Public Employees Retirement Association of Minnesota

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

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November 28, 2018

Public Employees Retirement Association of Minnesota
General Employees Retirement Plan
St. Paul, Minnesota

Dear Trustees of the General Employees Retirement Plan:

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 General Employees Retirement Plan ("GERP"), 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 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 purposes of funding the plan. A calculation of the plan's liability for purposes other than satisfying the requirements of GASB Statement No. 67 and No. 68 may produce significantly different results. The information in this report is calculated on a total plan basis. PERA is responsible for preparing the Schedule of Employer Allocations and the Schedule of Pension Amounts by Employer. This report may be provided to parties other than the Public Employees Retirement Association (PERA) only in its entirety and only with the permission of PERA. GRS is not responsible for unauthorized use of this report.

This report is based upon information, furnished to us by PERA, 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 Plan 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 General Employees Retirement Plan 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

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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
Employer's Fiscal Year Ending Date (Reporting Date)	Varies by Employer
Membership	
Number of	
- Service Retirements	89,313
- Survivors	8,701
- Disability Retirements	3,758
- Deferred Retirements	61,066
- Terminated other non-vested	138,768
- Active Members	153,059
- Total	454,665
Covered Payroll	$ 6,298,815
Net Pension Liability	
Total Pension Liability	$ 27,101,067
Plan Fiduciary Net Position	$ 21,553,477
Net Pension Liability	$ 5,547,590
Plan Fiduciary Net Position as a Percentage of Total Pension Liability	79.53%
Net Pension Liability as a Percentage of Covered Payroll	88.07%
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%
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)	$ 287,210

Deferred Outflows and 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	$ 146,835	$ 161,800
Changes in assumptions	$ 529,933	$ 623,331
Net difference between projected and actual earnings on pension plan investments	$ 709,233	$ 1,276,108
Total	$ 1,386,001	$ 2,061,239

* *Source: 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 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 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 or local governments 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 GERP 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 liability 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.

Both GASB Statement No. 67 and No. 68 require the notes of the financial statements for the employers and pension plans, to include certain additional information. The list of disclosure items should include:

- a description of benefits provided by the plan;
- the type 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 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.

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.

Timing of the Valuation

An actuarial valuation to determine the total pension liability is required to 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.

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 normal cost of the plan is expected to remain approximately level as a percent of pay,
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.

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 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 Fidelity "20-Year Municipal GO AA Index"); 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	$	513,422
2. Interest on the Total Pension Liability	$	1,948,853
3. Current-Period Benefit Changes	$	(79,217)
4. Employee Contributions (made negative for addition here)	$	(409,423)
5. Projected Earnings on Plan Investments (made negative for addition here)	$	(1,484,643)
6. Pension Plan Administrative Expense	$	11,943
7. Other Changes in Plan Fiduciary Net Position	$	(56)
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	$	2,191
9. Recognition of Outflow (Inflow) of Resources due to assumption changes		
Arising from Current Reporting Period	$	(65,557)
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	$	(115,788)
11. **Increase/(Decrease) from Experience in Current Reporting Period**	**$**	**321,725**
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	$	(178,762)
13. Recognition of Outflow (Inflow) of Resources due to assumption changes		
Arising from Prior Reporting Periods	$	316,606
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	$	(172,359)
15. Total Pension Expense / (Income)	**$**	**287,210**

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	$	8,763
2. Assumption Changes (gains) or losses	$	(262,228)
3. Recognition period for Liabilities: Average of the expected remaining service lives of all employees {in years}		4.0000
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	$	2,191
5. Outflow (Inflow) of Resources to be recognized in the current pension expense for Assumption Changes	$	(65,557)
6. Outflow (Inflow) of Resources to be recognized in the current pension expense due to Liabilities	$	(63,366)
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	$	6,572
8. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses for Assumption Changes	$	(196,671)
9. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses due to Liabilities	$	(190,099)
B. Outflows (Inflows) of Resources due to Assets		
1. Net difference between projected and actual earnings on pension plan investments (gains) or losses	$	(578,939)
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	$	(115,788)
4. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses due to Assets	$	(463,151)

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 of Resources
1. Due to Liabilities	$ 602,259	$ 527,781	$ 74,478
2. Due to Assets	$ 415,942	$ 704,089	$ (288,147)
3. Total	$ 1,018,201	$ 1,231,870	$ (213,669)

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

	Outflows of Resources	Inflows of Resources	Net Outflows of Resources
1. Differences between expected and actual experience	$ 72,323	$ 248,894	$ (176,571)
2. Assumption Changes	$ 529,936	$ 278,887	$ 251,049
3. Net Difference between projected and actual earnings on pension plan investments	$ 415,942	$ 704,089	$ (288,147)
4. Total	$ 1,018,201	$ 1,231,870	$ (213,669)

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 of Resources
1. Differences between expected and actual experience	$ 146,835	$ 161,800	$ (14,965)
2. Assumption Changes	$ 529,933	$ 623,331	$ (93,398)
3. Net Difference between projected and actual earnings on pension plan investments	$ 709,233	$ 1,276,108	$ (566,875)
4. Total	$ 1,386,001	$ 2,061,239	$ (675,238)

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

Year Ending June 30	Net Deferred Outflows of Resources
2019	$ 190,738
2020	$ (300,049)
2021	$ (450,140)
2022	$ (115,787)
2023	$ -
Thereafter	$ -
Total	$ (675,238)

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

	Market Value			
Assets in Trust	**June 30, 2018**		**June 30, 2017**	
Cash, equivalents, short term securities	$	237,529	$	491,850
Fixed income	$	5,230,420	$	3,895,018
Equity	$	13,073,271	$	13,042,724
SBI Alternative	$	2,976,338	$	2,635,922
Other	$	6,504	$	6,906
Total Assets in Trust	**$**	**21,524,062**	**$**	**20,072,420**
Assets Receivable*	$	42,026	$	40,865
Amounts Payable	$	(12,611)	$	(12,706)
Net Position Restricted for Pensions	**$**	**21,553,477**	**$**	**20,100,579**

** Includes $21 million Employer Supplemental Contribution receivable to be paid in July and December.*

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

Change in Assets		**Market Value**	
Year Ending		**June 30, 2018**	**June 30, 2017**
1.	Fund balance at market value at beginning of year	$ 20,100,579	$ 17,994,909
2.	Adjustment to match restated PERA fund balance	$ -	$ 240
3.	Fund balance at market value at beginning of year, as restated	$ 20,100,579	$ 17,995,149
4.	Contributions		
	a. Member	$ 409,423	$ 400,204
	b. Employer*	$ 488,819	$ 477,888
	c. Other sources	$ 16,000	$ 6,000
	d. Total contributions	$ 914,242	$ 884,092
5.	Investment income		
	a. Investment income/(loss)	$ 2,086,246	$ 2,703,723
	b. Investment expenses	$ (22,664)	$ (20,822)
	c. Net subtotal	$ 2,063,582	$ 2,682,901
6.	Other	$ 56	$ 411
7.	**Total additions:** *(4.d.) + (5.c.) + (6.)*	**$ 2,977,880**	**$ 3,567,404**
8.	Benefits Paid		
	a. Annuity benefits	$ (1,470,450)	$ (1,413,448)
	b. Refunds	$ (42,589)	$ (37,234)
	c. Total benefits paid	$ (1,513,039)	$ (1,450,682)
9.	Expenses		
	a. Other	$ -	$ -
	b. Administrative	$ (11,943)	$ (11,292)
	c. Total expenses	$ (11,943)	$ (11,292)
10.	**Total deductions:** *(8.c.) + (9.c.)*	**$ (1,524,982)**	**$ (1,461,974)**
11.	Net increase (decrease) in net position: *(7) + (10)*	$ 1,452,898	$ 2,105,430
12.	**Transfer between funds**	**$ -**	$ -
13.	**Net position restricted for pensions**	**$ 21,553,477**	**$ 20,100,579**
14.	Approximate return on market value of assets	10.4%	15.1%

** Includes $21 million Employer Supplemental Contribution receivable to be paid in July and December.*

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	$	513,422
2. Interest on the Total Pension Liability	$	1,948,853
3. Changes of benefit terms	$	(79,217)
4. Difference between expected and actual experience of the Total Pension Liability	$	8,763
5. Changes of assumptions	$	(262,228)
6. Benefit payments, including refunds of employee contributions	$	(1,513,039)
7. Net change in total pension liability	$	616,554
8. Total pension liability – beginning July 1, 2017	$	26,484,513
9. Total pension liability – ending June 30, 2018	**$**	**27,101,067**
B. Plan fiduciary net position		
1. Contributions – employer	$	504,819
2. Contributions – employee	$	409,423
3. Net investment income	$	2,063,582
4. Benefit payments, including refunds of employee contributions	$	(1,513,039)
5. Pension Plan Administrative Expense	$	(11,943)
6. Other	$	56
7. Net change in plan fiduciary net position	$	1,452,898
8. Plan fiduciary net position – beginning July 1, 2017	$	20,100,579
9. Plan fiduciary net position – ending June 30, 2018	**$**	**21,553,477**
C. Net pension liability	**$**	**5,547,590**
D. Plan fiduciary net position as a percentage of the total pension liability		**79.53%**
E. Covered-employee payroll^	**$**	**6,298,815**
F. Net pension liability as a percentage of covered-employee payroll		**88.07%**

^ *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 may be built prospectively)

Fiscal year ending June 30,	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009
Total Pension Liability										
Service Cost	$ 513,422	$ 471,706	$ 434,551	$ 421,602	$ 388,391					
Interest on the Total Pension Liability	$ 1,948,853	$ 1,921,869	$ 1,839,388	$ 1,712,534	$ 1,591,756					
Benefit Changes	$ (79,217)	$ -	$ -	$ 1,147,198	$ -					
Experience	$ 8,763	$ 280,527	$ (647,197)	$ (348,383)	$ 96,123					
Assumption Changes	$ (262,228)	$ (853,320)	$ 2,119,742	$ -	$ 645,499					
Benefit Payments	$ (1,470,450)	$ (1,413,448)	$ (1,359,176)	$ (1,235,303)	$ (1,109,866)					
Refunds	$ (42,589)	$ (37,234)	$ (37,209)	$ (35,655)	$ (38,264)					
Net Change in Total Pension Liability	$ 616,554	$ 370,100	$ 2,350,099	$ 1,661,993	$ 1,573,639					
Total Pension Liability - Beginning	$ 26,484,513	$ 26,114,413	$ 23,764,314	$ 22,102,321	$ 20,528,682					
Total Pension Liability - Ending (a)	$ 27,101,067	$ 26,484,513	$ 26,114,413	$ 23,764,314	$ 22,102,321					
Plan Fiduciary Net Position										
Employer Contributions	$ 504,819	$ 483,888	$ 465,978	$ 435,115	$ 382,251					
Employee Contributions	$ 409,423	$ 400,204	$ 375,291	$ 353,765	$ 334,495					
Pension Plan Net Investment Income	$ 2,063,582	$ 2,682,901	$ (20,851)	$ 777,504	$ 2,760,854					
Benefit Payments	$ (1,470,450)	$ (1,413,448)	$ (1,359,176)	$ (1,235,303)	$ (1,109,866)					
Refunds	$ (42,589)	$ (37,234)	$ (37,209)	$ (35,655)	$ (38,264)					
Pension Plan Administrative Expense	$ (11,943)	$ (11,292)	$ (11,350)	$ (10,367)	$ (9,861)					
Other*	$ 56	$ 651	$ 431	$ 891,914	$ 605					
Net Change in Plan Fiduciary Net Position	$ 1,452,898	$ 2,105,670	$ (586,886)	$ 1,176,973	$ 2,320,214					
Plan Fiduciary Net Position - Beginning	$ 20,100,579	$ 17,994,909	$ 18,581,795	$ 17,404,822	$ 15,084,608					
Plan Fiduciary Net Position - Ending (b)	$ 21,553,477	$ 20,100,579	$ 17,994,909	$ 18,581,795	$ 17,404,822					
Net Pension Liability - Ending (a) - (b)	$ 5,547,590	$ 6,383,934	$ 8,119,504	$ 5,182,519	$ 4,697,499					
Plan Fiduciary Net Position as a Percentage of Total Pension Liability	79.53 %	75.90 %	68.91 %	78.19 %	78.75 %					
Covered-employee payroll	$ 6,298,815	$ 6,156,985	$ 5,773,708	$ 5,549,255	$ 5,351,920					
Net Pension Liability as a Percentage of covered-employee payroll	88.07 %	103.69 %	140.63 %	93.39 %	87.77 %					

Notes to Schedule:

N/A

** For fiscal year ending June 30, 2017, includes $411 of other income and $240 due to PERA's restatement of the June 30, 2016 end of year plan fiduciary net position.*

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

Last 10 Fiscal Years (which may be built prospectively)

FY Ending June 30,	Total Pension Liability	Plan Net Position	Net Pension Liability	Plan Net Position as a % of Total Pension Liability	Covered Payroll	Net Pension Liability as a % of Covered Payroll
2009						
2010						
2011						
2012						
2013						
2014	$ 22,102,321	$ 17,404,822	$ 4,697,499	78.75%	$ 5,351,920	87.77%
2015	$ 23,764,314	$ 18,581,795	$ 5,182,519	78.19%	$ 5,549,255	93.39%
2016	$ 26,114,413	$ 17,994,909	$ 8,119,504	68.91%	$ 5,773,708	140.63%
2017	$ 26,484,513	$ 20,100,579	$ 6,383,934	75.90%	$ 6,156,985	103.69%
2018	$ 27,101,067	$ 21,553,477	$ 5,547,590	79.53%	$ 6,298,815	88.07%

Schedule of Contributions Multiyear (Dollars in Thousands)

Last 10 Fiscal Years

FY Ending June 30,	Actuarially Determined Contribution	Actual Contribution	Contribution Deficiency (Excess)	Covered Payroll	Actual Contribution as a % of Covered Payroll
2009	$ 381,151	$ 328,603	$ 52,548	$ 4,778,708	6.88%
2010	$ 443,548	$ 342,678	$ 100,870	$ 4,804,627	7.13
2011	$ 321,782	$ 357,596	$ (35,814)	$ 5,079,429	7.04
2012	$ 371,295	$ 368,037	$ 3,258	$ 5,142,592	7.16
2013	$ 430,773	$ 372,652	$ 58,121	$ 5,246,928	7.10
2014	$ 476,321	$ 382,251	$ 94,070	$ 5,351,920	7.14
2015	$ 523,017	$ 435,115	$ 87,902	$ 5,549,255	7.84
2016	$ 542,151	$ 465,978	$ 76,173	$ 5,773,708	8.07
2017	$ 615,083	$ 483,888	$ 131,195	$ 6,156,985	7.86
2018	$ 609,725	$ 504,819	$ 104,906	$ 6,298,815	8.01

Notes to Schedule of Contributions

Methods and Assumptions Used to Determine Contribution Rates for the Fiscal Year Ending June 30, 2018:

Valuation Date:	June 30, 2017
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.
Actuarial Cost Method	Entry Age Normal
Amortization Method	Level Percentage of Payroll, Closed
Remaining Amortization Period	16 years
Asset Valuation Method	5-year smoothed market; no corridor
Inflation	2.75%
Payroll Growth	3.50%
Salary Increases	3.50% to 11.50% 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 2016 valuation pursuant to an experience study of the period 2008 - 2015.
Mortality	RP-2014 annuitant generational mortality table, projected with scale MP-2015 from a base year of 2014, white collar adjustment, set forward two years for males and rates adjusted by a factor of 0.90 for females.

Other Information:

Notes	The plan is assumed to pay a 2.5% post retirement benefit increase beginning January 1, 2036. See separate funding report as of July 1, 2017 for additional detail.

Schedule of Investment Returns Multiyear

Last 10 Fiscal Years

FY Ending June 30,	Annual Return[1]
2009	
2010	
2011	
2012	
2013	
2014	
2015	
2016	
2017	
2018	

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

It is our understanding that this exhibit will be prepared by PERA with assistance from the State Board of Investment. Please provide a copy of the final exhibit for our files.

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, 2018, these best estimates are summarized in the following table:

Asset Class	Target Allocation	Final Target Allocation	Long-Term Expected Real Rate of Return (geometric)
Domestic Equity	33%	36%	5.10%
International Equity	16%	17%	5.30%
Private Markets	25%	25%	5.90%
Fixed Income	24%	20%	0.75%
Unallocated Cash	2%	2%	0.00%
Total	100%	100%	

The Minnesota State Board of Investment (SBI) compiled this data and the related investment notes and provided it to PERA for GASB compliance purposes. PERA 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.

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 plan 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 was 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 plan's net pension liability, calculated using a single discount rate of 7.50%, as well as what the plan's net pension liability would be if it were calculated using a single discount rate that is 1-percentage-point lower or 1-percentage-point higher:

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	$ 30,569,021	$ 27,101,067	$ 24,238,370
Net Position Restricted for Pensions	$ 21,553,477	$ 21,553,477	$ 21,553,477
Net Pension Liability	**$ 9,015,544**	**$ 5,547,590**	**$ 2,684,893**

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)
Current Reporting Period

	Total Pension Liability (a)	Plan Fiduciary Net Position (b)	Net Pension Liability (a) - (b)	Current Period: Deferred Outflows	Deferred Inflows	Pension Expense*
Balance Beginning of Year	**$ 26,484,513**	**$ 20,100,579**	**$ 6,383,934**			
Changes for the Year:						
Service Cost	$ 513,422		$ 513,422			$ 513,422
Interest on Total Pension Liability	$ 1,948,853		$ 1,948,853			$ 1,948,853
Interest on Fiduciary Net Position		$ 1,484,643	$ (1,484,643)			$ (1,484,643)
Changes in Benefit Terms	$ (79,217)		$ (79,217)			$ (79,217)
Liability Experience Gains and Losses	$ 8,763		$ 8,763	$ 6,572		$ 2,191
Changes in Assumptions	$ (262,228)		$ (262,228)		$ 196,671	$ (65,557)
Contributions - Employer		$ 504,819	$ (504,819)			$ -
Contributions - Employees		$ 409,423	$ (409,423)			$ (409,423)
Asset Gain/(Loss)		$ 578,939	$ (578,939)		$ 463,151	$ (115,788)
Benefit Payouts	$ (1,513,039)	$ (1,513,039)	$ -			$ -
Administrative Expenses		$ (11,943)	$ 11,943			$ 11,943
Other		$ 56	$ (56)			$ (56)
Net Changes	**$ 616,554**	**$ 1,452,898**	**$ (836,344)**	**$ 6,572**	**$ 659,822**	**$ 321,725**
Balance End of Year	**$ 27,101,067**	**$ 21,553,477**	**$ 5,547,590**			

** Pension Expense from Experience in the Current Reporting Period.*

GASB Statement No. 68 Reconciliation (Dollars in Thousands)
Current and Prior Reporting Periods

	Total Pension Liability (a)	Plan Fiduciary Net Position (b)	Net Pension Liability (a) - (b)	Deferred Outflows	Deferred Inflows	Net Deferred Outflows Prior Year	Total Pension Expense*
Balance Beginning of Year	**$ 26,484,513**	**$ 20,100,579**	**$ 6,383,934**				
Changes for the Year:							
Service Cost	$ 513,422		$ 513,422				$ 513,422
Interest on Total Pension Liability	$ 1,948,853		$ 1,948,853				$ 1,948,853
Interest on Fiduciary Net Position		$ 1,484,643	$ (1,484,643)				$ (1,484,643)
Changes in Benefit Terms	$ (79,217)		$ (79,217)				$ (79,217)
Liability Experience Gains and Losses	$ 8,763		$ 8,763	$ 146,835	$ 161,800	$ (200,299)	$ (176,571)
Changes in Assumptions	$ (262,228)		$ (262,228)	$ 529,933	$ 623,331	$ 419,879	$ 251,049
Contributions - Employer		$ 504,819	$ (504,819)				$ -
Contributions - Employees		$ 409,423	$ (409,423)				$ (409,423)
Asset Gain/(Loss)		$ 578,939	$ (578,939)	$ 709,233	$ 1,276,108	$ (276,083)	$ (288,147)
Benefit Payouts	$ (1,513,039)	$ (1,513,039)	$ -				$ -
Administrative Expenses		$ (11,943)	$ 11,943				$ 11,943
Other		$ 56	$ (56)				$ (56)
Net Changes	**$ 616,554**	**$ 1,452,898**	**$ (836,344)**				**$ 287,210**
Balance End of Year	**$ 27,101,067**	**$ 21,553,477**	**$ 5,547,590**	**$ 1,386,001**	**$ 2,061,239**	**$ (56,503)**	

** Pension Expense from Experience in the Current and Prior Reporting Periods.*

Summary of Population Statistics

		Terminated		Recipients			
	Actives	Deferred Retirement	Other Non-Vested	Service Retirement	Disability Retirement	Survivor	Total
GERP Members on 7/1/2017	**152,867**	**52,274**	**138,335**	**85,777**	**3,779**	**8,645**	**441,677**
New members	18,430	0	0	0	0	0	18,430
Return to active	2,907	(816)	(2,091)	0	0	0	0
Terminated non-vested	(10,003)	0	10,003	0	0	0	0
Service retirements	(3,534)	(2,141)	0	5,675	0	0	0
Terminated deferred	(4,976)	4,976	0	0	0	0	0
Terminated refund/transfer	(2,300)	(1,006)	(1,596)	0	0	0	(4,902)
Deaths	(231)	(148)	(324)	(2,343)	(176)	(563)	(3,785)
New beneficiary	0	0	0	0	0	657	657
Disabled	(102)	0	0	0	102	0	0
Data adjustments	1	7,927	(5,559)	204	53	(38)	2,588
Net change	192	8,792	433	3,536	(21)	56	12,988
GERP Members on 6/30/2018	**153,059**	**61,066**	**138,768**	**89,313**	**3,758**	**8,701**	**454,665**

SECTION E

SUMMARY OF BENEFITS

Summary of Plan Provisions - Basic

Following is a summary of the major plan provisions used in the valuation of this report. PERA 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 public employee who is not covered under the Social Security Act. General exceptions are employees covered by other public funds, certain part-time employees and full-time students under age 23.
Contributions	Shown as a percent of salary: Member 9.10% of salary Employer 11.78% of salary 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 and military service.
Salary	Includes amounts deducted for deferred compensation or supplemental retirement plans, net income from fees and sick leave payments funded by the employer. Excludes unused annual leaves and sick leave payments, severance payments, Workers' Compensation benefits and employer-paid flexible spending accounts and employer-paid deferred compensation deposits, cafeteria plans, healthcare expense accounts, day-care expenses, fringe benefits and the cost of insurance coverage.
Average salary	Average of the five highest successive years of annual 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: 100% vested after 5 years of Allowable Service. (Not applicable since all Basic members were hired before 1968.)
Retirement	
Normal retirement benefit	
Age/service requirement	Age 65 and vested. Proportionate retirement annuity is available at age 65 and one year of Allowable Service.
Amount	2.70% of Average Salary for each year of Allowable Service.
Early retirement benefit	
Age/service requirement	(a.) Age 55 and vested. (b.) Any age with 30 years of Allowable Service. (c.) Rule of 90: Age plus Allowable Service totals 90.

Summary of Plan Provisions – Basic (Continued)

Retirement (Continued)

Early retirement benefit (Continued)

Age/service requirement	The greater of (a) or (b):
Amount	(a.) 2.20% of Average Salary for each of the first ten years of Allowable Service and 2.70% of Average Salary for each subsequent year with reduction of 0.25% for each month if the Member is under age 65 at time of retirement and has less than 30 years of Allowable Service or if the Member is under age 62 and has 30 or more years of Allowable Service. No reduction if age plus years of Allowable Service totals 90. (b.) 2.70% 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. Augmentation adjustment is phased out over a five-year period starting July 1, 2019, resulting in no augmentation adjustment after June 30, 2024.
Form of payment	Life annuity with return on death of any balance of contributions over aggregate monthly payments. Actuarially equivalent options are: 25%, 50%, 75% or 100% Joint and Survivor. 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	Benefit recipients will receive a future annual increase equal to 50% of the Social Security Cost of Living Adjustment, not less than 1.0% and not more than 1.5%, beginning January 1, 2019. For retirements on or after January 1, 2024, the first benefit increase is delayed until the retiree reaches Normal Retirement Age (not applicable to Rule of 90 retirees, disability benefit recipients, or survivors). A benefit recipient who has been receiving a benefit for at least 12 full months as of June 30 will receive a full increase. Members receiving benefits for at least one month but less than 12 full months as of June 30 will receive a pro rata increase. Members retired under laws in effect before July 1, 1973 receive an additional lump sum payment each year. In 1989, this lump sum payment is the greater of $25 times each full year of Allowable Service or the difference between $400 times each full year of Allowable Service and the sum of benefits paid from any Minnesota public pension plan plus cash payments from the Social Security Administration for the preceding fiscal year July 1, 1988 through June 30, 1989. In each following year, the lump sum payment will increase by the same percentage increase that is applied to regular annuities paid from the fund. Effective January 1, 2002, annual lump sum payment is divided by 12 and paid as a monthly life annuity in the annuity form elected.

Summary of Plan Provisions – Basic (Continued)

Disability

<u>Disability benefit</u>

Age/service requirement	Total and permanent disability before normal retirement age if vested. Since all remaining active Basic members are over normal retirement age, none are eligible for disability benefits.
Amount	Normal Retirement benefit based on Allowable Service and Average Salary at disability without reduction for commencement before Normal Retirement Age. Supplemental benefit of $25 per month payable to the later of the normal retirement age or the five-year anniversary of commencement of disability. The disability benefit is reduced to that amount which, when added to Workers' Compensation, does not exceed the salary the disabled Member received as of the date of the disability or the salary currently payable for the same employment position substantially similar to the one the person held as of the date of the disability, whichever is greater. If a member becomes disabled prior to July 1, 1997 but did not commence his or her benefit before July 1, 1997, the benefit payable is calculated under the laws in effect at the time the Member became disabled and an actuarial increase shall be made for the change in the post-retirement interest rates from 5.00% to 6.00%. Payments stop earlier if disability ceases. If death occurs prior to age 65, or within five years of disability, the surviving spouse can receive a refund or a survivor benefit. Dependent children are entitled to dependent child benefits subject to the 70.00% family maximum. Payments revert to a retirement annuity at normal retirement age. Benefits may be reduced on resumption of partial employment.
Form of payment	Same as for retirement.
Benefit increases	Same as for retirement, except benefit increases are paid prior to Normal Retirement.

Summary of Plan Provisions - Basic (Continued)

Disability (Concluded)	
Retirement after disability	
Age/service requirement	Normal retirement age.
Amount	Any optional annuity continues. Otherwise, the larger of the disability benefit paid before normal retirement age or the normal retirement benefit available at normal retirement age, or an actuarially equivalent optional annuity.
Benefit increases	Same as for retirement, except benefit increases are paid prior to Normal Retirement.
Death	
Surviving spouse benefit	
Age/service requirement	Active Member with 18 months of Allowable Service or while Member is receiving a disability benefit.
Amount	50.00% of salary averaged over last six months. Family benefit is maximum of 70.00% and minimum of 50.00% of average salary. Benefit paid until spouse's death but no payments while spouse is remarried prior to July 1, 1991. If a member becomes deceased prior to July 1, 1997 and the beneficiary was not eligible to commence their survivor benefit as of July 1, 1997, the benefit payable is calculated under the laws in effect before July 1, 1997, and an actuarial increase shall be made for the change in the post-retirement interest rates from 5.00% to 6.00%. Surviving spouse optional annuity may be elected in lieu of this benefit.
Benefit increases	Same as for retirement, except benefit increases are paid prior to Normal Retirement.
Surviving dependent children's benefit	
Age/service requirement	Active Member with 18 months of Allowable Service or while Member is receiving a disability benefit.
Amount	10.00% of salary averaged over last six months for each child. Family benefit minimum (including spouse's benefit) of 50.00% of salary and maximum of 70.00% of average salary. Benefits paid until child marries, dies, or attains age 18 (age 22 if full-time student).

Summary of Plan Provisions - Basic (Continued)

Death (Concluded)	
<u>Surviving dependent children's benefit (Concluded)</u>	
Amount (Concluded)	If a member becomes deceased prior to July 1, 1997 and the beneficiary was not eligible to commence their survivor benefit before July 1, 1997, the benefit payable is calculated under the laws in effect before July 1, 1997, and 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, except benefit increases are paid prior to Normal Retirement.
<u>Surviving spouse optional annuity</u>	
Age/service requirement	Member or former Member who dies before retirement benefits commence and other survivor annuity is waived by spouse.
Amount	Survivor's payment of the 100% joint and survivor benefit the Member could have elected if terminated or an actuarial equivalent term certain annuity. If commencement is prior to age 65 (age 62 if 30 years of service), the benefit is reduced the same as early retirement with half the applicable reduction factor used from age 55 to the actual commencement age. If no surviving spouse, then an actuarial equivalent dependent child benefit is paid to age 20 or for five years if longer. If a member becomes deceased prior to July 1, 1997 and the beneficiary was not eligible to commence their survivor benefit as of July 1, 1997, the benefit payable is calculated under the laws in effect before July 1, 1997, and 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, except benefit increases are paid prior to Normal Retirement.
<u>Refund of contributions with interest</u>	
Age/service requirement	Member dies before receiving any retirement benefits and survivor benefits are not payable.
Amount	The excess of the Member's contributions with 6.00% interest until June 30, 2011; 4.00% through June 30, 2018; 3.00% thereafter over any disability or survivor benefits paid.

Termination	
<u>Refund of contributions</u>	
Age/service requirement	Termination of public 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. 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	Fully vested.
Amount	Benefit computed under law in effect at termination and increased by the following "augmentation" percentage compounded annually for terminations prior to 2012: (a.) 0.00% before July 1, 1971; (b.) 5.00% from July 1, 1971 to January 1, 1981; (c.) 3.00% thereafter until the earlier of January 1 of the year following attainment of age 55 and January 1, 2012; (d.) 5.00% thereafter until the earlier of the date the annuity begins and January 1, 2012; (e.) 1.00% from January 1, 2012 through December 31, 2018; and (f.) 0.00% from January 1, 2019, thereafter. Members who terminate after 2011 will receive no future augmentation. Members active with a public employer the day prior to the privatization of the employer become vested immediately and receive enhanced augmentation (unless the enhancement results in a net loss to the Plan). Amount is payable at a normal or early retirement. Augmentation equals 2.00% compounded annually, unless the enhancement results in a net loss to the Plan, in which case augmentation equals 1.00% compounded annually. If privatization occurred prior to January 1, 2011, augmentation occurs at the rate of 4.00% compounded annually through the year the Member turns age 55 and 6.00% thereafter until the annuity begins. If privatization occurred prior to January 1, 2007 (or January 1, 2008 for Hutchinson Area Health Care), augmentation occurs at the rate of 5.50% compounded annually through the year the Member turns age 55 and 7.50% thereafter until the annuity begins.

Summary of Plan Provisions - Basic (Continued)

Termination (Concluded)	
Deferred benefit (Concluded)	
Amount (Concluded)	If a member terminated employment prior to July 1, 1997 but was not eligible to commence their pension before July 1, 1997, the benefit payable is calculated under the laws in effect before July 1, 1997 and 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.
Actuarial equivalent factors	Effective July 1, 2019, actuarially equivalent factors based on the RP-2014 mortality table for healthy annuitants for a member turning age 62 in 2021, reflecting projected mortality improvements using Scale MP-2017, white collar adjustment, male rates set forward two years, female rates multiplied by 0.90, blended 40% males, 6.17% post-retirement interest, and 7.50% pre-retirement interest. Reflecting statutory requirements, joint and survivor factors are based on an interest assumption of 6.50%.
Combined service annuity	Members are eligible for combined service benefits if they: (a.) Meet minimum retirement age for each plan participated in and total public service meets the vesting requirements of each plan; or (b.) Have three or more years of service under PERA and the covered fund(s) (if hired prior to July 1, 2010). Other requirements for combined service include: (a.) Member must have at least six months of allowable service credit in each plan worked under; and (b.) Member may not be in receipt of a benefit from another plan. Members who meet the above requirements must have their benefits based on the following: (a.) Allowable service in all covered plans is 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 - Basic (Concluded)

Changes in plan provisions	The augmentation adjustment in early retirement factors is eliminated over a five-year period starting July 1, 2019, resulting in actuarial equivalence after June 30, 2024. Interest credited on member contributions decreased from 4.0% to 3.0%, beginning July 1, 2018. Deferred augmentation was changed to 0.00%, effective January 1, 2019. Augmentation that has already accrued for deferred members will still apply. Post-retirement benefit increases were changed from 1.0% per year with a provision to increase to 2.5% upon attainment of 90% funding ratio to 50% of the Social Security Cost of Living Adjustment, not less than 1.0% and not more than 1.5%, beginning January 1, 2019. For retirements on or after January 1, 2024, the first benefit increase is delayed until the retiree reaches Normal Retirement Age. Does not apply to Rule of 90 retirees, disability benefit recipients, or survivors. Actuarial equivalent factors were updated to reflect revised mortality and interest assumptions.

Summary of Plan Provisions - Coordinated

Following is a summary of the major plan provisions used in the valuation of this report. PERA 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 public employee who is covered under the Social Security Act. General exceptions are employees covered by other public funds, certain part-time employees and full-time students under age 23. City managers and persons holding certain elective office positions may choose to become Members.
Contributions Effective date	Shown as a percent of salary: **Member** / **Employer**
January 1, 2015	6.50% / 7.50% Member contributions are "picked up" according to the provisions of Internal Revenue Code 414(h).
Allowable service	Service during which member contributions are deducted. May also include certain leaves of absence and military service.
Salary	Includes amounts deducted for deferred compensation or supplemental retirement plans, net income from fees and sick leave payments funded by the employer. Excludes unused annual leave and sick leave payments, severance payments, Workers' Compensation benefits and employer-paid flexible spending accounts and employer-paid deferred compensation deposits, cafeteria plans, healthcare expense accounts, day-care expenses, fringe benefits and the cost of insurance coverage.
Average salary	Average of the five highest successive years of annual salary. Average salary is based on all Allowable Service if less than five years.
Vesting	Hired before July 1, 2010: 100% vested after three years of Allowable Service. Hired after June 30, 2010: 100% vested after five years of Allowable Service.
Retirement Normal retirement benefit Age/service requirement	First hired before July 1, 1989: (a.) Age 65 and vested. (b.) Proportionate retirement annuity is available at age 65 and one year of Allowable Service.
Amount	1.70% of Average Salary for each year of Allowable Service.

Summary of Plan Provisions – Coordinated (Continued)

Retirement (Continued)	
Normal retirement benefit (Continued)	
Age/service requirement	First hired after June 30, 1989: (a.) The greater of age 65 or the age eligible for full Social Security retirement benefits but no later than age 66 and vested. (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.
Early retirement benefit	
Age/service requirement	First hired before July 1, 1989: (a.) Age 55 and vested. (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 vested.
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 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. Augmentation adjustment is phased out over a five-year period starting July 1, 2019, resulting in no augmentation adjustment after June 30, 2024. First hired after June 30, 1989: (a.) 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. Augmentation adjustment is phased out over a five-year period starting July 1, 2019, resulting in no augmentation adjustment after June 30, 2024.

Summary of Plan Provisions – Coordinated (Continued)

Retirement (Continued)	
Form of payment	Life annuity with return on death of any balance of contributions over aggregate monthly payments. Actuarially equivalent options are: 25%, 50%, 75% or 100% Joint and Survivor. 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.
<u>Benefit increases</u>	Benefit recipients receive a future annual increase equal to 50% of the Social Security Cost of Living Adjustment, not less than 1.0% and not more than 1.5%, beginning January 1, 2019. For retirements on or after January 1, 2024, the first benefit increase is delayed until the retiree reaches Normal Retirement Age (not applicable to Rule of 90 retirees, disability benefit recipients, or survivors). A benefit recipient who has been receiving a benefit for at least 12 full months as of June 30 will receive a full increase. Members receiving benefits for at least one month but less than 12 full months as of June 30 will receive a pro rata increase. Members retired under laws in effect before July 1, 1973 will receive an additional lump sum payment each year. In 1989, this lump sum payment is $25 times each full year of Allowable Service. In each following year, the lump sum payment will increase by the same percentage increase that is applied to regular annuities paid from the fund.
Disability	
<u>Disability benefit</u>	
Age/service requirement	Total and permanent disability before normal retirement age if vested.
Amount	Normal Retirement benefit based on Allowable Service and Average Salary at disability without reduction for commencement before normal retirement age. The disability benefit is reduced to that amount which, when added to Workers' Compensation, does not exceed the salary the disabled Member received as of the date of the disability or the salary currently payable for the same employment position substantially similar to the one the person held as of the date of the disability, whichever is greater. If a Member becomes disabled prior to July 1, 1997 but did not commence his or her benefit before July 1, 1997, the benefit payable is calculated under the laws in effect before July 1, 1997, and an actuarial increase shall be made for the change in the post-retirement interest rates from 5.00% to 6.00%.

Summary of Plan Provisions – Coordinated (Continued)

Disability (Concluded)	
Disability benefit (Concluded)	
Amount (Concluded)	Payments stop if disability ceases or death occurs. Payments change to a retirement annuity at normal retirement age. Benefits may be reduced on resumption of partial employment.
Form of payment	Same as for retirement.
Benefit increases	Same as for retirement, except benefit increases are paid prior to Normal Retirement.
Retirement after disability	
Age/service requirement	Normal retirement age.
Amount	Any optional annuity continues. Otherwise, the larger of the disability benefit paid before normal retirement age or the normal retirement benefit available at normal retirement age, or an actuarially equivalent optional annuity.
Benefit increases	Same as for retirement, except benefit increases are paid prior to Normal Retirement.
Death	
Surviving spouse optional annuity	
Age/service requirement	Member or former Member who dies before retirement or disability benefits commence.
Amount	Survivor's payment of the 100% joint and survivor benefit the Member could have elected if terminated or an actuarial equivalent term certain annuity. If commencement is prior to age 65 (age 62 if 30 years of service), the benefit is reduced the same as early retirement with half the applicable reduction factor used from age 55 to the actual commencement age. If no surviving spouse, then an actuarial equivalent dependent child benefit is paid to age 20 or for five years if longer. If a member becomes deceased prior to July 1, 1997 and the beneficiary was not eligible to commence their survivor benefit before July 1, 1997, the benefit payable is calculated under the laws in effect before July 1, 1997, and 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, except benefit increases are paid prior to Normal Retirement.

Death (Concluded)	
Refund of contributions	
Age/service requirement	Member dies before receiving any retirement benefits and survivor benefits are not payable.
Amount	The excess of the Member's contributions with 6.00% interest until June 30, 2011; 4.00% through June 30, 2018; 3.00% thereafter over any disability or survivor benefits paid.
Termination	
Refund of contributions	
Age/service requirement	Termination of public 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. 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.
Deferred benefit	
Age/service requirement	Fully vested.
Amount	Benefit computed under law in effect at termination and increased by the following percentage (augmentation) compounded annually for terminations prior to 2012: (a.) 0.00% before July 1, 1971; (b.) 5.00% from July 1, 1971 to January 1, 1981; (c.) 3.00% (2.50% if hired after June 30, 2006) thereafter until the earlier of January 1 of the year following attainment of age 55 and January 1, 2012; (d.) 5.00% (2.50% if hired after June 30, 2006) thereafter until the earlier of the date the annuity begins and January 1, 2012; or (e.) 1.00% from January 1, 2012 through December 31, 2018; and (f.) 0.00% from January 1, 2019, thereafter. Members who terminate after 2011 will receive no future augmentation.

Summary of Plan Provisions – Coordinated (Continued)

Termination (Concluded)	
Deferred benefit (Concluded)	
Amount (Concluded)	Members active with a public employer the day prior to the privatization of the employer become vested immediately and receive enhanced augmentation (unless the enhancement results in a net loss to the Plan). Amount is payable at a normal or early retirement. Augmentation equals 2% compounded annually, unless the enhancement results in a net loss to the Plan, in which case augmentation equals 1.00% compounded annually. If privatization occurred prior to January 1, 2011, augmentation occurs at the rate of 4.00% compounded annually through the year the Member turns age 55 and 6.00% thereafter until the annuity begins. If privatization occurred prior to January 1, 2007 (or January 1, 2008 for Hutchinson Area Health Care), augmentation occurs at the rate of 5.50% compounded annually through the year the Member turns age 55 and 7.50% thereafter until the annuity begins. If a member terminated employment prior to July 1, 1997 but was not eligible to commence their pension before July 1, 1997, the benefit payable is calculated under the laws in effect before July 1, 1997 and 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.
Actuarial equivalent factors	Effective July 1, 2019, actuarially equivalent factors based on the RP-2014 mortality table for healthy annuitants for a member turning age 62 in 2021, reflecting projected mortality improvements using Scale MP-2017, white collar adjustment, male rates set forward two years, female rates multiplied by 0.90, blended 40% males, 6.17% post-retirement interest, and 7.50% pre-retirement interest. Reflecting statutory requirements, joint and survivor factors are based on an interest assumption of 6.50%.

Summary of Plan Provisions – Coordinated (Concluded)

Combined service annuity	Members are eligible for combined service benefits if they: (a.) Meet minimum retirement age for each plan participated in and total public service meets the vesting requirements of each plan; or (b.) Have three or more years of service under PERA and the covered fund(s) (if hired prior to July 1, 2010). Other requirements for combined service include: (a.) Member must have at least six months of allowable service credit in each plan worked under; and (b.) Member may not be in receipt of a benefit from another plan. Members who meet the above requirements must have their benefit based on the following: (a.) Allowable service in all covered plans is 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	The augmentation adjustment in early retirement factors is eliminated over a five-year period starting July 1, 2019, resulting in actuarial equivalence after June 30, 2024. Interest credited on member contributions decreased from 4.0% to 3.0%, beginning July 1, 2018. Deferred augmentation was changed to 0.00%, effective January 1, 2019. Augmentation that has already accrued for deferred members will still apply. Contribution stabilizer provisions were repealed. Post-retirement benefit increases were changed from 1.0% per year with a provision to increase to 2.5% upon attainment of 90% funding ratio to 50% of the Social Security Cost of Living Adjustment, not less than 1.0% and not more than 1.5%, beginning January 1, 2019. For retirements on or after January 1, 2024, the first benefit increase is delayed until the retiree reaches Normal Retirement Age. Does not apply to Rule of 90 retirees, disability benefit recipients, or survivors. Actuarial equivalent factors were updated to reflect revised mortality and interest assumptions.

Summary of Plan Provisions – Minneapolis Employees Retirement Fund (MERF)

Following is a summary of the major plan provisions used in the valuation of this report. PERA 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/employee rule	An employee of the City of Minneapolis, the Metropolitan Airports Commission, the Met Council/Environmental Services, the Municipal Employees Retirement Fund, and Special School District No. 1 if covered prior to July 1, 1978. Employees covered July 1, 1978 or later are covered by the Public Employees Retirement Association (PERA) Plan. Effective July 1, 1992, licensed peace officers and firefighters who are employed by the Metropolitan Airports Commission and covered by the Minneapolis Employees Retirement Fund will receive the greater of retirement, disability, or survivor benefits under: a) The Minneapolis Employees Retirement Fund; or b) The Public Employees Retirement Association (PERA) Police & Fire Plan.
Full consolidation	The MERF Division fully merged with PERA's General Employees Retirement Plan, effective January 1, 2015. Upon consolidation, state and employer contributions were revised as shown herein.
Contributions	
Member	9.75% of salary
Employer	9.75% of salary (Employer Regular Contributions) Employer Regular and Additional Contributions will be paid as long as there are active members. Employer Supplemental Contribution equals $21,000,000 in calendar years 2017 and 2018 and $31,000,000 in calendar years 2019 to 2031.
Contribution allocation	Employer Supplemental Contributions are allocated to the employers in proportion to their share of the actuarial accrued liability of MERF on July 1, 2009, as follows:

Employer	Allocation
City of Minneapolis	54.78%
Minneapolis Park Board	10.33%
Met Council	1.74%
Metropolitan Airport Commission	5.76%
Municipal Building Commission	1.08%
Minneapolis School District No. 1	23.04%
Hennepin County	3.17%
MnSCU	0.10%
Total	100.00%

Summary of Plan Provisions – Minneapolis Employees Retirement Fund (MERF) (Continued)

State contributions	The State's contribution equals $16,000,000 in 2017 and 2018, and $6,000,000 thereafter. The State's contributions are payable by September 30 each year and end on September 15, 2031.
Allowable service	Service during which member contributions were made. Allowable Service may also include certain leaves of absence, military service and service prior to becoming a member. Allowable service also includes time on duty disability provided that the member returns to active service if the disability ceases.
Salary	All amounts of salary, wages or compensation.
Average salary	Average of the five highest calendar years of salary out of the last ten calendar years.
Retirement Normal retirement benefit	
Age/service requirement	Age 60 and 10 years of employment. Any age with 30 years of employment. Proportionate retirement annuity is available at age 65 and one year allowable service.
Amount	2.00% of average salary for the first 10 years of allowable service plus 2.50% of average salary for each subsequent year of allowable service.

Summary of Plan Provisions –
Minneapolis Employees Retirement Fund (MERF) (Continued)

Disability

Disability benefit

Age/service requirement	Total and permanent disability before age 60 with five years of allowable service, or no allowable service if a work-related disability.
Amount	2.00% of average salary for the first 10 years of disability service plus 2.50% of average salary for each subsequent year of disability service. Disability service is the greater of (a) or (b) where: (a.) equals allowable service plus service projected to age 60, subject to a maximum of 22 years, and (b.) equals allowable service. Benefit is reduced by Workers' Compensation benefits. Payments stop at age 60 or earlier if disability ceases or death occurs. Benefits may be reduced on resumption of partial employment.

Disability after separation

Age/service requirement	Total and permanent disability after electing to receive a retirement benefit but before age 60.
Amount	Actuarial equivalent of total credit to member's account.

Retirement after disability

Age/service requirement	Total and permanent disability after electing to receive a retirement benefit but before age 60. Employee is still disabled after age 60.
Amount	Benefit continues according to the option selected.

Summary of Plan Provisions –
Minneapolis Employees Retirement Fund (MERF) (Continued)

Death

Pre-retirement survivor's spouse benefit	
Age/service requirement	Active member with 18 months of allowable service.
Amount	30% of salary averaged over the last six months to the surviving spouse plus 10% of salary averaged over the last six months to each surviving child. Maximum benefit is $900 per month.
Pre-retirement survivor's spouse annuity	
Age/service requirement	Active member or former member who dies before retirement with 20 years of allowable service.
Amount	Actuarial equivalent of a single life annuity which would have been paid as a retirement benefit on the date of death without regard to eligibility age for retirement benefit. If there is no surviving spouse, the designated beneficiary may be a dependent child or dependent parent.
Refund of accumulated city contributions	
Age/service requirement	Active member or former member dies after 10 years of allowable service and prior to retirement.
Amount	Present value of the City's annual installments of $60 or, in the case of a former member, the net accumulation of city deposits. This benefit is not payable if survivor's benefits are paid.
Lump sum	
Age/service requirement	Death prior to service or disability retirement without an eligible surviving beneficiary.
Amount	$750 with less than 10 years allowable service, or $1,500 with 10 or more years of allowable service.
Refund of member contributions at death	
Age/service requirement	Active member or former member dies before retirement.
Amount	The excess of the member's contributions (exclusive of the contributions to the survivor's account) plus interest to the date of death.

Summary of Plan Provisions –
Minneapolis Employees Retirement Fund (MERF) (Concluded)

Termination	
Deferred benefit	
Age/service requirement	Three years of allowable service.
Amount	Benefit computed under law in effect at termination and increased by the following percentage (augmentation), compounded annually: (a.) 0.00% prior to July 1, 1971, (b.) 5.00% from July 1, 1971 to January 1, 1981, and (c.) 3.00% thereafter until the annuity begins. Amount is payable at or after age 60.
Refund of member contributions upon termination	
Age/service requirement	Termination of public service.
Amount	Member's contributions with interest. A deferred annuity may be elected in lieu of a refund if vested.
Form of payment	▪ Life annuity. ▪ Life annuity with 3, 5, 10 or 15 years guaranteed. ▪ Life annuity with lump sum death benefit. ▪ Joint & Survivor (with or without bounce back feature).
Optional form conversion factors	1986 PET mortality table with a one-year setback, blended 50% male and 50% female, and 5% interest.
Two dollar bill and annuity	Optional Two Dollar Bill money purchase annuity available at age 55 with 20 years of service if member had service prior to June 28, 1973. According to PERA, this option is rarely utilized. We have assumed that remaining active members will not elect this optional benefit.
Benefit increases	Benefit recipients will receive a future annual increase equal to 50% of the Social Security Cost of Living Adjustment, not less than 1.0% and not more than 1.5%, beginning January 1, 2019. For retirements on or after January 1, 2024, the first benefit increase is delayed until the retiree reaches Normal Retirement Age (not applicable to Rule of 90 retirees, disability benefit recipients, or survivors).
Changes in plan provisions	Post-retirement benefit increases were changed from 1.0% per year with a provision to increase to 2.5% upon attainment of 90% funding ratio to 50% of the Social Security Cost of Living Adjustment, not less than 1.0% and not more than 1.5%, beginning January 1, 2019. For retirements on or after January 1, 2024, the first benefit increase is delayed until the retiree reaches Normal Retirement Age. Does not apply to Rule of 90 retirees, disability benefit recipients, or survivors.

SECTION F

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

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 increases after retirement will equal 50% of the Social Security Cost of Living Adjustment, not less than 1.0% and not more than 1.5%, beginning January 1, 2019. Stochastic modeling was used to determine the assumption that benefit increases will equal 1.25% per year. This is only an assumption; actual increases will depend on actual experience.

Asset Valuation Method

Fair value of assets.

Summary of Actuarial Assumptions – Basic and Coordinated

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, and a review of inflation and investment assumptions, dated September 11, 2017.

The Allowance for Combined Service Annuity assumptions are based on an analysis completed by the LCPR actuary and documented in a report dated October 2016.

Investment return	7.50% per annum.
Single Discount Rate	7.50% per annum.
Benefit increases after retirement	1.25% 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 earned during the year.
Inflation	2.50% per year.
Payroll growth	3.25% per year.
Mortality rates	
Healthy pre-retirement	RP-2014 Employee Mortality Table, adjusted for white collar and mortality improvements using projection scale MP-2017, from a base year of 2014. Rates are set forward one year for males and set back one year for females.
Healthy post-retirement	RP-2014 Healthy Annuitant Mortality Table, adjusted for white collar and mortality improvements using projection scale MP-2017, from a base year of 2014. Rates are set forward two years for males. Female rates are multiplied by a factor of 0.90.
Disabled retirees	RP-2014 Disabled Mortality Table, adjusted for mortality improvements using projection scale MP-2017, from a base year of 2014. Rates are set forward one year for males and set forward six years for females.
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 tables. Members who have attained the highest assumed retirement age are assumed to retire in one year. Note that significant plan changes reflected in this report may result in behavior changes that are not anticipated in the current retirement rates.
Withdrawal	Service-related rates based on experience; see table of sample rates.

Summary of Actuarial Assumptions – Basic and Coordinated (Continued)

Disability	Age-related rates based on experience; see table of sample rates.
Allowance for combined service annuity	Liabilities for former members are increased by 15.0% for vested members and 3.0% for non-vested members 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 dates at the rates described in the Summary of Plan Provisions and are discounted back to the valuation date. All employees withdrawing after becoming eligible for a deferred benefit are assumed to take the larger of contributions accumulated with interest or the value of the deferred benefit.
Commencement of deferred benefits	Members receiving deferred annuities (including current terminated deferred members) are assumed to begin receiving benefits at Normal Retirement.
Percentage married	80% of male and 70% of female active members are assumed to be married. Actual marital status is used for members in payment status.
Age of spouse	Males are assumed to have a beneficiary three years younger, while females are assumed to have a beneficiary two years older. For members in payment status, actual spouse date of birth is used, if provided.
Eligible children	Retiring members are assumed to have no dependent children.
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 25% Joint & Survivor option 15% elect 50% Joint & Survivor option 10% elect 75% Joint & Survivor option 35% elect 100% Joint & Survivor option Females: 10% elect 25% Joint & Survivor option 10% elect 50% Joint & Survivor option 5% elect 75% Joint & Survivor option 15% 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.
Eligibility testing	Eligibility for benefits is determined based upon the age nearest birthday and service 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 – Basic and Coordinated (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. 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 3,646 members reported with a salary less than $100. We used prior year salary (2,259 members), if available; otherwise high five salary with a 10% load to account for salary increases (833 members). If neither prior year salary or high five salary was available, we assumed a value of $35,000. There were also 2,606 members reported without a gender and 167 members reported with an invalid date of birth. We assumed a date of birth based on an entry age of 38 and female gender. <u>Data for terminated members:</u> We calculated benefits for these members using the reported Average Salary and credited service. If Average Salary was not reported (163 members), we assumed a value of $24,000. If credited service was not reported (151 members), we assumed credited service was elapsed time from hire to termination date (100 members); if elapsed time was not available, we assumed nine years. If termination date was invalid or not reported (126 members), we assumed the termination date was equal to hire date plus credited service; otherwise the valuation date unless they are noted as a pre-July 1, 1989 hire, then June 30, 1989. If reported termination date occurs prior to reported hire date, the two dates were swapped. There were 99 members reported with an invalid date of birth and 442 members reported without a gender. We assumed a date of birth of July 1, 1967 and female gender. <u>Data for retired members:</u> There were 119 members reported without a gender. We assumed retirees are female and beneficiaries are male. There were 6 members reported with an invalid date of birth. We assumed a date of birth of July 1, 1945. There were 527 members that were active last year, and retirement eligible, and not on the retiree data file this year. At the direction of PERA, we included these members in the 2018 valuation as retirees with an estimated life only monthly benefit. Any members deemed not eligible for retirement were assumed to have taken a refund.

Summary of Actuarial Assumptions – Basic and Coordinated (Continued)

Unknown data for certain members (Concluded)	<u>Data for retired members (Continued):</u> Because PERA reclassifies disabled members as retirees once the member reaches Normal Retirement Age, we compare the members that PERA reports as retirees to our disabled group from the last valuation. If a member was disabled in the valuation, we reclassify that member as a disabled retiree in this year's valuation. We reclassified 2,089 retirees as disabled retirees in this valuation.
Changes in actuarial assumptions	The mortality projection scale was changed from MP-2015 to MP-2017. The assumed benefit increase was changed from 1.00% per year through 2044 and 2.50% per year thereafter to 1.25% per year.

Summary of Actuarial Assumptions – Basic and Coordinated (Continued)

	Percentage of Members Dying Each Year*					
	Healthy Post-Retirement Mortality		Healthy Pre-Retirement Mortality		Disability Mortality	
Age in 2018	Male	Female	Male	Female	Male	Female
20	0.03%	0.01%	0.03%	0.01%	0.06%	0.11%
25	0.05	0.02	0.03	0.01	0.25	0.26
30	0.07	0.04	0.03	0.02	0.58	0.49
35	0.10	0.07	0.04	0.02	1.00	0.75
40	0.15	0.11	0.05	0.03	1.40	1.00
45	0.21	0.14	0.07	0.05	1.71	1.22
50	0.30	0.18	0.12	0.08	2.00	1.46
55	0.43	0.25	0.21	0.13	2.34	1.78
60	0.60	0.36	0.37	0.20	2.76	2.25
65	0.92	0.58	0.65	0.28	3.33	2.99
70	1.50	0.91	1.13	0.47	4.17	4.27
75	2.55	1.52	1.96	0.82	5.58	6.36
80	4.56	2.66	3.55	1.44	7.95	9.50
85	8.48	4.82	7.45	3.49	11.92	14.06
90	15.37	8.85	13.87	8.27	18.22	20.71

* *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 of Disability Retirement	
Age	Male	Female
20	0.01%	0.01%
25	0.01	0.01
30	0.01	0.01
35	0.03	0.02
40	0.05	0.04
45	0.08	0.05
50	0.15	0.10
55	0.34	0.16
60	0.53	0.28
65	0.00	0.00
70	0.00	0.00

Summary of Actuarial Assumptions – Basic and Coordinated (Continued)

	Retirement		
Age	**Rule of 90 Eligible**	**Tier 1**	**Tier 2**
55	20.0%	5.0%	5.0%
56	15.0%	5.0%	5.0%
57	15.0%	5.0%	5.0%
58	15.0%	6.0%	5.0%
59	15.0%	7.0%	6.0%
60	15.0%	8.0%	7.0%
61	18.0%	10.0%	9.0%
62	35.0%	20.0%	15.0%
63	25.0%	20.0%	15.0%
64	25.0%	25.0%	15.0%
65	32.5%	32.5%	25.0%
66	25.0%	25.0%	25.0%
67	20.0%	20.0%	20.0%
68	17.5%	17.5%	17.5%
69	15.0%	15.0%	15.0%
70	17.5%	17.5%	17.5%
71+	100.0%	100.0%	100.0%

Summary of Actuarial Assumptions – Basic and Coordinated (Concluded)

Salary Scale		
Year	**Increase**
1	11.25%
2	8.25
3	6.75
4	5.75
5	5.25
6	4.95
7	4.65
8	4.55
9	4.45
10	4.25
11	4.00
12	3.85
13	3.75
14	3.65
15	3.65
16	3.60
17	3.55
18	3.50
19	3.50
20	3.50
21	3.50
22	3.45
23	3.35
24	3.35
25	3.35
26+	3.25

	% Withdrawals	
Year	**Male**	**Female**
1	25.00%	25.00%
2	20.00	20.00
3	15.00	15.00
4	10.00	11.00
5	9.00	10.00
6	7.00	9.00
7	5.50	7.50
8	5.00	6.50
9	4.50	5.50
10	4.00	5.00
11	3.25	4.25
12	3.00	4.00
13	2.75	3.75
14	2.50	3.50
15	2.50	3.25
16	2.25	3.00
17	2.00	2.75
18	1.75	2.50
19	1.50	2.50
20	1.50	2.25
21	1.50	2.25
22	1.50	2.25
23	1.00	2.00
24	1.00	2.00
25	1.00	1.75
26	1.00	1.75
27	1.00	1.50
28	1.00	1.50
29	1.00	1.50
30	1.00	1.50

Summary of Actuarial Assumptions - MERF

The following assumptions were used in valuing the liabilities and benefits under the plan for MERF members only. Assumptions regarding investment return, mortality, benefit increases, and Combined Service Annuity (CSA) are the same as shown in the Basic and Coordinated Plan assumption summary.

Salary increases	Total reported pay for prior calendar year increased 1.86% (half year of 3.75%, compounded) to prior fiscal year and 3.75% annually for each future year.
Retirement	Active members are assumed to retire at age 61, or immediately if currently age 61 or older.
Withdrawal	Rates are shown in rate table.
Disability	Age-related rates based on experience; see table of sample rates.
Commencement of deferred benefits	Members receiving deferred annuities (including current terminated deferred members) are assumed to begin receiving benefits at age 60.
Percentage married	66.67% 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. For members in payment status, actual spouse date of birth is used, if provided.
Eligible children	Retiring members are assumed to have no dependent children.
Form of payment	Members are assumed to elect a life annuity.
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, based on average results for applicable members, were applied: There were no members with missing or invalid dates of birth. <u>Data for active members:</u> There were no active members with missing salary or service. <u>Data for terminated members:</u> Benefits were provided by PERA for 5 members. For the remaining members, we calculated benefits using the reported Average Salary, credited service and termination date from the 2016 valuation data file. <u>Data for Retired members:</u> There was 1 member reported without a gender. We assumed male gender.

Summary of Actuarial Assumptions – MERF (Continued)

Unknown data for certain members (Concluded)	Data for retired members (Continued): Because PERA reclassifies disabled members as retirees once the member reaches Normal Retirement Age, we compare the members that PERA reports as retirees to our disabled group from the last valuation. If a member was disabled in the valuation, we reclassify that member as a disabled retiree in this year's valuation. We reclassified 80 retirees as disabled retirees in this valuation.
Changes in actuarial assumptions	The mortality projection scale was changed from MP-2015 to MP-2017. The assumed benefit increase was changed from 1.00% per year through 2044 and 2.50% per year thereafter to 1.25% per year.

Summary of Actuarial Assumptions – MERF (Concluded)

	Withdrawal		Disability Retirement	
Age	Male	Female	Male	Female
20	21.00%	21.00%	0.21%	0.21%
25	11.00	11.00	0.21	0.21
30	5.00	5.00	0.23	0.23
35	1.50	1.50	0.30	0.30
40	1.00	1.00	0.41	0.41
45	1.00	1.00	0.61	0.61
50	1.00	1.00	0.93	0.93
55	1.00	1.00	1.60	1.60
60	1.00	1.00	0.00	0.00
65	0.00	0.00	0.00	0.00
70	0.00	0.00	0.00	0.00

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 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 assumed long-term expected rate of return is used. 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 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%; and **the resulting single discount rate 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 (SDR). 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)

	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
2018	$ 6,298,815	$ -	$ 6,298,815					
2019	$ 6,366,884	$ -	$ 6,366,884	$ 413,876	$ 477,541	$ -	$ 37,000	$ 928,417
2020	$ 6,005,504	$ 568,303	$ 6,573,807	$ 390,358	$ 450,413	$ 34,326	$ 37,000	$ 912,097
2021	$ 5,690,320	$ 1,097,136	$ 6,787,456	$ 369,871	$ 426,774	$ 66,267	$ 37,000	$ 899,912
2022	$ 5,428,017	$ 1,580,031	$ 7,008,048	$ 352,821	$ 407,101	$ 95,434	$ 37,000	$ 892,356
2023	$ 5,183,667	$ 2,052,143	$ 7,235,810	$ 336,938	$ 388,775	$ 123,949	$ 37,000	$ 886,662
2024	$ 4,953,825	$ 2,517,149	$ 7,470,974	$ 321,999	$ 371,537	$ 152,036	$ 37,000	$ 882,572
2025	$ 4,738,119	$ 2,975,661	$ 7,713,780	$ 307,978	$ 355,359	$ 179,730	$ 37,000	$ 880,067
2026	$ 4,535,397	$ 3,429,081	$ 7,964,478	$ 294,801	$ 340,155	$ 207,117	$ 37,000	$ 879,073
2027	$ 4,344,144	$ 3,879,180	$ 8,223,324	$ 282,369	$ 325,811	$ 234,302	$ 37,000	$ 879,482
2028	$ 4,161,821	$ 4,328,761	$ 8,490,582	$ 270,518	$ 312,137	$ 261,457	$ 37,000	$ 881,112
2029	$ 3,987,477	$ 4,779,049	$ 8,766,526	$ 259,186	$ 299,061	$ 288,655	$ 37,000	$ 883,902
2030	$ 3,820,302	$ 5,231,136	$ 9,051,438	$ 248,320	$ 286,523	$ 315,961	$ 37,000	$ 887,804
2031	$ 3,658,877	$ 5,686,732	$ 9,345,609	$ 237,827	$ 274,416	$ 343,479	$ 37,000	$ 892,722
2032	$ 3,501,921	$ 6,147,421	$ 9,649,342	$ 227,625	$ 262,644	$ 371,304	$ -	$ 861,573
2033	$ 3,347,573	$ 6,615,372	$ 9,962,945	$ 217,592	$ 251,068	$ 399,569	$ -	$ 868,229
2034	$ 3,195,976	$ 7,090,765	$ 10,286,741	$ 207,738	$ 239,698	$ 428,282	$ -	$ 875,718
2035	$ 3,048,079	$ 7,572,981	$ 10,621,060	$ 198,125	$ 228,606	$ 457,408	$ -	$ 884,139
2036	$ 2,903,100	$ 8,063,145	$ 10,966,245	$ 188,701	$ 217,732	$ 487,014	$ -	$ 893,447
2037	$ 2,759,477	$ 8,563,171	$ 11,322,648	$ 179,366	$ 206,961	$ 517,216	$ -	$ 903,543
2038	$ 2,617,738	$ 9,072,896	$ 11,690,634	$ 170,153	$ 196,330	$ 548,003	$ -	$ 914,486
2039	$ 2,477,221	$ 9,593,358	$ 12,070,579	$ 161,019	$ 185,792	$ 579,439	$ -	$ 926,250
2040	$ 2,336,771	$ 10,126,102	$ 12,462,873	$ 151,890	$ 175,258	$ 611,617	$ -	$ 938,765
2041	$ 2,195,308	$ 10,672,608	$ 12,867,916	$ 142,695	$ 164,648	$ 644,626	$ -	$ 951,969
2042	$ 2,052,790	$ 11,233,334	$ 13,286,124	$ 133,431	$ 153,959	$ 678,493	$ -	$ 965,883
2043	$ 1,911,032	$ 11,806,891	$ 13,717,923	$ 124,217	$ 143,327	$ 713,136	$ -	$ 980,680
2044	$ 1,771,271	$ 12,392,484	$ 14,163,755	$ 115,133	$ 132,845	$ 748,506	$ -	$ 996,484
2045	$ 1,633,174	$ 12,990,903	$ 14,624,077	$ 106,156	$ 122,488	$ 784,651	$ -	$ 1,013,295
2046	$ 1,495,894	$ 13,603,466	$ 15,099,360	$ 97,233	$ 112,192	$ 821,649	$ -	$ 1,031,074
2047	$ 1,360,366	$ 14,229,723	$ 15,590,089	$ 88,424	$ 102,027	$ 859,475	$ -	$ 1,049,926
2048	$ 1,227,618	$ 14,869,149	$ 16,096,767	$ 79,795	$ 92,071	$ 898,097	$ -	$ 1,069,963
2049	$ 1,098,451	$ 15,521,461	$ 16,619,912	$ 71,399	$ 82,384	$ 937,496	$ -	$ 1,091,279
2050	$ 974,009	$ 16,186,050	$ 17,160,059	$ 63,311	$ 73,051	$ 977,637	$ -	$ 1,113,999
2051	$ 854,997	$ 16,862,764	$ 17,717,761	$ 55,575	$ 64,125	$ 1,018,511	$ -	$ 1,138,211
2052	$ 742,109	$ 17,551,479	$ 18,293,588	$ 48,237	$ 55,658	$ 1,060,109	$ -	$ 1,164,004
2053	$ 636,416	$ 18,251,714	$ 18,888,130	$ 41,367	$ 47,731	$ 1,102,403	$ -	$ 1,191,501
2054	$ 538,961	$ 18,963,033	$ 19,501,994	$ 35,032	$ 40,422	$ 1,145,367	$ -	$ 1,220,821
2055	$ 450,561	$ 19,685,248	$ 20,135,809	$ 29,286	$ 33,792	$ 1,188,989	$ -	$ 1,252,067
2056	$ 370,823	$ 20,419,400	$ 20,790,223	$ 24,103	$ 27,812	$ 1,233,332	$ -	$ 1,285,247
2057	$ 299,487	$ 21,166,418	$ 21,465,905	$ 19,467	$ 22,462	$ 1,278,452	$ -	$ 1,320,381
2058	$ 237,365	$ 21,926,182	$ 22,163,547	$ 15,429	$ 17,802	$ 1,324,341	$ -	$ 1,357,572
2059	$ 184,592	$ 22,699,270	$ 22,883,862	$ 11,998	$ 13,844	$ 1,371,036	$ -	$ 1,396,878
2060	$ 140,400	$ 23,487,187	$ 23,627,587	$ 9,126	$ 10,530	$ 1,418,626	$ -	$ 1,438,282
2061	$ 104,366	$ 24,291,118	$ 24,395,484	$ 6,784	$ 7,827	$ 1,467,184	$ -	$ 1,481,795
2062	$ 75,671	$ 25,112,666	$ 25,188,337	$ 4,919	$ 5,675	$ 1,516,805	$ -	$ 1,527,399
2063	$ 52,918	$ 25,954,040	$ 26,006,958	$ 3,440	$ 3,969	$ 1,567,624	$ -	$ 1,575,033
2064	$ 35,414	$ 26,816,770	$ 26,852,184	$ 2,302	$ 2,656	$ 1,619,733	$ -	$ 1,624,691
2065	$ 22,325	$ 27,702,555	$ 27,724,880	$ 1,451	$ 1,674	$ 1,673,234	$ -	$ 1,676,359
2066	$ 13,062	$ 28,612,877	$ 28,625,939	$ 849	$ 980	$ 1,728,218	$ -	$ 1,730,047
2067	$ 7,163	$ 29,549,119	$ 29,556,282	$ 466	$ 537	$ 1,784,767	$ -	$ 1,785,770
2068	$ 3,700	$ 30,513,161	$ 30,516,861	$ 240	$ 277	$ 1,842,995	$ -	$ 1,843,512

* *Contributions related to future employee payroll in excess of normal cost and expenses of 7.96% of pay.*

Single Discount Rate Development
Projection of Contributions (Dollars in Thousands) (Concluded)

	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
2069	$ 1,685	$ 31,506,974	$ 31,508,659	$ 110	$ 126	$ 1,903,021	$ -	$ 1,903,257
2070	$ 626	$ 32,532,065	$ 32,532,691	$ 41	$ 47	$ 1,964,937	$ -	$ 1,965,025
2071	$ 170	$ 33,589,833	$ 33,590,003	$ 11	$ 13	$ 2,028,826	$ -	$ 2,028,850
2072	$ 47	$ 34,681,631	$ 34,681,678	$ 3	$ 4	$ 2,094,771	$ -	$ 2,094,778
2073	$ 12	$ 35,808,821	$ 35,808,833	$ 1	$ 1	$ 2,162,853	$ -	$ 2,162,855
2074	$ 2	$ 36,972,618	$ 36,972,620	$ -	$ -	$ 2,233,146	$ -	$ 2,233,146
2075	$ -	$ 38,174,230	$ 38,174,230	$ -	$ -	$ 2,305,723	$ -	$ 2,305,723
2076	$ -	$ 39,414,892	$ 39,414,892	$ -	$ -	$ 2,380,659	$ -	$ 2,380,659
2077	$ -	$ 40,695,876	$ 40,695,876	$ -	$ -	$ 2,458,031	$ -	$ 2,458,031
2078	$ -	$ 42,018,492	$ 42,018,492	$ -	$ -	$ 2,537,917	$ -	$ 2,537,917
2079	$ -	$ 43,384,093	$ 43,384,093	$ -	$ -	$ 2,620,399	$ -	$ 2,620,399
2080	$ -	$ 44,794,076	$ 44,794,076	$ -	$ -	$ 2,705,562	$ -	$ 2,705,562
2081	$ -	$ 46,249,884	$ 46,249,884	$ -	$ -	$ 2,793,493	$ -	$ 2,793,493
2082	$ -	$ 47,753,005	$ 47,753,005	$ -	$ -	$ 2,884,282	$ -	$ 2,884,282
2083	$ -	$ 49,304,978	$ 49,304,978	$ -	$ -	$ 2,978,021	$ -	$ 2,978,021
2084	$ -	$ 50,907,390	$ 50,907,390	$ -	$ -	$ 3,074,806	$ -	$ 3,074,806
2085	$ -	$ 52,561,880	$ 52,561,880	$ -	$ -	$ 3,174,738	$ -	$ 3,174,738
2086	$ -	$ 54,270,141	$ 54,270,141	$ -	$ -	$ 3,277,917	$ -	$ 3,277,917
2087	$ -	$ 56,033,920	$ 56,033,920	$ -	$ -	$ 3,384,449	$ -	$ 3,384,449
2088	$ -	$ 57,855,023	$ 57,855,023	$ -	$ -	$ 3,494,443	$ -	$ 3,494,443
2089	$ -	$ 59,735,311	$ 59,735,311	$ -	$ -	$ 3,608,013	$ -	$ 3,608,013
2090	$ -	$ 61,676,709	$ 61,676,709	$ -	$ -	$ 3,725,273	$ -	$ 3,725,273
2091	$ -	$ 63,681,202	$ 63,681,202	$ -	$ -	$ 3,846,345	$ -	$ 3,846,345
2092	$ -	$ 65,750,841	$ 65,750,841	$ -	$ -	$ 3,971,351	$ -	$ 3,971,351
2093	$ -	$ 67,887,743	$ 67,887,743	$ -	$ -	$ 4,100,420	$ -	$ 4,100,420
2094	$ -	$ 70,094,095	$ 70,094,095	$ -	$ -	$ 4,233,683	$ -	$ 4,233,683
2095	$ -	$ 72,372,153	$ 72,372,153	$ -	$ -	$ 4,371,278	$ -	$ 4,371,278
2096	$ -	$ 74,724,248	$ 74,724,248	$ -	$ -	$ 4,513,345	$ -	$ 4,513,345
2097	$ -	$ 77,152,786	$ 77,152,786	$ -	$ -	$ 4,660,028	$ -	$ 4,660,028
2098	$ -	$ 79,660,251	$ 79,660,251	$ -	$ -	$ 4,811,479	$ -	$ 4,811,479
2099	$ -	$ 82,249,209	$ 82,249,209	$ -	$ -	$ 4,967,852	$ -	$ 4,967,852
2100	$ -	$ 84,922,309	$ 84,922,309	$ -	$ -	$ 5,129,307	$ -	$ 5,129,307
2101	$ -	$ 87,682,284	$ 87,682,284	$ -	$ -	$ 5,296,010	$ -	$ 5,296,010
2102	$ -	$ 90,531,958	$ 90,531,958	$ -	$ -	$ 5,468,130	$ -	$ 5,468,130
2103	$ -	$ 93,474,247	$ 93,474,247	$ -	$ -	$ 5,645,844	$ -	$ 5,645,844
2104	$ -	$ 96,512,160	$ 96,512,160	$ -	$ -	$ 5,829,334	$ -	$ 5,829,334
2105	$ -	$ 99,648,805	$ 99,648,805	$ -	$ -	$ 6,018,788	$ -	$ 6,018,788
2106	$ -	$ 102,887,391	$ 102,887,391	$ -	$ -	$ 6,214,398	$ -	$ 6,214,398
2107	$ -	$ 106,231,231	$ 106,231,231	$ -	$ -	$ 6,416,366	$ -	$ 6,416,366
2108	$ -	$ 109,683,746	$ 109,683,746	$ -	$ -	$ 6,624,898	$ -	$ 6,624,898
2109	$ -	$ 113,248,468	$ 113,248,468	$ -	$ -	$ 6,840,207	$ -	$ 6,840,207
2110	$ -	$ 116,929,043	$ 116,929,043	$ -	$ -	$ 7,062,514	$ -	$ 7,062,514
2111	$ -	$ 120,729,237	$ 120,729,237	$ -	$ -	$ 7,292,046	$ -	$ 7,292,046
2112	$ -	$ 124,652,937	$ 124,652,937	$ -	$ -	$ 7,529,037	$ -	$ 7,529,037
2113	$ -	$ 128,704,158	$ 128,704,158	$ -	$ -	$ 7,773,731	$ -	$ 7,773,731
2114	$ -	$ 132,887,043	$ 132,887,043	$ -	$ -	$ 8,026,377	$ -	$ 8,026,377
2115	$ -	$ 137,205,872	$ 137,205,872	$ -	$ -	$ 8,287,235	$ -	$ 8,287,235
2116	$ -	$ 141,665,063	$ 141,665,063	$ -	$ -	$ 8,556,570	$ -	$ 8,556,570
2117	$ -	$ 146,269,177	$ 146,269,177	$ -	$ -	$ 8,834,658	$ -	$ 8,834,658
2118	$ -	$ 151,022,925	$ 151,022,925	$ -	$ -	$ 9,121,785	$ -	$ 9,121,785

** Contributions related to future employee payroll in excess of normal cost and expenses of 7.96% of pay.*

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

Fiscal Year Ending	Projected Beginning Plan 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	$ 21,553,477	$ 928,417	$ 1,593,419	$ 12,097	$ 1,591,579	$ 22,467,957
2020	$ 22,467,957	$ 912,096	$ 1,664,304	$ 11,410	$ 1,656,979	$ 23,361,318
2021	$ 23,361,318	$ 899,912	$ 1,735,338	$ 10,812	$ 1,720,939	$ 24,236,019
2022	$ 24,236,019	$ 892,356	$ 1,803,771	$ 10,313	$ 1,783,761	$ 25,098,052
2023	$ 25,098,052	$ 886,663	$ 1,874,930	$ 9,849	$ 1,845,601	$ 25,945,537
2024	$ 25,945,537	$ 882,571	$ 1,953,456	$ 9,412	$ 1,906,136	$ 26,771,376
2025	$ 26,771,376	$ 880,067	$ 2,031,521	$ 9,002	$ 1,965,123	$ 27,576,043
2026	$ 27,576,043	$ 879,072	$ 2,105,605	$ 8,617	$ 2,022,722	$ 28,363,615
2027	$ 28,363,615	$ 879,483	$ 2,176,981	$ 8,254	$ 2,079,190	$ 29,137,053
2028	$ 29,137,053	$ 881,112	$ 2,245,538	$ 7,907	$ 2,134,747	$ 29,899,467
2029	$ 29,899,467	$ 883,901	$ 2,310,006	$ 7,576	$ 2,189,669	$ 30,655,455
2030	$ 30,655,455	$ 887,803	$ 2,370,923	$ 7,259	$ 2,244,280	$ 31,409,356
2031	$ 31,409,356	$ 892,721	$ 2,428,548	$ 6,952	$ 2,298,893	$ 32,165,470
2032	$ 32,165,470	$ 861,573	$ 2,483,839	$ 6,654	$ 2,352,430	$ 32,888,980
2033	$ 32,888,980	$ 868,229	$ 2,537,334	$ 6,360	$ 2,404,979	$ 33,618,494
2034	$ 33,618,494	$ 875,719	$ 2,588,662	$ 6,072	$ 2,458,089	$ 34,357,568
2035	$ 34,357,568	$ 884,139	$ 2,637,466	$ 5,791	$ 2,512,043	$ 35,110,493
2036	$ 35,110,493	$ 893,448	$ 2,684,616	$ 5,516	$ 2,567,129	$ 35,880,938
2037	$ 35,880,938	$ 903,542	$ 2,729,254	$ 5,243	$ 2,623,650	$ 36,673,633
2038	$ 36,673,633	$ 914,486	$ 2,769,878	$ 4,974	$ 2,682,020	$ 37,495,287
2039	$ 37,495,287	$ 926,250	$ 2,805,563	$ 4,707	$ 2,742,773	$ 38,354,040
2040	$ 38,354,040	$ 938,765	$ 2,838,598	$ 4,440	$ 2,806,433	$ 39,256,200
2041	$ 39,256,200	$ 951,969	$ 2,868,970	$ 4,171	$ 2,873,473	$ 40,208,501
2042	$ 40,208,501	$ 965,884	$ 2,897,003	$ 3,900	$ 2,944,386	$ 41,217,868
2043	$ 41,217,868	$ 980,681	$ 2,921,661	$ 3,631	$ 3,019,735	$ 42,292,992
2044	$ 42,292,992	$ 996,484	$ 2,942,653	$ 3,365	$ 3,100,188	$ 43,443,646
2045	$ 43,443,646	$ 1,013,295	$ 2,960,732	$ 3,103	$ 3,186,450	$ 44,679,556
2046	$ 44,679,556	$ 1,031,074	$ 2,976,784	$ 2,842	$ 3,279,217	$ 46,010,221
2047	$ 46,010,221	$ 1,049,927	$ 2,990,208	$ 2,585	$ 3,379,226	$ 47,446,581
2048	$ 47,446,581	$ 1,069,963	$ 3,000,896	$ 2,332	$ 3,487,306	$ 49,000,622
2049	$ 49,000,622	$ 1,091,279	$ 3,009,187	$ 2,087	$ 3,604,348	$ 50,684,975
2050	$ 50,684,975	$ 1,113,999	$ 3,012,504	$ 1,851	$ 3,731,398	$ 52,516,017
2051	$ 52,516,017	$ 1,138,211	$ 3,012,371	$ 1,624	$ 3,869,631	$ 54,509,864
2052	$ 54,509,864	$ 1,164,005	$ 3,008,674	$ 1,410	$ 4,020,263	$ 56,684,048
2053	$ 56,684,048	$ 1,191,502	$ 3,000,635	$ 1,209	$ 4,184,643	$ 59,058,349
2054	$ 59,058,349	$ 1,220,822	$ 2,987,173	$ 1,024	$ 4,364,297	$ 61,655,271
2055	$ 61,655,271	$ 1,252,068	$ 2,968,099	$ 856	$ 4,560,925	$ 64,499,309
2056	$ 64,499,309	$ 1,285,247	$ 2,943,630	$ 705	$ 4,776,356	$ 67,616,577
2057	$ 67,616,577	$ 1,320,380	$ 2,913,549	$ 569	$ 5,012,558	$ 71,035,397
2058	$ 71,035,397	$ 1,357,573	$ 2,877,414	$ 451	$ 5,271,674	$ 74,786,779
2059	$ 74,786,779	$ 1,396,879	$ 2,834,048	$ 351	$ 5,556,075	$ 78,905,334
2060	$ 78,905,334	$ 1,438,282	$ 2,783,580	$ 267	$ 5,868,353	$ 83,428,122
2061	$ 83,428,122	$ 1,481,795	$ 2,725,571	$ 198	$ 6,211,303	$ 88,395,451
2062	$ 88,395,451	$ 1,527,399	$ 2,659,650	$ 144	$ 6,587,961	$ 93,851,017
2063	$ 93,851,017	$ 1,575,033	$ 2,587,072	$ 101	$ 7,001,557	$ 99,840,434
2064	$ 99,840,434	$ 1,624,691	$ 2,509,303	$ 67	$ 7,455,456	$ 106,411,211
2065	$ 106,411,211	$ 1,676,360	$ 2,427,309	$ 42	$ 7,953,187	$ 113,613,407
2066	$ 113,613,407	$ 1,730,046	$ 2,341,805	$ 25	$ 8,498,478	$ 121,500,101
2067	$ 121,500,101	$ 1,785,770	$ 2,253,460	$ 14	$ 9,095,285	$ 130,127,682
2068	$ 130,127,682	$ 1,843,513	$ 2,163,371	$ 7	$ 9,747,797	$ 139,555,614

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 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	$ 139,555,614	$ 1,903,257	$ 2,072,305	$ 3	$ 10,460,446	$ 149,847,009
2070	$ 149,847,009	$ 1,965,024	$ 1,980,620	$ 1	$ 11,237,951	$ 161,069,363
2071	$ 161,069,363	$ 2,028,850	$ 1,888,575	$ -	$ 12,085,367	$ 173,295,005
2072	$ 173,295,005	$ 2,094,777	$ 1,796,389	$ -	$ 13,008,112	$ 186,601,505
2073	$ 186,601,505	$ 2,162,854	$ 1,704,280	$ -	$ 14,011,998	$ 201,072,077
2074	$ 201,072,077	$ 2,233,146	$ 1,612,362	$ -	$ 15,103,264	$ 216,796,125
2075	$ 216,796,125	$ 2,305,723	$ 1,520,749	$ -	$ 16,288,613	$ 233,869,712
2076	$ 233,869,712	$ 2,380,659	$ 1,429,584	$ -	$ 17,575,248	$ 252,396,035
2077	$ 252,396,035	$ 2,458,031	$ 1,339,045	$ -	$ 18,970,905	$ 272,485,926
2078	$ 272,485,926	$ 2,537,917	$ 1,249,348	$ -	$ 20,483,892	$ 294,258,387
2079	$ 294,258,387	$ 2,620,399	$ 1,160,747	$ -	$ 22,123,126	$ 317,841,165
2080	$ 317,841,165	$ 2,705,562	$ 1,073,534	$ -	$ 23,898,181	$ 343,371,374
2081	$ 343,371,374	$ 2,793,493	$ 988,030	$ -	$ 25,819,333	$ 370,996,170
2082	$ 370,996,170	$ 2,884,282	$ 904,580	$ -	$ 27,897,609	$ 400,873,481
2083	$ 400,873,481	$ 2,978,021	$ 823,540	$ -	$ 30,144,843	$ 433,172,805
2084	$ 433,172,805	$ 3,074,806	$ 745,275	$ -	$ 32,573,738	$ 468,076,074
2085	$ 468,076,074	$ 3,174,738	$ 670,144	$ -	$ 35,197,929	$ 505,778,597
2086	$ 505,778,597	$ 3,277,917	$ 598,490	$ -	$ 38,032,056	$ 546,490,080
2087	$ 546,490,080	$ 3,384,449	$ 530,630	$ -	$ 41,091,839	$ 590,435,738
2088	$ 590,435,738	$ 3,494,443	$ 466,840	$ -	$ 44,394,162	$ 637,857,503
2089	$ 637,857,503	$ 3,608,013	$ 407,346	$ -	$ 47,957,167	$ 689,015,337
2090	$ 689,015,337	$ 3,725,273	$ 352,327	$ -	$ 51,800,349	$ 744,188,632
2091	$ 744,188,632	$ 3,846,345	$ 301,900	$ -	$ 55,944,661	$ 803,677,738
2092	$ 803,677,738	$ 3,971,351	$ 256,126	$ -	$ 60,412,632	$ 867,805,595
2093	$ 867,805,595	$ 4,100,420	$ 215,005	$ -	$ 65,228,488	$ 936,919,498
2094	$ 936,919,498	$ 4,233,683	$ 178,470	$ -	$ 70,418,283	$ 1,011,392,994
2095	$ 1,011,392,994	$ 4,371,278	$ 146,395	$ -	$ 76,010,043	$ 1,091,627,920
2096	$ 1,091,627,920	$ 4,513,345	$ 118,587	$ -	$ 82,033,918	$ 1,178,056,596
2097	$ 1,178,056,596	$ 4,660,028	$ 94,800	$ -	$ 88,522,345	$ 1,271,144,169
2098	$ 1,271,144,169	$ 4,811,479	$ 74,738	$ -	$ 95,510,229	$ 1,371,391,139
2099	$ 1,371,391,139	$ 4,967,852	$ 58,068	$ -	$ 103,035,123	$ 1,479,336,046
2100	$ 1,479,336,046	$ 5,129,307	$ 44,434	$ -	$ 111,137,439	$ 1,595,558,358
2101	$ 1,595,558,358	$ 5,296,010	$ 33,464	$ -	$ 119,860,654	$ 1,720,681,558
2102	$ 1,720,681,558	$ 5,468,130	$ 24,788	$ -	$ 129,251,552	$ 1,855,376,452
2103	$ 1,855,376,452	$ 5,645,844	$ 18,050	$ -	$ 139,360,460	$ 2,000,364,706
2104	$ 2,000,364,706	$ 5,829,334	$ 12,914	$ -	$ 150,241,525	$ 2,156,422,651
2105	$ 2,156,422,651	$ 6,018,788	$ 9,075	$ -	$ 161,952,989	$ 2,324,385,353
2106	$ 2,324,385,353	$ 6,214,398	$ 6,261	$ -	$ 174,557,498	$ 2,505,150,988
2107	$ 2,505,150,988	$ 6,416,366	$ 4,243	$ -	$ 188,122,431	$ 2,699,685,542
2108	$ 2,699,685,542	$ 6,624,898	$ 2,825	$ -	$ 202,720,254	$ 2,909,027,869
2109	$ 2,909,027,869	$ 6,840,207	$ 1,850	$ -	$ 218,428,892	$ 3,134,295,118
2110	$ 3,134,295,118	$ 7,062,514	$ 1,194	$ -	$ 235,332,146	$ 3,376,688,584
2111	$ 3,376,688,584	$ 7,292,046	$ 761	$ -	$ 253,520,124	$ 3,637,499,993
2112	$ 3,637,499,993	$ 7,529,037	$ 482	$ -	$ 273,089,716	$ 3,918,118,264
2113	$ 3,918,118,264	$ 7,773,731	$ 304	$ -	$ 294,145,103	$ 4,220,036,794
2114	$ 4,220,036,794	$ 8,026,377	$ 193	$ -	$ 316,798,300	$ 4,544,861,278
2115	$ 4,544,861,278	$ 8,287,235	$ 123	$ -	$ 341,169,744	$ 4,894,318,134
2116	$ 4,894,318,134	$ 8,556,570	$ 81	$ -	$ 367,388,927	$ 5,270,263,550
2117	$ 5,270,263,550	$ 8,834,658	$ 54	$ -	$ 395,595,074	$ 5,674,693,228
2118	$ 5,674,693,228	$ 9,121,785	$ 43	$ -	$ 425,937,873	$ 6,109,752,843

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 Benefit Payments
(Dollars in Thousands)

Fiscal Year Ending	Projected Beginning Plan 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)
2019	$ 21,553,477	$ 1,593,419	$ 1,593,419	$ -	$ 1,536,830	$ -	$ 1,536,830
2020	$ 22,467,957	$ 1,664,304	$ 1,664,304	$ -	$ 1,493,207	$ -	$ 1,493,207
2021	$ 23,361,317	$ 1,735,338	$ 1,735,338	$ -	$ 1,448,315	$ -	$ 1,448,315
2022	$ 24,236,017	$ 1,803,771	$ 1,803,771	$ -	$ 1,400,399	$ -	$ 1,400,399
2023	$ 25,098,051	$ 1,874,930	$ 1,874,930	$ -	$ 1,354,088	$ -	$ 1,354,088
2024	$ 25,945,535	$ 1,953,456	$ 1,953,456	$ -	$ 1,312,373	$ -	$ 1,312,373
2025	$ 26,771,374	$ 2,031,521	$ 2,031,521	$ -	$ 1,269,598	$ -	$ 1,269,598
2026	$ 27,576,040	$ 2,105,605	$ 2,105,605	$ -	$ 1,224,090	$ -	$ 1,224,090
2027	$ 28,363,612	$ 2,176,981	$ 2,176,981	$ -	$ 1,177,288	$ -	$ 1,177,288
2028	$ 29,137,050	$ 2,245,538	$ 2,245,538	$ -	$ 1,129,640	$ -	$ 1,129,640
2029	$ 29,899,463	$ 2,310,006	$ 2,310,006	$ -	$ 1,080,996	$ -	$ 1,080,996
2030	$ 30,655,451	$ 2,370,923	$ 2,370,923	$ -	$ 1,032,096	$ -	$ 1,032,096
2031	$ 31,409,352	$ 2,428,548	$ 2,428,548	$ -	$ 983,424	$ -	$ 983,424
2032	$ 32,165,467	$ 2,483,839	$ 2,483,839	$ -	$ 935,641	$ -	$ 935,641
2033	$ 32,888,977	$ 2,537,334	$ 2,537,334	$ -	$ 889,109	$ -	$ 889,109
2034	$ 33,618,490	$ 2,588,662	$ 2,588,662	$ -	$ 843,809	$ -	$ 843,809
2035	$ 34,357,564	$ 2,637,466	$ 2,637,466	$ -	$ 799,737	$ -	$ 799,737
2036	$ 35,110,488	$ 2,684,616	$ 2,684,616	$ -	$ 757,241	$ -	$ 757,241
2037	$ 35,880,934	$ 2,729,254	$ 2,729,254	$ -	$ 716,123	$ -	$ 716,123
2038	$ 36,673,630	$ 2,769,878	$ 2,769,878	$ -	$ 676,076	$ -	$ 676,076
2039	$ 37,495,284	$ 2,805,563	$ 2,805,563	$ -	$ 637,010	$ -	$ 637,010
2040	$ 38,354,037	$ 2,838,598	$ 2,838,598	$ -	$ 599,545	$ -	$ 599,545
2041	$ 39,256,196	$ 2,868,970	$ 2,868,970	$ -	$ 563,684	$ -	$ 563,684
2042	$ 40,208,497	$ 2,897,003	$ 2,897,003	$ -	$ 529,481	$ -	$ 529,481
2043	$ 41,217,864	$ 2,921,661	$ 2,921,661	$ -	$ 496,732	$ -	$ 496,732
2044	$ 42,292,988	$ 2,942,653	$ 2,942,653	$ -	$ 465,397	$ -	$ 465,397
2045	$ 43,443,642	$ 2,960,732	$ 2,960,732	$ -	$ 435,587	$ -	$ 435,587
2046	$ 44,679,552	$ 2,976,784	$ 2,976,784	$ -	$ 407,394	$ -	$ 407,394
2047	$ 46,010,217	$ 2,990,208	$ 2,990,208	$ -	$ 380,680	$ -	$ 380,680
2048	$ 47,446,576	$ 3,000,896	$ 3,000,896	$ -	$ 355,387	$ -	$ 355,387
2049	$ 49,000,617	$ 3,009,187	$ 3,009,187	$ -	$ 331,506	$ -	$ 331,506
2050	$ 50,684,971	$ 3,012,504	$ 3,012,504	$ -	$ 308,717	$ -	$ 308,717
2051	$ 52,516,012	$ 3,012,371	$ 3,012,371	$ -	$ 287,166	$ -	$ 287,166
2052	$ 54,509,858	$ 3,008,674	$ 3,008,674	$ -	$ 266,804	$ -	$ 266,804
2053	$ 56,684,041	$ 3,000,635	$ 3,000,635	$ -	$ 247,526	$ -	$ 247,526
2054	$ 59,058,341	$ 2,987,173	$ 2,987,173	$ -	$ 229,224	$ -	$ 229,224
2055	$ 61,655,262	$ 2,968,099	$ 2,968,099	$ -	$ 211,870	$ -	$ 211,870
2056	$ 64,499,300	$ 2,943,630	$ 2,943,630	$ -	$ 195,464	$ -	$ 195,464
2057	$ 67,616,569	$ 2,913,549	$ 2,913,549	$ -	$ 179,968	$ -	$ 179,968
2058	$ 71,035,389	$ 2,877,414	$ 2,877,414	$ -	$ 165,336	$ -	$ 165,336
2059	$ 74,786,771	$ 2,834,048	$ 2,834,048	$ -	$ 151,483	$ -	$ 151,483
2060	$ 78,905,326	$ 2,783,580	$ 2,783,580	$ -	$ 138,405	$ -	$ 138,405
2061	$ 83,428,114	$ 2,725,571	$ 2,725,571	$ -	$ 126,066	$ -	$ 126,066
2062	$ 88,395,442	$ 2,659,650	$ 2,659,650	$ -	$ 114,434	$ -	$ 114,434
2063	$ 93,851,009	$ 2,587,072	$ 2,587,072	$ -	$ 103,546	$ -	$ 103,546
2064	$ 99,840,426	$ 2,509,303	$ 2,509,303	$ -	$ 93,426	$ -	$ 93,426
2065	$ 106,411,202	$ 2,427,309	$ 2,427,309	$ -	$ 84,068	$ -	$ 84,068
2066	$ 113,613,398	$ 2,341,805	$ 2,341,805	$ -	$ 75,448	$ -	$ 75,448
2067	$ 121,500,092	$ 2,253,460	$ 2,253,460	$ -	$ 67,537	$ -	$ 67,537
2068	$ 130,127,673	$ 2,163,371	$ 2,163,371	$ -	$ 60,313	$ -	$ 60,313

Single Discount Rate Development
Present Values of Projected Benefit Payments
(Dollars in Thousands) (Concluded)

Fiscal Year Ending	Projected Beginning Plan 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)
2069	$ 139,555,605	$ 2,072,305	$ 2,072,305	$ -	$ 53,744	$ -	$ 53,744
2070	$ 149,846,999	$ 1,980,620	$ 1,980,620	$ -	$ 47,782	$ -	$ 47,782
2071	$ 161,069,353	$ 1,888,575	$ 1,888,575	$ -	$ 42,383	$ -	$ 42,383
2072	$ 173,294,994	$ 1,796,389	$ 1,796,389	$ -	$ 37,501	$ -	$ 37,501
2073	$ 186,601,494	$ 1,704,280	$ 1,704,280	$ -	$ 33,096	$ -	$ 33,096
2074	$ 201,072,067	$ 1,612,362	$ 1,612,362	$ -	$ 29,127	$ -	$ 29,127
2075	$ 216,796,115	$ 1,520,749	$ 1,520,749	$ -	$ 25,555	$ -	$ 25,555
2076	$ 233,869,703	$ 1,429,584	$ 1,429,584	$ -	$ 22,347	$ -	$ 22,347
2077	$ 252,396,027	$ 1,339,045	$ 1,339,045	$ -	$ 19,472	$ -	$ 19,472
2078	$ 272,485,919	$ 1,249,348	$ 1,249,348	$ -	$ 16,900	$ -	$ 16,900
2079	$ 294,258,379	$ 1,160,747	$ 1,160,747	$ -	$ 14,606	$ -	$ 14,606
2080	$ 317,841,157	$ 1,073,534	$ 1,073,534	$ -	$ 12,566	$ -	$ 12,566
2081	$ 343,371,367	$ 988,030	$ 988,030	$ -	$ 10,758	$ -	$ 10,758
2082	$ 370,996,163	$ 904,580	$ 904,580	$ -	$ 9,162	$ -	$ 9,162
2083	$ 400,873,474	$ 823,540	$ 823,540	$ -	$ 7,760	$ -	$ 7,760
2084	$ 433,172,798	$ 745,275	$ 745,275	$ -	$ 6,532	$ -	$ 6,532
2085	$ 468,076,068	$ 670,144	$ 670,144	$ -	$ 5,464	$ -	$ 5,464
2086	$ 505,778,591	$ 598,490	$ 598,490	$ -	$ 4,539	$ -	$ 4,539
2087	$ 546,490,074	$ 530,630	$ 530,630	$ -	$ 3,744	$ -	$ 3,744
2088	$ 590,435,732	$ 466,840	$ 466,840	$ -	$ 3,064	$ -	$ 3,064
2089	$ 637,857,498	$ 407,346	$ 407,346	$ -	$ 2,487	$ -	$ 2,487
2090	$ 689,015,332	$ 352,327	$ 352,327	$ -	$ 2,001	$ -	$ 2,001
2091	$ 744,188,627	$ 301,900	$ 301,900	$ -	$ 1,595	$ -	$ 1,595
2092	$ 803,677,732	$ 256,126	$ 256,126	$ -	$ 1,259	$ -	$ 1,259
2093	$ 867,805,589	$ 215,005	$ 215,005	$ -	$ 983	$ -	$ 983
2094	$ 936,919,492	$ 178,470	$ 178,470	$ -	$ 759	$ -	$ 759
2095	$ 1,011,392,988	$ 146,395	$ 146,395	$ -	$ 579	$ -	$ 579
2096	$ 1,091,627,914	$ 118,587	$ 118,587	$ -	$ 436	$ -	$ 436
2097	$ 1,178,056,589	$ 94,800	$ 94,800	$ -	$ 325	$ -	$ 325
2098	$ 1,271,144,163	$ 74,738	$ 74,738	$ -	$ 238	$ -	$ 238
2099	$ 1,371,391,133	$ 58,068	$ 58,068	$ -	$ 172	$ -	$ 172
2100	$ 1,479,336,040	$ 44,434	$ 44,434	$ -	$ 122	$ -	$ 122
2101	$ 1,595,558,352	$ 33,464	$ 33,464	$ -	$ 86	$ -	$ 86
2102	$ 1,720,681,552	$ 24,788	$ 24,788	$ -	$ 59	$ -	$ 59
2103	$ 1,855,376,446	$ 18,050	$ 18,050	$ -	$ 40	$ -	$ 40
2104	$ 2,000,364,701	$ 12,914	$ 12,914	$ -	$ 27	$ -	$ 27
2105	$ 2,156,422,646	$ 9,075	$ 9,075	$ -	$ 17	$ -	$ 17
2106	$ 2,324,385,348	$ 6,261	$ 6,261	$ -	$ 11	$ -	$ 11
2107	$ 2,505,150,982	$ 4,243	$ 4,243	$ -	$ 7	$ -	$ 7
2108	$ 2,699,685,537	$ 2,825	$ 2,825	$ -	$ 4	$ -	$ 4
2109	$ 2,909,027,864	$ 1,850	$ 1,850	$ -	$ 3	$ -	$ 3
2110	$ 3,134,295,113	$ 1,194	$ 1,194	$ -	$ 2	$ -	$ 2
2111	$ 3,376,688,579	$ 761	$ 761	$ -	$ 1	$ -	$ 1
2112	$ 3,637,499,987	$ 482	$ 482	$ -	$ 1	$ -	$ 1
2113	$ 3,918,118,259	$ 304	$ 304	$ -	$ -	$ -	$ -
2114	$ 4,220,036,790	$ 193	$ 193	$ -	$ -	$ -	$ -
2115	$ 4,544,861,274	$ 123	$ 123	$ -	$ -	$ -	$ -
2116	$ 4,894,318,130	$ 81	$ 81	$ -	$ -	$ -	$ -
2117	$ 5,270,263,546	$ 54	$ 54	$ -	$ -	$ -	$ -
2118	$ 5,674,693,224	$ 43	$ 43	$ -	$ -	$ -	$ -
				Totals	$ 30,786,600	$ -	$ 30,786,600

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 payments at predetermined rates of interest and 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.
Actuarial Valuation Date	The date as of which an actuarial valuation is performed.
Actuarially Determined Contribution (ADC) or Annual Required Contribution (ARC)	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	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	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.

Glossary of Terms

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.
GASB	The Governmental Accounting Standards Board is an organization that exists in order to promulgate accounting standards for governmental entities.
Fiduciary Net Position	The fiduciary net position is the value of the assets of the trust.
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 contribution entities to plan members for benefits provided through a defined benefit pension plan.
Non-Employer Contribution Entities	Non-employer contribution 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 Statement plan members are not considered non-employer contribution entities.
Normal Cost	The actuarial present value of the pension trust benefits allocated to the current year by the actuarial cost method.

Glossary of Terms

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.

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 Benefit Changes
4. Employee Contributions (made negative for addition here)
5. Projected Earnings on Plan Investments (made negative for addition here)
6. Pension Plan Administrative Expense
7. Other Changes in Plan Fiduciary Net Position
8. Recognition of Outflow (Inflow) of Resources due to Liabilities
9. Recognition of Outflow (Inflow) of Resources due to Assets

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 assets used in determining the unfunded liability of the plan. For purposes of the GASB Statement No. 67, the valuation asset is equal to the market value of assets.

Public Employees Retirement Association of Minnesota

Local Government Correctional Service Retirement Plan

GASB Statements No. 67 and No. 68 Accounting and Financial Reporting for Pensions

June 30, 2018

GRS Retirement Consulting

P: 800.521.0498 | F: 763.432.5842 | www.grsconsulting.com

November 28, 2018

Public Employees Retirement Association of Minnesota
Local Government Correctional Service Retirement Plan
St. Paul, Minnesota

Dear Trustees of the Local Government Correctional Service Retirement Plan:

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 Local Government Correctional Service Retirement Plan ("LGCSRP"), 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 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 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. PERA is responsible for preparing the Schedule of Employer Allocations and the Schedule of Pension Amounts by Employer. This report may be provided to parties other than the Public Employees Retirement Association (PERA) only in its entirety and only with the permission of PERA. GRS is not responsible for unauthorized use of this report.

This report is based upon information, furnished to us by PERA, 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 Plan 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 Local Government Correctional Service Retirement Plan 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, FSA, EA, MAAA

Table of Contents

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
Employer's Fiscal Year Ending Date (Reporting Date)		Varies by Employer
Membership		
Number of		
- Service Retirements		942
- Survivors		61
- Disability Retirements		190
- Deferred Retirements		3,165
- Terminated other non-vested		2,811
- Active Members		3,981
- Total		11,150
Covered Payroll	$	205,077
Net Pension Liability		
Total Pension Liability	$	696,842
Plan Fiduciary Net Position		680,395
Net Pension Liability	$	16,447
Plan Fiduciary Net Position as a Percentage of Total Pension Liability		97.64%
Net Pension Liability as a Percentage of Covered Payroll		8.02%
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%
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)	**$**	**(27,116)**

Deferred Outflows and 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	$ 857	$ 1,758
Changes in assumptions	$ 77,583	$ 190,166
Net difference between projected and actual earnings on pension plan investments	$ 18,910	$ 37,573
Total	$ 97,350	$ 229,497

* Source: *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. 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 LGCSRP 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 liability 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.

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.

Timing of the Valuation

An actuarial valuation to determine the total pension liability is required to 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.

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 normal cost of the plan is expected to remain approximately level as a percent of pay,
(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.

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 Fidelity's "20-Year Municipal GO AA Index"); 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	$	45,378
2.	Interest on the Total Pension Liability	$	53,811
3.	Current-Period Benefit Changes	$	(66,822)
4.	Employee Contributions (made negative for addition here)	$	(11,956)
5.	Projected Earnings on Plan Investments (made negative for addition here)	$	(45,746)
6.	Pension Plan Administrative Expense	$	308
7.	Other Changes in Plan Fiduciary Net Position	$	(1)
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	$	255
9.	Recognition of Outflow (Inflow) of Resources due to assumption changes		
	Arising from Current Reporting Period	$	(52,364)
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	$	(3,443)
11.	**Increase/(Decrease) from Experience in the Current Reporting Period**	**$**	**(80,580)**
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	$	(2,755)
13.	Recognition of Outflow (Inflow) of Resources due to assumption changes		
	Arising from Prior Reporting Periods	$	61,046
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	$	(4,827)
15.	**Total Pension Expense / (Income)**	**$**	**(27,116)**

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	$	1,018
2. Assumption Changes (gains) or losses	$	(209,457)
3. Recognition period for Liabilities: Average of the expected remaining service lives of all employees {in years}		4.0000
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	$	255
5. Outflow (Inflow) of Resources to be recognized in the current pension expense for Assumption Changes	$	(52,364)
6. Outflow (Inflow) of Resources to be recognized in the current pension expense due to Liabilities	$	(52,109)
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	$	763
8. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses for Assumption Changes	$	(157,093)
9. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses due to Liabilities	$	(156,330)
B. Outflows (Inflows) of Resources due to Assets		
1. Net difference between projected and actual earnings on pension plan investments (gains) or losses	$	(17,216)
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	$	(3,443)
4. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses due to Assets	$	(13,773)

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 of Resources
1. Due to Liabilities	$ 77,934	$ 71,752	$ 6,182
2. Due to Assets	$ 11,067	$ 19,337	$ (8,270)
3. Total	$ 89,001	$ 91,089	$ (2,088)

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

	Outflows of Resources	Inflows of Resources	Net Outflows of Resources
1. Differences between expected and actual experience	$ 351	$ 2,851	$ (2,500)
2. Assumption Changes	$ 77,583	$ 68,901	$ 8,682
3. Net Difference between projected and actual earnings on pension plan investments	$ 11,067	$ 19,337	$ (8,270)
4. Total	$ 89,001	$ 91,089	$ (2,088)

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 of Resources
1. Differences between expected and actual experience	$ 857	$ 1,758	$ (901)
2. Assumption Changes	$ 77,583	$ 190,166	$ (112,583)
3. Net Difference between projected and actual earnings on pension plan investments	$ 18,910	$ 37,573	$ (18,663)
4. Total	$ 97,350	$ 229,497	$ (132,147)

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

Year Ending June 30	Net Deferred Outflows of Resources
2019	$ 7,841
2020	$ (73,058)
2021	$ (63,486)
2022	$ (3,444)
2023	$ -
Thereafter	$ -
Total	$ (132,147)

Statement of Fiduciary Net Position
(Dollars in Thousands)

	Market Value	
Assets in Trust	**June 30, 2018**	**June 30, 2017**
Cash, equivalents, short term securities	$ 8,046	$ 15,461
Fixed income	$ 165,171	$ 116,764
Equity	$ 412,840	$ 390,993
SBI Alternative	$ 93,990	$ 79,019
Other	$ -	$ -
Total Assets in Trust	**$ 680,047**	**$ 602,237**
Assets Receivable	$ 846	$ 718
Amounts Payable	$ (498)	$ (495)
Net Position Restricted for Pensions	**$ 680,395**	**$ 602,460**

Statement of Changes in Fiduciary Net Position
(Dollars in Thousands)

Change in Assets		**Market Value**		
Year Ending		**June 30, 2018**		**June 30, 2017**
1.	Fund balance at market value at beginning of year	$ 602,460		$ 507,783
2.	Adjustment to match beginning of year asset statement	$ -		$ -
3.	Fund balance at market value at beginning of year	$ 602,460		$ 507,783
4.	Contributions			
	a. Member	$ 11,956		$ 11,666
	b. Employer	$ 17,871		$ 17,489
	c. Other sources	$ -		$ -
	d. Total contributions	$ 29,827		$ 29,155
5.	Investment income			
	a. Investment income/(loss)	$ 63,662		$ 78,973
	b. Investment expenses	$ (700)		$ (610)
	c. Net subtotal	$ 62,962		$ 78,363
6.	Other	$ 1		$ -
7.	**Total additions:** *(4.d.) + (5.c.) + (6.)*	**$ 92,790**		**$ 107,518**
8.	Benefits Paid			
	a. Annuity benefits	$ (13,183)		$ (11,033)
	b. Refunds	$ (1,364)		$ (1,478)
	c. Total benefits paid	$ (14,547)		$ (12,511)
9.	Expenses			
	a. Other	$ -		$ -
	b. Administrative	$ (308)		$ (330)
	c. Total expenses	$ (308)		$ (330)
10.	**Total deductions:** *(8.c.) + (9.c.)*	**$ (14,855)**		**$ (12,841)**
11.	Net increase (decrease) in net position: *(7.) + (10.)*	$ 77,935		$ 94,677
12.	**Net position restricted for pensions**	**$ 680,395**		**$ 602,460**
13.	Approximate return on market value of assets	10.3%		15.1%

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	$	45,378
2. Interest on the Total Pension Liability	$	53,811
3. Changes of benefit terms	$	(66,822)
4. Difference between expected and actual experience of the Total Pension Liability	$	1,018
5. Changes of assumptions	$	(209,457)
6. Benefit payments, including refunds of employee contributions	$	(14,547)
7. Net change in total pension liability	$	(190,619)
8. Total pension liability – beginning	$	887,461
9. Total pension liability – ending	**$**	**696,842**
B. Plan fiduciary net position		
1. Contributions – employer	$	17,871
2. Contributions – employee	$	11,956
3. Net investment income	$	62,962
4. Benefit payments, including refunds of employee contributions	$	(14,547)
5. Pension Plan Administrative Expense	$	(308)
6. Other	$	1
7. Net change in plan fiduciary net position	$	77,935
8. Plan fiduciary net position – beginning	$	602,460
9. Plan fiduciary net position – ending	**$**	**680,395**
C. Net pension liability	**$**	**16,447**
D. Plan fiduciary net position as a percentage of the total pension liability		**97.64%**
E. Covered-employee payroll*	**$**	**205,077**
F. Net pension liability as a percentage of covered employee payroll		**8.02%**

** 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 may be built prospectively)

Fiscal year ending June 30,	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009
Total Pension Liability										
Service Cost	$ 45,378	$ 49,202	$ 25,950	$ 25,098	$ 26,488					
Interest on the Total Pension Liability	$ 53,811	$ 47,336	$ 40,605	$ 37,043	$ 33,955					
Benefit Changes	$ (66,822)	$ -	$ -	$ -	$ -					
Experience	$ 1,018	$ (3,516)	$ 382	$ (7,892)	$ (5,327)					
Assumption Changes	$ (209,457)	$ (66,147)	$ 310,332	$ -	$ (34,168)					
Benefit Payments	$ (13,183)	$ (11,033)	$ (9,381)	$ (7,777)	$ (6,711)					
Refunds	$ (1,364)	$ (1,478)	$ (982)	$ (1,057)	$ (1,105)					
Net Change in Total Pension Liability	$ (190,619)	$ 14,364	$ 366,906	$ 45,415	$ 13,132					
Total Pension Liability - Beginning	$ 887,461	$ 873,097	$ 506,191	$ 460,776	$ 447,644					
Total Pension Liability - Ending (a)	$ 696,842	$ 887,461	$ 873,097	$ 506,191	$ 460,776					
Plan Fiduciary Net Position										
Employer Contributions	$ 17,871	$ 17,489	$ 16,490	$ 15,736	$ 15,054					
Employee Contributions	$ 11,956	$ 11,666	$ 11,008	$ 10,472	$ 10,030					
Pension Plan Net Investment Income	$ 62,962	$ 78,363	$ 209	$ 20,373	$ 69,451					
Benefit Payments	$ (13,183)	$ (11,033)	$ (9,381)	$ (7,777)	$ (6,711)					
Refunds	$ (1,364)	$ (1,478)	$ (982)	$ (1,057)	$ (1,105)					
Pension Plan Administrative Expense	$ (308)	$ (330)	$ (290)	$ (247)	$ (236)					
Other	$ 1	$ -	$ (2)	$ (1)	$ (1)					
Net Change in Plan Fiduciary Net Position	$ 77,935	$ 94,677	$ 17,052	$ 37,499	$ 86,482					
Plan Fiduciary Net Position - Beginning	$ 602,460	$ 507,783	$ 490,731	$ 453,232	$ 366,750					
Plan Fiduciary Net Position - Ending (b)	$ 680,395	$ 602,460	$ 507,783	$ 490,731	$ 453,232					
Net Pension Liability - Ending (a) - (b)	$ 16,447	$ 285,001	$ 365,314	$ 15,460	$ 7,544					
Plan Fiduciary Net Position as a Percentage of Total Pension Liability	97.64 %	67.89 %	58.16 %	96.95 %	98.36 %					
Covered Employee Payroll	$ 205,077	$ 200,103	$ 188,816	$ 179,623	$ 172,041					
Net Pension Liability as a Percentage of Covered Employee Payroll	8.02 %	142.43 %	193.48 %	8.61 %	4.39 %					

Notes to Schedule:

N/A

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

Last 10 Fiscal Years (which may be built prospectively)

FY Ending June 30,	Total Pension Liability	Plan Net Position	Net Pension Liability	Plan Net Position as a % of Total Pension Liability	Covered Payroll	Net Pension Liability as a % of Covered Payroll
2009						
2010						
2011						
2012						
2013						
2014	$ 460,776	$ 453,232	$ 7,544	98.36%	$ 172,041	4.39%
2015	$ 506,191	$ 490,731	$ 15,460	96.95%	$ 179,623	8.61%
2016	$ 873,097	$ 507,783	$ 365,314	58.16%	$ 188,816	193.48%
2017	$ 887,461	$ 602,460	$ 285,001	67.89%	$ 200,103	142.43%
2018	$ 696,842	$ 680,395	$ 16,447	97.64%	$ 205,077	8.02%

Schedule of Contributions Multiyear (Dollars in Thousands)

Last 10 Fiscal Years

FY Ending June 30,	Actuarially Determined Contribution	Actual Contribution	Contribution Deficiency (Excess)	Covered Payroll	Actual Contribution as a % of Covered Payroll
2009	$ 11,469	$ 14,124	$ (2,655)	$ 154,650	9.13%
2010	$ 12,273	$ 14,170	$ (1,897)	$ 154,777	9.16
2011	$ 12,183	$ 14,289	$ (2,106)	$ 165,077	8.66
2012	$ 12,473	$ 14,320	$ (1,847)	$ 164,340	8.71
2013	$ 14,207	$ 14,498	$ (291)	$ 164,820	8.80
2014	$ 14,606	$ 15,054	$ (448)	$ 172,041	8.75
2015	$ 13,759	$ 15,736	$ (1,977)	$ 179,623	8.76
2016	$ 16,446	$ 16,490	$ (44)	$ 188,816	8.73
2017	$ 17,269	$ 17,489	$ (220)	$ 200,103	8.74
2018	$ 19,031	$ 17,871	$ 1,160	$ 205,077	8.71

Notes to Schedule of Contributions

Methods and Assumptions Used to Determine Contribution Rates for Fiscal Year Ending June 30, 2018:

Valuation Date:	June 30
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.
Actuarial Cost Method	Entry Age Normal
Amortization Method	Level Percentage of Payroll, Closed
Remaining Amortization Period	21 years
Asset Valuation Method	5-Year smoothed market; no corridor
Inflation	2.75%
Payroll Growth	3.50%
Salary Increases	3.75% to 8.75% 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.
Mortality	RP-2014 annuitant generational mortality table projected with mortality improvement scale MP-2016, from a base year of 2006. Male rates adjusted by a factor of 0.96.

Other Information:

Notes	The plan is assumed to pay a 2.50% post-retirement benefit increase for all years. See separate funding report as of July 1, 2017 for additional detail.

Schedule of Investment Returns Multiyear

Last 10 Fiscal Years

FY Ending June 30,	Annual Return[1]
2009	
2010	
2011	
2012	
2013	
2014	
2015	
2016	
2017	
2018	

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

It is our understanding that this exhibit will be prepared by PERA with assistance from the State Board of Investment. Please provide a copy of the final exhibit for our files.

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, 2018, these best estimates are summarized in the following table:

Asset Class	Target Allocation	Final Target Allocation	Long-Term Expected Real Rate of Return (geometric)
Domestic Equity	33%	36%	5.10%
International Equity	16%	17%	5.30%
Private Markets	25%	25%	5.90%
Fixed Income	24%	20%	0.75%
Unallocated Cash	2%	2%	0.00%
Total	100%	100%	

The Minnesota State Board of Investment (SBI) compiled this data and the related investment notes and provided it to PERA for GASB compliance purposes. PERA 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 assumption dated September 11, 2017.

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 plan 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 was 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 plan's net pension liability, calculated using a single discount rate of 7.50%, as well as what the plan's net pension liability would be if it were calculated using a single discount rate that is 1-percentage-point lower or 1-percentage-point higher:

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	$ 821,153	$ 696,842	$ 597,397
Net Position Restricted for Pensions	$ 680,395	$ 680,395	$ 680,395
Net Pension Liability	**$ 140,758**	**$ 16,447**	**$ (82,998)**

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)
Current Reporting Period

	Total Pension Liability (a)	Plan Fiduciary Net Position (b)	Net Pension Liability (a) - (b)	Current Period Deferred Outflows	Current Period Deferred Inflows	Current Period Pension Expense*
Balance Beginning of Year	**$ 887,461**	**$ 602,460**	**$ 285,001**			
Changes for the Year:						
Service Cost	$ 45,378		$ 45,378			$ 45,378
Interest on Total Pension Liability	53,811		53,811			53,811
Interest on Fiduciary Net Position		$ 45,746	(45,746)			(45,746)
Changes in Benefit Terms	(66,822)		(66,822)			(66,822)
Liability Experience Gains and Losses	1,018		1,018	$ 763	$ -	255
Changes in Assumptions	(209,457)		(209,457)	-	157,093	(52,364)
Contributions - Employer		17,871	(17,871)			
Contributions - Employees		11,956	(11,956)			(11,956)
Asset Gain/(Loss)		17,216	(17,216)	-	13,773	(3,443)
Benefit Payouts	(14,547)	(14,547)				
Administrative Expenses		(308)	308			308
Other		1	(1)			(1)
Net Changes	**$ (190,619)**	**$ 77,935**	**$ (268,554)**	**$ 763**	**$ 170,866**	**$ (80,580)**
Balance End of Year	**$ 696,842**	**$ 680,395**	**$ 16,447**			

** Pension Expense from Experience in the Current Reporting Period.*

GASB Statement No. 68 Reconciliation (Dollars in Thousands)
Current and Prior Reporting Periods

	Total Pension Liability (a)	Plan Fiduciary Net Position (b)	Net Pension Liability (a) - (b)	Deferred Outflows	Deferred Inflows	Net Deferred Outflows Prior Year	Total Pension Expense*
Balance Beginning of Year	**$ 887,461**	**$ 602,460**	**$ 285,001**				
Changes for the Year:							
Service Cost	$ 45,378		$ 45,378				$ 45,378
Interest on Total Pension Liability	53,811		53,811				53,811
Interest on Fiduciary Net Position		$ 45,746	(45,746)				(45,746)
Changes in Benefit Terms	(66,822)		(66,822)				(66,822)
Liability Experience Gains and Losses	1,018		1,018	$ 857	$ 1,758	$ (4,419)	(2,500)
Changes in Assumptions	(209,457)		(209,457)	77,583	190,166	105,556	8,682
Contributions - Employer		17,871	(17,871)				
Contributions - Employees		11,956	(11,956)				(11,956)
Asset Gain/(Loss)		17,216	(17,216)	18,910	37,573	(9,717)	(8,270)
Benefit Payouts	(14,547)	(14,547)					
Administrative Expenses		(308)	308				308
Other		1	(1)				(1)
Net Changes	**$ (190,619)**	**$ 77,935**	**$ (268,554)**				**$ (27,116)**
Balance End of Year	**$ 696,842**	**$ 680,395**	**$ 16,447**	**$ 97,350**	**$ 229,497**	**$ 91,420**	

** Pension Expense from Experience in the Current and Prior Reporting Periods.*

Summary of Population Statistics

		Terminated		Recipients			
	Actives	Deferred Retirement	Other Non-Vested	Service Retirement	Disability Retirement	Survivor	Total
Members on July 1, 2017	**3,842**	**2,933**	**2,624**	**853**	**178**	**54**	**10,484**
New members	724	0	0	0	0	0	**724**
Return to active	49	(16)	(33)	0	0	0	**0**
Terminated non-vested	(317)	0	317	0	0	0	**0**
Service retirements	(69)	(35)	0	104	0	0	**0**
Terminated deferred	(171)	171	0	0	0	0	**0**
Terminated refund/transfer	(61)	(34)	(49)	0	0	0	**(144)**
Deaths	(7)	(2)	(3)	(15)	(4)	0	**(31)**
New beneficiary	0	0	0	0	0	8	**8**
Disabled	(9)	0	0	0	9	0	**0**
Data adjustments	0	148	(45)	0	7	(1)	**109**
Net change	139	232	187	89	12	7	**666**
Members on July 1, 2018	**3,981**	**3,165**	**2,811**	**942**	**190**	**61**	**11,150**

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. PERA 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	Local government employees in covered correctional service for a county administered jail or correctional facility or in a regional correctional facility administered by multiple counties, who are directly responsible for security, custody and control of persons confined in jail or facility, who are expected to respond to incidents within the jail or facility, and who are not members of the Public Employees Police and Fire Fund.
Contributions	Shown as a percent of salary: Member 5.83% Employer 8.75% Member contributions are "picked up" according to the provisions of Internal Revenue Code 414(h).
Allowable service	Local Government Correctional Service during which member contributions were made (effective July 1, 1999). May also include certain leaves of absence, military service and periods while temporary Worker's Compensation is paid.
Salary	Includes amounts deducted for deferred compensation or supplemental retirement plans, net income from fees and sick leave payments funded by the employer. Excludes unused annual leaves and sick leave payments, severance payments, Workers' Compensation benefits and employer-paid flexible spending accounts, cafeteria plans, healthcare expense accounts, day-care expenses, fringe benefits and the cost of insurance coverage.
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	1.9% of Average Salary for each year of Allowable Service, pro rata for completed months, adjusted for partial vesting if applicable.

Summary of Plan Provisions (Continued)

Retirement (Concluded)	
Early Retirement	
Age/service requirement	Age 50 and vested.
Amount	Normal Retirement Benefit based on Allowable Service and Average Salary at retirement date with actuarial reduction to commencement age assuming 3% augmentation to age 55 (2.50% if hired after June 30, 2006). Augmentation adjustment is phased out over a five-year period starting July 1, 2019, resulting in no augmentation adjustment after June 30, 2024.
Form of payment	Life annuity. Actuarially equivalent options are: 25%, 50%, 75% or 100% Joint and Survivor. 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	Benefit increases after retirement will equal 100% of the Social Security Cost of Living Adjustment, not less than 1.0% and not more than 2.5%, beginning January 1, 2019. If the funding status declines to 85% for two consecutive years or 80% for one year, the maximum increase will be lowered to 1.5%. A benefit recipient who has been receiving a benefit for at least 12 full months as of June 30 will receive a full increase. Members receiving benefits for at least one month but less than 12 full months as of June 30 will receive a pro rata increase.
Disability	
Duty Disability	
Age/service requirement	Member who cannot perform his duties as a direct result of a disability relating to an act of duty specific to protecting the property and personal safety of others.
Amount	47.50% of Average Salary plus 1.90% of Average Salary for each year in excess of 25 years of Allowable Service (pro rata for completed months). Payment begins at disability and ends at age 65 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.
Regular Disability	
Age/service requirement	At least one year of Allowable Service and a disability preventing member from performing normal duties that arise out of activities not related to covered employment or while at work, activities related to duties that do not present inherent dangers specific to occupation.

Summary of Plan Provisions (Continued)

Disability (Concluded)	
Amount	Normal Retirement Benefit based on Allowable Service (minimum of 10 years) and Average Salary at disability. Payment begins at disability and ends at age 65 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.
<u>Retirement benefit</u>	
Age/service requirement	Age 65 with continued disability.
Amount	Any optional annuity continues. Otherwise, the larger of the disability benefit paid before age 65 or the normal retirement benefit available at age 65, or an actuarially equivalent optional annuity.
<u>Form of payment</u>	Same as for retirement.
<u>Benefit increases</u>	Same as for retirement.
Death	
<u>Surviving spouse benefit</u>	
Age/service requirement	Vested active member at any age or vested former member age 50 or older who dies before retirement or disability benefit commences. If an active member dies, benefits may commence immediately, regardless of age.
Amount	Surviving spouse receives the 100% joint and survivor benefit 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. In lieu of this benefit, the surviving spouse may elect a refund of contributions with interest or an actuarially equivalent term certain annuity (lump sum payable to estate at death).
Benefit increases	Same as for retirement.
<u>Surviving dependent children's benefit</u>	
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.

Summary of Plan Provisions (Continued)

Death (Concluded)	
Refund of contributions	
Age/service requirement	Active employee dies and survivor benefits paid are less than member's contributions or a former employee dies before annuity begins.
Amount	If no survivor benefits are paid, the member's contributions with 6.00% interest until June 30, 2011; 4.00% to June 30, 2018; 3.00% thereafter. If survivor benefits are paid and accumulated contributions exceed total payments to the surviving spouse and children, then the remaining contributions are paid out.
Termination	
Refund of contributions	
Age/service requirement	Termination of local government 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. 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.
Deferred benefit	
Age/service requirement	Partially or fully vested.
Amount	Benefit computed under law in effect at termination and increased by the following percentage (augmentation), compounded annually, if termination of employment is prior to January 1, 2012: (a.) 3.00% (2.50% if hired after June 30, 2006) until the earlier of January 1 of the year following attainment of age 55 and January 1, 2012; (b.) 5.00% (2.50% if hired after June 30, 2006) thereafter until the earlier of the date the annuity begins and January 1, 2012; (c.) 1.00% from January 1, 2012 through December 31, 2018; and (d.) 0.00% thereafter. If a member terminates employment after 2011, they are not eligible for augmentation.
Form of payment	Same as for retirement.
Actuarial equivalent factors	Effective July 1, 2019, actuarially equivalent factors based on the RP-2014 mortality table for healthy annuitants for a member turning age 55 in 2021, reflecting projected mortality improvements using Scale MP-2017, male rates multiplied by 0.96, blended 65% males, 4.88% post-retirement interest, and 7.5% pre-retirement interest. Reflecting statutory requirements, joint and survivor factors are based on an interest assumption of 6.50%.

Summary of Plan Provisions (Concluded)

Combined service annuity	Members are eligible for combined service benefits if they: (a.) Meet minimum retirement age for each plan participated in and total public service meets the vesting requirements of each plan; or (b.) Have three or more years of service under PERA and the covered fund(s) (if hired prior to July 1, 2010). Other requirements for combined service include: (a.) Member must have at least six months of allowable service credit in each plan worked under; and (b.) Member may not be in receipt of a benefit from another plan. Members who meet the above requirements must have their benefit based on the following: (a.) Allowable service in all covered plans is 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	The augmentation adjustment in early retirement factors is eliminated over a five-year period starting July 1, 2019, resulting in actuarial equivalence after June 30, 2024. Post-retirement benefit increases were changed from 2.5% per year with a provision to reduce to 1.0% if the funding status declines to a certain level, to 100% of the Social Security Cost of Living Adjustment, not less than 1.0% and not more than 2.5%, beginning January 1, 2019. If the funding status declines to 85% for two consecutive years or 80% for one year, the maximum increase will be lowered to 1.5%. Deferred augmentation was changed to 0.0%, effective January 1, 2019. Augmentation that has already accrued for deferred members will still apply. Interest credited on member contributions decreased from 4.0% to 3.0%, beginning July 1, 2018. Actuarial equivalent factors were updated to reflect revised mortality and interest assumptions.

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 increases after retirement will equal 100% of the Social Security Cost of Living Adjustment, not less than 1.0% and not more than 2.5%, beginning January 1, 2019; if the funding status declines to 85% for two consecutive years or 80% for one year, the maximum increase will be lowered to 1.5%. Stochastic modeling was used to determine the assumption that benefit increases will equal 2.00% per year. This is only an assumption; actual increases will depend on actual experience.

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 February 2012, prepared by a former actuary, and a review of inflation and investment assumptions, dated September 11, 2017. The mortality assumption is based on the Public Employees' Police & Fire Plan experience study dated August 30, 2016. The Allowance for Combined Service Annuity assumptions are based on an analysis completed by the LCPR actuary and documented in a report dated October 2016.

Investment return	7.50% per annum.
Single Discount Rate	7.50% 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 earned during the year.
Inflation	2.00% 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-2017, from a base year of 2006.
Healthy post-retirement	RP-2014 annuitant generational mortality table projected with mortality improvement scale MP-2017 from a base year of 2006. Male rates are adjusted by a factor of 0.96.
Disabled	RP-2014 annuitant generational mortality table projected with mortality improvement scale MP-2017 from a base year of 2006. Male rates are adjusted by a factor of 0.96.
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. Note that plan changes reflected in this report may result in behavior changes that are not anticipated in the current retirement rates.
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	25%
2	20%
3	15%

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 35.0% for vested members and 1.0% for non-vested members 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 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. For members in payment status, actual spouse date of birth is used, if provided.
Eligible children	Retiring members are assumed to have no dependent children.
Form of payment	Married members retiring from active status are assumed to elect subsidized joint and survivor form of annuity as follows: Males: 5% elect 25% Joint & Survivor option 10% elect 50% Joint & Survivor option 10% elect 75% Joint & Survivor option 35% elect 100% Joint & Survivor option Females: 5% elect 25% Joint & Survivor option 5% elect 50% Joint & Survivor option 5% 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. Members receiving deferred annuities (including current terminated deferred members) are assumed to elect a straight life annuity.
Eligibility testing	Eligibility for benefits is determined based upon the age nearest birthday and service 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, based on average results for applicable members, were applied: <u>Data for active members:</u> There were 111 members reported with a salary less than $100. We used prior year salary (80 members), if available; otherwise high five salary with a 10% load to account for salary increases (31 members). If neither prior year salary or high five salary was available, we assumed a value of $35,000. There were also 33 members reported without a gender and no members reported without a date of birth. We assumed an entry age of 31 and male gender. <u>Data for terminated members:</u> We calculated benefits for these members using the reported Average Salary and credited service. There were no members reported without Average Salary. If credited service was not reported (28 members), we used elapsed time from hire date to termination date (17 members), otherwise we assumed nine years of service. If termination date was not reported (12 members), we assumed the termination date was equal to the hire date plus credited service, otherwise the valuation date. If the reported termination date occurs prior to the reported hire date, the two dates were swapped. There were no members reported without a date of birth. There were 5 members reported without a gender; male was assumed. <u>Data for retired members:</u> There were no members reported without a date of birth, gender or benefit. There were 3 members that were active last year, and retirement eligible, and not on the retiree data file this year. At the direction of PERA, we included these members in the 2018 valuation as retirees with an estimated life only monthly benefit. Because PERA reclassifies disabled members as retirees once the member reaches Normal Retirement Age, we compare the members that PERA reports as retirees to our disabled group from the last valuation. If a member was disabled in the valuation, we reclassify that member as a disabled retiree in this year’s valuation. We reclassified 61 retirees as disabled retirees in this valuation.

Summary of Actuarial Assumptions (Continued)

Changes in actuarial assumptions	The Single Discount Rate was changed from 5.96% per annum to 7.50% per annum. The mortality projection scale was changed from MP-2016 to MP-2017. The assumed post-retirement benefit increase was changed from 2.50% per year to 2.00% per year.

Summary of Actuarial Assumptions (Continued)

	Percentage of Members Dying Each Year*					
	Healthy Post-Retirement Mortality		Healthy Pre-Retirement Mortality		Disability Mortality	
Age in 2018	Male	Female	Male	Female	Male	Female
20	0.04%	0.02%	0.04%	0.02%	0.04%	0.02%
25	0.06	0.03	0.05	0.02	0.06	0.03
30	0.09	0.07	0.05	0.02	0.09	0.07
35	0.13	0.12	0.06	0.03	0.13	0.12
40	0.19	0.17	0.07	0.05	0.19	0.17
45	0.27	0.22	0.10	0.07	0.27	0.22
50	0.39	0.27	0.17	0.11	0.39	0.27
55	0.56	0.38	0.28	0.18	0.56	0.38
60	0.78	0.58	0.49	0.27	0.78	0.58
65	1.12	0.85	0.88	0.39	1.12	0.85
70	1.67	1.31	1.43	0.64	1.67	1.31
75	2.66	2.16	2.39	1.11	2.66	2.16
80	4.49	3.69	4.06	1.95	4.49	3.69
85	7.87	6.60	7.99	5.15	7.87	6.60
90	13.83	11.75	14.57	11.33	13.83	11.75

* *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.*

	Withdrawal Rates		Disability Retirement Rates	
Age	Male	Female	Male	Female
20	14.70%	14.20%	0.04%	0.04%
25	14.70%	14.20%	0.06%	0.06%
30	9.10%	11.40%	0.10%	0.08%
35	6.00%	8.60%	0.18%	0.11%
40	4.40%	6.90%	0.23%	0.18%
45	3.40%	4.30%	0.34%	0.39%
50	2.40%	3.10%	0.55%	0.70%
55	1.40%	2.20%	0.88%	1.18%
60	0.10%	0.20%	1.41%	2.41%
65	0.00%	0.00%	1.67%	2.67%

Summary of Actuarial Assumptions (Concluded)

Age	Retirement Rate
50	3%
51	2
52	2
53	2
54	5
55	20
56	8
57	8
58	8
59	8
60	15
61	15
62	30
63	30
64	30
65	40
66	40
67	40
68	40
69	40
70+	100

Salary Scale	
Age	Increase
20	8.50%
25	7.25
30	6.25
35	5.75
40	5.25
45	4.50
50	4.50
55	4.25
60	3.75
65	3.50
70+	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 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. 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 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 calculation, the expected rate of return on pension plan investments is 7.50%; the municipal bond rate is 3.62%; and **the resulting single discount rate 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 (SDR). 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)

	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
2018	$ 205,077	$ -	$ 205,077				
2019	$ 217,805	$ -	$ 217,805	$ 12,698	$ 19,058	$ -	$ 31,756
2020	$ 205,713	$ 19,171	$ 224,884	$ 11,993	$ 18,000	$ 94	$ 30,087
2021	$ 196,696	$ 35,496	$ 232,192	$ 11,467	$ 17,211	$ 174	$ 28,852
2022	$ 189,322	$ 50,417	$ 239,739	$ 11,037	$ 16,566	$ 247	$ 27,850
2023	$ 182,584	$ 64,946	$ 247,530	$ 10,645	$ 15,976	$ 318	$ 26,939
2024	$ 176,130	$ 79,445	$ 255,575	$ 10,268	$ 15,411	$ 389	$ 26,068
2025	$ 169,686	$ 94,195	$ 263,881	$ 9,893	$ 14,848	$ 462	$ 25,203
2026	$ 163,502	$ 108,955	$ 272,457	$ 9,532	$ 14,306	$ 534	$ 24,372
2027	$ 157,486	$ 123,826	$ 281,312	$ 9,181	$ 13,780	$ 607	$ 23,568
2028	$ 151,546	$ 138,909	$ 290,455	$ 8,835	$ 13,260	$ 681	$ 22,776
2029	$ 145,779	$ 154,115	$ 299,894	$ 8,499	$ 12,756	$ 755	$ 22,010
2030	$ 140,114	$ 169,527	$ 309,641	$ 8,169	$ 12,260	$ 831	$ 21,260
2031	$ 134,372	$ 185,332	$ 319,704	$ 7,834	$ 11,758	$ 908	$ 20,500
2032	$ 128,528	$ 201,567	$ 330,095	$ 7,493	$ 11,246	$ 988	$ 19,727
2033	$ 122,676	$ 218,147	$ 340,823	$ 7,152	$ 10,734	$ 1,069	$ 18,955
2034	$ 116,865	$ 235,034	$ 351,899	$ 6,813	$ 10,226	$ 1,152	$ 18,191
2035	$ 111,116	$ 252,220	$ 363,336	$ 6,478	$ 9,723	$ 1,236	$ 17,437
2036	$ 105,430	$ 269,715	$ 375,145	$ 6,147	$ 9,225	$ 1,322	$ 16,694
2037	$ 99,771	$ 287,566	$ 387,337	$ 5,817	$ 8,730	$ 1,409	$ 15,956
2038	$ 94,106	$ 305,819	$ 399,925	$ 5,486	$ 8,234	$ 1,499	$ 15,219
2039	$ 88,382	$ 324,541	$ 412,923	$ 5,153	$ 7,733	$ 1,590	$ 14,476
2040	$ 82,607	$ 343,736	$ 426,343	$ 4,816	$ 7,228	$ 1,684	$ 13,728
2041	$ 76,907	$ 363,292	$ 440,199	$ 4,484	$ 6,729	$ 1,780	$ 12,993
2042	$ 71,296	$ 383,209	$ 454,505	$ 4,157	$ 6,238	$ 1,878	$ 12,273
2043	$ 65,727	$ 403,550	$ 469,277	$ 3,832	$ 5,751	$ 1,977	$ 11,560
2044	$ 60,140	$ 424,388	$ 484,528	$ 3,506	$ 5,262	$ 2,080	$ 10,848
2045	$ 54,546	$ 445,729	$ 500,275	$ 3,180	$ 4,773	$ 2,184	$ 10,137
2046	$ 48,972	$ 467,562	$ 516,534	$ 2,855	$ 4,285	$ 2,291	$ 9,431
2047	$ 43,405	$ 489,917	$ 533,322	$ 2,531	$ 3,798	$ 2,401	$ 8,730
2048	$ 38,012	$ 512,643	$ 550,655	$ 2,216	$ 3,326	$ 2,512	$ 8,054
2049	$ 32,930	$ 535,621	$ 568,551	$ 1,920	$ 2,881	$ 2,625	$ 7,426
2050	$ 28,159	$ 558,870	$ 587,029	$ 1,642	$ 2,464	$ 2,738	$ 6,844
2051	$ 23,742	$ 582,365	$ 606,107	$ 1,384	$ 2,077	$ 2,854	$ 6,315
2052	$ 19,712	$ 606,094	$ 625,806	$ 1,149	$ 1,725	$ 2,970	$ 5,844
2053	$ 16,042	$ 630,103	$ 646,145	$ 935	$ 1,404	$ 3,088	$ 5,427
2054	$ 12,726	$ 654,418	$ 667,144	$ 742	$ 1,113	$ 3,207	$ 5,062
2055	$ 9,787	$ 679,039	$ 688,826	$ 571	$ 856	$ 3,327	$ 4,754
2056	$ 7,286	$ 703,927	$ 711,213	$ 425	$ 637	$ 3,449	$ 4,511
2057	$ 5,230	$ 729,098	$ 734,328	$ 305	$ 458	$ 3,573	$ 4,336
2058	$ 3,604	$ 754,589	$ 758,193	$ 210	$ 315	$ 3,697	$ 4,222
2059	$ 2,394	$ 780,441	$ 782,835	$ 140	$ 209	$ 3,824	$ 4,173
2060	$ 1,528	$ 806,749	$ 808,277	$ 89	$ 134	$ 3,953	$ 4,176
2061	$ 935	$ 833,611	$ 834,546	$ 55	$ 82	$ 4,085	$ 4,222
2062	$ 546	$ 861,122	$ 861,668	$ 32	$ 48	$ 4,219	$ 4,299
2063	$ 302	$ 889,371	$ 889,673	$ 18	$ 26	$ 4,358	$ 4,402
2064	$ 157	$ 918,430	$ 918,587	$ 9	$ 14	$ 4,500	$ 4,523
2065	$ 75	$ 948,366	$ 948,441	$ 4	$ 7	$ 4,647	$ 4,658
2066	$ 31	$ 979,235	$ 979,266	$ 2	$ 3	$ 4,798	$ 4,803
2067	$ 11	$ 1,011,081	$ 1,011,092	$ 1	$ 1	$ 4,954	$ 4,956
2068	$ 3	$ 1,043,949	$ 1,043,952	$ -	$ -	$ 5,115	$ 5,115

**Contributions related to future employees in excess of normal cost and expenses of 14.09% of pay.*

Single Discount Rate Development
Projection of Contributions (Dollars in Thousands) (Concluded)

	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
2069	$ 1	$ 1,077,880	$ 1,077,881	$ -	$ -	$ 5,282	$ 5,282
2070	$ -	$ 1,112,912	$ 1,112,912	$ -	$ -	$ 5,453	$ 5,453
2071	$ -	$ 1,149,081	$ 1,149,081	$ -	$ -	$ 5,630	$ 5,630
2072	$ -	$ 1,186,426	$ 1,186,426	$ -	$ -	$ 5,813	$ 5,813
2073	$ -	$ 1,224,985	$ 1,224,985	$ -	$ -	$ 6,002	$ 6,002
2074	$ -	$ 1,264,797	$ 1,264,797	$ -	$ -	$ 6,198	$ 6,198
2075	$ -	$ 1,305,903	$ 1,305,903	$ -	$ -	$ 6,399	$ 6,399
2076	$ -	$ 1,348,345	$ 1,348,345	$ -	$ -	$ 6,607	$ 6,607
2077	$ -	$ 1,392,166	$ 1,392,166	$ -	$ -	$ 6,822	$ 6,822
2078	$ -	$ 1,437,412	$ 1,437,412	$ -	$ -	$ 7,043	$ 7,043
2079	$ -	$ 1,484,128	$ 1,484,128	$ -	$ -	$ 7,272	$ 7,272
2080	$ -	$ 1,532,362	$ 1,532,362	$ -	$ -	$ 7,509	$ 7,509
2081	$ -	$ 1,582,164	$ 1,582,164	$ -	$ -	$ 7,753	$ 7,753
2082	$ -	$ 1,633,584	$ 1,633,584	$ -	$ -	$ 8,005	$ 8,005
2083	$ -	$ 1,686,675	$ 1,686,675	$ -	$ -	$ 8,265	$ 8,265
2084	$ -	$ 1,741,492	$ 1,741,492	$ -	$ -	$ 8,533	$ 8,533
2085	$ -	$ 1,798,091	$ 1,798,091	$ -	$ -	$ 8,811	$ 8,811
2086	$ -	$ 1,856,529	$ 1,856,529	$ -	$ -	$ 9,097	$ 9,097
2087	$ -	$ 1,916,866	$ 1,916,866	$ -	$ -	$ 9,393	$ 9,393
2088	$ -	$ 1,979,164	$ 1,979,164	$ -	$ -	$ 9,698	$ 9,698
2089	$ -	$ 2,043,487	$ 2,043,487	$ -	$ -	$ 10,013	$ 10,013
2090	$ -	$ 2,109,900	$ 2,109,900	$ -	$ -	$ 10,339	$ 10,339
2091	$ -	$ 2,178,472	$ 2,178,472	$ -	$ -	$ 10,675	$ 10,675
2092	$ -	$ 2,249,272	$ 2,249,272	$ -	$ -	$ 11,021	$ 11,021
2093	$ -	$ 2,322,374	$ 2,322,374	$ -	$ -	$ 11,380	$ 11,380
2094	$ -	$ 2,397,851	$ 2,397,851	$ -	$ -	$ 11,749	$ 11,749
2095	$ -	$ 2,475,781	$ 2,475,781	$ -	$ -	$ 12,131	$ 12,131
2096	$ -	$ 2,556,244	$ 2,556,244	$ -	$ -	$ 12,526	$ 12,526
2097	$ -	$ 2,639,322	$ 2,639,322	$ -	$ -	$ 12,933	$ 12,933
2098	$ -	$ 2,725,100	$ 2,725,100	$ -	$ -	$ 13,353	$ 13,353
2099	$ -	$ 2,813,665	$ 2,813,665	$ -	$ -	$ 13,787	$ 13,787
2100	$ -	$ 2,905,110	$ 2,905,110	$ -	$ -	$ 14,235	$ 14,235
2101	$ -	$ 2,999,526	$ 2,999,526	$ -	$ -	$ 14,698	$ 14,698
2102	$ -	$ 3,097,010	$ 3,097,010	$ -	$ -	$ 15,175	$ 15,175
2103	$ -	$ 3,197,663	$ 3,197,663	$ -	$ -	$ 15,669	$ 15,669
2104	$ -	$ 3,301,587	$ 3,301,587	$ -	$ -	$ 16,178	$ 16,178
2105	$ -	$ 3,408,889	$ 3,408,889	$ -	$ -	$ 16,704	$ 16,704
2106	$ -	$ 3,519,677	$ 3,519,677	$ -	$ -	$ 17,246	$ 17,246
2107	$ -	$ 3,634,067	$ 3,634,067	$ -	$ -	$ 17,807	$ 17,807
2108	$ -	$ 3,752,174	$ 3,752,174	$ -	$ -	$ 18,386	$ 18,386
2109	$ -	$ 3,874,120	$ 3,874,120	$ -	$ -	$ 18,983	$ 18,983
2110	$ -	$ 4,000,029	$ 4,000,029	$ -	$ -	$ 19,600	$ 19,600
2111	$ -	$ 4,130,030	$ 4,130,030	$ -	$ -	$ 20,237	$ 20,237
2112	$ -	$ 4,264,256	$ 4,264,256	$ -	$ -	$ 20,895	$ 20,895
2113	$ -	$ 4,402,844	$ 4,402,844	$ -	$ -	$ 21,574	$ 21,574
2114	$ -	$ 4,545,936	$ 4,545,936	$ -	$ -	$ 22,275	$ 22,275
2115	$ -	$ 4,693,679	$ 4,693,679	$ -	$ -	$ 22,999	$ 22,999
2116	$ -	$ 4,846,224	$ 4,846,224	$ -	$ -	$ 23,746	$ 23,746
2117	$ -	$ 5,003,726	$ 5,003,726	$ -	$ -	$ 24,518	$ 24,518
2118	$ -	$ 5,166,347	$ 5,166,347	$ -	$ -	$ 25,315	$ 25,315

**Contributions related to future employees in excess of normal cost and expenses of 14.09% of pay.*

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

Fiscal Year Ending	Projected Beginning Plan 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	$ 680,395	$ 31,756	$ 18,799	$ 327	$ 51,495	$ 744,520
2020	$ 744,520	$ 30,087	$ 21,338	$ 309	$ 56,150	$ 809,110
2021	$ 809,110	$ 28,852	$ 23,944	$ 295	$ 60,853	$ 874,576
2022	$ 874,576	$ 27,850	$ 26,694	$ 284	$ 65,625	$ 941,073
2023	$ 941,073	$ 26,939	$ 29,689	$ 274	$ 70,469	$ 1,008,518
2024	$ 1,008,518	$ 26,068	$ 33,053	$ 264	$ 75,372	$ 1,076,641
2025	$ 1,076,641	$ 25,203	$ 36,795	$ 255	$ 80,312	$ 1,145,106
2026	$ 1,145,106	$ 24,372	$ 41,017	$ 245	$ 85,261	$ 1,213,477
2027	$ 1,213,477	$ 23,568	$ 45,278	$ 236	$ 90,203	$ 1,281,734
2028	$ 1,281,734	$ 22,776	$ 49,646	$ 227	$ 95,132	$ 1,349,769
2029	$ 1,349,769	$ 22,010	$ 54,332	$ 219	$ 100,034	$ 1,417,262
2030	$ 1,417,262	$ 21,260	$ 59,131	$ 210	$ 104,892	$ 1,484,073
2031	$ 1,484,073	$ 20,500	$ 64,231	$ 202	$ 109,688	$ 1,549,828
2032	$ 1,549,828	$ 19,727	$ 69,457	$ 193	$ 114,399	$ 1,614,304
2033	$ 1,614,304	$ 18,955	$ 75,071	$ 184	$ 119,000	$ 1,677,004
2034	$ 1,677,004	$ 18,191	$ 80,782	$ 175	$ 123,464	$ 1,737,702
2035	$ 1,737,702	$ 17,437	$ 86,445	$ 167	$ 127,780	$ 1,796,307
2036	$ 1,796,307	$ 16,694	$ 92,300	$ 158	$ 131,933	$ 1,852,476
2037	$ 1,852,476	$ 15,956	$ 98,292	$ 150	$ 135,898	$ 1,905,888
2038	$ 1,905,888	$ 15,219	$ 104,263	$ 141	$ 139,657	$ 1,956,360
2039	$ 1,956,360	$ 14,476	$ 110,261	$ 133	$ 143,195	$ 2,003,637
2040	$ 2,003,637	$ 13,728	$ 116,191	$ 124	$ 146,495	$ 2,047,545
2041	$ 2,047,545	$ 12,993	$ 122,108	$ 115	$ 149,544	$ 2,087,859
2042	$ 2,087,859	$ 12,273	$ 127,715	$ 107	$ 152,335	$ 2,124,645
2043	$ 2,124,645	$ 11,560	$ 133,095	$ 99	$ 154,869	$ 2,157,880
2044	$ 2,157,880	$ 10,848	$ 138,434	$ 90	$ 157,140	$ 2,187,344
2045	$ 2,187,344	$ 10,137	$ 143,736	$ 82	$ 159,128	$ 2,212,791
2046	$ 2,212,791	$ 9,431	$ 148,911	$ 73	$ 160,821	$ 2,234,059
2047	$ 2,234,059	$ 8,730	$ 154,057	$ 65	$ 162,201	$ 2,250,868
2048	$ 2,250,868	$ 8,054	$ 158,850	$ 57	$ 163,260	$ 2,263,275
2049	$ 2,263,275	$ 7,426	$ 163,096	$ 49	$ 164,012	$ 2,271,568
2050	$ 2,271,568	$ 6,844	$ 166,836	$ 42	$ 164,475	$ 2,276,009
2051	$ 2,276,009	$ 6,315	$ 169,952	$ 36	$ 164,674	$ 2,277,010
2052	$ 2,277,010	$ 5,844	$ 172,360	$ 30	$ 164,643	$ 2,275,107
2053	$ 2,275,107	$ 5,427	$ 174,182	$ 24	$ 164,418	$ 2,270,746
2054	$ 2,270,746	$ 5,062	$ 175,462	$ 19	$ 164,030	$ 2,264,357
2055	$ 2,264,357	$ 4,754	$ 176,213	$ 15	$ 163,512	$ 2,256,395
2056	$ 2,256,395	$ 4,511	$ 176,420	$ 11	$ 162,899	$ 2,247,374
2057	$ 2,247,374	$ 4,336	$ 176,088	$ 8	$ 162,228	$ 2,237,842
2058	$ 2,237,842	$ 4,222	$ 175,216	$ 5	$ 161,542	$ 2,228,385
2059	$ 2,228,385	$ 4,173	$ 173,805	$ 4	$ 160,882	$ 2,219,631
2060	$ 2,219,631	$ 4,176	$ 171,893	$ 2	$ 160,297	$ 2,212,209
2061	$ 2,212,209	$ 4,222	$ 169,523	$ 1	$ 159,829	$ 2,206,736
2062	$ 2,206,736	$ 4,299	$ 166,740	$ 1	$ 159,524	$ 2,203,818
2063	$ 2,203,818	$ 4,402	$ 163,584	$ -	$ 159,425	$ 2,204,061
2064	$ 2,204,061	$ 4,523	$ 160,089	$ -	$ 159,576	$ 2,208,071
2065	$ 2,208,071	$ 4,658	$ 156,288	$ -	$ 160,022	$ 2,216,463
2066	$ 2,216,463	$ 4,803	$ 152,207	$ -	$ 160,807	$ 2,229,866
2067	$ 2,229,866	$ 4,956	$ 147,864	$ -	$ 161,978	$ 2,248,936
2068	$ 2,248,936	$ 5,115	$ 143,282	$ -	$ 163,582	$ 2,274,351

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 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	$ 2,274,351	$ 5,282	$ 138,478	$ -	$ 165,672	$ 2,306,827
2070	$ 2,306,827	$ 5,453	$ 133,470	$ -	$ 168,298	$ 2,347,108
2071	$ 2,347,108	$ 5,630	$ 128,275	$ -	$ 171,517	$ 2,395,980
2072	$ 2,395,980	$ 5,813	$ 122,912	$ -	$ 175,386	$ 2,454,267
2073	$ 2,454,267	$ 6,002	$ 117,402	$ -	$ 179,968	$ 2,522,835
2074	$ 2,522,835	$ 6,198	$ 111,766	$ -	$ 185,325	$ 2,602,592
2075	$ 2,602,592	$ 6,399	$ 106,025	$ -	$ 191,526	$ 2,694,492
2076	$ 2,694,492	$ 6,607	$ 100,204	$ -	$ 198,640	$ 2,799,535
2077	$ 2,799,535	$ 6,822	$ 94,328	$ -	$ 206,743	$ 2,918,772
2078	$ 2,918,772	$ 7,043	$ 88,424	$ -	$ 215,911	$ 3,053,302
2079	$ 3,053,302	$ 7,272	$ 82,517	$ -	$ 226,227	$ 3,204,284
2080	$ 3,204,284	$ 7,509	$ 76,635	$ -	$ 237,776	$ 3,372,934
2081	$ 3,372,934	$ 7,753	$ 70,807	$ -	$ 250,648	$ 3,560,528
2082	$ 3,560,528	$ 8,005	$ 65,062	$ -	$ 264,938	$ 3,768,409
2083	$ 3,768,409	$ 8,265	$ 59,430	$ -	$ 280,746	$ 3,997,990
2084	$ 3,997,990	$ 8,533	$ 53,944	$ -	$ 298,177	$ 4,250,756
2085	$ 4,250,756	$ 8,811	$ 48,635	$ -	$ 317,340	$ 4,528,272
2086	$ 4,528,272	$ 9,097	$ 43,535	$ -	$ 338,352	$ 4,832,186
2087	$ 4,832,186	$ 9,393	$ 38,671	$ -	$ 361,335	$ 5,164,243
2088	$ 5,164,243	$ 9,698	$ 34,070	$ -	$ 386,420	$ 5,526,291
2089	$ 5,526,291	$ 10,013	$ 29,751	$ -	$ 413,745	$ 5,920,298
2090	$ 5,920,298	$ 10,339	$ 25,733	$ -	$ 443,455	$ 6,348,359
2091	$ 6,348,359	$ 10,675	$ 22,029	$ -	$ 475,708	$ 6,812,713
2092	$ 6,812,713	$ 11,021	$ 18,648	$ -	$ 510,672	$ 7,315,758
2093	$ 7,315,758	$ 11,380	$ 15,597	$ -	$ 548,526	$ 7,860,067
2094	$ 7,860,067	$ 11,749	$ 12,876	$ -	$ 589,463	$ 8,448,403
2095	$ 8,448,403	$ 12,131	$ 10,483	$ -	$ 633,691	$ 9,083,742
2096	$ 9,083,742	$ 12,526	$ 8,408	$ -	$ 681,432	$ 9,769,292
2097	$ 9,769,292	$ 12,933	$ 6,638	$ -	$ 732,928	$ 10,508,515
2098	$ 10,508,515	$ 13,353	$ 5,153	$ -	$ 788,440	$ 11,305,155
2099	$ 11,305,155	$ 13,787	$ 3,930	$ -	$ 848,249	$ 12,163,261
2100	$ 12,163,261	$ 14,235	$ 2,943	$ -	$ 912,660	$ 13,087,213
2101	$ 13,087,213	$ 14,698	$ 2,161	$ -	$ 982,002	$ 14,081,752
2102	$ 14,081,752	$ 15,175	$ 1,556	$ -	$ 1,056,632	$ 15,152,003
2103	$ 15,152,003	$ 15,669	$ 1,098	$ -	$ 1,136,936	$ 16,303,510
2104	$ 16,303,510	$ 16,178	$ 759	$ -	$ 1,223,330	$ 17,542,259
2105	$ 17,542,259	$ 16,704	$ 515	$ -	$ 1,316,265	$ 18,874,713
2106	$ 18,874,713	$ 17,246	$ 343	$ -	$ 1,416,225	$ 20,307,841
2107	$ 20,307,841	$ 17,807	$ 225	$ -	$ 1,523,735	$ 21,849,158
2108	$ 21,849,158	$ 18,386	$ 145	$ -	$ 1,639,358	$ 23,506,757
2109	$ 23,506,757	$ 18,983	$ 93	$ -	$ 1,763,702	$ 25,289,349
2110	$ 25,289,349	$ 19,600	$ 60	$ -	$ 1,897,420	$ 27,206,309
2111	$ 27,206,309	$ 20,237	$ 39	$ -	$ 2,041,216	$ 29,267,723
2112	$ 29,267,723	$ 20,895	$ 25	$ -	$ 2,195,847	$ 31,484,440
2113	$ 31,484,440	$ 21,574	$ 17	$ -	$ 2,362,126	$ 33,868,123
2114	$ 33,868,123	$ 22,275	$ 11	$ -	$ 2,540,929	$ 36,431,316
2115	$ 36,431,316	$ 22,999	$ 8	$ -	$ 2,733,195	$ 39,187,502
2116	$ 39,187,502	$ 23,746	$ 6	$ -	$ 2,939,936	$ 42,151,178
2117	$ 42,151,178	$ 24,518	$ 4	$ -	$ 3,162,241	$ 45,337,933
2118	$ 45,337,933	$ 25,315	$ 3	$ -	$ 3,401,277	$ 48,764,522

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 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)
2019	$ 680,395	$ 18,799	$ 18,799	$ 0	$ 18,131	$ 0	$ 18,131
2020	744,520	21,338	21,338	0	19,145	0	19,145
2021	809,110	23,944	23,944	0	19,983	0	19,983
2022	874,576	26,694	26,694	0	20,724	0	20,724
2023	941,074	29,689	29,689	0	21,442	0	21,442
2024	1,008,519	33,053	33,053	0	22,206	0	22,206
2025	1,076,643	36,795	36,795	0	22,995	0	22,995
2026	1,145,107	41,017	41,017	0	23,845	0	23,845
2027	1,213,478	45,278	45,278	0	24,486	0	24,486
2028	1,281,734	49,646	49,646	0	24,975	0	24,975
2029	1,349,769	54,332	54,332	0	25,426	0	25,426
2030	1,417,262	59,131	59,131	0	25,740	0	25,740
2031	1,484,073	64,231	64,231	0	26,010	0	26,010
2032	1,549,828	69,457	69,457	0	26,164	0	26,164
2033	1,614,304	75,071	75,071	0	26,306	0	26,306
2034	1,677,003	80,782	80,782	0	26,332	0	26,332
2035	1,737,700	86,445	86,445	0	26,212	0	26,212
2036	1,796,305	92,300	92,300	0	26,035	0	26,035
2037	1,852,474	98,292	98,292	0	25,791	0	25,791
2038	1,905,886	104,263	104,263	0	25,449	0	25,449
2039	1,956,358	110,261	110,261	0	25,035	0	25,035
2040	2,003,636	116,191	116,191	0	24,541	0	24,541
2041	2,047,545	122,108	122,108	0	23,991	0	23,991
2042	2,087,858	127,715	127,715	0	23,342	0	23,342
2043	2,124,643	133,095	133,095	0	22,628	0	22,628
2044	2,157,879	138,434	138,434	0	21,894	0	21,894
2045	2,187,343	143,736	143,736	0	21,147	0	21,147
2046	2,212,790	148,911	148,911	0	20,379	0	20,379
2047	2,234,058	154,057	154,057	0	19,613	0	19,613
2048	2,250,866	158,850	158,850	0	18,812	0	18,812
2049	2,263,273	163,096	163,096	0	17,967	0	17,967
2050	2,271,565	166,836	166,836	0	17,097	0	17,097
2051	2,276,006	169,952	169,952	0	16,201	0	16,201
2052	2,277,006	172,360	172,360	0	15,285	0	15,285
2053	2,275,103	174,182	174,182	0	14,368	0	14,368
2054	2,270,742	175,462	175,462	0	13,464	0	13,464
2055	2,264,353	176,213	176,213	0	12,579	0	12,579
2056	2,256,392	176,420	176,420	0	11,715	0	11,715
2057	2,247,372	176,088	176,088	0	10,877	0	10,877
2058	2,237,840	175,216	175,216	0	10,068	0	10,068
2059	2,228,384	173,805	173,805	0	9,290	0	9,290
2060	2,219,631	171,893	171,893	0	8,547	0	8,547
2061	2,212,209	169,523	169,523	0	7,841	0	7,841
2062	2,206,734	166,740	166,740	0	7,174	0	7,174
2063	2,203,816	163,584	163,584	0	6,547	0	6,547
2064	2,204,059	160,089	160,089	0	5,960	0	5,960
2065	2,208,069	156,288	156,288	0	5,413	0	5,413
2066	2,216,460	152,207	152,207	0	4,904	0	4,904
2067	2,229,863	147,864	147,864	0	4,432	0	4,432
2068	2,248,932	143,282	143,282	0	3,995	0	3,995

Single Discount Rate Development
Present Values of Projected Benefits (Dollars in Thousands)
(Concluded)

Fiscal Year Ending	Projected Beginning Plan 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)
2069	$ 2,274,348	$ 138,478	$ 138,478	$ 0	$ 3,591	$ 0	$ 3,591
2070	2,306,823	133,470	133,470	0	3,220	0	3,220
2071	2,347,105	128,275	128,275	0	2,879	0	2,879
2072	2,395,977	122,912	122,912	0	2,566	0	2,566
2073	2,454,265	117,402	117,402	0	2,280	0	2,280
2074	2,522,833	111,766	111,766	0	2,019	0	2,019
2075	2,602,590	106,025	106,025	0	1,782	0	1,782
2076	2,694,490	100,204	100,204	0	1,566	0	1,566
2077	2,799,533	94,328	94,328	0	1,372	0	1,372
2078	2,918,769	88,424	88,424	0	1,196	0	1,196
2079	3,053,299	82,517	82,517	0	1,038	0	1,038
2080	3,204,281	76,635	76,635	0	897	0	897
2081	3,372,930	70,807	70,807	0	771	0	771
2082	3,560,524	65,062	65,062	0	659	0	659
2083	3,768,404	59,430	59,430	0	560	0	560
2084	3,997,985	53,944	53,944	0	473	0	473
2085	4,250,751	48,635	48,635	0	397	0	397
2086	4,528,266	43,535	43,535	0	330	0	330
2087	4,832,180	38,671	38,671	0	273	0	273
2088	5,164,237	34,070	34,070	0	224	0	224
2089	5,526,286	29,751	29,751	0	182	0	182
2090	5,920,292	25,733	25,733	0	146	0	146
2091	6,348,353	22,029	22,029	0	116	0	116
2092	6,812,707	18,648	18,648	0	92	0	92
2093	7,315,753	15,597	15,597	0	71	0	71
2094	7,860,062	12,876	12,876	0	55	0	55
2095	8,448,398	10,483	10,483	0	41	0	41
2096	9,083,737	8,408	8,408	0	31	0	31
2097	9,769,286	6,638	6,638	0	23	0	23
2098	10,508,509	5,153	5,153	0	16	0	16
2099	11,305,149	3,930	3,930	0	12	0	12
2100	12,163,254	2,943	2,943	0	8	0	8
2101	13,087,207	2,161	2,161	0	6	0	6
2102	14,081,745	1,556	1,556	0	4	0	4
2103	15,151,997	1,098	1,098	0	2	0	2
2104	16,303,503	759	759	0	2	0	2
2105	17,542,252	515	515	0	1	0	1
2106	18,874,706	343	343	0	1	0	1
2107	20,307,835	225	225	0	0	0	0
2108	21,849,152	145	145	0	0	0	0
2109	23,506,751	93	93	0	0	0	0
2110	25,289,342	60	60	0	0	0	0
2111	27,206,303	39	39	0	0	0	0
2112	29,267,718	25	25	0	0	0	0
2113	31,484,435	17	17	0	0	0	0
2114	33,868,118	11	11	0	0	0	0
2115	36,431,310	8	8	0	0	0	0
2116	39,187,496	6	6	0	0	0	0
2117	42,151,173	4	4	0	0	0	0
2118	45,337,928	3	3	0	0	0	0
				Totals	$ 931,405	$ 0	$ 931,405

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

GASB	The Governmental Accounting Standards Board is an organization that exists with authority to promulgate accounting standards for state and local governmental entities.
Fiduciary Net Position	The fiduciary net position is the value of the assets of the trust.
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 contribution entities to plan members for benefits provided through a defined benefit pension plan.
Non-Employer Contribution Entities	Non-employer contribution 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 contribution 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 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 in 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 plan. For purposes of the GASB Statement No. 67, the asset valuation method is equal to the market value of assets.

Public Employees Retirement Association of Minnesota

Public Employees Police and Fire Plan
GASB Statements No. 67 and No. 68 Accounting and Financial Reporting for Pensions
June 30, 2018

GRS

GRS Retirement Consulting

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November 28, 2018

Public Employees Retirement Association of Minnesota
Public Employees Police and Fire Plan
St. Paul, Minnesota

Dear Trustees of the Public Employees Police and Fire Plan:

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 Public Employees Police and Fire Plan ("PEPFP"), 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 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 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. PERA is responsible for preparing the Schedule of Employer Allocations and the Schedule of Pension Amounts by Employer. This report may be provided to parties other than the Public Employees Retirement Association (PERA) only in its entirety and only with the permission of PERA. GRS is not responsible for unauthorized use of this report.

This report is based upon information, furnished to us by PERA, 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 Plan 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.

277 Coon Rapids Boulevard | Suite 212 | Coon Rapids, Minnesota 55433-2629

To the best of our knowledge, the information contained within this report is accurate and fairly represents the actuarial position of the Public Employees Police and Fire Plan 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 individuals 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

Table of Contents

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
Employer's Fiscal Year Ending Date (Reporting Date)	Varies by Employer
Membership	
Number of	
- Service Retirements	7,534
- Survivors	1,875
- Disability Retirements	1,347
- Deferred Retirements	1,580
- Terminated other non-vested	1,188
- Active Members	11,673
- Total	25,197
Covered Payroll	$ 976,657
Net Pension Liability	
Total Pension Liability	$ 9,552,804
Plan Fiduciary Net Position	$ 8,486,907
Net Pension Liability	$ 1,065,897
Plan Fiduciary Net Position as a Percentage of Total Pension Liability	88.84%
Net Pension Liability as a Percentage of Covered Payroll	109.14%
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%
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)	**$ 41,114**

Deferred Outflows and 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	$ 43,265	$ 261,491
Changes in assumptions	$ 1,379,165	$ 1,569,139
Net difference between projected and actual earnings on pension plan investments	$ 281,474	$ 504,728
Total	$ 1,703,904	$ 2,335,358

* *Source: 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. 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 PEPFP 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 liability 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.

Required Supplementary Information

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.

Timing of the Valuation

An actuarial valuation to determine the total pension liability is required to 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.

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 normal cost of the plan is expected to remain approximately level as a percent of pay,
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.

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 Fidelity "20-Year Municipal GO AA Index") 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	$	203,131
2.	Interest on the Total Pension Liability	$	682,903
3.	Current-Period Benefit Changes	$	(50,771)
4.	Employee Contributions (made negative for addition here)	$	(105,479)
5.	Projected Earnings on Plan Investments (made negative for addition here)	$	(584,693)
6.	Pension Plan Administrative Expense	$	886
7.	Other Changes in Plan Fiduciary Net Position	$	(58)
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	$	3,620
9.	Recognition of Outflow (Inflow) of Resources due to assumption changes		
	Arising from Current Reporting Period	$	(7,135)
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	$	(45,855)
11.	**Increase/(Decrease) from Experience in the Current Reporting Period**	**$**	**96,549**
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	$	(92,931)
13.	Recognition of Outflow (Inflow) of Resources due to assumption changes		
	Arising from Prior Reporting Periods	$	112,349
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	$	(74,853)
15.	**Total Pension Expense / (Income)**	**$**	**41,114**

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	$	21,720
2. Assumption Changes (gains) or losses	$	(42,807)
3. Recognition period for Liabilities: Average of the expected remaining service lives of all employees {in years}		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	$	3,620
5. Outflow (Inflow) of Resources to be recognized in the current pension expense for Assumption Changes	$	(7,135)
6. Outflow (Inflow) of Resources to be recognized in the current pension expense due to Liabilities	$	(3,515)
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	$	18,100
8. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses for Assumption Changes	$	(35,672)
9. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses due to Liabilities	$	(17,572)
B. Outflows (Inflows) of Resources due to Assets		
1. Net difference between projected and actual earnings on pension plan investments (gains) or losses	$	(229,273)
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	$	(45,855)
4. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses due to Assets	$	(183,418)

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 of Resources
1. Due to Liabilities	$ 505,853	$ 489,950	$ 15,903
2. Due to Assets	165,483	286,191	(120,708)
3. Total	$ 671,336	$ 776,141	$ (104,805)

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

	Outflows of Resources	Inflows of Resources	Net Outflows of Resources
1. Differences between expected and actual experience	$ 10,137	$ 99,448	$ (89,311)
2. Assumption Changes	495,716	390,502	105,214
3. Net Difference between projected and actual earnings on pension plan investments	165,483	286,191	(120,708)
4. Total	$ 671,336	$ 776,141	$ (104,805)

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 of Resources
1. Differences between expected and actual experience	$ 43,265	$ 261,491	$ (218,226)
2. Assumption Changes	1,379,165	1,569,139	(189,974)
3. Net Difference between projected and actual earnings on pension plan investments	281,474	504,728	(223,254)
4. Total	$ 1,703,904	$ 2,335,358	$ (631,454)

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

Year Ending June 30	Net Deferred Outflows of Resources
2019	$ 28,428
2020	(75,357)
2021	(154,493)
2022	(426,518)
2023	(3,514)
Thereafter	0
Total	$ (631,454)

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

	Market Value				
Assets in Trust	**June 30, 2018**			**June 30, 2017**	
Cash, Equivalents, Short Term Securities	$	90,015		$	190,809
Fixed Income	$	2,060,635		$	1,535,288
Equity	$	5,150,491		$	5,141,012
SBI Alternative	$	1,172,591		$	1,038,994
Other	$	-		$	-
Total Assets in Trust	**$**	**8,473,732**		**$**	**7,906,103**
Assets Receivable	$	18,731 *		$	18,348 *
Amounts Payable	$	(5,556)		$	(5,572)
Net Position Restricted for Pensions	**$**	**8,486,907**		**$**	**7,918,879**

** Includes $13.648 million contribution receivable from Minneapolis to be paid July 15.*

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

Change in Assets		**Market Value**	
Year Ending		**June 30, 2018**	**June 30, 2017**
1.	Fund balance at market value at beginning of year	$ 7,918,879	$ 7,098,090
2.	Contributions		
	a. Member	$ 105,479	$ 101,984
	b. Employer	$ 170,781 *	$ 166,329 *
	c. Other sources	$ 9,000	$ 9,000
	d. Total contributions	$ 285,260	$ 277,313
3.	Investment income		
	a. Investment income/(loss)	$ 822,887	$ 1,067,162
	b. Investment expenses	$ (8,921)	$ (8,220)
	c. Net subtotal	$ 813,966	$ 1,058,942
4.	Other	$ 58	$ 24
5.	**Total additions:** *(2.d.) + (3.c.) + (4.)*	**$ 1,099,284**	**$ 1,336,279**
6.	Benefits Paid		
	a. Annuity benefits	$ (528,468)	$ (512,379)
	b. Refunds	$ (1,902)	$ (2,119)
	c. Total benefits paid	$ (530,370)	$ (514,498)
7.	Expenses		
	a. Other	$ -	$ -
	b. Administrative	$ (886)	$ (992)
	c. Total expenses	$ (886)	$ (992)
8.	**Total deductions:** *(6.c.) + (7.c.)*	**$ (531,256)**	**$ (515,490)**
9.	Net increase (decrease) in net position: *(5) + (8)*	$ 568,028	$ 820,789
10.	**Net position restricted for pensions**	**$ 8,486,907**	**$ 7,918,879**
11.	Approximate return on market value of assets	10.4%	15.2%

** Includes $13.648 million contribution receivable from Minneapolis to be paid July 15.*

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	$	203,131
2. Interest on the total pension liability	$	682,903
3. Changes of benefit terms	$	(50,771)
4. Difference between expected and actual experience of the total pension liability	$	21,720
5. Changes of assumptions	$	(42,807)
6. Benefit payments, including refunds of employee contributions	$	(530,370)
7. Net change in total pension liability	$	283,806
8. Total pension liability – beginning	$	9,268,998
9. Total pension liability – ending	**$**	**9,552,804**
B. Plan fiduciary net position		
1. Contributions – employer	$	179,781
2. Contributions – employee	$	105,479
3. Net investment income	$	813,966
4. Benefit payments, including refunds of employee contributions	$	(530,370)
5. Pension Plan Administrative Expense	$	(886)
6. Other	$	58
7. Net change in plan fiduciary net position	$	568,028
8. Plan fiduciary net position – beginning	$	7,918,879
9. Plan fiduciary net position – ending	**$**	**8,486,907**
C. Net pension liability	**$**	**1,065,897**
D. Plan fiduciary net position as a percentage of the total pension liability		**88.84%**
E. Covered-employee payroll*	**$**	**976,657**
F. Net pension liability as a percentage of covered-employee payroll		**109.14%**

**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 may be built prospectively)

Fiscal year ending June 30,	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009
Total Pension Liability										
Service Cost	$ 203,131	$ 318,401	$ 194,352	$ 187,959	$ 169,124					
Interest on the Total Pension Liability	$ 682,903	$ 616,740	$ 658,198	$ 648,233	$ 598,165					
Benefit Changes	$ (50,771)	$ -	$ -	$ -	$ -					
Difference between Expected and Actual Experience	$ 21,720	$ 37,292	$ (375,575)	$ (221,112)	$ 1,813					
Assumption Changes	$ (42,807)	$ (2,300,201)	$ 2,650,350	$ -	$ 323,945					
Benefit Payments	$ (528,468)	$ (512,379)	$ (498,608)	$ (481,330)	$ (452,462)					
Refunds	$ (1,902)	$ (2,119)	$ (2,391)	$ (1,953)	$ (1,633)					
Net Change in Total Pension Liability	$ 283,806	$ (1,842,266)	$ 2,626,326	$ 131,797	$ 638,952					
Total Pension Liability - Beginning	$ 9,268,998	$ 11,111,264	$ 8,484,938	$ 8,353,141	$ 7,714,189					
Total Pension Liability - Ending (a)	$ 9,552,804	$ 9,268,998	$ 11,111,264	$ 8,484,938	$ 8,353,141					
Plan Fiduciary Net Position										
Employer Contributions	$ 179,781	$ 175,329	$ 165,065	$ 153,317	$ 141,632					
Employee Contributions	$ 105,479	$ 101,984	$ 95,172	$ 88,733	$ 81,213					
Pension Plan Net Investment Income	$ 813,966	$ 1,058,942	$ (8,949)	$ 317,556	$ 1,158,389					
Benefit Payments	$ (528,468)	$ (512,379)	$ (498,608)	$ (481,330)	$ (452,462)					
Refunds	$ (1,902)	$ (2,119)	$ (2,391)	$ (1,953)	$ (1,633)					
Pension Plan Administrative Expense	$ (886)	$ (992)	$ (906)	$ (803)	$ (798)					
Other	$ 58	$ 24	$ 3	$ 84	$ 18					
Net Change in Plan Fiduciary Net Position	$ 568,028	$ 820,789	$ (250,614)	$ 75,604	$ 926,359					
Plan Fiduciary Net Position - Beginning	$ 7,918,879	$ 7,098,090	$ 7,348,704	$ 7,273,100	$ 6,346,741					
Plan Fiduciary Net Position - Ending (b)	$ 8,486,907	$ 7,918,879	$ 7,098,090	$ 7,348,704	$ 7,273,100					
Net Pension Liability - Ending (a) - (b)	$ 1,065,897	$ 1,350,119	$ 4,013,174	$ 1,136,234	$ 1,080,041					
Plan Fiduciary Net Position as a Percentage of Total Pension Liability	88.84 %	85.43 %	63.88 %	86.61 %	87.07 %					
Covered Employee Payroll	$ 976,657	$ 944,296	$ 881,222	$ 845,076	$ 820,333					
Net Pension Liability as a Percentage of Covered Employee Payroll	109.14 %	142.98 %	455.41 %	134.45 %	131.66 %					

Notes to Schedule:

N/A

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

Last 10 Fiscal Years (which may be built prospectively)

FY Ending June 30,	Total Pension Liability	Plan Net Position	Net Pension Liability	Plan Net Position as a % of Total Pension Liability	Covered Payroll	Net Pension Liability as a % of Covered Payroll
2009						
2010						
2011						
2012						
2013						
2014	$ 8,353,141	$ 7,273,100	$ 1,080,041	87.07%	$ 820,333	131.66%
2015	$ 8,484,938	$ 7,348,704	$ 1,136,234	86.61%	$ 845,076	134.45%
2016	$ 11,111,264	$ 7,098,090	$ 4,013,174	63.88%	$ 881,222	455.41%
2017	$ 9,268,998	$ 7,918,879	$ 1,350,119	85.43%	$ 944,296	142.98%
2018	$ 9,552,804	$ 8,486,907	$ 1,065,897	88.84%	$ 976,657	109.14%

Schedule of Contributions Multiyear
(Dollars in Thousands)

Last 10 Fiscal Years

FY Ending June 30,	Actuarially Determined Contribution	Actual Contribution	Contribution Deficiency (Excess)	Covered Payroll	Actual Contribution as a % of Covered Payroll
2009	$ 140,591	$ 101,548	$ 39,043	$ 733,164	13.85%
2010	$ 150,220	$ 107,066	$ 43,154	$ 740,101	14.47
2011	$ 124,284	$ 109,604	$ 14,680	$ 775,806	14.13
2012	$ 152,369	$ 121,891	$ 30,478	$ 794,417	15.34
2013	$ 189,254	$ 125,995	$ 63,259	$ 796,188	15.82
2014	$ 163,985	$ 141,632	$ 22,353	$ 820,333	17.27
2015	$ 197,325	$ 153,317	$ 44,008	$ 845,076	18.14
2016	$ 189,375	$ 165,065	$ 24,310	$ 881,222	18.73
2017	$ 165,252	$ 175,329	$ (10,077)	$ 944,296	18.57
2018	$ 193,183	$ 179,781	$ 13,402	$ 976,657	18.41

Notes to Schedule of Contributions

Methods and Assumptions Used to Determine Contribution Rates for Fiscal Year Ending June 30, 2018:

Valuation Date:	June 30, 2017
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.
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	3.50% to 12.50% 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 2017 valuation pursuant to an experience study of the period 2011 - 2015.
Mortality	RP-2014 annuitant generational mortalty table projected with mortality improvement scale MP-2016, from a base year of 2006. Male rates adjusted by a factor of 0.96.

Other Information:

Notes	The plan is assumed to pay a 2.50% post retirement benefit increase beginning January 1, 2034.
	See separate funding report as of July 1, 2017 for additional detail.

Schedule of Investment Returns Multiyear

Last 10 Fiscal Years

FY Ending June 30,	Annual Return[1]
2009	
2010	
2011	
2012	
2013	
2014	
2015	
2016	
2017	
2018	

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

It is our understanding that this exhibit will be prepared by PERA with assistance from the State Board of Investment. Please provide a copy of the final exhibit for our files.

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, 2018, these best estimates are summarized in the following table:

Asset Class	Target Allocation	Final Target Allocation	Long-Term Expected Real Rate of Return (geometric)
Domestic Equity	33%	36%	5.10%
International Equity	16%	17%	5.30%
Private Markets	25%	25%	5.90%
Fixed Income	24%	20%	0.75%
Unallocated Cash	2%	2%	0.00%
Total	100%	100%	

The Minnesota State Board of Investment (SBI) compiled this data and the related investment notes and provided it to PERA for GASB compliance purposes. PERA 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 reviews of inflation and investment return assumptions dated September 11, 2017.

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% and the municipal bond rate of 3.62%. The projection of cash flows used to determine this single discount rate assumed that plan member and employer contributions will be made at the current statutory rates. Based on these assumptions, the pension plan's fiduciary net position and future contributions were sufficient to finance 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 plan's net pension liability, calculated using a single discount rate of 7.50%, as well as what the plan's net pension liability would be if it were calculated using a single discount rate that is 1-percentage-point lower or 1-percentage-point higher:

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	$ 10,772,257	$ 9,552,804	$ 8,544,367
Net Position Restricted for Pensions	$ 8,486,907	$ 8,486,907	$ 8,486,907
Net Pension Liability	**$ 2,285,350**	**$ 1,065,897**	**$ 57,460**

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)
Current Reporting Period

	Total Pension Liability (a)	Plan Fiduciary Net Position (b)	Net Pension Liability (a) - (b)	Current Period: Deferred Outflows	Current Period: Deferred Inflows	Current Period: Pension Expense*
Balance Beginning of Year	**$ 9,268,998**	**$ 7,918,879**	**$ 1,350,119**			
Changes for the Year:						
Service Cost	$ 203,131		$ 203,131			$ 203,131
Interest on Total Pension Liability	$ 682,903		$ 682,903			$ 682,903
Interest on Fiduciary Net Position		$ 584,693	$ (584,693)			$ (584,693)
Changes in Benefit Terms	$ (50,771)		$ (50,771)			$ (50,771)
Liability Experience Gains and Losses	$ 21,720		$ 21,720	$ 18,100	$ -	$ 3,620
Changes in Assumptions	$ (42,807)		$ (42,807)	$ -	$ 35,672	$ (7,135)
Contributions - Employer		$ 179,781	$ (179,781)			
Contributions - Employees		$ 105,479	$ (105,479)			$ (105,479)
Asset Gain/(Loss)		$ 229,273	$ (229,273)	$ -	$ 183,418	$ (45,855)
Benefit Payouts	$ (530,370)	$ (530,370)				
Administrative Expenses		$ (886)	$ 886			$ 886
Other		$ 58	$ (58)			$ (58)
Net Changes	**$ 283,806**	**$ 568,028**	**$ (284,222)**	**$ 18,100**	**$ 219,090**	**$ 96,549**
Balance End of Year	**$ 9,552,804**	**$ 8,486,907**	**$ 1,065,897**			

** Pension Expense from Experience in the Current Reporting Period.*

GASB Statement No. 68 Reconciliation (Dollars in Thousands)
Current and Prior Reporting Periods

	Total Pension Liability (a)	Plan Fiduciary Net Position (b)	Net Pension Liability (a) - (b)	Deferred Outflows	Deferred Inflows	Net Deferred Outflows Prior Year	Total Pension Expense*
Balance Beginning of Year	**$ 9,268,998**	**$ 7,918,879**	**$ 1,350,119**				
Changes for the Year:							
Service Cost	$ 203,131		$ 203,131				$ 203,131
Interest on Total Pension Liability	$ 682,903		$ 682,903				$ 682,903
Interest on Fiduciary Net Position		$ 584,693	$ (584,693)				$ (584,693)
Changes in Benefit Terms	$ (50,771)		$ (50,771)				$ (50,771)
Liability Experience Gains and Losses	$ 21,720		$ 21,720	$ 43,265	$ 261,491	$ (329,257)	$ (89,311)
Changes in Assumptions	$ (42,807)		$ (42,807)	$ 1,379,165	$ 1,569,139	$ (41,953)	$ 105,214
Contributions - Employer		$ 179,781	$ (179,781)				
Contributions - Employees		$ 105,479	$ (105,479)				$ (105,479)
Asset Gain/(Loss)		$ 229,273	$ (229,273)	$ 281,474	$ 504,728	$ (114,689)	$ (120,708)
Benefit Payouts	$ (530,370)	$ (530,370)					
Administrative Expenses		$ (886)	$ 886				$ 886
Other		$ 58	$ (58)				$ (58)
Net Changes	**$ 283,806**	**$ 568,028**	**$ (284,222)**				**$ 41,114**
Balance End of Year	**$ 9,552,804**	**$ 8,486,907**	**$ 1,065,897**	**$ 1,703,904**	**$ 2,335,358**	**$ (485,899)**	

** Pension Expense from Experience in the Current and Prior Reporting Period.*

Summary of Population Statistics

		Terminated		Recipients			
	Actives	Deferred Retirement	Other Non-Vested	Service Retirement	Disability Retirement	Survivor	Total
Members on 7/1/2017	**11,522**	**1,506**	**1,134**	**7,408**	**1,310**	**1,861**	**24,741**
New members	641						641
Return to active	57	(22)	(35)	0	0	0	0
Terminated non-vested	(93)	0	93	0	0	0	0
Service retirements	(206)	(71)	0	277	0	0	0
Terminated deferred	(163)	163	0	0	0	0	0
Terminated refund/transfer	(31)	(19)	(27)	0	0	0	(77)
Deaths	(7)	(3)	(2)	(155)	(21)	(93)	(281)
New beneficiary	0	0	0	0	0	114	114
Disabled	(48)	0	0	0	48	0	0
Data adjustments	1	26	25	4	10	(7)	59
Net change	151	74	54	126	37	14	456
Members on 6/30/2018	**11,673**	**1,580**	**1,188**	**7,534**	**1,347**	**1,875**	**25,197**

SECTION E

SUMMARY OF BENEFITS

Summary of Plan Provisions – Police & Fire Plan

Following is a summary of the major plan provisions used in the valuation of this report. PERA 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	All full-time and certain part-time police officers and fire fighters, and certain paramedics, who are not contributing to any other local retirement fund.
Contributions	See contribution rates table below. Member contributions are "picked up" according to the provisions of Internal Revenue Code 414(h).
State contributions	$9 million paid annually on October 1 until both PERA P&F and MSRS State Patrol become 90% funded (on a Market Value of Assets basis), or July 1, 2048, if earlier. In addition, $4.5 million in fiscal years 2019 and 2020, and $9.0 million thereafter, until the plan reaches 100% funding, or July 1, 2048, if earlier.
Allowable service	Police and Fire service during which member contributions were made. May also include certain leaves of absence and military service.
Salary	Includes amounts deducted for deferred compensation or supplemental retirement plans, net income from fees and sick leave payments funded by the employer. Excludes unused annual leaves and sick leave payments, severance payments, Workers' Compensation benefits and employer-paid flexible spending accounts, cafeteria plans, healthcare expense accounts, day-care expenses, fringe benefits and the cost of insurance coverage.
Average salary	Average of the five highest successive years of salary. Average Salary is based on all Allowable Service if less than five years.

Effective as of	Member	Employer	Total
Prior to January 1, 2019	10.80%	16.20%	27.00%
January 1, 2019	11.30%	16.95%	28.25%
January 1, 2020 and later	11.80%	17.70%	29.50%

Summary of Plan Provisions – Police & Fire Plan (Continued)

Vesting		Vesting Percent if First Hired		
	Years of Service	Before 7/1/2010	After 6/30/2010 & before 7/1/2014	After 6/30/2014
	<3	0%	0%	0%
	3 – 4	100	0	0
	5	100	50	0
	6	100	60	0
	7	100	70	0
	8	100	80	0
	9	100	90	0
	10	100	100	50
	11	100	100	55
	12	100	100	60
	13	100	100	65
	14	100	100	70
	15	100	100	75
	16	100	100	80
	17	100	100	85
	18	100	100	90
	19	100	100	95
	20+	100	100	100

Summary of Plan Provisions – Police & Fire Plan (Continued)

Retirement

<u>Normal retirement benefit</u>

Age/service requirement	Age 55 and at least partially vested. Proportionate Retirement Annuity is available at age 65 and one year of Allowable Service.
Amount	3.00% of Average Salary for each year of Allowable Service (up to 33 years if hired after June 30, 2014), pro-rata for completed months, adjusted for partial vesting if applicable. A pro-rata share of member contributions will be refunded at retirement for excess service.

<u>Early retirement</u>

Age/service requirement	Age 50 and at least partially vested.
Amount	Normal Retirement Benefit based on Allowable Service and Average Salary at retirement date and 0.10% (0.20% for members enrolled in the plan after June 30, 2007) reduction for each month the member is under age 55. If the effective date of retirement is after June 30, 2019, the reduction is 5/12% for each month that the member is under age 55 at the time of retirement. The change in early retirement factors will be phased in over a five-year period for retirements occurring between July 1, 2014 and June 30, 2019.
Form of payment	Life annuity with return on death of any balance of contributions over aggregate monthly payments. Actuarially equivalent options are: 25%, 50%, 75% or 100% Joint and Survivor with bounce back feature. The Joint and Survivor options are determined on an actuarially equivalent basis, but with no actuarial reduction for the bounce back feature.
Benefit Increases	Benefit recipients receive a future annual 1.00% post-retirement benefit increase. A benefit recipient who has been receiving a benefit for at least 12 full months as of June 30 will receive a full increase. Members receiving benefits for at least one month but less than 12 full months as of June 30 will receive a pro rata increase. For retirements after May 31, 2014, the first increase will be delayed two years. Members retired under laws in effect before July 1, 1973 receive an additional lump sum payment each year. In 1989, this lump sum payment is the greater of $25 times each full year of Allowable Service or the difference between $400 times each full year of Allowable Service and the sum of benefits paid from any Minnesota public pension plan plus cash payments from the Social Security Administration for the preceding fiscal year July 1, 1988 through June 30, 1989. In each following year, the lump sum payment will increase by the same percentage increase that is applied to regular annuities paid from the Fund. Effective January 1, 2002, annual lump sum payment is divided by 12 and paid as a monthly life annuity in the annuity form elected.

Summary of Plan Provisions – Police & Fire Plan (Continued)

Disability	
<u>Duty disability benefit</u>	
Age/service requirement	Physically or mentally unable to perform normal duties as a police officer or fire fighter as a direct result of an act of duty specific to protecting property and personal safety of others. Members age 55 or older with 20 or more years of Allowable Service are not eligible to apply for duty disability benefits.
Amount	60.0%, plus an additional 3.00% for each year of service in excess of 20 years, of Average Salary paid until Normal Retirement Age, or for 60 months, whichever is later. The retirement benefit is then recalculated but is never lower than the disability benefit. If a member became disabled prior to July 1, 1997 but did not commence their benefit before July 1, 1997, the benefit is calculated under the laws in effect before July 1, 1997, and an actuarial increase shall be made for the change in post-retirement interest rates from 5.00% to 6.00%.
<u>Regular disability benefit</u>	
Age/service requirement	Physically or mentally unable to perform normal duties as a police officer or fire fighter with one year of Allowable Service. Members age 55 or older with 15 or more years of Allowable Service are not eligible to apply for regular disability benefits.
Amount	45.00% of Average Salary, paid until Normal Retirement Age, or for 60 months, whichever is later. The retirement benefit is then recalculated but is never lower than the disability benefit. Benefits for total and permanent regular disability are calculated as 3.00% of Average Salary for each year of Allowable Service, with a minimum of 45.00% of Average Salary. If a member became disabled prior to July 1, 1997 but did not commence his or her benefit before July 1, 1997, the benefit payable is calculated under the laws in effect before July 1, 1997, and an actuarial increase shall be made for the change in post-retirement interest rates from 5.00% to 6.00%.
Benefit increases	Same as for retirement.
<u>Retirement benefit</u>	
Age/service requirement	Upon cessation of disability benefits.
Amount	Any optional annuity continues. Otherwise, the larger of the disability benefit paid before age 55 or the normal retirement benefit available at age 55, or an actuarially equivalent optional annuity.
Form of payment	Same as for retirement.
Benefit increases	Same as for retirement.

Summary of Plan Provisions – Police & Fire Plan (Continued)

Death

Surviving spouse benefit

Age/service requirement	Death of active member or regular disabled member with surviving spouse whose disability benefit accrued before July 1, 2007, who is vested at death (service requirement is waived if death occurs in the line of duty).
Amount	50.00% of salary (60.00% if death occurs in the line of duty after June 30, 2007) averaged over last six months. Benefit paid until spouse's death but no payments while spouse is remarried prior to July 1, 1991. If a member becomes deceased prior to July 1, 1997 and the beneficiary was not eligible to commence their survivor benefits before July 1, 1997, the benefit payable is calculated under the laws in effect before July 1, 1997, and 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.

Surviving dependent children's benefit

Age/service requirement	Non-duty related death of active member or regular disabled member with eligible dependent child.
Amount	10.00% of salary averaged over last six months for each child. Family benefit minimum (including spouse's benefit) of 50.00% of salary and maximum of 70.00% of salary. Benefits paid until child marries, dies, or attains age 18 (age 23 if full-time student).

Duty disability surviving spouse benefit

Age/service requirement	Member who is totally and permanently disabled who dies before age 55 or within five years of the effective date of the disability benefit, whichever is later.
Amount	60.00% of salary averaged over last six months. Benefits paid until spouse's death but no payments while spouse is remarried prior to July 1, 1991.
Benefit increases	Same as for retirement.

Summary of Plan Provisions – Police & Fire Plan (Continued)

Death (Concluded)

Duty disability surviving dependent children's benefit

Age/service requirement	Death of a member with an eligible dependent child who was disabled in the line of duty and died as a direct result of the disability.
Amount	10.00% of salary averaged over last six months for each child. Family benefit minimum (including spouse's benefit) of 60.00% of salary and maximum of 80.00% of salary. Benefits paid until child marries, dies, or attains age 18 (age 23 if full-time student). If a member became deceased prior to July 1, 1997 and the beneficiary was not eligible to commence their survivor benefits before July 1, 1997, the benefit payable is calculated under the laws in effect before July 1, 1997, and an actuarial increase shall be made for the change in the post-retirement interest rates from 5.00% to 6.00%.

Surviving spouse optional annuity

Age/service requirement	Active member dies before age 55. Benefits commence when member would have been age 55 or as early as age 50 if qualified for early retirement, benefits commence immediately if member had 30 years of service.
Amount	Survivor's payment of the 100% joint and survivor benefit the member could have elected if terminated. Alternatively, spouse may elect refund of deceased's contributions with interest if there are no dependent children. If a member became deceased prior to July 1, 1997 and the beneficiary was not eligible to commence their survivor benefits before July 1, 1997, the benefit payable is calculated under the laws in effect before July 1, 1997, and 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 – Police & Fire Plan (Continued)

Termination	
Refund of contributions	
Age/service requirement	Termination of public 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. 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.
Deferred benefit	
Age/service requirement	Partially or fully vested.
Amount	Benefit computed under law in effect at termination and increased by the following percentage (augmentation) compounded annually for terminations prior to 2012: (a.) 0.00% before July 1, 1971; (b.) 5.00% from July 1, 1971 to January 1, 1981; (c.) 3.00% (2.50% if hired after June 30, 2006) thereafter until the earlier of January 1 of the year following attainment of age 55 and January 1, 2012; (d.) 5.00% (2.50% if hired after June 30, 2006) thereafter until the earlier of the date the annuity begins and January 1, 2012; (e.) 1.00% from January 1, 2012 through December 31, 2018; and (f.) 0.00% from January 1, 2019, thereafter. Members who terminate after 2011 will receive no future augmentation. If a member terminated employment prior to July 1, 1997 but was not eligible to commence their pension before July 1, 1997, the benefit payable is calculated under the laws in effect before July 1, 1997 and 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.
Actuarial equivalent factors	Effective July 1, 2019, actuarially equivalent factors based on the RP-2014 mortality table for healthy annuitants for a member turning age 55 in 2021, reflecting projected mortality improvements using Scale MP-2017, male rates multiplied by 0.96, blended 90% males, and 6.50% interest.

Summary of Plan Provisions – Police & Fire Plan (Concluded)

Combined service annuity	Members are eligible for combined service benefits if they: (a.) Meet minimum retirement age for each plan participated in and total public service meets the vesting requirements of each plan; or (b.) Have three or more years of service under PERA and the covered fund(s) (if hired prior to July 1, 2010). Other requirements for combined service include: (a.) Member must have at least six months of allowable service credit in each plan worked under; and (b.) Member may not be in receipt of a benefit from another plan. Members who meet the above requirements must have their benefits based on the following: (a.) Allowable service in all covered plans is 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	Post-retirement benefit increases were changed to 1.0% for all years, with no trigger. An end date of July 1, 2048 was added to the existing $9.0 million state contribution. New annual state aid will equal $4.5 million in fiscal years 2019 and 2020, and $9.0 million thereafter until the plan reaches 100% funding, or July 1, 2048, if earlier. Member contributions were changed from 10.8% to 11.3% of pay, effective January 1, 2019 and 11.8% of pay, effective January 1, 2020. Employer contributions were changed from 16.20% to 16.95% of pay, effective January 1, 2019 and 17.70% of pay, effective January 1, 2020. Interest credited on member contributions decreased from 4.0% to 3.0%, beginning July 1, 2018. Deferred augmentation was changed to 0.00%, effective January 1, 2019. Augmentation that has already accrued for deferred members will still apply. Actuarial equivalent factors were updated to reflect revised mortality and interest assumptions.

Summary of Plan Provisions – Minneapolis Police Relief Association

Normal retirement benefit	Monthly benefits are equal to the number of units multiplied by the unit values described herein. Units are based on service, as follows: **Service** / **Units** 20 / 35.0 units 21 / 36.6 units 22 / 38.2 units 23 / 39.8 units 24 / 41.4 units 25 or more / 43.0 units Members must be at least age 50 with 5 years of service to receive this benefit.
Unit values	**Calendar Year** / **Unit Value** 2012 / $ 104.651 2013 / 109.011 2014 / 114.825 2015 / 124.031 Unit values after 2015 are assumed to increase the same percentage as the post-retirement benefit increase.
Surviving spouse's benefit	Annual benefit based on 23 units for the surviving spouse of an active or retired member. Upon retirement, members may choose an alternative form of payment that provides 50%, 75%, or 100% of their benefit to their spouse after their death. The units are adjusted if one of these alternate forms is selected.
Surviving children's benefit	Annual benefit based on 8 units for each surviving child of an active or retired member. Benefits continue to age 18 or if the child is a full-time student, to age 22. The total benefit for surviving children and spouse combined is limited to 41 units.
Contributions	Member and employer contributions equal to 8.00% of the monthly unit value multiplied by 80 are required for each member. After 25 years of service, member contributions are paid to a separate health insurance account.
Benefit increases	Benefit recipients receive a future annual 1.00% post-retirement benefit increase.

Summary of Plan Provisions – Minneapolis Firefighters' Relief Association

Normal retirement benefit	Monthly benefits are equal to the number of units multiplied by the unit values described herein. Units are based on service, as follows: **Service** / **Units** 15 / 25.0 units 16 / 26.6 units 17 / 28.2 units 18 / 29.8 units 19 / 31.4 units 20 / 35.0 units 21 / 36.6 units 22 / 38.2 units 23 / 39.8 units 24 / 41.4 units 25 or more / 43.0 units Members must be at least age 50 with 5 years of service to receive this benefit. Members may choose among alternative survivor payment forms which modify the number of units payable to the member and their spouse. A member who is single at the time of retirement and who has at least 25 years of service may choose to receive 43.3 units on the condition of a reduced survivor payment to any future spouse.
Unit values	**Calendar Year** / **Unit Value** 2013 / 100.775 2014 / 104.264 2015 / 124.031 Unit values after 2015 are assumed to increase the same percentage as the post-retirement benefit increase.
Disability benefit	Annual benefit based on 41 units for the disabled member.
Surviving spouse's benefit	Annual benefit based on 23 units for the surviving spouse of an active or retired member and 22 units for the surviving spouse of a disabled member. Upon retirement, members may choose an alternative form of payment that provides 50%, 75% or 100% of their benefit to their spouse after their death. The units are adjusted if one of these alternate forms is selected.
Surviving children's benefit	Annual benefit based on 8 units for each surviving child of an active or retired member. Benefits continue to age 18 or if the child is a full-time student, to age 22. The total benefit for surviving children and spouse combined is limited to 43 units.
Contributions	Member and employer contributions equal to 8.00% of the monthly unit value multiplied by 80 are required for each member. After 25 years of service, member contributions are paid to a separate health insurance account.
Benefit increases	Benefit recipients receive a future annual 1.00% post-retirement benefit increase.

SECTION F

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

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.

Asset Valuation Method

Fair value of assets.

Summary of Actuarial Assumptions

The following assumptions were used in valuing the liabilities and benefits under the plan. The assumptions are based on the last experience study dated August 30, 2016, and a review of inflation and investment assumptions, dated September 11, 2017.

The Allowance for Combined Service Annuity assumptions are based on an analysis completed by the LCPR actuary and documented in a report dated October 2016.

Investment return	7.50% per annum.
Single Discount Rate	7.50% 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 earned during the year.
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-2017, from a base year of 2006.
Healthy post-retirement	RP-2014 annuitant generational mortality table projected with mortality improvement scale MP-2017 from a base year of 2006. Male rates are adjusted by a factor of 0.96.
Disabled	RP-2014 annuitant generational mortality table projected with mortality improvement scale MP-2017 from a base year of 2006. Male rates are adjusted by a factor of 0.96.
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. Note that plan changes reflected in this report may ultimately result in behavior changes that are not anticipated in the current retirement rates.
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	3.00%
2	3.00%
3	3.00%

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 33.0% for vested members and 2.0% for non-vested members 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 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 male and 60% of female active members are assumed to be married. Actual marital status is used for members in payment status.
Age of spouse	Males are assumed to be two years older than females. For members in payment status, actual spouse date of birth is used, if provided.
Eligible children	Retiring members are assumed to have no dependent children.
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 25% Joint & Survivor option 20% elect 50% Joint & Survivor option 20% elect 75% Joint & Survivor option 35% elect 100% Joint & Survivor option Females: 20% elect 25% Joint & Survivor option 20% elect 50% Joint & Survivor option 10% elect 75% Joint & Survivor option 20% 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.
Eligibility testing	Eligibility for benefits is determined based upon the age nearest birthday and service 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. 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 41 members reported with a salary less than $100. We used prior year salary (26 members), if available; otherwise high five salary with a 10% load to account for salary increases (15 members). If neither prior year salary nor high five salary was available, we assumed a value of $35,000. Note former members of Minneapolis Fire are excluded from these salary counts as salary is not used to calculate the benefit. There were also 133 members reported without a gender. We assumed male gender. There were 9 members reported without a date of birth. We assumed a date of birth of July 1, 1985. <u>Data for terminated members:</u> We calculated benefits for these members using the reported Average Salary and credited service. If Average Salary was not reported (1 member), we assumed a value of $24,000. If credited service was not reported (13 members), we used elapsed time from hire date to termination date (6 members); otherwise we assumed nine years of service. If termination date was invalid or not reported (7 members), we assumed the termination date was equal to the hire date plus credited service, otherwise the valuation date. If the reported termination date occurs prior to the reported hire date, the two dates were swapped. There were 8 members reported without a gender; male was assumed. There were no members reported without a date of birth. <u>Data for retired members:</u> There were no members with missing or invalid dates of birth. There were 21 members reported without a gender. We assumed retirees are male and beneficiaries are female. There were 13 members that were active last year and retirement eligible and none on the retiree data file this year. At the direction of PERA, we included these members in the 2018 valuation as retirees with an estimated life only monthly benefit.

Summary of Actuarial Assumptions (Continued)

Unknown data for certain members (Continued)	<u>Data for retired members (Continued):</u> Because PERA reclassifies disabled members as retirees once the member reaches Normal Retirement Age, we compare the members that PERA reports as retirees to our disabled group from the last valuation. If a member was disabled in the valuation, we reclassify that member as a disabled retiree in this year's valuation. We reclassified 205 retirees as disabled retirees in this valuation.
Changes in actuarial assumptions	The mortality projection scale was changed from MP-2016 to MP-2017.

Summary of Actuarial Assumptions (Continued)

Age in 2018	Percentage of Members Dying Each Year* Healthy Post-Retirement Mortality Males	Females	Healthy Pre-Retirement Mortality Males	Females	Disability Mortality Males	Females
20	0.04%	0.02%	0.04%	0.02%	0.04%	0.02%
25	0.06	0.03	0.05	0.02	0.06	0.03
30	0.09	0.07	0.05	0.02	0.09	0.07
35	0.13	0.12	0.06	0.03	0.13	0.12
40	0.19	0.17	0.07	0.05	0.19	0.17
45	0.27	0.22	0.10	0.07	0.27	0.22
50	0.39	0.27	0.17	0.11	0.39	0.27
55	0.56	0.38	0.28	0.18	0.56	0.38
60	0.78	0.58	0.49	0.27	0.78	0.58
65	1.12	0.85	0.88	0.39	1.12	0.85
70	1.67	1.31	1.43	0.64	1.67	1.31
75	2.66	2.16	2.39	1.11	2.66	2.16
80	4.49	3.69	4.06	1.95	4.49	3.69
85	7.87	6.60	7.99	5.15	7.87	6.60
90	13.83	11.75	14.57	11.33	13.83	11.75

* *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.*

Age	Withdrawal Rates After Third Year Males	Females	Rates of Disability Retirement Males	Females
20	3.00%	3.00%	0.11%	0.11%
25	2.60	2.60	0.13	0.13
30	2.10	2.10	0.16	0.16
35	1.60	1.60	0.19	0.19
40	1.25	1.25	0.29	0.29
45	1.25	1.25	0.54	0.54
50	0.00	0.00	1.04	1.04
55	0.00	0.00	2.03	2.03
60	0.00	0.00	0.00	0.00

Summary of Actuarial Assumptions (Concluded)

Age	Retirement Rate
50	10.00%
51	7.00
52	7.00
53	10.00
54	10.00
55	25.00
56	22.50
57	22.50
58	22.50
59	20.00
60	22.50
61	25.00
62	30.00
63	30.00
64	30.00
65	50.00
66	50.00
67	50.00
68	50.00
69	50.00
70+	100.00

Salary Scale	
Year	Increase
1	12.25%
2	10.50%
3	8.75%
4	7.75%
5	6.25%
6	5.75%
7	5.25%
8	5.00%
9	4.75%
10	4.50%
11	4.25%
12	4.15%
13	4.05%
14	3.95%
15	3.85%
16	3.75%
17	3.75%
18	3.75%
19	3.75%
20	3.75%
21	3.65%
22	3.55%
23	3.45%
24	3.35%
25+	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 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 assumed long-term rate of return is used. 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 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%; and **the resulting single discount rate 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 (SDR). 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)

	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*	Contributions due from Mergers	Additional State Contributions**	Total Contributions
2018	$ 976,657	$ 0	$ 976,657						
2019	1,000,474	0	1,000,474	$ 110,552	$ 165,829	$ 0	$ 15,338	$ 13,500	$ 305,219
2020	994,145	38,845	1,032,990	114,824	172,285	3,065	15,338	13,500	319,012
2021	983,109	83,453	1,066,562	116,007	174,010	7,102	15,338	18,000	330,457
2022	968,106	133,119	1,101,225	114,236	171,355	11,328	15,308	18,000	330,227
2023	949,697	187,318	1,137,015	112,064	168,096	15,941	15,308	18,000	329,409
2024	928,863	245,105	1,173,968	109,606	164,409	20,858	15,308	18,000	328,181
2025	905,931	306,191	1,212,122	106,900	160,350	26,057	15,308	18,000	326,615
2026	880,901	370,615	1,251,516	103,946	155,920	31,539	15,308	18,000	324,713
2027	854,178	438,012	1,292,190	100,793	151,189	37,275	15,308	18,000	322,565
2028	826,002	508,184	1,334,186	97,468	146,202	43,247	15,308	18,000	320,225
2029	796,958	580,589	1,377,547	94,041	141,062	49,408	15,308	18,000	317,819
2030	767,045	655,273	1,422,318	90,511	135,767	55,764	15,308	18,000	315,350
2031	735,843	732,700	1,468,543	86,829	130,244	62,353	15,308	18,000	312,734
2032	703,471	812,800	1,516,271	83,010	124,514	69,169	15,308	18,000	310,001
2033	669,676	895,873	1,565,549	79,022	118,533	76,239	0	18,000	291,794
2034	634,537	981,893	1,616,430	74,875	112,313	83,559	0	0	270,747
2035	598,162	1,070,802	1,668,964	70,583	105,875	91,125	0	0	267,583
2036	560,548	1,162,657	1,723,205	66,145	99,217	98,942	0	0	264,304
2037	521,758	1,257,451	1,779,209	61,567	92,351	107,009	0	0	260,927
2038	482,029	1,355,005	1,837,034	56,879	85,319	115,311	0	0	257,509
2039	441,879	1,454,858	1,896,737	52,142	78,213	123,808	0	0	254,163
2040	401,485	1,556,896	1,958,381	47,375	71,063	132,492	0	0	250,930
2041	361,233	1,660,795	2,022,028	42,626	63,938	141,334	0	0	247,898
2042	321,685	1,766,059	2,087,744	37,959	56,938	150,292	0	0	245,189
2043	283,314	1,872,282	2,155,596	33,431	50,147	159,331	0	0	242,909
2044	246,650	1,979,003	2,225,653	29,105	43,657	168,413	0	0	241,175
2045	211,817	2,086,170	2,297,987	24,994	37,492	177,533	0	0	240,019
2046	179,047	2,193,624	2,372,671	21,128	31,691	186,677	0	0	239,496
2047	148,789	2,300,994	2,449,783	17,557	26,336	195,815	0	0	239,708
2048	121,396	2,408,005	2,529,401	14,325	21,487	204,921	0	0	240,733
2049	97,268	2,514,339	2,611,607	11,478	17,216	213,970	0	0	242,664
2050	76,578	2,619,906	2,696,484	9,036	13,554	222,954	0	0	245,544
2051	59,322	2,724,797	2,784,119	7,000	10,500	231,880	0	0	249,380
2052	45,314	2,829,289	2,874,603	5,347	8,021	240,773	0	0	254,141
2053	34,153	2,933,875	2,968,028	4,030	6,045	249,673	0	0	259,748
2054	25,353	3,039,136	3,064,489	2,992	4,487	258,630	0	0	266,109
2055	18,418	3,145,667	3,164,085	2,173	3,260	267,696	0	0	273,129
2056	12,999	3,253,919	3,266,918	1,534	2,301	276,908	0	0	280,743
2057	8,854	3,364,238	3,373,092	1,045	1,567	286,297	0	0	288,909
2058	5,776	3,476,942	3,482,718	682	1,022	295,888	0	0	297,592
2059	3,591	3,592,315	3,595,906	424	636	305,706	0	0	306,766
2060	2,112	3,710,661	3,712,773	249	374	315,777	0	0	316,400
2061	1,162	3,832,276	3,833,438	137	206	326,127	0	0	326,470
2062	596	3,957,429	3,958,025	70	105	336,777	0	0	336,952
2063	285	4,086,376	4,086,661	34	50	347,751	0	0	347,835
2064	128	4,219,349	4,219,477	15	23	359,067	0	0	359,105
2065	52	4,356,558	4,356,610	6	9	370,743	0	0	370,758
2066	17	4,498,183	4,498,200	2	3	382,795	0	0	382,800
2067	5	4,644,387	4,644,392	1	1	395,237	0	0	395,239
2068	1	4,795,333	4,795,334	0	-	408,083	0	0	408,083

**Contributions related to future employees in excess of normal cost and expenses of 20.99% of pay.*

***Additional state contributions assumed to end after 15 years. Actual end date will depend on funding status of this plan and the MSRS State Patrol Plan.*

Single Discount Rate Development
Projection of Contributions (Concluded)
(Dollars in Thousands)

Fiscal Year Ending	Payroll: Payroll for Current Employees	Payroll: Payroll for New Employees	Payroll: Total Employee Payroll	Projected Contributions: Contributions from Current Employees	Projected Contributions: Employer Contributions for Current Employees	Projected Contributions: Contributions on Future Payroll toward current UAL*	Projected Contributions: Contributions due from Mergers	Projected Contributions: Additional State Contributions**	Projected Contributions: Total Contributions
2069	$ -	$ 4,951,183	$ 4,951,183	$ 0	$ 0	$ 421,346	$ 0	$ 0	$ 421,346
2070	0	5,112,096	5,112,096	0	0	435,039	0	0	435,039
2071	0	5,278,239	5,278,239	0	0	449,178	0	0	449,178
2072	0	5,449,782	5,449,782	0	0	463,776	0	0	463,776
2073	0	5,626,900	5,626,900	0	0	478,849	0	0	478,849
2074	0	5,809,774	5,809,774	0	0	494,412	0	0	494,412
2075	0	5,998,592	5,998,592	0	0	510,480	0	0	510,480
2076	0	6,193,546	6,193,546	0	0	527,071	0	0	527,071
2077	0	6,394,836	6,394,836	0	0	544,201	0	0	544,201
2078	0	6,602,669	6,602,669	0	0	561,887	0	0	561,887
2079	0	6,817,255	6,817,255	0	0	580,148	0	0	580,148
2080	0	7,038,816	7,038,816	0	0	599,003	0	0	599,003
2081	0	7,267,578	7,267,578	0	0	618,471	0	0	618,471
2082	0	7,503,774	7,503,774	0	0	638,571	0	0	638,571
2083	0	7,747,647	7,747,647	0	0	659,325	0	0	659,325
2084	0	7,999,445	7,999,445	0	0	680,753	0	0	680,753
2085	0	8,259,427	8,259,427	0	0	702,877	0	0	702,877
2086	0	8,527,858	8,527,858	0	0	725,721	0	0	725,721
2087	0	8,805,014	8,805,014	0	0	749,307	0	0	749,307
2088	0	9,091,177	9,091,177	0	0	773,659	0	0	773,659
2089	0	9,386,640	9,386,640	0	0	798,803	0	0	798,803
2090	0	9,691,706	9,691,706	0	0	824,764	0	0	824,764
2091	0	10,006,686	10,006,686	0	0	851,569	0	0	851,569
2092	0	10,331,904	10,331,904	0	0	879,245	0	0	879,245
2093	0	10,667,690	10,667,690	0	0	907,820	0	0	907,820
2094	0	11,014,390	11,014,390	0	0	937,325	0	0	937,325
2095	0	11,372,358	11,372,358	0	0	967,788	0	0	967,788
2096	0	11,741,960	11,741,960	0	0	999,241	0	0	999,241
2097	0	12,123,573	12,123,573	0	0	1,031,716	0	0	1,031,716
2098	0	12,517,589	12,517,589	0	0	1,065,247	0	0	1,065,247
2099	0	12,924,411	12,924,411	0	0	1,099,867	0	0	1,099,867
2100	0	13,344,455	13,344,455	0	0	1,135,613	0	0	1,135,613
2101	0	13,778,149	13,778,149	0	0	1,172,521	0	0	1,172,521
2102	0	14,225,939	14,225,939	0	0	1,210,627	0	0	1,210,627
2103	0	14,688,282	14,688,282	0	0	1,249,973	0	0	1,249,973
2104	0	15,165,651	15,165,651	0	0	1,290,597	0	0	1,290,597
2105	0	15,658,535	15,658,535	0	0	1,332,541	0	0	1,332,541
2106	0	16,167,437	16,167,437	0	0	1,375,849	0	0	1,375,849
2107	0	16,692,879	16,692,879	0	0	1,420,564	0	0	1,420,564
2108	0	17,235,398	17,235,398	0	0	1,466,732	0	0	1,466,732
2109	0	17,795,548	17,795,548	0	0	1,514,401	0	0	1,514,401
2110	0	18,373,903	18,373,903	0	0	1,563,619	0	0	1,563,619
2111	0	18,971,055	18,971,055	0	0	1,614,437	0	0	1,614,437
2112	0	19,587,615	19,587,615	0	0	1,666,906	0	0	1,666,906
2113	0	20,224,212	20,224,212	0	0	1,721,080	0	0	1,721,080
2114	0	20,881,499	20,881,499	0	0	1,777,016	0	0	1,777,016
2115	0	21,560,148	21,560,148	0	0	1,834,769	0	0	1,834,769
2116	0	22,260,852	22,260,852	0	0	1,894,399	0	0	1,894,399
2117	0	22,984,330	22,984,330	0	0	1,955,966	0	0	1,955,966
2118	0	23,731,321	23,731,321	0	0	2,019,535	0	0	2,019,535

**Contributions related to future employees in excess of normal cost and expenses of 20.99% of pay.*

***Additional state contributions assumed to end after 15 years. Actual end date will depend on funding status of this plan and the MSRS State Patrol Plan.*

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

Fiscal Year Ending	Projected Beginning Plan 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	$ 8,486,907	$ 305,219	$ 555,056	$ 900	$ 627,285	$ 8,863,455
2020	8,863,455	319,012	574,567	895	655,316	9,262,321
2021	9,262,321	330,457	595,413	885	684,885	9,681,365
2022	9,681,365	330,228	617,864	871	715,479	10,108,337
2023	10,108,337	329,409	641,497	855	746,602	10,541,996
2024	10,541,996	328,181	667,222	836	778,135	10,980,254
2025	10,980,254	326,614	694,021	815	809,960	11,421,992
2026	11,421,992	324,713	722,156	793	841,986	11,865,742
2027	11,865,742	322,565	751,036	769	874,125	12,310,627
2028	12,310,627	320,225	779,995	743	906,340	12,756,454
2029	12,756,454	317,819	808,672	717	938,633	13,203,517
2030	13,203,517	315,350	837,686	690	971,005	13,651,496
2031	13,651,496	312,734	866,765	662	1,003,437	14,100,240
2032	14,100,240	310,001	895,777	633	1,035,925	14,549,756
2033	14,549,756	291,793	924,992	603	1,067,894	14,983,848
2034	14,983,848	270,747	954,129	571	1,098,604	15,398,499
2035	15,398,499	267,583	983,914	538	1,128,491	15,810,121
2036	15,810,121	264,304	1,014,162	504	1,158,129	16,217,888
2037	16,217,888	260,928	1,044,174	470	1,187,483	16,621,655
2038	16,621,655	257,509	1,074,330	434	1,216,531	17,020,931
2039	17,020,931	254,163	1,104,036	398	1,245,261	17,415,921
2040	17,415,921	250,930	1,133,110	361	1,273,697	17,807,077
2041	17,807,077	247,898	1,161,115	325	1,301,892	18,195,427
2042	18,195,427	245,189	1,187,751	290	1,329,939	18,582,514
2043	18,582,514	242,909	1,212,479	255	1,357,978	18,970,667
2044	18,970,667	241,175	1,235,055	222	1,386,195	19,362,760
2045	19,362,760	240,019	1,255,876	191	1,414,794	19,761,506
2046	19,761,506	239,496	1,274,690	161	1,443,989	20,170,140
2047	20,170,140	239,707	1,290,928	134	1,474,048	20,592,833
2048	20,592,833	240,733	1,304,030	109	1,505,306	21,034,733
2049	21,034,733	242,664	1,313,210	88	1,538,182	21,502,281
2050	21,502,281	245,545	1,318,088	69	1,573,175	22,002,844
2051	22,002,844	249,380	1,318,434	53	1,610,847	22,544,584
2052	22,544,584	254,140	1,314,302	41	1,651,805	23,136,186
2053	23,136,186	259,748	1,306,155	31	1,696,682	23,786,430
2054	23,786,430	266,110	1,294,608	23	1,746,110	24,504,019
2055	24,504,019	273,130	1,280,229	17	1,800,717	25,297,620
2056	25,297,620	280,743	1,263,266	12	1,861,143	26,176,228
2057	26,176,228	288,909	1,243,869	8	1,928,053	27,149,313
2058	27,149,313	297,592	1,222,212	5	2,002,152	28,226,840
2059	28,226,840	306,765	1,198,437	3	2,084,180	29,419,345
2060	29,419,345	316,400	1,172,721	2	2,174,919	30,737,941
2061	30,737,941	326,470	1,145,242	1	2,275,197	32,194,365
2062	32,194,365	336,953	1,116,170	1	2,385,885	33,801,032
2063	33,801,032	347,835	1,085,671	0	2,507,909	35,571,105
2064	35,571,105	359,104	1,053,903	0	2,642,249	37,518,555
2065	37,518,555	370,758	1,021,002	0	2,789,948	39,658,259
2066	39,658,259	382,801	987,078	0	2,952,119	42,006,101
2067	42,006,101	395,239	952,226	0	3,129,948	44,579,062
2068	44,579,062	408,083	916,539	0	3,324,707	47,395,313

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 (Concluded)
(Dollars in Thousands)

Fiscal Year Ending	Projected Beginning Plan 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	$ 47,395,313	$ 421,346	$ 880,106	$ 0	$ 3,537,756	$ 50,474,309
2070	50,474,309	435,039	843,015	0	3,770,551	53,836,884
2071	53,836,884	449,178	805,358	0	4,024,651	57,505,355
2072	57,505,355	463,776	767,226	0	4,301,728	61,503,633
2073	61,503,633	478,849	728,717	0	4,603,572	65,857,337
2074	65,857,337	494,412	689,931	0	4,932,101	70,593,919
2075	70,593,919	510,480	650,975	0	5,289,371	75,742,795
2076	75,742,795	527,071	611,964	0	5,677,584	81,335,486
2077	81,335,486	544,201	573,020	0	6,099,100	87,405,767
2078	87,405,767	561,887	534,273	0	6,556,449	93,989,830
2079	93,989,830	580,148	495,860	0	7,052,341	101,126,459
2080	101,126,459	599,003	457,926	0	7,589,679	108,857,215
2081	108,857,215	618,471	420,626	0	8,171,576	117,226,636
2082	117,226,636	638,571	384,126	0	8,801,367	126,282,448
2083	126,282,448	659,325	348,599	0	9,482,625	136,075,799
2084	136,075,799	680,753	314,233	0	10,219,181	146,661,500
2085	146,661,500	702,877	281,214	0	11,015,139	158,098,302
2086	158,098,302	725,721	249,729	0	11,874,900	170,449,194
2087	170,449,194	749,307	219,946	0	12,803,182	183,781,737
2088	183,781,737	773,659	192,013	0	13,805,048	198,168,431
2089	198,168,431	798,803	166,046	0	14,885,932	213,687,120
2090	213,687,120	824,764	142,134	0	16,051,670	230,421,420
2091	230,421,420	851,569	120,332	0	17,308,532	248,461,189
2092	248,461,189	879,245	100,668	0	18,663,258	267,903,024
2093	267,903,024	907,820	83,141	0	20,123,093	288,850,796
2094	288,850,796	937,325	67,721	0	21,695,831	311,416,231
2095	311,416,231	967,788	54,345	0	23,389,852	335,719,526
2096	335,719,526	999,241	42,923	0	25,214,178	361,890,022
2097	361,890,022	1,031,716	33,332	0	27,178,514	390,066,920
2098	390,066,920	1,065,247	25,423	0	29,293,308	420,400,052
2099	420,400,052	1,099,867	19,025	0	31,569,803	453,050,697
2100	453,050,697	1,135,613	13,957	0	34,020,104	488,192,457
2101	488,192,457	1,172,521	10,028	0	36,657,240	526,012,190
2102	526,012,190	1,210,627	7,052	0	39,495,233	566,710,998
2103	566,710,998	1,249,973	4,853	0	42,549,173	610,505,291
2104	610,505,291	1,290,597	3,268	0	45,835,299	657,627,919
2105	657,627,919	1,332,541	2,156	0	49,371,082	708,329,386
2106	708,329,386	1,375,849	1,397	0	53,175,314	762,879,152
2107	762,879,152	1,420,564	892	0	57,268,212	821,567,036
2108	821,567,036	1,466,732	565	0	61,671,515	884,704,718
2109	884,704,718	1,514,401	357	0	66,408,604	952,627,366
2110	952,627,366	1,563,619	229	0	71,504,620	1,025,695,376
2111	1,025,695,376	1,614,437	150	0	76,986,595	1,104,296,258
2112	1,104,296,258	1,666,906	101	0	82,883,595	1,188,846,658
2113	1,188,846,658	1,721,080	71	0	89,226,871	1,279,794,538
2114	1,279,794,538	1,777,016	52	0	96,050,022	1,377,621,524
2115	1,377,621,524	1,834,769	40	0	103,389,173	1,482,845,426
2116	1,482,845,426	1,894,399	31	0	111,283,162	1,596,022,956
2117	1,596,022,956	1,955,966	25	0	119,773,744	1,717,752,641
2118	1,717,752,641	2,019,535	20	0	128,905,811	1,848,677,967

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 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)
2019	$ 8,486,907	$ 555,056	$ 555,056	$ 0	$ 535,343	$ 0	$ 535,343
2020	8,863,456	574,567	574,567	0	515,499	0	515,499
2021	9,262,322	595,413	595,413	0	496,933	0	496,933
2022	9,681,366	617,864	617,864	0	479,693	0	479,693
2023	10,108,337	641,497	641,497	0	463,294	0	463,294
2024	10,541,997	667,222	667,222	0	448,254	0	448,254
2025	10,980,254	694,021	694,021	0	433,728	0	433,728
2026	11,421,993	722,156	722,156	0	419,825	0	419,825
2027	11,865,742	751,036	751,036	0	406,152	0	406,152
2028	12,310,628	779,995	779,995	0	392,384	0	392,384
2029	12,756,454	808,672	808,672	0	378,428	0	378,428
2030	13,203,516	837,686	837,686	0	364,657	0	364,657
2031	13,651,495	866,765	866,765	0	350,991	0	350,991
2032	14,100,239	895,777	895,777	0	337,432	0	337,432
2033	14,549,755	924,992	924,992	0	324,127	0	324,127
2034	14,983,847	954,129	954,129	0	311,011	0	311,011
2035	15,398,499	983,914	983,914	0	298,344	0	298,344
2036	15,810,120	1,014,162	1,014,162	0	286,061	0	286,061
2037	16,217,887	1,044,174	1,044,174	0	273,978	0	273,978
2038	16,621,655	1,074,330	1,074,330	0	262,224	0	262,224
2039	17,020,932	1,104,036	1,104,036	0	250,674	0	250,674
2040	17,415,922	1,133,110	1,133,110	0	239,326	0	239,326
2041	17,807,078	1,161,115	1,161,115	0	228,131	0	228,131
2042	18,195,427	1,187,751	1,187,751	0	217,083	0	217,083
2043	18,582,514	1,212,479	1,212,479	0	206,142	0	206,142
2044	18,970,667	1,235,055	1,235,055	0	195,331	0	195,331
2045	19,362,760	1,255,876	1,255,876	0	184,766	0	184,766
2046	19,761,506	1,274,690	1,274,690	0	174,450	0	174,450
2047	20,170,141	1,290,928	1,290,928	0	164,347	0	164,347
2048	20,592,834	1,304,030	1,304,030	0	154,432	0	154,432
2049	21,034,734	1,313,210	1,313,210	0	144,669	0	144,669
2050	21,502,283	1,318,088	1,318,088	0	135,076	0	135,076
2051	22,002,845	1,318,434	1,318,434	0	125,685	0	125,685
2052	22,544,585	1,314,302	1,314,302	0	116,550	0	116,550
2053	23,136,188	1,306,155	1,306,155	0	107,746	0	107,746
2054	23,786,432	1,294,608	1,294,608	0	99,343	0	99,343
2055	24,504,021	1,280,229	1,280,229	0	91,386	0	91,386
2056	25,297,622	1,263,266	1,263,266	0	83,884	0	83,884
2057	26,176,230	1,243,869	1,243,869	0	76,833	0	76,833
2058	27,149,315	1,222,212	1,222,212	0	70,228	0	70,228
2059	28,226,841	1,198,437	1,198,437	0	64,058	0	64,058
2060	29,419,346	1,172,721	1,172,721	0	58,310	0	58,310
2061	30,737,943	1,145,242	1,145,242	0	52,971	0	52,971
2062	32,194,367	1,116,170	1,116,170	0	48,024	0	48,024
2063	33,801,034	1,085,671	1,085,671	0	43,453	0	43,453
2064	35,571,106	1,053,903	1,053,903	0	39,239	0	39,239
2065	37,518,557	1,021,002	1,021,002	0	35,362	0	35,362
2066	39,658,261	987,078	987,078	0	31,802	0	31,802
2067	42,006,103	952,226	952,226	0	28,538	0	28,538
2068	44,579,064	916,539	916,539	0	25,552	0	25,552

Single Discount Rate Development
Present Values of Projected Benefits (Concluded)
(Dollars in Thousands)

Fiscal Year Ending	Projected Beginning Plan 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)
2069	$ 47,395,315	$ 880,106	$ 880,106	$ 0	$ 22,825	$ 0	$ 22,825
2070	50,474,311	843,015	843,015	0	20,338	0	20,338
2071	53,836,886	805,358	805,358	0	18,074	0	18,074
2072	57,505,357	767,226	767,226	0	16,017	0	16,017
2073	61,503,636	728,717	728,717	0	14,151	0	14,151
2074	65,857,340	689,931	689,931	0	12,463	0	12,463
2075	70,593,922	650,975	650,975	0	10,939	0	10,939
2076	75,742,797	611,964	611,964	0	9,566	0	9,566
2077	81,335,487	573,020	573,020	0	8,332	0	8,332
2078	87,405,768	534,273	534,273	0	7,227	0	7,227
2079	93,989,831	495,860	495,860	0	6,239	0	6,239
2080	101,126,461	457,926	457,926	0	5,360	0	5,360
2081	108,857,217	420,626	420,626	0	4,580	0	4,580
2082	117,226,638	384,126	384,126	0	3,891	0	3,891
2083	126,282,451	348,599	348,599	0	3,285	0	3,285
2084	136,075,801	314,233	314,233	0	2,754	0	2,754
2085	146,661,503	281,214	281,214	0	2,293	0	2,293
2086	158,098,305	249,729	249,729	0	1,894	0	1,894
2087	170,449,197	219,946	219,946	0	1,552	0	1,552
2088	183,781,739	192,013	192,013	0	1,260	0	1,260
2089	198,168,433	166,046	166,046	0	1,014	0	1,014
2090	213,687,122	142,134	142,134	0	807	0	807
2091	230,421,423	120,332	120,332	0	636	0	636
2092	248,461,192	100,668	100,668	0	495	0	495
2093	267,903,027	83,141	83,141	0	380	0	380
2094	288,850,799	67,721	67,721	0	288	0	288
2095	311,416,234	54,345	54,345	0	215	0	215
2096	335,719,529	42,923	42,923	0	158	0	158
2097	361,890,025	33,332	33,332	0	114	0	114
2098	390,066,923	25,423	25,423	0	81	0	81
2099	420,400,055	19,025	19,025	0	56	0	56
2100	453,050,700	13,957	13,957	0	38	0	38
2101	488,192,460	10,028	10,028	0	26	0	26
2102	526,012,193	7,052	7,052	0	17	0	17
2103	566,711,000	4,853	4,853	0	11	0	11
2104	610,505,293	3,268	3,268	0	7	0	7
2105	657,627,921	2,156	2,156	0	4	0	4
2106	708,329,388	1,397	1,397	0	2	0	2
2107	762,879,154	892	892	0	1	0	1
2108	821,567,038	565	565	0	1	0	1
2109	884,704,721	357	357	0	1	0	1
2110	952,627,369	229	229	0	0	0	0
2111	1,025,695,379	150	150	0	0	0	0
2112	1,104,296,261	101	101	0	0	0	0
2113	1,188,846,661	71	71	0	0	0	0
2114	1,279,794,541	52	52	0	0	0	0
2115	1,377,621,526	40	40	0	0	0	0
2116	1,482,845,428	31	31	0	0	0	0
2117	1,596,022,956	25	25	0	0	0	0
2118	1,717,752,641	20	20	0	0	0	0
				Totals	$ 11,449,145	$ 0	$ 11,449,145

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

GASB	The Governmental Accounting Standards Board is an organization that exists with authority to promulgate accounting standards for state and local governmental entities.
Fiduciary Net Position	The fiduciary net position is the value of the net assets of the trust restricted for pension benefits.
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 contribution entities to plan members for benefits provided through a defined benefit pension plan.
Non-Employer Contribution Entities	Non-employer contribution 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 contribution 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 Outflows (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.