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TRA
TEACHERS
RETIREMENT
ASSOCIATION
of MINNESOTA

GASB STATEMENT NO. 67 REPORT

FOR THE

TEACHERS RETIREMENT ASSOCIATION

OF MINNESOTA

FOR ACCOUNTING PURPOSES

MEASUREMENT DATE: JUNE 30, 2018

www.CavMacConsulting.com

November 30, 2018

Mr. Jay Stoffel
Teachers Retirement Association of Minnesota
60 Empire Drive, Suite 400
St. Paul, MN 55103

Dear Mr. Stoffel:

This report has been prepared to assist the Teachers Retirement Association of Minnesota (TRA) in meeting the requirements of the Governmental Accounting Standards Board Statement No. 67 (GASB 67) for the June 30, 2018 Measurement Date. The calculations in this report have been made on a basis that is consistent with our understanding of this accounting standard. Please note that the discount rate used to determine the Total Pension Liability (TPL) changed from 5.12% at the Prior Measurement Date to 7.50% at the current Measurement Date.

The annual funding actuarial valuation used as the basis for much of the information presented in this report was performed as of July 1, 2018. The funding valuation was based upon data, furnished by the TRA staff, concerning active, inactive and retired members along with pertinent financial information. This information was reviewed for completeness and internal consistency, but was not audited by us. The valuation results depend on the integrity of the data. If any of the information is inaccurate or incomplete our results may be different and our calculations may need to be revised. Please see the actuarial valuation for additional details on the funding requirements for TRA including the actuarial assumptions and methods and the System's funding policy.

To the best of our knowledge, the information contained in this report is complete and accurate. The calculations were performed by, and under the supervision of, independent qualified actuaries with experience in performing valuations for public retirement systems. In addition, the valuation was prepared in accordance with generally accepted actuarial principles and practices, as well as in conformity with applicable Actuarial Standards of Practice, issued by the Actuarial Standards Board. The calculations are based on the current provisions of TRA and on actuarial assumptions that are internally consistent and individually reasonable based on the actual experience of TRA.

The calculation of the liability associated with the benefits described in this report was performed for the purpose of providing reporting and disclosure information that satisfies the requirements of GASB 67 for accounting valuation purposes and may not be appropriate for funding purposes or other types of analysis. Calculations for purposes other than satisfying the requirements of GASB 67 may produce significantly different results. Future actuarial results may differ significantly from the current results presented in this report due to such factors as changes in plan experience or changes in economic or demographic assumptions.

We, Patrice A. Beckham, FSA and Brent A. Banister, FSA, are members of the American Academy of Actuaries and meet the Qualification Standards to render the actuarial opinion contained herein. We are available to answer any questions on the material contained in this report or to provide explanations or further details as may be appropriate.

Respectfully submitted,

Patrice Beckham   Brent A. Banister

Patrice A. Beckham, FSA, EA, FCA, MAAA	Brent A. Banister, PhD, FSA, EA, FCA, MAAA
Principal and Consulting Actuary	Chief Actuary

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REPORT OF THE ANNUAL GASB STATEMENT NO. 67

TEACHERS RETIREMENT ASSOCIATION OF MINNESOTA

SUMMARY OF PRINCIPAL RESULTS
($ IN THOUSANDS)

Valuation Date (VD):	July 1, 2018
Prior Measurement Date:	June 30, 2017
Measurement Date (MD):	June 30, 2018
Membership Data:	
Retirees and Beneficiaries	66,104
Inactive Vested Members	14,936
Inactive Nonvested Members	34,375
Active Employees	82,495
Total	197,910
Single Equivalent Interest Rate (SEIR):	
Long-Term Expected Rate of Return	7.50%
Municipal Bond Index Rate at Prior Measurement Date	3.56%
Municipal Bond Index Rate at Measurement Date	3.89%
Year in which Fiduciary Net Position is Projected to be Depleted	N/A
Single Equivalent Interest Rate at Prior Measurement Date	5.12%
Single Equivalent Interest Rate at Measurement Date	7.50%
Net Pension Liability:	
Total Pension Liability (TPL)	$28,643,023
Fiduciary Net Position (FNP)	22,362,087
Net Pension Liability (NPL = TPL – FNP)	$6,280,936
FNP as a percentage of TPL	78.07%

INTRODUCTION

The Governmental Accounting Standards Board issued Statement No. 67 (GASB 67), *Financial Reporting for Pension Plans*, in June 2012. The effective date for reporting under GASB 67 for the Teachers Retirement Association of Minnesota (System) was the fiscal year ending June 30, 2014. Based on the provisions of GASB 67, the Teachers Retirement Association of Minnesota is a cost-sharing multiple employer defined benefit pension plan.

This report, prepared as of June 30, 2018 (the Measurement Date), presents information to assist the Teachers Retirement Association of Minnesota in meeting the requirements of GASB 67. Much of the material provided in this report is based on the data, assumptions and results of the annual funding actuarial valuation of the System performed as of July 1, 2018 (the Valuation Date). The results of that valuation were detailed in a separate report dated November 30, 2018.

GASB 67 discloses the Total Pension Liability (TPL) utilizing the Entry Age Normal actuarial cost method. The Net Pension Liability (NPL) is equal to the TPL minus the System's Fiduciary Net Position (FNP) (basically the fair (market) value of assets). The benefit provisions recognized in the calculation of the TPL are summarized in Appendix B.

Among the items needed for the liability calculation is the discount rate, or Single Equivalent Interest Rate (SEIR), as described by GASB 67. To determine the SEIR, the FNP must be projected, using GASB 67 guidelines, into the future for as long as there are anticipated benefits payable under the plan's provisions applicable to the members and beneficiaries of the System on the Measurement Date. If the FNP is not projected to be depleted at any point in the future, the long-term expected rate of return on plan investments expected to be used to finance the benefit payments may be used as the SEIR.

If, however, the FNP is projected to be depleted at a future measurement date, the SEIR is determined as the single rate that will generate a present value of benefit payments equal to the sum of the present value determined by discounting all projected benefit payments through the date of depletion by the long-term expected rate of return, and the present value determined by discounting those benefits after the date of depletion by a 20-year tax-exempt municipal bond (rating AA/Aa or higher) rate. The rate used, if necessary, for this purpose is the monthly average of the Bond Buyers General Obligation 20-year Municipal Bond Index Rate (formerly published monthly by the Board of Governors of the Federal Reserve System).

In 2018, the 2018 Omnibus Pension Bill was passed and contained significant changes to improve the sustainability of TRA. The 2018 legislation has a significant positive financial impact on TRA, immediately reducing TRA liabilities, increasing the funded ratio and putting the System on track to be funded in 30 years. More detail on the changes can be found in Section II of this report.

Our calculations indicate that the FNP is not projected to be depleted, so the Municipal Bond Index Rate is not used in the determination of the SEIR for the June 30, 2018 TPL. Our calculations as of the Prior Measurement Date indicated that the FNP was projected to be depleted in the year 2053, so the Municipal Bond Index Rate was used in the determination of the SEIR for the June 30, 2017 TPL. The SEIR as of the Measurement Date is 7.50% while it was 5.12% at the Prior Measurement Date. Please see Paragraph 31.b.(1) for more explanation of the development of the SEIR.

The FNP projections are based upon the Teachers Retirement Association of Minnesota's financial status on the Measurement Date, the indicated set of methods and assumptions, and the requirements of GASB 67. As such, the FNP projections are not reflective of the cash flows and asset accumulations that would occur on an ongoing plan basis, reflecting the impact of future members. Therefore, the results of this test do not necessarily indicate whether or not the fund will actually run out of money, the financial condition of the System, or the System's ability to make benefit payments in future years.

The sections that follow provide the results of all the necessary calculations, presented in the order laid out in GASB 67 for note disclosure and Required Supplementary Information (RSI).

SECTION I – NOTES TO FINANCIAL STATEMENTS

The material presented herein will follow the order presented in GASB 67. Paragraph numbers are provided for ease of reference.

Paragraphs 30.a. (1)-(3): This information will be supplied by the System.

Paragraph 30.a. (4): The data required regarding the membership of the System were furnished by the System. The following table summarizes the membership of the System as of July 1, 2018, the date of the valuation used to determine the June 30, 2018 Total Pension Liability.

Membership

Number as of July 1, 2018	
Retirees Or Their Beneficiaries Currently Receiving Benefits	66,104
Inactive Members Entitled To But Not Yet Receiving Benefits	14,936
Inactive Nonvested Members	34,375
Active Members	82,495
Total	197,910

Paragraphs 30.a. (5)-(6) and Paragraphs 30.b.-f.: This information will be supplied by the System.

Paragraph 31.a. (1)-(4): As stated earlier, the NPL is equal to the TPL minus the FNP. That result, as of June 30, 2018, is presented in the following table.

($ in Thousands)		
Total Pension Liability	$	28,643,023
Fiduciary Net Position		22,362,087
Net Pension Liability	$	6,280,936
Ratio of Fiduciary Net Position to Total Pension Liability		78.07%

Paragraph 31.b.: This paragraph requires information to be disclosed regarding the actuarial assumptions and other inputs used to measure the TPL. The complete set of actuarial assumptions and other inputs utilized in developing the TPL are outlined in Appendix C. The SEIR at the June 30, 2018 Measurement Date is 7.50% compared to 5.12% at the prior Measurement Date of June 30, 2017.

The TPL as of June 30, 2018 was determined based on an actuarial valuation prepared as of July 1, 2018, using the following key actuarial assumptions and other inputs:

Price inflation	2.50 percent
Salary increases, including price inflation	2.85 to 8.85 percent for 10 years and 3.25 to 9.25 percent, thereafter
Wage growth rate	2.85 percent for 10 years and 3.25 percent, thereafter
Payroll growth rate	3.00 percent
Long-term rate of return, net of investment expense, including price inflation	7.50 percent
Municipal Bond Index Rate	
Prior Measurement Date	3.56 percent
Measurement Date	3.89 percent
Year FNP is projected to be depleted	N/A
Single Equivalent Interest Rate, net of investment expense, including price inflation	
Prior Measurement Date	5.12 percent
Measurement Date	7.50 percent
Cost of Living Adjustment	1.0% for January, 2019 through January, 2023, then increasing by 0.1% each year up to 1.5% annually.
Mortality	Pre-retirement mortality rates were based on the RP-2014 white collar employee table, male rates set back 6 years and female rates set back 5 years. Generational projection uses the MP-2015 scale.

Post-retirement mortality rates were based on the RP-2014 white collar annuitant table, male rates set back 3 years and female rates set back 3 years, with further adjustments of the rates. Generational projection uses the MP-2015 scale.

Post-disability mortality rates were based on the RP-2014 disabled retiree mortality table, without adjustment.

The actuarial assumptions used in the July 1, 2018 actuarial funding valuation are prescribed by Minnesota Statutes Section 356.215, the Legislative Commission on Pensions and Retirement (LCPR), and the TRA Board of Trustees. Many of the assumptions prescribed are based on the full experience study report, dated June 5, 2015, that covered the six-year period beginning July 1, 2008 and ending June 30, 2014. The TRA Board commissioned a review of the economic assumptions used in the actuarial valuation and the findings and recommendations were provided to the Board at their November 2017 meeting and approved by the LCPR on February 19, 2018. Those recommendations are reflected in the July 1, 2018 funding valuation as well as the TPL at the current Measurement Date.

Paragraph 31.b.(1)

(a) Discount rate (SEIR): The discount rate used to measure the TPL as of the Measurement Date was 7.50%. The projection of cash flows used to determine the discount rate was performed in accordance with GASB 67. On that basis, the System's FNP was not projected to be depleted, so the Municipal Bond Index Rate was not used in the determination of the SEIR. The SEIR at the Prior Measurement Date was 5.12%.

(b) Projected cash flows: The projection of cash flows used to determine the discount rate assumed that plan contributions from members and employers will be made at the current contribution rates as set out in state statute and supplemental aid will be received as currently provided in statute:

a. Employee contribution rates: 11.00% for Basic members and 7.50% for Coordinated members. Effective July 1, 2023, employee contribution rates will increase to 11.25% for Basic members and 7.75% for Coordinated members.
b. Employer contribution rates: 11.71% for Basic members and 7.71% for Coordinated members. In addition, a supplemental amount equal to 3.64% of Salary for Special School District #1 members until the System is fully funded. Employer rates will increase by 0.21% per year until they reach 12.75% for Basic members and 8.75% for Coordinated members.
c. Supplemental aid: $35,587,410 every year until the amortization date of June 30, 2048 or full actuarial funding is achieved.

d. Administrative expenses in the prior year were projected forward with price inflation as an estimate for administrative expenses in current and future years. The portion of expenses in future years allocated to the current members was based on the proportionate share of covered payroll in each year for the remainder of the existing members to the total covered payroll for all members.

Based on those assumptions, the System's FNP was projected to be available to make all projected future benefit payments of current System members. Therefore, the long-term expected rate of return on System investments of 7.50% was applied to all periods of projected benefit payments to determine the TPL.

The FNP projections are based upon the System's financial status on the Measurement Date, the indicated set of methods and assumptions, and the requirements of GASB 67. As such, the FNP projections are not reflective of the cash flows and asset accumulations that would occur on an ongoing System basis, reflecting the impact of future members. Therefore, the results of this test do not necessarily indicate whether or not the fund will actually run out of money, the financial condition of the System, or the System's ability to make benefit payments in future years.

(c) **Long-term rate of return:** The long-term expected rate of return on pension plan investments is reviewed regularly as part of the experience study. An experience study of the economic assumptions was prepared in 2017 that resulted in a recommendation to reduce the long-term rate of return to 7.50%. Generally, several factors are considered in evaluating the long-term rate of return assumption including long-term historical data, estimates inherent in current market data, and an analysis in which best-estimate ranges of expected future real rates of return (expected returns, net of investment expense and inflation) were developed using assumptions for each major asset class, as well as estimates of variability and correlations, provided by the System's investment consultant (the State Board of Investment). These ranges were combined to produce the long-term expected rate of return by weighting the expected future real rates of return by the target asset allocation percentage and then adding expected inflation. The assumption is intended to be a long-term assumption (30 to 50 years) and is not expected to change absent a significant change in the asset allocation, a change in the inflation assumption, or a fundamental change in the market that alters expected returns in future years.

(d) **Municipal bond rate:** A municipal bond rate was note used in determining the discount rate. If it were required, the rate would be 3.89% on the Measurement Date.

(e) **Periods of projected benefit payments:** Projected future benefit payments for all current plan members were projected through 2117.

(f) Assumed asset allocation: The target asset allocation and best estimates of geometric real rates of return for each major asset class, as provided by the Minnesota State Board of Investment (SBI), are summarized in the following table:

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

[(1)] Domestic Equity includes U.S. Stock Actively Managed and the U.S. Stock Index Fund.
[(2)] International Equity includes Broad International Stock Fund.
[(3)] Private Markets includes the Alternative Investment Pool. If a 25 percent allocation to Private Markets cannot be achieved, the uncommitted allocation is invested in Public Equities.
[(4)] The Final Target Allocation will combine Fixed Income investment options.

(g) Sensitivity analysis: This paragraph requires disclosure of the sensitivity of the NPL to changes in the discount rate. The following presents the NPL of the System, calculated using the discount rate of 7.50 percent, as well as the System's NPL calculated using a discount rate that is 1-percentage-point lower (6.50 percent) or 1-percentage-point higher (8.50 percent) than the current rate:

($ in Thousands)	**1% Decrease (6.50%)**	**Current Discount Rate (7.50%)**	**1% Increase (8.50%)**
Total Pension Liability	$32,329,907	$28,643,023	$25,601,368
Fiduciary Net Position	22,362,087	22,362,087	22,362,087
Net Pension Liability	$9,967,820	$6,280,936	$3,239,281

Paragraph 31.c.: The TPL at June 30, 2018 is based upon an actuarial valuation prepared as of July 1, 2018.

SECTION II – REQUIRED SUPPLEMENTARY INFORMATION

There are several tables of Required Supplementary Information (RSI) that need to be included in the System's financial statements:

> **Paragraphs 32.a.-c.:** The required tables of schedules are provided in Appendix A.
> **Paragraph 32.d.:** The money-weighted rates of return will be supplied by the System.

Paragraph 34: The following information should be noted regarding the RSI, particularly for the *Schedule of Employer Contributions*. The required table for paragraphs 32.a.-b. uses assumptions specifically for developing the GASB TPL. The required table for paragraph 32.c. uses the same assumptions as the actuarial funding valuation. When the GASB valuation assumptions differ from the funding valuation assumptions, those differences are noted below.

Changes of benefit and funding terms: The following changes were made by the Minnesota Legislature and reflected in the valuation performed as of July 1 listed below:

2018: The 2018 Omnibus Pension Bill contained a number of changes:

- The COLA was reduced from 2.0% each January 1 to 1.0%, effective January 1, 2019. Beginning January 1, 2024, the COLA will increase 0.1% each year until reaching the ultimate rate of 1.5% in January 1, 2028.
- Beginning July 1, 2024, eligibility for the first COLA changes to normal retirement age (age 65 to 66, depending on date of birth). However, members who retire under Rule of 90 and members who are at least age 62 with 30 years of service credit are exempt.
- The COLA trigger provision, which would have increased the COLA to 2.5% if the funded ratio was at least 90% for two consecutive years, was eliminated.
- Augmentation in the early retirement reduction factors is phased out over a five-year period beginning July 1, 2019 and ending June 30, 2024 (this reduces early retirement benefits). Members who retire and are at least age 62 with 30 years of service are exempt.
- Augmentation on deferred benefits will be reduced to zero percent beginning July 1, 2019. Interest payable on refunds to members was reduced from 4.0% to 3.0%, effective July 1, 2018. Interest due on payments and purchases from members, employers is reduced from 8.5% to 7.5%, effective July 1, 2018.
- The employer contribution rate is increased each July 1 over the next 6 years, (7.71% in 2018, 7.92% in 2019, 8.13% in 2020, 8.34% in 2021, 8.55% in 2022, 8.75% in 2023). In addition, the employee contribution rate will increase from

7.50% to 7.75% on July 1, 2023. The state provides funding for the higher employer contribution rate through an adjustment in the school aid formula.

2015: The Duluth Teachers Retirement Fund Association was merged into TRA on June 30, 2015. This also resulted in an additional state-provided contribution stream of $14.377 million until the System becomes fully funded.

2014: The increase in the post-retirement benefit adjustment (COLA) from 2.0% to 2.5% is to be made once the System is 90% funded (on a market value basis) in two consecutive years, rather than just one year.

2013: The early retirement factors applicable to plan members were changed.

2010: The post-retirement benefit increases were suspended for 2011 and 2012, resuming in 2013 at 2.0%, and returning to 2.5% once the funding ratio of the plan reaches 90%. Also in 2010, changes were made to the interest rate credited on employee contributions, future increases on deferred vested benefits, and the requirement to receive a full post-retirement benefit adjustment. In addition, employee and employer contribution rates were increased 0.50% per year beginning July 1, 2011 through July 1, 2014. The legislation also created the "stabilizer" whereby the Board was also granted the authority to adjust contribution rates under certain conditions.

Changes in actuarial assumptions and methods:

7/1/2018 valuation:

- The investment return assumption was changed from 8.50% to 7.50%.
- The price inflation assumption was lowered from 3.00% to 2.50%.
- The payroll growth assumption was lowered from 3.50% to 3.00%.
- The wage inflation assumption (above price inflation) was reduced from 0.75% to 0.35% for the next 10 years, and 0.75% thereafter.
- The total salary increase assumption was adjusted by the wage inflation change.
- The amortization date for the funding of the Unfunded Actuarial Accrued Liability (UAAL) was reset to June 30, 2048 (30 years).
- A mechanism in the law that provided the TRA Board with some authority to set contribution rates was eliminated.

Note: Most of these changes were made previously for GASB purposes in the 2017 GASB valuation.

7/1/2017 valuation:

- The Cost of Living Adjustment was assumed to increase from 2.0% annually to 2.5% annually on July 1, 2045.
- Adjustments were made to the combined service annuity loads. The active load was reduced from 1.4% to 0.0%, the vested inactive load increased from 4.0% to 7.0% and the non-vested inactive load increased from 4.0% to 9.0%.

<u>For GASB valuation:</u>

- o The investment return assumption was changed from 8.00% to 7.50%.
- o The COLA was not assumed to increase to 2.5%, but remain at 2.0% for all future years.
- o The price inflation assumption was lowered from 2.75% to 2.50%.
- o The payroll growth assumption was lowered from 3.50% to 3.00%.
- o The general wage growth assumption was lowered from 3.50% to 2.85% for 10 years followed by 3.25%, thereafter.
- o The salary increase assumption was adjusted to reflect the changes in the general wage growth assumption.

7/1/2016 valuation:

- The Cost of Living Adjustment was not assumed to increase (it remained at 2% for all future years).
- The price inflation assumption was lowered from 3.00% to 2.75%.

- The general wage growth and payroll growth assumptions were lowered from 3.75% to 3.50%.
- Minor changes at some durations for the merit scale of the salary increase assumption.
- The pre-retirement mortality assumption was changed to the RP-2014 white collar employee table, male rates set back 6 years and female rates set back 5 years. Generational projection uses the MP-2015 scale.
- The post-retirement mortality assumption was changed to the RP-2014 white collar annuitant table, male rates set back 3 years and female rates set back 3 years, with further adjustments of the rates. Generational projection uses the MP-2015 scale.
- The post-disability mortality assumption was changed to the RP-2014 disabled retiree mortality table, without adjustment.
- Separate retirement assumptions for members hired before or after July 1, 1989 were created to better reflect each group's behavior in light of different requirements for retirement eligibility.
- Assumed termination rates were changed to be based solely on years of service in order to better fit the observed experience.
- A minor adjustment and simplification of the assumption regarding the election of optional forms of payment at retirement were made.

7/1/2015 valuation:

- The Cost of Living Adjustment was assumed to increase from 2.0% annually to 2.5% annually on July 1, 2037

<u>For GASB valuation:</u>

  - The COLA was not assumed to increase to 2.5%, but remain at 2.0% for all future years.
  - The investment return assumption was changed from 8.25% to 8.00%.

7/1/2014 valuation:

- The Cost of Living Adjustment was assumed to increase from 2.0% annually to 2.5% annually once the legally specified criteria was met. This was estimated to occur July 1, 2031.

<u>For GASB valuation:</u>

  - The Cost of Living Adjustment was assumed to increase from 2.0% annually to 2.5% annually on July 1, 2034.

7/1/2012 valuation:

- The investment return assumption was changed from 8.50% for all years to 8.00% for the next five years and 8.50% thereafter. This applies to funding calculations only.

7/1/2011 valuation:

- The salary increase assumption was changed to a service based assumption.
- The payroll growth assumption was decreased from 4.00% to 3.75%.
- The post-retirement mortality assumption was changed to the RP-2000 Mortality Tables, with white collar adjustments and male rates setback 2 years and female rates setback 3 years.
- The disabled mortality assumption was changed to the RP-2000 Disabled Retiree Mortality Tables.
- Assumed disability rates were changed to more closely reflect actual experience.
- Assumed retirement rates for Coordinated members were changed to more closely reflect actual experience.
- Assumed form of annuity election were changed to more closely reflect actual experience.
- Assumed difference in ages between spouses were changed to more closely reflect actual experience.

Method and assumptions used in calculations of actuarially determined contributions.

The System is funded with fixed contribution rates that vary by Basic vs. Coordinated members and employers as well as some supplemental state aid. The Actuarially Determined Contributions in the *Schedule of Employer Contributions* are calculated as of the beginning of the fiscal year in which contributions are reported.

The following actuarial methods and assumptions were used to determine the Actuarially Determined Contribution reported in the *Schedule of Employer Contributions* for the most recent Measurement Date, June 30, 2018 (based on the July 1, 2017 valuation). The actual employer contribution reported for fiscal year end 2018, and the corresponding Actuarially Determined Contribution, are based on the period from July 1, 2017 through June 30, 2018. The actuarial funding valuation is forward looking, so when calculating the Actuarially Determined Contribution for fiscal year end 2018, the assumptions from the July 1, 2017 valuation are used.

Actuarial cost method	Entry Age Normal
Amortization method	Level percentage of payroll, closed
Remaining amortization period	22 years
Asset valuation method	5-year moving average
Price Inflation	2.75 percent
Wage growth rate	3.50 percent
Salary increases, including inflation	3.50 to 9.50 percent
Long-term Rate of Return, net of investment expense, including price inflation	8.50 percent
Cost of Living Adjustment	2.00 percent per year, increasing to 2.50 percent per year on July 1, 2045.

Please see the information presented earlier in regard to Paragraph 34 for detailed information on the benefit changes and assumption changes that may have impacted the Actuarially Determined Contributions shown in the *Schedule of Employer Contributions*.

APPENDIX A

REQUIRED
SUPPLEMENTARY INFORMATION

Exhibit A

GASB 67 Paragraph 32(a) and (b)
SCHEDULE OF CHANGES IN THE EMPLOYERS' NET PENSION LIABILITY
Fiscal Year Ended June 30
($ in Thousands)

	2018	2017	2016	2015	2014
Total Pension Liability					
Service Cost	$1,056,681	$1,267,304	$438,938	$399,228	$367,621
Interest	2,064,148	1,975,771	2,062,775	2,019,707	1,895,469
Benefit term changes	(3,681,114)	0	0	0	0
Differences between expected and actual experience*	(17,461)	(167,572)	(798)	7,113	475,265
Assumption changes**	(10,167,248)	(3,355,602)	15,871,845	576,075	0
Benefit payments, including member refunds	(1,831,887)	(1,776,814)	(1,728,023)	(1,669,607)	(1,592,686)
Net change in Total Pension Liability	($12,576,881)	($2,056,913)	$16,644,737	$1,332,516	$1,145,669
Total Pension Liability - beginning	$41,219,904	$43,276,817	$26,632,080	$25,299,564	$23,755,943
Total Pension Liability - ending (a)	$28,643,023	$41,219,904	$43,276,817	$26,632,080	$24,901,612
Plan Fiduciary Net Position					
Employer contributions	$378,728	$367,791	$354,961	$340,208	$299,300
Non-employer contributions - Direct Aid (State/City/District)	35,587	35,587	35,587	41,587	21,001
Employee contributions	374,550	361,175	347,256	334,826	294,632
Net investment income	2,160,111	2,855,218	(23,672)	887,280	3,257,693
Benefit payments, including member refunds	(1,831,887)	(1,776,814)	(1,728,023)	(1,669,607)	(1,592,686)
Administrative expenses	(15,673)	(11,702)	(11,338)	(11,509)	(9,430)
Other	2,581	2,404	3,569	3,550	3,855
Net change in Plan Fiduciary Net Position	$1,103,997	$1,833,659	($1,021,660)	($73,665)	$2,274,365
Plan Fiduciary Net Position – beginning	$21,258,090	$19,424,431	$20,446,091	$20,519,756	$18,019,319
Plan Fiduciary Net Position - ending (b)	$22,362,087	$21,258,090	$19,424,431	$20,446,091	$20,293,684
Net Pension Liability - ending (a) - (b)	$6,280,936	$19,961,814	$23,852,386	$6,185,989	$4,607,928
Plan Fiduciary Net Position as a percentage of the Total Pension Liability	78.07%	51.57%	44.88%	76.77%	81.50%
Covered payroll	$4,832,917	$4,688,875	$4,515,699	$4,306,426	$4,056,482
Employers' Net Pension Liability as a percentage of covered payroll	129.96%	425.73%	528.21%	143.65%	113.59%

Note: Schedule is intended to show 10-year trend. Additional years will be reported as they become available.

* For 2017 and prior, includes impact of date change for expected increase in COLA to 2.50%.

** 2018 Assumption changes are due to the change in the SEIR.

Exhibit B

GASB 67 Paragraph 32(c)

SCHEDULE OF EMPLOYER AND NON-EMPLOYER CONTRIBUTIONS
Fiscal Year Ended June 30
($ in Thousands)

	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009
Actuarially determined employer contribution*	516,157	516,582	459,699	495,235	492,731	463,788	401,725	384,943	421,813	355,189
Actual non-employer contributions	35,587	35,587	35,587	41,587	21,001	19,954	21,726	21,510	21,550	20,448
Actual employer contributions	378,728	367,791	354,961	340,208	299,300	270,708	244,935	222,723	220,538	220,270
Total contributions	414,315	403,378	390,548	381,795	320,301	290,662	266,661	244,233	242,088	240,718
Annual contribution deficiency (excess)	101,842	113,204	69,151	113,440	172,430	173,126	135,064	140,710	179,725	114,471
Covered payroll	4,832,917	4,688,875	4,515,699	4,306,426	4,056,482	3,917,310	3,871,809	3,838,111	3,787,757	3,761,484
Actual contributions as a percentage of covered payroll	8.57%	8.60%	8.65%	8.87%	7.90%	7.42%	6.89%	6.36%	6.39%	6.40%

* The 2015 Actuarially determined employer contribution includes the required amount for both DTRFA ($11,039) and TRA ($484,196).

APPENDIX B

SUMMARY OF BENEFIT PROVISIONS VALUED

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: Member 11.00% — Employer 15.35% Employer rates will increase by 0.21% per year until they reach 16.39% beginning July 1, 2023. Member rates will increase to 11.25% effective July 1, 2023. 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.
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	
<u>Normal retirement</u>	
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.

BASIC MEMBERS

<u>*Early retirement*</u>

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.
<u>*Form of payment*</u>	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).
<u>*Benefit increases*</u>	Under current law, the annual post-retirement increase on January 1 is 1.0 percent for January, 2019 through January, 2023. Beginning January 1, 2024, this amount will increase in 0.1% step increments until the COLA reaches 1.5%. A benefit recipient who has been receiving a benefit for at least 12 full months as of the June 30 preceding the increase date will receive a full increase. Members receiving benefits for at least one full month but less than 12 full months as of the June 30 preceding the increase date will receive a prorated increase. Beginning July 1, 2024, eligibility for receipt of first COLA will be changed to Normal Retirement Age. Members who retire under rule of 90 or are least age 62 with 30 years of service are exempt from this delay in COLA.

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 3.00% 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;
(c) 2.00% beginning July 1, 2012 until the earlier of June 30, 2019 and when the annuity begins; and
(d) 0.00% beginning July 1, 2019.

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 public schools or by the University of Minnesota. Charter school teachers employed statewide 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: Member: 7.50% Employer: 7.71% Employer also contributes Supplemental amount equal to 3.64% of Salary (members employed by Special School District #1 only). Employer rates will increase by 0.21% per year until they reach 8.75% on July 1, 2023. Member rates will increase to 7.75% effective July 1, 2023. 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.
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.

COORDINATED MEMBERS

Retirement

<u>*Normal retirement*</u>

Age/Service requirements

<u>First hired before July 1, 1989:</u>

(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.

<u>First hired after June 30, 1989:</u>

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.

<u>*Early retirement*</u>

Age/Service requirements

<u>First hired before July 1, 1989</u>:

(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.

<u>First hired after June 30, 1989:</u>

(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. Beginning July 1, 2019, the augmentation adjustment will be phased out.

Early Retirement Reduction Factors

Age	Hired before 7/1/89	Hired from 7/1/89 to 6/30/06	Hired after 6/30/06
55	43.56%	51.55%	54.08%
58	33.59%	40.46%	42.74%
60	24.65%	30.75%	32.74%
62	13.68%	18.96%	20.53%
65	0.00%	4.21%	4.68%
66	0.00%	0.00%	0.00%

Members who are age 62 with 30 years of service are eligible for a special set of reduction factors:

Age	Hired before 7/1/89	Hired from 7/1/89 to 6/30/06	Hired after 6/30/06
62	10.40%	14.46%	16.11%
63	6.64%	10.40%	11.70%
64	3.18%	6.64%	7.55%
65	0.00%	3.18%	3.65%
66	0.00%	0.00%	0.00%

All of the early retirement reduction factors shown are the ultimate factors with augmentation reflected. These are being phased in from the prior factors over a five-year period beginning July 1, 2015. Beginning July 1, 2019, the augmentation component will be phased out over five years, for member who are not at least age 62 with 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	Under current law, the annual post-retirement increase on January 1 is 1.0 percent for January, 2019 through January, 2023. Beginning January 1, 2024, this amount will increase in 0.1% step increments until the COLA reaches 1.5%. A benefit recipient who has been receiving a benefit for at least 12 full months as of the June 30 preceding the increase date will receive a full increase. Members receiving benefits for at least one full month but less than 12 full months as of the June 30 preceding the increase date will receive a prorated increase. Beginning July 1, 2024, eligibility for receipt of first COLA will be changed to Normal Retirement Age. Members who retire under rule of 90 or are least age 62 with 30 years of service are exempt from this delay in COLA.

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

<u>*Surviving spouse optional annuity*</u>

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

<u>*Refund of contributions*</u>

Age/Service requirements	Thirty days following termination of teaching service.
Amount	Member's contributions earn 3.00% interest compounded annually. For vested members, a deferred annuity may be elected in lieu of a refund.

<u>*Deferred annuity*</u>

Age/Service requirements	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;
(c) 2.00% from July 1, 2012 forward until the earlier of June 30, 2019 and when the annuity begins; and
(d) 0.00% from July 1, 2019 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, increased by 2.00% from July 1, 2012 to July 1, 2019 and no increase going forward until the annuity begins.

APPENDIX C

STATEMENT 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 full experience study dated June 10, 2015 and the study of economic assumptions presented to the Board in November, 2017 and approved by the LCPR on February 19, 2018.

The Allowance for Combined Service Annuity was based on the recommendation of Deloitte Consulting LLP, the actuary for the Legislative Commission on Pensions and Retirement (LCPR). We are unable to judge the reasonableness of this assumption without performing a substantial amount of additional work beyond the scope of this assignment so we have relied on Deloitte's findings.

Investment Return		7.50% compounded annually.
Future post-retirement adjustments		1.0% for January, 2019 through January, 2023, then increasing by 0.1% each year up to 1.5% annually.
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		3.00% per year
Future Service		Members are assumed to earn future service at a full-time rate.
Mortality:	***Pre-retirement***	RP 2014 white collar employee table, male rates set back 6 years and female rates set back 5 years. Generational projection uses the MP-2015 scale.
	Post-retirement	RP 2014 white collar annuitant table, male rates set back 3 years and female rates set back 3 years, with further adjustments of the rates. Generational projection uses the MP-2015 scale.
	Post-disability	RP 2014 disabled retiree mortality, without adjustment
Disability		Age-related rates based on experience; see table of sample rates.

Summary of Actuarial Assumptions *(continued)*

Withdrawal	Rates vary by service based on actual plan experience, as shown in the rate table.
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.
Allowance for Combined Service Annuity	Liabilities for vested former members are increased by 7.00% and liabilities for non-vested former members are increased by 9.00% 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	Members are assumed to elect subsidized joint and survivor form of annuity as follows:

Males:	10.0% elect 50% J&S option
	10.0% elect 75% J&S option
	60.0% elect 100% J&S option
	20.0% elect Straight Life option
Females:	13.5% elect 50% J&S option
	6.5% elect 75% J&S option
	35.0% elect 100% J&S option
	45.0% elect Straight Life option

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

Summary of Actuarial Assumptions *(continued)*

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, 1970
Average salary	$40,000
Date of termination	Derived from date of birth, original entry age, and service

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.

Termination Rates

Service	Males	Females
Less than 1	32.00%	29.00%
1	15.00%	13.00%
2	11.00%	11.00%
3	8.50%	9.00%
4	6.25%	7.00%
5	5.25%	5.50%
6	4.60%	4.00%
7	4.10%	3.50%
8	2.80%	3.00%
9	2.30%	2.50%
10	2.00%	2.10%
15	1.10%	1.10%
20	0.60%	0.60%
25	0.50%	0.50%
30	0.50%	0.50%
Over 30	0.00%	0.00%

	Rate (%)			
	Pre-retirement Mortality*		Disability	
Age	Male	Female	Male	Female
20	0.023	0.013	0.00	0.00
25	0.026	0.014	0.00	0.00
30	0.036	0.014	0.00	0.00
35	0.031	0.018	0.01	0.01
40	0.035	0.024	0.03	0.03
45	0.041	0.033	0.05	0.05
50	0.061	0.055	0.10	0.10
55	0.105	0.092	0.16	0.16
60	0.175	0.140	0.25	0.25
65	0.292	0.204	0.00	0.00

**Rates shown are for 2014, the base year of the tables.*

	Annuitant Mortality Rates (%)			
	Retirement *		Disability	
Age	Male	Female	Male	Female
55	0.267	0.196	2.337	1.448
60	0.353	0.267	2.660	1.700
65	0.486	0.430	3.169	2.086
70	0.945	0.706	4.035	2.820
75	2.015	1.352	5.429	4.105
80	4.126	2.682	7.662	6.104
85	7.358	5.456	11.330	9.042
90	13.560	9.947	17.301	13.265
95	24.351	18.062	24.717	19.588
100	38.292	29.731	32.672	27.819

* *Rates shown are for 2014, the base year of the tables.*

Summary of Actuarial Assumptions *(continued)*

Salary Scale		
Service	Select Salary Increase Before July 1, 2028	Ultimate Salary Increase After June 30, 2028
1	8.85%	9.25%
2	7.10%	7.50%
3	6.60%	7.00%
4	6.35%	6.75%
5	6.75%	6.75%
6	6.20%	6.60%
7	6.05%	6.45%
8	5.90%	6.30%
9	5.75%	6.15%
10	5.60%	6.00%
11	5.35%	5.75%
12	5.10%	5.50%
13	4.85%	5.25%
14	4.60%	5.00%
15	4.35%	4.75%
16	4.10%	4.50%
17	3.85%	4.25%
18	3.65%	4.05%
19	3.55%	3.95%
20	3.45%	3.85%
21	3.35%	3.75%
22	3.25%	3.65%
23	3.15%	3.55%
24	3.05%	3.45%
25	2.95%	3.35%
26 or more	2.85%	3.25%

	Retirement Rate (%)					
	Coordinated Members				Basic Members	
	Tier 1	Tier 1	Tier 2	Tier 2	Eligible for 30 and Out	Not Eligible for 30 and Out
Age	Early	Unreduced	Early	Unreduced	Provision	Provision
55	5	35	5		40	5
56	10	35	5		40	5
57	10	35	5		40	5
58	10	35	5		40	5
59	14	35	5		40	5
60	17	35	6		25	25
61	20	35	15		25	25
62	25	35	15		25	25
63	25	35	15		25	25
64	25	35	20		25	25
65		40	30		40	40
66		35		35	40	40
67		30		30	40	40
68		30		25	40	40
69		30		25	40	40
70		35		35	60	60
71-74		100		100	60	60
75-79		100		100	60	100
80 & Over		100		100	100	100

Coordinated Tier 2 Members age 62 or older with 30 or more years of service have 5% added to their early retirement rates.

Changes in actuarial assumptions and methods since the previous valuation

The investment return assumption was reduced from 8.5% to 7.5%.
The price inflation assumption was reduced from 3.0% to 2.5%.
The payroll growth assumption was reduced from 3.5% to 3.0%.
The wage inflation assumption (above price inflation) was reduced from 0.75% to 0.35% for the next 10 years, and 0.75% thereafter.
The total salary increase assumption was adjusted by the wage inflation change.