Minnesota State Retirement System
Judges Retirement Fund

GASB Statements No. 67 and No. 68
Accounting and Financial Reporting for Pensions
June 30, 2018

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November 29, 2018

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 standards.

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 purposes of funding the plan. A calculation of the plan's liability for purposes other than satisfying the requirements of GASB Statements No. 67 and No. 68 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, 2018 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 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,

Brian B. Murphy

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

Bonita J. Wurst

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

BBM/BJW:rmn

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SECTION A

EXECUTIVE SUMMARY

Executive Summary
as of June 30, 2018 (Dollars in Thousands)

	2018
Actuarial Valuation Date	June 30, 2018
Measurement Date of the Net Pension Liability	June 30, 2018
Membership	
Number of	
- Service Retirements	272
- Survivors	81
- Disability Retirements	16
- Deferred Retirements	15
- Terminated other non-vested	0
- Active Members	317
- Total	701
Covered-Employee Payroll	$ 49,009 (1)
Net Pension Liability	
Total Pension Liability	$ 377,925
Plan Fiduciary Net Position	201,755
Net Pension Liability	$ 176,170
Plan Fiduciary Net Position as a Percentage of Total Pension Liability	53.38%
Net Pension Liability as a Percentage of Covered-Employee Payroll	359.46%
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	3.62% (2)
Last year ending June 30 in the 2019 to 2118 projection period for which projected benefit payments are fully funded	2118
Total Pension Expense/(Income)	$ 4,723

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	$ 3,993	$ 3,848
Changes in assumptions	11,332	34,303
Net difference between projected and actual earnings on pension plan investments	6,649	11,879
Total	$ 21,974	$ 50,030

(1) Assumed equal to actual employer contributions divided by employer contribution rate.

(2) Based on the 20-Year Municipal GO Index of mixed maturity general obligation municipal bonds as of the weekly rate closest to but not later than the Measurement Date.

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, 2018.

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%), 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 funded status of the plan is expected to gradually improve and is expected to be 100% funded within the next 30 years, and
3. The unfunded liability will grow initially as a dollar amount before beginning to decline.

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 market 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 actuarial value of assets were used instead of the market value of assets.

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, 2018 and a measurement date of June 30, 2018.

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 3.62% (based on the weekly rate closest to but not later than the measurement date of the "20-Year Municipal GO Index" as published by Fidelity); and the resulting single discount rate is 7.50%.

SECTION B

FINANCIAL STATEMENTS

Statement of Pension Expense Under GASB Statement No. 68
Fiscal Year Ended June 30, 2018 (Dollars in Thousands)

A. Expense			
1.	Service Cost	$	9,857
2.	Interest on the Total Pension Liability		26,746
3.	Current-Period Benefit Changes		-
4.	Employee Contributions (made negative for addition here)		(3,973)
5.	Projected Earnings on Plan Investments (made negative for addition here)		(13,786)
6.	Pension Plan Administrative Expense		66
7.	Other Changes in Plan Fiduciary Net Position		-
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		285
9.	Recognition of Outflow (Inflow) of Resources due to assumption changes		
	Arising from Current Reporting Period		-
10.	Recognition of Outflow (Inflow) of Resources due to the difference between projected (7.50%) and actual earnings on Pension Plan Investments		
	Arising from Current Reporting Period		(1,096)
11.	**Increases/(Decreases) from Experience in the Current Reporting Period**	**$**	**18,099**
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	$	578
13.	Recognition of Outflow (Inflow) of Resources due to assumption changes		
	Arising from Prior Reporting Periods		(12,166)
14.	Recognition of Outflow (Inflow) of Resources due to the difference between projected and actual earnings on Pension Plan Investments		
	Arising from Prior Reporting Periods		(1,788)
15.	**Total Pension Expense / (Income)**	**$**	**4,723**

Benefit changes since the previous measurement date are described on page 23.

Statement of Outflows and Inflows
Arising from Current Reporting Period
Fiscal Year Ended June 30, 2018 (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	$	1,424
2. Assumption Changes (gains) or losses		-
3. Recognition period for Liabilities: Average of the expected remaining service lives of all employees {in years}		5
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		285
5. Outflow (Inflow) of Resources to be recognized in the current pension expense for Assumption Changes		-
6. Outflow (Inflow) of Resources to be recognized in the current pension expense due to Liabilities	$	285
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	$	1,139
8. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses for Assumption Changes		-
9. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses due to Liabilities	$	1,139
B. Outflows (Inflows) of Resources due to Assets		
1. Net difference between projected and actual earnings on pension plan investments (gains) or losses	$	(5,479)
2. Recognition period for Assets {in years}		5
3. Outflow (Inflow) of Resources to be recognized in the current pension expense due to Assets		(1,096)
4. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses due to Assets	$	(4,383)

Statement of Outflows and Inflows
Arising from Current and Prior Reporting Periods
Fiscal Year Ended June 30, 2018 (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	$ 9,397	$ 20,700	$ (11,303)
2. Due to Assets	3,920	6,804	(2,884)
3. Total	$ 13,317	$ 27,504	$ (14,187)

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	$ 2,728	$ 1,865	$ 863
2. Assumption Changes	6,669	18,835	(12,166)
3. Net Difference between projected and actual earnings on pension plan investments	3,920	6,804	(2,884)
4. Total	**$ 13,317**	**$ 27,504**	**$ (14,187)**

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	$ 3,993	$ 3,848	$ 145
2. Assumption Changes	11,332	34,303	(22,971)
3. Net Difference between projected and actual earnings on pension plan investments*	6,649	11,879	(5,230)
4. Total	**$ 21,974**	**$ 50,030**	**$ (28,056)**

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
2019	$ (10,309)
2020	(14,966)
2021	(1,970)
2022	(811)
2023	-
Thereafter	-
Total	**$ (28,056)**

** Paragraph 71(b) of GASB Statement No. 68 requires deferred outflows and inflows arising from differences between projected and actual earnings on pension plan investments to be aggregated and shown as a net amount. For purposes of this valuation, amounts are shown separately for calculation purposes.*

Statement of Fiduciary Net Position as of June 30, 2018 (Dollars in Thousands)

Assets		**June 30, 2018**
Cash & Short-term Investments	$	3,458
Receivables		241
Investment Pools (at fair value)		198,170
Securities Lending Collateral		20,161
Capital Assets		-
Total Assets	**$**	**222,030**
Total Deferred Outflows of Resources	**$**	**-**
Total Liabilities	**$**	**(20,275)**
Total Deferred Inflows of Resources	**$**	**-**
Net Position Restricted for Pensions	**$**	**201,755**

Statement of Changes in Fiduciary Net Position
for the Fiscal Year Ended June 30, 2018 (Dollars in Thousands)

1. Net position at market value at beginning of year	**$**	**185,141**
Additions		
2. Contributions		
a. Employee	$	3,973
b. Employer		11,027
c. Other sources		6,000
d. Total contributions	$	21,000
3. Investment income		
a. Investment income/(loss)	$	19,477
b. Investment expenses		(212)
c. Net investment income/(loss)	$	19,265
4. Other Additions		-
5. Total Additions *(2.d.) + (3.c.) + (4.)*	**$**	**40,265**
Deductions		
6. Benefits Paid		
a. Annuity benefits	$	(23,585)
b. Refunds		-
c. Total benefits paid	$	(23,585)
7. Expenses		
a. Other deductions	$	-
b. Administrative		(66)
c. Total expenses	$	(66)
8. Total deductions *(6.c.) + (7.c.)*	**$**	**(23,651)**
9. Net increase/(decrease) in fiduciary net position *(5.) + (8.)*	**$**	**16,614**
10. Net position at market value at end of year *(1.) + (9.)*	**$**	**201,755**
11. State Board of Investment calculated annual investment return for the Judges Retirement Fund*		10.5%

** The fiscal year 2018 investment return for the Combined Funds is 10.3%.*

SECTION C

REQUIRED SUPPLEMENTARY INFORMATION

Schedule of Changes in Net Pension Liability and Related Ratios
Current Period
Fiscal Year Ended June 30, 2018 (Dollars in Thousands)

A. Total pension liability			
1. Service Cost	$	9,857	
2. Interest on the Total Pension Liability		26,746	
3. Changes of benefit terms		-	
4. Difference between expected and actual experience of the Total Pension Liability		1,424	(1)
5. Changes of assumptions		-	
6. Benefit payments, including refunds of employee contributions		(23,585)	
7. Net change in total pension liability	$	14,442	
8. Total pension liability – beginning		363,483	
9. Total pension liability – ending	**$**	**377,925**	
B. Plan fiduciary net position			
1. Contributions – employer	$	17,027	(2)
2. Contributions – employee		3,973	
3. Net investment income		19,265	
4. Benefit payments, including refunds of employee contributions		(23,585)	
5. Pension Plan Administrative Expense		(66)	
6. Other changes		-	
7. Net change in plan fiduciary net position	$	16,614	
8. Plan fiduciary net position – beginning		185,141	
9. Plan fiduciary net position – ending	**$**	**201,755**	
C. Net pension liability, *A.9 - B.9.*	**$**	**176,170**	
D. Plan fiduciary net position as a percentage of the total pension liability, *B.9 / A.9.*		**53.38%**	
E. Covered-employee payroll	**$**	**49,009**	(3)
F. Net pension liability as a percentage of covered-employee payroll, *C. / E.*		**359.46%**	

(1) *Includes impact of changes in expected timing of future post-retirement benefit increases.*
(2) *Includes $6 million supplemental state aid.*
(3) *Assumed equal to actual employer contributions divided by employer contribution rate.*

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,	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009
Total Pension Liability										
Service Cost	$ 9,857	$9,483	$ 13,711	$ 12,251	$ 12,075					
Interest on the Total Pension Liability	26,746	25,367	21,349	21,773	20,535					
Benefit Changes	-	-	-	-	0					
Experience[1]	1,424	(4,958)	7,135	(4,366)	5,080					
Assumption Changes	-	11,652	(85,756)	21,696	(8,416)					
Benefit Payments	(23,585)	(22,785)	(22,378)	(21,893)	(20,802)					
Refunds	-	(309)	-	-	0					
Net Change in Total Pension Liability	$ 14,442	$18,450	$ (65,939)	$ 29,461	8,472					
Total Pension Liability - Beginning	363,483	345,033	410,972	381,511	373,039					
Total Pension Liability - Ending (a)	**$ 377,925**	**$363,483**	**$ 345,033**	**$ 410,972**	**$ 381,511**					
Plan Fiduciary Net Position										
Employer Contributions [2]	$ 17,027	$13,758	$ 10,219	$ 9,776	$ 9,426					
Employee Contributions	3,973	3,932	3,763	3,629	3,578					
Pension Plan Net Investment Income	19,265	24,729	(186)	7,572	28,011					
Benefit Payments	(23,585)	(22,785)	(22,378)	(21,893)	(20,802)					
Refunds	-	(309)	-	-	0					
Pension Plan Administrative Expense	(66)	(89)	(93)	(60)	(55)					
Other Changes	-	-	-	-	0					
Net Change in Plan Fiduciary Net Position	**$ 16,614**	**$19,236**	**$ (8,675)**	**$ (976)**	**20,158**					
Plan Fiduciary Net Position - Beginning	**$ 185,141**	**$165,905**	**$ 174,580**	**$ 175,556**	**155,398**					
Plan Fiduciary Net Position - Ending (b)	**$ 201,755**	**$185,141**	**$ 165,905**	**$ 174,580**	**$ 175,556**					
Net Pension Liability - Ending (a) - (b)	**$ 176,170**	**$178,342**	**$ 179,128**	**$ 236,392**	**205,955**					
Plan Fiduciary Net Position as a Percentage of Total Pension Liability	**53.38 %**	**50.94 %**	**48.08 %**	**42.48 %**	**46.02 %**					
Covered-Employee Payroll[3]	**$ 49,009**	**$47,813**	**$ 45,418**	**$ 43,449**	**$ 41,893**					
Net Pension Liability as a Percentage of Covered-Employee Payroll	**359.46 %**	**373.00 %**	**394.40 %**	**544.07 %**	**491.62 %**					

[1] *Includes impact of changes in expected timing of future post-retirement benefit increases.*
[2] *Includes $3 million supplemental state aid for fiscal year ending 2017 and $6 million annual supplemental state aid thereafter.*
[3] *Assumed equal to actual employer contributions divided by employer contribution rate.*

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)
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
2017	363,483	185,141	178,342	50.94	47,813	373.00
2018	377,925	201,755	176,170	53.38	49,009	359.46

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)
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
2017	16,790	13,758 [3]	3,032	47,813 [2]	28.77
2018	18,032	17,027 [3]	1,005	49,009 [2]	34.74

Notes to Schedule of Contributions

Methods and Assumptions Used to Determine Fiscal Year Ending June 30, 2018 Contribution Rates Reported in this Schedule:

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. [3] Includes supplemental state aid of $3,000 for fiscal year ending June 30, 2017 and $6,000 annual supplemental state aid thereafter.
Valuation Date	June 30, 2017
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 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 2017 valuation pursuant to an experience study of the period 2011 - 2015, dated July 26, 2016.
Healthy Post-Retirement Mortality	RP-2014 annuitant generational mortality table projected with mortality improvement Scale MP-2015 from a base year of 2006, white collar adjustment.
Other Information	
Benefit Increases After Retirement	The post-retirement increase is assumed to be 1.75% per year through 2032, 2% per year from 2033 through 2044 and 2.5% per year thereafter.
	See separate funding actuarial valuation report as of July 1, 2017 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]
2009	
2010	
2011	
2012	
2013	
2014	18.66 %
2015	0.04
2016	(0.11)
2017	15.18
2018	10.46

[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, 2018, the annual money-weighted rate of return for the Judges Retirement Fund was 10.46%. 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.

Ten-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 asset class that is included in the pension fund's target asset allocation as of June 30, 2018, these best estimates are summarized in the following table:

Asset Class	Transitional Target Allocation	Final Target Allocation	Long-Term Expected Real Rate of Return (Geometric Mean)
Domestic Equity[(1)]	33%	36%	5.10%
International Equity[(2)]	16%	17%	5.30%
Private Markets[(3)]	25%	25%	5.90%
Fixed Income	16%	20% [(4)]	0.75%
Treasuries	8%	0%	0.50%
Cash	2%	2%	0.00%
Total	100%	100%	

(1) Domestic Equity includes U.S. Stock Actively Managed and the U.S. Stock Index Fund.

(2) International Equity includes Broad International Stock Fund.

(3) Private Markets includes the Alternative Investment Pool. If a 25 percent allocation uncommitted allocation to Private Markets cannot be achieved, the uncommitted allocation is invested in Public Equities.

(4) The Final Target Allocation will combine Fixed Income investment options.

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.

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, 2017.

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, 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. 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.

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 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	$416,575	$377,925	$344,834
Net Position Restricted for Pensions	201,755	201,755	201,755
Net Pension Liabitliy	**$214,820**	**$176,170**	**$143,079**

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

Note that we believe the 8.5% interest rate assumption would not comply with Actuarial Standards of Practice.

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	**$ 363,483**	**$ 185,141**	**$ 178,342**	**$ 33,867**	**$ 72,055**	
Changes for the Year:						
Service Cost	$ 9,857		$ 9,857			$ 9,857
Interest on Total Pension Liability	26,746		26,746			26,746
Interest on Plan Fiduciary Net Position		$ 13,786 (1)	(13,786)			(13,786)
Changes in Benefit Terms						
Liability Experience Gains and Losses	1,424		1,424	$ 1,139	$ -	285
Changes in Assumptions	-		-			-
Recognition of Deferred Outflows/(Inflows) of Resources Arising from Prior Reporting Periods						
Liability Experience Gains/(Losses)				(2,443)	(1,865)	578
Assumption Changes				(6,669)	(18,835)	(12,166)
Investment Gains/(Losses)				(3,920)	(5,708)	(1,788)
Contributions - Employer		17,027	(17,027)			
Contributions - Employees		3,973	(3,973)			(3,973)
Asset Gain/(Loss)		5,479 (1)	(5,479)		4,383	(1,096)
Benefit Payments and Refunds	(23,585)	(23,585)	-			
Administrative Expenses		(66)	66			66
Other Changes						
Net Changes	**$ 14,442**	**$ 16,614**	**$ (2,172)**	**$ (11,893)**	**$ (22,025)**	**$ 4,723**
Balance End of Year	**$ 377,925**	**$ 201,755**	**$ 176,170**	**$ 21,974**	**$ 50,030**	

(1) The sum of these items in column (b) equals the net investment income of $19,265.

Summary of Population Statistics

		Terminated		Recipients			
	Actives*	Deferred Retirement	Other Non-Vested	Service Retirement	Disability Retirement	Survivor	Total
Members on 7/1/2017	**317**	**15**	**0**	**255**	**16**	**80**	**683**
New members	27	0	0	0	0	0	**27**
Return to active	0	0	0	0	0	0	**0**
Terminated non-vested	0	0	0	0	0	0	**0**
Service retirements	(26)	(1)	0	27	0	0	**0**
Terminated deferred	(1)	1	0	0	0	0	**0**
Terminated refund/transfer	0	0	0	0	0	0	**0**
Deaths	0	0	0	(10)	0	(3)	**(13)**
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	0	0	0	17	0	1	**18**
Members on 6/30/2018	**317**	**15**	**0**	**272**	**16**	**81**	**701**

** 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

Actuarial Basis

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	$6,000,000 per year until the earlier of 1) the year after the plan reaches full funding, and 2) July 1, 2048.
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.

Actuarial Basis

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% with 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 or exceeds 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 or exceeds 90% for two consecutive years (on a Market Value of Assets basis), the benefit increase will revert to 2.50%.

Actuarial Basis

Summary of Plan Provisions (Continued)

Benefit increases (Continued)	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	
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'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. Beginning July 1, 2018, a member's contributions increase at 3.00% interest compounded daily.

Actuarial Basis

Summary of Plan Provisions (Concluded)

Termination	
<u>Refund of contributions</u>	
Age/Service requirement	Termination of service as a judge.
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. Beginning July 1, 2018, a member's contributions increase at 3.00% interest compounded daily. 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%.
<u>Form of payment</u>	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 6.50% interest. The actuarially equivalent factors are currently being updated to reflect changes adopted during the 2018 legislative session.
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; and (b.) Average salary is based on the high five consecutive years during their entire service in all covered plans.
Changes in plan provisions	Interest credited on member contributions will decrease from 4.0% to 3.0%, beginning July 1, 2018. An end date of July 1, 2048 was added for the $6 million state contribution.

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; and

(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 reverts 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 7.50%
  - Statutory salary increases of 2.50%
- 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 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 2037, 2.00% per annum for the years 2038 through 2051, 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 assumptions are based on the last experience study, dated July 26, 2016, and a review of inflation and investment return assumptions, dated September 11, 2017.

Investment return	7.50% per annum.
Single discount rate	7.50% per annum.
Benefit increases after retirement	1.75% per annum through 2037, 2.00% per annum from 2038 to 2051, 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-2014 employee generational mortality table projected with mortality improvement Scale MP-2015 from a base year of 2006, white collar adjustment.
Healthy post-retirement	RP-2014 annuitant generational mortality table projected with mortality improvement Scale MP-2015 from a base year of 2006, white collar adjustment.
Disabled	RP-2014 annuitant generational mortality table projected with mortality improvement Scale MP-2015 from a base year of 2006, white collar adjustment.
Notes	The RP-2014 employee mortality table as published by the Society of Actuaries (SOA) contains mortality rates for ages 18 to 80 and the annuitant mortality table contains mortality rates for ages 50 to 120. We have extended the annuitant mortality table as needed for members younger than age 50 who are receiving a benefit by deriving rates based on the employee table and the juvenile table. Similarly, we have extended the employee table as needed for members older than age 80 by deriving rates based on the annuitant 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	None.
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.

Summary of Actuarial Assumptions (Continued)

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.
Allowance for Combined Service Annuity	None.
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	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. There were no members reported with missing or invalid birth dates or gender. In cases where submitted data was missing or incomplete, the following assumptions, based on average results for applicable members at the time of the last experience study, were applied: <u>Data for active members</u>: There were 13 members who have reached the 24 year service cap. These members are reflected as active members in this valuation. We assumed these members earned the greater of the salary reported under the Unclassified Employees Retirement Plan or $153,345 for the July 1, 2017 to June 30, 2018 plan year. There were no members reported with missing service. <u>Data for terminated members</u>: There were no members reported without a benefit.

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 three 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 no retirees reported with a bounce back annuity and an unreasonable reduction factor. There were retired members reported with a survivor option and an invalid or missing survivor gender (41 members) and/or survivor date of birth (33 members). 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.
Changes in actuarial assumptions	The assumed post-retirement benefit increase rate was changed from 1.75% through 2038, 2.00% for 2039 through 2053, and 2.50% thereafter to 1.75% through 2037, 2.00% for 2038 through 2051, and 2.50% thereafter. For accounting purposes, this change was treated as a difference between expected and actual experience.

Summary of Actuarial Assumptions (Concluded)

Age in 2018	Percentage of Members Dying each Year*					
	Healthy Post-Retirement Mortality**		Healthy Pre-Retirement Mortality**		Disability Mortality**	
	Male	Female	Male	Female	Male	Female
20	0.02%	0.01%	0.02%	0.01%	0.02%	0.01%
25	0.03	0.02	0.03	0.01	0.03	0.02
30	0.05	0.05	0.03	0.02	0.05	0.05
35	0.08	0.08	0.03	0.03	0.08	0.08
40	0.11	0.12	0.04	0.03	0.11	0.12
45	0.16	0.14	0.06	0.05	0.16	0.14
50	0.25	0.19	0.11	0.09	0.25	0.19
55	0.37	0.27	0.18	0.14	0.37	0.27
60	0.51	0.39	0.32	0.21	0.51	0.39
65	0.73	0.63	0.56	0.30	0.73	0.63
70	1.20	1.02	0.99	0.52	1.20	1.02
75	2.09	1.72	1.79	0.93	2.09	1.72
80	3.70	3.04	3.20	1.65	3.70	3.04
85	6.82	5.57	6.66	4.41	6.82	5.57
90	12.49	10.16	12.64	9.84	12.49	10.16

* *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.*

** *Rates are adjusted for mortality improvements using Scale MP-2015 from a base year of 2006.*

Age	Percentage of Eligible Members Retiring each Year			
	Disability Retirement			
	Male	Female	Age	Retirement
20	0.00%	0.00%	60	0%
25	0.00	0.00	61	0
30	0.00	0.00	62	8
35	0.00	0.00	63	8
40	0.01	0.01	64	5
45	0.03	0.03	65	20
50	0.05	0.05	66	23
55	0.12	0.12	67	23
60	0.31	0.31	68	20
65	0.00	0.00	69	20
70	0.00	0.00	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 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 3.62% (based on the weekly rate closest to but not later than the measurement date of the “20-Year Municipal GO Index” as published by Fidelity) and **the resulting single discount rate as of June 30, 2018 is 7.50%.** In describing this index, Fidelity notes that the municipal curves are constructed using option-adjusted analytics of a diverse population of over 10,000 tax-exempt securities.

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)

Fiscal Year Ending	Projected Covered-Employee Payroll: Payroll for Current Employees	Payroll for New Employees	Total Employee Payroll	Projected Contributions: 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)
2018	$ 49,009		$ 49,009					
2019	49,824		49,824	$ 3,986	$ 11,210		$ 6,000	$ 21,196
2020	47,889	$ 3,180	51,069	3,814	10,775	$ 337	6,000	20,926
2021	45,681	6,665	52,346	3,622	10,278	708	6,000	20,608
2022	43,643	10,012	53,655	3,445	9,820	1,068	6,000	20,333
2023	41,453	13,543	54,996	3,257	9,327	1,450	6,000	20,034
2024	39,318	17,053	56,371	3,075	8,847	1,832	6,000	19,754
2025	37,215	20,565	57,780	2,897	8,373	2,218	6,000	19,488
2026	35,205	24,020	59,225	2,728	7,921	2,601	6,000	19,250
2027	33,262	27,443	60,705	2,566	7,484	2,983	6,000	19,033
2028	31,333	30,890	62,223	2,406	7,050	3,370	6,000	18,826
2029	29,170	34,609	63,779	2,229	6,563	3,790	6,000	18,582
2030	26,749	38,624	65,373	2,035	6,019	4,245	6,000	18,299
2031	24,423	42,584	67,007	1,849	5,495	4,698	6,000	18,042
2032	22,220	46,463	68,683	1,674	4,999	5,145	6,000	17,818
2033	19,982	50,418	70,400	1,499	4,496	5,604	6,000	17,599
2034	17,831	54,329	72,160	1,331	4,012	6,061	6,000	17,404
2035	15,870	58,094	73,964	1,179	3,571	6,505	6,000	17,255
2036	13,899	61,914	75,813	1,028	3,127	6,958	6,000	17,113
2037	11,825	65,883	77,708	870	2,661	7,431	6,000	16,962
2038	10,002	69,649	79,651	732	2,250	7,885	6,000	16,867
2039	8,471	73,171	81,642	617	1,906	8,313	6,000	16,836
2040	7,118	76,565	83,683	516	1,601	8,730	6,000	16,847
2041	5,888	79,887	85,775	425	1,325	9,142	6,000	16,892
2042	4,794	83,126	87,920	344	1,079	9,547	6,000	16,970
2043	3,782	86,336	90,118	270	851	9,951	6,000	17,072
2044	2,907	89,463	92,370	207	654	10,348	6,000	17,209
2045	2,201	92,479	94,680	156	495	10,735	6,000	17,386
2046	1,520	95,527	97,047	107	342	11,128	6,000	17,577
2047	968	98,505	99,473	68	218	11,515	6,000	17,801
2048	635	101,325	101,960	44	143	11,845	-	12,032
2049	427	104,082	104,509	30	96	12,167	-	12,293
2050	199	106,922	107,121	14	45	12,499	-	12,558
2051	40	109,759	109,799	3	9	12,831	-	12,843
2052	-	112,544	112,544	-	-	13,156	-	13,156
2053	-	115,358	115,358	-	-	13,485	-	13,485
2054	-	118,242	118,242	-	-	13,822	-	13,822
2055	-	121,198	121,198	-	-	14,168	-	14,168
2056	-	124,228	124,228	-	-	14,522	-	14,522
2057	-	127,334	127,334	-	-	14,885	-	14,885
2058	-	130,517	130,517	-	-	15,257	-	15,257
2059	-	133,780	133,780	-	-	15,639	-	15,639
2060	-	137,124	137,124	-	-	16,030	-	16,030
2061	-	140,553	140,553	-	-	16,431	-	16,431
2062	-	144,066	144,066	-	-	16,841	-	16,841
2063	-	147,668	147,668	-	-	17,262	-	17,262
2064	-	151,360	151,360	-	-	17,694	-	17,694
2065	-	155,144	155,144	-	-	18,136	-	18,136
2066	-	159,022	159,022	-	-	18,590	-	18,590
2067	-	162,998	162,998	-	-	19,054	-	19,054
2068	-	167,073	167,073	-	-	19,531	-	19,531

** Contributions related to future employees in excess of normal cost and expenses. Normal cost and expenses initially total 19.96% 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 (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*	Additional State Contributions	Total Contributions
	(a)	(b)	(c) = (a) + (b)	(d)	(e)	(f)		(g) = (d) + (e) + (f)
2069	$ -	$ 171,250	$ 171,250	$ -	$ -	$ 20,019	$ -	$ 20,019
2070	-	175,531	175,531	-	-	20,520	-	20,520
2071	-	179,919	179,919	-	-	21,033	-	21,033
2072	-	184,417	184,417	-	-	21,558	-	21,558
2073	-	189,028	189,028	-	-	22,097	-	22,097
2074	-	193,753	193,753	-	-	22,650	-	22,650
2075	-	198,597	198,597	-	-	23,216	-	23,216
2076	-	203,562	203,562	-	-	23,796	-	23,796
2077	-	208,651	208,651	-	-	24,391	-	24,391
2078	-	213,867	213,867	-	-	25,001	-	25,001
2079	-	219,214	219,214	-	-	25,626	-	25,626
2080	-	224,694	224,694	-	-	26,267	-	26,267
2081	-	230,312	230,312	-	-	26,923	-	26,923
2082	-	236,070	236,070	-	-	27,597	-	27,597
2083	-	241,971	241,971	-	-	28,286	-	28,286
2084	-	248,021	248,021	-	-	28,994	-	28,994
2085	-	254,221	254,221	-	-	29,718	-	29,718
2086	-	260,577	260,577	-	-	30,461	-	30,461
2087	-	267,091	267,091	-	-	31,223	-	31,223
2088	-	273,768	273,768	-	-	32,004	-	32,004
2089	-	280,613	280,613	-	-	32,804	-	32,804
2090	-	287,628	287,628	-	-	33,624	-	33,624
2091	-	294,819	294,819	-	-	34,464	-	34,464
2092	-	302,189	302,189	-	-	35,326	-	35,326
2093	-	309,744	309,744	-	-	36,209	-	36,209
2094	-	317,487	317,487	-	-	37,114	-	37,114
2095	-	325,424	325,424	-	-	38,042	-	38,042
2096	-	333,560	333,560	-	-	38,993	-	38,993
2097	-	341,899	341,899	-	-	39,968	-	39,968
2098	-	350,447	350,447	-	-	40,967	-	40,967
2099	-	359,208	359,208	-	-	41,991	-	41,991
2100	-	368,188	368,188	-	-	43,041	-	43,041
2101	-	377,393	377,393	-	-	44,117	-	44,117
2102	-	386,827	386,827	-	-	45,220	-	45,220
2103	-	396,498	396,498	-	-	46,351	-	46,351
2104	-	406,411	406,411	-	-	47,509	-	47,509
2105	-	416,571	416,571	-	-	48,697	-	48,697
2106	-	426,985	426,985	-	-	49,915	-	49,915
2107	-	437,660	437,660	-	-	51,162	-	51,162
2108	-	448,601	448,601	-	-	52,441	-	52,441
2109	-	459,816	459,816	-	-	53,753	-	53,753
2110	-	471,312	471,312	-	-	55,096	-	55,096
2111	-	483,094	483,094	-	-	56,474	-	56,474
2112	-	495,172	495,172	-	-	57,886	-	57,886
2113	-	507,551	507,551	-	-	59,333	-	59,333
2114	-	520,240	520,240	-	-	60,816	-	60,816
2115	-	533,246	533,246	-	-	62,336	-	62,336
2116	-	546,577	546,577	-	-	63,895	-	63,895
2117	-	560,241	560,241	-	-	65,492	-	65,492
2118	-	574,248	574,248	-	-	67,761	-	67,761

** Contributions related to future employees in excess of normal cost and expenses. Normal cost and expenses initially total 19.96% 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)
2019	$ 201,755	$ 21,196	$ 24,630	$ 60	$ 15,003	$ 213,264
2020	213,264	20,926	25,904	62	15,809	224,033
2021	224,033	20,608	27,252	59	16,555	233,885
2022	233,885	20,333	28,491	57	17,238	242,908
2023	242,908	20,034	29,813	54	17,856	250,931
2024	250,931	19,754	31,187	51	18,396	257,843
2025	257,843	19,488	32,454	48	18,859	263,688
2026	263,688	19,250	33,591	46	19,246	268,547
2027	268,547	19,033	34,700	43	19,562	272,399
2028	272,399	18,826	35,773	41	19,804	275,215
2029	275,215	18,582	36,806	38	19,968	276,921
2030	276,921	18,299	37,997	35	20,042	277,230
2031	277,230	18,042	39,014	32	20,018	276,244
2032	276,244	17,818	39,930	29	19,903	274,006
2033	274,006	17,599	40,743	26	19,697	270,533
2034	270,533	17,404	41,420	23	19,405	265,899
2035	265,899	17,255	41,899	21	19,034	260,268
2036	260,268	17,113	42,312	18	18,591	253,642
2037	253,642	16,962	42,685	15	18,075	245,979
2038	245,979	16,867	42,846	13	17,491	237,478
2039	237,478	16,836	42,798	11	16,854	228,359
2040	228,359	16,847	42,585	9	16,179	218,791
2041	218,791	16,892	42,158	8	15,478	208,995
2042	208,995	16,970	41,542	6	14,769	199,186
2043	199,186	17,072	40,786	5	14,065	189,532
2044	189,532	17,209	39,878	4	13,380	180,239
2045	180,239	17,386	38,795	3	12,729	171,556
2046	171,556	17,577	37,633	2	12,128	163,626
2047	163,626	17,801	36,357	1	11,588	156,657
2048	156,657	12,032	34,925	1	10,906	144,669
2049	144,669	12,293	33,410	1	10,072	133,623
2050	133,623	12,558	31,899	-	9,309	123,591
2051	123,591	12,843	30,351	-	8,624	114,707
2052	114,707	13,156	28,819	-	8,026	107,070
2053	107,070	13,485	27,342	-	7,520	100,733
2054	100,733	13,822	25,874	-	7,111	95,792
2055	95,792	14,168	24,418	-	6,807	92,349
2056	92,349	14,522	22,979	-	6,615	90,507
2057	90,507	14,885	21,559	-	6,542	90,375
2058	90,375	15,257	20,160	-	6,597	92,069
2059	92,069	15,639	18,784	-	6,789	95,713
2060	95,713	16,030	17,435	-	7,126	101,434
2061	101,434	16,431	16,116	-	7,619	109,368
2062	109,368	16,841	14,832	-	8,276	119,653
2063	119,653	17,262	13,584	-	9,109	132,440
2064	132,440	17,694	12,377	-	10,128	147,885
2065	147,885	18,136	11,214	-	11,346	166,153
2066	166,153	18,590	10,099	-	12,774	187,418
2067	187,418	19,054	9,037	-	14,425	211,860
2068	211,860	19,531	8,032	-	16,313	239,672

For purposes of this projection, we assumed the current fixed rate contribution would continue after the plan becomes fully funded. If we reflected a decrease in contribution rates due to full funding, future assets and contributions would be less than what is shown herein.

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)
2069	$ 239,672	$ 20,019	$ 7,088	$ -	$ 18,451	$ 271,054
2070	271,054	20,520	6,208	-	20,856	306,222
2071	306,222	21,033	5,395	-	23,542	345,402
2072	345,402	21,558	4,649	-	26,527	388,838
2073	388,838	22,097	3,971	-	29,830	436,794
2074	436,794	22,650	3,361	-	33,470	489,553
2075	489,553	23,216	2,816	-	37,467	547,420
2076	547,420	23,796	2,334	-	41,846	610,728
2077	610,728	24,391	1,913	-	46,632	679,838
2078	679,838	25,001	1,549	-	51,851	755,141
2079	755,141	25,626	1,237	-	57,533	837,063
2080	837,063	26,267	974	-	63,711	926,067
2081	926,067	26,923	755	-	70,418	1,022,653
2082	1,022,653	27,597	575	-	77,694	1,127,369
2083	1,127,369	28,286	431	-	85,578	1,240,802
2084	1,240,802	28,994	316	-	94,116	1,363,596
2085	1,363,596	29,718	227	-	103,355	1,496,442
2086	1,496,442	30,461	160	-	113,349	1,640,092
2087	1,640,092	31,223	109	-	124,152	1,795,358
2088	1,795,358	32,004	73	-	135,827	1,963,116
2089	1,963,116	32,804	47	-	148,440	2,144,313
2090	2,144,313	33,624	30	-	162,060	2,339,967
2091	2,339,967	34,464	18	-	176,766	2,551,179
2092	2,551,179	35,326	11	-	192,639	2,779,133
2093	2,779,133	36,209	6	-	209,768	3,025,104
2094	3,025,104	37,114	3	-	228,249	3,290,464
2095	3,290,464	38,042	2	-	248,185	3,576,689
2096	3,576,689	38,993	1	-	269,687	3,885,368
2097	3,885,368	39,968	-	-	292,874	4,218,210
2098	4,218,210	40,967	-	-	317,874	4,577,051
2099	4,577,051	41,991	-	-	344,825	4,963,867
2100	4,963,867	43,041	-	-	373,875	5,380,783
2101	5,380,783	44,117	-	-	405,183	5,830,083
2102	5,830,083	45,220	-	-	438,921	6,314,224
2103	6,314,224	46,351	-	-	475,273	6,835,848
2104	6,835,848	47,509	-	-	514,438	7,397,795
2105	7,397,795	48,697	-	-	556,628	8,003,120
2106	8,003,120	49,915	-	-	602,072	8,655,107
2107	8,655,107	51,162	-	-	651,017	9,357,286
2108	9,357,286	52,441	-	-	703,727	10,113,454
2109	10,113,454	53,753	-	-	760,488	10,927,695
2110	10,927,695	55,096	-	-	821,606	11,804,397
2111	11,804,397	56,474	-	-	887,409	12,748,280
2112	12,748,280	57,886	-	-	958,252	13,764,418
2113	13,764,418	59,333	-	-	1,034,516	14,858,267
2114	14,858,267	60,816	-	-	1,116,609	16,035,692
2115	16,035,692	62,336	-	-	1,204,972	17,303,000
2116	17,303,000	63,895	-	-	1,300,077	18,666,972
2117	18,666,972	65,492	-	-	1,402,434	20,134,898
2118	20,134,898	67,761	-	-	1,512,612	21,715,271

For purposes of this projection, we assumed the current fixed rate contribution would continue after the plan becomes fully funded. If we reflected a decrease in contribution rates due to full funding, future assets and contributions would be less than what is shown herein.

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)
2018	$ 201,755	$ 24,630	$ 24,630	$ -	$ 23,755	$ -	$ 23,755
2019	213,264	25,904	25,904	-	23,241	-	23,241
2020	224,033	27,252	27,252	-	22,745	-	22,745
2021	233,885	28,491	28,491	-	22,120	-	22,120
2022	242,908	29,813	29,813	-	21,531	-	21,531
2023	250,931	31,187	31,187	-	20,952	-	20,952
2024	257,843	32,454	32,454	-	20,282	-	20,282
2025	263,688	33,591	33,591	-	19,528	-	19,528
2026	268,547	34,700	34,700	-	18,765	-	18,765
2027	272,399	35,773	35,773	-	17,996	-	17,996
2028	275,215	36,806	36,806	-	17,224	-	17,224
2029	276,921	37,997	37,997	-	16,541	-	16,541
2030	277,230	39,014	39,014	-	15,799	-	15,799
2031	276,244	39,930	39,930	-	15,041	-	15,041
2032	274,006	40,743	40,743	-	14,277	-	14,277
2033	270,533	41,420	41,420	-	13,501	-	13,501
2034	265,899	41,899	41,899	-	12,705	-	12,705
2035	260,268	42,312	42,312	-	11,935	-	11,935
2036	253,642	42,685	42,685	-	11,200	-	11,200
2037	245,979	42,846	42,846	-	10,458	-	10,458
2038	237,478	42,798	42,798	-	9,717	-	9,717
2039	228,359	42,585	42,585	-	8,994	-	8,994
2040	218,791	42,158	42,158	-	8,283	-	8,283
2041	208,995	41,542	41,542	-	7,593	-	7,593
2042	199,186	40,786	40,786	-	6,934	-	6,934
2043	189,532	39,878	39,878	-	6,307	-	6,307
2044	180,239	38,795	38,795	-	5,708	-	5,708
2045	171,556	37,633	37,633	-	5,150	-	5,150
2046	163,626	36,357	36,357	-	4,629	-	4,629
2047	156,657	34,925	34,925	-	4,136	-	4,136
2048	144,669	33,410	33,410	-	3,681	-	3,681
2049	133,623	31,899	31,899	-	3,269	-	3,269
2050	123,591	30,351	30,351	-	2,893	-	2,893
2051	114,707	28,819	28,819	-	2,556	-	2,556
2052	107,070	27,342	27,342	-	2,255	-	2,255
2053	100,733	25,874	25,874	-	1,985	-	1,985
2054	95,792	24,418	24,418	-	1,743	-	1,743
2055	92,349	22,979	22,979	-	1,526	-	1,526
2056	90,507	21,559	21,559	-	1,332	-	1,332
2057	90,375	20,160	20,160	-	1,158	-	1,158
2058	92,069	18,784	18,784	-	1,004	-	1,004
2059	95,713	17,435	17,435	-	867	-	867
2060	101,434	16,116	16,116	-	745	-	745
2061	109,368	14,832	14,832	-	638	-	638
2062	119,653	13,584	13,584	-	544	-	544
2063	132,440	12,377	12,377	-	461	-	461
2064	147,885	11,214	11,214	-	388	-	388
2065	166,153	10,099	10,099	-	325	-	325
2066	187,418	9,037	9,037	-	271	-	271
2067	211,860	8,032	8,032	-	224	-	224

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)
2068	$ 239,672	$ 7,088	$ 7,088	$ -	$ 23,755	$ -	$ 184
2069	271,054	6,208	6,208	-	23,241	-	150
2070	306,222	5,395	5,395	-	22,745	-	121
2071	345,402	4,649	4,649	-	22,120	-	97
2072	388,838	3,971	3,971	-	21,531	-	77
2073	436,794	3,361	3,361	-	20,952	-	61
2074	489,553	2,816	2,816	-	20,282	-	47
2075	547,420	2,334	2,334	-	19,528	-	36
2076	610,728	1,913	1,913	-	18,765	-	28
2077	679,838	1,549	1,549	-	17,996	-	21
2078	755,141	1,237	1,237	-	17,224	-	16
2079	837,063	974	974	-	16,541	-	11
2080	926,067	755	755	-	15,799	-	8
2081	1,022,653	575	575	-	15,041	-	6
2082	1,127,369	431	431	-	14,277	-	4
2083	1,240,802	316	316	-	13,501	-	3
2084	1,363,596	227	227	-	12,705	-	2
2085	1,496,442	160	160	-	11,935	-	1
2086	1,640,092	109	109	-	11,200	-	1
2087	1,795,358	73	73	-	10,458	-	0
2088	1,963,116	47	47	-	9,717	-	0
2089	2,144,313	30	30	-	8,994	-	0
2090	2,339,967	18	18	-	8,283	-	0
2091	2,551,179	11	11	-	7,593	-	0
2092	2,779,133	6	6	-	6,934	-	0
2093	3,025,104	3	3	-	6,307	-	0
2094	3,290,464	2	2	-	5,708	-	0
2095	3,576,689	1	1	-	5,150	-	0
2096	3,885,368	-	-	-	4,629	-	0
2097	4,218,210	-	-	-	4,136	-	0
2098	4,577,051	-	-	-	3,681	-	0
2099	4,963,867	-	-	-	3,269	-	0
2100	5,380,783	-	-	-	2,893	-	0
2101	5,830,083	-	-	-	2,556	-	-
2102	6,314,224	-	-	-	2,255	-	-
2103	6,835,848	-	-	-	1,985	-	-
2104	7,397,795	-	-	-	1,743	-	-
2105	8,003,120	-	-	-	1,526	-	-
2106	8,655,107	-	-	-	1,332	-	-
2107	9,357,286	-	-	-	1,158	-	-
2108	10,113,454	-	-	-	1,004	-	-
2109	10,927,695	-	-	-	867	-	-
2110	11,804,397	-	-	-	745	-	-
2111	12,748,280	-	-	-	638	-	-
2112	13,764,418	-	-	-	544	-	-
2113	14,858,267	-	-	-	461	-	-
2114	16,035,692	-	-	-	388	-	-
2115	17,303,000	-	-	-	325	-	-
2116	18,666,972	-	-	-	271	-	-
2117	20,134,898	-	-	-	224	-	-
				Totals	$ 445,788	$ -	$ 445,788

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.