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Teachers Retirement Association of Minnesota

Actuarial Valuation Report
As of July 1, 2013

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November 27, 2013

Board of Trustees
Teachers Retirement Association of Minnesota
60 Empire Drive, Suite 400
St. Paul, MN 55103

Dear Board Members:

At your request, we have performed the annual actuarial valuation of the Teachers Retirement Association of Minnesota (TRA or System) as of July 1, 2013. The major findings of the actuarial valuation are contained in this report, which reflects the benefit provisions in place on July 1, 2013. There was no change to the actuarial methods or assumptions from the prior valuation. However, the 2013 Omnibus Retirement Bill, which was passed by the 2013 legislature and signed into law by the Governor on May 23, 2013, changed the early retirement factors applicable to plan members. The new factors will be phased-in over a five year period beginning July 1, 2015.

In preparing this report, we relied, without audit, on information (some oral and some in writing) supplied by TRA staff. This information includes, but is not limited to, statutory provisions, member data and financial information. We found this information to be reasonable and comparable to information used in prior valuations. The valuation results depend on the integrity of this information. If any of this information is inaccurate or incomplete, our results may be different and our calculations may need to be revised.

The statutory benefits of the System are reflected in the actuarially calculated contribution rates which are developed using the Entry Age Normal (EAN) cost method. An asset smoothing method is used for actuarial valuation purposes. Gains and losses are reflected in the unfunded actuarial accrued liability and are amortized as a level percent of payroll over a closed period set in state statutes. Actuarial assumptions, including discount rates, mortality tables and others identified in this report, are prescribed by Minnesota Statutes Section 356.215, the Legislative Commission on Pensions and Retirement (LCPR), and the Trustees. These parties are responsible for selecting the plan's funding policy, actuarial valuation methods, asset valuation method, and actuarial assumptions. The policies, methods and assumptions used in this valuation are those that have been so prescribed and are described in Appendix C of this report.

Future actuarial results may differ significantly from the current results presented in this report due to factors such as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period or additional cost or contribution requirements based on the plan's funded status); and changes in plan provisions or applicable law. Since the potential impact of such factors is outside the scope of a normal annual actuarial valuation, an analysis of the range of potential results is not presented herein.

Some actuarial computations presented in this report are for purposes of determining the required contribution amounts for funding the System. Other actuarial computations presented in this report, those under GASB Statement No. 25, are for purposes of fulfilling financial accounting requirements. The computations prepared for these two purposes may differ as disclosed in our report. The calculations in the enclosed report have been made on a basis consistent with our understanding of the System's funding requirements, the plan provisions described in Appendix B of this report, and of GASB Statement No. 25. Determinations for purposes other than meeting these requirements may be significantly different from the results contained in this report. Accordingly, additional determinations may be needed for other purposes.

On the basis of the foregoing, we hereby certify that, to the best of our knowledge and belief, this report is complete and accurate and that the valuation was prepared in accordance with principles of practice prescribed by the Actuarial Standards Board, and that the actuarial calculations were performed by qualified actuaries in accordance with accepted actuarial procedures, based on the current provisions of the retirement System. In addition, to the best of our knowledge and belief the valuation was performed in accordance with the requirements of Minnesota Statues, Section 356.215, and the requirements of the Standards for Actuarial Work established by the State of Minnesota Legislative Commission on Pensions and Retirement (LCPR). We are members of the American Academy of Actuaries and meet the Qualification Standards to render the actuarial opinion contained herein. Also, we meet the requirements of "approved actuary" under Minnesota Statues, Section 356.215, Subdivision 1, Paragraph (c).

Respectfully submitted,

Patrice Beckham

Brent A. Banister

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SECTION 1 – EXECUTIVE SUMMARY

The Teachers Retirement Association of Minnesota (TRA or System) provides retirement, disability, and death benefits to Minnesota public school teachers, administrators, and college faculty. This report presents the results of the July 1, 2013 actuarial valuation of the System. The primary purposes of performing the actuarial valuation are to:

- determine the Required Contribution Rate as set forth in Chapter 356 of the Minnesota statutes;
- determine the sufficiency of the Statutory Contribution Rate as set forth in Chapter 354 of the Minnesota statutes;
- determine the experience of the System since the last valuation date;
- disclose asset and liability measures as of the valuation date; and
- analyze and report on trends in System contributions, assets, and liabilities over the past several years.

There was no change to the actuarial methods or assumptions from the prior valuation. However, the 2013 Omnibus Retirement Bill, which was passed by the 2013 legislature and signed into law by the Governor on May 23, 2013, changed the early retirement factors applicable to plan members. The impact of this change was a decrease in the unfunded actuarial accrued liability of $77.5 million, a decrease in the normal cost rate of 0.12% of payroll (from 8.52% to 8.40%), and a decrease in the Required Contribution Rate of 0.25% of payroll.

The actuarial valuation results provide a "snapshot" view of the System's financial condition on July 1, 2013. The results reflect net unfavorable experience for the past plan year as demonstrated by an unfunded actuarial accrued liability (UAAL) that was higher than expected. The UAAL on July 1, 2013 is $6.644 billion as compared to an expected UAAL of $6.436 billion. The unfavorable experience was the combination of an experience loss of $363 million on the actuarial value of assets and a net experience gain of about $155 million on System liabilities. Despite a return of 14% on the market value of assets, there was an experience loss on the actuarial value of assets largely due to recognition of the remaining deferred investment loss from FY 2009. There is a now a deferred investment gain of $1.241 billion.

A summary of the key results from the July 1, 2013 actuarial valuation is shown below. Further detail on the valuation results can be found in the following sections of this Executive Summary. The contribution deficiency does not reflect the increase in the member and employer contribution rate scheduled to occur on July 1, 2014. After the scheduled contribution rate increase is recognized, the statutory contribution rate will be 1% of payroll higher than the total contribution rate for the current fiscal year.

	July 1, 2013 Valuation Results	July 1, 2012 Valuation Results
Total Required Contribution Rate (Chapter 356)	19.41%	18.75%
Statutory Contribution Rate (Chapter 354)	14.67%	13.71%
Sufficiency/(Deficiency)	(4.74%)	(5.04%)
Unfunded Actuarial Accrued Liability ($M)	$6,644	$6,219
Funded Ratio (Actuarial Assets)	71.63%	72.99%

The contribution deficiency decreased from 5.04% of payroll in last year's valuation to 4.74% of payroll in the 2013 valuation. The decrease in the deficiency was due the change in early retirement factors and the increase in member and employer contribution rates of 0.50% each, which was partially offset by the impact of a net actuarial loss due to overall experience which was not as favorable as expected based on the actuarial assumptions.

EXPERIENCE FOR THE LAST PLAN YEAR

Numerous factors contributed to the change in the Systems' assets, liabilities and actuarial contribution rate between July 1, 2012 and July 1, 2013. The components are examined in the following discussion.

ASSETS

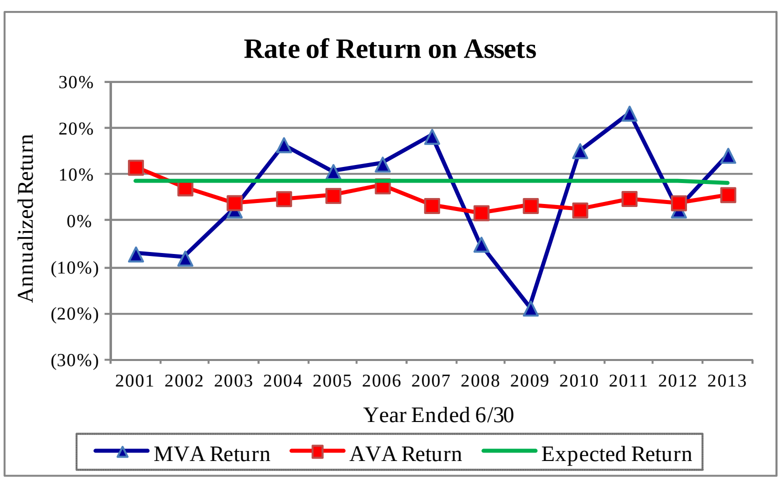
As of June 30, 2013, TRA had net assets of $18.0 billion, when measured on a market value basis. This was an increase of more than $1.3 billion from the prior year.

The market value of assets is not used directly in the calculation of the unfunded actuarial accrued liability and the Required Contribution Rate (actuarial contribution rate). An asset valuation method, which smoothes the effect of market fluctuations, is used to determine the value of assets used in the valuation. The resulting amount is called the "actuarial value of assets". In this year's valuation, the actuarial value of assets as of June 30, 2013 was $16.8 billion, a decrease of $30 million from the value in the prior year. The components of change in the asset values are shown in the following table:

	Market Value ($M)		Actuarial Value ($M)	
Net Assets, June 30, 2012	$	16,686	$	16,805
- Employer and Member Contributions	+	556	+	556
- Benefit Payments and Administrative Expenses	-	1,541	-	1,541
- Investment Income	+	2,314	+	955
Net Assets, June 30, 2013	$	18,015	$	16,775

On a market value basis, the rate of return was 14.2% as reported by the State Board of Investment (SBI). Despite the strong return on the market value of assets, there was an experience loss on the actuarial value of assets largely due to recognition of the remaining deferred investment loss from FY 2009. The rate of return, net of investment expenses, measured on the actuarial value of assets was approximately 5.7%. Because the rate of return was less than the assumption of 8.0%, there was an actuarial loss of $363 million.

Please see Section II of this report for more detailed information on the market and actuarial value of assets.



Market value returns have been very volatile. An asset smoothing method is used to calculate the actuarial value of assets that recognizes investment gains and losses equally over a five year period. As can be seen in this graph, the return on actuarial assets is much smoother than the return on market value.

LIABILITIES

The actuarial accrued liability is that portion of the present value of future benefits that will not be paid by future normal costs. The difference between this liability and the actuarial value of assets at the same date is called the unfunded actuarial accrued liability (UAAL). The dollar amount of unfunded actuarial accrued liability is reduced if the contributions to the System exceed the normal cost for the year plus interest on the prior year's UAAL.

The unfunded actuarial accrued liability is shown as of July 1, 2013 in the following table:

	Actuarial Value of Assets	Market Value of Assets
($Millions)		
Actuarial Accrued Liability	$23,419	$23,419
Value of Assets	16,775	18,015
Unfunded Actuarial Accrued Liability*	6,644	5,403
Funded Ratio	71.63%	76.93%

*Numbers may not add due to rounding

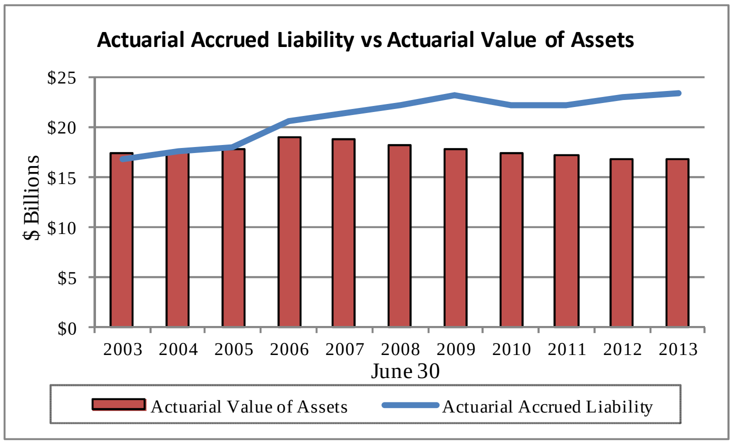
See Section III of the report for the detailed development of the unfunded actuarial accrued liability.

Changes in the UAAL occur for various reasons. The net change in the UAAL from July 1, 2012 to July 1, 2013 was $425 million. The components of this net change are shown in the table below (in millions):

Unfunded Actuarial Accrued Liability, July 1, 2012 ($M)		$6,219
• Expected increase from amortization method	$67	
• Expected increase from contributions below Required Rate	217	
• Investment experience	363	
• Liability experience	(155)	
• Other experience	10	
• Change in early retirement factors	(77)	
• Total		425
Unfunded Actuarial Accrued Liability, July 1, 2013		$6,644

As shown above, various components impacted the UAAL. Actuarial gains (losses), which result from actual experience that is more (less) favorable than anticipated based on the actuarial assumptions, are reflected in the UAAL and are measured as the difference between the expected unfunded actuarial accrued liability and the actual unfunded actuarial accrued liability, taking into account any changes due to actuarial assumptions and methods or benefit provision changes. Overall, the System experienced a net actuarial loss of $207 million. The net actuarial loss may be explained by considering the separate experience of assets and liabilities. As noted earlier, there was a $363 million loss, measured on the actuarial value of assets. Offsetting this somewhat, there was a liability gain of

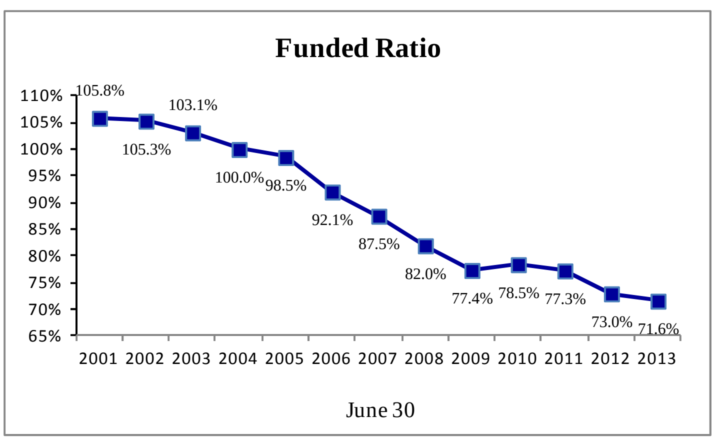
$155 million which arose from overall demographic experience in FY 2013 more favorable than anticipated by the actuarial assumptions. The liability gain was the result of various components of actuarial gains and losses, the largest of which was a gain from salary increases that were lower than expected.



The actuarial value of assets was slightly higher than the actuarial accrued liability in the early part of the period. Investment experience below the assumed rate of return of 8.5%, the merger of the Post Fund into TRA, and the merger of the Minneapolis Teachers Retirement Fund Association all served to increase the difference between the actuarial accrued liability and actuarial assets.

An evaluation of the unfunded actuarial accrued liability on a pure dollar basis may not provide a complete analysis since only the difference between the assets and liabilities (which are both very large numbers) is reflected. Another way to evaluate the unfunded actuarial accrued liability and the progress made in its funding is to track the funded ratio, the ratio of the actuarial value of assets to the actuarial accrued liability. The funded status information is shown below (in millions).

	7/1/09	7/1/10	7/1/11	7/1/12	7/1/13
Funded Ratio	77.4%	78.5%	77.3%	73.0%	71.6%
Unfunded Actuarial Accrued Liability ($M)	$5,232	$4,758	$5,039	$6,219	$6,644



The funded ratio has decreased over this period largely due to investment experience less than the 8.5% assumed rate of return and the dissolution of the Minnesota Post Retirement Investment Fund (MPRIF) with the associated transfer of assets and liabilities to TRA. The benefit reductions passed by the 2010 legislature along with strong investment returns in FY10 and FY11 stabilized the funded ratio in those years. The final reflection of the FY 2009 investment loss resulted in a reduction in the funded ratio in the 2012 and 2013 valuations.

CONTRIBUTION RATE

Under the Entry Age Normal cost method, the actuarial contribution rate consists of two components:

- a "normal cost" for the portion of projected liabilities allocated by the actuarial cost method to service of members during the year following the valuation date, and
- an "unfunded actuarial accrued liability contribution" for the excess of the portion of projected liabilities allocated to service to date over the actuarial value of assets.

See Section IV of the report for the detailed development of these contribution rates which are summarized in the following table:

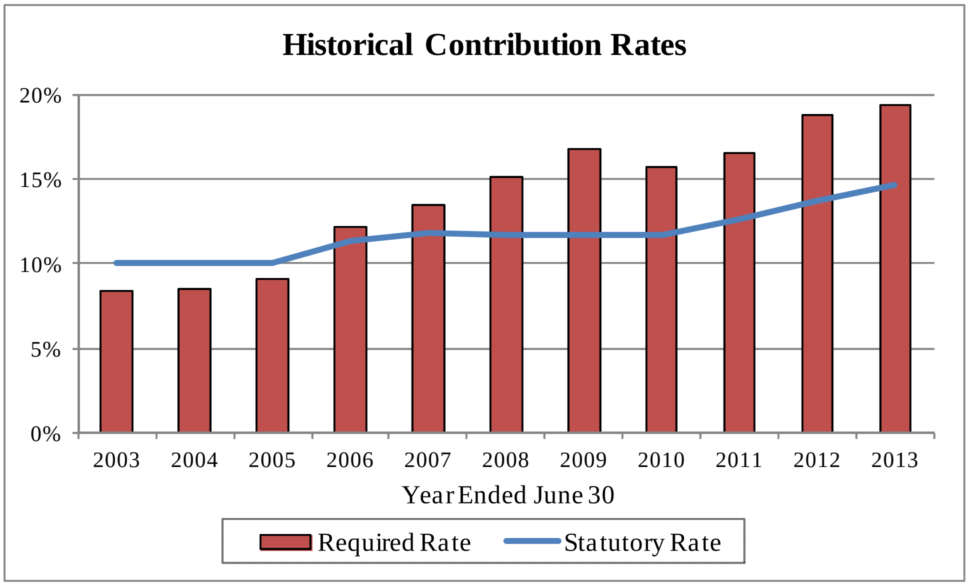
Contribution Rates	July 1, 2013	July 1, 2012
1. Statutory Contribution Rate	14.67%	13.71%
2. Normal Cost Rate	8.40%	8.53%
3. UAAL Contribution Rate	10.78%	9.98%
4. Expenses	0.23%	0.24%
5. Total Required Contribution Rate (2) + (3) + (4)	19.41%	18.75%
6. Deficiency (1) - (5)	(4.74%)	(5.04%)

As discussed earlier, there was one change in the plan provisions reflected in this valuation. The early retirement factors, which are applied to reduce the benefit amount for members retiring prior to full normal retirement age, were changed with the 2013 Retirement Bill. The new sets of factors, which include lesser reductions for members retiring at age 62 or older with at least 30 years of service, will be phased-in over a five year period beginning July 1, 2015. The net impact on the valuation results, using the actuarial value of assets, is summarized in the table below.

	Before Changes	After Changes	Impact of Changes
Projected Benefit Funding Ratio	90.6%	91.2%	0.6%
Actuarial Accrued Liability Funding Ratio (AVA)	71.4%	71.6%	0.2%
Actuarial Value of Assets (AVA)	$ 16.77B	$ 16.77B	$ 0.00B
Unfunded Actuarial Accrued Liability (UAAL)	$ 6.72B	$ 6.64B	$ (0.08)B
Normal Cost Rate (% of pay)	8.52%	8.40%	(0.12%)
Amortization of UAAL (% of pay)	10.91%	10.78%	(0.13%)
Expenses (% of pay)	0.23%	0.23%	0.00%
Total Required Contribution (% of pay)	19.66%	19.41%	(0.25%)
Contribution Deficiency (% of pay)	(4.99%)	(4.74%)	0.25%

The decrease in the Total Required Contribution Rate due to the change in the early retirement factors is 0.25% of pay.

A historical summary of the Statutory and Required Contribution Rates is shown in the graph below:



When the Statutory Contribution Rate is less than the Required Contribution Rate, the resulting contribution deficiency creates an increase in the unfunded actuarial accrued liability. For the plan year ending June 30, 2013, the contribution deficiency increased the UAAL by $218 million.

The actuarial contribution rate (Required Contribution Rate) is determined based on the snapshot of the System taken on the valuation date, July 1, 2013. The actuarial contribution rate in future years will change each year as the deferred actuarial investment experience is recognized and other experience (both investment and demographic) impacts the System. The contribution rates are scheduled to increase a total of 1% (0.5% employee and 0.5% employer) on July 1, 2014 from the current contribution rate. Even when these increases are considered a contribution deficiency still exists, indicating the UAAL will not be amortized by 2037 if all actuarial assumptions are met. It should be noted, however, that the Board will have the option to increase contribution rates further (the "stabilizer" provisions of the 2010 law), and that if rates are changed, the UAAL may then be amortized by 2037.

SUMMARY

The investment return on the market value of assets for FY 2013 was 14.2% as reported by SBI. However, due to the deferred investment gains and losses from past years, the return on the actuarial value of assets was 5.7%. This valuation reflects the final step in recognizing the significant investment loss that occurred in FY 2009. For many years in the recent past, the actuarial value of assets has been higher than the market value of assets, indicating deferred investment losses exist. In the 2013 valuation, the actuarial value of assets is now lower than the market value of assets reflecting deferred investment gains. With the lower return on the actuarial value of assets, the funded ratio decreased from 72.99% in last year's valuation to 71.63% this year.

As mentioned earlier, the System utilizes an asset smoothing method in the valuation process. While this is a common procedure for public retirement systems, it is important to identify the potential impact of the deferred investment experience. The asset smoothing method impacts only the timing of when the actual market experience is recognized in the valuation process. The deferred investment experience gain of $1.2 billion represents about 7% of the market value of assets, providing some margin to absorb future investment experience that is less than the assumed rate of return.

SECTION 1 – EXECUTIVE SUMMARY

The key valuation results from the July 1, 2013 actuarial valuation are shown below, using both actuarial and market value of assets.

	Actuarial Value	Market Value
Statutory Rate	14.67%	14.67%
Required Contribution		
Normal Cost	8.40%	8.40%
UAAL Contribution	10.78%	8.77%
Expenses	0.23%	0.23%
Total Required Contribution	19.41%	17.40%
Deficiency	(4.74%)	(2.73%)
UAAL ($M)	$6,644	$5,403
Funded Ratio	71.63%	76.93%

The long-term financial health of this retirement System, like all retirement systems, is heavily dependent on two key items: (1) future investment returns and (2) contributions to the System. Changes were made by the 2010 Legislature to strengthen the funding of TRA and enhance its long term sustainability. Contributions were increased by a total of 4%, to be phased in over four years beginning July 1, 2011, and benefit reductions were implemented. These changes, along with strong investment performance in three of the last four fiscal years, have significantly improved the projected long term funding of the System. However, a contribution deficiency still exists even when future scheduled contribution increases are considered. Given the current funded status, the deferred investment experience and scheduled increase in the Statutory Contribution Rate, the System's funded ratio is expected to increase slowly if all actuarial assumptions are met, but remain below 100% funded for the foreseeable future. In order for the funded ratio to reach 100% by June 30, 2037 contributions would have to increase beyond the scheduled rates, benefits would have to be lowered, or favorable experience would have to occur.

We conclude this executive summary by presenting comparative statistics and actuarial information on both the July 1, 2013 and July 1, 2012 valuations.

Principal Valuation Results

A summary of principal valuation results from the current valuation and the prior valuation follows.

	Actuarial Valuation as of	
	July 1, 2013	**July 1, 2012**
1. PARTICIPANT DATA		
A. Active members		
1. Number	76,765	76,649
2. Projected annual earnings for fiscal year *(000s)*	4,205,399	4,146,325
3. Average projected annual earnings for fiscal year 2014	54,783	54,095
4. Average age	43.5	43.5
5. Average service	12.1	12.0
B. Service retirements	52,331	50,780
C. Survivors	4,269	4,054
D. Disability retirements	568	591
E. Deferred retirements	12,614	12,201
F. Terminated other non-vested	28,881	27,591
G. Total	**175,428**	**171,866**
2. LIABILITIES AND FUNDING RATIOS *(dollars in thousands)*		
A. Accrued Benefit Funding Ratio		
1. Current assets (AVA)	$ 16,774,626	$ 16,805,077
2. Current benefit obligations	22,390,700	21,908,767
3. Funding ratio	74.92%	76.70%
B. Actuarial Accrued Liability Funding Ratio		
1. Current assets (AVA)	$ 16,774,626	$ 16,805,077
2. Market value of assets (MVA)	18,015,194	16,686,105
3. Actuarial accrued liability	23,418,629	23,024,505
4. Unfunded actuarial accrued liability *(B.3. - B.1.)*	6,644,003	6,219,428
5. Funding ratio (AVA) *(B.1. / B.3.)*	71.63%	72.99%
6. Funding ratio (MVA) *(B.2. / B.3.)*	76.93%	72.47%
C. Projected Benefit Funding Ratio		
1. Current and expected future assets	$ 24,199,106	$ 24,130,838
2. Current and expected future benefit obligations	26,546,074	26,142,509
3. Funding ratio (AVA)	91.16%	92.30%
3. CONTRIBUTIONS *(% of Payroll)*		
A. Normal Cost Rate	8.40%	8.53%
B. UAAL Amortization Payment	10.78%	9.98%
C. Expenses	0.23%	0.24%
D. Total Required Contribution (Chapter 356)	19.41%	18.75%
E. Statutory Contribution (Chapter 354)	14.67%	13.71%
F. Contribution (Deficiency)/Sufficiency *(3.E. - 3.D.)*	(4.74%)	(5.04%)

SECTION II

PLAN ASSETS

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SECTION II - PLAN ASSETS

In this section, the values assigned to the assets held by the System are presented. These assets are valued on two different bases: the market value and the actuarial value.

Market Value of Net Assets

For certain accounting statement purposes, System assets are valued at current market prices. These values represent the "snapshot" of the fair value of System assets as of the valuation date.

Actuarial Value of Net Assets

The market value of assets may not necessarily be the best measure of the System's ongoing ability to meet its obligations.

To arrive at a suitable value for the actuarial valuation, a technique for determining the actuarial value of assets is used which dampens volatility in the market value while still indirectly recognizing market value. The methodology used to determine the actuarial value of assets is prescribed in Minnesota Statutes, Section 356.215, Subdivision 1, Paragraph (f). The assets are valued based on a five-year moving average of expected and market values (five-year average actuarial value) determined as follows:

- At the end of each plan year, an average asset value is calculated as the average of the market asset value at the beginning and end of the fiscal year net of investment income for the fiscal year;
- The investment gain or (loss) is determined as the excess of actual investment income over the expected investment income based on the average asset value as calculated above;
- The investment gain or (loss) so determined is recognized over five years at 20% per year;
- The asset value is the sum of the market value plus the scheduled recognition of investment gains or (losses) during the current and the preceding four fiscal years. The Minnesota Post Retirement Investment Fund (MPRIF) was dissolved on June 30, 2009. For the purpose of determining the actuarial value of assets, the MPRIF asset loss for the fiscal year ending June 30, 2009 is recognized incrementally over five years at 20% per year, similar to the smoothing described above. Prior to June 30, 2009, MPRIF asset gains and losses were not smoothed.

TABLE 1

Statement of Fiduciary Net Position

(Dollars in Thousands)

	June 30, 2013		June 30, 2012	
		Amount		Amount
Cash and short-term investments				
Cash	$	8,475	$	7,393
Building account cash		67		29
Short term investments		469,717		320,809
Total cash and short term investments	$	478,259	$	328,231
Receivables		18,908		14,854
Investments (at fair value)				
Fixed income pool	$	4,134,002	$	3,716,922
Minneapolis pool		0		174
Alternative investments pool		2,610,107		2,609,840
Indexed equity pool		2,600,723		2,714,967
Domestic equity pool		5,504,431		4,829,112
Global equity pool		2,676,467		2,481,316
Total investments	$	17,525,730	$	16,352,331
Securities lending collateral	$	1,755,793	$	1,515,373
Building				
Land	$	171	$	171
Building and equipment		7,563		11,279
- Reserve for building depreciation		0		(3,110)
Deferred bond charge		84		146
- Reserve for deferred bond charge amortization		0		(55)
Total building	$	7,818	$	8,431
Fixed assets net of accumulation depreciation		6,026		4,350
Total Assets	**$**	**19,792,534**	**$**	**18,223,570**

TABLE 1 (continued)

STATEMENT OF FIDUCIARY NET POSITION

(Dollars in Thousands)

	June 30, 2013		June 30, 2012	
Liabilities		Amount		Amount
Current				
Accounts payable	$	8,687	$	8,741
Accrued compensated absences		67		82
Accrued expenses - building		90		3
Bonds payable		576		284
Bonds interest payable		15		41
Securities lending collateral		1,755,793		1,515,372
Total current liabilities	$	1,765,228	$	1,524,523
Long term				
Accrued compensated absences	$	604	$	688
Accrued OPEB liability*		0		45
Bonds payable		7,383		8,373
Total long term liabilities	$	7,987	$	9,106
Total Liabilities	**$**	**1,773,215**	$	**1,533,629**
Net position restricted for pensions	**$**	**18,019,319**	**$**	**16,689,941**
Earnings Limitation Savings Account (ELSA) accounts payable		(4,125)		(3,836)
Net position restricted for pensions, after adjustment for ELSA accounts	**$**	**18,015,194**	$	**16,686,105**

** Provided by TRA*

TABLE 2

STATEMENT OF CHANGES IN FIDUCIARY NET POSITION

(Dollars in Thousands)

The following exhibit shows the revenue, expenses and resulting assets of the Fund as reported by the Teachers Retirement Association for the Plan's fiscal years ended June 30, 2013 and 2012.

	For Year Ended	
	June 30, 2013	**June 30, 2012**
Additions		
Contributions		
Member	$ 265,809	$ 239,834
Employer	270,708	244,935
Direct aid (state/city/county)	19,954	21,726
Earnings Limitation Savings Account (ELSA)	1,792	859
Total contributions	$ 558,263	$ 507,354
Investment Income		
Investment income/(loss)	$ 2,326,918	$ 398,195
Less investment expenses	(24,702)	(22,757)
Net Investment Income	$ 2,302,216	$ 375,438
Securities Lending activities		
Securities lending income	$ 13,230	$ 13,278
Securities lending expenses:		
Borrowing rebates	(757)	(375)
Management fees	(4,394)	(5,154)
Total securities lending expenses	(5,151)	(5,529)
Net income from securities lending	8,079	7,749
Total Net Investment Income	$ 2,310,295	$ 383,187
Other Income	3,683	4,070
Total Additions	**$ 2,872,241**	**$ 894,611**
Deductions		
Benefits Paid		
Annuity benefits	$ (1,521,477)	$ (1,485,527)
Refunds	(10,463)	(11,836)
Total benefits paid	$ (1,531,940)	$ (1,497,363)
Administrative Expenses	(9,131)	(10,023)
Total Deductions	**$ (1,541,071)**	**$ (1,507,386)**
Increase/(Decrease) in ELSA Account Value	(2,081)	1,488
Net Increase (Decrease)		
Net Position Restricted for Pensions		
Beginning of Year	**$ 16,686,105**	**$ 17,297,392**
End of Year	**$ 18,015,194**	**$ 16,686,105**

TABLE 3

ACTUARIAL VALUE OF ASSETS AS OF JUNE 30, 2013

(Dollars in Thousands)

1. Market value of assets available for benefits				**$**	**18,015,194**
2. Determination of average balance					
a. Assets available at July 1, 2012*				$	16,689,941
b. Assets available at June 30, 2013*					18,019,319
c. Net investment income for fiscal year ending June 30, 2013					2,310,295
d. Average balance *(a. + b. - c.) / 2*				$	16,199,483
3. Expected return *(8.0% * 2.d.)*					1,295,959
4. Actual return					2,310,295
5. Current year unrecognized asset return					1,014,336
6. Unrecognized asset returns					
		Original Amount	**% Not Recognized**		
a. Year ended June 30, 2013	$	1,014,336	80%	$	811,469
b. Year ended June 30, 2012		(1,045,252)	60%		(627,151)
c. Year ended June 30, 2011		2,163,878	40%		865,551
d. Year ended June 30, 2010		953,497	20%		190,699
e. Total return not yet recognized				$	1,240,568
7. Actuarial value of assets at June 30, 2013 (1. - 6.e.)				**$**	**16,774,626**

* *Before recognition of ELSA accounts payable.*

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SECTION III

PLAN LIABILITIES

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SECTION III - PLAN LIABILITIES

In the previous section, an analysis was given of the assets of the System as of the valuation date, July 1, 2013. In this section, the discussion will focus on the commitments of the System, which are referred to as its liabilities.

Table 5 contains an analysis of the actuarial present value of all future benefits (PVFB) for contributing members, inactive members, retirees and their beneficiaries. The analysis is provided for each group.

The liabilities summarized in Table 5 include the actuarial present value of all future benefits expected to be paid with respect to each member. For an active member, this value includes measures of both benefits already earned and future benefits expected to be earned. For all members, active and retired, the value extends over benefits earnable and payable for the rest of their lives and, if an optional benefit is chosen, for the lives of the surviving beneficiaries.

The actuarial assumptions used to determine liabilities are based on the results of the 2004-2008 Quadrennial Experience Study. This set of assumptions is shown in Appendix C.

The liabilities reflect the benefit structure in place as of July 1, 2013. The scheduled future increase in the employee and employer contribution rates on July 1, 2014 is not reflected in this valuation unless so noted.

Actuarial Liabilities

A fundamental principle in financing the liabilities of a retirement program is that the cost of its benefits should be related to the period in which benefits are earned, rather than to the period of benefit distribution. An actuarial cost method is a mathematical technique that allocates the present value of future benefits into annual costs. In order to perform this allocation, it is necessary for the funding method to "breakdown" the present value of future benefits into two components:

(1) that which is attributable to the past and

(2) that which is attributable to the future.

Actuarial terminology calls the part attributable to the past the "past service liability" or the "actuarial accrued liability". The portion allocated to the future is known as the present value of future normal costs, with the specific piece of it allocated to the current year being called the "normal cost". Table 6 contains the calculation of actuarial accrued liabilities for all groups.

TABLE 4

ACTUARIAL VALUATION BALANCE SHEET AS OF JULY 1, 2013

(Dollars in Thousands)

The actuarial balance sheet is based on the fundamental equation that, at any given time, the present value of benefits to be paid in the future must be equal to the assets on hand plus the present value of future contributions to be received. The total contribution rate is determined as that amount which will make the total present and potential assets balance with the total present value of future benefits.

The contributions made in excess of amounts required for current benefit payments are accumulated as a reserve to help meet benefit payments in later years. This reserve system is designed to enable the establishment of a level rate of contribution each year.

A. Actuarial Value of Assets	$	16,774,626
B. Expected Future Assets		
1. Present value of expected future statutory supplemental contributions*	$	4,297,035
2. Present value of expected future normal cost contributions		3,127,445
3. Total expected future assets *(1. + 2.)*	$	7,424,480
C. Total Current and Expected Future Assets**	$	24,199,106

		Non-Vested Benefits		Vested Benefits		Total
D. Current Benefit Obligations						
1. Benefit recipients						
a. Service retirements	$	0	$	14,114,206	$	14,114,206
b. Disability		0		143,117		143,117
c. Survivors		0		887,916		887,916
2. Deferred retirements with augmentation to Normal Retirement Date		0		515,556		515,556
3. Former members without vested rights***		70,110		0		70,110
4. Active members		43,354		6,616,441		6,659,795
5. Total Current Benefit Obligations	$	113,464	$	22,277,236	$	22,390,700
E. Expected Future Benefit Obligations						4,155,374
F. Total Current and Expected Future Benefit Obligations						26,546,074
G. Unfunded Current Benefit Obligations *(D.5. - A.)*						5,616,074
H. Unfunded Current and Future Benefit Obligations *(F. - C.)*						2,346,968

* *Under LCPR guidelines, this amount does not include supplemental payments which could occur after the expiration of the remaining 24 year amortization period. Reflects contribution rate increases scheduled in statute.*

** *Does not reflect deferred investment experience in the asset smoothing method. Total expected future assets on a market value basis is $ 25,439,674.*

*** *Former members with insufficient service to vest who have not collected a refund of member contributions as of the valuation date.*

TABLE 5

DETERMINATION OF UNFUNDED ACTUARIAL ACCRUED LIABILITY
AS OF JULY 1, 2013

(Dollars in Thousands)

	Actuarial Present Value of Projected Benefits	Actuarial Present Value of Future Normal Costs	Actuarial Accrued Liability
1. Active Members			
a. Retirement annuities	$ 9,805,198	$ (2,361,845)	$ 7,443,353
b. Disability Benefits	192,479	(75,866)	116,613
c. Survivor benefits	89,312	(31,914)	57,398
d. Deferred retirements	720,043	(546,648)	173,395
e. Refunds	8,137	(111,172)	(103,035)
f. Total	$ 10,815,169	$ (3,127,445)	$ 7,687,724
2. Deferred Retirements with Future Augmentation to Normal Retirement Date	515,556	0	515,556
3. Former Members Without Vested Rights	70,110	0	70,110
4. Benefit Recipients	15,145,239	0	15,145,239
5. Total Actuarial Accrued Liability	$ 26,546,074	$ (3,127,445)	$ 23,418,629
6. Actuarial Value of Assets			$ 16,774,626
7. Unfunded Actuarial Accrued Liability (UAAL)			$ 6,644,003

* On a market value of assets basis, the unfunded actuarial accrued liability is $5,403,435.

TABLE 6

CHANGES IN UNFUNDED ACTUARIAL ACCRUED LIABILITY (UAAL)

(Dollars in Thousands)

A. Unfunded actuarial accrued liability at beginning of year	$	6,219,428
B. Changes due to interest requirements and current rate of funding*		
1. Normal cost and actual administrative expenses	$	362,927
2. Contributions		(558,263)
3. Interest on A., B.1., and B.2. at 8.0%		489,891
4. Total *(B.1. + B.2. + B.3.)*	$	294,555
C. Expected unfunded actuarial accrued liability at end of year *(A. + B.4.)*	$	6,513,983
D. Increase (decrease) due to actuarial losses (gains) because of experience deviations from expected		
1. Salary increases	$	(280,884)
2. Investment return (AVA)		362,982
3. Mortality of active members		2,593
4. Mortality of benefit recipients		14,126
5. Retirement from active service		45,664
6. Other items		63,031
7. Total	$	207,512
E. Unfunded actuarial accrued liability at end of year before plan amendments and changes in actuarial assumptions *(C. + D.7.)*	$	6,721,495
F. Change in unfunded actuarial accrued liability due to changes in plan provisions**	$	(77,492)
G. Unfunded actuarial accrued liability at end of year *(E. + F.)*	$	6,644,003

* *The amortization of the unfunded actuarial accrued liability (UAAL) using the current amortization method results in initial payments less than the "interest only" payment on the UAAL. Payments less than the interest only amount will result in the UAAL increasing in the absence of actuarial gains.*

** *The effect of new early retirement factors which will be phased in over 5 years beginning July 1, 2015.*

SECTION IV

SYSTEM CONTRIBUTIONS

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SECTION IV - CONTRIBUTIONS

Sections II and III were devoted to a discussion of the assets and liabilities of the System. A comparison of Tables 3 and 4 indicates that current assets fall short of meeting the actuarial present value of future projected benefits (total liability). This is expected in all but a fully closed fund, where no further contributions are anticipated.

In an active system, there will almost always be a difference between the actuarial value of assets and total liabilities. This deficiency has to be made up by future contributions and investment returns. An actuarial valuation sets out a schedule of future contributions that will finance this deficiency in an orderly fashion.

The method used to determine the incidence of the contributions in various years is called the actuarial cost method. Under an actuarial cost method, the contributions required to meet the difference between current assets and current liabilities are allocated each year between two elements: (1) the normal cost and (2) the payment on the unfunded actuarial accrued liability.

The term "fully funded" is often applied to a system in which contributions at the normal cost rate are sufficient to pay for the benefits of existing employees as well as for those of new employees. More often than not, systems are not fully funded, either because of past benefit improvements that have not been completely funded and/or because of actuarial deficiencies that have occurred because experience has not been as favorable as anticipated. Under these circumstances, an unfunded actuarial accrued liability (UAAL) exists.

Description of Rate Components

The actuarial cost method for the System is the traditional Entry Age Normal (EAN) – level percent of pay cost method. Under the EAN cost method, the actuarial present value of each member's projected benefits is allocated on a level basis over the member's compensation between the entry age of the member and the assumed exit ages. The portion of the actuarial present value allocated to the valuation year is called the normal cost. The actuarial present value of benefits allocated to prior years of service is called the actuarial accrued liability. The unfunded actuarial accrued liability (UAAL) represents the difference between the actuarial accrued liability and the actuarial value of assets as of the valuation date. The unfunded actuarial accrued liability is calculated each year and reflects experience gains/losses (actual experience versus experience expected based on the actuarial assumptions). The UAAL is amortized over a period set in state statute (by June 30, 2037). Contributions to fund the UAAL are determined as a level percentage of payroll assuming payroll increases 3.75% each year.

TABLE 7

NORMAL COST AT JULY 1, 2013

(Dollars in Thousands)

	Percent of Pay		Dollar Amount
1. Normal Cost Rate			
a. Retirement benefits	6.51%	$	273,833
b. Disability benefits	0.19%		7,994
c. Survivor benefits	0.09%		3,789
d. Deferred retirement benefits*	1.31%		55,100
e. Refunds	0.30%		12,619
f. Total	8.40%	$	353,335

* For vested members, includes the greater of the refund amount or the present value of the deferred monthly benefit.

TABLE 8

DETERMINATION OF SUPPLEMENTAL CONTRIBUTION RATE

(Dollars in Thousands)

		Amount
A. Determination of Unfunded Actuarial Accrued Liability (UAAL)*		
1. Actuarial accrued liability	$	23,418,629
2. Actuarial value of assets		16,774,626
3. Unfunded actuarial accrued liability	$	6,644,003
B. Determination of Supplemental Contribution Rate*		
1. Present value of future payrolls through the amortization date of June 30, 2037	$	61,612,234
2. Supplemental contribution rate *(A.3. / B.1.)***		10.78%

* *On a market value of assets basis, the unfunded actuarial accrued liability is $5,403,435 and the supplemental contribution rate is 8.77% of payroll.*

** *The amortization factor as of July 1, 2013 is 14.6507.*

TABLE 9

DETERMINATION OF CONTRIBUTION SUFFICIENCY/(DEFICIENCY)

(Dollars in Thousands)

The annual required contribution (ARC) is the sum of normal cost, a supplemental contribution to amortize the UAAL, and an allowance for expenses. The statutory contribution rates do not reflect the scheduled increase for July 1, 2014.

	Percent of Payroll		Dollar Amount
A. Statutory contributions - Chapter 354			
1. Employee contributions	7.00%	$	294,416
2. Employer contributions*	7.19%		302,454
3. Supplemental contributions**			
a. 1993 Legislation	0.12%		5,000
b. 1996 Legislation	0.05%		2,000
c. 1997 Legislation	0.31%		12,954
4. Total	14.67%	$	616,824
B. Required contributions - Chapter 356			
1. Normal cost			
a. Retirement benefits	6.51%	$	273,833
b. Disability benefits	0.19%		7,994
c. Survivors	0.09%		3,789
d. Deferred retirement benefits	1.31%		55,100
e. Refunds	0.30%		12,619
f. Total	8.40%	$	353,335
2. Supplemental contribution for the amortization of the Unfunded Actuarial Accrued Liability by June 30, 2037	10.78%		453,342
3. Allowance for expenses	0.23%	$	9,672
4. Total annual contribution for fiscal year ending June 30, 2014***	19.41%	$	816,349
C. Contribution Sufficiency / (Deficiency) *(A.4. - B.4.)***	(4.74%)	$	(199,525)

Note: Projected annual payroll for fiscal year beginning on the valuation date: $4,205,399

* *Employer contribution rate is blended to reflect rates of 14.14% of pay for Basic members, 6.50% of pay for Coordinated members not employed by Special School District #1, and 10.14% of pay for Coordinated members who are employed by Special School District #1.*

** *Includes contributions from School District #1, the City of Minneapolis, and matching state contributions.*

*** *On a market value of assets basis, the total required contribution is 17.40% of payroll and the contribution deficiency is (2.73%) of payroll.*

TABLE 10

STATUTORY AND REQUIRED CONTRIBUTION AMOUNTS

(Dollars in Thousands)

Basic Members

	Percent of Payroll		Dollar Amount
A. Statutory contributions - Chapter 354			
1. Employee contributions	10.00%	$	125
2. Employer contributions*	14.14%		176
3. Supplemental contributions**			
a. 1993 Legislation	0.12%		1
b. 1996 Legislation	0.05%		1
c. 1997 Legislation	0.31%		4
4. Total	24.62%	$	307
B. Required contributions - Chapter 356			
1. Normal cost			
a. Retirement benefits	11.47%	$	143
b. Disability benefits	0.45%		6
c. Survivors	0.43%		5
d. Deferred retirement benefits	2.10%		26
e. Refunds	0.54%		7
f. Total	14.99%	$	187

Note: Projected annual payroll for fiscal year beginning on the valuation date: $1,248 for 15 members.

* *All Basic active members are teachers employed by Special School District #1; employer contribution rate of 14.14% of payroll applies.*

** *Includes contributions from School District #1, the City of Minneapolis and matching state contributions.*

TABLE 11

STATUTORY AND REQUIRED CONTRIBUTION AMOUNTS

(Dollars in Thousands)

Coordinated Members

	Percent of Payroll		Dollar Amount
A. Statutory contributions - Chapter 354			
1. Employee contributions	7.00%	$	294,291
2. Employer contributions*	7.19%		302,278
3. Supplemental contributions**			
a. 1993 Legislation	0.12%		4,999
b. 1996 Legislation	0.05%		1,999
c. 1997 Legislation	0.31%		12,950
4. Total	14.67%	$	616,517
B. Required contributions - Chapter 356			
1. Normal cost			
a. Retirement benefits	6.51%	$	273,690
b. Disability benefits	0.19%		7,988
c. Survivors	0.09%		3,784
d. Deferred retirement benefits	1.31%		55,074
e. Refunds	0.30%		12,612
f. Total	8.40%	$	353,148

Note: Projected annual payroll for fiscal year beginning on the valuation date: $4,204,151. This includes $3,988,978 for 72,609 Coordinated members who are not employed by Special School District #1 and $215,173 for 4,141 members who are employed by Special School District #1.

* *Employer contribution rate is blended to reflect rates of 7.0% of pay for Coordinated members not employed by Special School District #1, and 10.64% of pay for Coordinated members who are employed by Special School District #1.*

** *Includes contributions from School District #1, the City of Minneapolis, and matching state contributions.*

SECTION V

PLAN ACCOUNTING

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GASB Statement Number 25, as amended by GASB Statement Number. 50, establishes financial reporting standards for defined benefit pension plans. In addition to two required statements regarding plan assets, the statement requires two schedules and accompanying notes disclosing information relative to the funded status of the plan and historical contribution patterns.

- The Schedule of Funding Progress provides information about whether the financial strength of the Plan is improving or deteriorating over time.
- The Schedule of Employer Contributions provides historical information about the annual required contribution (ARC) and the percentage of the ARC that was actually contributed.

The actuarial assumptions and methods used in the actuarial valuation are acceptable under GASB standards. The information presented in this section of the report is based on the valuation results.

In 2012, GASB issued the final version of the GASB Statements Number 67 and 68 which will supersede GASB Number 25 and 27. GASB Statement Number 67, which applies to the retirement system, will be effective for TRA for the fiscal year ending after June 30, 2014. GASB Statement Number 68, which applies to participating employers, is first effective for fiscal years beginning after June 15, 2014. The information in these statements did not apply to the current valuation report.

TABLE 12

SUMMARY OF MEMBERSHIP DATA

	July 1, 2013	July 1, 2012
Active members:		
Vested	61,398	61,727
Non-vested	15,367	14,922
Total	76,765	76,649
Pensioners and Beneficiaries	57,168	55,425
Terminated vested members entitled to, but not yet receiving, benefits:	12,614	12,201
Other terminated, non-vested members entitled to a refund of contributions	28,881	27,591
Total	**175,428**	**171,866**

TABLE 13

SCHEDULE OF FUNDING PROGRESS*
(Dollars in Thousands)

Provided below is the information required under GASB Statement No. 25, *Financial Reporting for Defined Benefit Pension Plans and Note Disclosures for Defined Contribution Plans*, as amended by GASB Statement No. 50.

Actuarial Valuation Date	Actuarial Value of Assets (a)	Actuarial Accrued Liability (AAL) (b)	Unfunded (Overfunded) AAL (UAAL) (b) - (a)	Funded Ratio (a) / (b)	Actual Covered Payroll (Previous FY) (c)	UAAL as a Percentage of Covered Payroll [(b) - (a)] / (c)
07/01/91	$ 5,614,924	$ 7,213,720	$ 1,598,796	77.84%	$ 1,943,375	82.27%
07/01/92	6,324,733	7,662,522	1,337,789	82.54%	1,989,624	67.24%
07/01/93	7,045,937	8,266,059	1,220,122	85.24%	2,065,881	59.06%
07/01/94	7,611,936	9,115,266	1,503,330	83.51%	2,150,300	69.91%
07/01/95	8,348,124	9,717,623	1,369,499	85.91%	2,204,693	62.12%
07/01/96	9,541,221	10,366,168	824,947	92.04%	2,268,390	36.37%
07/01/97	11,103,759	10,963,637	(140,122)	101.28%	2,359,011	(5.94%)
07/01/98	12,727,546	12,046,312	(681,234)	105.66%	2,422,957	(28.12%)
07/01/99	14,011,247	13,259,569	(751,678)	105.67%	2,625,254	(28.63%)
07/01/00	15,573,151	14,802,441	(770,710)	105.21%	2,704,575	(28.50%)
07/01/01	16,834,024	15,903,984	(930,040)	105.85%	2,812,000	(33.07%)
07/01/02	17,378,994	16,503,099	(875,895)	105.31%	2,873,771	(30.48%)
07/01/03	17,384,179	16,856,379	(527,800)	103.13%	2,952,887	(17.87%)
07/01/04	17,519,909	17,518,784	(1,125)	100.01%	3,032,483	(0.04%)
07/01/05	17,752,917	18,021,410	268,493	98.51%	3,121,571	8.60%
07/01/06	19,035,612	20,679,111	1,643,499	92.05%	3,430,645	47.91%
07/01/07	18,794,389	21,470,314	2,675,925	87.54%	3,532,159	75.76%
07/01/08	18,226,985	22,230,841	4,003,856	81.99%	3,645,230	109.84%
07/01/09	17,882,408	23,114,802	5,232,394	77.36%	3,761,484	139.10%
07/01/10	17,323,146	22,081,634	4,758,488	78.45%	3,787,757	125.63%
07/01/11	17,132,383	22,171,493	5,039,110	77.27%	3,838,111	131.29%
07/01/12	16,805,077	23,024,505	6,219,428	72.99%	3,871,809	160.63%
07/01/13	16,774,626	23,418,629	6,644,003	71.63%	3,917,310	169.61%

* Information prior to 2004 provided by Milliman; from 2004 to 2008 provided by The Segal Company; and 2009 to 2010 by Mercer.

TABLE 14

SCHEDULE OF CONTRIBUTIONS FROM THE EMPLOYER AND OTHER CONTRIBUTING ENTITIES

(Dollars in Thousands)

The GASB Statement No. 25 (as amended by GASB 50) required and actual contributions are as follows:

Plan Year Ended June 30	Actuarially Required Contribution Rate (a)	Actual Covered Payroll (b)	Actual Member Contributions (c)	Annual Required Contributions [(a)*(b)] - (c)	Actual Employer Contributions[1]	Percentage Contributed
2000	8.36%	$ 2,704,575	$ 138,696	$ 87,406	$ 134,419	153.79%
2001[2]	7.92%	2,812,000	145,075	77,635	139,799	180.07%
2002	7.85%	2,873,771	152,331	73,260	142,222	194.13%
2003[3]	7.57%	2,952,887	155,577	67,957	149,481	219.96%
2004	8.37%	3,032,483	159,140	94,679	151,029	159.52%
2005	8.46%	3,121,571	160,982	103,103	157,693	152.95%
2006[4]	9.05%	3,430,645	177,085	133,389	200,286	150.15%
2007[5]	12.16%	3,532,159	199,869	229,642	209,219	91.11%
2008[6]	13.44%	3,645,230	209,592	280,327	231,562	82.60%
2009[7]	15.08%	3,761,484	212,043	355,189	240,718	67.72%
2010[8]	16.81%	3,787,757	214,909	421,813	242,088	57.39%
2011[9]	15.71%	3,838,111	218,024	384,943	244,233	63.45%
2012[10]	16.57%	3,871,809	239,834	401,725	266,661	66.38%
2013[11]	18.75%	3,917,310	270,708	463,788	290,662	62.67%
2014[12]	19.41%					

Note: Information prior to 2004 provided by Milliman USA; 2004 to 2008 information provided by The Segal Company; 2009 and 2010 information provided by Mercer.

1 *Includes contributions from other sources (if applicable)*

2 *Actuarially Required Contribution Rate prior to change in Actuarial Assumptions and Asset Valuation Method is 7.31%.*

3 *Actuarially Required Contribution Rate prior to change in Actuarial Assumptions is 8.11%.*

4 *Actuarially Required Contribution Rate shown is the contribution rate stated in the TRA July 1, 2005 actuarial valuation.*

5 *Actuarially Required Contributions calculated according to parameters of GASB 25 (30-year amortization period), and post-merger of the Minneapolis Teachers' Retirement Fund Association.*

6 *Actuarially Required Contribution Rate prior to change in Asset Valuation Method is 11.58%.*

7 *Actuarially Required Contribution Rate prior to change in Actuarial Assumptions is 15.36%.*

8 *Actuarially Required Contribution Rate prior to change in Asset Valuation Method is 19.98%.*

9 *Actuarially Required Contribution Rate prior to change in Actuarial Assumptions and Plan Provisions is 18.91%.*

10 *Actuarially Required Contribution Rate prior to change in Actuarial Assumptions is 16.91%.*

11 *Actuarially Required Contribution Rate prior to change in Actuarial Assumptions is 18.15%.*

12 *Actuarially Required Contribution Rate prior to change in Plan Provisions is 19.66%.*

TABLE 15

PROJECTED BENEFIT PAYMENTS

(Dollars in Thousands)

The table below shows estimated benefits expected to be paid over the next twenty-five years, based on the assumptions used in the valuation. The "Actives" column shows benefits expected to be paid to members currently active on July 1, 2013. The "Retirees" column shows benefits expected to be paid to all other members. This includes those who, as of July 1, 2013, are receiving benefit payments or who terminated employment and are entitled to a deferred benefit.

Year Ending June 30	Actives	Retirees	Total
2014	$ 110,613	$ 1,521,173	$ 1,631,787
2015	173,919	1,507,478	1,681,398
2016	237,488	1,492,841	1,730,329
2017	301,383	1,479,782	1,781,165
2018	367,207	1,467,870	1,835,077
2019	434,986	1,455,912	1,890,898
2020	503,001	1,442,695	1,945,696
2021	570,284	1,426,645	1,996,929
2022	636,880	1,409,428	2,046,307
2023	700,846	1,389,882	2,090,728
2024	763,739	1,368,278	2,132,017
2025	828,656	1,343,541	2,172,197
2026	898,067	1,316,213	2,214,280
2027	972,643	1,285,842	2,258,485
2028	1,053,405	1,253,310	2,306,716
2029	1,140,647	1,218,267	2,358,914
2030	1,234,998	1,180,793	2,415,791
2031	1,336,362	1,140,409	2,476,771
2032	1,444,460	1,097,484	2,541,944
2033	1,558,661	1,052,342	2,611,003
2034	1,679,666	1,006,155	2,685,822
2035	1,805,611	957,638	2,763,249
2036	1,936,606	907,651	2,844,258
2037	2,067,994	855,734	2,923,728
2038	2,196,656	801,645	2,998,301

Note: Numbers may not add due to rounding

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APPENDIX A

SUMMARY STATISTICS ON MEMBERSHIP DATA

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TABLE 16

RECONCILIATION OF MEMBERS*

	Active Members**	Former Members***	Benefit Recipients**** Service Retirements	Disability Retirements	Survivors	Total
Members on 7/1/2012	**76,649**	**39,792**	**50,780**	**591**	**4,054**	**171,866**
New hires	4,916	-	-	-	-	**4,916**
Return from inactive	1,610	(1,610)	-	-	-	**0**
Return from zero balance	357	-	-	-	-	**357**
Transfer to inactive	(4,430)	4,430	-	-	-	**0**
Refunded	(246)	(668)	-	-	-	**(914)**
Restored write-off	-	111	-	-	-	**111**
Repay refunds	-	29	-	-	-	**29**
Transfer from non-status	-	15	-	-	-	**15**
Retirements	(1,986)	(568)	2,635	(59)		**22**
Benefits began	-	-	-	61	444	**505**
Benefits ended	-	-	-	(1)	(63)	**(64)**
Deaths	(42)	(71)	(1,081)	(23)	(157)	**(1,374)**
Adjustments for Disabilitants	(20)	(9)	-	-	-	**(29)**
Adjustments (Other)	(43)	44	(3)	(1)	(9)	**(12)**
Net changes	116	1,703	1,551	(23)	215	**3,562**
Members on 7/1/2013	**76,765**	**41,495**	**52,331**	**568**	**4,269**	**175,428**

* *All figures in this chart were provided by the Teachers Retirement Association. Recipient counts include all pensions in force, including double counting of multiple benefit types. Service Retirements include Supplemental and Variable optional joint annuitants. We have found these results to be reasonable.*

** *Active members include 15 Basic and 76,750 Coordinated members.*

*** *Former members include 30 Basic and 41,465 Coordinated members.*

**** *Benefit recipients include 4,707 Basic members and 52,461 Coordinated members.*

Former Member Statistics	**Vested**	**Non-vested**	**Total**
Number	12,614	28,881	41,495
Average Age	47.6	49.0	48.6
Average Service (years)	7.6	1.0	3.0
Average annual benefits, with augmentation to Normal Retirement Date and 4% Combined Service Annuity load	$9,928	N/A	N/A
Average refund value, with 4% Combined Service Annuity load	$29,688	$2,472	$10,746

TABLE 17

DISTRIBUTION OF ACTIVE MEMBERS*

	Years of Service as of July 1, 2013										
Age	**<3****	**3-4**	**5-9**	**10-14**	**15-19**	**20-24**	**25-29**	**30-34**	**35-39**	**40 +**	**Total**
<25	2,329	26									**2,355**
Avg. Earnings	23,240	39,627									**23,421**
25-29	4,464	2,392	1,644								**8,500**
Avg. Earnings	27,377	39,923	45,317								**34,377**
30-34	2,093	1,327	5,651	1,376							**10,447**
Avg. Earnings	24,953	38,433	48,343	58,557							**43,743**
35-39	1,404	693	2,466	4,657	1,095						**10,315**
Avg. Earnings	22,840	37,509	48,798	61,078	68,040						**52,093**
40-44	1,389	587	1,628	2,534	4,051	857					**11,046**
Avg. Earnings	21,267	37,326	46,461	59,570	67,831	72,516					**55,673**
45-49	1,118	442	1,230	1,530	2,164	2,810	581				**9,875**
Avg. Earnings	18,493	33,255	45,392	58,138	66,569	72,119	74,191				**57,719**
50-54	892	415	1,065	1,384	1,393	1,768	2,253	490			**9,660**
Avg. Earnings	17,326	31,364	44,000	56,590	63,530	70,135	72,783	72,125			**58,537**
55-59	703	285	691	924	1,260	1,294	1,374	1,605	382		**8,518**
Avg. Earnings	14,270	25,826	40,468	54,528	62,642	67,701	71,970	72,846	75,702		**59,521**
60-64	536	165	437	575	685	795	684	378	433	108	**4,796**
Avg. Earnings	7,713	20,900	37,078	53,076	60,468	67,538	72,715	77,348	78,902	74,755	**56,428**
65-69	293	58	100	89	106	108	77	60	36	52	**979**
Avg. Earnings	6,137	12,892	24,631	47,527	60,919	67,580	74,138	80,494	80,895	79,032	**41,425**
70 +	146	27	21	19	8	8	10	13	5	17	**274**
Avg. Earnings	5,119	12,876	20,217	53,297	56,407	72,530	75,736	68,835	75,421	87,038	**25,813**
Total	**15,367**	**6,417**	**14,933**	**13,088**	**10,762**	**7,640**	**4,979**	**2,546**	**856**	**177**	**76,765**
Avg. Earnings	**22,321**	**36,629**	**46,435**	**58,785**	**65,889**	**70,416**	**72,740**	**73,535**	**77,538**	**77,191**	**51,030**

* *Active members include 15 Basic and 76,750 Coordinated members.*

** *This exhibit does not reflect service earned in Combined Service Annuity benefits. It should not be relied upon as an indicator of non-vested status.*

In each cell, the top number is the count of active participants for the age/service combination and the bottom number is the amount of average annual earnings. Earnings shown in this exhibit are actual salaries earned during the fiscal year ending June 30, 2013 as reported by the Teachers Retirement Association of Minnesota.

TABLE 18

DISTRIBUTION OF SERVICE RETIREMENTS

	Years Since Retirement as of July 1, 2013							
Age	**<1**	**1-4**	**5-9**	**10-14**	**15-19**	**20-24**	**25 +**	**Total**
<55	1	2						**3**
Avg. Benefit	26,400	37,613						**33,875**
55-59	653	1,181	15					**1,849**
Avg. Benefit	35,673	32,736	37,277					**33,810**
60-64	1,057	4,823	3,616	111			1*	**9,608**
Avg. Benefit	28,741	31,067	27,134	36,916			1,531	**29,396**
65-69	487	3,122	5,257	4,727	144	2*	2*	**13,741**
Avg. Benefit	20,030	21,336	23,607	22,667	39,834	2,874	2,252	**22,805**
70-74	49	493	2,049	5,110	2,770	86	7	**10,564**
Avg. Benefit	14,646	17,413	20,283	24,369	26,397	29,712	8,153	**23,771**
75-79	12	56	247	1,586	3,381	1,910	63	**7,255**
Avg. Benefit	9,556	15,424	16,331	23,480	31,688	34,568	22,039	**29,883**
80-84	1	7	34	144	1,315	2,338	1,155	**4,994**
Avg. Benefit	3,250	16,439	14,260	23,761	31,711	36,323	28,816	**32,826**
85-89	1	3	11	21	129	893	1,713	**2,771**
Avg. Benefit	28,640	102,449	17,009	17,458	32,956	35,885	32,828	**33,714**
90 +			1	2	11	67	1,465	**1,546**
Avg. Benefit			81,132	46,821	7,272	34,818	29,190	**29,334**
Total	**2,261**	**9,687**	**11,230**	**11,701**	**7,750**	**5,296**	**4,406**	**52,331**
Avg. Benefit	**28,447**	**27,362**	**23,965**	**23,664**	**29,939**	**35,477**	**30,352**	**27,308**

** Pertaining to the accounts of former participants in the Minnesota Variable Annuity Fund, abolished by law in 1989.*

In each cell, the top number is the count of retired participants for the age/years retired combination and the bottom number is the average annual benefit amount.

TABLE 19

DISTRIBUTION OF SURVIVORS

	Years Since Death as of July 1, 2013							
Age	**<1**	**1-4**	**5-9**	**10-14**	**15-19**	**20-24**	**25 +**	**Total**
<45	10	72	34	13	5			**134**
Avg. Benefit	20,555	16,334	15,467	11,347	18,866			**16,040**
45-49	6	25	18	8	4		2	**63**
Avg. Benefit	16,710	14,221	17,048	9,179	27,169		22,965	**15,725**
50-54	12	31	21	8	6		2	**80**
Avg. Benefit	21,117	17,005	13,527	27,101	11,914		29,014	**17,637**
55-59	14	54	38	21	6	1	1	**135**
Avg. Benefit	26,329	16,660	14,526	18,817	15,954	7,198	8,350	**17,235**
60-64	34	104	76	43	14	6	1	**278**
Avg. Benefit	23,607	20,152	21,072	17,026	16,213	19,364	7,397	**20,081**
65-69	53	185	145	80	36	10	1	**510**
Avg. Benefit	21,984	20,856	19,754	18,602	21,243	14,394	5,564	**20,177**
70-74	57	220	178	112	52	38	15	**672**
Avg. Benefit	21,993	24,602	25,494	22,015	23,739	21,465	17,933	**23,793**
75-79	56	222	189	137	87	55	28	**774**
Avg. Benefit	28,425	30,599	30,550	29,000	33,895	28,796	27,467	**30,276**
80-84	64	199	176	145	88	59	71	**802**
Avg. Benefit	32,655	34,526	31,516	31,384	37,441	28,761	27,539	**32,425**
85-89	27	144	134	93	64	38	54	**554**
Avg. Benefit	33,702	31,833	33,995	28,867	34,974	37,378	33,177	**32,823**
90 +	16	54	63	38	33	22	41	**267**
Avg. Benefit	44,164	32,887	38,995	27,995	33,871	32,862	31,947	**34,283**
Total	**349**	**1,310**	**1,072**	**698**	**395**	**229**	**216**	**4,269**
Avg. Benefit	**27,070**	**26,220**	**27,057**	**25,489**	**30,876**	**28,415**	**28,796**	**27,059**

In each cell, the top number is the count of survivor participants for the age/years since death combination and the bottom number is the average annual benefit amount.

TABLE 20

DISTRIBUTION OF DISABILITY RETIREMENTS

	Years Disabled as of July 1, 2013							
Age	**<1**	**1-4**	**5-9**	**10-14**	**15-19**	**20-24**	**25 +**	**Total**
<45	2	11	8	1				**22**
Avg. Benefit	6,970	8,761	6,002	1,641				**7,271**
45-49	1	13	9	5	2			**30**
Avg. Benefit	23,079	10,525	8,039	7,252	3,968			**9,215**
50-54	4	33	16	7	3	1		**64**
Avg. Benefit	15,588	18,366	13,845	8,717	5,457	12,299		**15,307**
55-59	6	58	37	20	8	3	1	**133**
Avg. Benefit	24,270	23,900	17,363	13,569	16,291	10,568	5,139	**19,645**
60-64	2	80	100	75	32	6		**295**
Avg. Benefit	18,774	24,179	23,553	17,883	20,820	20,970		**21,900**
65-69		16	7	1				**24**
Avg. Benefit		26,575	14,538	30,148				**23,213**
Total	**15**	**211**	**177**	**109**	**45**	**10**	**1**	**568**
Avg. Benefit	**18,836**	**21,730**	**19,443**	**15,979**	**18,241**	**16,982**	**5,139**	**19,448**

In each cell, the top number is the count of disabled participants for the age/years disabled combination and the bottom number is the average annual benefit amount.

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APPENDIX B

SUMMARY OF PLAN PROVISIONS

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BASIC MEMBERS

This summary of provisions reflects our interpretation of applicable Statutes for purposes of preparing this valuation. This interpretation is not intended to provide a basis for administering the Plan.

Plan year

July 1 through June 30

Eligibility

Teachers first hired prior to July 1, 1978 employed by the Board of Education of Special School District No. 1, other than a charter school, and not covered by the Social Security Act. Certain part-time licensed employees of Special School District No. 1 are also covered. These members were transferred to TRA as part of the merger of the Minneapolis Teachers Retirement Fund Association (MTRFA) effective June 30, 2006.

Contributions

Shown as a percent of Salary:

Date of Increase	Member	Employer
July 1, 2010	9.00%	13.14%
July 1, 2011	9.50%	13.64%
July 1, 2012	10.00%	14.14%
July 1,2013	10.50%	14.64%
July 1, 2014	11.00%	15.14%

After June 30, 2015, the member and employer contribution rates may be adjusted as follows:

- if a contribution sufficiency of at least 1% has existed for two consecutive years, the member and employer contribution rates may be decreased to a level that is necessary to maintain a 1% sufficiency
- if a contribution deficiency of at least 0.25% has existed for two consecutive years, the member and employer contribution rates may each be increased as shown:

Contribution Deficiency	Allowable Increase in Member and Employer Contribution Rates
<2% of pay	0.25% of pay
2% to 4% of pay	0.50% of pay
>4% of pay	0.75% of pay

Potential contribution increases after June 30, 2015 are not reflected in this valuation report.

Employee contributions are "picked up" according to the provisions of Internal Revenue Code 414(h).

Teaching service

A year is earned during a calendar year if the member is employed in a covered position and employee contributions are deducted. Certain part-time service and military service is also included.

BASIC MEMBERS

Salary

Periodic compensation used for contribution purposes excluding lump sum annual or sick leave payments, severance payments, any payments made in lieu of employer paid fringe benefits or expenses, and employer contributions to a Section 457 deferred compensation plan.

Average salary

Average of the five highest successive years of Salary.

Retirement

Normal retirement

Age/Service requirements

Age 60, or any age with 30 years of Teaching Service

Amount

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

Early retirement

Age/Service requirements

Age 55 with less than 30 years of Teaching Service.

Amount

The greater of (a) or (b):

(a) 2.25% of Average Salary for each year of Teaching Service with reduction of 0.25% for each month before the Member would first be eligible for a normal retirement benefit.

(b) 2.50% of Average Salary for each year of Teaching Service assuming augmentation to the age of first eligibility for a normal retirement benefit at 3.00% per year and actuarial reduction for each month before the member would be first eligible for a normal retirement benefit.

An alternative benefit is available to members who are at least age 50 and have seven years of Teaching Service. The benefit is based on the accumulation of the 6.50% "city deposits" to the Retirement Fund. Other benefits are also provided under this alternative depending on the member's age and Teaching Service.

Form of payment

Life annuity. Actuarially equivalent options are:

(a) 10 or 15 year Certain and Life

(b) 50%, 75% or 100% Joint and Survivor with bounce back feature (option is canceled if member is predeceased by beneficiary).

Benefit increases

Benefit recipients received no annual increases in 2011 and 2012. Beginning January 1, 2013 the annual increase is 2.0% per year. When the funding ratio reaches 90% (on a Market Value of Assets basis), the annual increase will be 2.5%. A benefit recipient who has been receiving a benefit for at least 18 full months as of December 31 will receive a full increase. Members receiving benefits for at least six full months but less than 18 full months will receive a pro-rata increase.

APPENDIX B - SUMMARY OF PLAN PROVISIONS

BASIC MEMBERS

Disability

Age/service requirement	Total and permanent disability with three years of Teaching Service
Amount	An annuity actuarially equivalent to the continued accumulation of member and city contributions at the current rate for a period of 15 years (but not beyond age 65) plus an additional benefit equal to the smaller of 100% of the annuity provided by city contributions only or $150 per month. A member with 20 years of Teaching Service also receives an additional $7.50 per month. Payments stop earlier if disability ceases or death occurs. Benefits may be reduced on resumption of partial employment.
Form of payment	Same as for retirement.
Benefit increases	Same as for retirement.

Death	Choice of Benefit A, Benefit B or Benefit C
<u>*Benefit A*</u>	
Age/Service requirements	Death before retirement.
Amount	The accumulation of member and city contributions plus 6.00% interest. Paid as a life annuity, 15-year Certain and Life, or lump sum. If an annuity is chosen the beneficiary also receives additional benefits.
<u>*Benefit B*</u>	
Age/Service requirements	An active member with seven years of Teaching Service. A former member age 60 with seven years of Teaching Service who dies before retirement or disability benefits begin.
Amount	The actuarial equivalent of any benefits the member could have received if resignation occurred on the date of death.
<u>*Benefit C*</u>	
Age/Service requirements	As an active member who dies and leaves surviving children.
Amount	A monthly benefit of $248.30 to the surviving widow while caring for a child and an additional $248.30 per month for each surviving dependent child. The maximum family benefit is $579.30 per month. Benefits to the widow cease upon death or when no longer caring for an eligible child. Benefits for dependent children cease upon marriage or age 18 (age 22 if a full time student).
Benefit Increases	Same as for retirement.

BASIC MEMBERS

Withdrawal

<u>*Refund of contribution*</u>

Age/Service requirements	Termination of Teaching Service.
Amount	Member's contributions earn 4.00% interest compounded annually. For vested members, a deferred annuity may be elected in lieu of a refund.

<u>*Deferred annuity*</u>

Age/Service Requirements	Seven years of Teaching Service
Amount	The benefit is computed under law in effect at termination and increased by the following percentage compounded annually: (a) 3.00% therefore until the earlier of January 1 of the year following attainment of age 55 and June 30, 2012; (b) 5.00% thereafter until the earlier of June 30, 2012 and when the annuity begins; and (c) 2.00% beginning July 1, 2012. In addition, the interest earned on the member and city contributions between termination and age 60 can be applied to provide an additional annuity.

COORDINATED MEMBERS

This summary of provisions reflects our interpretation of applicable Statutes for purposes of preparing this valuation. This interpretation is not intended to provide a basis for administering the Plan.

Plan year

July 1 through June 30

Eligibility

A public school or MNSCU teacher who is covered by the Social Security Act, except for teachers employed by St. Paul or Duluth public schools or by the University of Minnesota. Charter school teachers employed by St. Paul or Duluth public schools are covered by TRA.

No MNSCU teacher will become a new Member unless that person elects coverage as defined by Minnesota Statutes under Chapter 354B.

Contributions

Shown as a percent of Salary:

Date of Increase	Member	Employer
July 1, 2010	5.50%	5.50%
July 1, 2011	6.00%	6.00%
July 1, 2012	6.50%	6.50%
July 1, 2013	7.00%	7.00%
July 1, 2014	7.50%	7.50%

Employer also contributes Supplemental amount equal to 3.64% of Salary (members employed by Special School District #1 only).

After June 30, 2015, the member and employer contribution rates may be adjusted as follows:

- if a contribution sufficiency of at least 1% has existed for two consecutive years, the member and employer contribution rates may be decreased to a level that is necessary to maintain a 1% sufficiency
- if a contribution deficiency of at least 0.25% has existed for two consecutive years, the member and employer contribution rates may each be increased as shown:

Contribution Deficiency	Allowable Increase in Member and Employer Contribution Rates
<2% of pay	0.25% of pay
2% to 4% of pay	0.50% of pay
>4% of pay	0.75% of pay

Potential contribution increases after June 30, 2015 are not reflected in this valuation report.

Employee contributions are "picked up" according to the provisions of Internal Revenue Code 414(h).

Teaching service

A year is earned during a calendar year if the member is employed in a covered position and employee contributions are deducted. Certain part-time service and military service is also included.

COORDINATED MEMBERS

Salary	Periodic compensation used for contribution purposes excluding lump sum annual or sick leave payments, severance payments, any payments made in lieu of employer paid fringe benefits or expenses, and employer contributions to a Section 457 deferred compensation plan.
Average salary	Average of the five highest successive years of Salary. Average salary is based on all Allowable Service if less than five years.
Retirement	
Normal retirement	
Age/Service requirements	First hired before July 1, 1989: (a) Age 65 and three years of Allowable Service; or (b) Age 62 and 30 years of Allowable Service. Proportionate Retirement Annuity is available at age 65 and one year of Allowable Service. First hired after June 30, 1989: The age when first eligible for full Social Security retirement benefits (but not to exceed age 66) and three years of Allowable Service. Proportionate Retirement Annuity is available at normal retirement age and one year of Allowable Service.
Early retirement	
Age/Service requirements	First hired before July 1, 1989: (a) Age 55 and three years of Allowable Service; or (b) Any age and 30 years of Allowable Service; or (c) Rule of 90: Age plus Allowable Service totals 90. First hired after June 30, 1989: (a) Age 55 with three years of Allowable Service.

COORDINATED MEMBERS

Retirement(continued)

Amount

First hired before July 1, 1989:

The greater of (a), (b) or (c):

(a) 1.20% of Average Salary for each of the first ten years of Allowable Service.
1.70% of Average Salary for each year of Allowable Service in excess of 10 prior to July 1, 2006, and
1.90% of Average Salary for years of Allowable Service after July 1, 2006.
No actuarial reduction if age plus years of service totals 90. Otherwise reduction of 0.25% for each month the member is under age 65 (or 62 if 30 years of Allowable Service) at time of retirement.

(b) 1.70% of Average Salary for each year of Allowable Service prior to July 1, 2006 and 1.90% for each year of Allowable Service beginning July 1, 2006, assuming augmentation to normal retirement age at 3.00% per year (2.50% per year for members hired after June 30, 2006) and actuarial reduction for each month the member is under the full Social Security benefit retirement age (not to exceed age 66). Beginning July 1, 2015, new early retirement reduction factors will apply, including special factors for members retiring at age 62 or later with at least 30 years of service.

(c) For eligible members: the monthly benefit that is actuarially equivalent to 2.2 times the members' accumulated deductions plus interest thereon.

First hired after June 30, 1989:

1.70% of Average Salary for each year of Allowable Service prior to July 1, 2006 and 1.90% for each year of Allowable Service beginning July 1, 2006, assuming augmentation to normal retirement age at 3.00% per year (2.50% per year for members hired after June 30, 2006) and actuarial reduction for each month the member is under the full Social Security benefit retirement age (not to exceed age 66). Beginning July 1, 2015, new early retirement reduction factors will apply, including special factors for members retiring at age 62 or later with at least 30 years of service.

Form of Payment

Life annuity. Actuarially equivalent options are:

(a) 50%, 75% or 100% Joint and Survivor with bounce back feature (option is canceled if member is predeceased by beneficiary).
(b) 15 year Certain and Life
(c) Guaranteed Refund.

COORDINATED MEMBERS

Retirement(continued)

Benefit increases	Benefit recipients received no annual increase in 2011 and 2012. Beginning January 1, 2013 the annual increase is 2.0% per year. When the funding ratio reaches 90% (on a Market Value of Assets basis), the annual increase will revert to 2.5%. A benefit recipient who has been receiving a benefit for at least 18 full months as of December 31 will receive a full increase. Members receiving benefits for at least six full months but less than 18 full months will receive a pro-rata increase.

Disability

Age/service requirement	Total and permanent disability before Normal Retirement Age with three years of Allowable Service.
Amount	Normal Retirement Benefit based on Allowable Service and Average Salary at disability without reduction for commencement before Normal Retirement Age unless an optional annuity plan is selected. Payments stop at Normal Retirement Age or the five year anniversary of the effective date of the disability benefit, whichever is later. Payments stop earlier if disability ceases or death occurs. Benefits may be reduced on resumption of partial employment.
Form of *payment*	Same as for retirement.
Benefit increases	Same as for retirement.

Retirement after disability

Age/service requirement	Normal Retirement Age or the five year anniversary of the effective date of the disability benefit, whichever is later.
Amount	Any optional annuity continues. Otherwise, the larger of the disability benefit paid before Normal Retirement Age or the normal retirement benefit available at Normal Retirement Age, or an actuarially equivalent optional annuity.
Benefit increases	Same as for retirement.

COORDINATED MEMBERS

Death

Surviving spouse optional annuity

Age/Service requirements	Member or former member with three years of Allowable Service who dies before retirement or disability benefits commence.
Amount	Survivor's payment of the 100% Joint and Survivor benefit or an actuarial equivalent term certain annuity. If commencement is prior to age 65 (age 62 if 30 years of service), the benefit is reduced for early retirement with half the applicable reduction factor used from age 55 to actual commencement age. If no surviving spouse, then an actuarial equivalent dependent child benefit is paid to age 20 or for five years if longer.
Benefit increase	Same as for retirement.

Withdrawal

Refund of contributions

Age/Service requirements	Thirty days following termination of teaching service.
Amount	Member's contributions earn 4.00% interest compounded annually. For vested members, a deferred annuity may be elected in lieu of a refund.

Deferred annuity

Age/Service requirements	Vested at date of termination. Current requirement is three years of Allowable Service.

COORDINATED MEMBERS

Withdrawal (continued)

Amount

For members first hired prior to July 1, 2006, the benefit is computed under law in effect at termination and increased by the following percentage compounded annually:

(a) 3.00% therefore until the earlier of January 1 of the year following attainment of age 55 and June 30, 2012;
(b) 5.00% thereafter until the earlier of June 30, 2012 and when the annuity begins; and
(c) 2.00% from July 1, 2012 forward.

Amount is payable as a normal or early retirement.

A member who terminated service before July 1, 1997 whose benefit does not commence until after June 30, 1997 shall receive an actuarially equivalent increase to reflect the change from 5.00% to 6.00% in the post-retirement interest assumption; or

For eligible members; the monthly benefit that is actuarially equivalent to 2.2 times the members' accumulated deductions plus interest thereon.

For members first hired July 1, 2006 and after, the benefit computed under law in effect at termination is increased by 2.50% compounded annually until June 30, 2012 and increased by 2.00% from July 1, 2012 forward until the annuity begins.

APPENDIX C

ACTUARIAL METHODS AND ASSUMPTIONS

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APPENDIX C – ACTUARIAL METHODS AND ASSUMPTIONS

Actuarial Cost Method

Liabilities and contributions in this report are computed using the Individual Entry Age Normal Cost Method. This method is prescribed by Minnesota Statutes.

The objective under this method is to fund each member's benefits under the Plan as payments which are level as a percentage of salary, starting at original participation date (or employment date), and continuing until the assumed date of retirement termination, disability or death. For valuation purposes, entry age for each member is determined as the age at valuation minus years of service as of the valuation date.

At any given date, a liability is calculated equal to the contributions which would have been accumulated if this method of funding had always been used, the current plan provisions had always been in place, and all assumptions had been met. The difference between this liability and the assets (if any) which are held in the fund is the unfunded actuarial accrued liability. The unfunded actuarial accrued liability is typically funded over a chosen period in accordance with the amortization schedule.

A detailed description of the calculation follows: The normal cost for each active member under the assumed retirement age is determined by applying to earnings the level percentage of salary which, if contributed each year from date of entry into the Plan until the assumed retirement (termination, disability or death) date, is sufficient to provide the full value of the benefits expected to be payable.

- The present value of future normal costs is the total of the discounted values of all active members' normal cost, assuming these to be paid in each case from the valuation date until retirement (termination, disability or death) date.

- The present value of projected benefits is calculated as the value of all benefit payments expected to be paid to the Plan's current members, including active and retired members, beneficiaries, and terminated members with vested rights.

- The actuarial accrued liability is the excess of the present value of projected benefits over the present value of future normal costs.

- The unfunded actuarial accrued liability is the excess of the actuarial accrued liability over the assets of the fund, and represents that part of the actuarial accrued liability which has not been funded by accumulated past contributions.

Amortization Method

The unfunded actuarial accrued liability is amortized as a level percentage of payroll each year to the statutory amortization date of June 30, 2037, assuming payroll increases of 3.75% per year (effective with the 2011 valuation). If the unfunded actuarial accrued liability is negative, the surplus amount is amortized over 30 years as a level percentage of payroll. If there is an increase in the unfunded actuarial accrued liability due to a change in the actuarial assumptions, plan provisions, or actuarial cost method, a new amortization period is determined. This new amortization period is determined by blending the period needed to amortize the prior unfunded actuarial accrued liability over the prior amortization period and the increase in unfunded actuarial accrued liability amortized over 30 years. If there is a decrease in the unfunded actuarial accrued liability, no change is made to the amortization period.

APPENDIX C – ACTUARIAL METHODS AND ASSUMPTIONS

Asset Valuation Method

As prescribed in the Minnesota Statutes Section 356.215, Subdivision 1, Paragraph (f), the assets are valued based on a five-year moving average of expected and market values (five-year average actuarial value) determined as follows:

- At the end of each plan year, an average asset value is calculated as the average of the market asset value at the beginning and end of the fiscal year net of investment income for the fiscal year;
- The investment gain or (loss) is taken as the excess of actual investment income over the expected investment income based on the average asset value as calculated above;
- The investment gain or (loss) so determined is recognized over five years at 20% per year;
- The asset value is the sum of the market value plus the scheduled recognition of investment gains or (losses) during the current and the preceding four fiscal years. The Minnesota Post Retirement Investment Fund (MPRIF) was dissolved on June 30, 2009. For the purpose of determining the actuarial value of assets, the MPRIF asset loss for the fiscal year ending June 30, 2009 is recognized incrementally over five years at 20% per year, similar to the smoothing described above. Prior to June 30, 2009, MPRIF asset gains and losses were not smoothed.

Supplemental Contributions

The City of Minneapolis, the Minneapolis School District, and the State of Minnesota are scheduled to make the following supplemental contributions to the Fund in FY14:

1993 Legislation:	Supplemental contributions of $5,000,000 annually are assumed to be made until the amortization date of June 30, 2037 or full actuarial funding is achieved, whichever is earlier.
1996 Legislation:	Supplemental contributions of $2,000,000 annually are assumed to be made until the amortization date of June 30, 2037 or full actuarial funding is achieved, whichever is earlier. Amount is variable as described in Minnesota Statutes, Chapter 423A.02. Assumed amount is based on actual amount received in most recent fiscal year, and information provided by the Teachers Retirement Association.
1997 Legislation:	Supplemental contributions of $12,954,000 annually are assumed to be made until the amortization date of June 30, 2037. Amount is fixed in statute.

The 1996 Legislation amount decreased from $3,710,708 to $2,000,000 since the prior valuation.

APPENDIX C – ACTUARIAL METHODS AND ASSUMPTIONS

Entry Age Calculation

As required by the LCPR Standards for Actuarial Work, a member's Entry Age is calculated as the age at the valuation date less years of service. Age on the valuation date is calculated as age nearest birthday. The years of service for each member are provided by TRA.

Decrement Timing

All decrements are assumed to occur in the middle of the plan year. This is the preferred decrement timing in the LCPR Standards for Actuarial Work.

Funding Objective

The fundamental financing objective of the fund is to establish contribution rates which, when expressed as a percentage of active member payroll, will remain approximately level from generation to generation and meet the required deadline for full funding.

Benefits included or excluded

To the best of our knowledge, all material benefits have been included in the liability.

IRC Section 415(b): The limitations of Internal Revenue Code Section 415(b) have been incorporated into our calculations. Annual benefits may not exceed the limits in IRC Section 415. This limit is indexed annually. For 2013, the limit is $205,000.

IRC Section 401(a)(17): The limitations of Internal Revenue Code Section 401(a)(l7) have been incorporated into our calculations. Compensation for any 12-month period used to determine accrued benefits may not exceed the limits in IRC Section 401(a)(17) for the calendar year in which the 12-month period begins. This limit is indexed annually. For 2013, the limit is $255,000. Certain members first hired before July 1, 1995 may have a higher limit.

APPENDIX C – ACTUARIAL METHODS AND ASSUMPTIONS

Summary of Actuarial Assumptions

The following assumptions were used in valuing the liabilities and benefits under the plan. All assumptions are prescribed by Statutes, the LCPR, or the Board of Trustees. The assumptions prescribed are based on the last experience study, dated October 30, 2009.

The Allowance for Combined Service Annuity was based on the recommendation of a prior actuary. We are unable to judge the reasonableness of this assumption without performing a substantial amount of additional work beyond the scope of this assignment.

Investment Return	Pre-retirement: 8.38% compounded annually to reflect an 8.0% assumption for four (4) years and 8.5% thereafter. Post-retirement: 6.38% compounded annually
Benefit Increases after Retirement	Payment of 2.0% annual benefit increases after retirement are accounted for by using a 6.38% post-retirement assumption, as directed by the LCPR actuary.
Salary Increases	Reported salary for prior fiscal year, with new hires annualized, is increased according to the salary increase table shown in the rate table for current fiscal year and annually for each future year. See table of sample rates.
Payroll Growth	3.75% per year
Future Service	Members are assumed to earn future service at a full-time rate.
Mortality: Pre-retirement	RP 2000 non-annuitant generational mortality, white collar adjustment, male rates set back 5 years and female rates set back 7 years.
Post-retirement	RP 2000 annuitant generational mortality, white collar adjustment, male rates set back 2 years and female rates set back 3 years.
Post-disability	RP 2000 disabled retiree mortality, without adjustment
Disability	Age-related rates based on experience; see table of sample rates.
Withdrawal	Select and ultimate rates based on actual plan experience. Ultimate rates after the third year are shown in the rate table. Select rates are as follows:

	First Year	Second Year	Third Year
Male	45%	12%	6%
Female	40%	10%	8%

Expenses	Prior year administrative expenses expressed as percentage of prior year payroll.
Retirement Age	Graded rates beginning at age 55 as shown in rate table. Members who have attained the highest assumed retirement age will retire in one year.
Percentage Married	85% of male members and 65% of female members are assumed to be married. Members are assumed to have no children.
Age Difference	Females two years younger than males.

Summary of Actuarial Assumptions *(continued)*

Allowance for Combined Service Annuity	Liabilities for active members are increased by 1.40% and liabilities for former members are increased by 4.00% to account for the effect of some Participants being eligible for a Combined Service Annuity.
Refund of Contributions	All employees withdrawing after becoming eligible for a deferred benefit are assumed to take the larger of their contributions accumulated with interest or the value of their deferred benefit.
Interest on member contributions	Members and former members who are eligible for the money purchase annuity are assumed to receive interest credits equal to the Pre-Retirement interest rate. All other members and former members receive the interest crediting rate as specified in statutes.
Commencement of deferred benefits	Members receiving deferred annuities (including current terminated deferred members) are assumed to begin receiving benefits at unreduced retirement age.
Form of payment	Married members are assumed to elect subsidized joint and survivor form of annuity as follows:

Males:	10% elect 50% J&S option 15% elect 75% J&S option 70% elect 100% J&S option
Females:	20% elect 50% J&S option 10% elect 75% J&S option 50% elect 100% J&S option

Members eligible for deferred annuities (including current terminated deferred members) and future disability benefits are assumed to elect a life annuity.

Missing data for members

Membership data was supplied by TRA as of the valuation date. This information has not been audited by CMC. We have reviewed the information for internal consistency and we have no reason to doubt its substantial accuracy. In the small number of cases where submitted data was missing or incomplete and could not be recovered from prior years, the following assumptions were applied if needed:

Data for active members:

Salary, Service, and Date of Birth	Based on current active demographics.
Gender	Female

Data for terminated members:

Date of birth	July 1, 1964
Average salary	$29,000
Date of termination	Derived from date of birth, original entry age, and service

Summary of Actuarial Assumptions *(continued)*

Data for in-pay members:

Beneficiary date of birth	Wife two years younger than husband
Gender	Based on first name
Form of payment	Life annuity for retirees and beneficiaries, 100% J&S option for disabled retirees.

Changes in actuarial assumptions and methods since the previous valuation

None.

Future post-retirement adjustments

Once the funded ratio reaches 90% on a market value basis, the COLA is scheduled by statute to revert back from 2.0% to 2.5%. Future assets and liabilities were projected using the 2013 valuation results as a starting point and assuming all actuarial assumptions are met in future years. These assumptions include a rate of return on assets of 8.0% for the next four years and 8.5% thereafter. The projections also assume the COLA remains at 2% and that future statutory contribution rates are not increased beyond the increase currently provided for in the statutes. In particular, there is no assumption that the stabilizer provisions will be utilized by the Board. Based on these projections, the funded status is not expected to reach 90% for over 30 years. At this time, there has not been any guidance provided by the LCPR regarding how or when to reflect the future COLA change. Absent guidance and given the funded ratio is not expected to exceed 90% for many years in the future, we have not reflected any change in the COLA assumption from the current 2.0%.

Summary of Actuarial Assumptions *(continued)*

	Rate (%)			
	Ultimate Withdrawal		Disability	
Age	Male	Female	Male	Female
20	3.70	4.50	0.00	0.00
25	3.20	4.50	0.00	0.00
30	2.70	4.50	0.00	0.00
35	2.50	3.90	0.01	0.01
40	2.35	2.75	0.03	0.03
45	2.10	2.10	0.05	0.05
50	1.85	1.85	0.10	0.10
55	0.00	0.00	0.16	0.16
60	0.00	0.00	0.25	0.25
65	0.00	0.00	0.00	0.00
70	0.00	0.00	0.00	0.00
75	0.00	0.00	0.00	0.00

	Mortality Rates (%)					
	Pre-Retirement*		Post-Retirement**		Post-Disability	
Age	Male	Female	Male	Female	Male	Female
20	0.0269	0.0155	0.0316	0.0184	2.2571	0.7450
25	0.0345	0.0188	0.0373	0.0194	2.2571	0.7450
30	0.0376	0.0197	0.0393	0.0223	2.2571	0.7450
35	0.0353	0.0235	0.0481	0.0363	2.2571	0.7450
40	0.0591	0.0401	0.0766	0.0527	2.2571	0.7450
45	0.0890	0.0562	0.1124	0.0763	2.2571	0.7450
50	0.1342	0.0837	0.1711	0.1229	2.8975	1.1535
55	0.1978	0.1344	0.5716	0.2681	3.5442	1.6544
60	0.2747	0.2015	0.5688	0.4253	4.2042	2.1839
65	0.4263	0.3107	0.9232	0.6736	5.0174	2.8026
70	0.6725	0.4979	1.5834	1.1211	6.2583	3.7635
75	0.9823	0.7591	2.6710	1.8784	8.2067	5.2230

* *Rates shown are RP 2000 employee mortality (base), white collar adjustment, set back 5 years for males and 7 years for females.*

** *Rates shown are RP 2000 annuitant mortality (base), white collar adjustment, set back 2 years for males and 3 years for females.*

Summary of Actuarial Assumptions *(continued)*

Salary Scale	
Service	**Salary Increase**
1	12.00%
2	9.00%
3	8.00%
4	7.50%
5	7.25%
6	7.00%
7	6.85%
8	6.70%
9	6.55%
10	6.40%
11	6.25%
12	6.00%
13	5.75%
14	5.50%
15	5.25%
16	5.00%
17	4.75%
18	4.50%
19	4.25%
20	4.00%
21	3.90%
22	3.80%
23	3.70%
24	3.60%
25 or more	3.50%

Summary of Actuarial Assumptions *(continued)*

	Retirement Rate (%)				
Age	Coordinated Members Eligible for Rule of 90	Coordinated Members Not Eligible for Rule of 90	Age	Basic Members Eligible for 30 and Out Provision	Basic Members Not Eligible for 30 and Out Provision
55 & Under	50	7	55 & Under	40	5
56	55	7	56	40	5
57	45	7	57	40	5
58	45	8	58	40	5
59	45	10	59	40	5
60	40	12	60	25	25
61	45	16	61	25	25
62	45	20	62	25	25
63	40	18	63	25	25
64	45	20	64	25	25
65	40	40	65	40	40
66	35	35	66	40	40
67	30	30	67	40	40
68	30	30	68	40	40
69	30	30	69	40	40
70	35	35	70-74	60	60
71 & Over	100	100	75-79	60	100
			80 & Over	100	100

Actuarial Asset Value. The value of assets used in calculating the required contributions. The actuarial asset value may be equal to the fair market value of assets, or it may spread the recognition of certain investment gains or losses over a period of years in accordance with an asset valuation method. The goal of an asset valuation method is to produce a relatively stable asset value thereby reducing year-to-year volatility in contribution requirements.

Actuarial Accrued Liability. The portion of the present value of all benefits attributable to service already rendered.

Actuarial Cost Method. Sometimes called "funding method," a particular technique used by actuaries to establish the amount and incidence of the annual actuarial cost of pension plan benefits, or normal cost, and the related unfunded actuarial accrued liability. Ordinarily, the annual contribution to the plan comprises the normal cost and an amount for amortization of the unfunded actuarial accrued liability.

Annual Pension Cost. A measure of the periodic cost of an employer's participation in a defined benefit pension plan.

Annual Required Contributions (ARC). The employer's periodic required contributions to a defined benefit pension plan, calculated in accordance with the parameters of GASB 25 (as amended by GASB 50) or GASB 27.

ASA. Associate of the Society of Actuaries.

Current Benefit Obligations. The present value of benefits earned to the valuation date, based on current service and including future salary increases to retirement.

EA. Enrolled Actuary.

FSA. Fellow of the Society of Actuaries.

MAAA. Member of the American Academy of Actuaries.

Normal Cost. The annual cost assigned to the current year, under the actuarial cost method in use.

Present Value. Sometimes called "actuarial present value," the current worth (on the valuation date) of an amount or series of amounts payable or receivable in the future. The present value is determined by discounting the future payments at a predetermined rate of interest, taking into account the probability of payment.

Statement No. 25 of the Governmental Accounting Standards Board (GASB 25). The accounting standard governing the financial reporting for defined benefit pension plans and note disclosures for defined contribution plans.

Statement No. 27 of the Governmental Accounting Standards Board (GASB 27). The accounting standard governing a state or local governmental employer's accounting for pensions.

Statement No. 50 of the Governmental Accounting Standards Board (GASB 50). The accounting standard amending both GASB 25 and GASB 27 to require a schedule of funding progress under the Entry Age Normal method for plans that use the aggregate funding method to determine the Annual Required Contribution.