistency, but it was not audited.

This report complements the actuarial valuation report for funding purposes that was or will be provided to the System and should be considered in conjunction with that report. Please see the actuarial valuation report as of June 30, 2016 for additional discussion of the nature of actuarial calculations and more information related to participant data, economic and demographic assumptions, and benefit provisions.

To the best of our knowledge, the information contained within this report is accurate and fairly represents the actuarial position of the Correctional Employees Retirement Fund as of the measurement date. All calculations have been made in conformity with generally accepted actuarial principles and practices as well as with the Actuarial Standards of Practice issued by the Actuarial Standards Board.

The signing actuaries are independent of the plan sponsor.

Brian B. Murphy and Bonita J. Wurst 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.

Respectfully submitted,

By Bonita J. Wurst	By Brian B. Murphy
Bonita J. Wurst, ASA, EA, FCA, MAAA	Brian B. Murphy, FSA, EA, FCA, MAAA

TABLE OF CONTENTS

SECTION A

EXECUTIVE SUMMARY

EXECUTIVE SUMMARY
AS OF JUNE 30, 2016 (DOLLARS IN THOUSANDS)

		2016
Actuarial Valuation Date		June 30, 2016
Measurement Date of the Net Pension Liability		June 30, 2016
Membership		
Number of		
- Service Retirements		2,426
- Survivors		208
- Disability Retirements		284
- Deferred Retirements		1,316
- Terminated other non-vested		661
- Active Members		4,521
- Total		9,416
Covered-employee Payroll [1]	$	241,242
Net Pension Liability		
Total Pension Liability	$	2,232,382
Plan Fiduciary Net Position		899,592
Net Pension Liability	$	1,332,790
Plan Fiduciary Net Position as a Percentage of Total Pension Liability		40.30%
Net Pension Liability as a Percentage of Covered-Employee Payroll		552.47%
Development of the Single Discount Rate		
Single Discount Rate		4.24%
Long-Term Expected Rate of Investment Return		7.50%
Long-Term Municipal Bond Rate [2]		2.85%
Last year ending June 30 in the 2017 to 2116 projection period for which projected benefit payments are fully funded		2045
Total Pension Expense/ (Income)	$	178,692

Deferred Outflows and Deferred Inflows of Resources by Source Arising from Current and Prior Periods to be Recognized in Future Pension Expenses

	Deferred Outflows of Resources		Deferred Inflows of Resources	
Difference between expected and actual experience in the measurement of the Total Pension Liability	$	6,794	$	611
Changes in assumptions		540,175		73,534
Net difference between projected and actual earnings on pension plan investments	$	75,554		31,519
Total	$	622,523	$	105,664

[1] *Assumed equal to actual member contributions divided by employee contribution rate*
[2] *Based on the Bond Buyer 20-Bond Index of general obligation municipal bonds as of June 30, 2016*

DISCUSSION

Accounting Standard

For pension plans that are administered through trusts or equivalent arrangements, Governmental Accounting Standards Board (GASB) Statement No. 67, *Financial Reporting for Pension Plans*, establishes standards of financial reporting for separately issued financial reports and specifies the required approach for measuring the pension liability. Similarly, GASB Statement No. 68, *Accounting and Financial Reporting for Pensions*, establishes standards for state and local government employers (as well as non-employer contributing entities) to account for and disclose the net pension liability, pension expense, and other information associated with providing retirement benefits to their employees (and former employees) on their basic financial statements. Governmental Accounting Standards Board (GASB) Statement No. 82, Pension Issues, is an amendment to Statements No. 67, No. 68, and No. 73, intended to improve consistency in the application of the accounting standards.

The following discussion provides a summary of the information that is required to be disclosed under these accounting standards. A number of these disclosure items are provided in this report. However, certain information, such as notes regarding accounting policies and investments, is not included in this report and the retirement system and/or plan sponsor will be responsible for preparing and disclosing that information to comply with these accounting standards.

Financial Statements

GASB Statement No. 68 requires state and local governmental employers to recognize the net pension liability and the pension expense on their financial statements. The net pension liability is the difference between the total pension liability and the plan's fiduciary net position. In traditional actuarial terms, this is analogous to the accrued liability less the market value of assets (not the smoothed actuarial value of assets that is often encountered in actuarial valuations performed to determine the employer's contribution requirement).

Paragraph 57 of GASB Statement No. 68 states, "Contributions to the pension plan from the employer subsequent to the measurement date of the collective net pension liability and before the end of the employer's reporting period should be reported as a deferred outflow of resources related to pensions." The information contained in this report does not incorporate any contributions made to CERF subsequent to the measurement date of June 30, 2016.

The pension expense recognized each fiscal year is equal to the change in the net pension liability from the beginning of the year to the end of the year, adjusted for deferred recognition of the difference between expected and actual experience in the measurement of the Total Pension Liability, assumption changes and investment experience.

Pension plans that prepare their own, stand-alone financial statements are required to present two financial statements – a Statement of Fiduciary Net Position and a Statement of Changes in Fiduciary Net Position in accordance with GASB Statement No. 67. The *Statement of Fiduciary Net Position* presents the assets and liabilities of the pension plan at the end of the pension plan's reporting period. The *Statement of Changes in Fiduciary Net Position* presents the additions, such as contributions and investment income, and deductions, such as benefit payments and expenses, and net increase or decrease in the fiduciary net position.

Notes to Financial Statements

GASB Statement No. 68 requires the notes of the employer's financial statements to disclose the total pension expense, the pension plan's liabilities and assets, and deferred outflows and inflows of resources related to pensions.

GASB Statement Nos. 67 and 68 require the notes of the financial statements for the employers and pension plans to include certain descriptive information about the pension plans through which the pension benefits are provided. The list of disclosure items should include:

- a description of benefits provided by the plan;
- the classes of employees and number of members covered by the pension plan;
- a description of the plan's funding policy, which includes member and employer contribution requirements;
- the pension plan's investment policies;
- the pension plan's fiduciary net position, net pension liability, and the pension plan's fiduciary net position as a percentage of the total pension liability;
- the net pension liability using a discount rate that is 1% higher and 1% lower than the current discount rate used to calculate the total pension liability and net pension liability for financial reporting purposes;
- significant assumptions and methods used to calculate the total pension liability;
- inputs to the discount rates; and
- certain information about mortality assumptions and the dates of experience studies.

Retirement systems that issue stand-alone financial statements are required to disclose additional information in accordance with GASB Statement No. 67. This information includes:

- the composition of the pension plan's Board and the authority under which benefit terms may be amended;
- a description of how fair value is determined;
- information regarding certain reserves and investments, which include concentrations of investments greater than or equal to 5%, receivables, and insurance contracts excluded from plan assets; and
- annual money-weighted rate of return.

MSRS' comprehensive annual financial report, which contains the basic financial statements and related note disclosures for the Correctional Employees Retirement Fund can be found online at www.msrs.state.mn.us/financial-information or obtained from MSRS at 60 Empire Drive, Suite 300, St. Paul, MN, 55103 or requested via email at info@msrs.us or telephone at 1-800-657-5757.

Required Supplementary Information

GASB Statement No. 67 requires a 10-year fiscal history of:

- sources of changes in the net pension liability;
- information about the components of the net pension liability and related ratios, including the pension plan's fiduciary net position as a percentage of the total pension liability, and the net pension liability as a percent of covered-employee payroll; and
- a comparison of the actual employer contributions to the actuarially determined contributions based on the plan's funding policy.

Measurement of the Net Pension Liability

The net pension liability is to be measured as the total pension liability, less the amount of the pension plan's fiduciary net position. In actuarial terms, this will be the accrued liability less the market value of assets (not the smoothed actuarial value of assets that is often encountered in actuarial valuations performed to determine the employer's contribution requirement).

General Implications of Contribution Allocation Procedure or Funding Policy on Future Expected Plan Contributions and Funded Status

Given the plan's contribution allocation procedure, if all actuarial assumptions are met (including the assumption of the plan earning 7.50% on the actuarial value of assets), then the following outcomes are expected:

1. The employer normal cost as a percentage of pay is expected to remain approximately level as a percentage of payroll.
2. The unfunded actuarial accrued liabilities will increase and not be eliminated.
3. The funded status of the plan will decrease.
4. The plan may eventually become insolvent and unable to pay benefits.

The projections in this report are strictly for the purpose of determining the GASB single discount rate and are different from a funding projection for the ongoing plan.

Limitations of Funded Status Measurements

Unless otherwise indicated, a funded status measurement presented in this report is based upon the actuarial accrued liability and the actuarial value of assets. Unless otherwise indicated, with regard to any funded status measurements presented in this report:

(1) The measurement is inappropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations, in other words of transferring the obligations to an unrelated third party in an arm's length market value type transaction.
(2) The measurement is dependent upon the actuarial cost method which, in combination with the plan's amortization policy, affects the timing and amounts of future contributions. The amounts of future contributions will most certainly differ from those assumed in this report due to future actual experience differing from assumed experience based upon the actuarial

assumptions. A funded status measurement in this report of 100% is not synonymous with no required future contributions. If the funded status were 100%, the plan would still require future normal cost contributions (i.e., contributions to cover the cost of the active membership accruing an additional year of service credit).

(3) The measurement would produce a different result if the market value of assets were used instead of the actuarial value of assets, unless the market value of assets is used in the measurement.

Limitation of Project Scope

Actuarial standards do not require the actuary to evaluate the ability of the plan sponsor or other contributing entity to make required contributions to the plan when due. Such an evaluation was not within the scope of this project and is not within the actuary's domain of expertise. Consequently, the actuary performed no such evaluation.

Timing of the Valuation

GASB Statement Nos. 67 and 68 require that an actuarial valuation to determine the total pension liability be performed at least every two years. The net pension liability and pension expense should be measured as of the pension plan's fiscal year end (measurement date) on a date that is within the employer's prior fiscal year. If the actuarial valuation used to determine the total pension liability is not calculated as of the measurement date, the total pension liability is required to be rolled forward from the actuarial valuation date to the measurement date.

The total pension liability shown in this report is based on an actuarial valuation performed as of June 30, 2016 and a measurement date of June 30, 2016.

Single Discount Rate

Projected benefit payments are required to be discounted to their actuarial present values using a Single Discount Rate that reflects (1) a long-term expected rate of return on pension plan investments (to the extent that the plan's fiduciary net position is projected to be sufficient to pay benefits) and (2) tax-exempt municipal bond rate based on an index of 20-year general obligation bonds with an average AA credit rating as of the measurement date (to the extent that the contributions for use with the long-term expected rate of return are not met).

For the purpose of this valuation, the long-term expected rate of return on pension plan investments is 7.50%; the municipal bond rate is 2.85% (based on the weekly rate closest to but not later than the measurement date of the "20-Bond GO Index"); and the resulting single discount rate is 4.24%. The long-term expected rate of return is based on a review of inflation and investment assumptions, dated September 11, 2014, and a recent asset liability study obtained by the Minnesota State Board of Investment.

Effective Date and Transition

GASB Statements No. 67 and No. 68 are effective for fiscal years beginning after June 15, 2013, and June 15, 2014 respectively. Earlier application is encouraged by the GASB. MSRS first implemented GASB Statement No. 67 for fiscal year 2014.

SECTION B

FINANCIAL STATEMENTS

Pension Expense Under GASB Statement No. 68
Fiscal Year Ended June 30, 2016 (Dollars in Thousands)

A. Expense

1.	Service Cost	$	56,718
2.	Interest on the Total Pension Liability		97,571
3.	Current-Period Benefit Changes		0
4.	Employee Contributions (made negative for addition here)		(21,953)
5.	Projected Earnings on Plan Investments (made negative for addition here)		(71,447)
6.	Pension Plan Administrative Expense		906
7.	Other Changes in Plan Fiduciary Net Position		0
8.	Recognition of Outflow (Inflow) of Resources due to differences between expected and actual experience in the measurement of the Total Pension Liability		
	Arising from Current Reporting Period		(153)
9.	Recognition of Outflow (Inflow) of Resources due to assumption changes		
	Arising from Current Reporting Period		115,310
10.	Recognition of Outflow (Inflow) of Resources due to the difference between projected (7.90%) and actual earnings on Pension Plan Investments		
	Arising from Current Reporting Period		14,328
11.	**Increases/(Decreases) from Experience in the Current Reporting Period**	**$**	**191,280**
12.	Recognition of Outflow (Inflow) of Resources due to differences between expected and actual experience in the measurement of the Total Pension Liability		
	Arising from Prior Reporting Periods		1,870
13.	Recognition of Outflow (Inflow) of Resources due to assumption changes		
	Arising from Prior Reporting Periods		(4,778)
14.	Recognition of Outflow (Inflow) of Resources due to the difference between projected (7.90%) and actual earnings on Pension Plan Investments		
	Arising from Prior Reporting Periods		(9,680)
15.	**Total Pension Expense / (Income)**	**$**	**178,692**

STATEMENT OF OUTFLOWS AND INFLOWS ARISING FROM CURRENT REPORTING PERIOD FISCAL YEAR ENDED JUNE 30, 2016 (DOLLARS IN THOUSANDS)

A. Outflows (Inflows) of Resources due to Liabilities		
1. Difference between expected and actual experience of the Total Pension Liability (gains) or losses	$	(764)
2. Assumption Changes (gains) or losses	$	576,552
3. Recognition period for Liabilities: Average of the expected remaining service lives of all employees {in years}		5.0000
4. Outflow (Inflow) of Resources to be recognized in the current pension expense for the difference between expected and actual experience of the Total Pension Liability*	$	(153)
5. Outflow (Inflow) of Resources to be recognized in the current pension expense for Assumption Changes	$	115,310
6. Outflow (Inflow) of Resources to be recognized in the current pension expense due to Liabilities	$	115,157
7. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses for the difference between expected and actual experience of the Total Pension Liability	$	(611)
8. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses for Assumption Changes	$	461,242
9. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses due to Liabilities	$	460,631
B. Outflows (Inflows) of Resources due to Assets		
1. Net difference between projected and actual earnings on pension plan investments (gains) or losses	$	71,642
2. Recognition period for Assets {in years}		5.0000
3. Outflow (Inflow) of Resources to be recognized in the current pension expense due to Assets	$	14,328
4. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses due to Assets	$	57,314

* *Includes impact of changes in expected timing of future post-retirement benefit increases, if applicable.*

STATEMENT OF OUTFLOWS AND INFLOWS ARISING FROM CURRENT AND PRIOR REPORTING PERIODS FISCAL YEAR ENDED JUNE 30, 2016 (DOLLARS IN THOUSANDS)

A. Outflows and Inflows of Resources due to Liabilities and Assets to be Recognized in Current Pension Expense

	Outflows of Resources	Inflows of Resources	Net Outflows/(Inflows) of Resources
1. Due to Liabilities	$ 136,913	$ 24,664	$ 112,249
2. Due to Assets	20,408	15,760	4,648
3. Totals	$ 157,321	$ 40,424	$ 116,897

B. Outflows and Inflows of Resources by Source to be Recognized in Current Pension Expense

	Outflows of Resources	Inflows of Resources	Net Outflows/(Inflows) of Resources
1. Differences between expected and actual experience	$ 1,870	$ 153	$ 1,717
2. Assumption Changes	135,043	24,511	110,532
3. Net Difference between projected and actual earnings on pension plan investments	20,408	15,760	4,648
4. Totals	$ 157,321	$ 40,424	$ 116,897

C. Deferred Outflows and Deferred Inflows of Resources by Source to be Recognized in Future Pension Expenses

	Deferred Outflows of Resources	Deferred Inflows of Resources	Net Deferred Outflows/ (Inflows) of Resources
1. Differences between expected and actual experience	$ 6,794	$ 611	$ 6,183
2. Assumption Changes	540,175	73,534	466,641
3. Net Difference between projected and actual earnings on pension plan investments	75,554	31,519	44,035
4. Total	$ 622,523	$ 105,664	$ 516,859

D. Deferred Outflows and Deferred Inflows of Resources by Year to be Recognized in Future Pension Expenses

Year Ending June 30	Net Deferred Outflows/ (Inflows) of Resources
2017	$ 116,897
2018	116,898
2019	132,655
2020	150,409
2021	0
Thereafter	0
Total	$ 516,859

Statement of Fiduciary Net Position as of June 30, 2016 (Dollars in Thousands)

Assets		**June 30, 2016**
Cash & Short-term Investments	$	23,048
Receivables		2,447
Investment Pools (at fair value)		875,584
Securities Lending Collateral		126,970
Capital Assets		0
Total Assets	**$**	**1,028,049**
Total Deferred Outflows of Resources	**$**	**0**
Total Liabilities	**$**	**(128,457)**
Total Deferred Inflows of Resources	**$**	**0**
Net Position Restricted for Pensions	**$**	**899,592**

STATEMENT OF CHANGES IN FIDUCIARY NET POSITION FOR YEAR ENDED JUNE 30, 2016 (DOLLARS IN THOUSANDS)

1. Net position at market value at beginning of year	**$**	**909,002**
Additions		
2. Contributions		
a. Employee	$	21,953
b. Employer		30,678
c. Other sources		0
d. Total contributions	$	52,631
3. Investment income		
a. Investment income/(loss)	$	993
b. Investment expenses		(1,188)
c. Net investment income/(loss)	$	(195)
4. Other Additions		0
5. Total Additions *(2.d.) + (3.c.) + (4.)*	**$**	**52,436**
Deductions		
6. Benefits Paid		
a. Annuity benefits	$	(59,045)
b. Refunds		(1,895)
c. Total benefits paid	$	(60,940)
7. Expenses		
a. Other deductions	$	0
b. Administrative		(906)
c. Total expenses	$	(906)
8. Total deductions *(6.c.) + (7.c.)*	**$**	**(61,846)**
9. Net increase/(decrease) in fiduciary net position *(5.) + (8.)*	**$**	**(9,410)**
10. Net position at market value at end of year *(1.) + (9.)*	**$**	**899,592**
11. State Board of Investment calculated annual investment return		(0.1)%

SECTION C

REQUIRED SUPPLEMENTARY INFORMATION

SCHEDULE OF CHANGES IN NET PENSION LIABILITY AND RELATED RATIOS CURRENT PERIOD

FISCAL YEAR ENDED JUNE 30, 2016 (DOLLARS IN THOUSANDS)

A. Total Pension Liability			
1. Service Cost	$	56,718	
2. Interest on the Total Pension Liability		97,571	
3. Changes of benefit terms		0	
4. Difference between expected and actual experience of the Total Pension Liability		(764)	
5. Changes of assumptions		576,552	(1)
6. Benefit payments, including refunds of employee contributions		(60,940)	
7. Net change in Total Pension Liability	$	669,137	
8. Total Pension Liability – Beginning		1,563,245	
9. Total Pension Liability – Ending	**$**	**2,232,382**	
B. Plan Fiduciary Net Position			
1. Contributions – Employer	$	30,678	
2. Contributions – Employee		21,953	
3. Net investment income		(195)	
4. Benefit payments, including refunds of employee contributions		(60,940)	
5. Pension Plan Administrative Expense		(906)	
6. Other changes		0	
7. Net change in Plan Fiduciary Net Position	$	(9,410)	
8. Plan Fiduciary Net Position – Beginning		909,002	
9. Plan Fiduciary Net Position – Ending	**$**	**899,592**	
C. Net Pension Liability, *A.9 - B.9.*	**$**	**1,332,790**	
D. Plan Fiduciary Net Position as a percentage of the Total Pension Liability, *B.9 / A.9.*		**40.30%**	
E. Covered-Employee payroll	**$**	**241,242**	(2)
F. Net Pension Liability as a percentage of Covered-Employee payroll, *C. / E.*		**552.47%**	

(1) *Assumption changes are summarized on page 30.*

(2) *Assumed equal to actual member contributions divided by employee contribution rate.*

SCHEDULES OF REQUIRED SUPPLEMENTARY INFORMATION
SCHEDULE OF CHANGES IN NET PENSION LIABILITY AND RELATED RATIOS MULTIYEAR (DOLLARS IN THOUSANDS)
Last 10 Fiscal Years (which will be built prospectively)

Fiscal year ending June 30,	2016	2015	2014	2013	2012	2011	2010	2009	2008	2007
Total Pension Liability										
Service Cost	$ 56,718	$ 48,805	$ 54,443							
Interest on the Total Pension Liability	97,571	92,039	85,702							
Benefit Changes	0	0	0							
Difference between Expected and Actual Experience	(764)	7,115	4,103							
Assumption Changes	576,552 (1)	118,399	(147,067)							
Benefit Payments	(59,045)	(54,909)	(50,842)							
Refunds	(1,895)	(1,590)	(1,447)							
Net Change in Total Pension Liability	$ 669,137	$ 209,859	$ (55,108)							
Total Pension Liability - Beginning	1,563,245	1,353,386	1,408,494							
Total Pension Liability - Ending (a)	**$ 2,232,382**	**$ 1,563,245**	**$ 1,353,386**							
Plan Fiduciary Net Position										
Employer Contributions	$ 30,678	$ 29,480	$ 26,468							
Employee Contributions	21,953	21,061	18,855							
Pension Plan Net Investment Income	(195)	38,624	137,523							
Benefit Payments	(59,045)	(54,909)	(50,842)							
Refunds	(1,895)	(1,590)	(1,447)							
Pension Plan Administrative Expense	(906)	(720)	(657)							
Other Changes	0	0	(1)							
Net Change in Plan Fiduciary Net Position	**$ (9,410)**	**$ 31,946**	**$ 129,899**							
Plan Fiduciary Net Position - Beginning	**909,002**	**877,056**	**747,157**							
Plan Fiduciary Net Position - Ending (b)	**$ 899,592**	**$ 909,002**	**$ 877,056**							
Net Pension Liability - Ending (a) - (b)	**$ 1,332,790**	**$ 654,243**	**$ 476,330**							
Plan Fiduciary Net Position as a Percentage of Total Pension Liability	**40.30 %**	**58.15 %**	**64.80 %**							
Covered-Employee Payroll (2)	**$ 241,242**	**$ 231,440**	**$ 219,244**							
Net Pension Liability as a Percentage of Covered-Employee Payroll	**552.47 %**	**282.68 %**	**217.26 %**							

Notes to Schedule:

(1) Assumption changes are summarized on page 30.

(2) Assumed equal to plan member contributions divided by employee contribution rate.

SCHEDULES OF REQUIRED SUPPLEMENTARY INFORMATION
SCHEDULE OF NET PENSION LIABILITY MULTIYEAR
(DOLLARS IN THOUSANDS)

Last 10 Fiscal Years (which will be built prospectively)

Fiscal Year Ending June 30,	Total Pension Liability (a)	Plan Net Position (b)	Net Pension Liability (a) - (b) = (c)	Plan Net Position as a % of Total Pension Liability (b)/(c)	Covered-Employee Payroll (d)	Net Pension Liability as a % of Covered-Employee Payroll (c)/(d)
2007						
2008						
2009						
2010						
2011						
2012						
2013						
2014	$ 1,353,386	$ 877,056	$ 476,330	64.80%	$ 219,244	217.26%
2015	1,563,245	909,002	654,243	58.15%	231,440	282.68%
2016	2,232,382	899,592	1,332,790	40.30%	241,242	552.47%

SCHEDULE OF CONTRIBUTIONS MULTIYEAR
(DOLLARS IN THOUSANDS)

Last 10 Fiscal Years

Fiscal Year Ending June 30,	Actuarially Determined Contribution	Actual Contributions	Contribution Deficiency (Excess)	Covered-Employee Payroll	Actual Contribution as a % of Covered-Employee Payroll
	(a)	(b)	(a) - (b) = (c)	(d)	(b)/(d)
2007	$ 29,115	$ 13,927	$ 15,188	$ 167,727	8.30%
2008	34,734	18,623	16,111	194,391	9.58
2009	31,738	20,126	11,612	193,445	10.40
2010	32,557	21,988	10,569	192,450	11.43
2011	33,274	23,892	9,382	197,702	12.08
2012	34,806	24,188	10,618	200,035	12.09
2013	34,060	24,632	9,428	204,198	12.06
2014	38,390	26,468	11,922	219,244	12.07
2015	40,109	29,480	10,629	231,440	12.74
2016	44,171	30,678	13,493	241,242	12.72

NOTES TO SCHEDULE OF CONTRIBUTIONS

Valuation Date:	June 30, 2016
Notes	Actuarially determined contribution rates are calculated as of each June 30 and apply to the fiscal year beginning on the day after the measurement date.

Methods and Assumptions Used to Determine Contribution Rates Reported in this Schedule:

Actuarial Cost Method	Entry Age Normal
Amortization Method	Level Percentage of Payroll, Closed
Remaining Amortization Period	22 years
Asset Valuation Method	5-Year smoothed market; no corridor
Inflation	2.75%
Payroll Growth	3.50%
Salary Increases	Service based tables ranging from 5.75% with one year of service to 3.50% with 19 or more years of service, including inflation.
Investment Rate of Return	8.00%
Retirement Age	Experience-based table of rates that are specific to the type of eligibility condition. Last updated for the 2012 valuation pursuant to an experience study of the period 2006 - 2011, prepared by a former actuary.
Healthy Post-Retirement Mortality	RP-2000 annuitant generational mortality table, projected with mortality improvement scale AA, white collar adjustment, set forward one year for males and set back one year for females.

Other Information:

Benefit Increases After Retirement	The post-retirement increase is assumed to stay at 2.0% indefinitely. See separate funding actuarial valuation report as of July 1, 2016 for additional detail. To obtain this report, contact MSRS as noted on page 3. This report is also available online at www.msrs.state.mn.us/actuarial-reports.

Schedule of Investment Returns Multiyear

Last 10 Fiscal Years

Fiscal Year Ending June 30,	Annual Return[1]
2007	
2008	
2009	
2010	
2011	
2012	
2013	
2014	18.62 %
2015	4.44
2016	(0.02)

[1] *Annual money-weighted rate of return, net of investment expenses.*

The Minnesota State Board of Investment (SBI) compiled this data and the related investment notes and provided it to MSRS for GASB-compliance purposes. MSRS furnished this information to us for inclusion within this report. We did not audit this information. We are not responsible for its accuracy or completeness.

Rate of Return

For the fiscal year ended June 30, 2016, the annual money-weighted rate of return for the Correctional Employees Retirement Fund was (0.02)%. The money-weighted rate of return is a method of calculating period-by-period returns on pension plan investments that adjusts for the changing amounts actually invested. For purposes of this schedule, the money-weighted rate of return is calculated as the internal rate of return on pension plan investments, net of pension plan investment expense.

10-Year Schedule of Money-Weighted Investment Return

Ten-year data is not available. Additional years will be provided when they become available.

To request additional information about the computation of the annual money-weighted rate of return and the investments for the Minnesota Retirement Systems (including the investments for MSRS' defined benefit retirement funds), contact SBI at 60 Empire Drive, Suite 355, St. Paul, Minnesota, 55103, via email at minn.sbi@state.mn.us or telephone at (651) 296-3328.

SECTION D

ADDITIONAL FINANCIAL STATEMENT DISCLOSURES

ASSET ALLOCATION

Long-Term Expected Return on Plan Assets

The long-term expected rate of return on pension plan investments was determined using a building-block method. Best estimates for expected future real rates of return (expected returns, net of inflation) were developed for each asset class using both long-term historical returns and long-term capital market expectation from a number of investment management and consulting organizations. The asset class estimates and the target allocations were then combined to produce a geometric, long-term expected real rate of return for the portfolio. Inflation expectations were applied to derive the nominal rate of return for the portfolio. For each major asset class that is included in the pension fund's target asset allocation as of June 30, 2016, these best estimates are summarized in the following table:

Asset Allocation

Asset Class	Target Allocation	Long-Term Expected Real Rate of Return (Geometric)
Domestic Stocks	45.00%	5.50%
International Stocks	15.00	6.00
Bonds	18.00	1.45
Alternative Assets	20.00	6.40
Unallocated Cash	2.00	0.50
Total	100.00%	

The Minnesota State Board of Investment (SBI) compiled this data and the related investment notes and provided it to MSRS for GASB-compliance purposes. MSRS furnished this information to us for inclusion within this report. We did not audit this information. We are not responsible for its accuracy or completeness.

At MSRS' direction, for purposes of this valuation, the long-term expected rate of return assumption is 7.50%. This assumption is based on a review of inflation and investment return assumptions dated September 11, 2014 and a recent asset liability study obtained by the SBI.

SENSITIVITY OF NET PENSION LIABILITY TO THE SINGLE DISCOUNT RATE ASSUMPTION

Single Discount Rate

A Single Discount Rate of 4.24% was used to measure the total pension liability. This Single Discount Rate was based on an expected rate of return on pension plan investments of 7.50% and a municipal bond rate of 2.85%. The projection of cash flows used to determine this Single Discount Rate assumed that employee and employer contributions will be made at the current statutory contribution rates. Based on these assumptions, the pension plan's fiduciary net position and future contributions were sufficient to finance the benefit payments through the year ending June 30, 2045. As a result, the long-term expected rate of return on pension plan investments was applied to projected benefit payments through the year ending June 30, 2045, and the municipal bond rate was applied to all benefit payments after the point of asset depletion.

Regarding the sensitivity of the net pension liability to changes in the Single Discount Rate, the following presents the plan's net pension liability, calculated using a Single Discount Rate of 4.24%, as well as what the fund's net pension liability would be if it were calculated using a single discount rate that is 1-percentage-point lower (3.24%) or 1-percentage-point higher (5.24%) than the current rate.

Sensitivity of Net Pension Liability to the Single Discount Rate Assumption

(Dollars in Thousands)

	1% Decrease 3.24%	Current Single Discount Rate Assumption 4.24%	1% Increase 5.24%
Total Pension Liability	$ 2,641,770	$ 2,232,382	$ 1,908,798
Net Position Restricted for Pensions	899,592	899,592	899,592
Net Pension Liability	**$1,742,178**	**$1,332,790**	**$1,009,206**

For more information on the calculation of the Single Discount Rate, refer to Section G of this report.

GASB Statement No. 68 Reconciliation (Dollars in Thousands)

	Total Pension Liability (a)	Plan Fiduciary Net Position (b)	Net Pension Liability (a) - (b)	Deferred Outflows	Deferred Inflows	Total Pension Expense
Balance Beginning of Year	**$ 1,563,245**	**$ 909,002**	**$ 654,243**	**$ 131,650**	**$ 145,324**	
Changes for the Year:						
Service Cost	$ 56,718		$ 56,718			$ 56,718
Interest on Total Pension Liability	97,571		97,571			97,571
Interest on Plan Fiduciary Net Position [1]		$ 71,447	(71,447)			(71,447)
Changes in Benefit Terms						
Liability Experience Gains and Losses	(764)		(764)	$ -	$ 611	(153)
Changes in Assumptions	576,552		576,552	461,242	-	115,310
Recognition of Deferred Outflows/(Inflows) of Resources Arising from Prior Reporting Periods						
Liability Experience Gains/(Losses)				(1,870)	-	1,870
Assumption Changes				(19,733)	(24,511)	(4,778)
Investment Gains/(Losses)				(6,080)	(15,760)	(9,680)
Contributions - Employer		30,678	(30,678)			
Contributions - Employees		21,953	(21,953)			(21,953)
Asset Gain/(Loss) [1]		(71,642)	71,642	57,314	-	14,328
Benefit Payment and Refunds	(60,940)	(60,940)				
Administrative Expenses		(906)	906			906
Other Changes						
Net Changes	**$ 669,137**	**$ (9,410)**	**$ 678,547**	**$ 490,873**	**$ (39,660)**	**$ 178,692**
Balance End of Year	**$ 2,232,382**	**$ 899,592**	**$ 1,332,790**	**$ 622,523**	**$ 105,664**	

[1] *The sum of these items equals the net investment income of $(195).*

SUMMARY OF POPULATION STATISTICS

		Terminated		Recipients			
	Actives	Deferred Retirement	Other Non-Vested	Service Retirement	Disability Retirement	Survivor	Total
Members on 7/1/2015	**4,449**	**1,276**	**531**	**2,292**	**279**	**198**	**9,025**
New members	541	0	0	0	0	0	**541**
Return to active	20	(10)	(10)	0	0	0	**0**
Terminated non-vested	(156)	0	156	0	0	0	**0**
Service retirements	(125)	(37)	0	162	0	0	**0**
Terminated deferred	(92)	92	0	0	0	0	**0**
Terminated refund/transfer	(106)	(9)	(59)	0	0	0	**(174)**
Deaths	(3)	(3)	0	(32)	(5)	(6)	**(49)**
New beneficiary	0	0	0	0	0	17	**17**
Disabled	(7)	0	0	0	7	0	**0**
Unexpected status changes	0	7	43	4	3	(1)	**56**
Net change	72	40	130	134	5	10	**391**
Members on 6/30/2016	**4,521**	**1,316**	**661**	**2,426**	**284**	**208**	**9,416**

SECTION E

SUMMARY OF BENEFITS

SUMMARY OF PLAN PROVISIONS

Following is a summary of the major plan provisions used in the valuation of this report. MSRS is solely responsible for the validity, accuracy and comprehensiveness of this information. If any of the plan provisions shown below are not accurate and complete, the valuation results may differ significantly from those shown in this report and may require a revision of this report.

Plan year	July 1 through June 30	
Eligibility	State employees in covered correctional service. Certain state employees with 75 percent working time spent in direct contact with inmates or patients are also eligible.	
Contributions	Shown as a percent of salary:	
Effective date	**Member**	**Employer**
July 1, 2014	9.10%	12.85%
	Member contributions are "picked up" according to the provisions of Internal Revenue Code 414(h).	
Allowable service	Service during which member contributions were made. May also include certain leave of absence, military service and periods while temporary Worker's Compensation is paid.	
Salary	Includes wages, allowances and fees. Excludes lump sum payments of separation and reduced salary while receiving Worker's Compensation benefits.	
Average salary	Average of the five highest successive years of Salary. Average Salary is based on all Allowable Service if less than five years.	
Vesting	Hired before July 1, 2010:	100% vested after 3 years of Allowable Service.
	Hired after June 30, 2010:	50% vested after 5 years of Allowable Service; 60% vested after 6 years of Allowable Service; 70% vested after 7 years of Allowable Service; 80% vested after 8 years of Allowable Service; 90% vested after 9 years of Allowable Service; and 100% vested after 10 years of Allowable Service.
Retirement		
Normal retirement benefit		
Age/Service requirement	Age 55 and vested. Proportionate Retirement Annuity is available at age 65 and one year of Allowable Service.	
Amount	2.40% (2.20% if first hired after June 30, 2010) of Average Salary for each year of Allowable Service, pro-rata for completed months.	
Early retirement		
Age/Service requirement	Age 50 and vested.	
Amount	Normal Retirement Benefit based on Allowable Service and Average Salary at retirement date reduced by 2/10% (5/12% if first hired after June 30, 2010 or if hired before July 1, 2010 and retire after June 30, 2015) per month for each month that the member is under age 55.	

SUMMARY OF PLAN PROVISIONS (CONTINUED)

Retirement (Continued)

Form of payment

Life annuity.

Actuarially equivalent options are:

50%, 75%, or 100% Joint and Survivor, or 15-year certain. If a Joint and Survivor benefit is elected and the beneficiary predeceases the annuitant, the annuitant's benefit increases to the Life Annuity amount. This "bounce back" is subsidized by the plan.

Benefit increases

Since 2011, benefit recipients have received annual 2.0% benefit increases. If the accrued liability funding ratio reaches 90% (actuarial accrued liability ratio on a Market Value of Assets basis) for two consecutive years, the benefit increase will revert to 2.5%. If, after reverting to a 2.5% increase, the funding ratio declines to less than 80% for one year or 85% for two consecutive years, the benefit increase will decrease to 2.0%.

A benefit recipient who has been receiving a benefit for at least 12 full months as of the June 30 of the calendar year immediately before the adjustment will receive a full increase. Members receiving benefits for at least one month but less than 12 full months as of the June 30 of the calendar year immediately before the adjustment will receive a pro rata increase.

Disability

Duty Disability

Age/Service requirement

Physically or mentally unable to perform normal job duties as a direct result of a disability relating to an incident while performing the duties of the job which present inherent dangers to the employee. Members who become disabled after June 30, 2009 will have disability benefits converted to retirement benefits at age 55 instead of age 65.

Amount

50.00% of Average Salary plus 2.40% (2.20% if first hired after June 30, 2010) of Average Salary for each year in excess of 20 years and 10 months of Allowable Service (pro rata for completed months).

Payment begins at disability and ends at age 55 (age 65 if disabled prior to July 1, 2009) or the five-year anniversary of the effective date of the disability benefit, whichever is later. Payments stop earlier if disability ceases or death occurs. Benefits may be paid upon re-employment but salary plus benefit cannot exceed current salary of position held at time of disability.

Member is reclassified from disabled to retired at age 55 (age 65 if disabled prior to July 1, 2009). Optional amount continues. Otherwise, normal retirement benefit equal to the disability benefit paid, or an actuarially equivalent option.

Regular Disability

Age/Service requirement

At least one year of covered Correctional service for employees hired before July 1, 2009, or a vested Correctional employee hired after June 30, 2009, and the employee is determined to have a regular disability not related to an incident while performing the duties of the job.

SUMMARY OF PLAN PROVISIONS (CONTINUED)

Disability (Continued)	
Amount	Normal retirement benefit based on covered Correctional Service (minimum of 15 years if hired prior to July 1, 2009) and Average Salary at disability. Payment begins at disability and ends at age 55 (age 65 if disabled prior to July 1, 2009) or the five-year anniversary of the effective date of the disability benefit, whichever is later. Payments stop earlier if disability ceases or death occurs. Benefits may be paid upon re-employment but salary plus benefit cannot exceed current salary of position held at time of disability. Member is reclassified from disabled to retired at age 55 (age 65 if disabled prior to July 1, 2009). Optional amount continues. Otherwise, normal retirement benefit equal to the disability benefit paid, or an actuarially equivalent option.
Benefit Increases	Same as for retirement.
Death	
Surviving spouse benefit	
Age/Service requirement	Member at any age or former member age 50 or older who dies before retirement or disability benefit commences and was vested. If a former member dies before age 55 and has less than 30 years of Allowable Service, benefits commence when the former member would have been age 55. If an active member dies, benefits may commence immediately, regardless of age.
Amount	Surviving spouse receives the 100% joint and survivor benefits using the Normal Retirement formula above. If commencement is prior to age 55, the appropriate early retirement formula described above applies except that one-half the monthly reduction factor is used from age 50 to the commencement age and the Rule of 90 does not apply. In lieu of this benefit, the surviving spouse may elect a refund of member contributions with interest or an actuarially equivalent term certain annuity (lump sum payable to estate at death).
Benefit increases	Same as for retirement.
Surviving dependent children's benefit	
Age/service requirement	If no surviving spouse, all dependent children (biological or adopted) below age 20 who are dependent for more than half of their support on deceased member.
Amount	Actuarially equivalent to surviving spouse 100% joint and survivor annuity payable to the later of age 20 or five years. The amount is to be proportionally divided among surviving children.
Benefit increases	Same as for retirement.
Refund of contributions with interest	
Age/service requirement	Active employee dies and survivor benefits are not payable or a former employee dies before annuity begins. If accumulated member contributions with interest exceed total payments to the surviving spouse and children, then the remainder is paid out.

SUMMARY OF PLAN PROVISIONS (CONTINUED)

Death (Continued)	
Amount	Member's contributions with 6.00% interest compounded daily until July 1, 2011 and 4.00% thereafter.
Termination	
Refund of contributions	
Age/Service requirement	Termination of state service.
Amount	Member's contributions with 6.00% interest through June 30, 2011 compounded daily. Beginning July 1, 2011 a member's contributions will increase at 4.00% interest compounded daily. If a member is vested, a deferred annuity may be elected in lieu of a refund.
Deferred benefit	
Age/service requirement	Partially or fully vested.
Amount	Benefit computed under law in effect at termination and increased by the following annual augmentation percentage: (a.) 0.00% before July 1, 1971; (b.) 5.00% from July 1, 1971 to January 1, 1981; (c.) 3.00% thereafter (2.50% if hired after June 30, 2006) until January 1 of the year following attainment of age 55 or January 1, 2012, whichever is earlier; (d.) 5.00% thereafter until the annuity begins (2.50% if hired after June 30, 2006), but before January 1, 2012; and (e.) 2.00% from January 1, 2012 thereafter. Amount is payable at normal or early retirement.
Optional form conversion factors	Actuarially equivalent factors based on RP-2000 mortality for healthy annuitants, white collar adjustment, projected to 2027 using scale AA, set forward one year for males and set back one year for females, blended 70% males, and 6.5% interest.
Combined service annuity	Members are eligible for combined service benefits if they: (a.) Have sufficient allowable service in total that equals or exceeds the applicable service credit vesting requirement of the retirement plan with the longest applicable service credit vesting requirement; (b.) Have at least six months of allowable service credit in each plan worked under; and (c.) Are not in receipt of a benefit from another plan, or have applied for benefits with an effective date within one year. Members who meet the above requirements must have their benefit based on the following: (a.) Allowable service in all covered plans are combined in order to determine eligibility for early retirement. (b.) Average salary is based on the high five consecutive years during their entire service in all covered plans.

SUMMARY OF PLAN PROVISIONS (CONCLUDED)

Contribution Stabilizer	The following is a summary of the contribution stabilizer provisions in Minnesota Statute 352.045: • If a contribution sufficiency of at least 1.0% exists, member and employer contributions may be adjusted by the Board of Directors to a level necessary to maintain a 1.0% sufficiency. Member and employer contributions may not be less than the sum of normal cost and administrative expenses. Employer contributions must be equal to 60% of the sum of member and employer contributions. • If a contribution deficiency of at least 0.5% exists, member and employer contribution rates may be increased by the Board of Directors to eliminate the deficiency. Employer contributions must be equal to 60% of the sum of member and employer contributions. • Any adjustment to the contribution rates must be reported to the Legislative Commission on Pensions and Retirement (LCPR) by January 15 following the most recent valuation report. If the LCPR does not recommend against or alter the change in rates, the adjustment becomes effective on the first day of the first full payroll period of the next fiscal year.
Changes in plan provisions	There have been no changes in plan provisions since the prior valuation.

SECTION F

ACTUARIAL COST METHOD AND ACTUARIAL ASSUMPTIONS

ACTUARIAL METHODS USED FOR THE DETERMINATION OF TOTAL PENSION LIABILITY AND RELATED VALUES

Actuarial Cost Method

Normal cost and the allocation of benefit values between service rendered before and after the valuation date were determined using an **Individual Entry-Age Actuarial Cost Method** having the following characteristics:

(i) the annual normal cost for each individual active member, payable from the date of employment to the date of retirement, is sufficient to accumulate the value of the member's benefit at the time of retirement;

(ii) each annual normal cost is a constant percentage of the member's year by year projected covered pay.

Actuarial gains/(losses), as they occur, reduce (increase) the Total Pension Liability.

Valuation of Future Post-Retirement Benefit Increases

Benefit recipients receive a future annual 2.00% post-retirement benefit increase. If the funding ratio (determined on a market value of assets basis) reaches 90% (based on a 2.50% post-retirement benefit increase assumption) for two consecutive years, the benefit increase will revert to 2.50%. If, after reverting to a 2.50% benefit increase, the funding ratio declines to less than 80% for one year or less than 85% for two consecutive years, the benefit increase will decrease to 2.00%.

To determine an assumption regarding a future change in the post-retirement benefit increase, we performed a projection of liabilities and assets based on the following methods and assumptions:

- Future investment returns of 7.50%
- Liabilities and normal cost based on statutory funding assumptions
    - Discount rate of 8.00%
    - Statutory salary increases (rate of 5.75% at year 1 declining to 3.50% at years 19 and later)
- Open group; stable active population (new member profile based on average new members hired in recent years)
- The postretirement benefit increase rate is assumed to be 2.00% per year until the funding ratio threshold required to pay a 2.50% postretirement benefit increase is reached
- Current statutory contributions (i.e., not including potential contribution increases under the contribution stabilizer statutes) as directed by MSRS

Based on these assumptions and methods, the projection indicates that this plan is not expected to attain the funding ratio threshold required to pay a 2.50% postretirement benefit. This assumption is reflected in our calculations.

Asset Valuation Method

Fair value of assets.

SUMMARY OF ACTUARIAL ASSUMPTIONS USED IN THE DETERMINATION OF TOTAL PENSION LIABILITY AND RELATED VALUES

The following assumptions were used in valuing the liabilities and benefits under the plan. The assumptions are based on the last experience study, dated February 2012, prepared by a former actuary, a review of inflation and investment return assumptions, dated September 11, 2014, and a recent asset liability study obtained by the SBI. An experience study for the 2011-2015 period was issued on July 26, 2016. This report recommended many changes to demographic assumptions, expected to be effective at a future date.

The Allowance for Combined Service Annuity was also based on a recommendation by a former actuary. We are unable to judge the reasonableness of this assumption without performing a substantial amount of additional work beyond the scope of the assignment. We note that the LCPR Actuary has recently completed a review of this assumption. This review recommended changes to this assumption, expected to be effective at a future date.

Investment return	7.50% per annum.
Single discount rate	4.24% per annum.
Benefit increases after retirement	2.00% per annum.
Salary increases	Reported salary at valuation date increased according to the rate table, to current fiscal year and annually for each future year. Prior fiscal year salary is annualized for members with less than one year of service.
Payroll growth	3.25% per year.
Inflation	2.50% per year.
Mortality rates	
Healthy pre-retirement	RP-2000 employee generational mortality table projected with mortality improvement scale AA, white collar adjustment.
Healthy post-retirement	RP-2000 annuitant generational mortality table projected with mortality improvement scale AA, white collar adjustment, set forward one year for males and set back one year for females. The RP-2000 employee mortality table as published by the Society of Actuaries (SOA) contains mortality rates for ages 15 to 70 and the annuitant mortality table contains mortality rates for ages 50 to 120. We have applied the annuitant mortality table for active members beyond age 70 until the assumed retirement age and the employee mortality table for annuitants younger than age 50.
Disabled	RP-2000 disabled mortality table.
Retirement	Members retiring from active status are assumed to retire according to the age related rates shown in the rate table. Members who have attained the highest assumed retirement age are assumed to retire in one year.
Withdrawal	Select and Ultimate rates based on actual experience. Ultimate rates after the third year are shown in rate table. Select rates in the first three years are:

Year	Select Withdrawal Rates
1	20%
2	15%
3	8%

SUMMARY OF ACTUARIAL ASSUMPTIONS (CONTINUED)

Disability	Age-related rates based on experience; see table of sample rates. All incidences are assumed to be duty-related.
Allowance for combined service annuity	Liabilities for former members are increased by 30.00% to account for the effect of some participants having eligibility for a Combined Service Annuity.
Administrative expenses	In the valuation year, equal to prior year administrative expenses expressed as a percentage of prior year projected payroll. In each subsequent year, equal to the initial administrative expense percentage applied to payroll for the closed group.
Refund of contributions	Account balances accumulate interest until normal retirement date and are discounted back to the valuation date. All employees withdrawing after becoming eligible for a deferred benefit take the larger of their contributions accumulated with interest or the value of their deferred benefit.
Commencement of deferred benefits	Members receiving deferred annuities (including current terminated deferred members) are assumed to begin receiving benefits at age 55.
Percentage married	85% of active members are assumed to be married. Actual marital status is used for members in payment status.
Age of spouse	Females are assumed to be three years younger than their male spouses.
Form of payment	Married members retiring from active status are assumed to elect subsidized joint and survivor form of annuity as follows: Males: 10% elect 50% Joint & Survivor option 10% elect 75% Joint & Survivor option 40% elect 100% Joint & Survivor option Females: 10% elect 50% Joint & Survivor option 10% elect 75% Joint & Survivor option 30% elect 100% Joint & Survivor option Remaining married members and unmarried members are assumed to elect the Straight Life option. Members receiving deferred annuities (including current terminated deferred members) are assumed to elect a straight life annuity, except that current terminated deferred members who terminated prior to July 1, 1997 are assumed to receive the Level Social Security option to age 62.
Eligibility testing	Eligibility for benefits is determined based upon the age nearest birthday and service nearest whole year on the date the decrement is assumed to occur.
Decrement operation	Withdrawal decrements do not operate during retirement eligibility. Decrements are assumed to occur mid-fiscal year.
Service credit accruals	It is assumed that members accrue one year of service credit per year.
Pay increases	Pay increases are assumed to happen at the beginning of the fiscal year. This is equivalent to assuming that reported earnings are pensionable earnings for the year ending on the valuation date.

SUMMARY OF ACTUARIAL ASSUMPTIONS (CONTINUED)

Unknown data for certain members	To prepare this report, GRS has used and relied on participant data supplied by MSRS. Although GRS has reviewed the data in accordance with Actuarial Standards of Practice No. 23, GRS has not verified or audited any of the data or information provided. In cases where submitted data was missing or incomplete, the following assumptions were applied: <u>Data for active members</u>: There were 11 members reported with zero or invalid salary. We used prior year salary (9 members), if available, otherwise, high five salary with a 10% load to account for salary increases (1 member). If neither pay nor high five salary were available, we assumed a value of $35,000 (1 member). There were 2 members reported without a gender and 1 member reported with a missing date of birth. We assumed members were hired at age 33 and male gender. There was 1 member reported with zero service. Due to the small number of members with zero service, and based on direction from MSRS, we used service of zero years for this member. <u>Data for terminated members</u>: There were 54 members reported without a benefit. If available, we calculated benefits for these members using the reported Average Salary, Credited Service and Termination Date provided. If Average Salary was not reported (20 members), we assumed a value of $30,000. If Credited Service was not reported (2 members), we assumed a value of 7.5 years. There were no members reported without a Termination Date. There were 62 members who terminated after June 30, 1997 and who were reported with a benefit in the Accelerated to Age 62 option. Based on direction from MSRS, we adjusted benefits for these members to reflect the assumed life annuity election. There were no members reported with missing or invalid gender or birth dates. <u>Data for members receiving benefits</u>: There was 1 member reported with a missing gender. We assumed male gender. There were no members reported with a missing or invalid birth date. There were no survivors reported on the data file with an expired benefit. There were 2 members reported without a benefit. Due to the small number of members with missing benefits, we made no adjustment to the reported data for members receiving benefits.

SUMMARY OF ACTUARIAL ASSUMPTIONS (CONTINUED)

Unknown data for certain members	Data for members receiving benefits: There were no retirees reported with a survivor option and a survivor date of death. There were 15 retirees reported with a bounce back annuity but were not reported with a reasonable reduction factor. A factor of 0.80, 0.85 and 0.90 was assumed for the 100%, 75% and 50% joint and survivor annuity, respectively. There were 7 retired members with an accelerated benefit election and a missing accelerated benefit amount and end date. We assumed the accelerated period has ended. There were retired members reported with a survivor option and an invalid or missing survivor gender (377 members) and/or survivor date of birth (310 members). We used the valuation assumptions if the survivor gender or date of birth was missing or invalid.
Change in actuarial assumptions	The single discount rate changed from 6.25% as of July 1, 2015 to 4.24% as of July 1, 2016. The long-term expected rate of return on pension plan investments has been reduced from 7.90% to 7.50% as of July 1, 2016. The inflation assumption has been reduced from 2.75% to 2.50%, the payroll growth assumption was reduced from 3.50% to 3.25%, and the salary scale rates have been reduced by 0.25% at each age.

SUMMARY OF ACTUARIAL ASSUMPTIONS (CONTINUED)

	Rate (%)*					
	Healthy Post-Retirement Mortality**		Healthy Pre-Retirement Mortality**		Disability Mortality	
Age	Male	Female	Male	Female	Male	Female
20	0.04%	0.02%	0.03%	0.02%	2.26%	0.75%
25	0.04	0.02	0.04	0.02	2.26	0.75
30	0.04	0.02	0.04	0.03	2.26	0.75
35	0.06	0.04	0.06	0.05	2.26	0.75
40	0.10	0.06	0.09	0.06	2.26	0.75
45	0.15	0.09	0.13	0.10	2.26	0.75
50	0.60	0.15	0.20	0.16	2.90	1.15
55	0.54	0.32	0.27	0.24	3.54	1.65
60	0.73	0.51	0.43	0.38	4.20	2.18
65	1.30	0.82	0.67	0.59	5.02	2.80
70	2.14	1.37	0.98	0.88	6.26	3.76

* *Generally, mortality rates are expected to increase as age increases. These standard mortality rates have been adjusted slightly to prevent decreasing mortality rates. If the rates were not adjusted as described, we would not expect the valuation results to be materially different.*

*** These rates were adjusted for mortality improvements using projection scale AA.*

	Withdrawal Rates After Third Year		Disability Retirement	
Age	Male	Female	Male	Female
20	13.20%	8.80%	0.05%	0.05%
25	8.10	7.80	0.08	0.08
30	5.00	7.45	0.11	0.11
35	3.45	7.10	0.15	0.15
40	2.55	5.70	0.24	0.24
45	1.95	3.50	0.39	0.39
50	0.00	0.00	0.67	0.67
55	0.00	0.00	1.17	1.17
60	0.00	0.00	1.88	1.88
65	0.00	0.00	0.00	0.00

SUMMARY OF ACTUARIAL ASSUMPTIONS (CONCLUDED)

Age	Percent Retiring
50	5%
51	3
52	3
53	3
54	5
55	55
56	12
57	12
58	10
59	10
60	10
61	10
62	30
63	30
64	30
65	50
66	50
67	50
68	50
69	50
70+	100

Salary Scale	
Year	Increase
1	5.50%
2	5.35
3	5.20
4	5.05
5	4.90
6	4.75
7	4.60
8	4.45
9	4.30
10	4.15
11	4.05
12	3.95
13	3.85
14	3.75
15	3.65
16	3.55
17	3.45
18	3.35
19+	3.25

SECTION G

CALCULATION OF THE SINGLE DISCOUNT RATE

CALCULATION OF THE SINGLE DISCOUNT RATE

GASB Statement No. 67 includes a specific requirement for the discount rate that is used for the purpose of the measurement of the Total Pension Liability. This rate considers the ability of the fund to meet benefit obligations in the future. To make this determination, employer contributions, employee contributions, benefit payments, expenses and investment returns are projected into the future. The Plan Fiduciary Net Position (assets) in future years can then be determined and compared to its obligation to make benefit payments in those years. As long as assets are projected to be on hand in a future year, the long-term expected rate of return is used as the discount rate. In years where assets are not projected to be sufficient to meet benefit payments, the use of a "risk-free" municipal bond rate is required, as described in the following paragraph.

The Single Discount Rate (SDR) is equivalent to applying these two rates to the benefits that are projected to be paid during the different time periods. The SDR reflects (1) the long-term expected rate of return on pension plan investments (during the period in which the fiduciary net position is projected to be sufficient to pay benefits) and (2) tax-exempt municipal bond rate based on an index of 20-year general obligation bonds with an average AA credit rating (which is published by the Federal Reserve Board (FRB)) as of the measurement date (to the extent that the contributions for use with the long-term expected rate of return are not met).

For the purpose of this valuation, the expected rate of return on pension plan investments is 7.50%; the municipal bond rate is 2.85% (based on the FRB rate as of June 30, 2016). **The resulting single discount rate as of July 1, 2016 is 4.24%.**

Benefit payments projected to occur up through June 30, 2044 were fully funded and benefit payments projected to occur in the year ended June 30, 2045 were partially funded. Assets were projected to be fully depleted by the fiscal year ending June 30, 2045. Benefit payments were discounted using 7.50%, the long-term expected rate of return on pension plan investments, as long as assets were sufficient to fund the benefit payments. Beginning in the July 1, 2044 to June 30, 2045 fiscal year, when benefit payments exceed the Plan's Fiduciary Net Position, benefit payments were discounted at 2.85%, the municipal bond rate. An equivalent single discount rate was determined that produced approximately the same present value of projected benefits when applied to all years of projected benefits as the present value of projected benefits using 7.50% through the point of asset depletion and 2.85% after. For more information on the calculation of the equivalent present value of projected benefits, see pages 38 and 39 of this report.

The tables in this section provide background for the development of the Single Discount Rate.

The **Projection of Contributions** table shows the development of expected contributions in future years. Normal Cost contributions for future hires are not included (nor are their liabilities).

The **Projection of Plan Fiduciary Net Position** table shows the development of expected asset levels in future years.

The **Present Values of Projected Benefit Payments** table shows the development of the Single Discount Rate. It breaks down the benefit payments into present values for funded and unfunded portions and shows the equivalent total at the SDR.

SINGLE DISCOUNT RATE DEVELOPMENT
PROJECTION OF CONTRIBUTIONS (DOLLARS IN THOUSANDS)

	Projected Covered-Employee Payroll			Projected Contributions			
Fiscal Year Ending	Payroll for Current Employees	Payroll for New Employees	Total Employee Payroll	Contributions from Current Employees	Employer Contributions for Current Employees	Contributions on Future Payroll toward Current UAL*	Total Contributions
	(a)	(b)	(c) = (a) + (b)	(d) = (a) x 9.10%	(e) = (a) x 12.85%	(f)	(g) = (d) + (e) + (f)
2016	$ 241,242		$ 241,242				
2017	247,282		247,282	$ 22,503	$ 31,776		$ 54,279
2018	234,860	$ 20,459	255,319	21,372	30,180	$ 779	52,331
2019	224,631	38,986	263,617	20,441	28,865	1,485	50,791
2020	215,459	56,725	272,184	19,607	27,686	2,161	49,454
2021	205,901	75,129	281,030	18,737	26,458	2,862	48,057
2022	196,085	94,079	290,164	17,844	25,197	3,584	46,625
2023	186,256	113,338	299,594	16,949	23,934	4,318	45,201
2024	176,910	132,421	309,331	16,099	22,733	5,045	43,877
2025	168,241	151,143	319,384	15,310	21,619	5,759	42,688
2026	159,325	170,439	329,764	14,499	20,473	6,494	41,466
2027	150,579	189,902	340,481	13,703	19,349	7,235	40,287
2028	142,716	208,831	351,547	12,987	18,339	7,956	39,282
2029	135,232	227,740	362,972	12,306	17,377	8,677	38,360
2030	127,767	247,002	374,769	11,627	16,418	9,411	37,456
2031	120,449	266,500	386,949	10,961	15,478	10,154	36,593
2032	113,180	286,345	399,525	10,299	14,544	10,910	35,753
2033	105,873	306,636	412,509	9,634	13,605	11,683	34,922
2034	98,620	327,296	425,916	8,974	12,673	12,470	34,117
2035	91,294	348,464	439,758	8,308	11,731	13,276	33,315
2036	83,475	370,575	454,050	7,596	10,727	14,119	32,442
2037	75,424	393,383	468,807	6,864	9,692	14,988	31,544
2038	67,811	416,232	484,043	6,171	8,714	15,858	30,743
2039	60,560	439,214	499,774	5,511	7,782	16,734	30,027
2040	53,281	462,736	516,017	4,849	6,847	17,630	29,326
2041	46,386	486,402	532,788	4,221	5,961	18,532	28,714
2042	40,084	510,019	550,103	3,648	5,151	19,432	28,231
2043	34,132	533,850	567,982	3,106	4,386	20,340	27,832
2044	28,781	557,660	586,441	2,619	3,698	21,247	27,564
2045	23,952	581,548	605,500	2,180	3,078	22,157	27,415
2046	19,502	605,677	625,179	1,775	2,506	23,076	27,357
2047	15,618	629,879	645,497	1,421	2,007	23,998	27,426
2048	12,442	654,034	666,476	1,132	1,599	24,919	27,650
2049	9,786	678,351	688,137	891	1,257	25,845	27,993
2050	7,551	702,950	710,501	687	970	26,782	28,439
2051	5,784	727,808	733,592	526	743	27,729	28,998
2052	4,358	753,076	757,434	397	560	28,692	29,649
2053	3,205	778,846	782,051	292	412	29,674	30,378
2054	2,289	805,178	807,467	208	294	30,677	31,179
2055	1,584	832,126	833,710	144	204	31,704	32,052
2056	1,051	859,754	860,805	96	135	32,757	32,988
2057	661	888,121	888,782	60	85	33,837	33,982
2058	399	917,268	917,667	36	51	34,948	35,035
2059	229	947,262	947,491	21	29	36,091	36,141
2060	123	978,162	978,285	11	16	37,268	37,295
2061	62	1,010,017	1,010,079	6	8	38,482	38,496
2062	29	1,042,878	1,042,907	3	4	39,734	39,741
2063	13	1,076,788	1,076,801	1	2	41,026	41,029
2064	5	1,111,792	1,111,797	0	1	42,359	42,360
2065	2	1,147,928	1,147,930	0	0	43,736	43,736
2066	0	1,185,238	1,185,238	0	0	45,158	45,158

**Contributions related to future employees in excess of normal cost and expenses of 18.14% of pay.*

SINGLE DISCOUNT RATE DEVELOPMENT
PROJECTION OF CONTRIBUTIONS (DOLLARS IN THOUSANDS) (CONCLUDED)

	Projected Covered-Employee Payroll			Projected Contributions			
Fiscal Year Ending	Payroll for Current Employees	Payroll for New Employees	Total Employee Payroll	Contributions from Current Employees	Employer Contributions for Current Employees	Contributions on Future Payroll toward Current UAL*	Total Contributions
	(a)	(b)	(c) = (a) + (b)	(d) = (a) x 9.10%	(e) = (a) x 12.85%	(f)	(g) = (d) + (e) + (f)
2067	$ 0	$ 1,223,758	$ 1,223,758	$ 0	$ 0	$ 46,625	$ 46,625
2068	0	1,263,531	1,263,531	0	0	48,141	48,141
2069	0	1,304,595	1,304,595	0	0	49,705	49,705
2070	0	1,346,995	1,346,995	0	0	51,320	51,320
2071	0	1,390,772	1,390,772	0	0	52,988	52,988
2072	0	1,435,972	1,435,972	0	0	54,711	54,711
2073	0	1,482,641	1,482,641	0	0	56,489	56,489
2074	0	1,530,827	1,530,827	0	0	58,325	58,325
2075	0	1,580,579	1,580,579	0	0	60,220	60,220
2076	0	1,631,948	1,631,948	0	0	62,177	62,177
2077	0	1,684,986	1,684,986	0	0	64,198	64,198
2078	0	1,739,748	1,739,748	0	0	66,284	66,284
2079	0	1,796,290	1,796,290	0	0	68,439	68,439
2080	0	1,854,669	1,854,669	0	0	70,663	70,663
2081	0	1,914,946	1,914,946	0	0	72,959	72,959
2082	0	1,977,182	1,977,182	0	0	75,331	75,331
2083	0	2,041,440	2,041,440	0	0	77,779	77,779
2084	0	2,107,787	2,107,787	0	0	80,307	80,307
2085	0	2,176,290	2,176,290	0	0	82,917	82,917
2086	0	2,247,019	2,247,019	0	0	85,611	85,611
2087	0	2,320,048	2,320,048	0	0	88,394	88,394
2088	0	2,395,449	2,395,449	0	0	91,267	91,267
2089	0	2,473,301	2,473,301	0	0	94,233	94,233
2090	0	2,553,684	2,553,684	0	0	97,295	97,295
2091	0	2,636,678	2,636,678	0	0	100,457	100,457
2092	0	2,722,370	2,722,370	0	0	103,722	103,722
2093	0	2,810,847	2,810,847	0	0	107,093	107,093
2094	0	2,902,200	2,902,200	0	0	110,574	110,574
2095	0	2,996,521	2,996,521	0	0	114,167	114,167
2096	0	3,093,908	3,093,908	0	0	117,878	117,878
2097	0	3,194,460	3,194,460	0	0	121,709	121,709
2098	0	3,298,280	3,298,280	0	0	125,664	125,664
2099	0	3,405,474	3,405,474	0	0	129,749	129,749
2100	0	3,516,152	3,516,152	0	0	133,965	133,965
2101	0	3,630,427	3,630,427	0	0	138,319	138,319
2102	0	3,748,416	3,748,416	0	0	142,815	142,815
2103	0	3,870,240	3,870,240	0	0	147,456	147,456
2104	0	3,996,022	3,996,022	0	0	152,248	152,248
2105	0	4,125,893	4,125,893	0	0	157,197	157,197
2106	0	4,259,985	4,259,985	0	0	162,305	162,305
2107	0	4,398,434	4,398,434	0	0	167,580	167,580
2108	0	4,541,383	4,541,383	0	0	173,027	173,027
2109	0	4,688,978	4,688,978	0	0	178,650	178,650
2110	0	4,841,370	4,841,370	0	0	184,456	184,456
2111	0	4,998,715	4,998,715	0	0	190,451	190,451
2112	0	5,161,173	5,161,173	0	0	196,641	196,641
2113	0	5,328,911	5,328,911	0	0	203,032	203,032
2114	0	5,502,101	5,502,101	0	0	209,630	209,630
2115	0	5,680,919	5,680,919	0	0	216,443	216,443
2116	0	5,865,549	5,865,549	0	0	223,477	223,477

**Contributions related to future employees in excess of normal cost and expenses of 18.14% of pay.*

SINGLE DISCOUNT RATE DEVELOPMENT
PROJECTION OF PLAN FIDUCIARY NET POSITION (DOLLARS IN THOUSANDS)

Fiscal Year Ending	Projected Beginning Plan Fiduciary Net Position	Projected Total Contributions	Projected Benefit Payments	Projected Administrative Expenses	Projected Investment Earnings at 7.50%	Projected Ending Plan Net Position
	(a)	(b)	(c)	(d)	(e)	(f)=(a)+(b)-(c)-(d)+(e)
2017	$ 899,592	$ 54,279	$ 66,631	$ 940	$ 66,980	$ 953,280
2018	953,280	52,331	70,579	892	70,791	1,004,931
2019	1,004,931	50,791	74,542	854	74,464	1,054,790
2020	1,054,790	49,454	78,550	819	78,008	1,102,883
2021	1,102,883	48,057	83,393	782	81,386	1,148,151
2022	1,148,151	46,625	88,877	745	84,528	1,189,682
2023	1,189,682	45,201	94,406	708	87,388	1,227,157
2024	1,227,157	43,877	100,127	672	89,941	1,260,176
2025	1,260,176	42,688	105,823	639	92,165	1,288,567
2026	1,288,567	41,466	111,669	605	94,035	1,311,794
2027	1,311,794	40,287	118,028	572	95,501	1,328,982
2028	1,328,982	39,282	124,170	542	96,528	1,340,080
2029	1,340,080	38,360	130,175	514	97,107	1,344,858
2030	1,344,858	37,456	136,331	486	97,206	1,342,703
2031	1,342,703	36,593	142,505	458	96,786	1,333,119
2032	1,333,119	35,753	148,627	430	95,812	1,315,627
2033	1,315,627	34,922	154,884	402	94,240	1,289,503
2034	1,289,503	34,117	161,071	375	92,024	1,254,198
2035	1,254,198	33,315	167,482	347	89,112	1,208,796
2036	1,208,796	32,442	174,326	317	85,424	1,152,019
2037	1,152,019	31,544	181,570	287	80,867	1,082,573
2038	1,082,573	30,743	188,390	258	75,379	1,000,047
2039	1,000,047	30,027	194,804	230	68,928	903,968
2040	903,968	29,326	201,167	202	61,463	793,388
2041	793,388	28,714	206,918	176	52,936	667,944
2042	667,944	28,231	211,715	152	43,334	527,642
2043	527,642	27,832	216,029	130	32,639	371,954
2044	371,954	27,564	219,511	109	20,825	200,723
2045	200,723	27,415	222,313	91	7,874	13,608
2046	13,608	27,357	224,562	74	0	0
2047	0	27,426	226,029	59	0	0
2048	0	27,650	226,462	47	0	0
2049	0	27,993	226,117	37	0	0
2050	0	28,439	225,054	29	0	0
2051	0	28,998	223,182	22	0	0
2052	0	29,649	220,690	17	0	0
2053	0	30,378	217,661	12	0	0
2054	0	31,179	214,161	9	0	0
2055	0	32,052	210,235	6	0	0
2056	0	32,988	205,925	4	0	0
2057	0	33,982	201,264	3	0	0
2058	0	35,035	196,278	2	0	0
2059	0	36,141	191,004	1	0	0
2060	0	37,295	185,472	0	0	0
2061	0	38,496	179,706	0	0	0
2062	0	39,741	173,731	0	0	0
2063	0	41,029	167,558	0	0	0
2064	0	42,360	161,199	0	0	0
2065	0	43,736	154,663	0	0	0
2066	0	45,158	147,961	0	0	0

**Contributions related to future employees in excess of normal cost and expenses of 18.14% of pay.*

SINGLE DISCOUNT RATE DEVELOPMENT
PROJECTION OF PLAN FIDUCIARY NET POSITION
(DOLLARS IN THOUSANDS) (CONCLUDED)

Fiscal Year Ending	Projected Beginning Plan Fiduciary Net Position	Projected Total Contributions	Projected Benefit Payments	Projected Administrative Expenses	Projected Investment Earnings at 7.50%	Projected Ending Plan Net Position
	(a)	(b)	(c)	(d)	(e)	(f)=(a)+(b)-(c)-(d)+(e)
2067	$ 0	$ 46,625	$ 141,098	$ 0	$ 0	$ 0
2068	0	48,141	134,079	0	0	0
2069	0	49,705	126,917	0	0	0
2070	0	51,320	119,627	0	0	0
2071	0	52,988	112,229	0	0	0
2072	0	54,711	104,747	0	0	0
2073	0	56,489	97,217	0	0	0
2074	0	58,325	89,689	0	0	0
2075	0	60,220	82,209	0	0	0
2076	0	62,177	74,832	0	0	0
2077	0	64,198	67,615	0	0	0
2078	0	66,284	60,620	0	0	0
2079	0	68,439	53,902	0	0	0
2080	0	70,663	47,514	0	0	0
2081	0	72,959	41,506	0	0	0
2082	0	75,331	35,922	0	0	0
2083	0	77,779	30,790	0	0	0
2084	0	80,307	26,129	0	0	0
2085	0	82,917	21,952	0	0	0
2086	0	85,611	18,253	0	0	0
2087	0	88,394	15,018	0	0	0
2088	0	91,267	12,224	0	0	0
2089	0	94,233	9,841	0	0	0
2090	0	97,295	7,835	0	0	0
2091	0	100,457	6,169	0	0	0
2092	0	103,722	4,803	0	0	0
2093	0	107,093	3,697	0	0	0
2094	0	110,574	2,814	0	0	0
2095	0	114,167	2,119	0	0	0
2096	0	117,878	1,577	0	0	0
2097	0	121,709	1,161	0	0	0
2098	0	125,664	844	0	0	0
2099	0	129,749	606	0	0	0
2100	0	133,965	430	0	0	0
2101	0	138,319	301	0	0	0
2102	0	142,815	208	0	0	0
2103	0	147,456	141	0	0	0
2104	0	152,248	95	0	0	0
2105	0	157,197	62	0	0	0
2106	0	162,305	40	0	0	0
2107	0	167,580	26	0	0	0
2108	0	173,027	16	0	0	0
2109	0	178,650	10	0	0	0
2110	0	184,456	6	0	0	0
2111	0	190,451	4	0	0	0
2112	0	196,641	2	0	0	0
2113	0	203,032	1	0	0	0
2114	0	209,630	1	0	0	0
2115	0	216,443	0	0	0	0
2116	0	223,477	0	0	0	0

**Contributions related to future employees in excess of normal cost and expenses of 18.14% of pay.*

SINGLE DISCOUNT RATE DEVELOPMENT
PRESENT VALUES OF PROJECTED BENEFITS (DOLLARS IN THOUSANDS)

Fiscal Year Ending	Projected Beginning Plan Fiduciary Net Position	Projected Benefit Payments	Funded Portion of Benefit Payments	Unfunded Portion of Benefit Payments	Present Value of Funded Benefit Payments using Expected Return Rate (v)	Present Value of Unfunded Benefit Payments using Municipal Bond Rate (vf)	Present Value of Benefit Payments using Single Discount Rate (sdr)
(a)	(b)	(c)	(d)	(e)	(f)=(d)*v^((a)-.5)	(g)=(e)*vf ^((a)-.5)	(h)=((c)/(1+sdr)^(a-.5)
2017	$ 899,592	$ 66,631	$ 66,631	$ 0	$ 64,265	$ 0	$ 65,260
2018	953,280	70,579	70,579	0	63,323	0	66,313
2019	1,004,931	74,542	74,542	0	62,213	0	67,185
2020	1,054,790	78,550	78,550	0	60,984	0	67,915
2021	1,102,883	83,393	83,393	0	60,227	0	69,166
2022	1,148,151	88,877	88,877	0	59,709	0	70,713
2023	1,189,682	94,406	94,406	0	58,999	0	72,054
2024	1,227,157	100,127	100,127	0	58,209	0	73,309
2025	1,260,176	105,823	105,823	0	57,228	0	74,325
2026	1,288,567	111,669	111,669	0	56,176	0	75,238
2027	1,311,794	118,028	118,028	0	55,232	0	76,284
2028	1,328,982	124,170	124,170	0	54,053	0	76,986
2029	1,340,080	130,175	130,175	0	52,714	0	77,424
2030	1,344,858	136,331	136,331	0	51,355	0	77,783
2031	1,342,703	142,505	142,505	0	49,935	0	77,996
2032	1,333,119	148,627	148,627	0	48,447	0	78,034
2033	1,315,627	154,884	154,884	0	46,964	0	78,009
2034	1,289,503	161,071	161,071	0	45,433	0	77,822
2035	1,254,198	167,482	167,482	0	43,945	0	77,625
2036	1,208,796	174,326	174,326	0	42,550	0	77,507
2037	1,152,019	181,570	181,570	0	41,226	0	77,441
2038	1,082,573	188,390	188,390	0	39,790	0	77,078
2039	1,000,047	194,804	194,804	0	38,274	0	76,457
2040	903,968	201,167	201,167	0	36,767	0	75,740
2041	793,388	206,918	206,918	0	35,180	0	74,734
2042	667,944	211,715	211,715	0	33,484	0	73,353
2043	527,642	216,029	216,029	0	31,782	0	71,800
2044	371,954	219,511	219,511	0	30,042	0	69,987
2045	200,723	222,313	200,723	21,590	25,554	9,693	67,994
2046	13,608	224,562	13,608	210,954	1,611	92,080	65,886
2047	0	226,029	0	226,029	0	95,925	63,616
2048	0	226,462	0	226,462	0	93,446	61,143
2049	0	226,117	0	226,117	0	90,718	58,564
2050	0	225,054	0	225,054	0	87,790	55,916
2051	0	223,182	0	223,182	0	84,647	53,193
2052	0	220,690	0	220,690	0	81,382	50,457
2053	0	217,661	0	217,661	0	78,041	47,739
2054	0	214,161	0	214,161	0	74,659	45,059
2055	0	210,235	0	210,235	0	71,259	42,432
2056	0	205,925	0	205,925	0	67,864	39,870
2057	0	201,264	0	201,264	0	64,490	37,381
2058	0	196,278	0	196,278	0	61,150	34,970
2059	0	191,004	0	191,004	0	57,858	32,645
2060	0	185,472	0	185,472	0	54,625	30,409
2061	0	179,706	0	179,706	0	51,460	28,264
2062	0	173,731	0	173,731	0	48,371	26,212
2063	0	167,558	0	167,558	0	45,359	24,251
2064	0	161,199	0	161,199	0	42,428	22,381
2065	0	154,663	0	154,663	0	39,580	20,599
2066	0	147,961	0	147,961	0	36,816	18,904

SINGLE DISCOUNT RATE DEVELOPMENT
PRESENT VALUES OF PROJECTED BENEFITS
(DOLLARS IN THOUSANDS) (CONCLUDED)

Fiscal Year Ending	Projected Beginning Plan Fiduciary Net Position	Projected Benefit Payments	Funded Portion of Benefit Payments	Unfunded Portion of Benefit Payments	Present Value of Funded Benefit Payments using Expected Return Rate (v)	Present Value of Unfunded Benefit Payments using Municipal Bond Rate (vf)	Present Value of Benefit Payments using Single Discount Rate (sdr)
(a)	(b)	(c)	(d)	(e)	(f)=(d)*v^((a)-.5)	(g)=(e)*vf ^((a)-.5)	(h)=((c)/(1+sdr)^(a-.5)
2067	$ 0	$ 141,098	$ 0	$ 141,098	$ 0	$ 34,135	$ 17,293
2068	0	134,079	0	134,079	0	31,538	15,764
2069	0	126,917	0	126,917	0	29,027	14,314
2070	0	119,627	0	119,627	0	26,601	12,943
2071	0	112,229	0	112,229	0	24,264	11,648
2072	0	104,747	0	104,747	0	22,019	10,429
2073	0	97,217	0	97,217	0	19,870	9,285
2074	0	89,689	0	89,689	0	17,823	8,217
2075	0	82,209	0	82,209	0	15,884	7,225
2076	0	74,832	0	74,832	0	14,058	6,309
2077	0	67,615	0	67,615	0	12,351	5,469
2078	0	60,620	0	60,620	0	10,766	4,703
2079	0	53,902	0	53,902	0	9,308	4,012
2080	0	47,514	0	47,514	0	7,977	3,392
2081	0	41,506	0	41,506	0	6,775	2,843
2082	0	35,922	0	35,922	0	5,701	2,360
2083	0	30,790	0	30,790	0	4,751	1,941
2084	0	26,129	0	26,129	0	3,920	1,580
2085	0	21,952	0	21,952	0	3,202	1,273
2086	0	18,253	0	18,253	0	2,589	1,016
2087	0	15,018	0	15,018	0	2,071	802
2088	0	12,224	0	12,224	0	1,639	626
2089	0	9,841	0	9,841	0	1,283	483
2090	0	7,835	0	7,835	0	993	369
2091	0	6,169	0	6,169	0	760	279
2092	0	4,803	0	4,803	0	576	208
2093	0	3,697	0	3,697	0	431	154
2094	0	2,814	0	2,814	0	319	112
2095	0	2,119	0	2,119	0	233	81
2096	0	1,577	0	1,577	0	169	58
2097	0	1,161	0	1,161	0	121	41
2098	0	844	0	844	0	85	29
2099	0	606	0	606	0	60	20
2100	0	430	0	430	0	41	13
2101	0	301	0	301	0	28	9
2102	0	208	0	208	0	19	6
2103	0	141	0	141	0	12	4
2104	0	95	0	95	0	8	2
2105	0	62	0	62	0	5	2
2106	0	40	0	40	0	3	1
2107	0	26	0	26	0	2	1
2108	0	16	0	16	0	1	0
2109	0	10	0	10	0	1	0
2110	0	6	0	6	0	0	0
2111	0	4	0	4	0	0	0
2112	0	2	0	2	0	0	0
2113	0	1	0	1	0	0	0
2114	0	1	0	1	0	0	0
2115	0	0	0	0	0	0	0
2116	0	0	0	0	0	0	0
				Totals	$ 1,405,671	$ 1,741,065	$ 3,146,736

SECTION H

GLOSSARY OF TERMS

GLOSSARY OF TERMS

Actuarial Accrued Liability (AAL)	The AAL is the difference between the actuarial present value of all benefits and the actuarial value of future normal costs. The definition comes from the fundamental equation of funding which states that the present value of all benefits is the sum of the Actuarial Accrued Liability and the present value of future normal costs. The AAL may also be referred to as "accrued liability" or "actuarial liability."
Actuarial Assumptions	These assumptions are estimates of future experience with respect to rates of mortality, disability, turnover, retirement, rate or rates of investment income and compensation increases. Actuarial assumptions are generally based on past experience, often modified for projected changes in conditions. Economic assumptions (compensation increases, payroll growth, inflation and investment return) consist of an underlying real rate of return plus an assumption for a long-term average rate of inflation.
Accrued Service	Service credited under the system which was rendered before the date of the actuarial valuation.
Actuarial Equivalent	A single amount or series of amounts of equal actuarial value to another single amount or series of amounts, computed on the basis of appropriate actuarial assumptions.
Actuarial Cost Method	A mathematical budgeting procedure for allocating the dollar amount of the actuarial present value of the pension trust benefits between future normal cost and actuarial accrued liability. The actuarial cost method may also be referred to as the actuarial funding method.
Actuarial Gain (Loss)	The difference in liabilities between actual experience and expected experience during the period between two actuarial valuations is the gain (loss) on the accrued liabilities.
Actuarial Present Value (APV)	The amount of funds currently required to provide a payment or series of payments in the future. The present value is determined by discounting future benefit payments at predetermined rates of interest to reflect the expected effects of the time value (present value) of money and the probabilities of payment.
Actuarial Valuation	The actuarial valuation report determines, as of the actuarial valuation date, the service cost, total pension liability, and related actuarial present value of projected benefit payments for pensions performed in conformity with Actuarial Standards of Practice unless otherwise specified by the GASB.
Actuarial Valuation Date	The date as of which an actuarial valuation is performed.
Actuarially Determined Contribution (ADC)	A calculated contribution into a defined benefit pension plan for the reporting period, most often determined based on the funding policy of the plan. Typically the Actuarially Determined Contribution has a normal cost payment and an amortization payment.

GLOSSARY OF TERMS

Amortization Payment The amortization payment is the periodic payment required to pay off an interest-discounted amount with payments of interest and principal.

Amortization Method The method used to determine the periodic amortization payment may be a level dollar amount, or a level percent of pay amount. The period will typically be expressed in years, and the method will either be "open" (meaning, reset each year) or "closed" (the number of years remaining will decline each year).

Cost-of-Living Adjustments Postemployment benefit changes intended to adjust benefit payments for the effects of inflation.

Cost-Sharing Multiple-Employer Defined Benefit Pension Plan (cost-sharing pension plan) A multiple-employer defined benefit pension plan in which the pension obligations to the employees of more than one employer are pooled and pension plan assets can be used to pay the benefits of the employees of any employer that provides pensions through the pension plan.

Covered-Employee Payroll The payroll of covered employees, which is typically only the pensionable pay and does not include pay above any pay cap.

Deferred Inflows and Outflows of Resources The deferred inflows and outflows of pension resources are amounts used under GASB Statement No. 68 in developing the annual pension expense. Deferred inflows and outflows arise with differences between expected and actual experiences; changes of assumptions. The portion of these amounts not included in pension expense should be included in the deferred inflows or outflows of resources.

Discount Rate or Single Discount Rate For GASB purposes, the discount rate is the single rate of return that results in the present value of all projected benefit payments to be equal to the sum of the funded and unfunded projected benefit payments, specifically:

1. The benefit payments to be made while the pension plans' fiduciary net position is projected to be greater than the benefit payments that are projected to be made in the period; and
2. The present value of the benefit payments not in (1) above, discounted using the municipal bond rate.

Entry Age Actuarial Cost Method (EAN) The EAN is a funding method for allocating the costs of the plan between the normal cost and the accrued liability. The actuarial present value of the projected benefits of each individual included in an actuarial valuation is allocated on a level basis (either level dollar or level percent of pay) over the earnings or service of the individual between entry age and assumed exit ages(s). The portion of the actuarial present value allocated to a valuation year is the normal cost. The portion of this actuarial present value not provided for at a valuation date by the actuarial present value of future normal costs is the actuarial accrued liability. The sum of the accrued liability plus the present value of all future normal costs is the present value of all benefits.

GLOSSARY OF TERMS

Fiduciary Net Position	The fiduciary net position is the value of the net assets of the trust restricted for pension benefits.
GASB	The Governmental Accounting Standards Board is an organization that exists with authority to promulgate accounting standards for state and local governmental entities.
Long-Term Expected Rate of Return	The long-term rate of return is the expected return to be earned over the entire trust portfolio based on the asset allocation of the portfolio.
Money-Weighted Rate of Return	The money-weighted rate of return is a method of calculating the returns that adjusts for the changing amounts actually invested. For purposes of GASB Statement No. 67, money-weighted rate of return is calculated as the internal rate of return on pension plan investments, net of pension plan investment expense.
Multiple-Employer Defined Benefit Pension Plan	A multiple-employer plan is a defined benefit pension plan that is used to provide pensions to the employees of more than one employer.
Municipal Bond Rate	The Municipal Bond Rate is the discount rate to be used for those benefit payments that occur after the assets of the trust have been depleted.
Net Pension Liability (NPL)	The NPL is the liability of employers and non-employer contributing entities to plan members for benefits provided through a defined benefit pension plan.
Non-Employer Contributing Entities	Non-employer contributing entities are entities that make contributions to a pension plan that is used to provide pensions to the employees of other entities. For purposes of the GASB Accounting Statements No. 67 and No. 68 plan members are not considered non-employer contributing entities.
Normal Cost	The actuarial present value of the pension trust benefits allocated to the current year by the actuarial cost method.
Other Postemployment Benefits (OPEB)	All postemployment benefits other than retirement income (such as death benefits, life insurance, disability, and long-term care) that are provided separately from a pension plan, as well as postemployment healthcare benefits regardless of the manner in which they are provided. Other post-employment benefits do not include termination benefits.
Real Rate of Return	The real rate of return is the rate of return on an investment after adjustment to eliminate inflation.
Service Cost	The service cost is the portion of the actuarial present value of projected benefit payments that is attributed to a valuation year.

GLOSSARY OF TERMS

Total Pension Expense The total pension expense is the sum of the following items that are recognized at the end of the employer's fiscal year:

1. Service Cost
2. Interest on the Total Pension Liability
3. Current-Period Changes in Benefit Terms
4. Employee Contributions
5. Projected Earnings on Plan Investments
6. Pension Plan Administrative Expense
7. Other Changes in Plan Fiduciary Net Position
8. Recognition of Outflow (Inflow) of Resources due to the difference between expected and actual in measurement of the Total Pension Liability
9. Recognition of Outflow (Inflow) of Resources due to Assumption Changes
10. Recognition of Outflow (Inflow) of Resources due to the difference between projected and actual earnings on pension plan investments

Total Pension Liability (TPL) The TPL is the portion of the actuarial present value of projected benefit payments that is attributed to past periods of member service.

Unfunded Actuarial Accrued Liability (UAAL) The UAAL is the difference between actuarial accrued liability and valuation assets.

Valuation Assets The valuation assets are the plan fiduciary net position used in determining the net position liability of the plan. For purposes of the GASB Statement No. 67, the asset valuation method is equal to the market value of assets.

Gabriel Roeder Smith & Company
Consultants & Actuaries

MINNESOTA STATE RETIREMENT SYSTEM
STATE PATROL RETIREMENT FUND

GASB STATEMENT NOS. 67 AND 68 ACCOUNTING AND FINANCIAL REPORTING FOR PENSIONS

JUNE 30, 2016

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December 1, 2016

Minnesota State Retirement System
State Patrol Retirement Fund
St. Paul, Minnesota

Dear Board of Directors:

This report provides accounting and financial reporting information that is intended to comply with the Governmental Accounting Standards Board (GASB) Statements No. 67 and No. 68 for the State Patrol Retirement Fund ("SPRF"), as amended by Statement No. 82. These calculations have been made on a basis that is consistent with our understanding of these accounting standards.

GASB Statement No. 67 is the accounting standard that applies to the financial reports issued by retirement systems. GASB Statement No. 68 establishes accounting and financial reporting for state and local government employers who provide their employees (including former employees) pension benefits through a trust. GASB Statement No. 82 is an amendment to Statements No. 67, No. 68, and No. 73, intended to improve consistency in the application of the accounting statements.

Our calculation of the liability associated with the benefits described in this report was performed for the purpose of providing financial reporting and disclosure information that satisfies the requirements of GASB Statements No. 67 and No. 68. The Net Pension Liability is not an appropriate measure for measuring the sufficiency of plan assets to cover the estimated cost of settling the employer's benefit obligation. The Net Pension Liability is not an appropriate measure for assessing the need for or amount of future employer contributions. The calculation of the plan's liability for this report may not be applicable for funding purposes of the plan. A calculation of the plan's liability for purposes other than satisfying the requirements of GASB Statement No. 67 may produce significantly different results. The information in this report is calculated on a total plan basis. MSRS is responsible for preparing the Schedule of Employer Allocations and the Schedule of Pension Amounts by Employer, as applicable. This report may be provided to parties other than the Minnesota State Retirement System (MSRS) only in its entirety and only with the permission of MSRS. GRS is not responsible for unauthorized use of this report.

This report is based upon information, furnished to us by MSRS, concerning retirement and ancillary benefits, active members, deferred vested members, retirees and beneficiaries, and financial data. If your understanding of this information is different, please let us know. This information was checked for internal consistency, but it was not audited.

This report complements the actuarial valuation report for funding purposes that was or will be provided to the System and should be considered in conjunction with that report. Please see the actuarial valuation report as of June 30, 2016 for additional discussion of the nature of actuarial calculations and more information related to participant data, economic and demographic assumptions, and benefit provisions.

To the best of our knowledge, the information contained within this report is accurate and fairly represents the actuarial position of the State Patrol Retirement Fund as of the measurement date. All calculations have been made in conformity with generally accepted actuarial principles and practices as well as with the Actuarial Standards of Practice issued by the Actuarial Standards Board.

The signing actuaries are independent of the plan sponsor.

Brian B. Murphy and Bonita J. Wurst 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.

Respectfully submitted,

Bonita J. Wurst

Bonita J. Wurst, ASA, EA, FCA, MAAA

Brian B. Murphy

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

BJW/BBM:sc

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SECTION A

EXECUTIVE SUMMARY

EXECUTIVE SUMMARY
AS OF JUNE 30, 2016 (DOLLARS IN THOUSANDS)

	2016
Actuarial Valuation Date	June 30, 2016
Measurement Date of the Net Pension Liability	June 30, 2016
Membership	
Number of	
- Service Retirements	844
- Survivors	151
- Disability Retirements	53
- Deferred Retirements	55
- Terminated other non-vested	20
- Active Members	892
- Total	2,015
Covered-employee Payroll [1]	$ 69,343
Net Pension Liability	
Total Pension Liability	$ 1,122,970
Plan Fiduciary Net Position	629,992
Net Pension Liability	$ 492,978
Plan Fiduciary Net Position as a Percentage of Total Pension Liability	56.10%
Net Pension Liability as a Percentage of Covered-employee Payroll	710.93%
Development of the Single Discount Rate	
Single Discount Rate	5.31%
Long-Term Expected Rate of Investment Return	7.50%
Long-Term Municipal Bond Rate[2]	2.85%
Last year ending June 30 in the 2017 to 2116 projection period for which projected benefit payments are fully funded	2052
Total Pension Expense / (Income)	$ 68,951

Deferred Outflows and Deferred Inflows of Resources by Source Arising from Current and Prior Periods to be Recognized in Future Pension Expenses

	Deferred Outflows of Resources	Deferred Inflows of Resources
Difference between expected and actual experience in the measurement of Total Pension Liability	$ -	$ 29,972
Changes in assumptions	251,348	-
Net difference between projected and actual earnings on pension plan investments	55,088	24,652
Totals	$ 306,436	$ 54,624

(1) *Assumed equal to actual member contributions divided by employee contribution rate.*
(2) *Based on Bond Buyer 20-Bond Index of general obligation municipal bonds as of June 30, 2016.*

DISCUSSION

Accounting Standard

For pension plans that are administered through trusts or equivalent arrangements, Governmental Accounting Standards Board (GASB) Statement No. 67, *Financial Reporting for Pension Plans*, establishes standards of financial reporting for separately issued financial reports and specifies the required approach for measuring the pension liability. Similarly, GASB Statement No. 68, *Accounting and Financial Reporting for Pensions,* establishes standards for state and local government employers (as well as non-employer contributing entities) to account for and disclose the net pension liability, pension expense, and other information associated with providing retirement benefits to their employees (and former employees) on their basic financial statements. Governmental Accounting Standards Board (GASB) Statement No. 82, Pension Issues, is an amendment to Statements No. 67, No. 68, and No. 73, intended to improve consistency in the application of the accounting standards.

The following discussion provides a summary of the information that is required to be disclosed under these accounting standards. A number of these disclosure items are provided in this report. However, certain information, such as notes regarding accounting policies and investments, is not included in this report and the retirement system and/or plan sponsor will be responsible for preparing and disclosing that information to comply with these accounting standards.

Financial Statements

GASB Statement No. 68 requires state and local governmental employers to recognize the net pension liability and the pension expense on their financial statements. The net pension liability is the difference between the total pension liability and the plan's fiduciary net position. In traditional actuarial terms, this is analogous to the accrued liability less the market value of assets (not the smoothed actuarial value of assets that is often encountered in actuarial valuations performed to determine the employer's contribution requirement).

Paragraph 57 of GASB Statement No. 68 states, "Contributions to the pension plan from the employer subsequent to the measurement date of the collective net pension liability and before the end of the employer's reporting period should be reported as a deferred outflow of resources related to pensions." The information contained in this report does not incorporate any contributions made to SPRF subsequent to the measurement date of June 30, 2016.

The pension expense or income recognized each fiscal year is equal to the change in the net pension liability from the beginning of the year to the end of the year, adjusted for deferred recognition of the difference between expected and actual experience in the measurement of the total pension liability, assumption changes, and investment experience.

Pension plans that prepare their own, stand-alone financial statements are required to present two financial statements – a Statement of Fiduciary Net Position and a Statement of Changes in Fiduciary Net Position in accordance with GASB Statement No. 67. The *Statement of Fiduciary Net Position* presents the assets and liabilities of the pension plan at the end of the pension plan's reporting period. The *Statement of Changes in Fiduciary Net Position* presents the additions, such as contributions and investment income, and deductions, such as benefit payments and expenses, and net increase or decrease in the fiduciary net position.

Notes to Financial Statements

GASB Statement No. 68 requires the notes of the employer's financial statements to disclose the total pension expense, the pension plan's liabilities and assets, and deferred outflows and inflows of resources related to pensions.

GASB Statement Nos. 67 and 68 require the notes of the financial statements for the employers and pension plans to include certain descriptive information about the pension plans through which the pension benefits are provided. The list of disclosure items should include:

- a description of benefits provided by the plan;
- the classes of employees and number of members covered by the pension plan;
- a description of the plan's funding policy, which includes member and employer contribution requirements;
- the pension plan's investment policies;
- the pension plan's fiduciary net position, net pension liability, and the pension plan's fiduciary net position as a percentage of the total pension liability;
- the net pension liability using a discount rate that is 1% higher and 1% lower than the current discount rate used to calculate the total pension liability and net pension liability for financial reporting purposes;
- significant assumptions and methods used to calculate the total pension liability;
- inputs to the discount rates; and
- certain information about mortality assumptions and the dates of experience studies.

Retirement systems that issue stand-alone financial statements are required to disclose additional information in accordance with GASB Statement No. 67. This information includes:

- the composition of the pension plan's Board and the authority under which benefit terms may be amended;
- a description of how fair value is determined;
- information regarding certain reserves and investments, which include concentrations of investments greater than or equal to 5%, receivables, and insurance contracts excluded from plan assets; and
- annual money-weighted rate of return.

MSRS' comprehensive annual financial report, which contains the basic financial statements and related note disclosures for the State Patrol Retirement Fund can be found online at www.msrs.state.mn.us/financial-information or obtained from MSRS at 60 Empire Drive, Suite 300, St. Paul, MN, 55103 or requested via email at info@msrs.us or telephone at 1-800-657-5757.

Required Supplementary Information

GASB Statement No. 67 requires a 10-year fiscal history of:

- sources of changes in the net pension liability;
- information about the components of the net pension liability and related ratios, including the pension plan's fiduciary net position as a percentage of the total pension liability, and the net pension liability as a percent of covered-employee payroll; and
- a comparison of the actual employer contributions to the actuarially determined contributions based on the plan's funding policy.

Measurement of the Net Pension Liability

The net pension liability is to be measured as the total pension liability, less the amount of the pension plan's fiduciary net position. In actuarial terms, this will be the accrued liability less the market value of assets (not the smoothed actuarial value of assets that is often encountered in actuarial valuations performed to determine the employer's contribution requirement).

General Implications of Contribution Allocation Procedure or Funding Policy on Future Expected Plan Contributions and Funded Status

Given the plan's contribution allocation procedure, if all actuarial assumptions are met (including the assumption of the plan earning 7.50% on the actuarial value of assets), then the following outcomes are expected:

1. The employer normal cost as a percentage of pay is expected to remain approximately level as a percentage of payroll.
2. The unfunded actuarial accrued liabilities will increase and not be eliminated.
3. The funded status of the plan will decrease.
4. The plan may eventually become insolvent and unable to pay benefits.

The projections in this report are strictly for the purpose of determining the GASB single discount rate and are different from a funding projection for the ongoing plan.

Limitations of Funded Status Measurements

Unless otherwise indicated, a funded status measurement presented in this report is based upon the actuarial accrued liability and the actuarial value of assets. Unless otherwise indicated, with regard to any funded status measurements presented in this report:

(1) The measurement is inappropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations, in other words of transferring the obligations to an unrelated third party in an arm's length market value type transaction.

(2) The measurement is dependent upon the actuarial cost method which, in combination with the plan's amortization policy, affects the timing and amounts of future contributions. The amounts of future contributions will most certainly differ from those assumed in this report due to future actual experience differing from assumed experience based upon the actuarial assumptions. A funded status measurement in this report of 100% is not synonymous with no required future contributions. If the funded status were 100%, the plan would still require future normal cost contributions (i.e., contributions to cover the cost of the active membership accruing an additional year of service credit).

(3) The measurement would produce a different result if the market value of assets were used instead of the actuarial value of assets, unless the market value of assets is used in the measurement.

Limitation of Project Scope

Actuarial standards do not require the actuary to evaluate the ability of the plan sponsor or other contributing entity to make required contributions to the plan when due. Such an evaluation was not within the scope of this project and is not within the actuary's domain of expertise. Consequently, the actuary performed no such evaluation.

Timing of the Valuation

GASB Statements Nos. 67 and 68 require that an actuarial valuation to determine the total pension liability be performed at least every two years. The net pension liability and pension expense should be measured as of the pension plan's fiscal year end (measurement date) on a date that is within the employer's prior fiscal year. If the actuarial valuation used to determine the total pension liability is not calculated as of the measurement date, the total pension liability is required to be rolled forward from the actuarial valuation date to the measurement date.

The total pension liability shown in this report is based on an actuarial valuation performed as of June 30, 2016 and a measurement date of June 30, 2016.

Single Discount Rate

Projected benefit payments are required to be discounted to their actuarial present values using a Single Discount Rate that reflects (1) a long-term expected rate of return on pension plan investments (to the extent that the plan's fiduciary net position is projected to be sufficient to pay benefits) and (2) tax-exempt municipal bond rate based on an index of 20-year general obligation bonds with an average AA credit rating as of the measurement date (to the extent that the contributions for use with the long-term expected rate of return are not met).

For the purpose of this valuation, the expected rate of return on pension plan investments is 5.31%; the municipal bond rate is 2.85% (based on the weekly rate closest to but not later than the measurement date of the Bond Buyer 20-Year GO Index); and the resulting Single Discount Rate is 5.31%. The long-term expected rate of return is based on a review of inflation and investment assumptions, dated September 11, 2014, and a recent asset liability study obtained by the Minnesota Board of Investments.

Effective Date and Transition

GASB Statement Nos. 67 and 68 are effective for fiscal years beginning after June 15, 2013, and June 15, 2014 respectively. Earlier application is encouraged by the GASB. MSRS first implemented GASB Statement No. 67 for fiscal year 2014.

SECTION B

FINANCIAL STATEMENTS

PENSION EXPENSE UNDER GASB STATEMENT NO. 68
FISCAL YEAR ENDED JUNE 30, 2016 (DOLLARS IN THOUSANDS)

A. Expense

1.	Service Cost	$	16,555
2.	Interest on the Total Pension Liability		64,592
3.	Current-Period Benefit Changes		0
4.	Employee Contributions (made negative for addition here)		(9,292)
5.	Projected Earnings on Plan Investments (made negative for addition here)		(51,164)
6.	Pension Plan Administrative Expense		220
7.	Other Changes in Plan Fiduciary Net Position		0
8.	Recognition of Outflow (Inflow) of Resources due to differences between expected and actual experience in the measurement of the Total Pension Liability		
	Arising from Current Reporting Period		(3,704)
9.	Recognition of Outflow (Inflow) of Resources due to assumption changes		
	Arising from Current Reporting Period		47,264
10.	Recognition of Outflow (Inflow) of Resources due to the difference between projected (7.90%) and actual earnings on Pension Plan Investments		
	Arising from Current Reporting Period		10,388
11.	**Increases/(Decreases) from Experience in the Current Reporting Period**	**$**	**74,859**
12.	Recognition of Outflow (Inflow) of Resources due to differences between expected and actual experience in the measurement of the Total Pension Liability		
	Arising from Prior Reporting Periods		(3,105)
13.	Recognition of Outflow (Inflow) of Resources due to assumption changes		
	Arising from Prior Reporting Periods		5,010
14.	Recognition of Outflow (Inflow) of Resources due to the difference between projected (7.90%) and actual earnings on Pension Plan Investments		
	Arising from Prior Reporting Periods		(7,813)
15.	**Total Pension Expense / (Income)**	**$**	**68,951**

Statement of Outflows and Inflows Arising from Current Reporting Period Fiscal Year Ended June 30, 2016 (Dollars in Thousands)

A. Outflows (Inflows) of Resources due to Liabilities		
1. Difference between expected and actual experience of the Total Pension Liability (gains) or losses	$	(22,222)
2. Assumption Changes (gains) or losses	$	283,584
3. Recognition period for Liabilities: Average of the expected remaining service lives of all employees {in years, rounded to the nearest whole number}		6.0000
4. Outflow (Inflow) of Resources to be recognized in the current pension expense for the difference between expected and actual experience of the Total Pension Liability	$	(3,704)
5. Outflow (Inflow) of Resources to be recognized in the current pension expense for Assumption Changes	$	47,264
6. Outflow (Inflow) of Resources to be recognized in the current pension expense due to Liabilities	$	43,560
7. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses for the difference between expected and actual experience of the Total Pension Liability	$	(18,518)
8. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses for Assumption Changes	$	236,320
9. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses due to Liabilities	$	217,802
B. Outflows (Inflows) of Resources due to Assets		
1. Net difference between projected and actual earnings on pension plan investments (gains) or losses	$	51,938
2. Recognition period for Assets {in years}		5.0000
3. Outflow (Inflow) of Resources to be recognized in the current pension expense due to Assets	$	10,388
4. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses due to Assets	$	41,550

STATEMENT OF OUTFLOWS AND INFLOWS ARISING FROM CURRENT AND PRIOR REPORTING PERIODS FISCAL YEAR ENDED JUNE 30, 2016 (DOLLARS IN THOUSANDS)

A. Outflows and Inflows of Resources due to Liabilities and Assets to be Recognized in Current Pension Expense

	Outflows of Resources	Inflows of Resources	Net Outflows/(Inflows) of Resources
1. Due to Liabilities	$ 52,274	$ 6,809	$ 45,465
2. Due to Assets	14,901	12,326	2,575
3. Total	$ 67,175	$ 19,135	$ 48,040

B. Outflows and Inflows of Resources by Source to be Recognized in Current Pension Expense

	Outflows of Resources	Inflows of Resources	Net Outflows/(Inflows) of Resources
1. Differences between expected and actual experience	$ -	$ 6,809	$ (6,809)
2. Assumption Changes	52,274	-	52,274
3. Net Difference between projected and actual earnings on pension plan investments	$ 14,901	12,326	2,575
4. Total	$ 67,175	$ 19,135	$ 48,040

C. Deferred Outflows and Deferred Inflows of Resources by Source to be Recognized in Future Pension Expenses

	Deferred Outflows of Resources	Deferred Inflows of Resources	Net Deferred Outflows/ (Inflows) of Resources
1. Differences between expected and actual experience	$ -	$ 29,972	$ (29,972)
2. Assumption Changes	251,348	-	251,348
3. Net Difference between projected and actual earnings on pension plan investments	55,088	24,652	30,436
4. Total	$ 306,436	$ 54,624	$ 251,812

D. Deferred Outflows and Deferred Inflows of Resources by Year to be Recognized in Future Pension Expenses

Year Ending June 30	Net Deferred Outflows/ (Inflows) of Resources
2017	$ 48,040
2018	48,040
2019	60,364
2020	51,808
2021	43,560
Thereafter	-
Total	$ 251,812

STATEMENT OF FIDUCIARY NET POSITION AS OF JUNE 30, 2016 (DOLLARS IN THOUSANDS)

Assets		**June 30, 2016**
Cash & Short-term Investments	$	14,684
Receivables		1,136
Investment Pools (at fair value)		614,571
Securities Lending Collateral		89,099
Capital Assets		0
Total Assets	**$**	**719,490**
Total Deferred Outflows of Resources	**$**	**0**
Total Liabilities	**$**	**(89,498)**
Total Deferred Inflows of Resources	**$**	**0**
Net Position Restricted for Pensions	**$**	**629,992**

STATEMENT OF CHANGES IN FIDUCIARY NET POSITION FOR YEAR ENDED JUNE 30, 2016 (DOLLARS IN THOUSANDS)

1.	**Net Position at market value at beginning of year**	**$**	**664,530**
Additions			
2.	Contributions		
	a. Employee	$	9,292
	b. Employer		13,938
	c. Other sources - Supplemental State Aid		1,000
	d. Total contributions	$	24,230
3.	Investment income		
	a. Investment income/(loss)	$	73
	b. Investment expenses		(847)
	c. Net investment income/(loss)	$	(774)
4.	Other Additions		-
5.	**Total Additions** *(2.d.) + (3.c.) + (4.)*	**$**	**23,456**
Deductions			
6.	Benefits Paid		
	a. Annuity benefits	$	(57,695)
	b. Refunds	$	(79)
	c. Total benefits paid	$	(57,774)
7.	Expenses		
	a. Other deductions	$	-
	b. Administrative		(220)
	c. Total expenses	$	(220)
8.	**Total Deductions** *(6.c.) + (7.c.)*	**$**	**(57,994)**
9.	**Net increase/(decrease) in fiduciary net position** *(5.) + (8.)*	**$**	**(34,538)**
10.	**Net position at market value at end of year** *(1.) + (9.)*	**$**	**629,992**
11.	State Board of Investment calculated annual investment return		-0.1%

SECTION C

REQUIRED SUPPLEMENTARY INFORMATION

SCHEDULE OF CHANGES IN NET PENSION LIABILITY AND RELATED RATIOS CURRENT PERIOD

FISCAL YEAR ENDED JUNE 30, 2016 (DOLLARS IN THOUSANDS)

A. Total pension liability		
1. Service Cost	$	16,555
2. Interest on the Total Pension Liability		64,592
3. Changes of benefit terms		-
4. Difference between expected and actual experience of the Total Pension Liability (1)		(22,222)
5. Changes of assumptions		283,584
6. Benefit payments, including refunds of employee contributions		(57,774)
7. Net change in total pension liability	$	284,735
8. Total pension liability – beginning		838,235
9. Total pension liability – ending	**$**	**1,122,970**
B. Plan fiduciary net position		
1. Contributions – employer (2)	$	14,938
2. Contributions – employee		9,292
3. Net investment income		(774)
4. Benefit payments, including refunds of employee contributions		(57,774)
5. Pension Plan Administrative Expense		(220)
6. Other changes		-
7. Net change in plan fiduciary net position	$	(34,538)
8. Plan fiduciary net position – beginning		664,530
9. Plan fiduciary net position – ending	**$**	**629,992**
C. Net pension liability, *A.9. - B.9.*	**$**	**492,978**
D. Plan fiduciary net position as a percentage of the total pension liability, *B.9. / A.9.*		**56.10%**
E. Covered-employee payroll (3)	**$**	**69,343**
F. Net pension liability as a percentage of covered-employee payroll, *C. / E.*		**710.93%**

(1) Includes impact of changes in expected timing of future post-retirement benefit increases.
(2) Includes $1 million supplemental state aid.
(3) Assumed equal to actual member contributions divided by employee contribution rate.

SCHEDULES OF REQUIRED SUPPLEMENTARY INFORMATION

SCHEDULE OF CHANGES IN NET PENSION LIABILITY AND RELATED RATIOS MULTIYEAR (DOLLARS IN THOUSANDS)

Last 10 Fiscal Years (which will be built prospectively)

Fiscal year ending June 30,	2016	2015	2014	2013	2012	2011	2010	2009	2008	2007
Total Pension Liability										
Service Cost	$ 16,555	$ 16,144	$ 14,514							
Interest on the Total Pension Liability	64,592	63,753	60,183							
Benefit Changes	0	0	0							
Difference between Expected and Actual Experience	(22,222)	(12,855)	(5,771)							
Assumption Changes	283,584	0	30,058							
Benefit Payments	(57,695)	(55,465)	(53,697)							
Refunds	(79)	(15)	(25)							
Net Change in Total Pension Liability	$ 284,735	$ 11,562	$ 45,262							
Total Pension Liability - Beginning	838,235	826,673	781,411							
Total Pension Liability - Ending (a)	**$ 1,122,970**	**$ 838,235**	**$ 826,673**							
Plan Fiduciary Net Position										
Employer Contributions [(1)]	$ 14,938	$ 14,763	$ 12,894							
Employee Contributions	9,292	9,174	7,930							
Pension Plan Net Investment Income	(774)	28,903	107,187							
Benefit Payments	(57,695)	(55,465)	(53,697)							
Refunds	(79)	(15)	(25)							
Pension Plan Administrative Expense	(220)	(170)	(150)							
Other	0	0	0							
Net Change in Plan Fiduciary Net Position	**$ (34,538)**	**$ (2,810)**	**$ 74,139**							
Plan Fiduciary Net Position - Beginning	**664,530**	**667,340**	**593,201**							
Plan Fiduciary Net Position - Ending (b)	**$ 629,992**	**$ 664,530**	**$ 667,340**							
Net Pension Liability - Ending (a) - (b)	**$ 492,978**	**$ 173,705**	**$ 159,333**							
Plan Fiduciary Net Position as a Percentage of Total Pension Liability	**56.10 %**	**79.28 %**	**80.73 %**							
Covered-Employee Payroll [(2)]	**$ 69,343**	**$ 68,463**	**$ 63,952**							
Net Pension Liability as a Percentage of Covered-Employee Payroll	**710.93 %**	**253.72 %**	**249.15 %**							

Notes to Schedule:

(1) Includes $1 million supplemental state aid.

(2) Assumed equal to actual member contributions divided by employee contribution rate.

Schedules of Required Supplementary Information
Schedule of Net Pension Liability Multiyear
(Dollars in Thousands)

Last 10 Fiscal Years (which will be built prospectively)

Fiscal Year Ending June 30,	Total Pension Liability	Plan Net Position	Net Pension Liability	Plan Net Position as a % of Total Pension Liability	Covered-Employee Payroll	Net Pension Liability as a % of Covered-Employee Payroll
	(a)	(b)	(a) - (b) = (c)	(b) / (c)	(d)	(c) / (d)
2007						
2008						
2009						
2010						
2011						
2012						
2013						
2014	$ 826,673	$ 667,340	$ 159,333	80.73%	$ 63,952	249.14%
2015	838,235	664,530	173,705	79.28%	68,463	253.72%
2016	1,122,970	629,992	492,978	56.10%	69,343	710.93%

SCHEDULE OF CONTRIBUTIONS MULTIYEAR (DOLLARS IN THOUSANDS)

Last 10 Fiscal Years

Fiscal Year Ending June 30,	Actuarially Determined Contribution (1)	Actual Contributions	Contribution Deficiency (Excess)	Covered-Employee Payroll	Actual Contribution as a % of Covered-Employee Payroll
	(a)	(b)	(a) - (b) = (c)	(d)	(b) / (d)
2007	$ 11,427	$ 7,461	$ 3,966	$ 61,498	12.13%
2008	12,355	8,279	4,076	60,029	13.79
2009	14,999	9,178	5,821	61,511	14.92
2010	17,410	10,104	7,306	63,250	15.97
2011	14,826	9,873	4,953	63,250	15.61
2012	14,912	11,620	3,292	62,524 (2)	18.58
2013	18,711	11,482	7,229	62,121 (2)	18.48
2014	18,444	12,894 (3)	5,550	63,952 (2)	20.16
2015	20,648	14,763 (3)	5,885	68,463 (2)	21.56
2016	20,463	14,938 (3)	5,525	69,343 (2)	21.54

NOTES TO SCHEDULE OF CONTRIBUTIONS

Valuation Date:	June 30, 2016
Notes	(1) Actuarially determined contribution rates are calculated as of each June 30 and apply to the fiscal year beginning on the day after the measurement date. (2) Assumed equal to actual member contributions divided by employee contribution rate. (3) Includes supplemental state aid of $1,000.

Methods and Assumptions Used to Determine Contribution Rates Reported in this Schedule:

Actuarial Cost Method	Entry Age Normal
Amortization Method	Level Percentage of Payroll, Closed
Remaining Amortization Period	22 years
Asset Valuation Method	5-Year smoothed market; no corridor
Inflation	2.75%
Payroll Growth	3.50%
Salary Increases	Service based tables ranging from 7.75% with one year of service to 3.75% with 21 or more years of service, including inflation
Investment Rate of Return	8.00%
Retirement Age	Experience-based table of rates that are specific to the type of eligibility condition. Last updated for the 2012 valuation pursuant to an experience study of the period 2006 - 2011, prepared by a former actuary.
Healthy Post-retirement Mortality	RP-2000 annuitant generational mortality table, projected with mortality improvement scale AA, white collar adjustment, set back two years for males and set forward one year for females.

Other Information:

Benefit Increases After Retirement	The post-retirement benefit increase is assumed to be 1.00% through 2044, 1.50% from 2045 through 2061 and 2.50% thereafter. See separate funding actuarial valuation report as of July 1, 2016 for additional detail. To obtain this report, contact MSRS as noted on page 3. The report is also available online at www.msrs.state.mn.us/actuarial-reports.

Schedule of Investment Returns Multiyear

Last 10 Fiscal Years

Fiscal Year Ending June 30,	Annual Return[1]
2007	
2008	
2009	
2010	
2011	
2012	
2013	
2014	18.69 %
2015	4.46
2016	(0.12)

[1] *Annual money-weighted rate of return, net of investment expenses.*

The Minnesota State Board of Investment (SBI) compiled this data and the related investment notes and provided it to MSRS for GASB-compliance purposes. MSRS furnished this information to us for inclusion within this report. We did not audit this information. We are not responsible for its accuracy or completeness.

Rate of Return

For the fiscal year ended June 30, 2016, the annual money-weighted rate of return for the State Patrol Retirement Fund was (0.12)%. The money-weighted rate of return is a method of calculating period-by-period returns on pension plan investments that adjusts for the changing amounts actually invested. For purposes of this schedule, the money-weighted rate of return is calculated as the internal rate of return on pension plan investments, net of pension plan investment expense.

10-Year Schedule of Money-Weighted Investment Return

Ten-year data is not available. Additional years will be provided when they become available.

To request additional information about the computation of the annual money-weighted rate of return and the investments for the Minnesota Retirement Systems (including the investments for MSRS' defined benefit retirement funds), contact SBI at 60 Empire Drive, Suite 355, St. Paul, Minnesota, 55103, via email at minn.sbi@state.mn.us or telephone at (651) 296-3328.

SECTION D

ADDITIONAL FINANCIAL STATEMENT DISCLOSURES

ASSET ALLOCATION

Long-Term Expected Return on Plan Assets

The long-term expected rate of return on pension plan investments was determined using a building-block method. Best estimates for expected future real rates of return (expected returns, net of inflation) were developed for each asset class using both long-term historical returns and long-term capital market expectation from a number of investment management and consulting organizations. The asset class estimates and the target allocations were then combined to produce a geometric, long-term expected rate of return for the portfolio. Inflation expectations were applied to derive the nominal rate of return for the portfolio. For each major asset class that is included in the pension fund's target asset allocation as of June 30, 2016, these best estimates are summarized in the following table:

Asset Class	Target Allocation	Long-Term Expected Real Rate of Return (Geometric)
Domestic Stocks	45.00%	5.50%
International Stocks	15.00%	6.00%
Bonds	18.00%	1.45%
Alternative Assets	20.00%	6.40%
Unallocated Cash	2.00%	0.50%
Total	100.00%	

The Minnesota State Board of Investment (SBI) compiled this data and the related investment notes and provided it to MSRS for GASB-compliance purposes. MSRS furnished this information to us for inclusion within this report. We did not audit this information. We are not responsible for its accuracy or completeness.

At MSRS' direction, for purposes of this valuation, the long-term expected rate of return assumption is 7.50%. This assumption is based on a review of inflation and investment return assumptions dated September 11, 2014, and a recent asset liability study obtained by the SBI.

Single Discount Rate

A Single Discount Rate of 5.31% was used to measure the total pension liability. This Single Discount Rate was based on the expected rate of return on pension plan investments of 7.50% and a municipal bond rate of 2.85%. The projection of cash flows used to determine this Single Discount Rate assumed that employee and employer contributions will be made at the current statutory contribution rates. Based on these assumptions, the pension plan's fiduciary net position and future contributions were sufficient to finance the benefit payments through the year ending June 30, 2052. As a result, the long-term expected rate of return on pension plan investments was applied to projected benefit payments through the year ending June 30, 2052, and the municipal bond rate was applied to all benefit payments after the point of asset depletion.

Regarding the sensitivity of the net pension liability to changes in the Single Discount Rate, the following presents the plan's net pension liability, calculated using a Single Discount Rate of 5.31%, as well as what the plan's net pension liability would be if it were calculated using a Single Discount Rate that is one percent lower (4.31%) or one percent higher (6.31%):

Sensitivity of Net Pension Liability
to the Single Discount Rate Assumption

(Dollars in Thousands)

	1% Decrease 4.31%	Current Single Discount Rate Assumption 5.31%	1% Increase 6.31%
Total Pension Liability	$1,278,614	$1,122,970	$995,912
Net Position Restricted for Pensions	629,992	629,992	629,992
Net Pension Liability	**$ 648,622**	**$ 492,978**	**$365,920**

For more information on the calculation of the single discount rate, refer to Section G of this report.

GASB Statement No. 68 Reconciliation (Dollars in Thousands)

	Total Pension Liability (a)	Plan Fiduciary Net Position (b)	Net Pension Liability (a) - (b)	Deferred Outflows	Deferred Inflows	Total Pension Expense
Balance Beginning of Year	**$ 838,235**	**$ 664,530**	**$ 173,705**	**$ 38,089**	**$ 51,537**	
Changes for the Year:						
Service Cost	$ 16,555		$ 16,555			$ 16,555
Interest on Total Pension Liability	64,592		64,592			64,592
Interest on Fiduciary Net Position (1)		$ 51,164	(51,164)			(51,164)
Changes in Benefit Terms						
Liability Experience Gains and Losses	(22,222)		(22,222)		$ 18,518	(3,704)
Changes in Assumptions	283,584		283,584	$ 236,320		47,264
Recognition of Deferred Outflows/(Inflows) of Resources Arising from Prior Reporting Periods						
Liability Experience Gains/(Losses)					(3,105)	(3,105)
Assumption Changes				(5,010)		5,010
Investment Gains/(Losses)				(4,513)	(12,326)	(7,813)
Contributions - Employer (2)		14,938	(14,938)			
Contributions - Employees		9,292	(9,292)			(9,292)
Asset Gain/(Loss)(1)		(51,938)	51,938	41,550		10,388
Benefit Payments and Refunds	(57,774)	(57,774)	-			
Administrative Expenses		(220)	220			220
Other changes		-	-			-
Net Changes	**$ 284,735**	**$ (34,538)**	**$ 319,273**	**$ 268,347**	**$ 3,087**	**$ 68,951**
Balance End of Year	**$ 1,122,970**	**$ 629,992**	**$ 492,978**	**$ 306,436**	**$ 54,624**	

(1) *The sum of these items equals the net investment income of $(774).*
(2) *Includes supplemental state aid of $1,000.*

SUMMARY OF POPULATION STATISTICS

		Terminated		Recipients			
	Actives	Deferred Retirement	Other Non-Vested	Service Retirement	Disability Retirement	Survivor	Total
Members on 7/1/2015	**843**	**52**	**17**	**816**	**57**	**154**	**1,939**
New Members	94	0	0	0	0	0	**94**
Return to active	1	(1)	0	0	0	0	**0**
Terminated non-vested	(4)	0	4	0	0	0	**0**
Service retirements	(35)	(2)	0	37	0	0	**0**
Terminated deferred	(5)	5	0	0	0	0	**0**
Terminated refund/transfer	(2)	0	(2)	0	0	0	**(4)**
Deaths	0	0	0	(16)	(4)	(9)	**(29)**
New beneficiary	0	0	0	0	0	7	**7**
Disabled	0	0	0	0	0	0	**0**
Unexpected status change	0	1	1	7	0	(1)	**8**
Net change	49	3	3	28	(4)	(3)	**76**
Members on 6/30/2016	**892**	**55**	**20**	**844**	**53**	**151**	**2,015**

SECTION E

SUMMARY OF BENEFITS

SUMMARY OF PLAN PROVISIONS

Following is a summary of the major plan provisions used in the valuation of this report. MSRS is solely responsible for the validity, accuracy and comprehensiveness of this information. If any of the plan provisions shown below are not accurate and complete, the valuation results may differ significantly from those shown in this report and may require a revision of this report.

Plan year	July 1 through June 30
Eligibility	State troopers, conservation officers, certain crime bureau and gambling enforcement officers, and certain other persons listed in Minnesota Statutes 352B.011 subdivision 10.
Contributions	Percent of Salary **Effective Date** / **Member** / **Employer** July 1, 2014 – June 30, 2016: 13.40% / 20.10% July 1, 2016 and later: 14.40% / 21.60% Member contributions are "picked up" according to the provisions of Internal Revenue Code 414(h).
State Contributions	$1 million paid annually on October 1 until both the Public Employees Retirement Association Police and Fire Plan and the State Patrol Retirement Fund become 90% funded (on a Market Value of Assets basis).
Allowable service	Service during which member contributions were deducted. Includes period receiving temporary Worker's Compensation and reduced salary from employer. See Normal Retirement benefit definition below for information about service limits.
Salary	Salaries excluding lump sum payments at separation.
Average salary	Average of the five highest years of Salary. Average Salary is based on all Allowable Service if less than five years. Average Salary is based on all years without regard to any service limits.
Retirement	
Normal retirement benefit	
Age/Service requirement	Age 55 and three years (ten years if first hired after June 30, 2013) of Allowable Service.
Amount	3.00% of Average Salary for each year of Allowable Service up to 33 years. Members with at least 28 years of service as of July 1, 2013 are not subject to this service limit. Member contributions made after the service cap will be refunded at retirement.
Early retirement benefit	
Age/Service requirement	Age 50 and three years (ten years if first hired after June 30, 2013) of Allowable Service.
Amount	Normal Retirement Benefit based on Allowable Service and Average Salary at retirement reduced by 1/10% for each month that the member is under age 55. If the effective date of retirement is after June 30, 2015, the reduction is 0.34% for each month that the member is under age 55 at the time of retirement.

SUMMARY OF PLAN PROVISIONS (CONTINUED)

Retirement (Concluded)	
Form of payment	Life annuity. Actuarially equivalent options are: 50%, 75%, or 100% Joint and Survivor, or 15-year certain. If a Joint and Survivor benefit is elected and the beneficiary predeceases the annuitant, the annuitant's benefit increases to the Life Annuity amount. This "bounce back" is subsidized by the plan.
Benefit increases	Since January 1, 2014, benefit recipients receive annual 1.0% benefit increases. When the funding ratio reaches 85% for two consecutive years, the benefit increase will increase to 1.5%; the benefit will revert to 2.5% when the funding ratio reaches 90% for two consecutive years (actuarial accrued liability funding ratio determined using Market Value of Assets). If, after reverting to a 1.5% increase, the funding ratio declines to less than 75% for one year or 80% for two consecutive years, the benefit increase will decrease to 1.0%. A benefit recipient who has been receiving a benefit for at least 12 full months as of the June 30 of the calendar year immediately before the adjustment will receive a full increase. Members receiving benefits for at least one month but less than 12 full months as of the June 30 of the calendar year immediately before the adjustment will receive a pro rata increase.
Disability	
Occupational disability benefit	
Age/Service requirement	Member who cannot perform his duties as a direct result of a disability relating to an act of duty.
Amount	60% of Average Salary plus 3.00% of Average Salary for each year in excess of 20 years of Allowable Service (pro rata for completed months). Payments cease at age 65 (age 55 if disabled after June 30, 2015) or earlier if disability ceases or death occurs. Benefits may be paid upon re-employment but salary plus benefit cannot exceed current salary of position held at time of disability.
Non-duty disability benefit	
Age/Service requirement	At least one year of Allowable Service and disability not related to covered employment.
Amount	Normal Retirement Benefit based on Allowable Service (minimum of 15 years) and Average Salary at disability without reduction for commencement before age 55. Payments cease at age 65 (age 55 if disabled after June 30, 2015) or earlier if disability ceases or death occurs. Benefits may be paid upon re-employment but salary plus benefit cannot exceed current salary of position held at time of disability.

SUMMARY OF PLAN PROVISIONS (CONTINUED)

Disability (continued)

Retirement after disability	
Age/Service requirement	Age 65 (age 55 if disabled after June 30, 2015) with continued disability.
Amount	Optional annuity continues. Otherwise, normal retirement benefit equal to the disability benefit paid, or an actuarially equivalent option.
Form of payment	Same as for retirement.
Benefit increases	Same as for retirement.

Death

Surviving spouse benefit	
Age/Service requirement	Member who is active or receiving a disability benefit or former member.
Amount	50% of Average Salary if member was active or occupational disability and either had less than three years (five years if first hired after June 30, 2013) of Allowable Service or was under age 55. Annuity is paid for life. Surviving spouse receives the 100% joint and survivor benefit commencing on the member's 55th birthday if member was active or a disability with three years (five years if first hired after June 30, 2013) of Allowable Service. A spouse who had been receiving the 50% benefit shall be entitled to the greater benefit. The surviving spouse of a former member receives the 100% joint and survivor benefit commencing on the member's 55th birthday if former member had three years (five years if first hired after June 30, 2013) of Allowable Service.
Benefit increases	Same as for retirement.
Surviving dependent children’s benefit	
Age/Service requirement	Member who is active or receiving a disability benefit. Child must be unmarried, under age 18 (or 23 if full-time student) and dependent upon the member.
Amount	10% of Average Salary for each child and $20 per month prorated among all dependent children. Benefit must not be less than 50% nor exceed 70% of Average Salary.
Benefit increases	Same as for retirement.
Refund of contributions	
Age/Service requirement	Member dies before receiving any retirement benefits and survivor benefits are not payable.
Amount	Member contributions with 6.00% interest compounded daily until June 30, 2011 and 4.00% thereafter.

SUMMARY OF PLAN PROVISIONS (CONTINUED)

Termination	
Refund of contributions	
Age/service requirement	Termination of state service.
Amount	Member contributions with 6.00% interest compounded daily to June 30, 2011 and 4.00% thereafter. If a member is vested, a deferred annuity may be elected in lieu of a refund.
Deferred benefit	
Age/service requirement	Three years (ten years if first hired after June 30, 2013) of Allowable Service.
Amount	Benefit is computed under law in effect at termination and increased by the following annual augmentation percentage: (a.) 0.00% before July 1, 1971; (b.) 5.00% from July 1, 1971 to January 1, 1981; (c.) 3.00% thereafter (2.50% if hired after June 30, 2006) until January 1, 2012; and (d.) 2.00% after December 31, 2011 until the annuity begins. Amount is payable at normal or early retirement. If a member terminated employment prior to July 1, 1997 but was not eligible to commence their pension before July 1, 1997, an actuarial increase shall be made for the change in the post-retirement interest rates from 5.00% to 6.00%.
Optional form conversion factors	Actuarially equivalent factors based on RP-2000 for healthy annuitants, white collar adjustment, projected to 2027 using scale AA, set back two years for males and set forward one year for females, blended 95% males, and 6.5% interest.
Combined service annuity	Members are eligible for combined service benefits if they: (a.) Have sufficient allowable service in total that equals or exceeds the applicable service credit vesting requirement of the retirement plan with the longest applicable service credit vesting requirement; and (b.) Have at least six months of allowable service credit in each plan worked under; and (c.) Are not in receipt of a benefit from another plan, or have applied for benefits with an effective date within one year. Members who meet the above requirements must have their benefit based on the following: (a.) Allowable service in all covered plans are combined in order to determine eligibility for early retirement. (b.) Average salary is based on the high five consecutive years during their entire service in all covered plans.

SUMMARY OF PLAN PROVISIONS (CONCLUDED)

Contribution stabilizer	The following is a summary of the contribution stabilizer provisions in Minnesota Statute 352.045: • If a contribution sufficiency of at least 2.0% exists, member and employer contributions may be adjusted by the Board of Directors to a level necessary to maintain a 2.0% sufficiency. Member and employer contributions may not be less than the sum of normal cost and administrative expenses. Employer contributions must be equal to 60% of the sum of member and employer contributions. • If a contribution deficiency of at least 0.5% exists, member and employer contribution rates may be increased by the Board of Directors to eliminate the deficiency. Employer contributions must be equal to 60% of the sum of member and employer contributions. • Any adjustment to the contribution rates must be reported to the Legislative Commission on Pensions and Retirement (LCPR) by January 15 following the most recent valuation report. If the LCPR does not recommend against or alter the change in rates, the adjustment becomes effective on the first day of the first full payroll period of the next fiscal year.
Changes in plan provisions	There have been no changes in plan provisions since the prior valuation.

SECTION F

ACTUARIAL COST METHOD AND ACTUARIAL ASSUMPTIONS

ACTUARIAL METHODS USED FOR THE DETERMINATION OF TOTAL PENSION LIABILITY AND RELATED VALUES

Actuarial Cost Method

Normal cost and the allocation of benefit values between service rendered before and after the valuation date were determined using an **Individual Entry-Age Actuarial Cost Method** having the following characteristics:

(i) the annual normal cost for each individual active member, payable from the date of employment to the date of retirement, is sufficient to accumulate the value of the member's benefit at the time of retirement;

(ii) each annual normal cost is a constant percentage of the member's year by year projected covered pay.

Actuarial gains/(losses), as they occur, reduce (increase) the Total Pension Liability.

Valuation of Future Post-Retirement Benefit Increases

Benefit recipients receive a future annual 1.00% post-retirement benefit increase. If the funding ratio (based on the market value of assets) reaches 85% (based on a 1.50% post-retirement benefit increase assumption) for two consecutive years, the benefit increase will increase to 1.50%; if the funding ratio reaches 90% (based on a 2.50% post-retirement benefit increase assumption) for two consecutive years, the benefit increase revert to 2.50%. If, after reverting to a 1.50% benefit increase, the funding ratio declines to less than 75% for one year or less than 80% for two consecutive years, the benefit increase will decrease to 1.00%.

To determine an assumption regarding a future change in the post-retirement benefit increase, we performed a projection of liabilities and assets based on the following methods and assumptions:

- Future investment returns of 7.50%
- Liabilities and normal cost based on statutory funding assumptions
  - Discount rate of 8.00%
  - Statutory salary increases (rate of 7.75% at year 1 declining to 3.75% at years 21 and later)
- Open group; stable active population (new member profile based on average new members hired in recent years).
- The postretirement benefit increase rate is assumed to be 1.00% per year until the funding ratio threshold required to pay a 1.50% postretirement benefit increase is reached and is then assumed to be 1.50% until the threshold required to pay a 2.50% post-retirement increase is reached.
- Current statutory contributions (i.e. not including potential contribution increases under the contribution stabilizer statutes) as directed by MSRS.

Based on these assumptions and methods, the projection indicates that this plan is not expected to attain the funding ratio threshold required to pay 1.50% or 2.50% postretirement benefit increases. This assumption is reflected in our calculations.

Asset Valuation Method

Fair value of assets.

SUMMARY OF ACTUARIAL ASSUMPTIONS USED FOR THE DETERMINATION OF TOTAL PENSION LIABILITY AND RELATED VALUES

The following assumptions were used in valuing the liabilities and benefits under the plan. The demographic assumptions are based on the last experience study, dated February 2012, prepared by a former actuary. The economic assumptions are based on a review of inflation and investment return assumptions dated September 11, 2014, and a recent asset liability study obtained by the SBI. An experience study for the 2011-2015 period was issued on July 26, 2016. This report recommended many changes to demographic assumptions, expected to be effective at a future date.

The Allowance for Combined Service Annuity was also based on a recommendation by a former actuary. We are unable to judge the reasonableness of this assumption without performing a substantial amount of additional work beyond the scope of the assignment. We note that the LCPR Actuary is currently working on a review of this assumption. The review recommended changes to this assumption, expected to be effective at a future date.

Investment return	7.50% per annum.
Single discount rate	5.31% per annum.
Benefit increases after retirement	1.00% per annum.
Salary increases	Reported salary at valuation date increased according to the rate table, to current fiscal year and annually for each future year. Prior fiscal year salary is annualized for members with less than one year of service.
Inflation	2.50% per year.
Payroll growth	3.25% per year.
Mortality rates	
Healthy pre-retirement	RP-2000 employee generational mortality table projected with mortality improvement scale AA, white collar adjustment.
Healthy post-retirement	RP-2000 annuitant generational mortality table projected with mortality improvement scale AA, white collar adjustment, set back two years for males and set forward one year for females. The RP-2000 employee mortality table as published by the Society of Actuaries (SOA) contains mortality rates for ages 15 to 70 and the annuitant mortality table contains mortality rates for ages 50 to 95. We have applied the annuitant mortality table for active members beyond age 70 until the assumed retirement age and the employee mortality table for annuitants younger than age 50.
Disabled	RP-2000 annuitant generational mortality table projected with mortality improvement scale AA, white collar adjustment, set back two years for males and set forward one year for females.
Retirement	Members retiring from active status are assumed to retire according to the age related rates shown in the rate table. Members who have attained the highest assumed retirement age are assumed to retire in one year.

SUMMARY OF ACTUARIAL ASSUMPTIONS (CONTINUED)

Withdrawal	Select and Ultimate rates based on actual experience. Ultimate rates after the third year are shown in rate table. Select rates in the first three years are: Year / Select Withdrawal Rates 1 / 5% 2 / 2% 3 / 2%
Disability	Age-related rates based on experience; see table of sample rates. All incidences are assumed to be duty-related.
Allowance for combined service annuity	Liabilities for former members are increased by 30.00% to account for the effect of some participants having eligibility for a Combined Service Annuity.
Administrative expenses	In the valuation year, equal to prior year administrative expenses expressed as a percentage of prior year projected payroll. In each subsequent year, equal to the initial administrative expense percentage applied to payroll for the closed group.
Refund of contributions	All employees withdrawing after becoming eligible for a deferred benefit take the larger of their contributions accumulated with interest or the value of their deferred benefit. Account balances for deferred members accumulate interest until normal retirement date and are discounted back to the valuation date.
Commencement of deferred benefits	Members receiving deferred annuities (including current terminated deferred members) are assumed to begin receiving benefits at age 55.
Percentage married	85% of active members are assumed to be married. Actual marital status is used for members in payment status.
Age of spouse	Females are assumed to be two years younger than their male spouses.
Eligible children	Each member may have two dependent children depending on member's age. Assumed first born child born at member's age 28 and second born child at member's age 31.
Form of payment	Married members retiring from active status are assumed to elect subsidized joint and survivor form of annuity as follows: Males: 15% elect 50% Joint & Survivor option 25% elect 75% Joint & Survivor option 35% elect 100% Joint & Survivor option Females: 25% elect 50% Joint & Survivor option 30% elect 75% Joint & Survivor option 5% elect 100% Joint & Survivor option Remaining married members and unmarried members are assumed to elect the Straight Life option.
Eligibility testing	Eligibility for benefits is determined based upon the age nearest birthday and service nearest whole year on the date the decrement is assumed to occur.
Decrement operation	Withdrawal decrements do not operate during retirement eligibility. Decrements are assumed to occur mid-fiscal year.
Service credit accruals	It is assumed that members accrue one year of service credit per year.

Summary of Actuarial Assumptions (Continued)

Pay increases	Pay increases are assumed to happen at the beginning of the fiscal year. This is equivalent to assuming that reported earnings are pensionable earnings for the year ending on the valuation date.
Unknown data for certain members	To prepare this report, GRS has used and relied on participant data supplied by the Fund. Although GRS has reviewed the data in accordance with Actuarial Standards of Practice No. 23, GRS has not verified or audited any of the data or information provided. There are no members reported with missing birth dates. In cases where submitted data was missing or incomplete, the following assumptions were applied: <u>Data for active members</u>: There were 2 members reported with missing salary and no members reported with missing service. We used prior year salary (2 members). There were no members reported with a missing or invalid date of birth or gender. <u>Data for terminated members</u>: There was 1 member reported without a benefit. We calculated benefits for this member using the reported Credited Service and Termination Date. Average Salary was not reported, so we assumed a value of $35,000. <u>Data for members receiving benefits</u>: There were 2 members reported with a missing gender. We assumed male gender. There was 1 member reported without a benefit. Due to the small number of members with missing benefits, we made no adjustment to the reported data for members receiving benefits. There were no survivors reported with an expired benefit. There were no retirees reported with a bounce back annuity and an unreasonable reduction factor. There were 10 retirees reported with a survivor option and a survivor date of death. We assumed no benefit was payable to the survivor, and the member benefit already reflected the increase to the life annuity value (i.e. "bounce back"), if applicable. For retirees that elected a survivor benefit option, we used the valuation assumptions if the survivor date of birth was missing or invalid (209 members) and/or the survivor gender was missing or invalid (225 members).
Changes in actuarial assumptions	The assumed post-retirement benefit increase rate was changed from 1.00% per year through 2031, 1.50% per year from 2032 to 2052, and 2.50% per year thereafter to 1.00% for all years. For accounting purposes, this change was treated as a difference between expected and actual experience. The assumed investment return was changed from 7.90% to 7.50%. The assumed future salary increases, payroll growth, and inflation were decreased by 0.25%. The Single Discount Rate changed from 7.90% to 5.31%.

SUMMARY OF ACTUARIAL ASSUMPTIONS (CONTINUED)

	Rate (%)*					
	Healthy Post-Retirement Mortality**		Healthy Pre-Retirement Mortality**		Disability Mortality*	
Age	Male	Female	Male	Female	Male	Female
20	0.03%	0.02%	0.03%	0.02%	0.03%	0.02%
25	0.04	0.02	0.04	0.02	0.04	0.02
30	0.04	0.03	0.04	0.03	0.04	0.03
35	0.05	0.05	0.06	0.05	0.05	0.05
40	0.08	0.07	0.09	0.06	0.08	0.07
45	0.11	0.11	0.13	0.10	0.11	0.11
50	0.17	0.25	0.20	0.16	0.17	0.25
55	0.57	0.39	0.27	0.24	0.57	0.39
60	0.57	0.61	0.43	0.38	0.57	0.61
65	0.92	1.01	0.67	0.59	0.92	1.01
70	1.58	1.69	0.98	0.88	1.58	1.69

* *Generally, mortality rates are expected to increase as age increases. These standard mortality rates have been adjusted slightly to prevent decreasing mortality rates. If the rates were not adjusted as described, we would not expect the valuation results to be materially different.*

*** These rates were adjusted for mortality improvements using projection scale AA.*

	Withdrawal Rates After Third Year		Disability Retirement	
Age	Male	Female	Male	Female
20	1.47%	1.47%	0.03%	0.03%
25	1.13	1.13	0.05	0.05
30	0.80	0.80	0.06	0.06
35	0.47	0.47	0.09	0.09
40	0.40	0.40	0.14	0.14
45	0.40	0.40	0.23	0.23
50	0.00	0.00	0.40	0.40
55	0.00	0.00	0.70	0.70
60	0.00	0.00	1.13	1.13
65	0.00	0.00	0.00	0.00

SUMMARY OF ACTUARIAL ASSUMPTIONS (CONCLUDED)

Age	Percent Retiring
50	7 %
51	6
52	6
53	6
54	3
55	65
56	50
57	30
58	20
59	20
60+	100

Salary Scale	
Year	Increase
1	7.50%
2	7.00
3	6.50
4	6.25
5	6.00
6	5.75
7	5.50
8	5.35
9	5.20
10	5.05
11	4.90
12	4.75
13	4.60
14	4.45
15	4.30
16	4.15
17	4.00
18	3.85
19	3.70
20	3.55
21+	3.50

SECTION G

CALCULATION OF THE SINGLE DISCOUNT RATE

CALCULATION OF THE SINGLE DISCOUNT RATE

GASB Statement No. 67 includes a specific requirement for the discount rate that is used for the purpose of the measurement of the Total Pension Liability. This rate considers the ability of the fund to meet benefit obligations in the future. To make this determination, employer contributions, employee contributions, benefit payments, expenses and investment returns are projected into the future. The Plan Fiduciary Net Position (assets) in future years can then be determined and compared to its obligation to make benefit payments in those years. As long as assets are projected to be on hand in a future year, the long-term expected rate of return is used as the discount rate. In years where assets are not projected to be sufficient to meet benefit payments, the use of a “risk-free” municipal rate is required, as described in the following paragraph.

The *Single Discount Rate* (SDR) is equivalent to applying these two rates to the benefits that are projected to be paid during the different time periods. The SDR reflects (1) the long-term expected rate of return on pension plan investments (during the period in which the plan fiduciary net position is projected to be sufficient to pay benefits) and (2) tax-exempt municipal bond rate based on an index of 20-year general obligation bonds with an average AA credit rating as of the measurement date (to the extent that the contributions for use with the long-term expected rate of return are not met).

For the purpose of this valuation, the long-term expected rate of return on pension plan investments is 7.50%; the municipal bond rate is 2.85% (based on the 20-Bond GO rate as of June 30, 2016). **The resulting single discount rate as of July 1, 2016 is 5.31%.**

Benefit payments projected to occur up through June 30, 2052 were fully funded and benefit payments projected to occur in the year ended June 30, 2053 were partially funded. Assets were projected to be fully depleted by the fiscal year ending June 30, 2053. Benefit payments were discounted using 7.50%, the long-term expected rate of return on pension plan investments, as long as assets were sufficient to fund the benefit payments. Beginning in the July 1, 2052 to June 30, 2053 fiscal year, when benefit payments exceed the Plan’s Fiduciary Net Position, benefit payments were discounted at 2.85%, the municipal bond rate. An equivalent single discount rate was determined that produced approximately the same present value of projected benefits when applied to all years of projected benefits as the present value of projected benefits using 7.50% through the point of asset depletion and 2.85% after. For more information on the calculation of the equivalent present value of projected benefits, see pages 35 through 36 of this report.

The tables in this section provide background for the development of the single discount rate.

The **Projection of Contributions** table shows the development of expected contributions in future years. Normal Cost contributions for future hires are not included (nor are their liabilities).

The **Projection of Plan Fiduciary Net Position** table shows the development of expected asset levels in future years.

The **Present Values of Projected Benefit Payments** table shows the development of the Single Discount Rate. It breaks down the benefit payments into present values for funded and unfunded portions and shows the equivalent total at the SDR.

SINGLE DISCOUNT RATE DEVELOPMENT
PROJECTION OF CONTRIBUTIONS (DOLLARS IN THOUSANDS)

	Projected Covered-Employee Payroll			Projected Contributions				
Fiscal Year Ending	Payroll for Current Employees	Payroll for New Employees	Total Employee Payroll	Contributions from Current Employees	Employer Contributions for Current Employees	Contributions on Future Payroll toward Current UAL*	Additional State Contributions	Total Contributions
	(a)	(b)	(c) = (a) + (b)	(d)	(e)	(f)	(g)	(h) = (d) + (e) + (f) + (g)
2016	$ 69,343		$ 69,343					
2017	72,959		72,959	$ 10,506	$ 15,759		$ 1,000	$ 27,265
2018	72,404	$ 2,927	75,331	10,426	15,639	$ 336	1,000	27,401
2019	71,802	5,977	77,779	10,339	15,509	686	1,000	27,534
2020	71,517	8,790	80,307	10,298	15,448	1,009	1,000	27,755
2021	71,167	11,750	82,917	10,248	15,372	1,349	1,000	27,969
2022	70,950	14,661	85,611	10,217	15,325	1,683	1,000	28,225
2023	70,391	18,003	88,394	10,136	15,204	2,067	1,000	28,407
2024	69,221	22,046	91,267	9,968	14,952	2,531	1,000	28,451
2025	67,441	26,792	94,233	9,711	14,567	3,076	1,000	28,354
2026	65,283	32,012	97,295	9,401	14,101	3,675	1,000	28,177
2027	63,128	37,329	100,457	9,090	13,636	4,285	1,000	28,011
2028	60,713	43,009	103,722	8,743	13,114	4,937	1,000	27,794
2029	57,980	49,113	107,093	8,349	12,524	5,638	1,000	27,511
2030	55,068	55,506	110,574	7,930	11,895	6,372	1,000	27,197
2031	52,101	62,066	114,167	7,503	11,254	7,125	1,000	26,882
2032	49,013	68,865	117,878	7,058	10,587	7,906	1,000	26,551
2033	45,833	75,876	121,709	6,600	9,900	8,711	1,000	26,211
2034	42,817	82,847	125,664	6,166	9,248	9,511	1,000	25,925
2035	39,825	89,923	129,748	5,735	8,602	10,323	1,000	25,660
2036	36,789	97,176	133,965	5,298	7,947	11,156	1,000	25,401
2037	33,716	104,603	138,319	4,855	7,283	12,008	1,000	25,146
2038	30,810	112,005	142,815	4,437	6,655	12,858	1,000	24,950
2039	28,010	119,446	147,456	4,033	6,050	13,712	1,000	24,795
2040	24,846	127,402	152,248	3,578	5,367	14,626	1,000	24,571
2041	21,650	135,546	157,196	3,118	4,676	15,561	1,000	24,355
2042	18,405	143,900	162,305	2,650	3,975	16,520	1,000	24,145
2043	15,157	152,423	167,580	2,183	3,274	17,498	1,000	23,955
2044	12,399	160,628	173,027	1,785	2,678	18,440	1,000	23,903
2045	9,774	168,876	178,650	1,407	2,111	19,387	1,000	23,905
2046	7,100	177,356	184,456	1,022	1,534	20,360	1,000	23,916
2047	4,737	185,714	190,451	682	1,023	21,320	1,000	24,025
2048	2,858	193,783	196,641	412	617	22,246	1,000	24,275
2049	1,596	201,435	203,031	230	345	23,125	1,000	24,700
2050	926	208,704	209,630	133	200	23,959	1,000	25,292
2051	515	215,928	216,443	74	111	24,789	1,000	25,974
2052	262	223,215	223,477	38	57	25,625	1,000	26,720
2053	104	230,636	230,740	15	23	26,477	1,000	27,515
2054	23	238,216	238,239	3	5	27,347	1,000	28,355
2055	4	245,978	245,982	1	1	28,238	1,000	29,240
2056	0	253,976	253,976	0	0	29,156	1,000	30,156
2057	0	262,231	262,231	0	0	30,104	1,000	31,104
2058	0	270,753	270,753	0	0	31,082	1,000	32,082
2059	0	279,553	279,553	0	0	32,093	1,000	33,093
2060	0	288,638	288,638	0	0	33,136	1,000	34,136
2061	0	298,019	298,019	0	0	34,213	1,000	35,213
2062	0	307,704	307,704	0	0	35,324	1,000	36,324
2063	0	317,705	317,705	0	0	36,473	1,000	37,473
2064	0	328,030	328,030	0	0	37,658	1,000	38,658
2065	0	338,691	338,691	0	0	38,882	1,000	39,882
2066	0	349,699	349,699	0	0	40,145	1,000	41,145

**Contributions related to future employees in excess of normal cost and expenses of 24.52% of pay.*

SINGLE DISCOUNT RATE DEVELOPMENT
PROJECTION OF CONTRIBUTIONS (DOLLARS IN THOUSANDS) (CONTINUED)

	Projected Covered-Employee Payroll			Projected Contributions				
Fiscal Year Ending	Payroll for Current Employees	Payroll for New Employees	Total Employee Payroll	Contributions from Current Employees	Employer Contributions for Current Employees	Contributions on Future Payroll toward Current UAL*	Additional State Contributions	Total Contributions
	(a)	(b)	(c) = (a) + (b)	(d)	(e)	(f)	(g)	(h) = (d) + (e) + (f) + (g)
2067	$ 0	$ 361,064	$ 361,064	$ 0	$ 0	$ 41,450	$ 1,000	$ 42,450
2068	0	372,799	372,799	0	0	42,797	1,000	43,797
2069	0	384,914	384,914	0	0	44,188	1,000	45,188
2070	0	397,424	397,424	0	0	45,624	1,000	46,624
2071	0	410,340	410,340	0	0	47,107	1,000	48,107
2072	0	423,677	423,677	0	0	48,638	1,000	49,638
2073	0	437,446	437,446	0	0	50,219	1,000	51,219
2074	0	451,663	451,663	0	0	51,851	1,000	52,851
2075	0	466,342	466,342	0	0	53,536	1,000	54,536
2076	0	481,498	481,498	0	0	55,276	1,000	56,276
2077	0	497,147	497,147	0	0	57,072	1,000	58,072
2078	0	513,304	513,304	0	0	58,927	1,000	59,927
2079	0	529,987	529,987	0	0	60,842	1,000	61,842
2080	0	547,211	547,211	0	0	62,820	1,000	63,820
2081	0	564,995	564,995	0	0	64,861	1,000	65,861
2082	0	583,358	583,358	0	0	66,969	1,000	67,969
2083	0	602,317	602,317	0	0	69,146	1,000	70,146
2084	0	621,892	621,892	0	0	71,393	1,000	72,393
2085	0	642,104	642,104	0	0	73,714	1,000	74,714
2086	0	662,972	662,972	0	0	76,109	1,000	77,109
2087	0	684,519	684,519	0	0	78,583	1,000	79,583
2088	0	706,766	706,766	0	0	81,137	1,000	82,137
2089	0	729,735	729,735	0	0	83,774	1,000	84,774
2090	0	753,452	753,452	0	0	86,496	1,000	87,496
2091	0	777,939	777,939	0	0	89,307	1,000	90,307
2092	0	803,222	803,222	0	0	92,210	1,000	93,210
2093	0	829,327	829,327	0	0	95,207	1,000	96,207
2094	0	856,280	856,280	0	0	98,301	1,000	99,301
2095	0	884,109	884,109	0	0	101,496	1,000	102,496
2096	0	912,843	912,843	0	0	104,794	1,000	105,794
2097	0	942,510	942,510	0	0	108,200	1,000	109,200
2098	0	973,142	973,142	0	0	111,717	1,000	112,717
2099	0	1,004,769	1,004,769	0	0	115,347	1,000	116,347
2100	0	1,037,424	1,037,424	0	0	119,096	1,000	120,096
2101	0	1,071,140	1,071,140	0	0	122,967	1,000	123,967
2102	0	1,105,952	1,105,952	0	0	126,963	1,000	127,963
2103	0	1,141,895	1,141,895	0	0	131,090	1,000	132,090
2104	0	1,179,007	1,179,007	0	0	135,350	1,000	136,350
2105	0	1,217,325	1,217,325	0	0	139,749	1,000	140,749
2106	0	1,256,888	1,256,888	0	0	144,291	1,000	145,291
2107	0	1,297,737	1,297,737	0	0	148,980	1,000	149,980
2108	0	1,339,913	1,339,913	0	0	153,822	1,000	154,822
2109	0	1,383,460	1,383,460	0	0	158,821	1,000	159,821
2110	0	1,428,423	1,428,423	0	0	163,983	1,000	164,983
2111	0	1,474,846	1,474,846	0	0	169,312	1,000	170,312
2112	0	1,522,779	1,522,779	0	0	174,815	1,000	175,815
2113	0	1,572,269	1,572,269	0	0	180,497	1,000	181,497
2114	0	1,623,368	1,623,368	0	0	186,363	1,000	187,363
2115	0	1,676,127	1,676,127	0	0	192,419	1,000	193,419
2116	0	1,730,602	1,730,602	0	0	198,673	1,000	199,673

**Contributions related to future employees in excess of normal cost and expenses of 24.52% of pay.*

SINGLE DISCOUNT RATE DEVELOPMENT
PROJECTION OF PLAN FIDUCIARY NET POSITION (DOLLARS IN THOUSANDS)

Fiscal Year Ending	Projected Beginning Plan Fiduciary Net Position	Projected Total Contributions	Projected Benefit Payments	Projected Administrative Expenses	Projected Investment Earnings at 7.50%	Projected Ending Plan Net Position
	(a)	(b)	(c)	(d)	(e)	(f)=(a)+(b)-(c)-(d)+(e)
2017	$ 629,992	$ 27,265	$ 58,659	$ 182	$ 46,087	$ 644,503
2018	644,503	27,401	60,045	181	47,129	658,807
2019	658,807	27,534	61,404	180	48,157	672,914
2020	672,914	27,755	62,683	179	49,176	686,983
2021	686,983	27,969	63,986	178	50,191	700,979
2022	700,979	28,225	65,144	177	51,208	715,091
2023	715,091	28,407	66,523	176	52,222	729,021
2024	729,021	28,451	68,070	173	53,211	742,440
2025	742,440	28,354	69,851	169	54,149	754,923
2026	754,923	28,177	71,804	163	55,007	766,140
2027	766,140	28,011	73,741	158	55,771	776,023
2028	776,023	27,794	75,839	152	56,427	784,253
2029	784,253	27,511	78,065	145	56,952	790,506
2030	790,506	27,197	80,356	138	57,326	794,535
2031	794,535	26,882	82,610	130	57,533	796,210
2032	796,210	26,551	85,078	123	57,556	795,116
2033	795,116	26,211	87,338	115	57,379	791,253
2034	791,253	25,925	89,374	107	57,004	784,701
2035	784,701	25,660	91,277	100	56,433	775,417
2036	775,417	25,401	93,157	92	55,658	763,227
2037	763,227	25,146	94,930	84	54,669	748,028
2038	748,028	24,950	96,486	77	53,465	729,880
2039	729,880	24,795	97,889	70	52,047	708,763
2040	708,763	24,571	99,498	62	50,396	684,170
2041	684,170	24,355	101,117	54	48,484	655,838
2042	655,838	24,145	102,788	46	46,290	623,439
2043	623,439	23,955	104,320	38	43,797	586,833
2044	586,833	23,903	105,399	31	41,010	546,316
2045	546,316	23,905	106,370	24	37,936	501,763
2046	501,763	23,916	107,324	18	34,560	452,897
2047	452,897	24,025	107,945	12	30,877	399,842
2048	399,842	24,275	108,077	7	26,902	342,935
2049	342,935	24,700	107,590	4	22,668	282,709
2050	282,709	25,292	106,522	2	18,212	219,689
2051	219,689	25,974	105,095	1	13,563	154,130
2052	154,130	26,720	103,419	1	8,736	86,166
2053	86,166	27,515	101,602	0	3,735	15,814
2054	15,814	28,355	99,597	0	-	-
2055	-	29,240	97,509	0	-	-
2056	-	30,156	95,342	0	-	-
2057	-	31,104	93,103	0	-	-
2058	-	32,082	90,787	0	-	-
2059	-	33,093	88,395	0	-	-
2060	-	34,136	85,925	0	-	-
2061	-	35,213	83,371	0	-	-
2062	-	36,324	80,733	0	-	-
2063	-	37,473	78,008	0	-	-
2064	-	38,658	75,193	0	-	-
2065	-	39,882	72,288	0	-	-
2066	-	41,145	69,298	0	-	-

SINGLE DISCOUNT RATE DEVELOPMENT
PROJECTION OF PLAN FIDUCIARY NET POSITION
(DOLLARS IN THOUSANDS) (CONTINUED)

Fiscal Year Ending	Projected Beginning Plan Fiduciary Net Position	Projected Total Contributions	Projected Benefit Payments	Projected Administrative Expenses	Projected Investment Earnings at 7.50%	Projected Ending Plan Net Position
	(a)	(b)	(c)	(d)	(e)	(f)=(a)+(b)-(c)-(d)+(e)
2067	$ -	$ 42,450	$ 66,227	$ 0	$ -	$ -
2068	-	43,797	63,083	0	-	-
2069	-	45,188	59,877	0	-	-
2070	-	46,624	56,622	0	-	-
2071	-	48,107	53,338	0	-	-
2072	-	49,638	50,037	0	-	-
2073	-	51,219	46,737	0	165	4,647
2074	-	52,851	43,455	0	346	9,742
2075	-	54,536	40,202	0	528	14,862
2076	-	56,276	36,990	0	710	19,996
2077	-	58,072	33,831	0	893	25,134
2078	-	59,927	30,736	0	1,075	30,266
2079	-	61,842	27,717	0	1,257	35,382
2080	-	63,820	24,786	0	1,437	40,471
2081	-	65,861	21,960	0	1,617	45,518
2082	-	67,969	19,259	0	1,794	50,504
2083	-	70,146	16,699	0	1,968	55,415
2084	-	72,393	14,301	0	2,139	60,231
2085	-	74,714	12,088	0	2,306	64,932
2086	-	77,109	10,073	0	2,468	69,504
2087	-	79,583	8,268	0	2,626	73,941
2088	-	82,137	6,681	0	2,778	78,234
2089	-	84,774	5,311	0	2,926	82,389
2090	-	87,496	4,149	0	3,069	86,416
2091	-	90,307	3,186	0	3,208	90,329
2092	-	93,210	2,405	0	3,344	94,149
2093	-	96,207	1,784	0	3,477	97,900
2094	-	99,301	1,302	0	3,609	101,608
2095	-	102,496	935	0	3,740	105,301
2096	-	105,794	661	0	3,871	109,004
2097	-	109,200	461	0	4,004	112,743
2098	-	112,717	317	0	4,139	116,539
2099	-	116,347	215	0	4,276	120,408
2100	-	120,096	144	0	4,417	124,369
2101	-	123,967	95	0	4,561	128,433
2102	-	127,963	62	0	4,710	132,611
2103	-	132,090	40	0	4,862	136,912
2104	-	136,350	25	0	5,020	141,345
2105	-	140,749	16	0	5,182	145,915
2106	-	145,291	10	0	5,350	150,631
2107	-	149,980	6	0	5,522	155,496
2108	-	154,822	4	0	5,701	160,519
2109	-	159,821	2	0	5,885	165,704
2110	-	164,983	1	0	6,075	171,057
2111	-	170,312	1	0	6,271	176,582
2112	-	175,815	-	0	6,474	182,289
2113	-	181,497	0	0	6,683	188,180
2114	-	187,363	0	0	6,899	194,262
2115	-	193,419	0	0	7,122	200,541
2116	-	199,673	0	0	7,352	207,025

SINGLE DISCOUNT RATE DEVELOPMENT
PRESENT VALUES OF PROJECTED BENEFITS (DOLLARS IN THOUSANDS)

Fiscal Year Ending	Projected Beginning Plan Fiduciary Net Position	Projected Benefit Payments	Funded Portion of Benefit Payments	Unfunded Portion of Benefit Payments	Present Value of Funded Benefit Payments using Expected Return Rate (v)	Present Value of Unfunded Benefit Payments using Municipal Bond Rate (vf)	Present Value of Benefit Payments using Single Discount Rate (sdr)
(a)	(b)	(c)	(d)	(e)	(f)=(d)*v^((a)-.5)	(g)=(e)*vf ^((a)-.5)	(h)=((c)/(1+sdr)^(a-.5)
2017	$ 629,992	$ 58,659	$ 58,659	$ 0	$ 56,576	$ 0	$ 57,161
2018	644,503	60,045	60,045	0	53,873	0	55,561
2019	658,807	61,404	61,404	0	51,248	0	53,952
2020	672,914	62,683	62,683	0	48,666	0	52,299
2021	686,983	63,986	63,986	0	46,211	0	50,694
2022	700,979	65,144	65,144	0	43,765	0	49,008
2023	715,091	66,523	66,523	0	41,573	0	47,522
2024	729,021	68,070	68,070	0	39,573	0	46,175
2025	742,440	69,851	69,851	0	37,775	0	44,993
2026	754,923	71,804	71,804	0	36,122	0	43,919
2027	766,140	73,741	73,741	0	34,508	0	42,829
2028	776,023	75,839	75,839	0	33,014	0	41,826
2029	784,253	78,065	78,065	0	31,612	0	40,882
2030	790,506	80,356	80,356	0	30,270	0	39,960
2031	794,535	82,610	82,610	0	28,947	0	39,009
2032	796,210	85,078	85,078	0	27,732	0	38,148
2033	795,116	87,338	87,338	0	26,483	0	37,187
2034	791,253	89,374	89,374	0	25,209	0	36,134
2035	784,701	91,277	91,277	0	23,950	0	35,043
2036	775,417	93,157	93,157	0	22,738	0	33,961
2037	763,227	94,930	94,930	0	21,554	0	32,862
2038	748,028	96,486	96,486	0	20,379	0	31,716
2039	729,880	97,889	97,889	0	19,233	0	30,554
2040	708,763	99,498	99,498	0	18,185	0	29,491
2041	684,170	101,117	101,117	0	17,192	0	28,459
2042	655,838	102,788	102,788	0	16,256	0	27,470
2043	623,439	104,320	104,320	0	15,348	0	26,474
2044	586,833	105,399	105,399	0	14,425	0	25,399
2045	546,316	106,370	106,370	0	13,542	0	24,340
2046	501,763	107,324	107,324	0	12,710	0	23,320
2047	452,897	107,945	107,945	0	11,892	0	22,272
2048	399,842	108,077	108,077	0	11,076	0	21,175
2049	342,935	107,590	107,590	0	10,256	0	20,016
2050	282,709	106,522	106,522	0	9,446	0	18,818
2051	219,689	105,095	105,095	0	8,669	0	17,629
2052	154,130	103,419	103,419	0	7,936	0	16,474
2053	86,166	101,602	86,166	15,434	6,151	5,534	15,368
2054	15,814	99,597	15,814	83,783	1,050	29,207	14,305
2055	-	97,509	-	97,509	-	33,051	13,299
2056	-	95,342	-	95,342	-	31,421	12,347
2057	-	93,103	-	93,103	-	29,832	11,449
2058	-	90,787	-	90,787	-	28,284	10,602
2059	-	88,395	-	88,395	-	26,776	9,802
2060	-	85,925	-	85,925	-	25,306	9,047
2061	-	83,371	-	83,371	-	23,874	8,336
2062	-	80,733	-	80,733	-	22,478	7,665
2063	-	78,008	-	78,008	-	21,117	7,033
2064	-	75,193	-	75,193	-	19,791	6,437
2065	-	72,288	-	72,288	-	18,499	5,876
2066	-	69,298	-	69,298	-	17,243	5,349

SINGLE DISCOUNT RATE DEVELOPMENT
PRESENT VALUES OF PROJECTED BENEFITS
(DOLLARS IN THOUSANDS) (CONTINUED)

Fiscal Year Ending	Projected Beginning Plan Fiduciary Net Position	Projected Benefit Payments	Funded Portion of Benefit Payments	Unfunded Portion of Benefit Payments	Present Value of Funded Benefit Payments using Expected Return Rate (v)	Present Value of Unfunded Benefit Payments using Municipal Bond Rate (vf)	Present Value of Benefit Payments using Single Discount Rate (sdr)
(a)	(b)	(c)	(d)	(e)	(f)=(d)*v^((a)-.5)	(g)=(e)*vf ^((a)-.5)	(h)=((c)/(1+sdr)^(a-.5)
2067	$ -	$ 66,227	$ -	66,227	$ -	16,022	$ 4,854
2068	-	63,083	-	63,083	-	14,839	4,391
2069	-	59,877	-	59,877	-	13,694	3,957
2070	-	56,622	-	56,622	-	12,591	3,553
2071	-	53,338	-	53,338	-	11,532	3,178
2072	-	50,037	-	50,037	-	10,519	2,831
2073	-	46,737	-	46,737	-	9,552	2,511
2074	-	43,455	-	43,455	-	8,636	2,217
2075	-	40,202	-	40,202	-	7,768	1,948
2076	-	36,990	-	36,990	-	6,949	1,702
2077	-	33,831	-	33,831	-	6,179	1,478
2078	-	30,736	-	30,736	-	5,459	1,275
2079	-	27,717	-	27,717	-	4,786	1,092
2080	-	24,786	-	24,786	-	4,161	927
2081	-	21,960	-	21,960	-	3,585	780
2082	-	19,259	-	19,259	-	3,057	650
2083	-	16,699	-	16,699	-	2,577	535
2084	-	14,301	-	14,301	-	2,146	435
2085	-	12,088	-	12,088	-	1,763	349
2086	-	10,073	-	10,073	-	1,429	276
2087	-	8,268	-	8,268	-	1,140	215
2088	-	6,681	-	6,681	-	896	165
2089	-	5,311	-	5,311	-	692	125
2090	-	4,149	-	4,149	-	526	93
2091	-	3,186	-	3,186	-	393	67
2092	-	2,405	-	2,405	-	288	48
2093	-	1,784	-	1,784	-	208	34
2094	-	1,302	-	1,302	-	147	24
2095	-	935	-	935	-	103	16
2096	-	661	-	661	-	71	11
2097	-	461	-	461	-	48	7
2098	-	317	-	317	-	32	5
2099	-	215	-	215	-	21	3
2100	-	144	-	144	0	14	2
2101	-	95	-	95	0	9	1
2102	-	62	-	62	0	6	1
2103	-	40	-	40	0	4	0
2104	-	25	-	25	0	2	0
2105	-	16	-	16	0	1	0
2106	-	10	-	10	0	0	0
2107	-	6	-	6	0	0	0
2108	-	4	-	4	0	0	0
2109	-	2	-	2	0	0	0
2110	-	1	-	1	0	0	0
2111	-	1	-	1	0	0	0
2112	-	-	-	0	0	0	0
2113	-	0	0	0	0	0	0
2114	-	0	0	0	0	0	0
2115	-	0	0	0	0	0	0
2116	-	0	0	0	0	0	0
				Totals	$ 975,143	$ 484,259	$ 1,459,402

SECTION H

GLOSSARY OF TERMS

GLOSSARY OF TERMS

Actuarial Accrued Liability (AAL) The AAL is the difference between the actuarial present value of all benefits and the actuarial value of future normal costs. The definition comes from the fundamental equation of funding which states that the present value of all benefits is the sum of the Actuarial Accrued Liability and the present value of future normal costs. The AAL may also be referred to as "accrued liability" or "actuarial liability."

Actuarial Assumptions These assumptions are estimates of future experience with respect to rates of mortality, disability, turnover, retirement, rate or rates of investment income and compensation increases. Actuarial assumptions are generally based on past experience, often modified for projected changes in conditions. Economic assumptions (compensation increases, payroll growth, inflation and investment return) consist of an underlying real rate of return plus an assumption for a long-term average rate of inflation.

Accrued Service Service credited under the system which was rendered before the date of the actuarial valuation.

Actuarial Equivalent A single amount or series of amounts of equal actuarial value to another single amount or series of amounts, computed on the basis of appropriate actuarial assumptions.

Actuarial Cost Method A mathematical budgeting procedure for allocating the dollar amount of the actuarial present value of the pension trust benefits between future normal cost and actuarial accrued liability. The actuarial cost method may also be referred to as the actuarial funding method.

Actuarial Gain (Loss) The difference in liabilities between actual experience and expected experience during the period between two actuarial valuations is the gain (loss) on the accrued liabilities.

Actuarial Present Value (APV) The amount of funds currently required to provide a payment or series of payments in the future. The present value is determined by discounting future benefit payments at predetermined rates of interest to reflect the expected effects of the time value (present value) of money and the probabilities of payment.

Actuarial Valuation The actuarial valuation report determines, as of the actuarial valuation date, the service cost, total pension liability, and related actuarial present value of projected benefit payments for pensions performed in conformity with Actuarial Standards of Practice unless otherwise specified by the GASB.

Actuarial Valuation Date The date as of which an actuarial valuation is performed.

Actuarially Determined Contribution (ADC) A calculated contribution into a defined benefit pension plan for the reporting period, most often determined based on the funding policy of the plan. Typically the Actuarially Determined Contribution has a normal cost payment and an amortization payment.

GLOSSARY OF TERMS

Amortization Payment	The amortization payment is the periodic payment required to pay off an interest-discounted amount with payments of interest and principal.
Amortization Method	The method used to determine the periodic amortization payment may be a level dollar amount, or a level percent of pay amount. The period will typically be expressed in years, and the method will either be "open" (meaning, reset each year) or "closed" (the number of years remaining will decline each year).
Cost-of-Living Adjustments	Postemployment benefit changes intended to adjust benefit payments for the effects of inflation.
Cost-Sharing Multiple-Employer Defined Benefit Pension Plan (cost-sharing pension plan)	A multiple-employer defined benefit pension plan in which the pension obligations to the employees of more than one employer are pooled and pension plan assets can be used to pay the benefits of the employees of any employer that provides pensions through the pension plan.
Covered-Employee Payroll	The payroll of covered employees, which is typically only the pensionable pay (meets the statutory salary definition) and does not include pay above any pay cap.
Deferred Inflows and Outflows of Resources	The deferred inflows and outflows of pension resources are amounts used under GASB Statement No. 68 in developing the annual pension expense. Deferred inflows and outflows arise with differences between expected and actual experiences; changes of assumptions. The portion of these amounts not included in pension expense should be included in the deferred inflows or outflows of resources.
Discount Rate or Single Discount Rate	For GASB purposes, the discount rate is the single rate of return that results in the present value of all projected benefit payments to be equal to the sum of the funded and unfunded projected benefit payments, specifically: 1. The benefit payments to be made while the pension plans' fiduciary net position is projected to be greater than the benefit payments that are projected to be made in the period; and 2. The present value of the benefit payments not in (1) above, discounted using the municipal bond rate.
Entry Age Actuarial Cost Method or Entry Age Normal (EAN)	The EAN is a funding method for allocating the costs of the plan between the normal cost and the accrued liability. The actuarial present value of the projected benefits of each individual included in an actuarial valuation is allocated on a level basis (either level dollar or level percent of pay) over the earnings or service of the individual between entry age and assumed exit ages(s). The portion of the actuarial present value allocated to a valuation year is the normal cost. The portion of this actuarial present value not provided for at a valuation date by the actuarial present value of future normal costs is the actuarial accrued liability. The sum of the accrued liability plus the present value of all future normal costs is the present value of all benefits.

GLOSSARY OF TERMS

Fiduciary Net Position	The fiduciary net position is the value of the net assets of the trust restricted for pension benefits.
GASB	The Governmental Accounting Standards Board is an organization that exists with authority to promulgate accounting standards for state and local governmental entities.
Long-Term Expected Rate of Return	The long-term rate of return is the expected return to be earned over the entire trust portfolio based on the asset allocation of the portfolio.
Money-Weighted Rate of Return	The money-weighted rate of return is a method of calculating the returns that adjusts for the changing amounts actually invested. For purposes of GASB Statement No. 67, money-weighted rate of return is calculated as the internal rate of return on pension plan investments, net of pension plan investment expense.
Multiple-Employer Defined Benefit Pension Plan	A multiple-employer plan is a defined benefit pension plan that is used to provide pensions to the employees of more than one employer.
Municipal Bond Rate	The Municipal Bond Rate is the discount rate to be used for those benefit payments that occur after the assets of the trust have been depleted.
Net Pension Liability (NPL)	The NPL is the liability of employers and non-employer contributing entities to plan members for benefits provided through a defined benefit pension plan.
Non-Employer Contributing Entities	Non-employer contributing entities are entities that make contributing to a pension plan that is used to provide pensions to the employees of other entities. For purposes of the GASB Accounting Statements No. 67 and No. 68 plan members are not considered non-employer contributing entities.
Normal Cost	The actuarial present value of the pension trust benefits allocated to the current year by the actuarial cost method.
Other Postemployment Benefits (OPEB)	All postemployment benefits other than retirement income (such as death benefits, life insurance, disability, and long-term care) that are provided separately from a pension plan, as well as postemployment healthcare benefits regardless of the manner in which they are provided. Other post-employment benefits do not include termination benefits.
Real Rate of Return	The real rate of return is the rate of return on an investment after adjustment to eliminate inflation.
Service Cost	The service cost is the portion of the actuarial present value of projected benefit payments that is attributed to a valuation year.

GLOSSARY OF TERMS

Total Pension Expense	The total pension expense is the sum of the following items that are recognized at the end of the employer's fiscal year: 1. Service Cost 2. Interest on the Total Pension Liability 3. Current-Period Changes in Benefit Terms 4. Employee Contributions 5. Projected Earnings on Plan Investments 6. Pension Plan Administrative Expense 7. Other Changes in Plan Fiduciary Net Position 8. Recognition of Outflow (Inflow) of Resources due to the difference between expected and actual in measurement of the Total Pension Liability 9. Recognition of Outflow (Inflow) of Resources due to Assumption Changes 10. Recognition of Outflow (Inflow) of Resources due to the difference between projected and actual earnings on pension plan investments
Total Pension Liability (TPL)	The TPL is the portion of the actuarial present value of projected benefit payments that is attributed to past periods of member service.
Unfunded Actuarial Accrued Liability (UAAL)	The UAAL is the difference between actuarial accrued liability and valuation assets.
Valuation Assets	The valuation assets are the plan fiduciary net position used in determining the net position liability of the plan. For purposes of the GASB Statement No. 67, the asset valuation method is equal to the market value of assets.

Gabriel Roeder Smith & Company
Consultants & Actuaries

MINNESOTA STATE RETIREMENT SYSTEM

JUDGES RETIREMENT FUND

GASB STATEMENTS NO. 67 AND NO. 68 ACCOUNTING AND FINANCIAL REPORTING FOR PENSIONS

JUNE 30, 2016

GRS
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December 1, 2016

Minnesota State Retirement System
Judges Retirement Fund
St. Paul, Minnesota

Dear Board of Directors:

This report provides accounting and financial reporting information that is intended to comply with the Governmental Accounting Standards Board (GASB) Statements No. 67 and No. 68 for the Judges Retirement Fund ("JRF"), as amended by Statement No. 82. These calculations have been made on a basis that is consistent with our understanding of these accounting standards.

GASB Statement No. 67 is the accounting standard that applies to the financial reports issued by retirement systems. GASB Statement No. 68 establishes accounting and financial reporting for state and local government employers who provide their employees (including former employees) pension benefits through a trust. GASB Statement No. 82 is an amendment to Statements No. 67, No. 68, and No. 73, intended to improve consistency in the application of the accounting statements.

Our calculation of the liability associated with the benefits described in this report was performed for the purpose of providing financial reporting and disclosure information that satisfies the requirements of GASB Statements No. 67 and No. 68. The Net Pension Liability is not an appropriate measure for measuring the sufficiency of plan assets to cover the estimated cost of settling the employer's benefit obligations. The Net Pension Liability is not an appropriate measure for assessing the need for or amount of future employer contributions. The calculation of the plan's liability for this report may not be applicable for funding purposes of the plan. A calculation of the plan's liability for purposes other than satisfying the requirements of GASB Statement No. 67 may produce significantly different results. The information in this report is calculated on a total plan basis. MSRS is responsible for preparing the Schedule of Employer Allocations and the Schedule of Pension Amounts by Employer, as applicable. This report may be provided to parties other than the Minnesota State Retirement System (MSRS) in its entirety and only with the permission of MSRS. GRS is not responsible for unauthorized use of this report.

This report is based upon information, furnished to us by MSRS, concerning retirement and ancillary benefits, active members, deferred vested members, retirees and beneficiaries, and financial data. If your understanding of this information is different, please let us know. This information was checked for internal consistency, but it was not audited.

This report complements the actuarial valuation report for funding purposes that was or will be provided to the System and should be considered in conjunction with that report. Please see the actuarial valuation report as of June 30, 2016 for additional discussion of the nature of actuarial calculations and more information related to participant date, economic and demographic assumptions, and benefit provisions.

To the best of our knowledge, the information contained within this report is accurate and fairly represents the actuarial position of the Judges Retirement Fund as of the measurement date. All calculations have been made in conformity with generally accepted actuarial principles and practices as well as with the Actuarial Standards of Practice issued by the Actuarial Standards Board.

The signing actuaries are independent of the plan sponsor.

Brian B. Murphy and Bonita J. Wurst 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.

Respectfully submitted,

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

By Bonita J. Wurst
Bonita J. Wurst, ASA, EA, FCA, MAAA

BBM/BJW:sc

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SECTION A

EXECUTIVE SUMMARY

EXECUTIVE SUMMARY
AS OF JUNE 30, 2016 (DOLLARS IN THOUSANDS)

		2016
Actuarial Valuation Date		June 30, 2016
Measurement Date of the Net Pension Liability		June 30, 2016
Membership		
Number of		
- Service Retirements		250
- Survivors		80
- Disability Retirements		20
- Deferred Retirements		17
- Terminated other non-vested		0
- Active Members		311
- Total		678
Covered-Employee Payroll	$	45,418 [1]
Net Pension Liability		
Total Pension Liability	$	345,033
Plan Fiduciary Net Position		165,905
Net Pension Liability	$	179,128
Plan Fiduciary Net Position as a Percentage of Total Pension Liability		48.08%
Net Pension Liability as a Percentage of Covered-Employee Payroll		394.40%
Development of the Single Discount Rate		
Single Discount Rate		7.50%
Long-Term Expected Rate of Investment Return		7.50%
Long-Term Municipal Bond Rate [2]		2.85%
Last year ending June 30 in the 2017 to 2116 projection period for which projected benefit payments are fully funded		2116
Total Pension Expense/(Income)	$	5,720

Deferred Outflows and Deferred Inflows of Resources by Source Arising from Current and Prior Periods to be Recognized in Future Pension Expenses

	Deferred Outflows of Resources	Deferred Inflows of Resources
Difference between expected and actual experience in the measurement of Total Pension Liability	$ 7,740	$ 2,620
Changes in assumptions	13,018	71,972
Net difference between projected and actual earnings on pension plan investments	14,489	6,419
Total	$ 35,247	$ 81,011

[1] *Assumed equal to actual employer contributions divided by employer contribution rate.*

[2] *Based on the Bond Buyer 20-Bond Index of general obligation municipal bonds as of June 30, 2016*

DISCUSSION

Accounting Standard

For pension plans that are administered through trusts or equivalent arrangements, Governmental Accounting Standards Board (GASB) Statement No. 67, *Financial Reporting for Pension Plans,* establishes standards of financial reporting for separately issued financial reports and specifies the required approach for measuring the pension liability. Similarly, GASB Statement No. 68, *Accounting and Financial Reporting for Pensions,* establishes standards for state and local government employers (as well as non-employer contributing entities) to account for and disclose the net pension liability, pension expense, and other information associated with providing retirement benefits to their employees (and former employees) on their basic financial statements.

The following discussion provides a summary of the information that is required to be disclosed under these accounting standards. A number of these disclosure items are provided in this report. However, certain information, such as notes regarding accounting policies and investments, is not included in this report and the retirement system and/or plan sponsor will be responsible for preparing and disclosing that information to comply with these accounting standards.

Financial Statements

GASB Statement No. 68 requires state and local governmental employers to recognize the net pension liability and the pension expense on their financial statements. The net pension liability is the difference between the total pension liability and the plan's fiduciary net position. In traditional actuarial terms, this is analogous to the accrued liability less the market value of assets (not the smoothed actuarial value of assets that is often encountered in actuarial valuations performed to determine the employer's contribution requirement).

Paragraph 57 of GASB Statement No. 68 states, "Contributions to the pension plan from the employer subsequent to the measurement date of the collective net pension liability and before the end of the employer's reporting period should be reported as a deferred outflow of resources related to pensions." The information contained in this report does not incorporate any contributions made to JRF subsequent to the measurement date of June 30, 2016.

The pension expense recognized each fiscal year is equal to the change in the net pension liability from the beginning of the year to the end of the year, adjusted for deferred recognition of the difference between expected and actual experience in the measurement of the Total Pension Liability, assumption changes, and investment experience.

Pension plans that prepare their own, stand-alone financial statements are required to present two financial statements – a Statement of Fiduciary Net Position and a Statement of Changes in Fiduciary Net Position in accordance with GASB Statement No. 67. The *Statement of Fiduciary Net Position* presents the assets and liabilities of the pension plan at the end of the pension plan's reporting period. The *Statement of Changes in Fiduciary Net Position* presents the additions, such as contributions and investment income, and deductions, such as benefit payments and expenses, and net increase or decrease in the fiduciary net position.

Notes to Financial Statements

GASB Statement No. 68 requires the notes to the employer's financial statements to disclose the total pension expense, the pension plan's liabilities and assets, and deferred outflows and inflows of resources related to pensions.

Both GASB Statements No. 67 and No. 68 require the notes to the financial statements for the employers and pension plans to include certain descriptive information about the pension plans through which the pension benefits are provided. The list of disclosure items should include:

- a description of benefits provided by the plan;
- the classes of employees and number of members covered by the pension plan;
- a description of the plan's funding policy, which includes member and employer contribution requirements;
- the pension plan's investment policies;
- the pension plan's fiduciary net position, net pension liability, and the pension plan's fiduciary net position as a percentage of the total pension liability;
- the net pension liability using a discount rate that is 1% higher and 1% lower than the current discount rate used to calculate the total pension liability and net pension liability for financial reporting purposes;
- significant assumptions and methods used to calculate the total pension liability;
- inputs to the discount rates; and
- certain information about mortality assumptions and the dates of experience studies.

Retirement systems that issue stand-alone financial statements are required to disclose additional information in accordance with Statement No. 67. This information includes:

- the composition of the pension plan's Board and the authority under which benefit terms may be amended;
- a description of how fair value is determined;
- information regarding certain reserves and investments, which include concentrations of investments greater than or equal to 5%, receivables, and insurance contracts excluded from plan assets; and
- annual money-weighted rate of return.

MSRS' comprehensive annual financial report, which contains the basic financial statements and related note disclosures for the Judges Retirement Fund can be found online at www.msrs.state.mn.us/financial-information or obtained from MSRS at 60 Empire Drive, Suite 300, St. Paul, MN, 55103 or requested via email at info@msrs.us or telephone at 1-800-657-5757.

Required Supplementary Information

GASB Statement No. 67 requires a 10-year fiscal history of:

- sources of changes in the net pension liability;
- information about the components of the net pension liability and related ratios, including the pension plan's fiduciary net position as a percentage of the total pension liability, and the net pension liability as a percent of covered-employee payroll; and
- comparison of the actual employer contributions to the actuarially determined contributions based on the plan's funding policy.

Measurement of the Net Pension Liability

The net pension liability is to be measured as the total pension liability, less the amount of the pension plan's fiduciary net position. In actuarial terms, this will be the accrued liability less the market value of assets (not the smoothed actuarial value of assets that is often encountered in actuarial valuations performed to determine the employer's contribution requirement).

General Implications of Contribution Allocation Procedure or Funding Policy on Future Expected Plan Contributions and Funded Status

Given the plan's contribution allocation procedure, if all actuarial assumptions are met (including the assumption of the plan earning 7.50% on the actuarial value of assets), then the following outcomes are expected:

1. The employer normal cost as a percentage of pay is expected to decline as a percentage of payroll.
2. The unfunded liability is expected to be paid off in approximately 41 years.
3. The funded status of the plan is expected to reach a 100% funded ratio in approximately 41 years.

The projections in this report are strictly for the purpose of determining the GASB single discount rate and are different from a funding projection for the ongoing plan.

Limitations of Funded Status Measurements

Unless otherwise indicated, a funded status measurement presented in this report is based upon the actuarial accrued liability and the actuarial value of assets. Unless otherwise indicated, with regard to any funded status measurements presented in this report:

(1) The measurement is inappropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations, in other words of transferring the obligations to an unrelated third party in an arm's length market value type transaction.
(2) The measurement is dependent upon the actuarial cost method which, in combination with the plan's amortization policy, affects the timing and amounts of future contributions. The amounts of future contributions will most certainly differ from those assumed in this report due to future actual experience differing from assumed experience based upon the actuarial assumptions. A funded status measurement in this report of 100% is not synonymous with no required future contributions. If the funded status were 100%, the plan would still require future normal cost contributions (i.e., contributions to cover the cost of the active membership accruing an additional year of service credit).
(3) The measurement would produce a different result if the market value of assets were used instead of the actuarial value of assets, unless the market value of assets is used in the measurement.

Limitation of Project Scope

Actuarial standards do not require the actuary to evaluate the ability of the plan sponsor or other contributing entity to make required contributions to the plan when due. Such an evaluation was not within the scope of this project and is not within the actuary's domain of expertise. Consequently, the actuary performed no such evaluation.

Timing of the Valuation

GASB Statement Nos. 67 and 68 require that an actuarial valuation to determine the total pension liability be performed at least every two years. The net pension liability and pension expense should be measured as of the pension plan's fiscal year end (measurement date) on a date that is within the employer's prior fiscal year. If the actuarial valuation used to determine the total pension liability is not calculated as of the measurement date, the total pension liability is required to be rolled forward from the actuarial valuation date to the measurement date.

The total pension liability shown in this report is based on an actuarial valuation performed as of June 30, 2016 and a measurement date of June 30, 2016.

Single Discount Rate

Projected benefit payments are required to be discounted to their actuarial present values using a single discount rate that reflects (1) a long-term expected rate of return on pension plan investments (to the extent that the plan's fiduciary net position is projected to be sufficient to pay benefits) and (2) tax-exempt municipal bond rate based on an index of 20-year general obligation bonds with an average AA credit rating as of the measurement date (to the extent that the contributions for use with the long-term expected rate of return are not met).

For the purpose of this valuation, the long-term expected rate of return on pension plan investments is 7.50%; the municipal bond rate is 2.85% (based on the weekly rate closest to but not later than the measurement date of the Bond Buyer 20-Year GO Index); and the resulting single discount rate is 7.50%. The long-term expected rate of return is based on a review of inflation and investment assumptions, dated September 11, 2014, and a recent asset liability study obtained by the Minnesota State Board of Investment.

Effective Date and Transition

GASB Statements No. 67 and No. 68 are effective for fiscal years beginning after June 15, 2013, and June 15, 2014 respectively. Earlier application is encouraged by the GASB. MSRS first implemented GASB Statement No. 67 for fiscal year 2014.

SECTION B

FINANCIAL STATEMENTS

Pension Expense Under GASB Statement No. 68
Fiscal Year Ended June 30, 2016 (Dollars in Thousands)

A. Expense			
1.	Service Cost	$	13,711
2.	Interest on the Total Pension Liability		21,349
3.	Current-Period Benefit Changes		0
4.	Employee Contributions (made negative for addition here)		(3,763)
5.	Projected Earnings on Plan Investments (made negative for addition here)		(13,456)
6.	Pension Plan Administrative Expense		93
7.	Other Changes in Plan Fiduciary Net Position		0
8.	Recognition of Outflow (Inflow) of Resources due to differences between expected and actual experience in the measurement of the Total Pension Liability		
	Arising from Current Reporting Period		1,427
9.	Recognition of Outflow (Inflow) of Resources due to assumption changes		
	Arising from Current Reporting Period		(17,151)
10.	Recognition of Outflow (Inflow) of Resources due to the difference between projected (7.90%) and actual earnings on Pension Plan Investments		
	Arising from Current Reporting Period		2,728
11.	**Increases/(Decreases) from Experience in the Current Reporting Period**	**$**	**4,938**
12.	Recognition of Outflow (Inflow) of Resources due to differences between expected and actual experience in the measurement of the Total Pension Liability		
	Arising from Prior Reporting Periods		143
13.	Recognition of Outflow (Inflow) of Resources due to assumption changes		
	Arising from Prior Reporting Periods		2,656
14.	Recognition of Outflow (Inflow) of Resources due to the difference between projected (7.90%) and actual earnings on Pension Plan Investments		
	Arising from Prior Reporting Periods		(2,017)
15.	**Total Pension Expense / (Income)**	**$**	**5,720**

Statement of Outflows and Inflows Arising from Current Reporting Period Fiscal Year Ended June 30, 2016 (Dollars in Thousands)

A. Outflows (Inflows) of Resources due to Liabilities		
1. Difference between expected and actual experience of the Total Pension Liability (gains) or losses	$	7,135
2. Assumption Changes (gains) or losses	$	(85,756)
3. Recognition period for Liabilities: Average of the expected remaining service lives of all employees {in years}		5.0000
4. Outflow (Inflow) of Resources to be recognized in the current pension expense for the difference between expected and actual experience of the Total Pension Liability	$	1,427
5. Outflow (Inflow) of Resources to be recognized in the current pension expense for Assumption Changes	$	(17,151)
6. Outflow (Inflow) of Resources to be recognized in the current pension expense due to Liabilities	$	(15,724)
7. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses for the difference between expected and actual experience of the Total Pension Liability	$	5,708
8. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses for Assumption Changes	$	(68,605)
9. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses due to Liabilities	$	(62,897)
B. Outflows (Inflows) of Resources due to Assets		
1. Net difference between projected and actual earnings on pension plan investments (gains) or losses	$	13,642
2. Recognition period for Assets {in years}		5.0000
3. Outflow (Inflow) of Resources to be recognized in the current pension expense due to Assets	$	2,728
4. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses due to Assets	$	10,914

STATEMENT OF OUTFLOWS AND INFLOWS ARISING FROM CURRENT AND PRIOR REPORTING PERIODS
FISCAL YEAR ENDED JUNE 30, 2016 (DOLLARS IN THOUSANDS)

A. Outflows and Inflows of Resources due to Liabilities and Assets to be Recognized in Current Pension Expense

	Outflows of Resources	Inflows of Resources	Net Outflows/ (Inflows) of Resources
1. Due to Liabilities	$ 6,782	$ 19,707	$ (12,925)
2. Due to Assets	3,920	3,209	711
3. Total	$ 10,702	$ 22,916	$ (12,214)

B. Outflows and Inflows of Resources by Source to be Recognized in Current Pension Expense

	Outflows of Resources	Inflows of Resources	Net Outflows/ (Inflows) of Resources
1. Differences between expected and actual experience	$ 2,443	$ 873	$ 1,570
2. Assumption Changes	4,339	18,834	(14,495)
3. Net Difference between projected and actual earnings on pension plan investments	3,920	3,209	711
4. Total	$ 10,702	$ 22,916	$ (12,214)

C. Deferred Outflows and Deferred Inflows of Resources by Source to be Recognized in Future Pension Expenses

	Deferred Outflows of Resources	Deferred Inflows of Resources	Net Deferred Outflows/ (Inflows) of Resources
1. Differences between expected and actual experience	$ 7,740	$ 2,620	$ 5,120
2. Assumption Changes	13,018	71,972	(58,954)
3. Net Difference between projected and actual earnings on pension plan investments	14,489	6,419	8,070
4. Total	$ 35,247	$ 81,011	$ (45,764)

D. Deferred Outflows and Deferred Inflows of Resources by Year to be Recognized in Future Pension Expenses

Year Ending June 30	Net Deferred Outflows/ (Inflows) of Resources
2017	$ (12,214)
2018	(12,215)
2019	(8,339)
2020	(12,996)
2021	0
Thereafter	0
Total	$ (45,764)

STATEMENT OF FIDUCIARY NET POSITION AS OF JUNE 30, 2016 (DOLLARS IN THOUSANDS)

Assets		**June 30, 2016**
Cash & Short-term Investments	$	5,048
Receivables		174
Investment Pools (at fair value)		160,823
Securities Lending Collateral		23,332
Capital Assets		0
Total Assets	**$**	**189,377**
Total Deferred Outflows of Resources	**$**	**0**
Total Liabilities	**$**	**(23,472)**
Total Deferred Inflows of Resources	**$**	**0**
Net Position Restricted for Pensions	**$**	**165,905**

STATEMENT OF CHANGES IN FIDUCIARY NET POSITION FOR THE FISCAL YEAR ENDED JUNE 30, 2016 (DOLLARS IN THOUSANDS)

1. Net position at market value at beginning of year	**$**	**174,580**
Additions		
2. Contributions		
a. Employee	$	3,763
b. Employer		10,219
c. Other sources		0
d. Total contributions	$	13,982
3. Investment income		
a. Investment income/(loss)	$	36
b. Investment expenses		(222)
c. Net investment income/(loss)	$	(186)
4. Other Additions		0
5. Total Additions *(2.d.) + (3.c.) + (4.)*	**$**	**13,796**
Deductions		
6. Benefits Paid		
a. Annuity benefits	$	(22,378)
b. Refunds		0
c. Total benefits paid	$	(22,378)
7. Expenses		
a. Other deductions	$	0
b. Administrative		(93)
c. Total expenses	$	(93)
8. Total deductions *(6.c.) + (7.c.)*	**$**	**(22,471)**
9. Net increase/(decrease) in fiduciary net position *(5.) + (8.)*	**$**	**(8,675)**
10. Net position at market value at end of year *(1.) + (9.)*	**$**	**165,905**
11. State Board of Investment calculated annual investment return		-0.1%

SECTION C

REQUIRED SUPPLEMENTARY INFORMATION

Schedule of Changes in Net Pension Liability and Related Ratios
Current Period
Fiscal Year Ended June 30, 2016 (Dollars in Thousands)

A. Total pension liability			
1. Service Cost	$	13,711	
2. Interest on the Total Pension Liability		21,349	
3. Changes of benefit terms		0	
4. Difference between expected and actual experience of the Total Pension Liability		7,135	(1)
5. Changes of assumptions		(85,756)	(2)
6. Benefit payments, including refunds of employee contributions		(22,378)	
7. Net change in total pension liability	$	(65,939)	
8. Total pension liability – beginning		410,972	
9. Total pension liability – ending	**$**	**345,033**	
B. Plan fiduciary net position			
1. Contributions – employer	$	10,219	
2. Contributions – employee		3,763	
3. Net investment income		(186)	
4. Benefit payments, including refunds of employee contributions		(22,378)	
5. Pension Plan Administrative Expense		(93)	
6. Other changes		0	
7. Net change in plan fiduciary net position	$	(8,675)	
8. Plan fiduciary net position – beginning		174,580	
9. Plan fiduciary net position – ending	**$**	**165,905**	
C. Net pension liability, *A.9 - B.9.*	**$**	**179,128**	
D. Plan fiduciary net position as a percentage of the total pension liability, *B.9 / A.9.*		**48.08%**	
E. Covered-employee payroll	**$**	**45,418**	(3)
F. Net pension liability as a percentage of covered-employee payroll, *C. / E.*		**394.40%**	

[1] *Includes impact of changes in expected timing of future post-retirement benefit increases.*
[2] *Assumption changes are summarized on page 26.*
[3] *Assumed equal to actual employer contributions divided by employer contribution rate.*

SCHEDULES OF REQUIRED SUPPLEMENTARY INFORMATION

SCHEDULE OF CHANGES IN NET PENSION LIABILITY AND RELATED RATIOS MULTIYEAR (DOLLARS IN THOUSANDS)

Last 10 Fiscal Years (which will be built prospectively)

Fiscal year ending June 30,	2016	2015	2014	2013	2012	2011	2010	2009	2008	2007
Total Pension Liability										
Service Cost	$ 13,711	$ 12,251	$ 12,075							
Interest on the Total Pension Liability	21,349	21,773	20,535							
Benefit Changes	0	0	0							
Difference between Expected and Actual Experience	7,135 (1)	(4,366)	5,080							
Assumption Changes	(85,756) (2)	21,696	(8,416)							
Benefit Payments	(22,378)	(21,893)	(20,802)							
Refunds	0	0	0							
Net Change in Total Pension Liability	$ (65,939)	29,461	8,472							
Total Pension Liability - Beginning	410,972	381,511	373,039							
Total Pension Liability - Ending (a)	**$ 345,033**	**$ 410,972**	**$ 381,511**							
Plan Fiduciary Net Position										
Employer Contributions	$ 10,219	$ 9,776	$ 9,426							
Employee Contributions	3,763	3,629	3,578							
Pension Plan Net Investment Income	(186)	7,572	28,011							
Benefit Payments	(22,378)	(21,893)	(20,802)							
Refunds	0	0	0							
Pension Plan Administrative Expense	(93)	(60)	(55)							
Other Changes	0	0	0							
Net Change in Plan Fiduciary Net Position	**$ (8,675)**	**(976)**	**20,158**							
Plan Fiduciary Net Position - Beginning	**174,580**	**175,556**	**155,398**							
Plan Fiduciary Net Position - Ending (b)	**$ 165,905**	**$ 174,580**	**$ 175,556**							
Net Pension Liability - Ending (a) - (b)	**$ 179,128**	**236,392**	**205,955**							
Plan Fiduciary Net Position as a Percentage of Total Pension Liability	**48.08 %**	**42.48 %**	**46.02 %**							
Covered-Employee Payroll(3)	**$ 45,418**	**$ 43,449**	**$ 41,893**							
Net Pension Liability as a Percentage of Covered-Employee Payroll	**394.40 %**	**544.07 %**	**491.62 %**							

Notes to Schedule:

(1) *Includes impact of changes in expected timing of future post-retirement benefit increases.*
(2) *Assumption changes are summarized on page 26.*
(3) *Assumed equal to actual employer contributions divided by employer contribution rate.*

SCHEDULES OF REQUIRED SUPPLEMENTARY INFORMATION
SCHEDULE OF NET PENSION LIABILITY MULTIYEAR (DOLLARS IN THOUSANDS)

Fiscal Year Ending June 30,	Total Pension Liability	Plan Net Position	Net Pension Liability	Plan Net Position as a % of Total Pension Liability	Covered-Employee Payroll	Net Pension Liability as a % of Covered-Employee Payroll
	(a)	(b)	(a) - (b) = (c)	(b)/(c)	(d)	(c)/(d)
2007						
2008						
2009						
2010						
2011						
2012						
2013						
2014	$ 381,511	$ 175,556	$ 205,955	46.02%	$ 41,893	491.62%
2015	410,972	174,580	236,392	42.48%	43,449	544.07%
2016	345,033	165,905	179,128	48.08%	45,418	394.40%

SCHEDULE OF CONTRIBUTIONS MULTIYEAR (DOLLARS IN THOUSANDS)

Last 10 Fiscal Years

Fiscal Year Ending June 30,	Actuarially Determined Contribution [1]	Actual Contributions	Contribution Deficiency (Excess)	Covered-Employee Payroll	Actual Contributions as a % of Covered-Employee Payroll
	(a)	(b)	(a) - (b) = (c)	(d)	(b)/(d)
2007	$ 8,331	$ 7,572	$ 759	$ 36,195	20.92%
2008	10,045	7,936	2,109	38,296	20.72
2009	8,985	8,219	766	39,444	20.84
2010	9,400	8,283	1,117	39,291	21.08
2011	9,804	8,297	1,507	40,473	20.50
2012	9,879	7,922	1,957	38,644 [2]	20.50
2013	13,524	8,177	5,347	39,888 [2]	20.50
2014	14,193	9,426	4,767	41,893 [2]	22.50
2015	14,298	9,776	4,522	43,449 [2]	22.50
2016	15,644	10,219	5,425	45,418 [2]	22.50

NOTES TO SCHEDULE OF CONTRIBUTIONS

Valuation Date:	June 30, 2016
Notes	(1) Actuarially determined contribution rates are calculated as of each June 30 and apply to the fiscal year beginning on the day after the measurement date. (2) Assumed equal to actual employer contributions divided by employer contribution rate.

Methods and Assumptions Used to Determine Contribution Rates Reported in this Schedule:

Actuarial Cost Method	Entry Age Normal
Amortization Method	Level Percentage of Payroll, Closed
Remaining Amortization Period	23 years
Asset Valuation Method	5-Year smoothed market; no corridor
Inflation	2.75%
Payroll Increases	2.75%
Salary Increases	2.75%
Investment Rate of Return	8.00%
Retirement Age	Experience-based table of rates that are specific to the type of eligibility condition. Last updated for the 2012 valuation pursuant to an experience study of the period 2007 - 2011, prepared by a former actuary.
Healthy Post-Retirement Mortality	RP-2000 annuitant generational mortality table, projected with mortality improvement scale AA, white collar adjustment, set back one year for males and set back two years for females.

Other Information:

Benefit Increases After Retirement	The post-retirement increase is assumed to be 1.75% per year through 2034, 2% per year from 2035 through 2045, and 2.5% per year thereafter..

See separate funding actuarial valuation report as of July 1, 2016 for additional detail. To obtain this report, contact MSRS at 60 Empire Drive, Suite 300, St. Paul, MN, 55103 or request via email at info@msrs.us or telephone at 1-800-651-5757.

This report can be found online at www.msrs.state.mn.us/actuarial-reports.

SCHEDULE OF INVESTMENT RETURNS MULTIYEAR

Last 10 Fiscal Years

Fiscal Year Ending June 30,	Annual Return[1]
2007	
2008	
2009	
2010	
2011	
2012	
2013	
2014	18.66 %
2015	4.45
2016	(0.11)

[1] *Annual money-weighted rate of return, net of investment expenses.*

The Minnesota State Board of Investment (SBI) compiled this data and the related investment notes and provided it to MSRS for GASB-compliance purposes. MSRS furnished this information to us for inclusion within this report. We did not audit this information. We are not responsible for its accuracy or completeness.

Rate of Return

For the fiscal year ended June 30, 2016, the annual money-weighted rate of return for the Judges Retirement Fund was (0.11) %. The money-weighted rate of return is a method of calculating period-by-period returns on pension plan investments that adjusts for the changing amounts actually invested. For purposes of this schedule, the money-weighted rate of return is calculated as the internal rate of return on pension plan investments, net of pension plan investment expense.

10-Year Schedule of Money-Weighted Investment Return

Ten-year data is not available. Additional years will be provided when they become available.

To request additional information about the computation of the annual money-weighted rate of return and the investments for the Minnesota Retirement Systems (including the investments for MSRS' defined benefit retirement funds), contact SBI at 60 Empire Drive, Suite 355, St. Paul, Minnesota, 55103, via email at minn.sbi@state.mn.us or telephone at (651) 296-3328.

SECTION D

ADDITIONAL FINANCIAL STATEMENT DISCLOSURES

ASSET ALLOCATION

Long-Term Expected Return on Plan Assets

The long-term expected rate of return on pension plan investments was determined using a building-block method. Best estimates for expected future real rates of return (expected returns, net of inflation) were developed for each asset class using both long-term historical returns and long-term capital market expectation from a number of investment management and consulting organizations. The asset class estimates and the target allocations were then combined to produce geometric, long-term expected real rate of return for the portfolio. Inflation expectations were applied to derive the nominal rate of return for the portfolio. For each asset class that is included in the pension fund's target asset allocation as of June 30, 2016, these best estimates are summarized in the following table:

Asset Class	Target Allocation	Long-Term Expected Real Rate of Return (Geometric)
Domestic Stocks	45.00%	5.50%
International Stocks	15.00%	6.00%
Bonds	18.00%	1.45%
Alternative Assets	20.00%	6.50%
Unallocated Cash	2.00%	0.50%
Total	100.00%	

The Minnesota State Board of Investment (SBI) compiled this data and the related investment notes and provided it to MSRS for GASB-compliance purposes. MSRS furnished this information to us for inclusion within this report. We did not audit this information. We are not responsible for its accuracy or completeness.

At MSRS' direction, for purposes of this valuation, the long-term expected rate of return assumption is 7.50%. This assumption is based on a review of inflation and investment return assumptions dated September 11, 2014, and a recent asset liability study obtained by the SBI.

SENSITIVITY OF NET PENSION LIABILITY TO THE SINGLE DISCOUNT RATE ASSUMPTION

Single Discount Rate

A single discount rate of 7.50% was used to measure the total pension liability. This single discount rate was based on the expected rate of return on pension plan investments of 7.50%. The projection of cash flows used to determine this single discount rate assumed that member, employer, and state contributions will be made at the current statutory contribution rates. Based on these assumptions, due to the additional state contributions reflected in the projection, the pension plan's fiduciary net position and future contributions were projected to be available to make all projected future benefit payments of current plan members. As a result, the long-term expected rate of return on pension plan investments was applied to all periods of projected benefit payments to determine the total pension liability.

Regarding the sensitivity of the net pension liability to changes in the single discount rate, the following presents the fund's net pension liability, calculated using a single discount rate of 7.50%, as well as what the fund's net pension liability would be if it were calculated using a single discount rate that is 1-percentage-point lower (6.50%) or 1-percentage-point higher (8.50%) than the current single discount rate:

Sensitivity of Net Pension Liability

to the Single Discount Rate Assumption

(Dollars in Thousands)

	1% Decrease 6.50%	Current Single Discount Rate Assumption 7.50%	1% Increase 8.50%
Total Pension Liability	$379,111	$345,033	$315,686
Net Position Restricted for Pensions	$165,905	$165,905	$165,905
Net Pension Liabitliy	**$213,206**	**$179,128**	**$149,781**

A single discount rate of 5.25% was used for the measurement date as of July 1, 2015. For more information on the calculation of the single discount rate, refer to Section G of this report.

GASB Statement No. 68 Reconciliation (Dollars in Thousands)

	Total Pension Liability (a)	Plan Fiduciary Net Position (b)	Net Pension Liability (a) - (b)	Deferred Outflows	Deferred Inflows	Total Pension Expense
Balance Beginning of Year	**$ 410,972**	**$ 174,580**	**$ 236,392**	**$ 25,172**	**$ 18,171**	
Changes for the Year:						
Service Cost	$ 13,711		$ 13,711			$ 13,711
Interest on Total Pension Liability	21,349		21,349			21,349
Interest on Plan Fiduciary Net Position (1)		$ 13,456	(13,456)			(13,456)
Changes in Benefit Terms						
Liability Experience Gains and Losses	7,135		7,135	$ 5,708		1,427
Changes in Assumptions	(85,756)		(85,756)		$ 68,605	(17,151)
Recognition of Deferred Outflows/(Inflows) of Resources Arising from Prior Reporting Periods						
Liability Experience Gains/(Losses)				(1,016)	(873)	143
Assumption Changes				(4,339)	(1,683)	2,656
Investment Gains/(Losses)				(1,192)	(3,209)	(2,017)
Contributions - Employer		10,219	(10,219)			
Contributions - Employees		3,763	(3,763)			(3,763)
Asset Gain/(Loss) (1)		(13,642)	13,642	10,914		2,728
Benefit Payments and Refunds	(22,378)	(22,378)	0			
Administrative Expenses		(93)	93			93
Other Changes						
Net Changes	**$ (65,939)**	**$ (8,675)**	**$ (57,264)**	**$ 10,075**	**$ 62,840**	**$ 5,720**
Balance End of Year	**$ 345,033**	**$ 165,905**	**$ 179,128**	**$ 35,247**	**$ 81,011**	

(1) The sum of these items equals the net investment income of $(186).

SUMMARY OF POPULATION STATISTICS

		Terminated		Recipients			
	Actives*	Deferred Retirement	Other Non-Vested	Service Retirement	Disability Retirement	Survivor	Total
Members on 7/1/2015	**312**	**16**	**0**	**240**	**23**	**83**	**674**
New members	16	0	0	0	0	0	**16**
Return to active	0	0	0	0	0	0	**0**
Terminated non-vested	0	0	0	0	0	0	**0**
Service retirements	(14)	(2)	0	16	0	0	**0**
Terminated deferred	(3)	3	0	0	0	0	**0**
Terminated refund/transfer	0	0	0	0	0	0	**0**
Deaths	0	0	0	(6)	(3)	(7)	**(16)**
New beneficiary	0	0	0	0	0	4	**4**
Disabled	0	0	0	0	0	0	**0**
Unexpected status changes	0	0	0	0	0	0	**0**
Net change	(1)	1	0	10	(3)	(3)	**4**
Members on 6/30/2016	**311**	**17**	**0**	**250**	**20**	**80**	**678**

* *Includes active Judges who have reached the maximum benefit formula (employee contributions are directed to the Unclassified Employees Retirement Plan).*

SECTION E

SUMMARY OF BENEFITS

SUMMARY OF PLAN PROVISIONS

Following is a summary of the major plan provisions used in the valuation of this report. MSRS is solely responsible for the validity, accuracy and comprehensiveness of this information. If any of the plan provisions shown below are not accurate and complete, the valuation results may differ significantly from those shown in this report and may require a revision of this report.

Plan year	July 1 through June 30
Eligibility	A judge or justice of any court. If the member was active prior to January 1, 1974, benefits may be computed according to provisions of the prior plan.
Tier 1 / Tier 2 Member	Tier 1 includes judges or justices first appointed or elected before July 1, 2013 and Tier 2 includes judges or justices first appointed or elected after June 30, 2013. A judge or justice with less than five years of service as of December 30, 2013 may make a one-time irrevocable election into Tier 2. For the purpose of this valuation, we have assumed no Tier 1 members elected Tier 2 benefits as of the valuation date.
Contributions	
Member	9.00% of salary for Tier 1 members, 7.00% of salary for Tier 2 members. Tier 1 member contributions after maximum benefit is reached are redirected to the Unclassified Employees Retirement Plan.
Employer	22.50% of salary. Member contributions are "picked up" according to the provisions of Internal Revenue Code 414(h).
State Contributions	$3,000,000 for the year ending June 30, 2017 and $6,000,000 per year thereafter until the plan is fully funded.
Allowable service	Service as a judge. Credit may also be earned for uncredited judicial service if the appropriate employee contributions, with interest, are made.
Salary	Salary set by law.
Average salary	Average of the five highest years of salary of the last 10 years prior to termination of judicial service.

SUMMARY OF PLAN PROVISIONS (CONTINUED)

Retirement

Normal retirement benefit

Age/Service requirement

First appointed as a judge before July 1, 2013 (Tier 1):
(a.) Age 65 and five years of Allowable Service
(b.) Age 70 (mandatory retirement age)

First appointed as a judge after June 30, 2013 (Tier 2):
(a.) Age 66 and five years of Allowable Service
(b.) Age 70 (mandatory retirement age)

Judges appointed before July 1, 2013 with less than five years of allowable service on or before December 31, 2013 may make a one-time election for the Tier 2 benefit package.

Amount

First appointed as a judge before July 1, 2013 (Tier 1): 2.70% of Average Salary for each year of Allowable Service prior to July 1, 1980 and 3.20% of Average Salary for each year of Allowable Service after June 30, 1980. Maximum benefit equal to 76.80% of Average Salary.

First appointed as a judge after June 30, 2013 (Tier 2): 2.50% of Average Salary for each year of Allowable Service

Tier 1 who elected into Tier 2: 3.20% of Average Salary for each year of Allowable Service prior to January 1, 2014 plus 2.50% of Average Salary for each year of Allowable Service after December 31, 2013.

Early retirement

Age/Service requirement

Age 60 and five years of Allowable Service.

Amount

Normal Retirement Benefit based on Allowable Service and Average Salary at retirement date with reduction of 0.50% for each month the member is under Normal Retirement Age at time of retirement.

Form of payment

Life annuity. Actuarially equivalent options are:
(a.) 50%,75% or 100% joint and survivor with no bounce back feature
(b.) 50%, 75% or 100% bounce back feature
(c.) 15-year certain and life thereafter

Benefit increases

Since January 1, 2014, benefit recipients receive annual 1.75% benefit increases. If the accrued liability funding ratio reaches 70% for two consecutive years (on a Market Value of Assets basis), the benefit increase will revert to 2.00%. If the accrued liability funding ratio reaches 90% for two consecutive years (on a Market Value of Assets basis), the benefit increase will revert to 2.50%.

A benefit recipient who has been receiving a benefit for at least 12 full months as of the June 30 of the calendar year immediately before the adjustment will receive a full increase. Members receiving benefits for at least one month but less than 12 full months as of the June 30 of the calendar year immediately before the adjustment will receive a pro rata increase.

SUMMARY OF PLAN PROVISIONS (CONTINUED)

Disability	
Disability benefit	
Age/Service requirement	Permanent inability to perform the function of judge.
Amount	No benefit is paid by the Fund. Instead, salary is continued for one year but not beyond age 70. Employee contributions continue and Allowable Service is earned. If disability continues after the first year (or at age 70 if earlier), the larger of 25.00% of Average Salary or the Normal Retirement Benefit, without reduction.
Retirement after disability	
Age/Service requirement	Member is still disabled after salary payments cease after one year or at age 70, if earlier.
Amount	No change in disability benefit amount from pre-retirement computed benefit amount.
Form of payment	Same as for retirement.
Benefit increases	Same as for retirement.
Death	
Survivor's benefit	
Age/service requirement	Active or disabled member dies before retirement or a former member eligible for a deferred annuity dies.
Amount	Larger of 25% of Average Salary or 60% of Normal Retirement Benefit earned at date of death. If member dies after age 60 with five or more years of service, spouse may receive the 100% joint and survivor benefit the member had earned as of date of death. Benefit paid to spouse for life. If no spouse, benefit is paid to surviving dependent children until child marries, dies, or attains age 18 (age 22 if full-time student).
Benefit increases	Same as for retirement.
Refund of contributions	
Age/service requirement	Member dies prior to retirement or former member eligible for a deferred annuity dies and survivors' benefits are not payable.
Amount	Member contributions with 6.00% annual interest compounded daily until June 30, 2011 and 4.00% thereafter.

SUMMARY OF PLAN PROVISIONS (CONCLUDED)

Termination	
<u>Refund of contributions</u>	
Age/Service requirement	Termination of service as a judge.
Amount	Member contributions with 6.00% annual interest compounded daily until June 30, 2011, 4.00% thereafter. If a member is vested, a deferred annuity may be elected in lieu of a refund.
<u>Deferred benefit</u>	
Age/service requirement	Five years of Allowable Service.
Amount	Benefit computed under law in effect at termination. Amount is payable at normal or early retirement. If a member terminated employment prior to July 1, 1997 but was not eligible to commence their pension before July 1, 1997, an actuarial increase shall be made for the change in the post-retirement interest rates from 5.00% to 6.00%.
Form of payment	Same as for retirement.
Optional form conversion factors	Actuarially equivalent factors based on RP-2000 for healthy annuitants, white collar adjustment, projected to 2022 using scale AA, set back one year for males and set back two years for females, blended 80% males, and 6.5% interest.
Combined service annuity	Members are eligible for combined service benefits if they: (a.) Have sufficient allowable service in total that equals or exceeds the applicable service credit vesting requirement of the retirement plan with the longest applicable service credit vesting requirement; (b.) Have at least six months of allowable service credit in each plan worked under; and (c.) Are not in receipt of a benefit from another plan, or have applied for benefits with an effective date within one year. Members who meet the above requirements must have their benefit based on the following: (a.) Allowable service in all covered plans are combined in order to determine eligibility for early retirement; (b.) Average salary is based on the high five consecutive years during their entire service in all covered plans.
Changes in plan provisions	2016 legislation provides state contributions equal to $3,000,000 for the fiscal year ending June 30, 2017, and $6,000,000 per year thereafter until the plan is fully funded.

SECTION F

ACTUARIAL COST METHOD AND ACTUARIAL ASSUMPTIONS

ACTUARIAL METHODS USED FOR THE DETERMINATION OF TOTAL PENSION LIABILITY AND RELATED VALUES

Actuarial Cost Method

Normal cost and the allocation of benefit values between service rendered before and after the valuation date were determined using an **Individual Entry-Age Actuarial Cost Method** having the following characteristics:

(i) the annual normal cost for each individual active member, payable from the date of employment to the date of retirement, is sufficient to accumulate the value of the member's benefit at the time of retirement;

(ii) each annual normal cost is a constant percentage of the member's year by year projected covered pay.

Actuarial gains/(losses), as they occur, reduce (increase) the Total Pension Liability.

Valuation of Future Post-Retirement Benefit Increases

Benefit recipients receive a future annual 1.75% post-retirement benefit increase. If the funding ratio (determined on a market value of assets basis) reaches 70% (based on a 2.00% post-retirement benefit increase assumption) for two consecutive years, the benefit increase will increase to 2.00%, if the funding ratio reaches 90% (based on a 2.50% post-retirement benefit increase assumption) for two consecutive years, the benefit increase revert to 2.50%.

To determine an assumption regarding a future change in the post-retirement benefit increase, we performed a projection of liabilities and assets based on the following methods and assumptions:

- Future investment returns of 7.50%
- Liabilities and normal cost based on statutory funding assumptions
  - Discount rate of 8.00%
  - Statutory salary increases of 2.75%
- Open group; stable active population (new member profile based on average new members hired in recent years)
- The post-retirement benefit increase rate is assumed to be 1.75% per year until the funding ratio threshold required to pay a 2.00% post-retirement benefit increase is reached and is assumed to be 2.00% per year until the threshold required to pay a 2.50% post-retirement benefit increase is reached
- Current statutory contributions (i.e. not including potential contribution increases under the contribution stabilizer statutes) as directed by MSRS

Based on these assumptions and methods, the projection indicates that this plan is expected to pay 1.75% per annum through 2041, 2.00% per annum for the years 2042 through 2054, and 2.50% per annum thereafter. This assumption is reflected in our calculations.

Asset Valuation Method

Fair value of assets.

SUMMARY OF ACTUARIAL ASSUMPTIONS USED FOR THE DETERMINATION OF TOTAL PENSION LIABILITY AND RELATED VALUES

The following assumptions were used in valuing the liabilities and benefits under the plan. The demographic assumptions are based on the last experience study, dated February 2012, prepared by a former actuary. The economic assumptions are based on a review of inflation and investment return assumptions dated September 11, 2014, and a recent asset liability study obtained by the SBI.

Investment return	7.50% per annum.
Single discount rate	7.50% per annum.
Benefit increases after retirement	1.75% per annum through 2041, 2.00% per annum for the years 2042 through 2054, and 2.50% per annum thereafter.
Salary increases	2.50% per year.
Payroll growth	2.50% per year.
Inflation	2.50% per year.
Mortality rates	
Healthy pre-retirement	RP-2000 employee generational mortality table projected using mortality improvement scale AA, white collar adjustment.
Healthy post-retirement	RP-2000 annuitant generational mortality table projected with mortality improvement scale AA, white collar adjustment, set back one year for males and set back two years for females. The RP-2000 employee mortality table as published by the Society of Actuaries (SOA) contains mortality rates for ages 15 to 70 and the annuitant mortality table contains mortality rates for ages 50 to 95. We have applied the annuitant mortality table for active members beyond age 70 until the assumed retirement age and the employee mortality table for annuitants younger than age 50.
Disabled	RP-2000 annuitant generational mortality table projected with mortality improvement scale AA, white collar adjustment, set back one year for males and set back two years for females.
Retirement	Members retiring from active status are assumed to retire according to the age related rates shown in the rate table. Members who have attained the highest assumed retirement age are assumed to retire in one year.
Withdrawal	None.

SUMMARY OF ACTUARIAL ASSUMPTIONS (CONTINUED)

Disability	Age-related rates based on experience; see table of sample rates.
Administrative expenses	In the valuation year, equal to prior year administrative expenses expressed as a percentage of prior year projected payroll. In each subsequent year, equal to the initial administrative expense percentage applied to payroll for the closed group.
Refund of contributions	Account balances for deferred members accumulate interest until normal retirement date and are discounted back to the valuation date.
Commencement of deferred benefits	Members receiving deferred annuities (including current terminated deferred members) are assumed to begin receiving benefits at age 65.
Percentage married	Marital status as indicated by data.
Age of spouse	Females are assumed to be three years younger than their male spouses.
Form of payment	Members are assumed to elect a life annuity.
Eligibility testing	Eligibility for benefits is determined based upon the age nearest birthday and service nearest whole year on the date the decrement is assumed to occur.
Decrement operation	Withdrawal decrements do not operate during retirement eligibility. Decrements are assumed to occur mid-fiscal year.
Service credit accruals	It is assumed that members accrue one year of service credit per year.
Pay Increases	Pay increases are assumed to happen at the beginning of the fiscal year. This is equivalent to assuming that reported earnings are pensionable earnings for the year ending on the valuation date.
Unknown data for certain members	To prepare this report, GRS has used and relied on participant data supplied by the Fund. Although GRS has reviewed the data in accordance with Actuarial Standards of Practice No. 23, GRS has not verified or audited any of the data or information provided. In cases where submitted data was missing or incomplete, the following assumptions were applied: <u>Data for active members:</u> There were 11 members who have reached the 24-year service cap. Based on the salary reported under the Unclassified Employees Retirement Plan, we assumed these members earned $149,605 (9 members) or $159,370 (2 members) for the July 1, 2015 to June 30, 2016 plan year. There were no members reported with missing service. There were no members reported with missing or invalid birth dates. There were no members reported with an invalid gender. <u>Data for terminated members:</u> There was 1 member reported without a benefit. We calculated the benefit for this member using the reported Average Salary, Credited Service and Termination Date provided.

SUMMARY OF ACTUARIAL ASSUMPTIONS (CONTINUED)

Unknown data for certain members	Data for members receiving benefits: There were no members reported without a benefit. There were no members reported with missing or invalid birth dates. There was 1 member reported with a missing gender. We assumed male gender. There were retired members reported with a survivor option and an invalid or missing survivor gender (50 members) and/or survivor date of birth (38 members). We used the valuation assumptions if the survivor gender or date of birth was missing or invalid. There were 2 retirees reported with a bounce-back survivor option and a survivor date of death. We assumed no benefit was payable to the survivor, and the member benefit already reflected the increase to the life annuity value (i.e., “bounce back”), if applicable. There was 1 retiree reported with a bounce back annuity but was not reported with a reasonable reduction factor. A factor of 0.80, 0.85 and 0.90 was assumed for the 100%, 75% and 50% joint and survivor annuity, respectively. There were no survivors reported on the data file with an expired benefit.
Changes in actuarial assumptions	The assumed post-retirement benefit increase rate was changed from 1.75% for all years to 1.75% per year through 2041, 2% per year from 2042 through 2054, and 2.5% per year thereafter. The assumed investment return was changed from 7.90% to 7.50%. The assumed future salary increases, payroll growth, and inflation were decreased by 0.25%. The single discount rate was changed from 5.25% to 7.50%.

SUMMARY OF ACTUARIAL ASSUMPTIONS (CONCLUDED)

	Rate (%) *					
	Healthy Post-Retirement Mortality**		Healthy Pre-Retirement Mortality**		Disability Mortality**	
Age	Male	Female	Male	Female	Male	Female
20	0.03%	0.02%	0.03%	0.02%	0.03%	0.02%
25	0.04	0.02	0.04	0.02	0.04	0.02
30	0.04	0.02	0.04	0.03	0.04	0.02
35	0.05	0.04	0.06	0.05	0.05	0.04
40	0.08	0.06	0.09	0.06	0.08	0.06
45	0.12	0.08	0.13	0.10	0.12	0.08
50	0.18	0.13	0.20	0.16	0.18	0.13
55	0.56	0.29	0.27	0.24	0.56	0.29
60	0.61	0.47	0.43	0.38	0.61	0.47
65	1.04	0.74	0.67	0.59	1.04	0.74
70	1.74	1.24	0.98	0.88	1.74	1.24

** Generally, mortality rates are expected to increase as age increases. These standard mortality rates have been adjusted slightly to prevent decreasing mortality rates. If the rates were not adjusted as described, we would not expect the valuation results to be materially different.*

*** These rates were adjusted for mortality improvements using projection scale AA.*

	Disability Retirement	
Age	Male	Female
20	0.00%	0.00%
25	0.00	0.00
30	0.00	0.00
35	0.01	0.00
40	0.01	0.01
45	0.02	0.03
50	0.07	0.05
55	0.17	0.12
60	0.38	0.31
65	0.00	0.00
70	0.00	0.00

Age	Retirement
60	0%
61	0
62	8
63	5
64	8
65	25
66	20
67	10
68	30
69	10
70	100

SECTION G

CALCULATION OF THE SINGLE DISCOUNT RATE

CALCULATION OF THE SINGLE DISCOUNT RATE

GASB Statement No. 67 includes a specific requirement for the discount rate that is used for the purpose of the measurement of the Total Pension Liability. This rate considers the ability of the fund to meet benefit obligations in the future. To make this determination, employer contributions, employee contributions, benefit payments, expenses and investment returns are projected into the future. The Plan Fiduciary Net Position (assets) in future years can then be determined and compared to its obligation to make benefit payments in those years. As long as assets are projected to be on hand in a future year, the long-term rate of return is used as the discount rate. In years where assets are not projected to be sufficient to meet benefit payments, the use of a “risk-free” municipal bond rate is required, as described in the following paragraph.

The *Single Discount Rate* (SDR) is equivalent to applying these two rates to the benefits that are projected to be paid during the different time periods. The SDR reflects (1) the long-term expected rate of return on pension plan investments (during the period in which the plan fiduciary net position is projected to be sufficient to pay benefits) and (2) tax-exempt municipal bond rate based on an index of 20-year general obligation bonds with an average AA credit rating as of the measurement date (to the extent that the contributions for use with the long-term expected rate of return are not met).

For the purpose of this valuation, the expected rate of return on pension plan investments is 7.50%; the municipal bond rate is 2.85% (based on the 20-Bond GO rate as of June 30, 2016). The Plan’s Fiduciary Net Position was projected to be available to meet all projected future benefit payments of current active and inactive employees. Therefore, the long-term expected rate of return on pension plan investments was applied to all periods of projected benefit payments to determine the Total Pension Liability. **The resulting single discount rate as of July 1, 2016 is 7.50%.**

The tables in this section provide background for the development of the single discount rate.

The **Projection of Contributions** table shows the development of expected contributions in future years. Normal Cost contributions for future hires are not included (nor are their liabilities).

The **Projection of Plan Fiduciary Net Position** table shows the development of expected asset levels in future years.

The **Present Values of Projected Benefit Payments** table shows the development of the Single Discount Rate. It breaks down the benefit payments into present values for funded and unfunded portions and shows the equivalent total at the SDR.

SINGLE DISCOUNT RATE DEVELOPMENT
PROJECTION OF CONTRIBUTIONS (DOLLARS IN THOUSANDS)

	Projected Covered-Employee Payroll			Projected Contributions				
Fiscal Year Ending	Payroll for Current Employees	Payroll for New Employees	Total Employee Payroll	Contributions from Current Employees	Employer Contributions for Current Employees	Contributions on Future Payroll toward Current UAL*	Additional State Contributions	Total Contributions
	(a)	(b)	(c) = (a) + (b)	(d)	(e)	(f)		(g) = (d) + (e) + (f)
2016	$ 45,418		$ 45,418					
2017	47,953		47,953	$ 3,990	$ 10,790		$ 3,000	$ 17,780
2018	45,666	$ 3,486	49,152	3,779	10,275	$ 379	6,000	20,433
2019	42,836	7,545	50,381	3,526	9,638	825	6,000	19,989
2020	40,759	10,882	51,641	3,337	9,171	1,195	6,000	19,703
2021	38,918	14,014	52,932	3,169	8,757	1,546	6,000	19,472
2022	36,919	17,336	54,255	2,990	8,307	1,922	6,000	19,219
2023	34,693	20,918	55,611	2,795	7,806	2,330	6,000	18,931
2024	32,437	24,565	57,002	2,599	7,298	2,749	6,000	18,646
2025	30,178	28,249	58,427	2,405	6,790	3,175	6,000	18,370
2026	28,171	31,716	59,887	2,232	6,338	3,581	6,000	18,151
2027	26,354	35,030	61,384	2,077	5,930	3,974	6,000	17,981
2028	24,462	38,457	62,919	1,917	5,504	4,382	6,000	17,803
2029	22,412	42,080	64,492	1,746	5,043	4,816	6,000	17,605
2030	20,216	45,888	66,104	1,566	4,548	5,276	6,000	17,390
2031	18,074	49,683	67,757	1,392	4,067	5,738	6,000	17,197
2032	16,182	53,269	69,451	1,240	3,641	6,179	6,000	17,060
2033	14,367	56,820	71,187	1,094	3,233	6,620	6,000	16,947
2034	12,688	60,279	72,967	961	2,855	7,054	6,000	16,870
2035	11,175	63,616	74,791	841	2,514	7,477	6,000	16,832
2036	9,617	67,044	76,661	720	2,164	7,915	6,000	16,799
2037	8,040	70,537	78,577	598	1,809	8,363	6,000	16,770
2038	6,706	73,836	80,542	496	1,509	8,792	6,000	16,797
2039	5,566	76,989	82,555	409	1,252	9,207	6,000	16,868
2040	4,554	80,065	84,619	333	1,025	9,616	6,000	16,974
2041	3,538	83,197	86,735	257	796	10,035	6,000	17,088
2042	2,727	86,176	88,903	197	614	10,439	6,000	17,250
2043	2,140	88,985	91,125	154	481	10,825	6,000	17,460
2044	1,581	91,823	93,404	113	356	11,217	6,000	17,686
2045	1,100	94,639	95,739	78	248	11,610	6,000	17,936
2046	633	97,499	98,132	45	143	12,011	6,000	18,199
2047	366	100,219	100,585	26	82	12,397	6,000	18,505
2048	237	102,863	103,100	17	53	12,724	6,000	18,794
2049	128	105,550	105,678	9	29	13,056	6,000	19,094
2050	42	108,278	108,320	3	9	13,394	6,000	19,406
2051	0	111,028	111,028	0	0	13,734	6,000	19,734
2052	0	113,803	113,803	0	0	14,077	6,000	20,077
2053	0	116,648	116,648	0	0	14,429	6,000	20,429
2054	0	119,565	119,565	0	0	14,790	6,000	20,790
2055	0	122,554	122,554	0	0	15,160	6,000	21,160
2056	0	125,617	125,617	0	0	15,539	6,000	21,539
2057	0	128,758	128,758	0	0	15,927	6,000	21,927
2058	0	131,977	131,977	0	0	16,326	0	16,326
2059	0	135,276	135,276	0	0	16,734	0	16,734
2060	0	138,658	138,658	0	0	17,152	0	17,152
2061	0	142,125	142,125	0	0	17,581	0	17,581
2062	0	145,678	145,678	0	0	18,020	0	18,020
2063	0	149,320	149,320	0	0	18,471	0	18,471
2064	0	153,053	153,053	0	0	18,933	0	18,933
2065	0	156,879	156,879	0	0	19,406	0	19,406
2066	0	160,801	160,801	0	0	19,891	0	19,891

** Contributions related to future employees in excess of normal cost and expenses. Normal cost and expenses initially total 19.99% of pay but trend down over the projection period (based on the projection assumptions) due to the recognition of lower normal costs for Judges hired after June 30, 2013.*

SINGLE DISCOUNT RATE DEVELOPMENT
PROJECTION OF CONTRIBUTIONS (CONTINUED) (DOLLARS IN THOUSANDS)

	Projected Covered-Employee Payroll			Projected Contributions			
Fiscal Year Ending	Payroll for Current Employees	Payroll for New Employees	Total Employee Payroll	Contributions from Current Employees	Employer Contributions for Current Employees	Contributions on Future Payroll toward Current UAL*	Total Contributions
	(a)	(b)	(c) = (a) + (b)	(d)	(e)	(f)	(g) = (d) + (e) + (f)
2067	$ 0	$ 164,821	$ 164,821	$ 0	$ 0	$ 20,388	$ 0 $ 20,388
2068	0	168,942	168,942	0	0	20,898	0 20,898
2069	0	173,165	173,165	0	0	21,421	0 21,421
2070	0	177,494	177,494	0	0	21,956	0 21,956
2071	0	181,932	181,932	0	0	22,505	0 22,505
2072	0	186,480	186,480	0	0	23,068	0 23,068
2073	0	191,142	191,142	0	0	23,644	0 23,644
2074	0	195,920	195,920	0	0	24,235	0 24,235
2075	0	200,818	200,818	0	0	24,841	0 24,841
2076	0	205,839	205,839	0	0	25,462	0 25,462
2077	0	210,985	210,985	0	0	26,099	0 26,099
2078	0	216,259	216,259	0	0	26,751	0 26,751
2079	0	221,666	221,666	0	0	27,420	0 27,420
2080	0	227,208	227,208	0	0	28,106	0 28,106
2081	0	232,888	232,888	0	0	28,808	0 28,808
2082	0	238,710	238,710	0	0	29,528	0 29,528
2083	0	244,678	244,678	0	0	30,267	0 30,267
2084	0	250,795	250,795	0	0	31,023	0 31,023
2085	0	257,065	257,065	0	0	31,799	0 31,799
2086	0	263,491	263,491	0	0	32,594	0 32,594
2087	0	270,078	270,078	0	0	33,409	0 33,409
2088	0	276,830	276,830	0	0	34,244	0 34,244
2089	0	283,751	283,751	0	0	35,100	0 35,100
2090	0	290,845	290,845	0	0	35,978	0 35,978
2091	0	298,116	298,116	0	0	36,877	0 36,877
2092	0	305,569	305,569	0	0	37,799	0 37,799
2093	0	313,208	313,208	0	0	38,744	0 38,744
2094	0	321,038	321,038	0	0	39,712	0 39,712
2095	0	329,064	329,064	0	0	40,705	0 40,705
2096	0	337,291	337,291	0	0	41,723	0 41,723
2097	0	345,723	345,723	0	0	42,766	0 42,766
2098	0	354,366	354,366	0	0	43,835	0 43,835
2099	0	363,225	363,225	0	0	44,931	0 44,931
2100	0	372,306	372,306	0	0	46,054	0 46,054
2101	0	381,614	381,614	0	0	47,206	0 47,206
2102	0	391,154	391,154	0	0	48,386	0 48,386
2103	0	400,933	400,933	0	0	49,595	0 49,595
2104	0	410,956	410,956	0	0	50,835	0 50,835
2105	0	421,230	421,230	0	0	52,106	0 52,106
2106	0	431,761	431,761	0	0	53,409	0 53,409
2107	0	442,555	442,555	0	0	54,744	0 54,744
2108	0	453,619	453,619	0	0	56,113	0 56,113
2109	0	464,959	464,959	0	0	57,515	0 57,515
2110	0	476,583	476,583	0	0	58,953	0 58,953
2111	0	488,498	488,498	0	0	60,427	0 60,427
2112	0	500,710	500,710	0	0	61,938	0 61,938
2113	0	513,228	513,228	0	0	63,486	0 63,486
2114	0	526,059	526,059	0	0	65,073	0 65,073
2115	0	539,210	539,210	0	0	66,700	0 66,700
2116	0	552,690	552,690	0	0	68,976	0 68,976

** Contributions related to future employees in excess of normal cost and expenses. Normal cost and expenses initially total 19.99% of pay but trend down over the projection period (based on the projection assumptions) due to the recognition of lower normal costs for Judges hired after June 30, 2013.*

Single Discount Rate Development
Projection of Plan Fiduciary Net Position (Dollars in Thousands)

Fiscal Year Ending	Projected Beginning Plan Fiduciary Net Position	Projected Total Contributions	Projected Benefit Payments	Projected Administrative Expenses	Projected Investment Earnings at 7.50%	Projected Ending Plan Net Position
	(a)	(b)	(c)	(d)	(e)	(f)=(a)+(b)-(c)-(d)+(e)
2017	$ 165,905	$ 17,780	$ 22,931	$ 101	$ 12,249	$ 172,902
2018	172,902	20,433	24,136	96	12,828	181,931
2019	181,931	19,989	25,588	90	13,435	189,677
2020	189,677	19,703	26,864	86	13,959	196,389
2021	196,389	19,472	27,874	82	14,417	202,322
2022	202,322	19,219	28,939	78	14,814	207,338
2023	207,338	18,931	30,110	73	15,136	211,222
2024	211,222	18,646	31,360	68	15,371	213,811
2025	213,811	18,370	32,513	63	15,513	215,118
2026	215,118	18,151	33,467	59	15,568	215,311
2027	215,311	17,981	34,329	55	15,545	214,453
2028	214,453	17,803	35,203	51	15,441	212,443
2029	212,443	17,605	36,010	47	15,254	209,245
2030	209,245	17,390	36,929	42	14,972	204,636
2031	204,636	17,197	37,693	38	14,592	198,694
2032	198,694	17,060	38,289	34	14,119	191,550
2033	191,550	16,947	38,701	30	13,564	183,330
2034	183,330	16,870	38,930	27	12,937	174,180
2035	174,180	16,832	38,970	23	12,248	164,267
2036	164,267	16,799	38,937	20	11,504	153,613
2037	153,613	16,770	38,818	17	10,709	142,257
2038	142,257	16,797	38,439	14	9,872	130,473
2039	130,473	16,868	37,849	12	9,013	118,493
2040	118,493	16,974	37,087	10	8,146	106,516
2041	106,516	17,088	36,235	7	7,284	94,646
2042	94,646	17,250	35,223	6	6,436	83,103
2043	83,103	17,460	34,072	4	5,621	72,108
2044	72,108	17,686	32,858	3	4,849	61,782
2045	61,782	17,936	31,563	2	4,132	52,285
2046	52,285	18,199	30,237	1	3,478	43,724
2047	43,724	18,505	28,790	1	2,900	36,338
2048	36,338	18,794	27,273	0	2,413	30,272
2049	30,272	19,094	25,760	0	2,025	25,631
2050	25,631	19,406	24,259	0	1,743	22,521
2051	22,521	19,734	22,521	0	1,577	21,311
2052	21,311	20,077	21,311	0	1,536	21,613
2053	21,613	20,429	19,816	0	1,628	23,854
2054	23,854	20,790	18,395	0	1,862	28,111
2055	28,111	21,160	17,053	0	2,244	34,462
2056	34,462	21,539	15,785	0	2,781	42,997
2057	42,997	21,927	14,549	0	3,481	53,856
2058	53,856	16,326	13,349	0	4,134	60,967
2059	60,967	16,734	12,187	0	4,725	70,239
2060	70,239	17,152	11,067	0	5,477	81,801
2061	81,801	17,581	9,994	0	6,399	95,787
2062	95,787	18,020	8,970	0	7,502	112,339
2063	112,339	18,471	7,999	0	8,796	131,607
2064	131,607	18,933	7,081	0	10,292	153,751
2065	153,751	19,406	6,219	0	12,002	178,940
2066	178,940	19,891	5,416	0	13,938	207,353

SINGLE DISCOUNT RATE DEVELOPMENT
PROJECTION OF PLAN FIDUCIARY NET POSITION (CONTINUED)
(DOLLARS IN THOUSANDS)

Fiscal Year Ending	Projected Beginning Plan Fiduciary Net Position	Projected Total Contributions	Projected Benefit Payments	Projected Administrative Expenses	Projected Investment Earnings at 7.50%	Projected Ending Plan Net Position
	(a)	(b)	(c)	(d)	(e)	(f)=(a)+(b)-(c)-(d)+(e)
2067	$ 207,353	$ 20,388	$ 4,678	$ 0	$ 16,115	$ 239,178
2068	239,178	20,898	4,005	0	18,545	274,616
2069	274,616	21,421	3,397	0	21,245	313,885
2070	313,885	21,956	2,854	0	24,230	357,217
2071	357,217	22,505	2,376	0	27,518	404,864
2072	404,864	23,068	1,960	0	31,127	457,099
2073	457,099	23,644	1,600	0	35,079	514,222
2074	514,222	24,235	1,292	0	39,397	576,562
2075	576,562	24,841	1,033	0	44,104	644,474
2076	644,474	25,462	817	0	49,228	718,347
2077	718,347	26,099	640	0	54,798	798,604
2078	798,604	26,751	495	0	60,847	885,707
2079	885,707	27,420	379	0	67,409	980,157
2080	980,157	28,106	288	0	74,521	1,082,496
2081	1,082,496	28,808	216	0	82,225	1,193,313
2082	1,193,313	29,528	161	0	90,565	1,313,245
2083	1,313,245	30,267	118	0	99,589	1,442,983
2084	1,442,983	31,023	86	0	109,348	1,583,268
2085	1,583,268	31,799	62	0	119,899	1,734,904
2086	1,734,904	32,594	44	0	131,301	1,898,755
2087	1,898,755	33,409	30	0	143,621	2,075,755
2088	2,075,755	34,244	21	0	156,927	2,266,905
2089	2,266,905	35,100	14	0	171,295	2,473,286
2090	2,473,286	35,978	9	0	186,806	2,696,061
2091	2,696,061	36,877	6	0	203,547	2,936,479
2092	2,936,479	37,799	4	0	221,612	3,195,886
2093	3,195,886	38,744	2	0	241,103	3,475,731
2094	3,475,731	39,712	1	0	262,127	3,777,569
2095	3,777,569	40,705	1	0	284,801	4,103,074
2096	4,103,074	41,723	0	0	309,252	4,454,049
2097	4,454,049	42,766	0	0	335,613	4,832,428
2098	4,832,428	43,835	0	0	364,031	5,240,294
2099	5,240,294	44,931	0	0	394,661	5,679,886
2100	5,679,886	46,054	0	0	427,672	6,153,612
2101	6,153,612	47,206	0	0	463,244	6,664,062
2102	6,664,062	48,386	0	0	501,571	7,214,019
2103	7,214,019	49,595	0	0	542,862	7,806,476
2104	7,806,476	50,835	0	0	587,342	8,444,653
2105	8,444,653	52,106	0	0	635,252	9,132,011
2106	9,132,011	53,409	0	0	686,852	9,872,272
2107	9,872,272	54,744	0	0	742,421	10,669,437
2108	10,669,437	56,113	0	0	802,259	11,527,809
2109	11,527,809	57,515	0	0	866,688	12,452,012
2110	12,452,012	58,953	0	0	936,056	13,447,021
2111	13,447,021	60,427	0	0	1,010,736	14,518,184
2112	14,518,184	61,938	0	0	1,091,129	15,671,251
2113	15,671,251	63,486	0	0	1,177,666	16,912,403
2114	16,912,403	65,073	0	0	1,270,811	18,248,287
2115	18,248,287	66,700	0	0	1,371,062	19,686,049
2116	19,686,049	68,976	0	0	1,478,978	21,234,003

SINGLE DISCOUNT RATE DEVELOPMENT
PRESENT VALUES OF PROJECTED BENEFITS (DOLLARS IN THOUSANDS)

Fiscal Year Ending	Projected Beginning Plan Fiduciary Net Position	Projected Benefit Payments	Funded Portion of Benefit Payments	Unfunded Portion of Benefit Payments	Present Value of Funded Benefit Payments using Expected Return Rate (v)	Present Value of Unfunded Benefit Payments using Municipal Bond Rate (vf)	Present Value of Benefit Payments using Single Discount Rate (sdr)
(a)	(b)	(c)	(d)	(e)	(f)=(d)*v^((a)-.5)	(g)=(e)*vf ^((a)-.5)	(h)=((c)/(1+sdr)^(a-.5)
2017	$ 165,905	$ 22,931	$ 22,931	$ 0	$ 22,117	$ 0	$ 22,117
2018	172,902	24,136	24,136	0	21,654	0	21,654
2019	181,931	25,588	25,588	0	21,355	0	21,355
2020	189,677	26,864	26,864	0	20,857	0	20,857
2021	196,389	27,874	27,874	0	20,131	0	20,131
2022	202,322	28,939	28,939	0	19,442	0	19,442
2023	207,338	30,110	30,110	0	18,817	0	18,817
2024	211,222	31,360	31,360	0	18,231	0	18,231
2025	213,811	32,513	32,513	0	17,583	0	17,583
2026	215,118	33,467	33,467	0	16,836	0	16,836
2027	215,311	34,329	34,329	0	16,065	0	16,065
2028	214,453	35,203	35,203	0	15,325	0	15,325
2029	212,443	36,010	36,010	0	14,582	0	14,582
2030	209,245	36,929	36,929	0	13,911	0	13,911
2031	204,636	37,693	37,693	0	13,208	0	13,208
2032	198,694	38,289	38,289	0	12,481	0	12,481
2033	191,550	38,701	38,701	0	11,735	0	11,735
2034	183,330	38,930	38,930	0	10,981	0	10,981
2035	174,180	38,970	38,970	0	10,225	0	10,225
2036	164,267	38,937	38,937	0	9,504	0	9,504
2037	153,613	38,818	38,818	0	8,814	0	8,814
2038	142,257	38,439	38,439	0	8,119	0	8,119
2039	130,473	37,849	37,849	0	7,436	0	7,436
2040	118,493	37,087	37,087	0	6,778	0	6,778
2041	106,516	36,235	36,235	0	6,161	0	6,161
2042	94,646	35,223	35,223	0	5,571	0	5,571
2043	83,103	34,072	34,072	0	5,013	0	5,013
2044	72,108	32,858	32,858	0	4,497	0	4,497
2045	61,782	31,563	31,563	0	4,018	0	4,018
2046	52,285	30,237	30,237	0	3,581	0	3,581
2047	43,724	28,790	28,790	0	3,172	0	3,172
2048	36,338	27,273	27,273	0	2,795	0	2,795
2049	30,272	25,760	25,760	0	2,456	0	2,456
2050	25,631	24,259	24,259	0	2,151	0	2,151
2051	22,521	22,521	22,521	0	1,858	0	1,858
2052	21,311	21,311	21,311	0	1,617	0	1,617
2053	21,613	19,816	19,816	0	1,415	0	1,415
2054	23,854	18,395	18,395	0	1,221	0	1,221
2055	28,111	17,053	17,053	0	1,053	0	1,053
2056	34,462	15,785	15,785	0	907	0	907
2057	42,997	14,549	14,549	0	778	0	778
2058	53,856	13,349	13,349	0	664	0	664
2059	60,967	12,187	12,187	0	564	0	564
2060	70,239	11,067	11,067	0	476	0	476
2061	81,801	9,994	9,994	0	400	0	400
2062	95,787	8,970	8,970	0	334	0	334
2063	112,339	7,999	7,999	0	277	0	277
2064	131,607	7,081	7,081	0	228	0	228
2065	153,751	6,219	6,219	0	186	0	186
2066	178,940	5,416	5,416	0	151	0	151

SINGLE DISCOUNT RATE DEVELOPMENT
PRESENT VALUES OF PROJECTED BENEFITS (CONTINUED)
(DOLLARS IN THOUSANDS)

Fiscal Year Ending	Projected Beginning Plan Fiduciary Net Position	Projected Benefit Payments	Funded Portion of Benefit Payments	Unfunded Portion of Benefit Payments	Present Value of Funded Benefit Payments using Expected Return Rate (v)	Present Value of Unfunded Benefit Payments using Municipal Bond Rate (vf)	Present Value of Benefit Payments using Single Discount Rate (sdr)
(a)	(b)	(c)	(d)	(e)	(f)=(d)*v^((a)-.5)	(g)=(e)*vf ^((a)-.5)	(h)=((c)/(1+sdr)^(a-.5)
2067	$ 207,353	$ 4,678	$ 4,678	$ 0	$ 22,117	$ 0	$ 121
2068	239,178	4,005	4,005	0	21,654	0	97
2069	274,616	3,397	3,397	0	21,355	0	76
2070	313,885	2,854	2,854	0	20,857	0	60
2071	357,217	2,376	2,376	0	20,131	0	46
2072	404,864	1,960	1,960	0	19,442	0	35
2073	457,099	1,600	1,600	0	18,817	0	27
2074	514,222	1,292	1,292	0	18,231	0	20
2075	576,562	1,033	1,033	0	17,583	0	15
2076	644,474	817	817	0	16,836	0	11
2077	718,347	640	640	0	16,065	0	8
2078	798,604	495	495	0	15,325	0	6
2079	885,707	379	379	0	14,582	0	4
2080	980,157	288	288	0	13,911	0	3
2081	1,082,496	216	216	0	13,208	0	2
2082	1,193,313	161	161	0	12,481	0	1
2083	1,313,245	118	118	0	11,735	0	1
2084	1,442,983	86	86	0	10,981	0	1
2085	1,583,268	62	62	0	10,225	0	0
2086	1,734,904	44	44	0	9,504	0	0
2087	1,898,755	30	30	0	8,814	0	0
2088	2,075,755	21	21	0	8,119	0	0
2089	2,266,905	14	14	0	7,436	0	0
2090	2,473,286	9	9	0	6,778	0	0
2091	2,696,061	6	6	0	6,161	0	0
2092	2,936,479	4	4	0	5,571	0	0
2093	3,195,886	2	2	0	5,013	0	0
2094	3,475,731	1	1	0	4,497	0	0
2095	3,777,569	1	1	0	4,018	0	0
2096	4,103,074	0	0	0	3,581	0	0
2097	4,454,049	0	0	0	3,172	0	0
2098	4,832,428	0	0	0	2,795	0	0
2099	5,240,294	0	0	0	2,456	0	0
2100	5,679,886	0	0	0	2,151	0	0
2101	6,153,612	0	0	0	1,858	0	0
2102	6,664,062	0	0	0	1,617	0	0
2103	7,214,019	0	0	0	1,415	0	0
2104	7,806,476	0	0	0	1,221	0	0
2105	8,444,653	0	0	0	1,053	0	0
2106	9,132,011	0	0	0	907	0	0
2107	9,872,272	0	0	0	778	0	0
2108	10,669,437	0	0	0	664	0	0
2109	11,527,809	0	0	0	564	0	0
2110	12,452,012	0	0	0	476	0	0
2111	13,447,021	0	0	0	400	0	0
2112	14,518,184	0	0	0	334	0	0
2113	15,671,251	0	0	0	277	0	0
2114	16,912,403	0	0	0	228	0	0
2115	18,248,287	0	0	0	186	0	0
2116	19,686,049	0	0	0	151	0	0
				Totals	$ 408,263	$ -	$ 408,263

SECTION H

GLOSSARY OF TERMS

GLOSSARY OF TERMS

Actuarial Accrued Liability (AAL) The AAL is the difference between the actuarial present value of all benefits and the actuarial value of future normal costs. The definition comes from the fundamental equation of funding which states that the present value of all benefits is the sum of the Actuarial Accrued Liability and the present value of future normal costs. The AAL may also be referred to as "accrued liability" or "actuarial liability."

Actuarial Assumptions These assumptions are estimates of future experience with respect to rates of mortality, disability, turnover, retirement, rate or rates of investment income and compensation increases. Actuarial assumptions are generally based on past experience, often modified for projected changes in conditions. Economic assumptions (compensation increases, payroll growth, inflation and investment return) consist of an underlying real rate of return plus an assumption for a long-term average rate of inflation.

Accrued Service Service credited under the system which was rendered before the date of the actuarial valuation.

Actuarial Equivalent A single amount or series of amounts of equal actuarial value to another single amount or series of amounts, computed on the basis of appropriate actuarial assumptions.

Actuarial Cost Method A mathematical budgeting procedure for allocating the dollar amount of the actuarial present value of the pension trust benefits between future normal cost and actuarial accrued liability. The actuarial cost method may also be referred to as the actuarial funding method.

Actuarial Gain (Loss) The difference in liabilities between actual experience and expected experience during the period between two actuarial valuations is the gain (loss) on the accrued liabilities.

Actuarial Present Value (APV) The amount of funds currently required to provide a payment or series of payments in the future. The present value is determined by discounting future benefit payments at predetermined rates of interest to reflect the expected effects of the time value (present value) of money and the probabilities of payment.

Actuarial Valuation The actuarial valuation report determines, as of the actuarial valuation date, the service cost, total pension liability, and related actuarial present value of projected benefit payments for pensions performed in conformity with Actuarial Standards of Practice unless otherwise specified by the GASB.

Actuarial Valuation Date The date as of which an actuarial valuation is performed.

Actuarially Determined Contribution (ADC) A calculated contribution into a defined benefit pension plan for the reporting period, most often determined based on the funding policy of the plan. Typically the Actuarially Determined Contribution has a normal cost payment and an amortization payment.

GLOSSARY OF TERMS

Amortization Payment	The amortization payment is the periodic payment required to pay off an interest-discounted amount with payments of interest and principal.
Amortization Method	The method used to determine the periodic amortization payment may be a level dollar amount, or a level percent of pay amount. The period will typically be expressed in years, and the method will either be “open” (meaning, reset each year) or “closed” (the number of years remaining will decline each year).
Cost-of-Living Adjustments	Postemployment benefit changes intended to adjust benefit payments for the effects of inflation.
Cost-Sharing Multiple-Employer Defined Benefit Pension Plan (cost-sharing pension plan)	A multiple-employer defined benefit pension plan in which the pension obligations to the employees of more than one employer are pooled and pension plan assets can be used to pay the benefits of the employees of any employer that provides pensions through the pension plan.
Covered-Employee Payroll	The payroll of covered employees, which is typically only the pensionable pay and does not include pay above any pay cap.
Deferred Inflows and Outflows of Resources	The deferred inflows and outflows of pension resources are amounts used under GASB Statement No. 68 in developing the annual pension expense. Deferred inflows and outflows arise with differences between expected and actual experiences; changes of assumptions. The portion of these amounts not included in pension expense should be included in the deferred inflows or outflows of resources.
Discount Rate or Single Discount Rate	For GASB purposes, the discount rate is the single rate of return that results in the present value of all projected benefit payments to be equal to the sum of the funded and unfunded projected benefit payments, specifically: 1. The benefit payments to be made while the pension plans’ fiduciary net position is projected to be greater than the benefit payments that are projected to be made in the period; and 2. The present value of the benefit payments not in (1) above, discounted using the municipal bond rate.
Entry Age Actuarial Cost Method or Entry Age Normal (EAN)	The EAN is a funding method for allocating the costs of the plan between the normal cost and the accrued liability. The actuarial present value of the projected benefits of each individual included in an actuarial valuation is allocated on a level basis (either level dollar or level percent of pay) over the earnings or service of the individual between entry age and assumed exit ages(s). The portion of the actuarial present value allocated to a valuation year is the normal cost. The portion of this actuarial present value not provided for at a valuation date by the actuarial present value of future normal costs is the actuarial accrued liability. The sum of the accrued liability plus the present value of all future normal costs is the present value of all benefits.

GLOSSARY OF TERMS

Fiduciary Net Position	The fiduciary net position is the value of the net assets of the trust restricted for pension benefits.
GASB	The Governmental Accounting Standards Board is an organization that exists with authority to promulgate accounting standards for state and local governmental entities.
Long-Term Expected Rate of Return	The long-term rate of return is the expected return to be earned over the entire trust portfolio based on the asset allocation of the portfolio.
Money-Weighted Rate of Return	The money-weighted rate of return is a method of calculating the returns that adjusts for the changing amounts actually invested. For purposes of GASB Statement No. 67, money-weighted rate of return is calculated as the internal rate of return on pension plan investments, net of pension plan investment expense.
Multiple-Employer Defined Benefit Pension Plan	A multiple-employer plan is a defined benefit pension plan that is used to provide pensions to the employees of more than one employer.
Municipal Bond Rate	The Municipal Bond Rate is the discount rate to be used for those benefit payments that occur after the assets of the trust have been depleted.
Net Pension Liability (NPL)	The NPL is the liability of employers and non-employer contributing entities to plan members for benefits provided through a defined benefit pension plan.
Non-Employer Contributing Entities	Non-employer contributing entities are entities that make contributions to a pension plan that is used to provide pensions to the employees of other entities. For purposes of the GASB Accounting Statements No. 67 and No. 68 plan members are not considered non-employer contributing entities.
Normal Cost	The actuarial present value of the pension trust benefits allocated to the current year by the actuarial cost method.
Other Postemployment Benefits (OPEB)	All postemployment benefits other than retirement income (such as death benefits, life insurance, disability, and long-term care) that are provided separately from a pension plan, as well as postemployment healthcare benefits regardless of the manner in which they are provided. Other post-employment benefits do not include termination benefits.
Real Rate of Return	The real rate of return is the rate of return on an investment after adjustment to eliminate inflation.
Service Cost	The service cost is the portion of the actuarial present value of projected benefit payments that is attributed to a valuation year.

GLOSSARY OF TERMS

Total Pension Expense The total pension expense is the sum of the following items that are recognized at the end of the employer's fiscal year:

1. Service Cost
2. Interest on the Total Pension Liability
3. Current-Period Changes in Benefit Terms
4. Employee Contributions
5. Projected Earnings on Plan Investments
6. Pension Plan Administrative Expense
7. Other Changes in Plan Fiduciary Net Position
8. Recognition of Outflow (Inflow) of Resources due to the difference between expected and actual in measurement of the Total Pension Liability
9. Recognition of Outflow (Inflow) of Resources due to Assumption Changes
10. Recognition of Outflow (Inflow) of Resources due to the difference between projected and actual earnings on pension plan investments

Total Pension Liability (TPL) The TPL is the portion of the actuarial present value of projected benefit payments that is attributed to past periods of member service.

Unfunded Actuarial Accrued Liability (UAAL) The UAAL is the difference between actuarial accrued liability and valuation assets.

Valuation Assets The valuation assets are the plan fiduciary net position used in determining the net position liability of the plan. For purposes of the GASB Statement No. 67, the asset valuation method is equal to the market value of assets.

Gabriel Roeder Smith & Company
Consultants & Actuaries

MINNESOTA STATE RETIREMENT SYSTEM
LEGISLATORS RETIREMENT FUND

GASB STATEMENTS NO. 67 AND NO. 68 ACCOUNTING AND FINANCIAL REPORTING FOR PENSIONS

JUNE 30, 2016

GRS
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December 1, 2016

Minnesota State Retirement System
Legislators Retirement Fund
St. Paul, Minnesota

Dear Board of Directors:

This report provides accounting and financial reporting information that is intended to comply with the Governmental Accounting Standards Board (GASB) Statements No. 67 and No. 68 for the Legislators Retirement Fund ("LRF"), as amended by Statement No. 82. These calculations have been made on a basis that is consistent with our understanding of these accounting standards.

GASB Statement No. 67 is the accounting standard that applies to the financial reports issued by retirement systems. GASB Statement No. 68 establishes accounting and financial reporting for state and local government employers who provide their employees (including former employees) pension benefits through a trust. GASB Statement No. 82 is an amendment to Statements No. 67, No. 68, and No. 73, intended to improve consistency in the application of the accounting statements.

Our calculation of the liability associated with the benefits described in this report was performed for the purpose of providing financial reporting and disclosure information that satisfies the requirements of GASB Statements No. 67 and No. 68. The Net Pension Liability is not an appropriate measure for determining the sufficiency of plan assets to cover the estimated cost of settling the employer's benefit obligation. The Net Pension Liability is not an appropriate measure for assessing the need for or amount of future employer contributions. The calculation of the plan's liability for this report may not be applicable for funding purposes of the plan. A calculation of the plan's liability for purposes other than satisfying the requirements of GASB Statement No. 67 may produce significantly different results. The information in this report is calculated on a total plan basis. MSRS is responsible for preparing the Schedule of Employer Allocations and the Schedule of Pension Amounts by Employer, as applicable. This report may be provided to parties other than the Minnesota State Retirement System (MSRS) only in its entirety and only with the permission of MSRS. GRS is not responsible for unauthorized use of this report.

This report is based upon information, furnished to us by MSRS, concerning retirement and ancillary benefits, active members, deferred vested members, retirees and beneficiaries, and financial data. If your understanding of this information is different, please let us know. This information was checked for internal consistency, but it was not audited.

This report complements the actuarial valuation report for funding purposes that was or will be provided to the System and should be considered in conjunction with that report. Please see the actuarial valuation report as of June 30, 2016 for additional discussion of the nature of actuarial calculations and more information related to participant data, economic and demographic assumptions, and benefit provisions.

To the best of our knowledge, the information contained within this report is accurate and fairly represents the actuarial position of the Legislators Retirement Fund as of the measurement date. All calculations have been made in conformity with generally accepted actuarial principles and practices as well as with the Actuarial Standards of Practice issued by the Actuarial Standards Board.

The signing actuaries are independent of the plan sponsor.

Brian B. Murphy and Bonita J. Wurst 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.

Respectfully submitted,

Brian B Murphy

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

Bonita J. Wurst

Bonita J. Wurst, ASA, EA, FCA, MAAA

BBM/BJW:dj

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SECTION A

EXECUTIVE SUMMARY

EXECUTIVE SUMMARY
AS OF JUNE 30, 2016 (DOLLARS IN THOUSANDS)

	2016
Actuarial Valuation Date	June 30, 2016
Measurement Date of the Net Pension Liability	June 30, 2016
Membership	
Number of	
- Service Retirements	302
- Survivors	70
- Disability Retirements	0
- Deferred Retirements	52
- Terminated other non-vested	0
- Active Members	23
- Total	447
Covered-employee Payroll [1]	$ 989
Net Pension Liability	
Total Pension Liability	$ 154,701
Plan Fiduciary Net Position	0
Net Pension Liability	$ 154,701
Plan Fiduciary Net Position as a Percentage of Total Pension Liability	0.00%
Net Pension Liability as a Percentage of Covered-employee Payroll	15,642.16%
Development of the Single Discount Rate	
Single Discount Rate	2.85%
Long-Term Expected Rate of Investment Return	7.50%
Long-Term Municipal Bond Rate [2]	2.85%
Last year ending June 30 in the 2017 to 2116 projection period for which projected benefit payments are fully funded	2017
Total Pension Expense/(Income)	$ 18,525

Deferred Outflows and Deferred Inflows by Source Arising from Current and Prior Periods to be Recognized in Future Pension Expenses

	Deferred Outflows of Resources	Deferred Inflows of Resources
Difference between expected and actual experience in the measurement of the Total Pension Liability	$ 0	$ 0
Changes in assumptions	0	0
Net difference between projected and actual earnings on pension plan investments	268	415
Totals	**$ 268**	**$ 415**

[1] *Assumed equal to actual member contributions divided by employee contribution rate.*
[2] *Based on the Bond Buyer 20-Bond Index of general obligation municipal bonds as of June 30, 2016*

DISCUSSION

Accounting Standard

For pension plans that are administered through trusts or equivalent arrangements, Governmental Accounting Standards Board (GASB) Statement No. 67, *Financial Reporting for Pension Plans*, establishes standards of financial reporting for separately issued financial reports and specifies the required approach for measuring the pension liability. Similarly, GASB Statement No. 68, *Accounting and Financial Reporting for Pensions*, establishes standards for state and local government employers (as well as non-employer contributing entities) to account for and disclose the net pension liability, pension expense, and other information associated with providing retirement benefits to their employees (and former employees) on their basic financial statements. Governmental Accounting Standards Board (GASB) Statement No. 82, Pension Issues, is an amendment to Statements No. 67, No. 68, and No. 73, intended to improve consistency in the application of the accounting standards.

The following discussion provides a summary of the information that is required to be disclosed under these accounting standards. A number of these disclosure items are provided in this report. However, certain information, such as notes regarding accounting policies and investments, is not included in this report and the retirement system and/or plan sponsor will be responsible for preparing and disclosing that information to comply with these accounting standards.

Financial Statements

GASB Statement No. 68 requires state and local governmental employers to recognize the net pension liability and the pension expense on their financial statements. The net pension liability is the difference between the total pension liability and the plan's fiduciary net position. In traditional actuarial terms, this is analogous to the accrued liability less the market value of assets (not the smoothed actuarial value of assets that is often encountered in actuarial valuations performed to determine the employer's contribution requirement).

Paragraph 57 of GASB Statement No. 68 states, "Contributions to the pension plan from the employer subsequent to the measurement date of the collective net pension liability and before the end of the employer's reporting period should be reported as a deferred outflow of resources related to pensions." The information contained in this report does not incorporate any contributions made to LRF subsequent to the measurement date of June 30, 2016.

The pension expense recognized each fiscal year is equal to the change in the net pension liability from the beginning of the year to the end of the year, adjusted for deferred recognition of the difference between expected and actual experience in the measurement of the Total Pension Liability, assumption changes and investment experience.

Pension plans that prepare their own, stand-alone financial statements are required to present two financial statements – a Statement of Fiduciary Net Position and a Statement of Changes in Fiduciary Net Position in accordance with GASB Statement No. 67. The *Statement of Fiduciary Net Position* presents the assets and liabilities of the pension plan at the end of the pension plan's reporting period. The *Statement of Changes in Fiduciary Net Position* presents the additions, such as contributions and investment income, and deductions, such as benefit payments and expenses, and net increase or decrease in the fiduciary net position.

Notes to Financial Statements

GASB Statement No. 68 requires the notes to the employer's financial statements to disclose the total pension expense, the pension plan's liabilities and assets, and deferred outflows and inflows of resources related to pensions.

Both GASB Statements No. 67 and No. 68 require the notes to the financial statements for the employers and pension plans to include certain descriptive information about the pension plans through which the pension benefits are provided. The list of disclosure items should include:

- a description of benefits provided by the plan;
- the classes of employees and number of members covered by the pension plan;
- a description of the plan's funding policy, which includes member and employer contribution requirements;
- the pension plan's investment policies;
- the pension plan's fiduciary net position, net pension liability, and the pension plan's fiduciary net position as a percentage of the total pension liability;
- the net pension liability using a discount rate that is 1% higher and 1% lower than the current discount rate used to calculate the total pension liability and net pension liability for financial reporting purposes;
- significant assumptions and methods used to calculate the total pension liability;
- inputs to the discount rates; and
- certain information about mortality assumptions and the dates of experience studies.

Retirement systems that issue stand-alone financial statements are required to disclose additional information in accordance with GASB Statement No. 67. This information includes:

- the composition of the pension plan's Board and the authority under which benefit terms may be amended;
- a description of how fair value is determined;
- information regarding certain reserves and investments, which include concentrations of investments greater than or equal to 5%, receivables, and insurance contracts excluded from plan assets; and
- annual money-weighted rate of return.

MSRS' comprehensive annual financial report, which contains the basic financial statements and related note disclosures for the Legislators Retirement Fund can be found online at www.msrs.state.mn.us/financial-information or obtained from MSRS at 60 Empire Drive, Suite 300, St. Paul, MN, 55103 or requested via email at info@msrs.us or telephone at 1-800-657-5757.

Required Supplementary Information

GASB Statement No. 67 requires a 10-year fiscal history of:

- sources of changes in the net pension liability;
- information about the components of the net pension liability and related ratios, including the pension plan's fiduciary net position as a percentage of the total pension liability, and the net pension liability as a percent of covered-employee payroll; and
- a comparison of the actual employer contributions to the actuarially determined contributions based on the plan's funding policy.

Measurement of the Net Pension Liability

The net pension liability is to be measured as the total pension liability, less the amount of the pension plan's fiduciary net position. In actuarial terms, this will be the accrued liability less the market value of assets (not the smoothed actuarial value of assets that is often encountered in actuarial valuations performed to determine the employer's contribution requirement).

General Implications of Contribution Allocation Procedure or Funding Policy on Future Expected Plan Contributions and Funded Status

Given the plan's contribution allocation procedure, if all actuarial assumptions are met (including the assumption of the plan earning 7.50% on the actuarial value of assets), then the following outcomes are expected:

1. The employer normal cost as a percentage of pay is expected to remain approximately level as a percentage of payroll.
2. The unfunded actuarial accrued liabilities will increase and not be eliminated.
3. The funded status of the plan will remain at 0%.
4. The plan will be completely dependent upon current contributions to pay benefits.

Limitations of Funded Status Measurements

Unless otherwise indicated, a funded status measurement presented in this report is based upon the actuarial accrued liability and the actuarial value of assets. Unless otherwise indicated, with regard to any funded status measurements presented in this report:

(1) The measurement is inappropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations, in other words of transferring the obligations to an unrelated third party in an arm's length market value type transaction.

(2) The measurement is dependent upon the actuarial cost method which, in combination with the plan's amortization policy, affects the timing and amounts of future contributions. The amounts of future contributions will most certainly differ from those assumed in this report due to future actual experience differing from assumed experience based upon the actuarial assumptions. A funded status measurement in this report of 100% is not synonymous with no required future contributions. If the funded status were 100%, the plan would still require future normal cost contributions (i.e., contributions to cover the cost of the active membership accruing an additional year of service credit).

(3) The measurement would produce a different result if the market value of assets were used instead of the actuarial value of assets, unless the market value of assets is used in the measurement.

Limitation of Project Scope

Actuarial standards do not require the actuary to evaluate the ability of the plan sponsor or other contributing entity to make required contributions to the plan when due. Such an evaluation was not within the scope of this project and is not within the actuary's domain of expertise. Consequently, the actuary performed no such evaluation.

Timing of the Valuation

GASB Statement Nos. 67 and 68 require that an actuarial valuation to determine the total pension liability be performed at least every two years. The net pension liability and pension expense should be measured as of the pension plan's fiscal year end (measurement date) on a date that is within the employer's prior fiscal year. If the actuarial valuation used to determine the total pension liability is not calculated as of the measurement date, the total pension liability is required to be rolled forward from the actuarial valuation date to the measurement date.

The total pension liability shown in this report is based on an actuarial valuation performed as of June 30, 2016 and a measurement date of June 30, 2016.

Single Discount Rate

Projected benefit payments are required to be discounted to their actuarial present values using a Single Discount Rate that reflects (1) a long-term expected rate of return on pension plan investments (to the extent that the plan's fiduciary net position is projected to be sufficient to pay benefits) and (2) tax-exempt municipal bond rate based on an index of 20-year general obligation bonds with an average AA credit rating as of the measurement date (to the extent that the contributions for use with the long-term expected rate of return are not met).

For the purpose of this valuation, the long-term expected rate of return on pension plan investments is 7.50%; the municipal bond rate is 2.85% (based on the weekly rate closest to but not later than the measurement date of the "20-Bond GO Index"); and the resulting single discount rate is 2.85%. The long-term expected rate of return is based on a review of inflation and investment assumptions, dated September 11, 2014, and a recent asset liability study obtained by the Minnesota State Board of Investment.

Effective Date and Transition

GASB Statements No. 67 and No. 68 are effective for fiscal years beginning after June 15, 2013, and June 15, 2014 respectively. Earlier application is encouraged by the GASB. MSRS first implemented GASB Statement No. 67 for fiscal year 2014.

SECTION B

FINANCIAL STATEMENTS

PENSION EXPENSE UNDER GASB STATEMENT NO. 68
FISCAL YEAR ENDED JUNE 30, 2016 (DOLLARS IN THOUSANDS)

A. Expense			
1.	Service Cost	$	495
2.	Interest on the Total Pension Liability		5,333
3.	Current-Period Benefit Changes		0
4.	Employee Contributions (made negative for addition here)		(89)
5.	Projected Earnings on Plan Investments (made negative for addition here)		(138)
6.	Pension Plan Administrative Expense		42
7.	Other Changes in Plan Fiduciary Net Position		(41)
8.	Recognition of Outflow (Inflow) of Resources due to differences between expected and actual experience in the measurement of the Total Pension Liability		
	Arising from Current Reporting Period		(1,597)
9.	Recognition of Outflow (Inflow) of Resources due to assumption changes		
	Arising from Current Reporting Period		14,653
10.	Recognition of Outflow (Inflow) of Resources due to the difference between projected (7.90%) and actual earnings on Pension Plan Investments		
	Arising from Current Reporting Period		41
11.	**Increases/(Decreases) from Experience in the Current Reporting Period**	**$**	**18,699**
12.	Recognition of Outflow (Inflow) of Resources due to differences between expected and actual experience in the measurement of the Total Pension Liability		
	Arising from Prior Reporting Periods		0
13.	Recognition of Outflow (Inflow) of Resources due to assumption changes		
	Arising from Prior Reporting Periods		0
14.	Recognition of Outflow (Inflow) of Resources due to the difference between projected (7.90%) and actual earnings on Pension Plan Investments		
	Arising from Prior Reporting Periods		(174)
15.	**Total Pension Expense / (Income)**	**$**	**18,525**

STATEMENT OF OUTFLOWS AND INFLOWS ARISING FROM CURRENT REPORTING PERIOD FISCAL YEAR ENDED JUNE 30, 2016 (DOLLARS IN THOUSANDS)

A. Outflows (Inflows) of Resources due to Liabilities		
1. Difference between expected and actual experience of the Total Pension Liability (gains) or losses	$	(1,597) [1]
2. Assumption Changes (gains) or losses		14,653 [2]
3. Recognition period for Liabilities: Average of the expected remaining service lives of all employees {in years}		1.0000
4. Outflow (Inflow) of Resources to be recognized in the current pension expense for the difference between expected and actual experience of the Total Pension Liability	$	(1,597)
5. Outflow (Inflow) of Resources to be recognized in the current pension expense for Assumption Changes		14,653
6. Outflow (Inflow) of Resources to be recognized in the current pension expense due to Liabilities	$	13,056
7. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses for the difference between expected and actual experience of the Total Pension Liability	$	0
8. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses for Assumption Changes		0
9. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses due to Liabilities	$	0
B. Outflows (Inflows) of Resources due to Assets		
1. Net difference between projected and actual earnings on pension plan investments (gains) or losses	$	207
2. Recognition period for Assets {in years}		5.0000
3. Outflow (Inflow) of Resources to be recognized in the current pension expense due to Assets	$	41
4. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses due to Assets	$	166

[1] *Includes impact of changes in expected timing of future post-retirement benefit increases.*

[2] *Assumption changes are summarized on page 31.*

STATEMENT OF OUTFLOWS AND INFLOWS ARISING FROM CURRENT AND PRIOR REPORTING PERIODS FISCAL YEAR ENDED JUNE 30, 2016 (DOLLARS IN THOUSANDS)

A. Outflows and Inflows of Resources due to Liabilities and Assets to be Recognized in Current Pension Expense

	Outflows of Resources	Inflows of Resources	Net Outflows/(Inflows) of Resources
1. Due to Liabilities	$ 14,653	$ 1,597	$ 13,056
2. Due to Assets	75	208	(133)
3. Total	$ 14,728	$ 1,805	$ 12,923

B. Outflows and Inflows of Resources by Source to be Recognized in Current Pension Expense

	Outflows of Resources	Inflows of Resources	Net Outflows/(Inflows) of Resources
1. Differences between expected and actual experience	$ 0	$ 1,597	$ (1,597)
2. Assumption Changes	14,653	0	14,653
3. Net Difference between projected and actual earnings on pension plan investments	75	208	(133)
4. Total	$ 14,728	$ 1,805	$ 12,923

C. Deferred Outflows and Deferred Inflows of Resources by Source to be Recognized in Future Pension Expenses

	Deferred Outflows of Resources	Deferred Inflows of Resources	Net Deferred Outflows/(Inflows) of Resources
1. Differences between expected and actual experience	$ 0	$ 0	$ 0
2. Assumption Changes	0	0	0
3. Net Difference between projected and actual earnings on pension plan investments	268	415	(147)
4. Total	$ 268	$ 415	$ (147)

D. Deferred Outflows and Deferred Inflows of Resources by Year to be Recognized in Future Pension Expenses

Year Ending June 30	Net Deferred Outflows/(Inflows) of Resources
2017	$ (133)
2018	(132)
2019	75
2020	43
2021	0
Thereafter	0
Total	$ (147)

STATEMENT OF FIDUCIARY NET POSITION AS OF JUNE 30, 2016 (DOLLARS IN THOUSANDS)

Assets		June 30, 2016
Cash & Short-term Investments	$	1,465
Receivables		2
Investment Pools (at fair value)		0
Securities Lending Collateral		0
Capital Assets		0
Total Assets	**$**	**1,467**
Total Deferred Outflows of Resources	**$**	**0**
Total Liabilities	**$**	**(1,508)**
Total Deferred Inflows of Resources	**$**	**0**
Net Position Restricted for Pensions	**$**	**(41)**
Adjustment to Zero	**$**	**41**
Adjusted Net Position Restricted for Pensions	**$**	**0**

STATEMENT OF CHANGES IN FIDUCIARY NET POSITION FOR THE FISCAL YEAR ENDED JUNE 30, 2016 (DOLLARS IN THOUSANDS)

1.	**Net position at market value at beginning of year**	**$**	**3,430**
Additions			
2.	Contributions		
	a. Employee	$	89
	b. Employer		0
	c. State General Fund Appropriations		5,087
	d. Total contributions	$	5,176
3.	Investment income		
	a. Investment income/(loss)	$	(68)
	b. Investment expenses		(1)
	c. Net investment income/(loss)	$	(69)
4.	Other Additions	$	41
5.	**Total Additions** *(2.d.) + (3.c.) + (4.)*	**$**	**5,148**
Deductions			
6.	Benefits Paid		
	a. Annuity benefits	$	(8,496)
	b. Refunds		(40)
	c. Total benefits paid	$	(8,536)
7.	Expenses		
	a. Other deductions	$	0
	b. Administrative		(42)
	c. Total expenses	$	(42)
8.	**Total deductions** *(6.c.) + (7.c.)*	**$**	**(8,578)**
9.	**Net increase/(decrease) in fiduciary net position** *(5.) + (8.)*	**$**	**(3,430)**
10.	**Net position at market value at end of year** *(1.) + (9.)*	$	0
11.	State Board of Investment calculated annual investment return		-0.1%

SECTION C

REQUIRED SUPPLEMENTARY INFORMATION

SCHEDULE OF CHANGES IN NET PENSION LIABILITY AND RELATED RATIOS
CURRENT PERIOD
FISCAL YEAR ENDED JUNE 30, 2016 (DOLLARS IN THOUSANDS)

A. Total Pension Liability			
1. Service Cost	$	495	
2. Interest on the Total Pension Liability		5,333	
3. Changes of benefit terms		0	
4. Difference between expected and actual experience of the Total Pension Liability		(1,597)	(1)
5. Changes of assumptions		14,653	(2)
6. Benefit payments, including refunds of employee contributions		(8,536)	
7. Net change in Total Pension Liability	$	10,348	
8. Total Pension Liability – Beginning		144,353	
9. Total Pension Liability – Ending	**$**	**154,701**	
B. Plan Fiduciary Net Position			
1. Contributions – State General Fund Appropriations	$	5,087	
2. Contributions – Employee		89	
3. Net investment income		(69)	
4. Benefit payments, including refunds of employee contributions		(8,536)	
5. Pension Plan Administrative Expense		(42)	
6. Other changes		41	
7. Net change in Plan Fiduciary Net Position	$	(3,430)	
8. Plan Fiduciary Net Position – Beginning		3,430	
9. Plan Fiduciary Net Position – Ending	**$**	**-**	
C. Net Pension Liability, *A.9.-B.9.*	**$**	**154,701**	
D. Plan Fiduciary Net Position as a percentage of the Total Pension Liability, *B.9./A.9.*		**0.00%**	
E. Covered-Employee Payroll	**$**	**989**	**(3)**
F. Net Pension Liability as a percentage of Covered-Employee Payroll, *C./E.*		**15,642.16%**	

(1) *Includes impact of changes in expected timing of future post-retirement benefit increases.*

(2) *Assumption changes are summarized on page 31.*

(3) *Assumed equal to actual member contributions divided by employee contribution rate.*

SCHEDULES OF REQUIRED SUPPLEMENTARY INFORMATION

SCHEDULE OF CHANGES IN NET PENSION LIABILITY AND RELATED RATIOS MULTIYEAR (DOLLARS IN THOUSANDS)

Last 10 Fiscal Years (which will be built prospectively)

Fiscal year ending June 30,	2016	2015	2014	2013	2012	2011	2010	2009	2008	2007
Total Pension Liability										
Service Cost	$ 495	$ 428	$ 398							
Interest on the Total Pension Liability	5,333	6,113	6,177							
Benefit Changes	0	0	0							
Difference between Expected and Actual Experience	(1,597)	(7,303)	(237)							
Assumption Changes	14,653 (1)	7,057 (1)	11,201							
Benefit Payments	(8,496)	(8,441)	(8,407)							
Refunds	(40)	0	(79)							
Net Change in Total Pension Liability	$ 10,348	$ (2,146)	9,053							
Total Pension Liability - Beginning	144,353	146,499	137,446							
Total Pension Liability - Ending (a)	**$ 154,701**	**$ 144,353**	**$ 146,499**							
Plan Fiduciary Net Position										
State General Fund Appropriation	$ 5,087	$ 3,216	$ 3,436							
Employee Contributions	89	153	101							
Pension Plan Net Investment Income	(69)	281	1,750							
Benefit Payments	(8,496)	(8,441)	(8,407)							
Refunds	(40)	0	(79)							
Pension Plan Administrative Expense	(42)	(37)	(36)							
Other Changes	41	0	0							
Net Change in Plan Fiduciary Net Position	$ (3,430)	(4,828)	(3,235)							
Plan Fiduciary Net Position - Beginning	3,430	8,258	11,493							
Plan Fiduciary Net Position - Ending (b)	**0**	**$ 3,430**	**$ 8,258**							
Net Pension Liability - Ending (a) - (b)	**$ 154,701**	**140,923**	**138,241**							
Plan Fiduciary Net Position as a Percentage of Total Pension Liability	**0.00 %**	**2.38 %**	**5.64 %**							
Covered-Employee Payroll (2)	**$ 989**	**$ 1,700**	**$ 1,122**							
Net Pension Liability as a Percentage of Covered-Employee Payroll	**15,642.16 %**	**8,289.59 %**	**12,320.94 %**							

Notes to Schedule:

(1) *Assumption changes are summarized on page 31.*
(2) *Assumed equal to plan member contributions divided by employee contribution rate.*

SCHEDULES OF REQUIRED SUPPLEMENTARY INFORMATION
SCHEDULE OF NET PENSION LIABILITY MULTIYEAR (DOLLARS IN THOUSANDS)

Last 10 Fiscal Years (which will be built prospectively)

Fiscal Year Ending June 30,	Total Pension Liability	Plan Net Position	Net Pension Liability	Plan Net Position as a % of Total Pension Liability	Covered-Employee Payroll	Net Pension Liability as a % of Covered-Employee Payroll
	(a)	(b)	(a)-(b)=(c)	(b)/(c)	(d)	(c)/(d)
2007						
2008						
2009						
2010						
2011						
2012						
2013						
2014	$ 146,499	$ 8,258	$ 138,241	5.64%	$ 1,122	12,320.94 %
2015	144,353	3,430	140,923	2.38%	1,700	8,289.59 %
2016	154,701	0	154,701	0.00%	989	15,642.16 %

SCHEDULE OF CONTRIBUTIONS MULTIYEAR* (DOLLARS IN THOUSANDS)
Last 10 Fiscal Years

Fiscal Year Ending June 30,	Actuarially Determined Contribution	Actual Contributions	Contribution Deficiency (Excess)	Covered-Employee Payroll	Actual Contribution as a % of Covered-Employee Payroll
	(a)	(b)	(a)-(b)=(c)	(d)	(b)/(d)
2007	$ 2,885	$ 2,199	$ 686	$ 2,380	92.39%
2008	3,736	2,652	1,084	1,993	133.07
2009	5,084	1,711	3,373	1,963	87.16
2010	8,183	2,428	5,755	1,877	129.36
2011	8,164	3,265	4,899	1,774	184.05
2012	19,348	4,401	14,947	1,378	319.38
2013	17,402	3,869	13,533	1,233	313.79
2014	21,082	3,436	17,646	1,122	306.24
2015	38,736	3,216	35,520	1,700	189.18
2016	21,711	5,087	16,624	989	514.36

* *Effective July 1, 2013, the Elective State Officers Retirement Fund was administratively consolidated with the Legislators Retirement Fund. All figures in the table above represent the combined total from both funds, as directed by MSRS.*

NOTES TO SCHEDULE OF CONTRIBUTIONS

Valuation Date:	June 30, 2016
Notes	Actuarially determined contribution rates are calculated as of each June 30 and apply to the fiscal year beginning on the day after the measurement date.

Methods and Assumptions Used to Determine Contribution Rates Reported in this Schedule:

Actuarial Cost Method	Entry Age Normal
Amortization Method	Level Dollar, Closed
Remaining Amortization Period	10 years
Asset Valuation Method	Market value of assets
Salary Increases	5.00% including inflation
Investment Rate of Return	0.00% per annum
Retirement Age	Experience-based table of rates that are specific to the type of eligibility condition. Last updated for the 2012 valuation pursuant to an experience study prepared by a former actuary.
Healthy Post-Retirement Mortality	RP-2000 annuitant generational mortality table, projected with mortalilty improvement scale AA, white collar adjustment.
Other Information:	
Benefit Increases After Retirement	The post-retirement increase is assumed to remain 2.00% for all future years.

See separate funding actuarial valuation report as of July 1, 2016 for additional detail. To obtain this report, contact MSRS at 60 Empire Drive, Suite 300, St. Paul, MN, 55103 or request via email at info@msrs.us or telephone at 1-800-651-5757.
This report can be found online at www.msrs.state.mn.us/actuarial-reports.

SCHEDULE OF INVESTMENT RETURNS MULTIYEAR

Last 10 Fiscal Years

Fiscal Year Ending June 30,	Annual Return[1]
2007	
2008	
2009	
2010	
2011	
2012	
2013	
2014	19.30 %
2015	5.00
2016	NA

[1] *Annual money-weighted rate of return, net of investment expenses.*

The Minnesota State Board of Investment (SBI) compiled this data and the related investment notes and provided it to MSRS for GASB-compliance purposes. MSRS furnished this information to us for inclusion within this report. We did not audit this information. We are not responsible for its accuracy or completeness.

Rate of Return

For the year ended June 30, 2016, the Legislators Retirement Fund assets were depleted, and therefore an annual money-weighted rate of return cannot be calculated. The money-weighted rate of return is a method of calculating period-by-period returns on pension plan investments that adjusts for the changing amounts actually invested. For purposes of this schedule, the money-weighted rate of return is calculated as the internal rate of return on pension plan investments, net of pension plan investment expense.

10-Year Schedule of Money-Weighted Investment Return

Ten-year data is not available. Additional years will be provided when they become available.

To request additional information about the computation of the annual money-weighted rate of return and the investments for the Minnesota Retirement Systems (including the investments for MSRS' defined benefit retirement funds), contact SBI at 60 Empire Drive, Suite 355, St. Paul, Minnesota, 55103, via email at minn.sbi@state.mn.us or telephone at (651) 296-3328.

SECTION D

ADDITIONAL FINANCIAL STATEMENT DISCLOSURES

ASSET ALLOCATION

Long-Term Expected Return on Plan Assets

The long-term expected rate of return on pension plan investments was determined using a building-block method. Best estimates for expected future real rates of return (expected returns, net of inflation) were developed for each asset class using both long-term historical returns and long-term capital market expectation from a number of investment management and consulting organizations. The asset class estimates and the target allocations were then combined to produce geometric, long-term expected real rate of return for the portfolio. Inflation expectations were applied to derive the nominal rate of return for the portfolio. For each asset class that is included in the pension fund's target asset allocation as of June 30, 2016, these best estimates are summarized in the following table:

Asset Class	Target Allocation	Long-Term Expected Real Rate of Return (Geometric)
Domestic Stocks	45.00%	5.50%
International Stocks	15.00	6.00
Bonds	18.00	1.45
Alternative Assets	20.00	6.40
Unallocated Cash	2.00	0.50
Total	100.00%	

The Minnesota State Board of Investment (SBI) compiled this data and the related investment notes and provided it to MSRS for GASB-compliance purposes. MSRS furnished this information to us for inclusion within this report. We did not audit this information. We are not responsible for its accuracy or completeness.

At MSRS' direction, for purposes of this valuation, the long-term expected rate of return assumption is 7.50%. This assumption is based on a review of inflation and investment return assumptions dated September 11, 2014, and a recent asset liability study obtained by the SBI. Since the plan's assets are $0, MSRS' long-term expected rate of investment return of 7.50% is not utilized in this valuation. A single discount rate of 2.85% was used to measure the total pension liability as of July 1, 2016.

Single Discount Rate

A single discount rate of 2.85% was used to measure the total pension liability. This single discount rate was based on a municipal bond rate of 2.85% and the pay-as-you-go status of this plan. Since the plan's assets are $0, MSRS' long-term expected rate of investment return of 7.50% is not utilized in this valuation.

Regarding the sensitivity of the net pension liability to changes in the single discount rate, the following presents the fund's net pension liability, calculated using a single discount rate of 2.85%, as well as what the fund's net pension liability would be if it were calculated using a single discount rate that is 1-percentage-point lower (1.85%) or 1-percentage-point higher (3.85%) than the current rate:

Sensitivity of Net Pension Liability to the Single Discount Rate Assumption

(Dollars in Thousands)

	1% Decrease 1.85%	Current Single Discount Rate Assumption 2.85%	1% Increase 3.85%
Total Pension Liability	$173,150	$154,701	$139,340
Net Position Restricted for Pensions	0	0	0
Net Pension Liability	$173,150	$154,701	$139,340

For more information on the calculation of the single discount rate, refer to Section G of this report.

GASB Statement No. 68 Reconciliation (Dollars in Thousands)

	Total Pension Liability (a)	Plan Fiduciary Net Position (b)	Net Pension Liability (a) - (b)	Deferred Outflows	Deferred Inflows	Total Pension Expense
Balance Beginning of Year	**$ 144,353**	**$ 3,430**	**$ 140,923**	**$ 136**	**$ 623**	
Changes for the Year:						
Service Cost	$ 495		$ 495			$ 495
Interest on Total Pension Liability	5,333		5,333			5,333
Interest on Plan Fiduciary Net Position (1)		$ 138	(138)			(138)
Changes in Benefit Terms						
Liability Experience Gains and Losses	(1,597)		(1,597)	-	-	(1,597)
Changes in Assumptions	14,653		14,653	-	-	14,653
Recognition of Deferred Outflows/(Inflows) of Resources Arising from Prior Reporting Periods						
Liability Experience Gains/(Losses)				-	-	-
Assumption Changes				-	-	-
Investment Gains/(Losses)				$ (34)	$ (208)	(174)
State General Fund Appropriations		5,087	(5,087)			
Contributions - Employees		89	(89)			(89)
Asset Gain/(Loss) (1)		(207)	207	166	-	41
Benefit Payouts	(8,536)	(8,536)				
Administrative Expenses		(42)	42			42
Other Changes		41	(41)			(41)
Net Changes	**$ 10,348**	**$ (3,430)**	**$ 13,778**	**$ 132**	**$ (208)**	**$ 18,525**
Balance End of Year	**$ 154,701**	**$ -**	**$ 154,701**	**$ 268**	**$ 415**	

(1) The sum of these items equals the net investment income of $(69).

SUMMARY OF POPULATION STATISTICS

		Terminated		Recipients			
	Actives	Deferred Retirement	Other Non-Vested	Service Retirement	Disability Retirement	Survivor	Total
Members on 7/1/2015	**23**	**56**	**0**	**305**	**0**	**72**	**456**
Additions	0	0	0	0	0	0	**0**
Return to active	0	0	0	0	0	0	**0**
Terminated non-vested	0	0	0	0	0	0	**0**
Service retirements	0	(3)	0	3	0	0	**0**
Terminated deferred	0	0	0	0	0	0	**0**
Terminated refund/transfer	0	0	0	0	0	0	**0**
Deaths	0	0	0	(7)	0	(5)	**(12)**
New beneficiary	0	0	0	0	0	3	**3**
Disabled	0	0	0	0	0	0	**0**
Unexpected status changes	0	(1)	0	1	0	0	**0**
Net change	0	(4)	0	(3)	0	(2)	**(9)**
Members on 6/30/2016	**23**	**52**	**0**	**302**	**0**	**70**	**447**

SECTION E

SUMMARY OF BENEFITS

SUMMARY OF PLAN PROVISIONS – LEGISLATORS RETIREMENT PLAN

Following is a summary of the major plan provisions used in the valuation of this report. MSRS is solely responsible for the validity, accuracy and comprehensiveness of this information. If any of the plan provisions shown below are not accurate and complete, the valuation results may differ significantly from those shown in this report and may require a revision of this report.

Plan year	July 1 through June 30
Eligibility	Members of the State Legislature first elected to office before July 1, 1997 and who elect to retain coverage under this plan (i.e., do not elect Social Security coverage).
Contributions	
Member	9.00% of salary which must be paid to the state's General Fund.
Employer	Plan is funded by annual appropriations from the state's General Fund. Employee contributions are "picked up" according to the provisions of Internal Revenue Code 414(h).
Allowable service	Service while in an eligible position.
Salary	Compensation received for service as a member of the legislature. Salary includes the monthly compensation paid to a legislator and the per diem payments paid during a regular or special session. Salary does not include additional compensation attributable to a leadership position.
Average salary	Average of the five highest successive years of salary.
Retirement	
<u>Normal retirement benefit</u>	
Age/Service requirements	Age 62 and either six full years of service or service during all or part of four regular legislative sessions. For eligibility purposes, service does not include credit for time not served when a member does not serve a full term of office.
	A percentage of Average Salary for each year of service as follows:
Amount	First elected prior to January 1, 1979: (a) 5.00% for the first eight years of service prior to January 1, 1979; and (b) 2.50% for subsequent years. Elected after December 31, 1978: (a) 2.50%.

SUMMARY OF PLAN PROVISIONS – LEGISLATORS RETIREMENT PLAN (CONTINUED)

Retirement (Continued)	
Early retirement benefit	
Age/service requirements	Age 55 and either six full years of service or service during all or part of four regular legislative sessions.
Amount	Normal retirement benefit based on service and Average Salary at retirement date and actuarially reduced for each month the member is under age 62 assuming augmentation to age 62 at 3.00% per year.
Form of payment	Paid as a 50% joint and survivor annuity to member, spouse and dependent children. Annuitants may elect 100% joint and survivor bounce back annuity, life annuity, or a term certain and life annuity on an actuarially equivalent basis.
Benefit increases	Since 2011, benefit recipients have received annual 2.00% benefit increases. When the funding ratio of the State Employees Retirement Fund reaches 90% for two consecutive years (actuarial accrued liability on a Market Value of Assets basis) for two consecutive years, the benefit increase will revert to 2.50%. If, after reverting to a 2.50% increase, the State Employees Retirement Fund funding ratio (determined on a Market Value of Assets basis) declines to less than 80% for the most recent actuarial valuation year or 85% for two consecutive years, the benefit increase will decrease to 2.00%. A benefit recipient who has been receiving a benefit for at least 12 full months as of the June 30 of the calendar year immediately before the adjustment will receive a full increase. Members receiving benefits for at least one month but less than 12 full months as of the June 30 of the calendar year immediately before the adjustment will receive a pro rata increase.
Disability	No additional benefits provided beyond standard plan. Treated as retirement or termination, depending on age and service at termination.
Death	
Surviving spouse benefit	
Age/Service requirement	Death while active, or after termination if service requirements for a normal retirement benefit is met but payments have not begun.
Amount	Survivor payments of 50% of the retirement benefit of the member assuming the member had attained normal retirement age and had a minimum of eight years of service. Benefit is paid for life. A former member's benefit is augmented as a Deferred Annuity to date of death before determining the portion payable to the spouse. If the legislator was at least age 60 at death, the surviving spouse may elect an optional joint and survivor annuity. If a deferred benefit was not eligible to be in pay status before July 1, 1997, an actuarial increase shall be made for the change in the post-retirement interest rates from 5.00% to 6.00%.
Benefit increases	Same as for retirement.

SUMMARY OF PLAN PROVISIONS – LEGISLATORS RETIREMENT PLAN (CONTINUED)

Death (Continued)

Surviving dependent children's benefit

Age/Service requirement	Same as spouse's benefit.
Amount	Benefit for first child is 25.00% of the retirement benefit (computed as for surviving spouse) with 12.50% for each additional child. Maximum payable (including spouse) is 100.00% of the retirement benefit. Benefits cease when a child marries or attains age 18 (22 if a full-time student).
Benefit increases	Same as retirement.

Refund of contributions

Age/Service requirement	Member dies before receiving any retirement benefits and survivor benefits are not payable.
Amount	Member's contributions with 6.00% annual interest compounded daily until June 30, 2011, 4.00% thereafter.

Termination

Refund of contributions

Age/Service requirement	Termination of service.
Amount	Member's contributions with 6.00% annual interest compounded daily until June 30, 2011, 4.00% thereafter. If a member is vested, a deferred annuity may be elected in lieu of a refund.

Deferred benefit

Age/service requirement	Same service requirements as for normal retirement.
Amount	Benefit computed under law in effect at termination and increased by the following annual augmentation percentage: (a.) 0.00% before July 1, 1973; (b.) 5.00% from July 1, 1973 to January 1, 1981; (c.) 3.00% until the earlier of January 1 of the year following attainment of age 55 and January 1, 2012; (d.) 5.00% until the earlier of January 1, 2012 and when the annuity begins; and (e.) 2.00% from January 1, 2012 forward. Amount is payable at normal or early retirement. For members who terminated prior to July 1, 1997 but were not eligible to commence their pensions before July 1, 1997, the benefit shall be increased to reflect the actuarial equivalent change in post-retirement interest rate from 5.00% to 6.00%.

Adjustments for benefits not in pay status	Benefits are adjusted on an actuarial equivalent basis to reflect the 1997 change in post-retirement interest rate assumption from 5.00% to 6.00%.

SUMMARY OF PLAN PROVISIONS – LEGISLATORS RETIREMENT PLAN (CONCLUDED)

Optional form conversion factors	Actuarially equivalent factors based on RP-2000 mortality for healthy annuitants, white collar adjustment, projected to 2025 using scale AA, blended 55% males, and 6.50% interest.
Combined service annuity	Members are eligible for combined service benefits if they: (a.) Have sufficient allowable service in total that equals or exceeds the applicable service credit vesting requirement of the retirement plan with the longest applicable service credit vesting requirement; and (b.) Have at least six months of allowable service credit in each plan worked under; and (c.) Are not in receipt of a benefit from another plan, or have applied for benefits with an effective date within one year. Members who meet the above requirements must have their benefit based on the following: (a.) Allowable service in all covered plans are combined in order to determine eligibility for early retirement. (b.) Average salary is based on the high five consecutive years during their entire service in all covered plans.
Changes in Plan Provisions	There have been no changes in plan provisions since the prior valuation.

SUMMARY OF PLAN PROVISIONS – ELECTIVE STATE OFFICERS RETIREMENT PLAN

Following is a summary of the major plan provisions used in the valuation of this report. MSRS is solely responsible for the validity, accuracy and comprehensiveness of this information. If any of the plan provisions shown below are not accurate and complete, the valuation results may differ significantly from those shown in this report and may require a revision of this report.

Plan year	July 1 through June 30
Eligibility	Must be employed as a "Constitutional Officer" first elected prior to July 1, 1997 and must elect to retain coverage under this plan (i.e., does not elect Social Security coverage). Plan is closed to new members since July 1, 1997.
Contributions	Plan is funded by annual appropriations from the State's General Fund.
Allowable service	Service while in an eligible position as a constitution officer.
Salary	Salary upon which Elective State Officers Retirement Fund contributions have been made.
Average salary	Average of the five highest successive years of Salary.
Retirement	
<u>Normal retirement benefit</u>	
Age/Service requirements	Age 62 and eight years of Allowable Service.
Amount	2.50% of Average Salary for each year of Allowable Service. For members who terminated service after June 30, 1997, an actuarial increase shall be made for the change in the post-retirement interest rates from 5.00% to 6.00%.
<u>Early retirement benefit</u>	
Age/Service requirement	Age 60 and eight years of Allowable Service.
Amount	Normal retirement benefit based on Allowable Service and Average Salary at retirement date with reduction of 0.50% for each month the member is under age 62 at the time of retirement.
Form of Payment	Life annuity.
Benefit increases	Since 2011, benefit recipients have received annual 2.00% benefit increases. When the funding ratio of the State Employees Retirement Fund reaches 90% (actuarial accrued liability ratio on a Market Value of Assets basis) for two consecutive years, the benefit increase will revert to 2.50%. If, after reverting to a 2.50% increase, the State Employees Retirement Fund funding ratio (determined on a Market Value of Assets basis) declines to less than 80% for the most recent actuarial valuation year or 85% for two consecutive years, the benefit increase will decrease to 2.00%. A benefit recipient who has been receiving a benefit for at least 12 full months as of the June 30 of the calendar year immediately before the adjustment will receive a full increase. Members receiving benefits for at least one month but less than 12 full months as of the June 30 of the calendar year immediately before the adjustment will receive a pro rata increase.
Disability	No additional benefits provided beyond standard plan. Treated as retirement or termination, depending on age and Allowable Service as of disablement.

SUMMARY OF PLAN PROVISIONS – ELECTIVE STATE OFFICERS RETIREMENT PLAN (CONTINUED)

Death	
<u>Surviving spouse benefit</u>	
Age/Service requirement	Death while active, or after retirement, or after termination but prior to retirement with at least eight years of Allowable Service.
Amount	Survivor payments of 50% of the retirement benefit of the member assuming the member had attained age 62 and had a minimum of eight years of Allowable Service. A former member's benefit is augmented as a Deferred Annuity to date of death before determining the portion payable to the spouse. If a member dies prior to July 1, 1997 and the beneficiary was not eligible to commence a survivor benefit as of July 1, 1997, an actuarial increase shall be made for the change in the post-retirement interest rates from 5.00% to 6.00%.
Benefit increases	Same as for retirement.
<u>Surviving dependent children's benefit</u>	
Age/Service requirement	Same as spouse's benefit.
Amount	Benefit for first child is 25.00% of the retirement benefit (computed as for surviving spouse) with 12.50% for each additional eligible child. Maximum payable (including spouse) is 100.00% of the retirement benefit. Benefits cease when a child marries or attains age 18 (22 if a full-time student).
Benefit increases	Same as for retirement.
Termination	
<u>Refund of contributions</u>	
Age/Service requirement	Termination of service.
Amount	Member's contributions with 6.00% interest compounded daily to July 1, 2011 and 4.00% compounded daily thereafter. If a member is vested, a deferred annuity may be elected in lieu of a refund.
<u>Deferred benefit</u>	
Age/service requirement	Eight years of Allowable Service.

SUMMARY OF PLAN PROVISIONS – ELECTIVE STATE OFFICERS RETIREMENT PLAN (CONCLUDED)

Termination (Continued)	
Deferred benefit Amount	Benefit computed under law in effect at termination and increased by the following annual augmentation percentage: (a.) 0.00% before July 1, 1979; (b.) 5.00% from July 1, 1979 to January 1, 1981; (c.) 3.00% until age 55, or until January 1, 2012, whichever is earlier; (d.) 5.00% thereafter until the annuity begins but prior to January 1, 2012; and (e.) 2.00% from January 1, 2012 thereafter. Amount is payable at normal or early retirement. If a member terminated prior to July 1, 1997 but was not eligible to commence his or her pension before July 1, 1997, an actuarial increase shall be made for the change in the post-retirement interest rates from 5.00% to 6.00%.
Combined service annuity	Members are eligible for combined service benefits if they: (a.) Have sufficient allowable service in total that equals or exceeds the applicable service credit vesting requirement of the retirement plan with the longest applicable service credit vesting requirement; and (b.) Have at least six months of allowable service credit in each plan worked under; and (c.) Are not in receipt of a benefit from another plan, or have applied for benefits with an effective date within one year. Members who meet the above requirements must have their benefit based on the following: (a.) Allowable service in all covered plans are combined in order to determine eligibility for early retirement. (b.) Average salary is based on the high five consecutive years during their entire service in all covered plans.
Optional form conversion factors	Actuarially equivalent factors based on RP-2000 mortality for healthy annuitants, white collar adjustment, projected to 2025 using scale AA, blended 55% males, and 6.50% interest.
Changes in plan provisions	There have been no changes in plan provisions since the prior valuation.

SECTION F

ACTUARIAL COST METHOD AND ACTUARIAL ASSUMPTIONS

ACTUARIAL METHODS USED FOR THE DETERMINATION OF TOTAL PENSION LIABILITY AND RELATED VALUES

Actuarial Cost Method

Normal cost and the allocation of benefit values between service rendered before and after the valuation date were determined using an **Individual Entry-Age Actuarial Cost Method** having the following characteristics:

(i) the annual normal cost for each individual active member, payable from the date of employment to the date of retirement, is sufficient to accumulate the value of the member's benefit at the time of retirement;

(ii) each annual normal cost is a constant percentage of the member's year by year projected covered pay.

Actuarial gains/(losses), as they occur, reduce (increase) the Total Pension Liability.

Valuation of Future Post-Retirement Benefit Increases

Benefit recipients receive a future annual 2.00% post-retirement benefit increase. If the funding ratio (on a market value of assets basis) of the State Employees Retirement Fund (SERF) reaches 90% (based on a 2.50% post-retirement benefit increase assumption) for two consecutive years, the benefit increase in the Legislators Retirement Fund will revert to 2.50%.

To determine an assumption regarding a future change in the post-retirement benefit increase, we performed a projection of the SERF liabilities and assets. For additional detail, see the 2016 GASB Statements No. 67 and 68 valuation report for the SERF which can be found online at www.msrs.state.mn.us/actuarial-reports. The projection indicates that this plan is expected to pay a 2.00% benefit increase indefinitely. This assumption is reflected in our calculations.

Asset Valuation Method

Fair value of assets.

SUMMARY OF ACTUARIAL ASSUMPTIONS USED IN THE DETERMINATION OF TOTAL PENSION LIABILITY AND RELATED VALUES

The following assumptions were used in valuing the liabilities and benefits under the plan. The demographic assumptions are based on the last experience study, dated February 2012, prepared by a former actuary. The economic assumptions are based on a review of inflation and investment return assumptions, dated September 11, 2014, and a recent asset liability study obtained by the SBI.

The Allowance for Combined Service Annuity was also based on a recommendation by a former actuary. We are unable to judge the reasonableness of this assumption without performing a substantial amount of additional work beyond the scope of the assignment. We note that the LCPR Actuary has recently completed a review of this assumption. This review recommended changes to this assumption, expected to be effective at a future date.

Investment return	7.50% per annum.
Single discount rate	2.85% per annum.
Benefit increases after retirement	2.00% per annum.
Salary increases	4.50% annually.
Inflation	2.50% annually.
Mortality rates	
Healthy Pre-retirement	RP-2000 employee generational mortality table projected with mortality improvement scale AA, white collar adjustment, set forward three years for males and set back one year for females.
Healthy Post-retirement	RP-2000 annuitant generational mortality table projected with mortality improvement scale AA, white collar adjustment. The RP-2000 employee mortality table as published by the Society of Actuaries (SOA) contains mortality rates for ages 15 to 70 and the annuitant mortality table contains mortality rates for ages 50 to 120. We have applied the annuitant mortality table for active members beyond age 70 until the assumed retirement age and the employee mortality table for annuitants younger than age 50.
Disabled	N/A
Retirement	Members retiring from active status are assumed to retire according to the age related rates shown in the rate table. Members who have attained the highest assumed retirement age are assumed to retire in one year.
Withdrawal	Ultimate rates based on actual experience. Rates are shown in rate table.

SUMMARY OF ACTUARIAL ASSUMPTIONS (CONTINUED)

Disability	None.
Allowance for combined service annuity	Liabilities for former members are increased by 30.00% to account for the effect of some participants having eligibility for a Combined Service Annuity.
Administrative expenses	In the valuation year, equal to prior year administrative expenses expressed as a percentage of prior year projected payroll. In each subsequent year, equal to the initial administrative expense percentage applied to payroll for the closed group.
Refund of contributions	Account balances accumulate interest until normal retirement date and are discounted back to the valuation date. All employees withdrawing after becoming eligible for a deferred benefit take the larger of their contributions accumulated with interest or the value of their deferred benefit.
Commencement of deferred benefits	Members receiving deferred annuities (including current terminated deferred members) are assumed to begin receiving benefits at age 62.
Percentage married	85% of active members are assumed to be married. 100% of Elective State Officers members are assumed to be eligible for the automatic 50% survivor benefit.
Age of spouse	Females are assumed to be three years younger than their male spouses.
Eligible children	Each member may have two dependent children depending on member’s age. Assumed first born child born at member’s age 28 and second born child at member’s age 31.
Form of payment	Active married members are assumed to elect 50% joint and survivor annuity. Active single members and deferred members are assumed to elect a life annuity. Unless reported with a joint & survivor option, retired members are assumed to have a spouse that is eligible for the automatic survivor benefit. Deferred Elective State Officers Retirement Fund members are assumed to elect a life annuity with automatic survivor benefits.
Eligibility testing	Eligibility for benefits is determined based upon the age nearest birthday and service nearest whole year on the date the decrement is assumed to occur.
Decrement operation	Withdrawal decrements do not operate during retirement eligibility. Decrements are assumed to occur mid-fiscal year.
Service credit accruals	It is assumed that members accrue one year of service credit per year.
Pay Increases	Pay increases are assumed to happen at the beginning of the fiscal year. This is equivalent to assuming that reported earnings are pensionable earnings for the year ending on the valuation date.

SUMMARY OF ACTUARIAL ASSUMPTIONS (CONTINUED)

Unknown data for certain members	To prepare this report, GRS has used and relied on participant data supplied by the Fund. Although GRS has reviewed the data in accordance with Actuarial Standards of Practice No. 23, GRS has not verified or audited any of the data or information provided. In cases where submitted data was missing or incomplete, the following assumptions were applied: **Legislators Retirement Plan** <u>Data for active members:</u> There were no members reported with zero or invalid salary. There were no members reported with missing service. There were no members reported with missing or invalid gender or birth dates. <u>Data for terminated members:</u> There were 11 members reported without a benefit. If available, we calculated benefits for these members using the reported Average Salary and credited service. If Average Salary was also not reported (10 members), we assumed a value of $30,000. There were no members reported without credited service or a termination date. There were no members reported with missing or invalid gender or birth dates. <u>Data for members receiving benefits:</u> There were no members reported with missing or invalid birth dates, gender, or benefits. There were 292 retired members reported: ▪ 111 members were reported with the 75% or 100% joint and survivor option. These members were valued as indicated by the option elected. ▪ 180 members were reported with a life annuity or the 50% joint and survivor option. All of these members were valued as a 50% joint and survivor annuity per MSRS' direction. ▪ There was one retiree reported with a bounce back annuity but was not reported with a reasonable reduction factor. A factor of 0.80 was assumed for the 100% joint and survivor annuity. Of the 292 retired members, 158 members had an invalid or missing survivor gender and 150 members had a missing or invalid survivor date of birth. We used the valuation assumptions if the survivor gender or date of birth was missing or invalid. There were no survivors reported on the data file with an expired benefit.

SUMMARY OF ACTUARIAL ASSUMPTIONS (CONTINUED)

Unknown data for certain members	**Elective State Officers Retirement Fund** There were no members reported with missing gender, birth dates or benefit amounts. <u>Data for members receiving benefits:</u> Unless reported with the 100% joint & survivor option, all retired and deferred members were assumed to have a spouse that is eligible for the automatic survivor benefit. Valuation assumptions were used if the survivor gender (6 members) or date of birth (6 members) were missing or invalid.
Changes in actuarial assumptions	The single discount rate changed from 3.80% to 2.85%. The long-term expected rate of return on pension plan investments has been reduced from 7.90% to 7.50% as of July 1, 2016. The inflation assumption has been reduced from 2.75% to 2.50%, and the salary scale rates have been reduced by 0.25% at each age. The assumed post-retirement benefit increase rate was changed from 2.00% per year through 2043 and 2.50% thereafter to 2.00% for all year. For accounting purposes, this change was treated as a difference between expected and actual experience.

SUMMARY OF ACTUARIAL ASSUMPTIONS (CONCLUDED)

Age	Healthy Pre-Retirement Mortality** Male	Healthy Pre-Retirement Mortality** Female	Healthy Post-Retirement Mortality** Male	Healthy Post-Retirement Mortality** Female
	Rate (%)*			
20	0.04%	0.02%	0.03%	0.02%
25	0.04	0.02	0.04	0.02
30	0.05	0.02	0.04	0.03
35	0.08	0.04	0.06	0.05
40	0.11	0.06	0.09	0.06
45	0.17	0.09	0.13	0.10
50	0.24	0.15	0.60	0.24
55	0.35	0.22	0.54	0.35
60	0.56	0.34	0.66	0.56
65	0.85	0.54	1.16	0.91
70	2.67	0.82	1.93	1.52

* *Generally, mortality rates are expected to increase as age increases. These standard mortality rates have been adjusted slightly to prevent decreasing mortality rates. If the rates were not adjusted as described, we would not expect the valuation results to be materially different.*

** *These rates were adjusted for mortality improvements using projection scale AA.*

Age	Percent Retiring
60	0.00%
61	0.00
62	40.00
63	30.00
64	30.00
65	40.00
66	30.00
67	25.00
68	25.00
69	25.00
70	30.00
71+	100.00

Service	Withdrawal House	Withdrawal Senate
1	0.0%	0.0%
2	30.0	0.0
3	0.0	0.0
4	20.0	25.0
5	0.0	0.0
6	10.0	0.0
7	0.0	0.0
8	5.0	10.0
9+	0.0	0.0

SECTION G

CALCULATION OF THE SINGLE DISCOUNT RATE

CALCULATION OF THE SINGLE DISCOUNT RATE

GASB Statement No. 67 includes a specific requirement for the discount rate that is used for the purpose of the measurement of the Total Pension Liability. This rate considers the ability of the fund to meet benefit obligations in the future. To make this determination, employer contributions, employee contributions, benefit payments, expenses and investment returns are projected into the future. The Plan Fiduciary Net Position (assets) in future years can then be determined and compared to its obligation to make benefit payments in those years. As long as assets are projected to be on hand in a future year, the long-term expected rate of return is used as the discount rate. In years where assets are not projected to be sufficient to meet benefit payments, the use of a "risk-free" municipal bond rate is required, as described in the following paragraph.

The *Single Discount Rate* (SDR) is equivalent to applying these two rates to the benefits that are projected to be paid during the different time periods. The SDR reflects (1) the long-term expected rate of return on pension plan investments (during the period in which the plan fiduciary net position is projected to be sufficient to pay benefits) and (2) tax-exempt municipal bond rate based on an index of 20-year general obligation bonds with an average AA credit rating as of the measurement date (to the extent that the contributions for use with the long-term expected rate of return are not met).

This plan is currently funded on a pay-as-you-go basis by annual appropriations from the state's General Fund. The current contribution levels (member contributions and annual appropriations) are not sufficient to cover annual benefit payments. For the fiscal year ending June 30, 2016, total contributions (plan member contributions and state General Fund appropriations) were $5.2 million and total benefit payments were $8.5 million.

For the purpose of this valuation, we have recognized that the assets are not sufficient to pay benefits in any future year regardless of future investment income. The municipal bond rate is 2.85% (based on the 20-Bond GO rate as of June 30, 2016); and the **resulting single discount rate is 2.85%.**

SECTION H

GLOSSARY OF TERMS

GLOSSARY OF TERMS

Actuarial Accrued Liability (AAL)	The AAL is the difference between the actuarial present value of all benefits and the actuarial value of future normal costs. The definition comes from the fundamental equation of funding which states that the present value of all benefits is the sum of the Actuarial Accrued Liability and the present value of future normal costs. The AAL may also be referred to as "accrued liability" or "actuarial liability."
Actuarial Assumptions	These assumptions are estimates of future experience with respect to rates of mortality, disability, turnover, retirement, rate or rates of investment income and compensation increases. Actuarial assumptions are generally based on past experience, often modified for projected changes in conditions. Economic assumptions (compensation increases, payroll growth, inflation and investment return) consist of an underlying real rate of return plus an assumption for a long-term average rate of inflation.
Accrued Service	Service credited under the system which was rendered before the date of the actuarial valuation.
Actuarial Equivalent	A single amount or series of amounts of equal actuarial value to another single amount or series of amounts, computed on the basis of appropriate actuarial assumptions.
Actuarial Cost Method	A mathematical budgeting procedure for allocating the dollar amount of the actuarial present value of the pension trust benefits between future normal cost and actuarial accrued liability. The actuarial cost method may also be referred to as the actuarial funding method.
Actuarial Gain (Loss)	The difference in liabilities between actual experience and expected experience during the period between two actuarial valuations is the gain (loss) on the accrued liabilities.
Actuarial Present Value (APV)	The amount of funds currently required to provide a payment or series of payments in the future. The present value is determined by discounting future benefit payments at predetermined rates of interest to reflect the expected effects of the time value (present value) of money and the probabilities of payment.
Actuarial Valuation	The actuarial valuation report determines, as of the actuarial valuation date, the service cost, total pension liability, and related actuarial present value of projected benefit payments for pensions performed in conformity with Actuarial Standards of Practice unless otherwise specified by the GASB.
Actuarial Valuation Date	The date as of which an actuarial valuation is performed.
Actuarially Determined Contribution (ADC)	A calculated contribution into a defined benefit pension plan for the reporting period, most often determined based on the funding policy of the plan. Typically the Actuarially Determined Contribution has a normal cost payment and an amortization payment.

GLOSSARY OF TERMS

Amortization Payment	The amortization payment is the periodic payment required to pay off an interest-discounted amount with payments of interest and principal.
Amortization Method	The method used to determine the periodic amortization payment may be a level dollar amount, or a level percent of pay amount. The period will typically be expressed in years, and the method will either be "open" (meaning, reset each year) or "closed" (the number of years remaining will decline each year).
Cost-of-Living Adjustments	Postemployment benefit changes intended to adjust benefit payments for the effects of inflation.
Cost-Sharing Multiple-Employer Defined Benefit Pension Plan (cost-sharing pension plan)	A multiple-employer defined benefit pension plan in which the pension obligations to the employees of more than one employer are pooled and pension plan assets can be used to pay the benefits of the employees of any employer that provides pensions through the pension plan.
Covered-Employee Payroll	The payroll of covered employees, which is typically only the pensionable pay (meets the statutory salary definition) and does not include pay above any pay cap.
Deferred Inflows and Outflows of Resources	The deferred inflows and outflows of pension resources are amounts used under GASB Statement No. 68 in developing the annual pension expense. Deferred inflows and outflows arise with differences between expected and actual experiences; changes of assumptions. The portion of these amounts not included in pension expense should be included in the deferred inflows or outflows of resources.
Discount Rate or Single Discount Rate	For GASB purposes, the discount rate is the single rate of return that results in the present value of all projected benefit payments to be equal to the sum of the funded and unfunded projected benefit payments, specifically: 1. The benefit payments to be made while the pension plans' fiduciary net position is projected to be greater than the benefit payments that are projected to be made in the period; and 2. The present value of the benefit payments not in (1) above, discounted using the municipal bond rate.
Entry Age Actuarial Cost Method or Entry Age Normal (EAN)	The EAN is a funding method for allocating the costs of the plan between the normal cost and the accrued liability. The actuarial present value of the projected benefits of each individual included in an actuarial valuation is allocated on a level basis (either level dollar or level percent of pay) over the earnings or service of the individual between entry age and assumed exit ages(s). The portion of the actuarial present value allocated to a valuation year is the normal cost. The portion of this actuarial present value not provided for at a valuation date by the actuarial present value of future normal costs is the actuarial accrued liability. The sum of the accrued liability plus the present value of all future normal costs is the present value of all benefits.

GLOSSARY OF TERMS

Fiduciary Net Position	The fiduciary net position is the value of the net assets of the trust restricted for pension benefits.
GASB	The Governmental Accounting Standards Board is an organization that exists with authority to promulgate accounting standards for state and local governmental entities.
Long-Term Expected Rate of Return	The long-term rate of return is the expected return to be earned over the entire trust portfolio based on the asset allocation of the portfolio.
Money-Weighted Rate of Return	The money-weighted rate of return is a method of calculating the returns that adjusts for the changing amounts actually invested. For purposes of GASB Statement No. 67, money-weighted rate of return is calculated as the internal rate of return on pension plan investments, net of pension plan investment expense.
Multiple-Employer Defined Benefit Pension Plan	A multiple-employer plan is a defined benefit pension plan that is used to provide pensions to the employees of more than one employer.
Municipal Bond Rate	The Municipal Bond Rate is the discount rate to be used for those benefit payments that occur after the assets of the trust have been depleted.
Net Pension Liability (NPL)	The NPL is the liability of employers and non-employer contributing entities to plan members for benefits provided through a defined benefit pension plan.
Non-Employer Contributing Entities	Non-employer contributing entities are entities that make contributions to a pension plan that is used to provide pensions to the employees of other entities. For purposes of the GASB Accounting Statements No. 67 and No. 68 plan members are not considered non-employer contributing entities.
Normal Cost	The actuarial present value of the pension trust benefits allocated to the current year by the actuarial cost method.
Other Postemployment Benefits (OPEB)	All postemployment benefits other than retirement income (such as death benefits, life insurance, disability, and long-term care) that are provided separately from a pension plan, as well as postemployment healthcare benefits regardless of the manner in which they are provided. Other post-employment benefits do not include termination benefits.
Real Rate of Return	The real rate of return is the rate of return on an investment after adjustment to eliminate inflation.
Service Cost	The service cost is the portion of the actuarial present value of projected benefit payments that is attributed to a valuation year.

Glossary of Terms

Total Pension Expense	The total pension expense is the sum of the following items that are recognized at the end of the employer's fiscal year: 1. Service Cost 2. Interest on the Total Pension Liability 3. Current-Period Changes in Benefit Terms 4. Employee Contributions 5. Projected Earnings on Plan Investments 6. Pension Plan Administrative Expense 7. Other Changes in Plan Fiduciary Net Position 8. Recognition of Outflow (Inflow) of Resources due to the difference between expected and actual in measurement of the Total Pension Liability 9. Recognition of Outflow (Inflow) of Resources due to Assumption Changes 10. Recognition of Outflow (Inflow) of Resources due to the difference between projected and actual earnings on pension plan investments
Total Pension Liability (TPL)	The TPL is the portion of the actuarial present value of projected benefit payments that is attributed to past periods of member service.
Unfunded Actuarial Accrued Liability (UAAL)	The UAAL is the difference between actuarial accrued liability and valuation assets.
Valuation Assets	The valuation assets are the plan fiduciary net position used in determining the net position liability of the fund. For purposes of the GASB Statement No. 67, the asset valuation method is equal to the market value of assets.