St. Paul Teachers' Retirement Fund Association

GASB Statement Nos. 67 and 68 Accounting and Financial Reporting for Pensions

June 30, 2018

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December 6, 2018

St. Paul Teachers' Retirement Fund Association
1619 Dayton Avenue, Room 309
St. Paul, Minnesota 55104-6206

Dear Trustees:

This report provides accounting and financial reporting information that is intended to comply with the Governmental Accounting Standards Board (GASB) Statement Nos. 67 and 68 for the St. Paul Teachers' Retirement Fund Association ("SPTRFA" or "Fund"). These calculations have been made on a basis that is consistent with our understanding of these Statements.

GASB Statement No. 67 is the accounting standard that applies to the stand-alone 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 accounting statements.

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 Statement Nos. 67 and 68. *The Net Pension Liability is not an appropriate measure for measuring the sufficiency of plan assets to cover the estimated cost of settling the employer's benefit obligation. The Net Pension Liability is not an appropriate measure for assessing the need for or amount of future employer contributions. The calculation of the plan's liability for this report is not 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 may produce significantly different results. The information in this report is calculated on a total plan basis. The Fund 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 St. Paul Teachers' Retirement Fund Association only in its entirety and only with the permission of the Board. GRS is not responsible for unauthorized use of this report.

This report is based upon information, furnished to us by the Fund, 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 Fund and should be considered in conjunction with that report. Please see the actuarial funding 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 represents the actuarial position of the St. Paul Teachers' Retirement Fund Association according to the disclosed assumptions. 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.

Bonita J. Wurst and James D. Anderson are Members of the American Academy of Actuaries (MAAA) and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein.

Respectfully submitted,

Bonita J. Wurst

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

James D. Anderson

James D. Anderson, FSA, EA, FCA, MAAA

BJW/JDA:sc

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SECTION A

EXECUTIVE SUMMARY

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

		2018
Actuarial Valuation Date		June 30, 2018
Measurement Date of the Net Pension Liability		June 30, 2018
Membership		
Number of		
- Service Retirements		3,547
- Survivors		342
- Disability Retirements		25
- Deferred Retirements		2,031
- Terminated other non-vested		3,014
- Active Members		3,577
- Total		12,536
Covered Payroll	$	263,122
Net Pension Liability		
Total Pension Liability	$	1,676,193
Plan Fiduciary Net Position		1,070,572
Net Pension Liability	$	605,621
Plan Fiduciary Net Position as a Percentage of Total Pension Liability		63.87%
Net Pension Liability as a Percentage of Covered Payroll		230.17%
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 within which projected benefit payments are fully funded		2118
Total Pension Expense	$	(17,060)

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

	Deferred Outflows of Resources	Deferred Inflows of Resources
Difference between expected and actual experience	$ 3,552	$ 24,082
Changes in assumptions	88,921	11,321
Net difference between projected and actual earnings on pension plan investments	42,106	45,002
Total	$ 134,579	$ 80,405

** Fixed-income municipal bonds with 20 years to maturity that include only federally tax-exempt municipal bonds as reported in Fidelity Index's '20-Year Municipal GO AA Index' as of June 29, 2018.*

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.

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." There were no contributions made to SPTRFA 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.

GASB Statement Nos. 67 and 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 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

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

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

Measurement of the Net Pension Liability

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

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

Given the plan's contribution allocation procedure, if all actuarial assumptions are met (including the assumption of the plan earning 7.50%), 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.

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.

Single Discount Rate

Projected benefit payments are required to be discounted to their actuarial present values using a single discount rate. This rate differs depending on whether or not the Fund has a projected sufficiency of assets to pay benefits.

Due to the projected sufficiency of assets to pay benefits, the single discount rate is equal to the 7.50% long-term expected rate of return on pension plan investments, for the purposes of this valuation.

Had the Fund been projected to have insufficient assets to pay all projected benefits, the single discount rate would instead reflect a combination of (1) the7.50% long-term expected rate of return on pension plan investments (for all years where a projected asset sufficiency exists), then (2) a lower tax-exempt municipal bond rate* (for all remaining years where projected asset insufficiencies exist).

* *Fixed-income municipal bonds with 20 years to maturity that include only federally tax-exempt municipal bonds as reported in Fidelity Index's "20-Year Municipal GO AA Index" as of June 29, 2018.*

SECTION B

FINANCIAL STATEMENTS

Note – Section B is intended to assist in preparation of the financial statements of the St. Paul Teachers' Retirement Fund Association. Financial statements are the responsibility of management, subject to the auditor's review.

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

A. Expense/(Income)

1.	Service Cost, Beginning of Year	$ 25,087
2.	Interest on the Total Pension Liability	125,256
3.	Current-Period Benefit Changes	(74,376)
4.	Employee Contributions (made negative for addition here)	(20,112)
5.	Projected Earnings on Plan Investments (made negative for addition here)	(80,277)
6.	Pension Plan Administrative Expense	786
7.	Other Changes in Plan Fiduciary Net Position	-
8.	Recognition of Outflow (Inflow) of Resources due to Liabilities	13,071
9.	Recognition of Outflow (Inflow) of Resources due to Assets	(6,495)
10.	**Total Pension Expense / (Income)**	**$ (17,060)**

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	$	(13,445)
2. Assumption Changes (gains) or losses	$	118,561
3. Recognition period for Liabilities: Average of the expected remaining service lives of all employees {in years}		4
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	$	(3,361)
5. Outflow (Inflow) of Resources to be recognized in the current pension expense for Assumption Changes	$	29,640
6. Outflow (Inflow) of Resources to be recognized in the current pension expense due to Liabilities	$	26,279
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	$	(10,084)
8. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses for Assumption Changes	$	88,921
9. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses due to Liabilities	$	78,837
B. Outflows (Inflows) of Resources due to Assets		
1. Net difference between projected and actual earnings on pension plan investments (gains) or losses	$	(15,609)
2. Recognition period for Assets {in years}		5
3. Outflow (Inflow) of Resources to be recognized in the current pension expense due to Assets	$	(3,122)
4. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses due to Assets	$	(12,487)

Statement of Outflows and Inflows Arising from Current and Prior Reporting Periods Fiscal Year Ended June 30, 2018 (Dollars in Thousands)

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

	Outflows of Resources	Inflows of Resources	Net Outflows/(Inflows) of Resources
1. Due to Liabilities	$ 39,347	$ 26,276	$ 13,071
2. Due to Assets	26,616	33,111	(6,495)
3. Total	$ 65,963	$ 59,387	$ 6,576

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

	Outflows of Resources	Inflows of Resources	Net Outflows/(Inflows) of Resources
1. Differences between expected and actual experience	$ 1,777	$ 20,615	$ (18,838)
2. Assumption Changes	37,570	5,661	31,909
3. Net Difference between projected and actual earnings on pension plan investments	26,616	33,111	(6,495)
4. Total	$ 65,963	$ 59,387	$ 6,576

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

	Deferred Outflows of Resources	Deferred Inflows of Resources	Net Deferred Outflows/ (Inflows) of Resources
1. Differences between expected and actual experience	$ 3,552	$ 24,082	$ (20,530)
2. Assumption Changes	88,921	11,321	77,600
3. Net Difference between projected and actual earnings on pension plan investments	42,106	45,002	(2,896)
4. Total	$ 134,579	$ 80,405	$ 54,174

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

Year Ending June 30	Net Deferred Outflows/ (Inflows) of Resources
2019	$ 21,052
2020	23,925
2021	12,318
2022	(3,121)
2023	-
Thereafter	-
Total	$ 54,174

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

	2018
Assets	
Cash and Deposits	$ 4,984
Receivables	
Accounts Receivable - Sale of Investments	$ -
Accrued Interest and Other Dividends	-
Contributions	-
Accounts Receivable - Other	-
Total Receivables	$ -
Investments	
Fixed Income	$ 172,947
Equity	666,356
Real Assets	70,887
Cash and Cash Equivalents	40,953
Other	115,667
Total Investments	$ 1,066,810
Total Assets	$ 1,071,794
Liabilities	
Payables	
Accounts Payable - Purchase of Investments	$ 1,222
Accrued Expenses	-
Accounts Payable - Other	-
Total Liabilities	$ 1,222
Net Position Restricted for Pensions	$ 1,070,572

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

Additions		
Contributions		
Employer	$	28,199
Employer (for Reemployed Annuitants)		345
Employee		20,112
Other		10,665
Total Contributions	$	59,321
Investment Income		
Net Appreciation in Fair Value of Investments	$	88,130
Interest and Dividends		12,112
Less Investment Expense		(4,356)
Net Investment Income	$	95,886
Other		0
Total Additions	$	155,207
Deductions		
Benefit payments, including refunds of employee contributions	$	116,098
Pension Plan Administrative Expense		786
Other		-
Total Deductions	$	116,884
Net Increase in Net Position	$	38,323
Net Position Restricted for Pensions		
Beginning of Year	$	1,032,249
End of Year	$	1,070,572

SECTION C

REQUIRED SUPPLEMENTARY INFORMATION

Note – Section C is intended to assist in preparation of the financial statements of the St. Paul Teachers' Retirement Fund Association. Financial statements are the responsibility of management, subject to the auditor's review.

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	$	25,087
2. Interest on the Total Pension Liability		125,256
3. Changes of benefit terms		(74,376)
4. Difference between expected and actual experience of the Total Pension Liability		(13,445)
5. Changes of assumptions		118,561
6. Benefit payments, including refunds of employee contributions		(116,098)
7. Net change in Total Pension Liability	$	64,985
8. Total Pension Liability – Beginning		1,611,208
9. Total Pension Liability – Ending	**$**	**1,676,193**
B. Plan fiduciary net position		
1. Contributions – Employer^	$	39,209
2. Contributions – Employee		20,112
3. Net investment income		95,886
4. Benefit payments, including refunds of employee contributions		(116,098)
5. Pension Plan Administrative Expense		(786)
6. Other		-
7. Net change in Plan Fiduciary Net Position	$	38,323
8. Plan Fiduciary Net Position – Beginning		1,032,249
9. Plan Fiduciary Net Position – Ending	**$**	**1,070,572**
C. Net Pension Liability	**$**	**605,621**
D. Plan Fiduciary Net Position as a Percentage of the Total Pension Liability		**63.87%**
E. Covered-Employee payroll	**$**	**263,122**
F. Net pension liability as a percentage of Covered-Employee payroll		**230.17%**

^ *Includes employer contributions, supplemental contributions, and reemployed annuitant employer contributions.*

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	$ 25,087	$ 24,098	$ 25,596	$ 24,998	$ 22,954					
Interest on the Total Pension Liability	125,256	123,820	124,294	123,108	118,503					
Benefit Changes	(74,376)	-	-	(5,677)	-					
Difference between Expected and Actual Experience	(13,445)	7,106	(42,295)	(17,133)	(16,257)					
Assumption Changes	118,561	(22,643)	-	-	39,642					
Benefit Payments	(115,298)	(112,771)	(111,167)	(108,878)	(105,742)					
Refunds	(800)	(972)	(628)	(875)	(1,103)					
Net Change in Total Pension Liability	64,985	18,638	(4,200)	15,543	57,997					
Total Pension Liability - Beginning	1,611,208	1,592,570	1,596,770	1,581,227	1,523,230					
Total Pension Liability - Ending (a)	$ 1,676,193	$ 1,611,208	$ 1,592,570	$ 1,596,770	$ 1,581,227					
Plan Fiduciary Net Position										
Employer Contributions*	$ 39,209	$ 38,350	$ 37,228	$ 36,711	$ 35,197					
Employee Contributions	20,112	20,146	18,538	17,567	16,564					
Pension Plan Net Investment Income	95,886	128,719	1,475	25,757	168,176					
Benefit Payments	(115,298)	(112,771)	(111,167)	(108,878)	(105,742)					
Refunds	(800)	(972)	(628)	(875)	(1,103)					
Pension Plan Administrative Expense	(786)	(889)	(749)	(748)	(739)					
Other	-	-	-	-	-					
Net Change in Plan Fiduciary Net Position	38,323	72,583	(55,303)	(30,466)	112,353					
Plan Fiduciary Net Position - Beginning	1,032,249	959,666	1,014,969	1,045,435	933,082					
Plan Fiduciary Net Position - Ending (b)	$ 1,070,572	$ 1,032,249	$ 959,666	$ 1,014,969	$ 1,045,435					
Net Pension Liability - Ending (a) - (b)	605,621	578,959	632,904	581,801	535,792					
Plan Fiduciary Net Position as a Percentage of Total Pension Liability	63.87 %	64.07 %	60.26 %	63.56 %	66.12 %					
Covered Employee Payroll	$ 263,122	$ 264,342	$ 258,787	$ 263,844	$ 259,740					
Net Pension Liability as a Percentage of Covered Employee Payroll	230.17 %	219.02 %	244.57 %	220.51 %	206.28 %					

Notes to Schedule:

N/A

* *Includes employer contributions, supplemental contributions, and reemployed annuitant employer contributions.*

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

Last 10 Fiscal Years (to be completed prospectively, commencing with 2014)

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	$ 1,581,227	$ 1,045,435	$ 535,792	66.12%	$ 259,740	206.28%
2015	1,596,770	1,014,969	581,801	63.56%	263,844	220.51%
2016	1,592,570	959,666	632,904	60.26%	258,787	244.57%
2017	1,611,208	1,032,249	578,959	64.07%	264,342	219.02%
2018	1,676,193	1,070,572	605,621	63.87%	263,122	230.17%

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	$ 29,007	$ 24,844	$ 4,163	$ 243,166	10.22%
2010	30,328	25,126	5,202	239,996	10.47
2011	33,819	25,090	8,729	239,738	10.47
2012	29,797	25,109	4,688	239,053	10.50
2013	41,424	26,445	14,979	247,432	10.69
2014	40,916	35,197	5,719	259,740	13.55
2015	40,320	36,711	3,609	263,844	13.91
2016	39,068	37,228	1,840	258,787	14.39
2017	39,172	38,350	822	264,342	14.51
2018	38,196	39,209	(1,013)	263,122	14.90

* *Includes employer contributions, supplemental contributions, and reemployed annuitant employer contributions.*

Notes to Schedule of Contributions

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

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.
Valuation Date	June 30, 2017
Actuarial Cost Method	Entry Age Normal
Amortization Method	Level Percentage of Payroll, Closed
Remaining Amortization Period	25 years
Asset Valuation Method	5-Year smoothed market; no corridor
Inflation	3.00%
Salary Increases	4.00% to 8.90%; age and service based
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.
Mortality	RP-2000 Combined Mortality Table, projected with scale AA to 2020, set back one year for males and set back three years for females.

Other Information:

Notes	The plan is assumed to pay a 2.0% COLA beginning January 1, 2042, and a 2.5% COLA beginning January 1, 2052. See separate funding report as of July 1, 2017 for additional detail.

Schedule of Investment Returns Multiyear

Last 10 Fiscal Years (to be completed prospectively, commencing with 2014)

FY Ending June 30,	Annual Return[1]
2009	
2010	
2011	
2012	
2013	
2014	18.50 %
2015	2.65 %
2016	0.34 %
2017	13.93 %
2018	9.75 %

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

St. Paul Teachers' Retirement Fund Association compiled this data and the related investment notes and furnished this information for inclusion within this report. We did not audit this information. We are not responsible for its accuracy or completeness.

Rate of Return

The Association's money-weighted rate of return for the year ending June 30, 2018 was 9.75% (net of investment expenses). The money-weighted rate of return expresses investment performance, net of investment expenses, adjusted for the actual cash flows that took place during the performance period.

10-Year Schedule of Money-Weighted Investment Return

This schedule is presented to illustrate the requirement to show information for 10 years. However, until a full 10-year trend is compiled, SPTRFA will present information for those years for which information is available.

SECTION D

NOTES TO FINANCIAL STATEMENTS

Note – Section D is intended to assist in preparation of the financial statements of the St. Paul Teachers' Retirement Fund Association. Financial statements are the responsibility of management, subject to the auditor's review.

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 in which expected future real rates of return (expected returns, net of pension plan investment expense and inflation) are developed for each major asset class. These real rates of return are combined to produce the long-term expected rate of return by weighting the expected future real rates of return by the target asset allocation percentage and by adding expected inflation. For each major asset class that is included in the pension plan's target asset allocation as of June 30, 2018, these best estimates are summarized in the following table:

Long-Term Expected Real Rate of Return*

Asset Class	Target Allocation	Long-Term Expected Real Rate of Return (Arithmetic)
Domestic Equity	35%	6.55%
International Equity	20%	6.98%
Fixed Income	20%	3.45%
Real Assets	11%	3.90%
Private Equity & Alternatives	9%	7.47%
Opportunistic	5%	6.08%
Total	**100%**	

** For purposes of these calculations, SPTRFA's assumed inflation rate is 2.75%.*

St. Paul Teachers' Retirement Fund Association compiled this data and the related investment notes and furnished this information for inclusion within this report. We did not audit this information. We are not responsible for its accuracy or completeness.

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 contributions will be made at the current contribution rate and that employer contributions will be made at rates equal to the difference between actuarially determined contribution rates and the member rate. 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 one percent lower or one percent 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	$1,875,684	$1,676,193	$1,510,952
Net Position Restricted for Pensions	1,070,572	1,070,572	1,070,572
Net Pension Liability	**$ 805,112**	**$ 605,621**	**$ 440,380**

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

Reconciliation of Members

Summary of Changes in Participant Status
During Fiscal Year Ending June 30, 2018

	Active Participants	Leave of Absence	Vested Terminated	Other Non-Vested	Retired Participants	Disableds	Survivors and Beneficiaries	Alternate Payees[2]	Total
A. Number as of June 30, 2017	3,409	141	2,034	2,945	3,436	29	342	44	12,380
B. Additions	297	4	107	142	138		22	5	715
C. Deletions									
1. Retirements	(78)	(3)	(53)	-	-	-	-	-	(134)
2. Disability	-	-	-	-	-	-	-	-	-
3. Died with Beneficiary	(1)	(1)	(1)	-	(19)	-	-	-	(22)
4. Died without Beneficiary	-	-	-	-	(56)	(1)	(20)	-	(77)
5. Terminated - Deferred	(91)	(16)	-	-	-	-	-	-	(107)
6. Terminated - Not Vested	(142)	-	-	-	-	-	-	-	(142)
7. Refunds	(8)	(4)	(34)	(77)	-	-	-	-	(123)
8. Rehired as Active	124	(55)	(21)	(48)	-	-	-	-	-
9. Leave of Absence	(65)	65	-	-	-	-	-	-	-
10. Repayment of Refund	-	-	-	-	-	-	-	-	-
11. Expired Benefits	-	-	-	-	-	-	(3)	-	(3)
12. Disability to Retirement	-	-	-	-	-	(4)	-	-	(4)
D. Data Adjustments[1]	-	1	(1)	52	1	-	(1)	1	53
E. Total on June 30, 2018	3,445	132	2,031	3,014	3,500	24	340	50	12,536

[1] *Includes members not valued in prior valuation who repaid refunds or otherwise restored prior service.*

[2] *Includes alternate payees of retired participants (47), disabled participants (1), and survivors (2).*

GASB Reconciliation (Dollars in Thousands)
Fiscal Year Ended June 30, 2018

	Total Pension Liability (a)	Plan Fiduciary Net Position (b)	Net Pension Liability (a) - (b)	Deferred Outflows	Deferred Inflows	Outflows Prior Year	Total Pension Expense
Balance Beginning of Year	**$ 1,611,208**	**$ 1,032,249**	**$ 578,959**				
Changes for the Year:							
Service Cost	$ 25,087		$ 25,087				$ 25,087
Interest on Total Pension Liability	125,256		125,256				125,256
Interest on Fiduciary Net Position (1)		$ 80,277	(80,277)				(80,277)
Changes in Benefit Terms	(74,376)		(74,376)				(74,376)
Liability Experience Gains and Losses	(13,445)		(13,445)	$ 3,552	$ 24,082	$ (25,923)	(18,838)
Changes in Assumptions	118,561		118,561	88,921	11,321	(9,052)	31,909
Contributions - Employer		39,209	(39,209)				-
Contributions - Employees		20,112	(20,112)				(20,112)
Asset Gain/(Loss) (1)		15,609	(15,609)	42,106	45,002	6,218	(6,495)
Benefit Payouts	(116,098)	(116,098)					-
Administrative Expenses		(786)	786				786
Other changes							$ -
Net Changes	**$ 64,985**	**$ 38,323**	**$ 26,662**				**$ (17,060)**
Balance End of Year	**$ 1,676,193**	**$ 1,070,572**	**$ 605,621**	**$ 134,579**	**$ 80,405**	**$ (28,757)**	

(1) *The sum of these items equals the net investment income of $95,886.*

SECTION E

SUMMARY OF BENEFITS

Summary of Benefit Provisions for Basic Members as of July 1, 2018

STATUTORY CONTRIBUTIONS

Statutory contribution rates for members and their employers are shown as a percent of pay below:

Contribution After June 30,	Member	Employer Regular	Employer Additional
2017	10.00%	10.000%	3.64%
2018	10.00%	10.835%	3.64%
2019	10.00%	11.670%	3.64%
2020	10.00%	11.880%	3.64%
2021	10.00%	12.090%	3.64%
2022	10.25%	12.300%	3.64%
2023	10.25%	12.500%	3.64%

SUPPLEMENTAL CONTRIBUTIONS

1996 legislation provides for a variable amortization aid contribution paid annually on July 15. The actual contribution during the past fiscal year was $838,000.

Annual supplemental contributions of $14,827,000 will be contributed by the State of Minnesota each October 1. The contributions will continue until the plan is 100% funded or until June 30, 2048, whichever occurs earlier.

PARTICIPANTS

Professional Educators first employed prior to July 1, 1978 by schools in the City of St. Paul or St. Paul College whose position requires a license from the Minnesota Department of Education, who are not covered under the Social Security Act.

ACCREDITED SERVICE

Service which has been verified and accredited by the Association for the purpose of determining contributions and benefits (may include service earned while working outside of St. Paul Public Schools, previous St. Paul service, military service and governmental service).

ALLOWABLE ST. PAUL SERVICE

Service earned as a licensed educator in the St. Paul Public Schools, in the St. Paul College, or as an employee of the Association. Also includes service credited after receipt of payment as required, for licensed educators on leave.

SALARY

Total compensation earned during a school year (July 1 to June 30) excluding lump sum payments for unused leave at termination and employer-paid insurance coverage.

Summary of Benefit Provisions for Basic Members as of July 1, 2018

AVERAGE SALARY

Average of the highest five years of salary during the last 10 years of St. Paul service while making contributions or while disabled.

NORMAL RETIREMENT BENEFIT

Eligibility

Attainment of age 65 and 5 years of Accredited Service.

Benefit

2.50% of Average Salary for each year of Accredited Service.

EARLY RETIREMENT BENEFIT

Eligibility

Attainment of age 55 and 5 years of Accredited Service.

Benefit

The greater of the following benefits:

- 2.00 percent of Average Salary per year of Accredited Service, subject to a maximum of 40 years with a 0.25% reduction for each month the member is under age 65. If the member has 25 years of Accredited Service, the reduction is taken from age 60, therefore no reduction is required if the member is age 60 or older. No reduction is taken if age plus years of Accredited Service totals at least 90.

- 2.50 percent of Average Salary per year of Accredited Service, subject to a maximum of 40 years, reduced for each month the member is under age 65 using linear interpolation of the table listed below. The factors for retirements on or after July 1, 2024 will be phased in over a sixty-month period starting July 1, 2019.

UNDER AGE 62 OR LESS THAN 30 YEARS OF SERVICE

Age at Retirement	RETIREMENTS PRIOR TO JULY 1, 2019	RETIREMENTS ON OR AFTER JULY 1, 2024	AGE 62 OR OLDER WITH 30 YEARS OF SERVICE
55	0.5376	0.4200	
56	0.5745	0.4600	
57	0.6092	0.5000	
58	0.6419	0.5400	
59	0.6726	0.5800	
60	0.7354	0.6500	
61	0.7947	0.7200	
62	0.8507	0.7900	0.8831
63	0.9035	0.8600	0.9246
64	0.9533	0.9300	0.9635
65	1.0000	1.0000	1.0000

Summary of Benefit Provisions for Basic Members as of July 1, 2018

DISABILITY RETIREMENT BENEFIT

Eligibility

Total and permanent disablement before attaining age 65 and 5 years of Accredited Service.

Benefit

If the member is under age 65, 75 percent of the member's annual contract salary less any Social Security and Workers' Compensation benefits payable until age 65. At age 65, a normal retirement benefit is calculated using the projected service and average salary as if the member had continued to teach in their position held at the time of disability. Members age 65 or older at time of disability receive a normal retirement benefit.

DEFERRED RETIREMENT BENEFIT

Eligibility

5 years of Accredited Service.

Benefit

Benefit computed under law in effect at termination and payable as a normal or early retirement benefit. For members hired on or before June 30, 2006, the benefit is augmented at 3.00 percent compounded annually from the 1st of the month following termination until the January 1st after turning age 55 and then augmented at 5.00 percent compounded annually from that date to July 1, 2012. For members hired after June 30, 2006, the benefit is augmented at 2.50 percent compounded annually from the 1st of the month following termination to July 1, 2012. Augmentation for all members, regardless of hire date, changed to 2.00 percent as of July 1, 2012 for the portion of benefit deferral which occurs after June 30, 2012 to June 30, 2019. After June 30, 2019, benefits are not augmented.

ACTIVE SURVIVOR BENEFIT (Family Benefit)

Eligibility

Active member with three years of Accredited Service.

Benefit

- Children's Benefit: 25 percent of the maximum Bachelor of Arts salary for the year in which the member died for each eligible child up to a maximum of two. Benefits are paid until the child attains age 18, or 22 for full-time students.
- Spousal Benefit: 15 percent of the maximum Bachelor of Arts salary for an eligible spouse who has legal custody of an eligible child. Spousal benefits cease when the spouse remarries, dies, or elects the regular survivor benefit. Electing the regular survivor benefit does not disqualify the child from receiving the family benefit.

Summary of Benefit Provisions for Basic Members as of July 1, 2018

SURVIVOR BENEFIT (Active or Retired Member)

Eligibility

Active member or retired member with five years of Accredited Service. A surviving spouse must have been married to the member for three years at the earlier of his death or retirement.

Benefit

Retirement benefit earned at the time of death or retirement, whichever is earlier, reduced by the use of one hundred percent joint survivorship tables, based on the ages of the member and survivor at the time of retirement.

REFUND OF CONTRIBUTIONS

Eligibility

Termination or death where no annuity is payable, or prior to age 55, if a refund of contributions is chosen in lieu of an annuity.

Benefit

Member contributions with 6.00 percent interest accrued through June 30, 2011, 4.00 percent interest accrued through June 30, 2018, and 3.00 percent interest thereafter.

REEMPLOYED ANNUITANTS

The School District shall make the regular employer contribution and additional employer contribution, plus a supplemental contribution equal to 2.5% of salary, on behalf of any retired member who is reemployed by the School District. Reemployed annuitants do not accrue additional benefits.

NORMAL FORM OF RETIREMENT BENEFITS

Unreduced annuity payments made until the death of the member, with a 100 percent Joint & Survivor adjusted pension payable to the surviving beneficiary.

BENEFIT INCREASES

2019:	0.00 percent
2020:	0.00 percent
2021 and thereafter:	1.00 percent

For retirements on and after July 1, 2024, the first benefit increase is delayed until the retiree reaches Normal Retirement Age (not applicable to Rule of 90 retirees, Rule of 62/30 retirees, disability benefit recipients, or survivors).

Summary of Benefit Provisions for Basic Members as of July 1, 2018

CHANGES IN PLAN PROVISIONS

Lower early retirement factors will be phased in over a sixty-month period starting July 1, 2019.

Interest credited on refunds of member contributions decreased from 4.0% to 3.0% prospectively, beginning July 1, 2018.

Deferred augmentation was changed to 0.00% for future accruing benefits, effective July 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 2.0% if the funding ratio reaches 80% for two consecutive years or 2.5% if the funding ratio reaches 90% for two consecutive years, to 0.0% for January 1, 2019 and 2020 and 1.0% thereafter.

For retirements on or after July 1, 2024, the first benefit increase is delayed until the retiree reaches Normal Retirement Age. Does not apply to Rule of 90 retirees, Rule of 62/30 retirees, disability benefit recipients, or survivors.

Member contributions will increase from 10.00% of pay to 10.25% of pay, effective July 1, 2022.

Employer regular contributions will increase from 10.00% of pay to 12.50% of pay over six years, beginning July 1, 2018.

Additional supplemental contributions of $5,000,000 will be made by the State of Minnesota annually beginning October 1, 2018.

Summary of Benefit Provisions for Coordinated Members as of July 1, 2018

STATUTORY CONTRIBUTIONS

Statutory contribution rates for members and their employers are shown as a percent-of-pay below.

Contribution After June 30,	Member	Employer Regular	Employer Additional
2017	7.50%	6.500%	3.84%
2018	7.50%	7.335%	3.84%
2019	7.50%	8.170%	3.84%
2020	7.50%	8.380%	3.84%
2021	7.50%	8.590%	3.84%
2022	7.75%	8.800%	3.84%
2023	7.75%	9.000%	3.84%

SUPPLEMENTAL CONTRIBUTIONS

1996 legislation provides for a variable amortization aid contribution paid annually on July 15. The actual contribution during the past fiscal year was $838,000.

Annual supplemental contributions of $14,827,000 will be contributed by the State of Minnesota each October 1. The contributions will continue until the plan is 100% funded or until June 30, 2048, whichever occurs earlier.

PARTICIPANTS

Professional educators in the public schools of the City of St. Paul, excluding charter schools, whose position requires a license from the Minnesota Department of Education, and who are covered under the Social Security Act and make contributions to the St. Paul Teachers' Retirement Fund Association, are covered under the Coordinated Plan.

ALLOWABLE SERVICE

Service earned as a licensed educator in the St. Paul Public Schools, in the St. Paul College, or in certain charter schools, or as an employee of the Association. Also includes service credited after receipt of payment as required, for licensed educators on leave. Service is granted on a proportional basis for part-time teachers.

Summary of Benefit Provisions for Coordinated Members as of July 1, 2018

SALARY

Total compensation excluding lump sum payments for unused leave at termination and employer-paid insurance coverage.

AVERAGE SALARY

Average of the highest five successive years of salary while making contributions. In cases where the Allowable Service is less than five years, Average Salary is based on the Allowable Service years.

NORMAL RETIREMENT BENEFIT

Eligibility

Three years of Allowable Service. The eligibility age is 65 for those hired before July 1, 1989 and the earlier of eligibility for full Social Security retirement benefits to a maximum of age 66 for those hired on or after July 1, 1989. A Proportionate Retirement Annuity is available at Normal Retirement Age with one year of Allowable Service.

Benefit

1.70 percent of Average Salary for each year of Allowable Service rendered before July 1, 2015 and 1.90 percent of Average Salary for each year of Allowable Service rendered after June 30, 2015.

Summary of Benefit Provisions for Coordinated Members as of July 1, 2018

EARLY RETIREMENT BENEFIT

Eligibility

Attainment of age 55 and 3 years of Allowable Service.

Benefit

Members hired before July 1, 1989 are eligible for the greater of the following benefits. Members hired after July 1, 1989 are eligible for the benefits shown in item (b):

a) For the first ten years of Allowable Service, 1.20 percent of Average Salary for each year of Allowable Service rendered prior to July 1, 2015, plus 1.40 percent of Average Salary for each year of Allowable Service rendered after June 30, 2015. Additionally, for each subsequent year of Allowable Service in excess of ten years, 1.70 percent of Average Salary for each year rendered prior to July 1, 2015, plus 1.90 percent of Average Salary for each year rendered after June 30, 2015. There is a reduction of 0.25 percent for each month the member is under age 65, or under age 62 with 30 years of Allowable Service. No reduction applies if the age plus years of service totals at least 90.

b) 1.70 percent of Average Salary per year of Allowable Service rendered before July 1, 2015 and 1.90 percent of Average Salary for each year of service rendered after June 30, 2015 reduced for each month the member is under the Normal Retirement Age using linear interpolation of the factors in the tables listed below. The factors for retirements on or after July 1, 2024 will be phased in over a sixty-month period starting July 1, 2019.

	UNDER AGE 62 OR LESS THAN 30 YEARS OF SERVICE					
	RETIREMENTS PRIOR TO JULY 1, 2019		RETIREMENTS ON OR AFTER JULY 1, 2024		AGE 62 OR OLDER WITH 30 YEARS OF SERVICE	
Normal Retirement Age:	**65**	**66**	**65**	**66**	**65**	**66**
Age at Retirement						
55	0.5376	0.4592	0.4200	0.3500		
56	0.5745	0.4992	0.4600	0.3900		
57	0.6092	0.5370	0.5000	0.4300		
58	0.6419	0.5726	0.5400	0.4700		
59	0.6726	0.6062	0.5800	0.5100		
60	0.7354	0.6726	0.6500	0.5800		
61	0.7947	0.7354	0.7200	0.6500		
62	0.8507	0.7947	0.7900	0.7200	0.8831	0.8389
63	0.9035	0.8507	0.8600	0.7900	0.9246	0.8831
64	0.9533	0.9035	0.9300	0.8600	0.9635	0.9246
65	1.0000	0.9533	1.0000	0.9300	1.0000	0.9635
66		1.0000		1.0000		1.0000

Summary of Benefit Provisions for Coordinated Members as of July 1, 2018

DISABILITY RETIREMENT BENEFIT

Eligibility

Total and permanent disablement and three years of Allowable Service with service earned within the current fiscal year and at least two years of Allowable Service since the last interruption in service.

Benefit

Calculated as a normal retirement benefit payable for life without reduction for early commencement. At normal retirement age, the benefit converts from a disability benefit to a retirement benefit. The disability benefit is reduced by any Workers' Compensation benefits payable.

DEFERRED RETIREMENT BENEFIT

Eligibility

Three years of Allowable Service.

Benefit

Benefit computed under law in effect at termination and payable as a normal or early retirement benefit. For members hired on or before June 30, 2006, the benefit is augmented at 3.00 percent compounded annually from the 1st of the month following termination until the January 1st after turning age 55 and then augmented at 5.00 percent compounded annually from that date to July 1, 2012. For members hired after June 30, 2006, the benefit is augmented at 2.50 percent compounded annually from the 1st of the month following termination to July 1, 2012. Augmentation for all members, regardless of hire date, changed to 2.00 percent as of July 1, 2012 for the portion of benefit deferral which occurs after June 30, 2012 to June 30, 2019. After June 30, 2019, benefits are not augmented.

SURVIVOR BENEFIT (Active Members)

Eligibility

Active member with three years of Allowable service. A surviving spouse is defined as the person legally married to the member at the time of death. If none, a dependent child who is the legal child of the member, who is less than 20 years of age and unmarried.

Benefit

Retirement benefit earned at the time of death with choices for either a reduced for 100 percent joint survivorship, or 5-, 10-, 15-, or 20-year term certain. The benefit is available immediately upon application. Actuarial reductions assuming 2.5% augmentation for the calculation of the survivorship portion of a 100 percent joint and survivor benefit are actuarially determined based on the member's and survivor's ages at the death of the member.

Early retirement reductions apply to the survivor benefit based on the member's age when deceased. If the deceased member had not yet attained age 55 at time of death, the additional early retirement reduction from age 55 to the age of the member at death applies at only one-half of the actuarial rate.

Summary of Benefit Provisions for Coordinated Members as of July 1, 2018

REFUND OF CONTRIBUTIONS

Eligibility

Termination or death where no annuity is payable or a refund of contributions is chosen in lieu of an annuity.

Benefit

Member contributions with 6.00 percent interest accrued through June 30, 2011, 4.00 percent interest accrued through June 30, 2018, and 3.00 percent interest thereafter.

REEMPLOYED ANNUITANTS

The School District shall make the regular employer contribution and additional employer contribution, plus a supplemental contribution equal to 2.5% of salary, on behalf of any retired member who is reemployed by the School District. Reemployed annuitants do not accrue additional benefits.

NORMAL FORM OF RETIREMENT BENEFITS

Straight life annuity. Actuarially equivalent options are available to provide post-retirement beneficiary or survivor benefits.

BENEFIT INCREASES

2019:	0.00 percent
2020:	0.00 percent
2021 and thereafter:	1.00 percent

For retirements on and after July 1, 2024, the first benefit increase is delayed until the retiree reaches Normal Retirement Age (not applicable to Rule of 90 retirees, Rule of 62/30 retirees, disability benefit recipients, or survivors).

Summary of Benefit Provisions for Coordinated Members as of July 1, 2018

CHANGES IN PLAN PROVISIONS

Lower early retirement factors will be phased in over a sixty-month period starting July 1, 2019.

Interest credited on refunds of member contributions decreased from 4.0% to 3.0% prospectively, beginning July 1, 2018.

Deferred augmentation was changed to 0.00% for future accruing benefits, effective July 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 2.0% if the funding ratio reaches 80% for two consecutive years or 2.5% if the funding ratio reaches 90% for two consecutive years, to 0.0% for January 1, 2019 and 2020 and 1.0% thereafter.For retirements on or after July 1, 2024, the first benefit increase is delayed until the retiree reaches Normal Retirement Age. Does not apply to Rule of 90 retirees, Rule of 62/30 retirees, disability benefit recipients, or survivors.

Member contributions will increase from 7.50% of pay to 7.75% of pay, effective July 1, 2022.

Employer regular contributions will increase from 6.50% of pay to 9.00% of pay over six years, beginning July 1, 2018.

Additional supplemental contributions of $5,000,000 will be made by the State of Minnesota annually beginning October 1, 2018.

SECTION F

ACTUARIAL COST METHOD AND ACTUARIAL ASSUMPTIONS

Actuarial Cost Method and Actuarial Assumptions

I. 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:

1) 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
2) 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 Unfunded Actuarial Accrued Liability.

II. Current Actuarial Assumptions

The assumptions were last updated for the July 1, 2018 valuation. Assumptions are based on an experience study for the five-year period of July 1, 2011 to June 30, 2016, as well as a legislated change to the investment return assumption effective July 1, 2018. Note that the significant plan changes reflected in this report may ultimately result in behavior changes not anticipated in the actuarial assumptions.

A. Demographic Assumptions

Mortality:

1. Healthy and Disabled Annuitant Mortality:
    a. Male: RP-2014 Healthy Annuitant Mortality Table for males adjusted for white collar and projected with Scale MP-2017 from 2006
    b. Female: RP-2014 Healthy Annuitant Mortality Table for females adjusted for white collar and projected with Scale MP-2017 from 2006, set back 2 years
2. Employee Mortality:
    a. Male: RP-2014 Employee Mortality Table for males adjusted for white collar and projected with Scale MP-2017 from 2006
    b. Female: RP-2014 Employee Mortality Table for females adjusted for white collar and projected with Scale MP-2017 from 2006

Actuarial Cost Method and Actuarial Assumptions

Deaths Expressed as the Number of Occurrences per 10,000:

Age in 2018	Post-Retirement Mortality	
	Male	Female
55	40	25
56	42	27
57	45	29
58	48	31
59	51	33
60	55	35
61	59	38
62	64	41
63	69	46
64	74	51
65	81	56
66	88	62
67	96	67
68	105	74
69	116	81
70	128	89
71	142	98
72	158	108
73	176	120
74	197	133
75	220	148
76	246	165
77	275	184
78	309	205
79	347	230
80	390	258
81	440	289
82	497	325
83	563	367
84	638	414

Deaths Expressed as the Number of Occurrences per 10,000:

Age in 2018	Pre-Retirement Mortality Male	Female
30	4	2
31	4	2
32	4	2
33	4	2
34	4	3
35	4	3
36	4	3
37	4	3
38	5	3
39	5	4
40	5	4
41	5	4
42	5	4
43	6	5
44	6	5
45	7	6
46	8	6
47	9	7
48	10	8
49	11	8
50	12	9
51	13	10
52	15	11
53	16	12
54	18	14
55	20	15
56	22	16
57	25	18
58	27	20
59	31	21

Actuarial Cost Method and Actuarial Assumptions

Rates of Disability:

Disability Expressed as the Number of Occurrences per 10,000:

Age	Disability	Age	Disability
20	1	45	4
21	1	46	4
22	1	47	4
23	1	48	4
24	1	49	4
25	1	50	9
26	1	51	9
27	1	52	9
28	1	53	9
29	1	54	9
30	2	55	17
31	2	56	17
32	2	57	17
33	2	58	17
34	2	59	17
35	2	60	35
36	2	61	35
37	2	62	35
38	2	63	35
39	2	64	35
40	3		
41	3		
42	3		
43	3		
44	3		

Actuarial Cost Method and Actuarial Assumptions

Rates of Termination:

Year	Number of Terminations per 1,000 Active Members	
	Male	Female
1	400	400
2	260	220
3	160	150
4	110	120
5	80	100
6	50	85
7	48	70
8	45	55
9	43	45
10	40	40
11	38	38
12	35	35
13	33	30
14	30	25
15 & Over	25	20

Rates of Retirement:

Retirements Expressed as the Number of Occurrences per 10,000:

Age	Basic Members Eligible for Rule of 90 Provision	Basic Members Not Eligible for Rule of 90 Provision	Male Coordinated Members Eligible for Rule of 90 Provision	Female Coordinated Members Eligible for Rule of 90 Provision	Male Coordinated Members Not Eligible for Rule of 90 Provision	Female Coordinated Members Not Eligible for Rule of 90 Provision
55	5,000	800	2,500	2,500	900	500
56	5,000	1,300	2,500	2,500	700	500
57	4,000	1,300	2,500	2,500	700	500
58	4,000	1,800	2,500	2,500	700	600
59	3,500	1,800	2,500	3,000	700	600
60	3,500	2,000	2,500	3,000	1,200	900
61	3,500	2,000	2,500	3,000	1,200	1,100
62	3,500	4,000	4,500	3,000	2,500	2,000
63	3,500	4,000	3,500	3,000	2,800	2,300
64	4,000	4,000	2,500	3,000	2,800	2,600
65	5,000	5,000	3,000	4,500	3,000*	4,500*
66	3,000	5,000	3,000	4,300	3,000	4,300
67	3,000	5,000	3,500	3,800	3,500	3,800
68	3,000	5,000	4,000	3,800	4,000	3,800
69	3,000	5,000	4,500	3,000	4,500	3,000
70 & Over	10,000	10,000	10,000	10,000	10,000	10,000

**2,800 for male members and 3,000 for female members hired after June 30, 1989 with a Normal Retirement Age equal to 66.*

Actuarial Cost Method and Actuarial Assumptions

B. Economic Assumptions

Investment Return Rate: 7.50%

Price Inflation: 2.50% per year

Wage Inflation: 3.00% per year

Future Salary Increases: Service-based rates shown below:

Annual Salary Increases

Year	Ultimate Rate of Annual Salary Increases	Year	Ultimate Rate of Annual Salary Increases
1	9.00%	21	3.40%
2	8.00	22	3.20
3	7.00	23 & Over	3.00
4	6.80		
5	6.60		
6	6.40		
7	6.20		
8	6.00		
9	5.75		
10	5.50		
11	5.25		
12	5.00		
13	4.75		
14	4.50		
15	4.25		
16	4.00		
17	3.90		
18	3.80		
19	3.70		
20	3.60		

Asset Value: The actuarial value of assets is smoothed by using a five-year average market value.

Actuarial Cost Method and Actuarial Assumptions

C. Other Assumptions

Marital Status:	It is assumed that 75% of male members and 60% of female members have an eligible spouse. The male spouse is assumed to be two years older than the female spouse. Married members are assumed to have two dependent children.
Deferred Benefit Commencement:	Basic Plan members who terminate vested are assumed to commence benefits at age 61. Coordinated Plan members are assumed to commence benefits at age 62. If the member is already past the assumed deferral age, the member is assumed to commence benefits one year from the valuation date.
Administrative Expenses:	Prior year administrative expenses (excluding investment expenses) are expressed as a percentage-of-payroll and then applied to projected payroll.
Refund of Contributions:	All employees withdrawing after becoming eligible for a deferred benefit take the larger of their contributions accumulated with interest or the value of their deferred benefit. Account balances for deferred members accumulate interest until the assumed benefit commencement date and are discounted back to the valuation date.
Allowance for Combined Service Annuity:	20.0% load on liabilities for former, vested members. 9.0% load on liabilities for former, non-vested members.
Missing Salary and Salary Minimums:	Active members with reported salaries of $100 or less were assumed to have the average non-zero active salary. Active members with salaries less than those reported at the prior valuation date are valued using their prior salary amount. Active members who have been hired within one year of the valuation date have had their pay annualized by dividing by months of service credited, not to exceed the average non-zero active salary. For members on leave of absence at valuation date who were not on leave at the prior valuation date, the prior year's valuation pay was used.
Missing Data for Deferred Vested Members:	Deferred vested members without a reported benefit and without salary information were assumed to have a final average salary of $40,000.
Decrement Timing:	Retirement and Termination: end of valuation year – consistent with retirements and terminations occurring at the end of the school year. Death and Disability: middle of valuation year.
Eligibility Testing:	Eligibility for benefits is determined based upon the age nearest birthday and service nearest whole year on the date the decrement is assumed to occur.
Service Credit Accruals:	It is assumed that members accrue one year of service credit per year. Exact fractional service is used to determine the amount of benefit payable.

Actuarial Cost Method and Actuarial Assumptions

Supplemental Contributions:	1996 legislation provides for a variable amortization aid contribution paid annually on July 15. We assumed the annual amortization aid contribution will equal $838,000, which was the actual contribution for the most recent fiscal year. Additionally, annual supplemental contributions equal to $14,827,000 are scheduled to be paid each October 1. The contributions described herein will continue until the plan is 100% funded or until June 30, 2048, whichever occurs earlier.
Projected Annual Payroll Calculation:	The census data as of July 1, 2018 reflects retirements and terminations occurring during the months of May and June; however, it does not necessarily reflect the replacements hired to fill their positions who may have hire dates in August and September. We assumed that May and June retirements are replaced by members coming in at the B.A. entry salary level of $45,659; and the Projected Annual Payroll for the fiscal year ending June 30, 2019 includes this replacement salary amount.
Changes in Actuarial Assumptions Since the Prior Valuation:	The assumed investment return was lowered from 8.0% to 7.5%. Assumed wage inflation decreased from 4.0% to 3.0%. Salary increase rates were updated from an age-based table with a service-based component during the first fifteen years, to a service based table of rates. Retirement, withdrawal, and disability rates were adjusted to better fit observed experience. The mortality table was updated from the RP-2000 Mortality Table (with adjustments) projected with Scale AA to 2020, to the RP-2014 Mortality Table, with white collar adjustment, set back 2 years for females, projected with Scale MP-2017 from 2006.

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 valuation discount rate 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. As in 2017, the plan is projected to have sufficient assets to pay all benefits.

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 SDR. It breaks down the benefit payments into present values for funded and unfunded portions and shows the equivalent total using the SDR.

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

	Payroll			Projected Contributions				
Year	Payroll for Current Employees	Payroll for New Employees	Total Employee Payroll	Contributions from Current Employees	Employer Contributions for Current Employees	Employer Contributions on Future Payroll toward Current UAL*	Supplemental Contributions	Total Contributions
0	$ 263,122	$ -	$ 263,122					
1	281,782	-	281,782	$ 21,138	$ 31,508	$ -	$ 15,665	$ 68,311
2	267,406	22,829	290,235	20,055	32,115	2,504	15,665	70,339
3	256,772	42,170	298,942	19,258	31,378	4,715	15,665	71,016
4	247,967	59,943	307,910	18,598	30,822	6,828	15,665	71,913
5	240,294	76,854	317,148	18,623	30,373	9,107	15,665	73,768
6	233,424	93,238	326,662	18,090	29,972	11,235	15,665	74,962
7	226,914	109,548	336,462	17,586	29,136	13,201	15,665	75,588
8	220,656	125,900	346,556	17,101	28,332	15,171	15,665	76,269
9	214,441	142,511	356,952	16,619	27,534	17,173	15,665	76,991
10	208,120	159,541	367,661	16,129	26,723	19,225	15,665	77,742
11	201,581	177,110	378,691	15,623	25,883	21,342	15,665	78,513
12	194,697	195,355	390,052	15,089	24,999	23,540	15,665	79,293
13	187,219	214,534	401,753	14,509	24,039	25,851	15,665	80,064
14	179,227	234,579	413,806	13,890	23,013	28,267	15,665	80,835
15	170,821	255,399	426,220	13,239	21,933	30,776	15,665	81,613
16	161,998	277,008	439,006	12,555	20,801	33,379	15,665	82,400
17	152,951	299,226	452,177	11,854	19,639	36,057	15,665	83,215
18	143,681	322,061	465,742	11,135	18,449	38,808	15,665	84,057
19	134,268	345,446	479,714	10,406	17,240	41,626	15,665	84,937
20	124,878	369,228	494,106	9,678	16,034	44,492	15,665	85,869
21	115,520	393,409	508,929	8,953	14,833	47,406	15,665	86,857
22	106,392	417,805	524,197	8,245	13,661	50,345	15,665	87,916
23	97,379	442,544	539,923	7,547	12,504	53,326	15,665	89,042
24	88,572	467,548	556,120	6,864	11,373	56,340	15,665	90,242
25	80,025	492,779	572,804	6,202	10,275	59,380	15,665	91,522
26	71,618	518,370	589,988	5,550	9,196	62,464	15,665	92,875
27	63,485	544,203	607,688	4,920	8,151	65,576	15,665	94,312
28	55,722	570,196	625,918	4,318	7,155	68,709	15,665	95,847
29	48,377	596,319	644,696	3,749	6,212	71,856	15,665	97,482
30	41,423	622,614	664,037	3,210	5,319	75,025	15,665	99,219
31	34,977	648,981	683,958	2,711	4,491	78,202	-	85,404
32	29,112	675,364	704,476	2,256	3,738	81,381	-	87,375
33	23,845	701,766	725,611	1,848	3,062	84,563	-	89,473
34	19,046	728,333	747,379	1,476	2,446	87,764	-	91,686
35	14,870	754,930	769,800	1,152	1,909	90,969	-	94,030
36	11,307	781,587	792,894	876	1,452	94,181	-	96,509
37	8,329	808,352	816,681	645	1,069	97,407	-	99,121
38	5,907	835,275	841,182	458	759	100,651	-	101,868
39	3,990	862,427	866,417	309	512	103,922	-	104,743
40	2,614	889,796	892,410	203	336	107,220	-	107,759
41	1,645	917,537	919,182	127	211	110,563	-	110,901
42	960	945,797	946,757	74	123	113,969	-	114,166
43	520	974,640	975,160	40	67	117,444	-	117,551
44	257	1,004,158	1,004,415	20	33	121,001	-	121,054
45	118	1,034,429	1,034,547	9	15	124,649	-	124,673
46	47	1,065,537	1,065,584	4	6	128,397	-	128,407
47	11	1,097,540	1,097,551	1	1	132,254	-	132,256
48	-	1,130,478	1,130,478	-	-	136,223	-	136,223
49	-	1,164,392	1,164,392	-	-	140,309	-	140,309
50	-	1,199,324	1,199,324	-	-	144,519	-	144,519

** Contributions related to future employees in excess of normal cost and expenses of 8.54% of pay.*

For purposes of this projection, based on GASB guidance, we assumed the statutory contribution rates 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 Contributions (Concluded) (Dollars in Thousands)

	Payroll			Projected Contributions				
Year	Payroll for Current Employees	Payroll for New Employees	Total Employee Payroll	Contributions from Current Employees	Employer Contributions for Current Employees	Employer Contributions on Future Payroll toward Current UAL*	Supplemental Contributions	Total Contributions
51	$ -	$ 1,235,304	$ 1,235,304	$ -	$ -	$ 148,854	$ -	$ 148,854
52	-	1,272,363	1,272,363	-	-	153,320	-	153,320
53	-	1,310,534	1,310,534	-	-	157,919	-	157,919
54	-	1,349,850	1,349,850	-	-	162,657	-	162,657
55	-	1,390,345	1,390,345	-	-	167,537	-	167,537
56	-	1,432,056	1,432,056	-	-	172,563	-	172,563
57	-	1,475,017	1,475,017	-	-	177,740	-	177,740
58	-	1,519,268	1,519,268	-	-	183,072	-	183,072
59	-	1,564,846	1,564,846	-	-	188,564	-	188,564
60	-	1,611,791	1,611,791	-	-	194,221	-	194,221
61	-	1,660,145	1,660,145	-	-	200,047	-	200,047
62	-	1,709,949	1,709,949	-	-	206,049	-	206,049
63	-	1,761,248	1,761,248	-	-	212,230	-	212,230
64	-	1,814,085	1,814,085	-	-	218,597	-	218,597
65	-	1,868,508	1,868,508	-	-	225,155	-	225,155
66	-	1,924,563	1,924,563	-	-	231,910	-	231,910
67	-	1,982,300	1,982,300	-	-	238,867	-	238,867
68	-	2,041,769	2,041,769	-	-	246,033	-	246,033
69	-	2,103,022	2,103,022	-	-	253,414	-	253,414
70	-	2,166,113	2,166,113	-	-	261,017	-	261,017
71	-	2,231,096	2,231,096	-	-	268,847	-	268,847
72	-	2,298,029	2,298,029	-	-	276,912	-	276,912
73	-	2,366,970	2,366,970	-	-	285,220	-	285,220
74	-	2,437,979	2,437,979	-	-	293,776	-	293,776
75	-	2,511,118	2,511,118	-	-	302,590	-	302,590
76	-	2,586,452	2,586,452	-	-	311,667	-	311,667
77	-	2,664,045	2,664,045	-	-	321,017	-	321,017
78	-	2,743,967	2,743,967	-	-	330,648	-	330,648
79	-	2,826,286	2,826,286	-	-	340,567	-	340,567
80	-	2,911,074	2,911,074	-	-	350,784	-	350,784
81	-	2,998,406	2,998,406	-	-	361,308	-	361,308
82	-	3,088,358	3,088,358	-	-	372,147	-	372,147
83	-	3,181,009	3,181,009	-	-	383,312	-	383,312
84	-	3,276,440	3,276,440	-	-	394,811	-	394,811
85	-	3,374,733	3,374,733	-	-	406,655	-	406,655
86	-	3,475,975	3,475,975	-	-	418,855	-	418,855
87	-	3,580,254	3,580,254	-	-	431,421	-	431,421
88	-	3,687,662	3,687,662	-	-	444,363	-	444,363
89	-	3,798,291	3,798,291	-	-	457,694	-	457,694
90	-	3,912,240	3,912,240	-	-	471,425	-	471,425
91	-	4,029,607	4,029,607	-	-	485,568	-	485,568
92	-	4,150,496	4,150,496	-	-	500,135	-	500,135
93	-	4,275,010	4,275,010	-	-	515,139	-	515,139
94	-	4,403,261	4,403,261	-	-	530,593	-	530,593
95	-	4,535,359	4,535,359	-	-	546,511	-	546,511
96	-	4,671,419	4,671,419	-	-	562,906	-	562,906
97	-	4,811,562	4,811,562	-	-	579,793	-	579,793
98	-	4,955,909	4,955,909	-	-	597,187	-	597,187
99	-	5,104,586	5,104,586	-	-	615,103	-	615,103
100	-	5,257,724	5,257,724	-	-	633,556	-	633,556

** Contributions related to future employees in excess of normal cost and expenses of 8.54% of pay.*

For purposes of this projection, based on GASB guidance, we assumed the statutory contribution rates 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)

Year	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)
1	$ 1,070,572	$ 68,311	$ 116,766	$ 789	$ 78,479	$ 1,099,807
2	1,099,807	70,339	120,093	749	80,624	1,129,928
3	1,129,928	71,016	122,280	719	82,829	1,160,774
4	1,160,774	71,913	124,945	694	85,078	1,192,126
5	1,192,126	73,768	127,158	673	87,417	1,225,480
6	1,225,480	74,962	129,041	654	89,894	1,260,641
7	1,260,641	75,588	130,895	635	92,486	1,297,185
8	1,297,185	76,269	132,474	618	95,195	1,335,557
9	1,335,557	76,991	133,963	600	98,045	1,376,030
10	1,376,030	77,742	135,437	583	101,055	1,418,807
11	1,418,807	78,513	136,888	564	104,238	1,464,106
12	1,464,106	79,293	138,365	545	107,611	1,512,100
13	1,512,100	80,064	140,160	524	111,174	1,562,654
14	1,562,654	80,835	142,010	502	114,926	1,615,903
15	1,615,903	81,613	144,179	478	118,869	1,671,728
16	1,671,728	82,400	146,299	454	123,008	1,730,383
17	1,730,383	83,215	148,318	428	127,364	1,792,216
18	1,792,216	84,057	150,392	402	131,957	1,857,436
19	1,857,436	84,937	152,490	376	136,804	1,926,311
20	1,926,311	85,869	154,576	350	141,929	1,999,183
21	1,999,183	86,857	156,456	323	147,362	2,076,623
22	2,076,623	87,916	158,033	298	153,152	2,159,360
23	2,159,360	89,042	159,585	273	159,342	2,247,886
24	2,247,886	90,242	160,848	248	165,981	2,343,013
25	2,343,013	91,522	162,037	224	173,119	2,445,393
26	2,445,393	92,875	163,384	201	180,799	2,555,482
27	2,555,482	94,312	164,407	178	189,072	2,674,281
28	2,674,281	95,847	165,237	156	198,008	2,802,743
29	2,802,743	97,482	165,923	135	207,679	2,941,846
30	2,941,846	99,219	166,511	116	218,154	3,092,592
31	3,092,592	85,404	167,029	98	228,933	3,239,802
32	3,239,802	87,375	166,967	82	240,049	3,400,177
33	3,400,177	89,473	166,639	67	252,168	3,575,112
34	3,575,112	91,686	166,253	53	265,384	3,765,876
35	3,765,876	94,030	165,412	42	279,809	3,974,261
36	3,974,261	96,509	164,086	32	295,578	4,202,230
37	4,202,230	99,121	162,183	23	312,843	4,451,988
38	4,451,988	101,868	159,754	17	331,765	4,725,850
39	4,725,850	104,743	156,863	11	352,517	5,026,236
40	5,026,236	107,759	153,417	7	375,284	5,355,855
41	5,355,855	110,901	149,537	5	400,264	5,717,478
42	5,717,478	114,166	145,386	3	427,659	6,113,914
43	6,113,914	117,551	140,978	1	457,679	6,548,165
44	6,548,165	121,054	136,354	1	490,547	7,023,411
45	7,023,411	124,673	131,553	-	526,501	7,543,032
46	7,543,032	128,407	126,618	-	565,792	8,110,613
47	8,110,613	132,256	121,579	-	608,687	8,729,977
48	8,729,977	136,223	116,453	-	655,475	9,405,222
49	9,405,222	140,309	111,256	-	706,460	10,140,735
50	10,140,735	144,519	106,006	-	761,971	10,941,219

For purposes of this projection, based on GASB guidance, we assumed the statutory contribution rates 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)

Year	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)
51	$ 10,941,219	$ 148,854	$ 100,716	$ -	$ 822,362	$ 11,811,719
52	11,811,719	153,320	95,400	-	888,010	12,757,649
53	12,757,649	157,919	90,074	-	959,320	13,784,814
54	13,784,814	162,657	84,754	-	1,036,728	14,899,445
55	14,899,445	167,537	79,460	-	1,120,700	16,108,222
56	16,108,222	172,563	74,209	-	1,211,737	17,418,313
57	17,418,313	177,740	69,022	-	1,310,375	18,837,406
58	18,837,406	183,072	63,919	-	1,417,191	20,373,750
59	20,373,750	188,564	58,919	-	1,532,803	22,036,198
60	22,036,198	194,221	54,042	-	1,657,875	23,834,252
61	23,834,252	200,047	49,304	-	1,793,118	25,778,113
62	25,778,113	206,049	44,727	-	1,939,297	27,878,732
63	27,878,732	212,230	40,326	-	2,097,233	30,147,869
64	30,147,869	218,597	36,120	-	2,267,808	32,598,154
65	32,598,154	225,155	32,125	-	2,451,967	35,243,151
66	35,243,151	231,910	28,355	-	2,650,730	38,097,436
67	38,097,436	238,867	24,825	-	2,865,187	41,176,665
68	41,176,665	246,033	21,544	-	3,096,514	44,497,668
69	44,497,668	253,414	18,521	-	3,345,973	48,078,534
70	48,078,534	261,017	15,761	-	3,614,919	51,938,709
71	51,938,709	268,847	13,265	-	3,904,812	56,099,103
72	56,099,103	276,912	11,032	-	4,217,221	60,582,204
73	60,582,204	285,220	9,059	-	4,553,832	65,412,197
74	65,412,197	293,776	7,336	-	4,916,460	70,615,097
75	70,615,097	302,590	5,853	-	5,307,057	76,218,891
76	76,218,891	311,667	4,596	-	5,727,722	82,253,684
77	82,253,684	321,017	3,548	-	6,180,714	88,751,867
78	88,751,867	330,648	2,690	-	6,668,464	95,748,289
79	95,748,289	340,567	2,000	-	7,193,587	103,280,443
80	103,280,443	350,784	1,456	-	7,758,895	111,388,666
81	111,388,666	361,308	1,037	-	8,367,414	120,116,351
82	120,116,351	372,147	722	-	9,022,401	129,510,177
83	129,510,177	383,312	491	-	9,727,358	139,620,356
84	139,620,356	394,811	325	-	10,486,051	150,500,893
85	150,500,893	406,655	210	-	11,302,531	162,209,869
86	162,209,869	418,855	132	-	12,181,157	174,809,749
87	174,809,749	431,421	81	-	13,126,612	188,367,701
88	188,367,701	444,363	49	-	14,143,936	202,955,951
89	202,955,951	457,694	29	-	15,238,547	218,652,163
90	218,652,163	471,425	17	-	16,416,269	235,539,840
91	235,539,840	485,568	10	-	17,683,365	253,708,763
92	253,708,763	500,135	6	-	19,046,571	273,255,463
93	273,255,463	515,139	4	-	20,513,126	294,283,724
94	294,283,724	530,593	2	-	22,090,815	316,905,130
95	316,905,130	546,511	1	-	23,788,006	341,239,646
96	341,239,646	562,906	1	-	25,613,699	367,416,250
97	367,416,250	579,793	1	-	27,577,566	395,573,608
98	395,573,608	597,187	-	-	29,690,008	425,860,803
99	425,860,803	615,103	-	-	31,962,208	458,438,114
100	458,438,114	633,556	-	-	34,406,185	493,477,855

For purposes of this projection, based on GASB guidance, we assumed the statutory contribution rates 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)

Year	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)
1	$ 1,070,572	$ 116,766	$ 116,766	$ -	$ 112,619	$ -	$ 112,619
2	1,099,783	120,093	120,093	-	107,747	-	107,747
3	1,129,906	122,280	122,280	-	102,055	-	102,055
4	1,160,751	124,945	124,945	-	97,004	-	97,004
5	1,192,102	127,158	127,158	-	91,834	-	91,834
6	1,225,457	129,041	129,041	-	86,692	-	86,692
7	1,260,618	130,895	130,895	-	81,803	-	81,803
8	1,297,161	132,474	132,474	-	77,014	-	77,014
9	1,335,533	133,963	133,963	-	72,446	-	72,446
10	1,376,006	135,437	135,437	-	68,133	-	68,133
11	1,418,782	136,888	136,888	-	64,058	-	64,058
12	1,464,081	138,365	138,365	-	60,232	-	60,232
13	1,512,075	140,160	140,160	-	56,757	-	56,757
14	1,562,629	142,010	142,010	-	53,494	-	53,494
15	1,615,879	144,179	144,179	-	50,522	-	50,522
16	1,671,703	146,299	146,299	-	47,688	-	47,688
17	1,730,359	148,318	148,318	-	44,973	-	44,973
18	1,792,190	150,392	150,392	-	42,421	-	42,421
19	1,857,410	152,490	152,490	-	40,011	-	40,011
20	1,926,286	154,576	154,576	-	37,729	-	37,729
21	1,999,158	156,456	156,456	-	35,524	-	35,524
22	2,076,597	158,033	158,033	-	33,378	-	33,378
23	2,159,334	159,585	159,585	-	31,355	-	31,355
24	2,247,861	160,848	160,848	-	29,398	-	29,398
25	2,342,987	162,037	162,037	-	27,549	-	27,549
26	2,445,367	163,384	163,384	-	25,840	-	25,840
27	2,555,456	164,407	164,407	-	24,188	-	24,188
28	2,674,256	165,237	165,237	-	22,614	-	22,614
29	2,802,718	165,923	165,923	-	21,124	-	21,124
30	2,941,820	166,511	166,511	-	19,719	-	19,719
31	3,092,566	167,029	167,029	-	18,401	-	18,401
32	3,239,776	166,967	166,967	-	17,111	-	17,111
33	3,400,153	166,639	166,639	-	15,885	-	15,885
34	3,575,087	166,253	166,253	-	14,743	-	14,743
35	3,765,850	165,412	165,412	-	13,645	-	13,645
36	3,974,237	164,086	164,086	-	12,591	-	12,591
37	4,202,206	162,183	162,183	-	11,577	-	11,577
38	4,451,964	159,754	159,754	-	10,608	-	10,608
39	4,725,826	156,863	156,863	-	9,689	-	9,689
40	5,026,212	153,417	153,417	-	8,815	-	8,815
41	5,355,831	149,537	149,537	-	7,993	-	7,993
42	5,717,455	145,386	145,386	-	7,229	-	7,229
43	6,113,892	140,978	140,978	-	6,521	-	6,521
44	6,548,143	136,354	136,354	-	5,867	-	5,867
45	7,023,389	131,553	131,553	-	5,265	-	5,265
46	7,543,010	126,618	126,618	-	4,714	-	4,714
47	8,110,590	121,579	121,579	-	4,211	-	4,211
48	8,729,954	116,453	116,453	-	3,752	-	3,752
49	9,405,198	111,256	111,256	-	3,334	-	3,334
50	10,140,711	106,006	106,006	-	2,955	-	2,955

For purposes of this projection, based on GASB guidance, we assumed the statutory contribution rates 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 (concluded)
(Dollars in Thousands)

Year	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)
51	$ 10,941,195	$ 100,716	$ 100,716	$ -	$ 2,612	$ -	$ 2,612
52	11,811,696	95,400	95,400	-	2,301	-	2,301
53	12,757,626	90,074	90,074	-	2,021	-	2,021
54	13,784,792	84,754	84,754	-	1,769	-	1,769
55	14,899,423	79,460	79,460	-	1,543	-	1,543
56	16,108,199	74,209	74,209	-	1,341	-	1,341
57	17,418,290	69,022	69,022	-	1,160	-	1,160
58	18,837,382	63,919	63,919	-	999	-	999
59	20,373,725	58,919	58,919	-	857	-	857
60	22,036,173	54,042	54,042	-	731	-	731
61	23,834,227	49,304	49,304	-	620	-	620
62	25,778,088	44,727	44,727	-	524	-	524
63	27,878,707	40,326	40,326	-	439	-	439
64	30,147,844	36,120	36,120	-	366	-	366
65	32,598,129	32,125	32,125	-	303	-	303
66	35,243,127	28,355	28,355	-	249	-	249
67	38,097,411	24,825	24,825	-	202	-	202
68	41,176,640	21,544	21,544	-	163	-	163
69	44,497,644	18,521	18,521	-	131	-	131
70	48,078,509	15,761	15,761	-	103	-	103
71	51,938,683	13,265	13,265	-	81	-	81
72	56,099,078	11,032	11,032	-	63	-	63
73	60,582,179	9,059	9,059	-	48	-	48
74	65,412,172	7,336	7,336	-	36	-	36
75	70,615,073	5,853	5,853	-	27	-	27
76	76,218,866	4,596	4,596	-	20	-	20
77	82,253,659	3,548	3,548	-	14	-	14
78	88,751,843	2,690	2,690	-	10	-	10
79	95,748,266	2,000	2,000	-	7	-	7
80	103,280,420	1,456	1,456	-	5	-	5
81	111,388,643	1,037	1,037	-	3	-	3
82	120,116,328	722	722	-	2	-	2
83	129,510,154	491	491	-	1	-	1
84	139,620,332	325	325	-	1	-	1
85	150,500,869	210	210	-	-	-	-
86	162,209,846	132	132	-	-	-	-
87	174,809,725	81	81	-	-	-	-
88	188,367,677	49	49	-	-	-	-
89	202,955,927	29	29	-	-	-	-
90	218,652,139	17	17	-	-	-	-
91	235,539,816	10	10	-	-	-	-
92	253,708,739	6	6	-	-	-	-
93	273,255,438	4	4	-	-	-	-
94	294,283,700	2	2	-	-	-	-
95	316,905,105	1	1	-	-	-	-
96	341,239,621	1	1	-	-	-	-
97	367,416,225	1	1	-	-	-	-
98	395,573,584	-	-	-	-	-	-
99	425,860,779	-	-	-	-	-	-
100	458,438,089	-	-	-	-	-	-
				Totals	$ 1,869,580	$ -	$ 1,869,580

For purposes of this projection, based on GASB guidance, we assumed the statutory contribution rates 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.

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 employees that are provided with pensions through the pension plan.
Deferred Retirement Option Program (DROP)	A program that permits a plan member to elect a calculation of benefit payments based on service credits and salary, as applicable, as of the DROP entry date. The plan member continues to provide service to the employer and is paid for the service by the employer after the DROP entry date; however, the pensions that would have been paid to the plan member are credited to an individual member account within the defined benefit pension plan until the end of the DROP period. Other variations for DROP exist and will be more fully detailed in the plan provision section of the valuation report.
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 cost 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 market value of the assets of the trust dedicated to the defined benefit provisions.
Long-Term Expected Rate of Return	The long-term rate of return is the expected return to be earned over the entire trust portfolio based on the asset allocation of the portfolio.
Money-Weighted Rate of Return	The money-weighted rate of return is a method of calculating the returns that adjusts for the changing amounts actually invested. For purposes of GASB Statement No. 67, money-weighted rate of return is calculated as the internal rate of return on pension plan investments, net of pension plan investment expense.
Multiple-Employer Defined Benefit Pension Plan	A multiple-employer plan is a defined benefit pension plan that is used to provide pensions to the employees of more than one employer.
Municipal Bond Rate	The Municipal Bond Rate is the discount rate to be used for those benefit payments that occur after the assets of the trust have been depleted.
Net Pension Liability (NPL)	The NPL is the liability of employers and non-employer contributing entities to plan members for benefits provided through a defined benefit pension plan.
Non-Employer Contributing Entities	Non-employer contributing entities are entities that make contributions to a pension plan that is used to provide pensions to the employees of other entities. For purposes of the GASB accounting statements, plan members are not considered non-employer contributing entities.
Normal Cost	The portion of the actuarial present value allocated to a valuation year is called the normal cost. For purposes of application to the requirements of this Statement, the term normal cost is the equivalent of service cost.

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 GASB Statement Nos. 67 and 68, the valuation assets are equal to the market value of assets.