St. Paul Teachers' Retirement Fund Association

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

June 30, 2017

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January 8, 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, 2017 for additional discussion of the nature of actuarial calculations and more information related to participant data, economic and demographic assumptions, and benefit provisions.

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As noted in the actuarial valuation report for funding purposes, GRS believes the 8.00% return rate is within the reasonable range for this valuation as of July 1, 2017, but cautions the Fund that declining capital market and inflation expectations may result in 8.00% being deemed unreasonable for future valuations. GRS previously recommended reducing the investment return assumption to 7.50%, and the Fund has proposed legislation to enact this recommended assumption change. Although the proposed legislation passed the Minnesota House and Senate during 2017, the legislation was vetoed by the Governor. Reducing the investment return assumption remains a priority for the Fund.

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, MAAA

BJW/JDA:dj

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SECTION A

EXECUTIVE SUMMARY

Executive Summary
as of June 30, 2017 (Dollars in Thousands)

		2017
Actuarial Valuation Date		June 30, 2017
Measurement Date of the Net Pension Liability		June 30, 2017
Membership		
Number of		
- Service Retirements		3,478
- Survivors		343
- Disability Retirements		30
- Deferred Retirements		2,034
- Terminated other non-vested		2,945
- Active Members		3,550
- Total		12,380
Covered Payroll	$	264,342
Net Pension Liability		
Total Pension Liability	$	1,611,208
Plan Fiduciary Net Position		1,032,249
Net Pension Liability	$	578,959
Plan Fiduciary Net Position as a Percentage of Total Pension Liability		64.07%
Net Pension Liability as a Percentage of Covered Payroll		219.02%
Development of the Single Discount Rate		
Single Discount Rate		8.00%
Long-Term Expected Rate of Investment Return		8.00%
Long-Term Municipal Bond Rate*		3.56%
Last year ending June 30 in the 2018 to 2117 projection period within which projected benefit payments are fully funded		2117
Total Pension Expense	$	37,550

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	$	5,329	$	31,252
Changes in assumptions		7,930		16,982
Net difference between projected and actual earnings on pension plan investments		68,722		62,504
Total	$	81,981	$	110,738

** 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 30, 2017.*

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, 2017.

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 8.00% on the actuarial value of assets), then the following outcomes are expected:

1. The unfunded actuarial accrued liabilities will increase in the short term but will be fully amortized after approximately 40 years.
2. The funded status of the plan will continue to increase towards a 100% funded ratio.

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, 2017 and a measurement date of June 30, 2017.

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 8.00% 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) the 8.00% 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 30, 2017.*

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, 2017 (Dollars in Thousands)

A. Expense/(Income)

1.	Service Cost, Beginning of Year	$ 24,098
2.	Interest on the Total Pension Liability	123,820
3.	Current-Period Benefit Changes	-
4.	Employee Contributions (made negative for addition here)	(20,146)
5.	Projected Earnings on Plan Investments (made negative for addition here)	(74,528)
6.	Pension Plan Administrative Expense	889
7.	Other Changes in Plan Fiduciary Net Position	-
8.	Recognition of Outflow (Inflow) of Resources due to Liabilities	(13,208)
9.	Recognition of Outflow (Inflow) of Resources due to Assets	(3,375)
10.	**Total Pension Expense / (Income)**	**$ 37,550**

Statement of Outflows and Inflows Arising from Current Reporting Period Fiscal Year Ended June 30, 2017 (Dollars in Thousands)

A. Outflows (Inflows) of Resources due to Liabilities		
1. Difference between expected and actual experience of the Total Pension Liability (gains) or losses*	$	7,106
2. Assumption Changes (gains) or losses	$	(22,643)
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	$	1,777
5. Outflow (Inflow) of Resources to be recognized in the current pension expense for Assumption Changes	$	(5,661)
6. Outflow (Inflow) of Resources to be recognized in the current pension expense due to Liabilities	$	(3,884)
7. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses for the difference between expected and actual experience of the Total Pension Liability	$	5,329
8. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses for Assumption Changes	$	(16,982)
9. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses due to Liabilities	$	(11,653)
B. Outflows (Inflows) of Resources due to Assets		
1. Net difference between projected and actual earnings on pension plan investments (gains) or losses	$	(54,191)
2. Recognition period for Assets {in years}		5
3. Outflow (Inflow) of Resources to be recognized in the current pension expense due to Assets	$	(10,838)
4. Deferred Outflow (Inflow) of Resources to be recognized in future pension expenses due to Assets	$	(43,353)

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

Statement of Outflows and Inflows Arising from Current and Prior Reporting Periods Fiscal Year Ended June 30, 2017 (Dollars in Thousands)

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

	Outflows of Resources	Inflows of Resources	Net Outflows/(Inflows) of Resources
1. Due to Liabilities	$ 9,705	$ 22,913	$ (13,208)
2. Due to Assets	26,616	29,991	(3,375)
3. Total	$ 36,321	$ 52,904	$ (16,583)

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	$ 17,252	$ (15,475)
2. Assumption Changes	7,928	5,661	2,267
3. Net Difference between projected and actual earnings on pension plan investments	26,616	29,991	(3,375)
4. Total	$ 36,321	$ 52,904	$ (16,583)

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	$ 5,329	$ 31,252	$ (25,923)
2. Assumption Changes	7,930	16,982	(9,052)
3. Net Difference between projected and actual earnings on pension plan investments	68,722	62,504	6,218
4. Total	$ 81,981	$ 110,738	$ (28,757)

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
2018	$ (16,581)
2019	(2,105)
2020	768
2021	(10,839)
2022	-
Thereafter	-
Total	$ (28,757)

Statement of Fiduciary Net Position
as of June 30, 2017 (Dollars in Thousands)

		2017
Assets		
Cash and Deposits	$	32,899
Receivables		
Accounts Receivable - Sale of Investments	$	-
Accrued Interest and Other Dividends		-
Contributions		-
Accounts Receivable - Other		-
Total Receivables	$	-
Investments		
Fixed Income	$	188,598
Equities		637,561
Real Estate		69,727
Other		105,917
Total Investments	$	1,001,803
Total Assets	$	1,034,702
Liabilities		
Payables		
Accounts Payable - Purchase of Investments	$	2,453
Accrued Expenses		-
Accounts Payable - Other		-
Total Liabilities	$	2,453
Net Position Restricted for Pensions	$	1,032,249

Statement of Changes in Fiduciary Net Position for Year Ended June 30, 2017 (Dollars in Thousands)

Additions		
Contributions		
Employer	$	27,543
Employer (for Reemployed Annuitants)		142
Employee		20,146
Other		10,665
Total Contributions	$	58,496
Investment Income		
Net Appreciation in Fair Value of Investments	$	120,543
Interest and Dividends		12,999
Less Investment Expense		(4,823)
Net Investment Income	$	128,719
Other		0
Total Additions	$	187,215
Deductions		
Benefit payments, including refunds of employee contributions	$	113,743
Pension Plan Administrative Expense		889
Other		-
Total Deductions	$	114,632
Net Increase in Net Position	$	72,583
Net Position Restricted for Pensions		
Beginning of Year	$	959,666
End of Year	$	1,032,249

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, 2017 (Dollars in Thousands)

A. Total pension liability		
1. Service Cost	$	24,098
2. Interest on the Total Pension Liability		123,820
3. Changes of benefit terms		-
4. Difference between expected and actual experience of the Total Pension Liability+		7,106
5. Changes of assumptions		(22,643)
6. Benefit payments, including refunds of employee contributions		(113,743)
7. Net change in Total Pension Liability	$	18,638
8. Total Pension Liability – Beginning		1,592,570
9. Total Pension Liability – Ending	**$**	**1,611,208**
B. Plan fiduciary net position		
1. Contributions – Employer^	$	38,350
2. Contributions – Employee		20,146
3. Net investment income		128,719
4. Benefit payments, including refunds of employee contributions		(113,743)
5. Pension Plan Administrative Expense		(889)
6. Other		-
7. Net change in Plan Fiduciary Net Position	$	72,583
8. Plan Fiduciary Net Position – Beginning		959,666
9. Plan Fiduciary Net Position – Ending	**$**	**1,032,249**
C. Net Pension Liability	**$**	**578,959**
D. Plan Fiduciary Net Position as a Percentage of the Total Pension Liability		**64.07%**
E. Covered-Employee payroll	**$**	**264,342**
F. Net pension liability as a percentage of Covered-Employee payroll		**219.02%**

\+ *Includes impact of changes in expected timing of future COLA increase.*

^ *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,	2017	2016	2015	2014	2013	2012	2011	2010	2009	2008
Total Pension Liability										
Service Cost	$ 24,098	$ 25,596	$ 24,998	$ 22,954						
Interest on the Total Pension Liability	123,820	124,294	123,108	118,503						
Benefit Changes	-	-	(5,677)	-						
Difference between Expected and Actual Experience	7,106	(42,295)	(17,133)	(16,257)						
Assumption Changes	(22,643)	-	-	39,642						
Benefit Payments	(112,771)	(111,167)	(108,878)	(105,742)						
Refunds	(972)	(628)	(875)	(1,103)						
Net Change in Total Pension Liability	18,638	(4,200)	15,543	57,997						
Total Pension Liability - Beginning	1,592,570	1,596,770	1,581,227	1,523,230						
Total Pension Liability - Ending (a)	$ 1,611,208	$ 1,592,570	$ 1,596,770	$ 1,581,227						
Plan Fiduciary Net Position										
Employer Contributions*	$ 38,350	$ 37,228	$ 36,711	$ 35,197						
Employee Contributions	20,146	18,538	17,567	16,564						
Pension Plan Net Investment Income	128,719	1,475	25,757	168,176						
Benefit Payments	(112,771)	(111,167)	(108,878)	(105,742)						
Refunds	(972)	(628)	(875)	(1,103)						
Pension Plan Administrative Expense	(889)	(749)	(748)	(739)						
Other	-	-	-	-						
Net Change in Plan Fiduciary Net Position	72,583	(55,303)	(30,466)	112,353						
Plan Fiduciary Net Position - Beginning	959,666	1,014,969	1,045,435	933,082						
Plan Fiduciary Net Position - Ending (b)	$ 1,032,249	$ 959,666	$ 1,014,969	$ 1,045,435						
Net Pension Liability - Ending (a) - (b)	578,959	632,904	581,801	535,792						
Plan Fiduciary Net Position as a Percentage of Total Pension Liability	64.07 %	60.26 %	63.56 %	66.12 %						
Covered Employee Payroll	$ 264,342	$ 258,787	$ 263,844	$ 259,740						
Net Pension Liability as a Percentage of Covered Employee Payroll	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
2008						
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%

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
2008	$ 41,580	$ 24,285	$ 17,295	$ 235,993	10.29%
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

* *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, 2017 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, 2016
Actuarial Cost Method	Entry Age Normal
Amortization Method	Level Percentage of Payroll, Closed
Remaining Amortization Period	26 years
Asset Valuation Method	5-Year smoothed market; no corridor
Inflation	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, 2055, and a 2.5% COLA beginning January 1, 2066. See separate funding report as of July 1, 2016 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]
2008	
2009	
2010	
2011	
2012	
2013	
2014	18.50 %
2015	2.65 %
2016	0.34 %
2017	13.93 %

[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, 2017 was 13.93% (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, 2017, 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 8.00% 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 8.00%. 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 8.00%, 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 7.00%	Current Single Discount Rate Assumption 8.00%	1% Increase 9.00%
Total Pension Liability	$1,794,734	$1,611,208	$1,457,534
Net Position Restricted for Pensions	1,032,249	1,032,249	1,032,249
Net Pension Liability	**$ 762,485**	**$ 578,959**	**$ 425,285**

In interpreting the above results, users should be aware that we do not consider 9.00% to be a reasonable assumption.

Reconciliation of Members

Summary of Changes in Participant Status
During Fiscal Year Ending June 30, 2017

	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, 2016	3,455	79	2,020	2,915	3,324	31	328	40	12,192
B. Additions	358	3	113	191	190		27	3	885
C. Deletions									
1. Retirements	(107)	(3)	(78)						(188)
2. Disability									-
3. Died with Beneficiary			(1)		(22)				(23)
4. Died without Beneficiary					(58)		(11)		(69)
5. Terminated - Deferred	(101)	(12)							(113)
6. Terminated - Not Vestec	(187)	(4)							(191)
7. Refunds	(16)		(25)	(69)					(110)
8. Rehired as Active	112	(25)	(38)	(49)					-
9. Leave of Absence	(103)	103							-
10. Repayment of Refund									-
11. Expired Benefits							(1)		(1)
12. Disability to Retirement						(2)			(2)
D. Data Adjustments[1]	(2)		43	(43)	2		(1)	1	-
E. Total on June 30, 2017	3,409	141	2,034	2,945	3,436	29	342	44	12,380

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

[2] *Includes alternate payees of retired participants (42), disabled participants (1), and survivors (1).*

GASB Reconciliation (Dollars in Thousands)
Fiscal Year Ended June 30, 2017

	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	**$ 1,592,570**	**$ 959,666**	**$ 632,904**				
Changes for the Year:							
Service Cost	$ 24,098		$ 24,098				$ 24,098
Interest on Total Pension Liability	123,820		123,820				123,820
Interest on Fiduciary Net Position [1]		$ 74,528	(74,528)				(74,528)
Changes in Benefit Terms	-		-				-
Liability Experience Gains and Losses	7,106		7,106	$ 5,329	$ 31,252	$ (48,504)	(15,475)
Changes in Assumptions	(22,643)		(22,643)	7,930	16,982	15,858	2,267
Contributions - Employer		38,350	(38,350)				-
Contributions - Employees		20,146	(20,146)				(20,146)
Asset Gain/(Loss) [1]		54,191	(54,191)	68,722	62,504	57,034	(3,375)
Benefit Payouts	(113,743)	(113,743)					-
Administrative Expenses		(889)	889				889
Other changes							$ -
Net Changes	**$ 18,638**	**$ 72,583**	**$ (53,945)**				**$ 37,550**
Balance End of Year	**$ 1,611,208**	**$ 1,032,249**	**$ 578,959**	**$ 81,981**	**$ 110,738**	**$ 24,388**	

[1] *The sum of these items equals the net investment income of $128,719.*

SECTION E

SUMMARY OF BENEFITS

Summary of Benefit Provisions for Basic Members as of July 1, 2017

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
2014	9.00%	9.00%	3.64%
2015	9.50%	9.50%	3.64%
2016	10.00%	9.75%	3.64%
2017	10.00%	10.00%	3.64%

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.

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.

Summary of Benefit Provisions for Basic Members
as of July 1, 2017

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.

Age at Retirement	Under Age 62 or Less Than 30 Years of Service	Age 62 or Older with 30 Years of Service
55	0.5376	
56	0.5745	
57	0.6092	
58	0.6419	
59	0.6726	
60	0.7354	
61	0.7947	
62	0.8507	0.8831
63	0.9035	0.9246
64	0.9533	0.9635
65	1.0000	1.0000

Summary of Benefit Provisions for Basic Members as of July 1, 2017

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.

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, 2017

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 before July 1, 2011 with 4.00 percent accrual 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

If the Accrued Liability Funding Ratio, based on Actuarial Value of Assets, as determined by the two consecutive and most recent actuarial valuations are:

Less than 80 percent for two consecutive years, the COLA: 1.00 percent
Between 80 percent and 90 percent for two consecutive years, the COLA: 2.00 percent
If at least 90 percent for two consecutive years, the COLA: 2.50 percent

Changes in Plan Provisions

There have been no changes in plan provisions since the prior valuation.

Summary of Benefit Provisions for Coordinated Members as of July 1, 2017

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
2014	6.50%	5.50%	3.84%
2015	7.00%	6.00%	3.84%
2016	7.50%	6.25%	3.84%
2017	7.50%	6.50%	3.84%

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.

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, 2017

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 table listed below.

	Under Age 62 or Less Than 30 Years of Service		Age 62 or Older with 30 Years of Service	
Normal Retirement Age:	**65**	**66**	**65**	**66**
Age at Retirement				
55	0.5376	0.4592		
56	0.5745	0.4992		
57	0.6092	0.5370		
58	0.6419	0.5726		
59	0.6726	0.6062		
60	0.7354	0.6726		
61	0.7947	0.7354		
62	0.8507	0.7947	0.8831	0.8389
63	0.9035	0.8507	0.9246	0.8831
64	0.9533	0.9035	0.9635	0.9246
65	1.0000	0.9533	1.0000	0.9635
66		1.0000		1.0000

Summary of Benefit Provisions for Coordinated Members as of July 1, 2017

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.

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, 2017

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 until July 1, 2011 with 4.00 percent accrual 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

If the Accrued Liability Funding Ratio, based on Actuarial Value of Assets, as determined by the two consecutive and most recent actuarial valuations are:

Less than 80 percent for two consecutive years, the COLA: 1.00 percent
Between 80 percent and 90 percent for two consecutive years, the COLA: 2.00 percent
If at least 90 percent for two consecutive years, the COLA: 2.50 percent

Changes in Plan Provisions

There have been no changes in plan provisions since the prior valuation.

SECTION F

ACTUARIAL COST METHOD AND ACTUARIAL ASSUMPTIONS

Actuarial 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, 2017 valuation as a result of an analysis of Combined Service Annuity assumptions completed by the LCPR Actuary and documented in a report dated October 2016. Other assumptions are based on an experience study for the five-year period of July 1, 2006 to June 30, 2011, as well as a legislated change to the investment return assumption effective July 1, 2015.

An experience study for the 2011 to 2016 period is currently in process. This report recommends many changes to demographic assumptions, expected to be effective at a future date.

A. Demographic Assumptions

Mortality:

1. Healthy Mortality*:
   a. Male: RP-2000 Combined Mortality Table for males projected with Scale AA to 2020 set back 1 year
   b. Female: RP-2000 Combined Mortality Table for females projected with Scale AA to 2020 set back 3 years
2. Disabled Mortality:
   a. Male: RP-2000 Disabled Life Mortality Table for males
   b. Female: RP-2000 Disabled Life Mortality Table for females

* *Mortality rates were adjusted to include margin for future mortality improvement as described in the table name above.*

Actuarial Cost Method and Actuarial Assumptions

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

	Healthy Mortality		Disabled Mortality	
Age	Male	Female	Male	Female
20	2	1	226	75
21	2	1	226	75
22	2	1	226	75
23	3	1	226	75
24	3	1	226	75
25	3	1	226	75
26	3	1	226	75
27	3	1	226	75
28	3	2	226	75
29	4	2	226	75
30	4	2	226	75
31	4	2	226	75
32	5	2	226	75
33	5	2	226	75
34	6	3	226	75
35	6	3	226	75
36	7	3	226	75
37	8	4	226	75
38	8	4	226	75
39	9	4	226	75
40	9	4	226	75
41	9	5	226	75
42	10	5	226	75
43	10	5	226	75
44	10	6	226	75

Actuarial Cost Method and Actuarial Assumptions

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

	Healthy Mortality		Disabled Mortality	
Age	Male	Female	Male	Female
45	11	6	226	75
46	12	7	238	82
47	12	8	251	90
48	13	8	264	98
49	13	9	277	106
50	14	9	290	115
51	15	10	303	125
52	17	11	316	135
53	18	12	329	145
54	19	13	342	155
55	21	15	354	165
56	25	17	367	176
57	29	20	380	187
58	33	23	393	197
59	38	27	407	208
60	43	31	420	218
61	49	35	435	229
62	57	40	450	241
63	65	46	466	253
64	76	53	483	266
65	85	60	502	280
66	96	69	522	296
67	111	78	545	313
68	124	88	569	332
69	135	99	596	353

Actuarial Cost Method and Actuarial Assumptions

Rates of Disability:

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

Age	Disability	Age	Disability
20	2	45	5
21	2	46	5
22	2	47	5
23	2	48	5
24	2	49	5
25	2	50	10
26	2	51	10
27	2	52	10
28	2	53	10
29	2	54	10
30	3	55	20
31	3	56	20
32	3	57	20
33	3	58	20
34	3	59	20
35	3	60	40
36	3	61	40
37	3	62	40
38	3	63	40
39	3	64	40
40	3		
41	3		
42	3		
43	3		
44	3		

Rates of Termination:

Years of Service	Number of Terminations per 1,000 Active Members: Male	Female
0	400	400
1	180	180
2	140	140
3	100	100
4	60	67
5	50	59
6	45	51
7	41	43
8	37	35
9	33	31
10	29	27
11	25	23
12	20	19
13	20	15
14	20	13
15 & Over	20	13

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	3,500	3,500	700	500
56	5,000	1,300	3,500	3,500	700	500
57	4,000	1,300	3,500	3,500	700	500
58	4,000	1,800	3,500	3,500	700	500
59	3,500	1,800	3,500	3,500	700	500
60	3,500	2,000	3,500	3,500	1,100	800
61	3,500	2,000	3,500	3,500	1,500	1,100
62	3,500	4,000	3,500	3,500	1,900	1,400
63	3,500	4,000	3,500	3,500	2,300	1,900
64	4,000	4,000	3,500	4,000	2,700	2,400
65	5,000	5,000	3,500	5,000	3,100	3,500
66	3,000	5,000	3,500	5,000	3,500	3,500
67	3,000	5,000	3,500	5,000	3,500	3,500
68	3,000	5,000	3,500	5,000	3,500	3,500
69	3,000	5,000	3,500	5,000	3,500	3,500
70 & Over	10,000	10,000	10,000	10,000	10,000	10,000

B. Economic Assumptions

Investment Return Rate: 8.00%

Cost-of-Living Increases: 1.00% per year through 2041; 2.00% beginning 2042; 2.50% beginning 2052.

Wage Inflation: 4.00% per year

Future Salary Increases: In addition to the age-based rates shown below, during the first 15 years of employment, a service-based component of 0.20% x (15-T), where T is completed years of service, is included in the salary increase used.

Annual Salary Increases

Age	Ultimate Rate of Annual Salary Increases	Age	Ultimate Rate of Annual Salary Increases
<22	5.90%	45	4.75%
23	5.85	46	4.70
24	5.80	47	4.65
		48	4.60
25	5.75	49	4.55
26	5.70		
27	5.65	50	4.50
28	5.60	51	4.45
29	5.55	52	4.40
		53	4.35
30	5.50	54	4.30
31	5.45		
32	5.40	55	4.25
33	5.35	56	4.20
34	5.30	57	4.15
		58	4.10
35	5.25	59	4.05
36	5.20		
37	5.15	60 & Over	4.00
38	5.10		
39	5.05		
40	5.00		
41	4.95		
42	4.90		
43	4.85		
44	4.80		

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

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.

Actuarial Cost Method and Actuarial Assumptions

Valuation of Future Post-Retirement Benefit Increases:	If the plan has reached the funding ratio threshold required to pay a different benefit increase, Minnesota Statutes require the benefit increase rate to be reflected in the liability calculations. If the plan has not yet reached the funding ratio threshold required to pay a benefit increase, Minnesota Statutes require a projection to be performed to determine the expected attainment of the funding ratio thresholds, and the expected payment of benefit increases must be reflected in the liability calculations.
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, according to 1997 legislation, annual supplemental contributions currently equal to $2,827,000 are scheduled to be paid on October 1. According to 2014 legislation, the State of Minnesota will make annual additional supplemental contributions of $7,000,000 on October 1. The contributions described herein will continue until the plan is 100% funded or until June 30, 2042, whichever occurs earlier.
Projected Annual Payroll Calculation:	The census data as of July 1, 2017 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 $44,759; and the Projected Annual Payroll for the fiscal year ending June 30, 2018 includes this replacement salary amount.
Changes in Actuarial Assumptions Since the Prior Valuation:	The Combined Service Annuity (CSA) loads on liabilities were changed as follows:

	Active Pre-89	Active Post-89	Vested Terminated	Non-Vested Terminated
Prior	7.0%	2.0%	30.0%	30.0%
Current	0.0%	0.0%	20.0%	9.0%

The assumed cost-of-living adjustments were changed from 1.00% per year through 2054; 2.00% beginning 2055; 2.50% beginning 2066 to 1.00% per year through 2041; 2.00% beginning 2042; 2.50% beginning 2052.

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 2016, 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 8.00%; the municipal bond rate is 3.56%; and the resulting Single Discount Rate is 8.00%.

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	$ 264,342	$ -	$ 264,342					
1	280,785	-	280,785	$ 21,059	$ 29,033	$ -	$ 10,665	$ 60,757
2	271,554	20,462	292,016	20,367	28,079	1,756	10,665	60,867
3	265,673	38,024	303,697	19,925	27,471	3,262	10,665	61,323
4	260,853	54,992	315,845	19,564	26,972	4,718	10,665	61,919
5	256,950	71,528	328,478	19,271	26,569	6,137	10,665	62,642
6	253,842	87,775	341,617	19,038	26,247	7,531	10,665	63,481
7	251,225	104,057	355,282	18,842	25,977	8,928	10,665	64,412
8	248,660	120,833	369,493	18,650	25,711	10,367	10,665	65,393
9	246,223	138,050	384,273	18,467	25,459	11,845	10,665	66,436
10	243,551	156,093	399,644	18,266	25,183	13,393	10,665	67,507
11	240,628	175,002	415,630	18,047	24,881	15,015	10,665	68,608
12	237,173	195,082	432,255	17,788	24,524	16,738	10,665	69,715
13	232,889	216,656	449,545	17,467	24,081	18,589	10,665	70,802
14	227,780	239,747	467,527	17,083	23,552	20,570	10,665	71,870
15	221,853	264,375	486,228	16,639	22,940	22,683	10,665	72,927
16	215,073	290,604	505,677	16,130	22,239	24,934	10,665	73,968
17	207,452	318,452	525,904	15,559	21,451	27,323	10,665	74,998
18	199,140	347,801	546,941	14,936	20,591	29,841	10,665	76,033
19	190,204	378,614	568,818	14,265	19,667	32,485	10,665	77,082
20	180,906	410,665	591,571	13,568	18,706	35,235	10,665	78,174
21	171,196	444,038	615,234	12,840	17,702	38,098	10,665	79,305
22	161,121	478,722	639,843	12,084	16,660	41,074	10,665	80,483
23	150,886	514,551	665,437	11,316	15,602	44,148	10,665	81,731
24	140,409	551,645	692,054	10,531	14,518	47,331	10,665	83,045
25	129,871	589,865	719,736	9,740	13,429	50,610	10,665	84,444
26	119,197	629,329	748,526	8,940	12,325	53,996	-	75,261
27	108,461	670,006	778,467	8,135	11,215	57,487	-	76,837
28	97,665	711,941	809,606	7,325	10,099	61,084	-	78,508
29	86,964	755,026	841,990	6,522	8,992	64,781	-	80,295
30	76,478	799,191	875,669	5,736	7,908	68,571	-	82,215
31	66,404	844,292	910,696	4,980	6,866	72,440	-	84,286
32	56,791	890,333	947,124	4,259	5,872	76,391	-	86,522
33	47,762	937,247	985,009	3,582	4,939	80,416	-	88,937
34	39,399	985,010	1,024,409	2,955	4,074	84,514	-	91,543
35	31,619	1,033,767	1,065,386	2,371	3,269	88,697	-	94,337
36	24,875	1,083,126	1,108,001	1,866	2,572	92,932	-	97,370
37	18,957	1,133,364	1,152,321	1,422	1,960	97,243	-	100,625
38	13,896	1,184,518	1,198,414	1,042	1,437	101,632	-	104,111
39	9,760	1,236,591	1,246,351	732	1,009	106,099	-	107,840
40	6,518	1,289,687	1,296,205	489	674	110,655	-	111,818
41	4,232	1,343,821	1,348,053	317	438	115,300	-	116,055
42	2,587	1,399,388	1,401,975	194	268	120,067	-	120,529
43	1,453	1,456,601	1,458,054	109	150	124,976	-	125,235
44	748	1,515,628	1,516,376	56	77	130,041	-	130,174
45	335	1,576,696	1,577,031	25	35	135,280	-	135,340
46	131	1,639,981	1,640,112	10	14	140,710	-	140,734
47	38	1,705,679	1,705,717	3	4	146,347	-	146,354
48	3	1,773,942	1,773,945	-	-	152,204	-	152,204
49	-	1,844,903	1,844,903	-	-	158,293	-	158,293
50	-	1,918,699	1,918,699	-	-	164,624	-	164,624

** Contributions related to future employees in excess of normal cost and expenses of 9.26% 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	$ -	$ 1,995,447	$ 1,995,447	$ -	$ -	$ 171,209	$ -	$ 171,209
52	-	2,075,265	2,075,265	-	-	178,058	-	178,058
53	-	2,158,276	2,158,276	-	-	185,180	-	185,180
54	-	2,244,607	2,244,607	-	-	192,587	-	192,587
55	-	2,334,391	2,334,391	-	-	200,291	-	200,291
56	-	2,427,767	2,427,767	-	-	208,302	-	208,302
57	-	2,524,878	2,524,878	-	-	216,634	-	216,634
58	-	2,625,873	2,625,873	-	-	225,300	-	225,300
59	-	2,730,908	2,730,908	-	-	234,312	-	234,312
60	-	2,840,144	2,840,144	-	-	243,684	-	243,684
61	-	2,953,750	2,953,750	-	-	253,432	-	253,432
62	-	3,071,900	3,071,900	-	-	263,569	-	263,569
63	-	3,194,776	3,194,776	-	-	274,112	-	274,112
64	-	3,322,567	3,322,567	-	-	285,076	-	285,076
65	-	3,455,469	3,455,469	-	-	296,479	-	296,479
66	-	3,593,688	3,593,688	-	-	308,338	-	308,338
67	-	3,737,436	3,737,436	-	-	320,672	-	320,672
68	-	3,886,933	3,886,933	-	-	333,499	-	333,499
69	-	4,042,410	4,042,410	-	-	346,839	-	346,839
70	-	4,204,107	4,204,107	-	-	360,712	-	360,712
71	-	4,372,271	4,372,271	-	-	375,141	-	375,141
72	-	4,547,162	4,547,162	-	-	390,146	-	390,146
73	-	4,729,048	4,729,048	-	-	405,752	-	405,752
74	-	4,918,210	4,918,210	-	-	421,982	-	421,982
75	-	5,114,939	5,114,939	-	-	438,862	-	438,862
76	-	5,319,536	5,319,536	-	-	456,416	-	456,416
77	-	5,532,318	5,532,318	-	-	474,673	-	474,673
78	-	5,753,610	5,753,610	-	-	493,660	-	493,660
79	-	5,983,755	5,983,755	-	-	513,406	-	513,406
80	-	6,223,105	6,223,105	-	-	533,942	-	533,942
81	-	6,472,029	6,472,029	-	-	555,300	-	555,300
82	-	6,730,910	6,730,910	-	-	577,512	-	577,512
83	-	7,000,147	7,000,147	-	-	600,613	-	600,613
84	-	7,280,153	7,280,153	-	-	624,637	-	624,637
85	-	7,571,359	7,571,359	-	-	649,623	-	649,623
86	-	7,874,213	7,874,213	-	-	675,607	-	675,607
87	-	8,189,182	8,189,182	-	-	702,632	-	702,632
88	-	8,516,749	8,516,749	-	-	730,737	-	730,737
89	-	8,857,419	8,857,419	-	-	759,967	-	759,967
90	-	9,211,715	9,211,715	-	-	790,365	-	790,365
91	-	9,580,184	9,580,184	-	-	821,980	-	821,980
92	-	9,963,391	9,963,391	-	-	854,859	-	854,859
93	-	10,361,927	10,361,927	-	-	889,053	-	889,053
94	-	10,776,404	10,776,404	-	-	924,615	-	924,615
95	-	11,207,460	11,207,460	-	-	961,600	-	961,600
96	-	11,655,759	11,655,759	-	-	1,000,064	-	1,000,064
97	-	12,121,989	12,121,989	-	-	1,040,067	-	1,040,067
98	-	12,606,869	12,606,869	-	-	1,081,669	-	1,081,669
99	-	13,111,143	13,111,143	-	-	1,124,936	-	1,124,936
100	-	13,635,589	13,635,589	-	-	1,169,934	-	1,169,934

** Contributions related to future employees in excess of normal cost and expenses of 9.26% 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 8.00%	Projected Ending Plan Net Position
	(a)	(b)	(c)	(d)	(e)	(f)=(a)+(b)-(c)-(d)+(e)
1	$ 1,032,249	$ 60,757	$ 115,983	$ 927	$ 80,377	$ 1,056,473
2	1,056,473	60,867	120,332	896	82,150	1,078,262
3	1,078,262	61,323	122,732	877	83,817	1,099,793
4	1,099,793	61,919	125,153	861	85,469	1,121,167
5	1,121,167	62,642	127,456	848	87,117	1,142,622
6	1,142,622	63,481	129,197	838	88,799	1,164,867
7	1,164,867	64,412	130,802	829	90,552	1,188,200
8	1,188,200	65,393	132,341	821	92,398	1,212,829
9	1,212,829	66,436	133,673	813	94,357	1,239,136
10	1,239,136	67,507	135,107	804	96,448	1,267,180
11	1,267,180	68,608	136,585	794	98,677	1,297,086
12	1,297,086	69,715	138,188	783	101,050	1,328,880
13	1,328,880	70,802	139,974	769	103,567	1,362,506
14	1,362,506	71,870	142,036	752	106,219	1,397,807
15	1,397,807	72,927	144,406	732	108,992	1,434,588
16	1,434,588	73,968	147,336	710	111,861	1,472,371
17	1,472,371	74,998	150,377	685	114,806	1,511,113
18	1,511,113	76,033	153,434	657	117,827	1,550,882
19	1,550,882	77,082	156,767	628	120,920	1,591,489
20	1,591,489	78,174	160,191	597	124,079	1,632,954
21	1,632,954	79,305	163,726	565	127,303	1,675,271
22	1,675,271	80,483	167,228	532	130,598	1,718,592
23	1,718,592	81,731	170,461	498	133,988	1,763,352
24	1,763,352	83,045	173,795	463	137,490	1,809,629
25	1,809,629	84,444	177,121	429	141,118	1,857,641
26	1,857,641	75,261	181,906	393	144,831	1,895,434
27	1,895,434	76,837	186,813	358	148,160	1,933,260
28	1,933,260	78,508	191,491	322	151,070	1,971,025
29	1,971,025	80,295	195,992	287	153,986	2,009,027
30	2,009,027	82,215	200,369	252	156,931	2,047,552
31	2,047,552	84,286	204,514	219	159,933	2,087,038
32	2,087,038	86,522	208,427	187	163,027	2,127,973
33	2,127,973	88,937	211,571	158	166,274	2,171,455
34	2,171,455	91,543	214,320	130	169,749	2,218,297
35	2,218,297	94,337	216,727	104	173,512	2,269,315
36	2,269,315	97,370	219,081	82	177,621	2,325,143
37	2,325,143	100,625	220,531	63	182,159	2,387,333
38	2,387,333	104,111	220,948	46	187,255	2,457,705
39	2,457,705	107,840	220,328	32	193,056	2,538,241
40	2,538,241	111,818	218,650	22	199,721	2,631,108
41	2,631,108	116,055	215,875	14	207,426	2,738,700
42	2,738,700	120,529	212,266	9	216,351	2,863,305
43	2,863,305	125,235	207,899	5	226,675	3,007,311
44	3,007,311	130,174	202,822	2	238,589	3,173,250
45	3,173,250	135,340	197,132	1	252,290	3,363,747
46	3,363,747	140,734	190,896	-	267,986	3,581,571
47	3,581,571	146,354	184,207	-	285,895	3,829,613
48	3,829,613	152,204	177,125	-	306,245	4,110,937
49	4,110,937	158,293	169,702	-	329,281	4,428,809
50	4,428,809	164,624	161,990	-	355,262	4,786,705

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 8.00%	Projected Ending Plan Net Position
	(a)	(b)	(c)	(d)	(e)	(f)=(a)+(b)-(c)-(d)+(e)
51	$ 4,786,705	$ 171,209	$ 154,026	$ -	$ 384,464	$ 5,188,352
52	5,188,352	178,058	145,853	-	417,186	5,637,743
53	5,637,743	185,180	137,514	-	453,743	6,139,152
54	6,139,152	192,587	129,053	-	494,479	6,697,165
55	6,697,165	200,291	120,518	-	539,757	7,316,695
56	7,316,695	208,302	111,964	-	589,969	8,003,002
57	8,003,002	216,634	103,443	-	645,535	8,761,728
58	8,761,728	225,300	95,007	-	706,904	9,598,925
59	9,598,925	234,312	86,712	-	774,558	10,521,083
60	10,521,083	243,684	78,615	-	849,016	11,535,168
61	11,535,168	253,432	70,770	-	930,833	12,648,663
62	12,648,663	263,569	63,229	-	1,020,606	13,869,609
63	13,869,609	274,112	56,041	-	1,118,978	15,206,658
64	15,206,658	285,076	49,255	-	1,226,638	16,669,117
65	16,669,117	296,479	42,908	-	1,344,331	18,267,019
66	18,267,019	308,338	37,035	-	1,472,859	20,011,181
67	20,011,181	320,672	31,663	-	1,613,086	21,913,276
68	21,913,276	333,499	26,806	-	1,765,948	23,985,917
69	23,985,917	346,839	22,468	-	1,932,453	26,242,741
70	26,242,741	360,712	18,639	-	2,113,693	28,698,507
71	28,698,507	375,141	15,304	-	2,310,851	31,369,195
72	31,369,195	390,146	12,438	-	2,525,207	34,272,110
73	34,272,110	405,752	10,006	-	2,758,148	37,426,004
74	37,426,004	421,982	7,968	-	3,011,176	40,851,194
75	40,851,194	438,862	6,283	-	3,285,920	44,569,693
76	44,569,693	456,416	4,906	-	3,584,142	48,605,345
77	48,605,345	474,673	3,794	-	3,907,754	52,983,978
78	52,983,978	493,660	2,905	-	4,258,825	57,733,558
79	57,733,558	513,406	2,202	-	4,639,593	62,884,355
80	62,884,355	533,942	1,652	-	5,052,484	68,469,129
81	68,469,129	555,300	1,226	-	5,500,121	74,523,324
82	74,523,324	577,512	898	-	5,985,341	81,085,279
83	81,085,279	600,613	651	-	6,511,213	88,196,454
84	88,196,454	624,637	465	-	7,081,057	95,901,683
85	95,901,683	649,623	328	-	7,698,461	104,249,439
86	104,249,439	675,607	229	-	8,367,304	113,292,121
87	113,292,121	702,632	158	-	9,091,782	123,086,377
88	123,086,377	730,737	108	-	9,876,427	133,693,433
89	133,693,433	759,967	73	-	10,726,139	145,179,466
90	145,179,466	790,365	49	-	11,646,216	157,615,998
91	157,615,998	821,980	33	-	12,642,379	171,080,324
92	171,080,324	854,859	22	-	13,720,815	185,655,976
93	185,655,976	889,053	14	-	14,888,209	201,433,224
94	201,433,224	924,615	9	-	16,151,785	218,509,615
95	218,509,615	961,600	6	-	17,519,347	236,990,556
96	236,990,556	1,000,064	4	-	18,999,331	256,989,947
97	256,989,947	1,040,067	3	-	20,600,852	278,630,863
98	278,630,863	1,081,669	2	-	22,333,757	302,046,287
99	302,046,287	1,124,936	1	-	24,208,689	327,379,911
100	327,379,911	1,169,934	1	-	26,237,144	354,786,988

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	$ 1,032,249	$ 115,983	$ 115,983	$ -	$ 111,605	$ -	$ 111,605
2	1,056,474	120,332	120,332	-	107,213	-	107,213
3	1,078,261	122,732	122,732	-	101,251	-	101,251
4	1,099,793	125,153	125,153	-	95,600	-	95,600
5	1,121,168	127,456	127,456	-	90,148	-	90,148
6	1,142,623	129,197	129,197	-	84,610	-	84,610
7	1,164,869	130,802	130,802	-	79,316	-	79,316
8	1,188,202	132,341	132,341	-	74,304	-	74,304
9	1,212,832	133,673	133,673	-	69,493	-	69,493
10	1,239,140	135,107	135,107	-	65,036	-	65,036
11	1,267,184	136,585	136,585	-	60,877	-	60,877
12	1,297,090	138,188	138,188	-	57,029	-	57,029
13	1,328,884	139,974	139,974	-	53,487	-	53,487
14	1,362,510	142,036	142,036	-	50,255	-	50,255
15	1,397,813	144,406	144,406	-	47,309	-	47,309
16	1,434,594	147,336	147,336	-	44,693	-	44,693
17	1,472,378	150,377	150,377	-	42,237	-	42,237
18	1,511,120	153,434	153,434	-	39,903	-	39,903
19	1,550,889	156,767	156,767	-	37,750	-	37,750
20	1,591,497	160,191	160,191	-	35,717	-	35,717
21	1,632,961	163,726	163,726	-	33,801	-	33,801
22	1,675,278	167,228	167,228	-	31,967	-	31,967
23	1,718,600	170,461	170,461	-	30,171	-	30,171
24	1,763,360	173,795	173,795	-	28,482	-	28,482
25	1,809,638	177,121	177,121	-	26,877	-	26,877
26	1,857,651	181,906	181,906	-	25,559	-	25,559
27	1,906,110	186,813	186,813	-	24,304	-	24,304
28	1,943,935	191,491	191,491	-	23,067	-	23,067
29	1,981,699	195,992	195,992	-	21,861	-	21,861
30	2,019,701	200,369	200,369	-	20,693	-	20,693
31	2,058,225	204,514	204,514	-	19,557	-	19,557
32	2,097,711	208,427	208,427	-	18,455	-	18,455
33	2,138,646	211,571	211,571	-	17,345	-	17,345
34	2,182,129	214,320	214,320	-	16,269	-	16,269
35	2,228,970	216,727	216,727	-	15,233	-	15,233
36	2,279,988	219,081	219,081	-	14,258	-	14,258
37	2,335,816	220,531	220,531	-	13,289	-	13,289
38	2,398,005	220,948	220,948	-	12,328	-	12,328
39	2,468,377	220,328	220,328	-	11,383	-	11,383
40	2,548,914	218,650	218,650	-	10,460	-	10,460
41	2,641,781	215,875	215,875	-	9,562	-	9,562
42	2,749,372	212,266	212,266	-	8,705	-	8,705
43	2,873,978	207,899	207,899	-	7,895	-	7,895
44	3,017,985	202,822	202,822	-	7,132	-	7,132
45	3,183,923	197,132	197,132	-	6,418	-	6,418
46	3,374,421	190,896	190,896	-	5,755	-	5,755
47	3,592,244	184,207	184,207	-	5,142	-	5,142
48	3,840,285	177,125	177,125	-	4,578	-	4,578
49	4,121,611	169,702	169,702	-	4,061	-	4,061
50	4,439,483	161,990	161,990	-	3,589	-	3,589

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	$ 4,797,379	$ 154,026	$ 154,026	$ -	$ 3,160	$ -	$ 3,160
52	5,199,028	145,853	145,853	-	2,771	-	2,771
53	5,648,418	137,514	137,514	-	2,419	-	2,419
54	6,149,827	129,053	129,053	-	2,102	-	2,102
55	6,707,840	120,518	120,518	-	1,817	-	1,817
56	7,327,369	111,964	111,964	-	1,563	-	1,563
57	8,013,676	103,443	103,443	-	1,337	-	1,337
58	8,772,402	95,007	95,007	-	1,137	-	1,137
59	9,609,599	86,712	86,712	-	961	-	961
60	10,531,757	78,615	78,615	-	807	-	807
61	11,545,842	70,770	70,770	-	673	-	673
62	12,659,337	63,229	63,229	-	556	-	556
63	13,880,283	56,041	56,041	-	457	-	457
64	15,217,331	49,255	49,255	-	372	-	372
65	16,679,791	42,908	42,908	-	300	-	300
66	18,277,693	37,035	37,035	-	240	-	240
67	20,021,855	31,663	31,663	-	190	-	190
68	21,923,950	26,806	26,806	-	149	-	149
69	23,996,591	22,468	22,468	-	115	-	115
70	26,253,415	18,639	18,639	-	89	-	89
71	28,709,181	15,304	15,304	-	67	-	67
72	31,379,868	12,438	12,438	-	51	-	51
73	34,282,784	10,006	10,006	-	38	-	38
74	37,436,678	7,968	7,968	-	28	-	28
75	40,861,868	6,283	6,283	-	20	-	20
76	44,580,367	4,906	4,906	-	15	-	15
77	48,616,020	3,794	3,794	-	11	-	11
78	52,994,653	2,905	2,905	-	7	-	7
79	57,744,232	2,202	2,202	-	5	-	5
80	62,895,029	1,652	1,652	-	4	-	4
81	68,479,804	1,226	1,226	-	2	-	2
82	74,533,999	898	898	-	2	-	2
83	81,095,954	651	651	-	1	-	1
84	88,207,129	465	465	-	1	-	1
85	95,912,357	328	328	-	-	-	-
86	104,260,112	229	229	-	-	-	-
87	113,302,795	158	158	-	-	-	-
88	123,097,050	108	108	-	-	-	-
89	133,704,106	73	73	-	-	-	-
90	145,190,139	49	49	-	-	-	-
91	157,626,671	33	33	-	-	-	-
92	171,090,996	22	22	-	-	-	-
93	185,666,649	14	14	-	-	-	-
94	201,443,897	9	9	-	-	-	-
95	218,520,288	6	6	-	-	-	-
96	237,001,229	4	4	-	-	-	-
97	257,000,620	3	3	-	-	-	-
98	278,641,536	2	2	-	-	-	-
99	302,056,960	1	1	-	-	-	-
100	327,390,583	1	1	-	-	-	-
				Totals	$ 1,847,494	$ -	$ 1,847,494

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.