

Motion

_____ moves the approval of changes to the actuarial assumptions used in the annual actuarial valuations of the following pension plans, effective beginning with the actuarial valuations as of July 1, 2020:

- the State Employees Retirement Fund, administered by the Minnesota State Retirement System (MSRS),
- the General Employees Retirement Plan, administered by the Public Employees Retirement Association (PERA), and
- the Teachers Retirement Association (TRA),

as described in the attached correspondence from each of the executive directors of MSRS, PERA, and TRA, which requests approval by Commission and states that the assumption changes were recommended by the plan's actuary and approved by the plan's governing board.

Copies of the requests are attached:

- Letter dated February 14, 2020, from Erin Leonard, Executive Director of MSRS, attaching letter and summary from actuary GRS Retirement Consulting;
- Letter dated September 4, 2019, from Doug Anderson, Executive Director of PERA, attaching letter and summary from GRS Retirement Consulting; and
- Memo dated February 26, 2020, from J. Michael Stoffel, Executive Director of TRA, attaching tables.

Note from Commission staff:

Under Minnesota Statutes, Section 356.215, Subdivision 18, changes to actuarial assumptions must be approved by the Legislative Commission on Pensions and Retirement if they are to take effect for the next annual actuarial valuation for the affected plan.

The need for changes in the actuarial assumptions are a result of the experience study conducted by the actuary for each of the plans for the period July 1, 2014, through June 30, 2018, copies of which were submitted to the Commission. The experience studies compared actual experience with the assumptions used for actuarial purposes and identified changes that needed to be made to align the assumptions with actual experience.

Staff consulted with the actuaries at Van Iwaarden Associates, the Commission's actuary, regarding their review of the experience studies and the proposed assumption changes. The actuaries concur with the proposed changes and will be available to testify at the meeting.

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February 14, 2020

Via Electronic Mail

Susan Lenczewski, Executive Director
Legislative Commission on Pensions and Retirement
110 Rev. Dr. Martin Luther King Jr. Blvd.
State Office Building, Room 55
St. Paul, MN 55155

Dear Ms. Lenczewski:

At the September 19, 2019 meeting of the Minnesota State Retirement System (MSRS) Board of Directors the Board approved the adoption of the assumptions changes for the State Employees Retirement Fund recommended by the plan actuary. Gabriel Roeder Smith & Company previously presented the Experience Study results for the State Employees Retirement Fund at the July Board meeting.

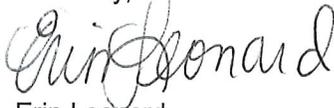
The MSRS Board approved the recommended economic assumption and demographic assumption changes included in the full report. A summary of the recommendation is, as follows:

- Decrease the price inflation rate from 2.50% to 2.25%
- Decrease the payroll growth rate from 3.35% to 3.00%
- Decrease disability rates
- Decrease early retirement rates
- Increase normal retirement rates
- Increase the percentage of retirees electing 100% joint and survivor annuities and, accordingly, reduce the percentage electing single life annuities (and 50% joint & survivor annuities for males)
- Reduce withdrawal rates in the first few years of service for both males and females
- Increase withdrawal rates in later years of service for both males and females
- Reduce the marital status assumption from 65% to 60% for females
- Utilize the newly published public sector mortality tables (PUB-2010) with the latest mortality improvement scale (MP-2018)

The MSRS Board of Directors requests that the Legislative Commission on Pensions and Retirement approve the adoption of these recommendations. Detailed descriptions of these recommendations are provided in the Experience Study, a copy of which is on-file with your Commission.

Please let me know if you have any questions about the assumptions and the Board's request.

Sincerely,



Erin Leonard
Executive Director

Attachment:

Minnesota State Employees Retirement Fund, 4-Year Experience Study, July 1, 2014 through June 30, 2018

July 12, 2019

Ms. Erin Leonard, Executive Director
Minnesota State Retirement System
60 Empire Drive, Suite 400
Saint Paul, Minnesota 55103

Re: Proposed Assumption Changes – MSRS SERF

Dear Erin:

Enclosed is a supplemental actuarial valuation showing the estimated impact of changing the actuarial assumptions of the State Employees Retirement Fund of the Minnesota State Retirement System (MSRS SERF). Unless noted otherwise and to the best of our knowledge and belief, the calculations were completed in accordance with the requirements of Minnesota Statutes, Section 356.215, and the requirements of the Standards for Actuarial Work established by the Legislative Commission on Pensions and Retirement (LCPR).

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors 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. Due to the limited scope of the actuary's assignment, the actuary did not perform an analysis of the potential range of such future measurements.

This report should not be relied on for any purpose other than the purpose described in the primary communication. This report is intended for use by the PERA Board and staff and may be provided to other parties only in its entirety and only with permission of the Board. GRS is not responsible for unauthorized use of this report. Determinations of the financial results associated with the benefits described in this report in a manner other than the intended purpose may produce significantly different results.

The valuation was based upon information furnished by MSRS, concerning Retirement System benefits, financial transactions, plan provisions and active members, terminated members, retirees and beneficiaries. The signing actuaries are independent of the plan sponsor.

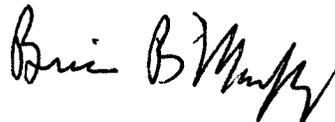
Please call if you have any questions regarding the calculations enclosed.

Sincerely,



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

BJW/BBM:dj
Enclosures



Brian B. Murphy, FSA, EA, FCA, MAAA, PhD

Minnesota State Employees Retirement Fund

Executive Summary

Requested By: Ms. Erin Leonard, Executive Director
Minnesota State Retirement System

Date: July 12, 2019

Submitted By: Bonita J. Wurst, ASA, EA, FCA, MAAA and Brian B. Murphy, FSA, EA, FCA, MAAA, PhD
Gabriel, Roeder, Smith & Company

This report contains an actuarial valuation of proposed changes in actuarial assumptions for the State Employees Retirement Fund. Please see our report, *State Employees Retirement Fund 4-Year Experience Study*, dated June 27, 2019, for a full description of the proposed changes.

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

The date of the valuation was June 30, 2018. This means that the results of the supplemental valuations indicate what the June 30, 2018 valuation would have shown if the proposed assumptions had been in effect on that date. Supplemental valuations do **not** predict the result of future actuarial valuations. Rather, supplemental valuations give an indication of the probable long-term cost of the **assumption change only** without comment on the complete end result of the future valuations.

Unless noted otherwise, actuarial assumptions and methods were consistent with those used in the regular actuarial valuation of the MSRS SERF on the valuation date as prescribed by Minnesota Statutes Section 356.215, the requirements of the Standards for Actuarial Work established by the Legislative Commission on Pensions and Retirement (LCPR) and the Board of Directors for the June 30, 2018 MSRS SERF Valuation.

Results in this report are shown on an Actuarial Value of Assets (AVA) basis.

Minnesota State Employees Retirement Fund Calculations as of June 30, 2018

A brief summary of the data, as of June 30, 2018, used in this valuation is presented below:

Active Members			
Number	Projected Annual Earnings	Average in Years	
		Age	Service
51,223	\$3,133,366,000	46.6	11.1

Retired Members		Deferred Vested Members		Non-Vested Members	
Number	Average Annual Benefits	Number	Average Annual Benefits*	Number	Average Member Contributions*
40,821	\$19,874	17,109	\$8,836	8,235	\$2,922

* Reflects 4% Combined Service Annuity load for Deferred Vested members and 5% Combined Service Annuity load for Non-Vested members.

Minnesota State Employees Retirement Fund

Step 1 – Change Mortality Assumptions

Calculations as of June 30, 2018

Recently, the Society of Actuaries published a mortality study that was specific to public sector retirement systems. This is a very comprehensive study and there are numerous mortality tables created for each classification of employee (General members, Public Safety, Teachers, Survivors, Juvenile, headcount-weighted, benefit-weighted, above median, below median). One of the key findings of the study is that there is a high correlation between longevity and income and education. Consistent with the SOA study, SERF members with higher benefits generally appear to experience longer lifespans, resulting in lower mortality rates.

Fully generational tables, which are utilized for the MSRS valuations, help take into account future improvements in mortality that are expected to occur. The Society of Actuaries updates the projection scale annually and the latest published table is called the MP-2018 Projection Scale.

Present Mortality Assumptions:

- Healthy pre-retirement: RP-2014 employee generational mortality table, adjusted for white collar and mortality improvements using scale MP-2015, from a base year of 2014. Rates are set forward one year for males.
- Healthy post-retirement: RP-2014 healthy annuitant generational mortality table, adjusted for white collar and mortality improvements using scale MP-2015, from a base year of 2014. Rates are set forward two years for males
- Disabled: RP-2014 disabled generational mortality table, adjusted for mortality improvements using scale MP-2015, from a base year of 2014. Rates are set forward two years for males and set forward four years for females.

Proposed Mortality Assumptions:

- Healthy pre-retirement: Pub-2010 General Employee Mortality Table, projected with mortality improvement scale MP-2018. Rates are multiplied by a factor of 0.97 for males and 1.06 for females.
- Healthy post-retirement: Pub-2010 General Retired Mortality Table, projected with mortality improvement scale MP-2018. Rates are multiplied by a factor of 1.04 for males and 1.10 for females.
- Disabled: Pub-2010 General/Teacher Disabled Retiree Mortality Table, projected with mortality improvement scale MP-2018. Rates are set forward two years for males and set forward five years for females.

Minnesota State Employees Retirement Fund

Step 2 – Change Mortality Assumptions

Calculations as of June 30, 2018

Actuarial Statement

The financial effect of the proposal is shown below:

	Valuation Baseline	Update Mortality	Change from Baseline
Normal Cost Rate, % of Pay	8.1%	8.0%	-0.1%
Amortization of Unfunded Accrued Liability, % of Pay	3.1%	2.3%	-0.8%
Expenses, % of Pay	0.3%	0.3%	0.0%
Total Required Contribution, % of Pay	11.5%	10.6%	-0.9%
Actuarial Accrued Liability, 000s	\$14,679,489	\$14,272,825	\$(406,664)
Funded Ratio, AVA Basis	88.8%	91.3%	2.5%

Minnesota State Employees Retirement Fund

Step 2 – Change Other Demographic Assumptions

Calculations as of June 30, 2018

Our report, the *Minnesota State Employees Retirement Fund 4-Year Experience Study*, dated June 27, 2019, contained several recommended changes to demographic assumptions, including changes to retirement, withdrawal and disability rates, the assumed age difference for retirees and their spouse and form of payment elections.

Present Demographic Assumptions: See the *Minnesota State Retirement System State Employees Retirement Fund Actuarial Valuation Report as of July 1, 2018*, dated December 5, 2018, for a complete description of the present demographic assumptions.

Proposed Demographic Assumptions: Change demographic assumptions as follows (please see our experience study report noted above for a full description of the proposed assumptions):

- Retirement:
 - Increase the rate of assumed unreduced retirement rates (i.e., Normal Retirement) at ages 66, 67 and 69.
 - Lower the assumed Rule of 90 retirement rates at all ages except 55 (slight increase) and 57 (no change).
 - Slight adjustments to rates for Tier 1 and Tier 2 members.
- Withdrawal:
 - Generally, proposed rates are lower than current rates for years 1 to 5 and slightly higher thereafter.
- Disability:
 - Proposed rates are 70% of current rates.
- Marital statistics:
 - Change the assumed ratio of married new female retirees from 65% to 60%.
 - Change the assumption that male retirees have a beneficiary three years younger to two years younger.
- Form of Payment:
 - Minor changes to form of payment assumptions.

Minnesota State Employees Retirement Fund

Step 2 – Change Other Demographic Assumptions

Calculations as of June 30, 2018

Actuarial Statement

The financial effect of the proposal is shown below:

	Valuation Baseline	Updated Mortality & Demographic Assumptions	Change from Baseline
Normal Cost Rate, % of Pay	8.1%	8.0%	-0.1%
Amortization of Unfunded Accrued Liability, % of Pay	3.1%	2.3%	-0.8%
Expenses, % of Pay	0.3%	0.3%	0.0%
Total Required Contribution, % of Pay	11.5%	10.6%	-0.9%
Actuarial Accrued Liability, 000s	\$14,679,489	\$14,286,046	\$(393,443)
Funded Ratio, AVA Basis	88.8%	91.2%	2.4%

Minnesota State Employees Retirement Fund

Step 3 – Change Merit and Seniority / Payroll Growth Increase Assumptions

Calculations as of June 30, 2018

Pay increases granted to active members typically consist of two pieces:

- An across-the-board, economic type of increase granted to most or all members of the group. This increase is typically tied to inflation or cost-of-living changes and is known as the payroll growth assumption, and
- An increase as a result of merit and seniority. This increase is typically related to performance of an individual and includes promotions and increased years of experience.

Our report, the *Minnesota State Employees Retirement Fund of Minnesota 4-Year Experience Study*, dated June 27, 2019, contained recommended changes to both the payroll growth assumption and merit and seniority increase assumptions:

- Lower the price inflation assumption from 2.50% to 2.25%.
- Maintain the current wage inflation assumption of 0.75%. When combined with the change in price inflation assumption, the assumed growth in payroll is reduced, from 3.25% to 3.00%.
- Change the assumed merit and seniority increase rates. In general, proposed rates are lower in the first two years of a member's career and higher in later years, with overall rates approximately the same as the current assumption.

Present Salary Increase Assumptions: See the *Minnesota State Retirement System State Employees Retirement Fund Actuarial Valuation Report as of July 1, 2018*, dated December 5, 2018, for a complete description of the present salary scale assumption.

Minnesota State Employees Retirement Fund

Step 3 – Change Merit and Seniority / Payroll Growth Increase Assumptions

Calculations as of June 30, 2018

Proposed Salary Increase Assumptions:

Year	Gross Salary %	
	2018	
	Valuation	Proposed
1	13.75%	13.00%
2	11.25%	9.00%
3	6.00%	5.80%
4	5.25%	5.40%
5	5.00%	5.00%
6	4.90%	4.90%
7	4.75%	4.80%
8	4.50%	4.60%
9	4.25%	4.50%
10	4.00%	4.20%
11	3.95%	4.10%
12	3.90%	4.00%
13	3.85%	3.90%
14	3.80%	3.80%
15	3.75%	3.70%
16	3.70%	3.60%
17	3.65%	3.50%
18	3.60%	3.50%
19	3.55%	3.50%
20	3.50%	3.40%
21	3.45%	3.30%
22	3.40%	3.30%
23	3.35%	3.20%
24	3.30%	3.20%
25	3.25%	3.20%
26	3.25%	3.20%
27	3.25%	3.10%
28	3.25%	3.10%
29	3.25%	3.00%
30+	3.25%	3.00%
Total	5.26%	5.01%

Minnesota State Employees Retirement Fund

Step 3 – Change Merit and Seniority / Payroll Growth Increase

Assumptions

Calculations as of June 30, 2018

Actuarial Statement

The financial effect of the proposal is shown below:

	Valuation Baseline	Updated Mortality, Demographic & Economic Assumptions	Change from Baseline
Normal Cost Rate, % of Pay	8.1%	7.9%	-0.2%
Amortization of Unfunded Accrued Liability, % of Pay	3.1%	2.3%	-0.8%
Expenses, % of Pay	0.3%	0.3%	0.0%
Total Required Contribution, % of Pay	11.5%	10.5%	-1.0%
Actuarial Accrued Liability, 000s	\$14,679,489	\$14,251,870	\$(427,619)
Funded Ratio, AVA Basis	88.8%	91.5%	2.7%

Minnesota State Employees Retirement Fund

Steps 1-3 – All Changes

Calculations as of June 30, 2018

A step-by-step summary of the changes due to the mortality assumption, other demographic assumptions and the economic assumption changes are summarized below:

	Valuation Baseline	Update Mortality	Add Changes to Demographic Assumptions	Add Changes to Economic Assumptions
Normal Cost Rate, % of Pay	8.1%	8.0%	8.0%	7.9%
Amortization of Unfunded Accrued Liability, % of Pay	3.1%	2.3%	2.3%	2.3%
Expenses, % of Pay	0.3%	0.3%	0.3%	0.3%
Total Required Contribution, % of Pay	11.5%	10.6%	10.6%	10.5%
Actuarial Accrued Liability, 000s	\$14,679,489	\$14,272,825	\$14,286,046	\$14,251,870
Funded Ratio, AVA Basis	88.8%	91.3%	91.2%	91.5%

It is important to remember that the experience study also showed that the probability of achieving the 7.5% return assumption is less than 50%. Therefore, although the required contribution rate will decrease as a result of this experience study and the sufficiency will increase, it is important that the statutory rate be maintained at least at its present level.

Minnesota State Employees Retirement Fund

Calculations as of June 30, 2018

Comments

Comment 1 — The calculations are based upon assumptions regarding future events, which may or may not materialize. They are also based upon plan provisions that are outlined in this report. If you have reason to believe that the assumptions that were used are unreasonable, that the plan provisions are incorrectly described, that important plan provisions relevant to this proposal are not described, or that conditions have changed since the calculations were made, you should contact the author(s) of this report prior to relying on information in the report.

Comment 2 — If you have reason to believe that the information provided in this report is inaccurate, or is in any way incomplete, or if you need further information in order to make an informed decision on the subject matter of this report, please contact the author(s) of this report prior to making such decision.

Comment 3 — In the event that more than one change is being considered, it is very important to remember that the results of separate actuarial valuations cannot generally be added together to produce a correct estimate of the combined effect of all of the changes. The total can be considerably greater than the sum of the parts due to the interaction of various plan provisions with each other, and with the assumptions that must be used.

Comment 4 — The reader of this report should keep in mind that actuarial calculations are mathematical estimates based on current data and assumptions about future events (which may or may not materialize). Please note that actuarial calculations can and do vary from one valuation year to the next, sometimes significantly if the group valued is very small (less than 30 lives). As a result, the cost impact of a benefit change may fluctuate over time, as the demographics of the group changes.

Comment 5 — Early retirement benefits were changed effective June 30, 2018. These changes may impact retirement behavior in the future and will be analyzed in the next experience study. Our recommendation to lower early retirement rates is consistent with the expected behavior changes.

Comment 6 — We have provided this analysis in the same format as that used when plan or assumption changes are considered by the Trustees. For any legislative proposals, it may be necessary to follow-up with a more in-depth analysis to comply with the Standards for Actuarial Work. We will provide the additional information upon request.

Comment 7 — The recommended change to the mortality assumption may result in a change to the plan's actuarially equivalent factors. An update to these factors has not been reflected in this study.

Comment 8 — Please see our report, the *Minnesota State Employees Retirement Fund 4-Year Experience Study*, dated June 27, 2019, for recommended changes to the Standards for Actuarial Work.

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September 4, 2019

Susan Lenczewski, Executive Director
Legislative Commission on Pensions and Retirement
State Office Building, Room 55
100 Rev. Dr. Martin Luther King Jr. Boulevard
St. Paul, MN 55155

Dear Ms. Lenczewski,

Preliminary results from the General Employees Retirement Plan (the Plan) 4-Year Experience Study were presented by Gabriel Roeder Smith & Company (GRS) to the PERA Board of Trustees on June 13, 2019. The study covered the four year period from July 1, 2014 through June 30, 2018. The final report was issued June 27, 2019 and was previously sent to your attention. There were no significant changes between the draft and the final reports.

The PERA Board of Trustees approved the actuarial assumption changes recommended by GRS in their final report at the August 8, 2019 board meeting. The approved recommended changes are outlined below:

Assumption	Proposed Change
Price Inflation	Decrease from 2.50% to 2.25%.
Wage Inflation (i.e. Payroll Growth)	Decrease from 3.25% to 3.00%.
Individual Merit and Seniority	Adjust current rates to be same on average, but with a slightly different allocation, with lower increases assumed early in a member's career.
Retirement Rates	Increase the rate of assumed unreduced retirements, lower the assumed Rule of 90 rates at ages 61 and 62, and adjust early retirement rates for Tier 1 and Tier 2 members.
Termination Rates	Decrease the rates in the first 5 years of employment and slightly increase the rates thereafter.
Disability Rates	Lower rates at most ages.
Mortality Rates	Change the base mortality rate table to the PUB-2010 general mortality table with future improvement projected using scale MP-2018.
Other	Minor changes to the spouse age difference and form of payment assumptions.

The report also recommended consideration of layered amortization as an alternative to the current 30-year closed period amortization. The distinction of this particular recommendation is that it is a recommendation to consider, as opposed to a recommendation to change. The PERA Board will

consider and discuss layered amortization at the October Board meeting and is not asking for LCPR approval at this time.

The GRS report also included a recommendation that "...the *Minnesota Standards for Actuarial Practice* be amended to be less prescriptive and more principle based so that the actuaries for the systems may use their best judgment to calculate contribution rates and liabilities in a mathematically consistent manner and in accordance with actuarial standards of practice." Since this change would also impact all other plans in the State, the PERA Board is not including it as a Board approved assumption for the General Employees Retirement Plan nor are they asking the LCPR to change the *Minnesota Standards for Actuarial Practice* at this time.

The estimated cost impact using expected July 1, 2018 results were provided by GRS in a separate letter dated July 12, 2019. The key results are as follows:

	Valuation Baseline	Update Mortality	Add Changes to Demographic Assumptions	Add Changes to Economic Assumptions
Funding Ratio (Market Value of Assets Basis)	79.5%	80.0%	79.6%	79.8%
Contribution Sufficiency (30-Year Amortization Basis)	1.1%	1.3%	1.1%	1.1%

Minnesota Statutes Section 356.215, states that actuarial assumptions used for the preparation of actuarial valuations, other than the assumed rate of return, may only be changed with the approval of the LCPR or after a period of one year has elapsed since the date on which the proposed assumption change or changes were received by the LCPR without commission action.

The PERA Board of Trustees respectfully requests that the LCPR review the experience study recommendations and approve the changes adopted by the PERA Board. We further request that the Commission review and approve the recommended changes so that the revised assumptions may be used in the July 1, 2020 actuarial valuation.

Please contact me if we can provide any additional information to help with the evaluation process.

Sincerely,



Doug Anderson, EA, ASA, MAAA
Executive Director

July 12, 2019

Mr. Doug Anderson, Executive Director
Public Employees Retirement Association of Minnesota
60 Empire Drive, Suite 200
Saint Paul, Minnesota 55103

Re: Proposed Assumption Changes – PERA GERP

Dear Doug:

Enclosed is a supplemental actuarial valuation showing the estimated impact of changing the actuarial assumptions of the General Employees Retirement Plan of the Public Employees Retirement Association (PERA GERP). Unless noted otherwise and to the best of our knowledge and belief, the calculations were completed in accordance with the requirements of Minnesota Statutes, Section 356.215, and the requirements of the Standards for Actuarial Work established by the Legislative Commission on Pensions and Retirement (LCPR).

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors 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. Due to the limited scope of the actuary's assignment, the actuary did not perform an analysis of the potential range of such future measurements.

This report should not be relied on for any purpose other than the purpose described in the primary communication. This report is intended for use by the PERA Board and staff and may be provided to other parties only in its entirety and only with the permission of the Board. GRS is not responsible for unauthorized use of this report. Determinations of the financial results associated with the benefits described in this report in a manner other than the intended purpose may produce significantly different results.

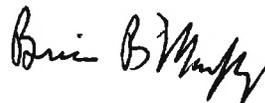
The valuation was based upon information furnished by PERA, concerning Retirement System benefits, financial transactions, plan provisions and active members, terminated members, retirees and beneficiaries. The signing actuaries are independent of the plan sponsor.

Please call if you have any questions regarding the calculations enclosed.

Sincerely,



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



Brian B. Murphy, FSA, EA, FCA, MAAA, PhD



BJW/BBM:dj
Enclosures

LCPR JUL 12 2019

General Employees Retirement Plan of Minnesota

Executive Summary

Requested By: Mr. Doug Anderson, Executive Director
Public Employees Retirement Association of Minnesota

Date: July 12, 2019

Submitted By: Bonita J. Wurst, ASA, EA, FCA, MAAA and Brian B. Murphy, FSA, EA, FCA, MAAA, PhD
Gabriel, Roeder, Smith & Company

This report contains an actuarial valuation of proposed changes in actuarial assumptions for the General Employees Retirement Plan. Please see our report, *General Employees Retirement Plan of Minnesota 4-Year Experience Study*, dated June 27, 2019, for a full description of the proposed changes.

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

The date of the valuation was June 30, 2018. This means that the results of the supplemental valuations indicate what the June 30, 2018 valuation would have shown if the proposed assumptions had been in effect on that date. Supplemental valuations do **not** predict the result of future actuarial valuations. Rather, supplemental valuations give an indication of the probable long-term cost of the **assumption change only** without comment on the complete end result of the future valuations.

Unless noted otherwise, actuarial assumptions and methods were consistent with those used in the regular actuarial valuation of the PERA GERP on the valuation date as prescribed by Minnesota Statutes Section 356.215, the requirements of the Standards for Actuarial Work established by the Legislative Commission on Pensions and Retirement (LCPR) and the Trustees for the June 30, 2018 PERA GERP Valuation.

Results in this report are shown on an Actuarial Value of Assets (AVA) basis.

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General Employees Retirement Plan of Minnesota Calculations as of June 30, 2018

A brief summary of the data, as of June 30, 2018, used in this valuation is presented below:

Active Members			
Number	Projected Annual Earnings	Average in Years	
		Age	Service
153,059	\$6,366,884,000	46.3	9.7

Retired Members		Deferred Vested Members		Non-Vested Members	
Number	Average Annual Benefits	Number	Average Annual Benefits*	Number	Average Member Contributions*
101,772	\$14,726	61,066	\$5,789	138,768	\$783

** Reflects 15% Combined Service Annuity load for Deferred Vested members and 3% Combined Service Annuity load for Non-Vested members.*

General Employees Retirement Plan of Minnesota

Step 1 – Change Mortality Assumptions

Calculations as of June 30, 2018

Recently, the Society of Actuaries published a mortality study that was specific to public sector retirement systems. This is a very comprehensive study and there are numerous mortality tables created for each classification of employee (General members, Public Safety, Teachers, Survivors, Juvenile, headcount-weighted, benefit-weighted, above median, below median). One of the key findings of the study is that there is a high correlation between longevity and income and education. Consistent with the SOA study, GERP members with higher benefits generally appear to experience longer lifespans, resulting in lower mortality rates.

Fully generational tables, which are utilized for the PERA valuations, help take into account future improvements in mortality that are expected to occur. The Society of Actuaries updates the projection scale annually and the latest published table is called the MP-2018 Projection Scale.

Present Mortality Assumptions:

- Healthy pre-retirement: RP-2014 employee generational mortality table, adjusted for white collar and mortality improvements using scale MP-2017, from a base year of 2014. Rates are set forward one year for males and set back one year for females.
- Healthy post-retirement: RP-2014 healthy annuitant generational mortality table, adjusted for white collar and mortality improvements using scale MP-2017, from a base year of 2014. Rates are set forward two years for males. Female rates are multiplied by a factor of 0.90.
- Disabled: RP-2014 disabled generational mortality table, adjusted for mortality improvements using scale MP-2017, from a base year of 2014. Rates are set forward one year for males and set forward six years for females.

Proposed Mortality Assumptions:

- Healthy pre-retirement: Pub-2010 General Employee Mortality Table, projected with mortality improvement scale MP-2018. Rates are multiplied by a factor of 1.07 for males and 0.98 for females.
- Healthy post-retirement: Pub-2010 General Retired Mortality Table, projected with mortality improvement scale MP-2018. Rates are multiplied by a factor of 1.02 for males and 0.90 for females.
- Disabled: Pub-2010 General/Teacher Disabled Retiree Mortality Table, projected with mortality improvement scale MP-2018. Rates are set forward two years for males and set forward four years for females.

General Employees Retirement Plan of Minnesota

Step 2 – Change Mortality Assumptions

Calculations as of June 30, 2018

Actuarial Statement

The financial effect of the proposal is shown below:

	Valuation Baseline	Update Mortality	Change from Baseline
Normal Cost Rate, % of Pay	7.8%	7.7%	-0.1%
Amortization of Unfunded Accrued Liability, % of Pay	5.5%	5.4%	-0.1%
Expenses, % of Pay	0.2%	0.2%	0.0%
Total Required Contribution, % of Pay	13.5%	13.3%	-0.2%
Actuarial Accrued Liability, 000s	\$27,101,067	\$26,953,454	\$(147,613)
Funded Ratio, AVA Basis	78.0%	78.4%	0.4%

General Employees Retirement Plan of Minnesota

Step 2 – Change Other Demographic Assumptions

Calculations as of June 30, 2018

Our report, the *General Employees Retirement Plan of Minnesota 4-Year Experience Study*, dated June 27, 2019, contained several recommended changes to demographic assumptions, including changes to retirement, withdrawal and disability rates, the assumed age difference for retirees and their spouse, and form of payment elections.

Present Demographic Assumptions: See the *Public Employees Retirement Association of Minnesota General Employees Retirement Plan Actuarial Valuation Report as of July 1, 2018*, dated November 28, 2018, for a complete description of the present demographic assumptions.

Proposed Demographic Assumptions: Change demographic assumptions as follows (please see our experience study report noted above for a full description of the proposed assumptions):

- Retirement:
 - Increase the rate of assumed unreduced retirement rates (i.e., Normal Retirement) at all ages.
 - Slightly lower the assumed Rule of 90 retirement rates at ages 61 and 62.
 - Slight adjustments to rates for Tier 1 and Tier 2 members.

- Withdrawal:
 - Generally, proposed rates are lower than current rates for years 1 to 5 and slightly higher thereafter.

- Disability:
 - Proposed rates are lower than current rates for most ages.

- Age Difference:
 - Change the assumption that female retirees have a beneficiary two years older to one year older.

- Form of Payment:
 - Minor changes to form of payment assumptions.

General Employees Retirement Plan of Minnesota

Step 2 – Change Other Demographic Assumptions

Calculations as of June 30, 2018

Actuarial Statement

The financial effect of the proposal is shown below:

	Valuation Baseline	Updated Mortality & Demographic Assumptions	Change from Baseline
Normal Cost Rate, % of Pay	7.8%	7.8%	0.0%
Amortization of Unfunded Accrued Liability, % of Pay	5.5%	5.5%	0.0%
Expenses, % of Pay	0.2%	0.2%	0.0%
Total Required Contribution, % of Pay	13.5%	13.5%	0.0%
Actuarial Accrued Liability, 000s	\$27,101,067	\$27,084,116	\$(16,951)
Funded Ratio, AVA Basis	78.0%	78.0%	-

General Employees Retirement Plan of Minnesota

Step 3 – Change Merit and Seniority / Payroll Growth Increase Assumptions

Calculations as of June 30, 2018

Pay increases granted to active members typically consist of two pieces:

- An across-the-board, economic type of increase granted to most or all members of the group. This increase is typically tied to inflation or cost-of-living changes and is known as the payroll growth assumption, and
- An increase as a result of merit and seniority. This increase is typically related to performance of an individual and includes promotions and increased years of experience.

Our report, the *General Employees Retirement Plan of Minnesota 4-Year Experience Study*, dated June 27, 2019, contained recommended changes to both the payroll growth assumption and merit and seniority increase assumptions:

- Lower the price inflation assumption from 2.50% to 2.25%.
- Maintain the current wage inflation assumption of 0.75%. When combined with the change in price inflation assumption, the assumed growth in payroll is reduced, from 3.25% to 3.00%
- Change the assumed merit and seniority increase rates. In general, proposed rates are lower in the early years of a member's career and higher in later years, with overall rates approximately the same as the current assumption.

Future annual post-retirement benefit increases (COLAs) are assumed to be 1.25% per year, consistent with the 2018 valuation and Step 1 and Step 2 results. This assumption is based on stochastic modeling and will be re-determined on a regular basis. The change in assumed price inflation may result in a slightly lower COLA assumption. See Comment 5 on page 11 for additional details.

General Employees Retirement Plan of Minnesota
Step 3 – Change Merit and Seniority / Payroll Growth Increase
Assumptions
Calculations as of June 30, 2018

Proposed Salary Increase Assumptions:

Year	Gross Salary %	
	2018 Valuation	Proposed
1	11.25%	10.25%
2	8.25%	7.25%
3	6.75%	6.00%
4	5.75%	5.50%
5	5.25%	5.00%
6	4.95%	4.70%
7	4.65%	4.50%
8	4.55%	4.40%
9	4.45%	4.30%
10	4.25%	4.20%
11	4.00%	4.00%
12	3.85%	3.90%
13	3.75%	3.80%
14	3.65%	3.70%
15	3.65%	3.65%
16	3.60%	3.60%
17	3.55%	3.50%
18	3.50%	3.40%
19	3.50%	3.40%
20	3.50%	3.40%
21	3.50%	3.30%
22	3.45%	3.30%
23	3.35%	3.30%
24	3.35%	3.20%
25	3.35%	3.20%
26	3.25%	3.10%
27	3.25%	3.00%
28	3.25%	3.00%
29	3.25%	3.00%
30+	3.25%	3.00%
Total	5.01%	4.76%

General Employees Retirement Plan of Minnesota
Step 3 – Change Merit and Seniority / Payroll Growth Increase
Assumptions
Calculations as of June 30, 2018

Actuarial Statement

The financial effect of the proposal is shown below:

	Valuation Baseline	Updated Mortality, Demographic & Economic Assumptions	Change from Baseline
Normal Cost Rate, % of Pay	7.8%	7.7%	-0.1%
Amortization of Unfunded Accrued Liability, % of Pay	5.5%	5.6%	0.1%
Expenses, % of Pay	0.2%	0.2%	0.0%
Total Required Contribution, % of Pay	13.5%	13.5%	0.0%
Actuarial Accrued Liability, 000s	\$27,101,067	\$27,006,609	\$(94,458)
Funded Ratio, AVA Basis	78.0%	78.2%	0.2%

General Employees Retirement Plan of Minnesota Steps 1-3 – All Changes Calculations as of June 30, 2018

A step-by-step summary of the changes due to the mortality assumption, other demographic assumptions and the economic assumption changes are summarized below:

	Valuation Baseline	Update Mortality	Add Changes to Demographic Assumptions	Add Changes to Economic Assumptions
Normal Cost Rate, % of Pay	7.8%	7.7%	7.8%	7.7%
Amortization of Unfunded Accrued Liability, % of Pay	5.5%	5.4%	5.5%	5.6%
Expenses, % of Pay	0.2%	0.2%	0.2%	0.2%
Total Required Contribution, % of Pay	13.5%	13.3%	13.5%	13.5%
Actuarial Accrued Liability, 000s	\$27,101,067	\$26,953,454	\$27,084,116	\$27,006,609
Funded Ratio, AVA Basis	78.0%	78.4%	78.0%	78.2%

It is important to remember that the experience study also showed that the probability of achieving the 7.5% return assumption is less than 50%. Therefore, although the required contribution rate will not change as a result of this experience study and a sufficiency will continue, it is important that the statutory rate be maintained at least at its present level.

General Employees Retirement Plan of Minnesota

Calculations as of June 30, 2018

Comments

Comment 1 — The calculations are based upon assumptions regarding future events, which may or may not materialize. They are also based upon plan provisions that are outlined in this report. If you have reason to believe that the assumptions that were used are unreasonable, that the plan provisions are incorrectly described, that important plan provisions relevant to this proposal are not described, or that conditions have changed since the calculations were made, you should contact the author(s) of this report prior to relying on information in the report.

Comment 2 — If you have reason to believe that the information provided in this report is inaccurate, or is in any way incomplete, or if you need further information in order to make an informed decision on the subject matter of this report, please contact the authors of the report prior to making such decision.

Comment 3 — In the event that more than one change is being considered, it is very important to remember that the results of separate actuarial valuations cannot generally be added together to produce a correct estimate of the combined effect of all of the changes. The total can be considerably greater than the sum of the parts due to the interaction of various plan provisions with each other, and with the assumptions that must be used.

Comment 4 — The reader of this report should keep in mind that actuarial calculations are mathematical estimates based on current data and assumptions about future events (which may or may not materialize). Please note that actuarial calculations can and do vary from one valuation year to the next, sometimes significantly if the group valued is very small (less than 30 lives). As a result, the cost impact of a benefit change may fluctuate over time, as the demographics of the group changes.

Comment 5 — Effective January 1, 2019, PERA GERP benefit recipients receive a future annual post-retirement benefit increase equal to 50% of the Social Security Cost-of-Living Adjustment, not less than 1% and not more than 1.5%. For purposes of setting a post-retirement benefit increase assumption for the July 1, 2018 valuation, we examined the capital market inflation assumptions for twelve investment consulting firms. Please see the *Public Employees Retirement Association of Minnesota General Employees Retirement Plan Actuarial Valuation Report as of July 1, 2018*, dated November 28, 2018, for a complete description of the analysis used to set the post-retirement benefit increase assumption. We determined an annual COLA assumption of 1.25% would be appropriate to model the effect of the post-retirement benefit increases for the annual valuation and for this supplemental cost study. This is only an assumption; actual increases will depend on actual experience.

Comment 6 — Early retirement benefits were changed effective June 30, 2018. These changes may impact retirement behavior in the future and will be analyzed in the next experience study. Our recommendation to lower early retirement rates is consistent with the expected behavior changes.

General Employees Retirement Plan of Minnesota Calculations as of June 30, 2018

Comments (Concluded)

Comment 7 — The recommended change to the mortality assumption may result in a change to the plan's actuarially equivalent factors. An update to these factors has not been reflected in this study.

Comment 8 — We have provided this analysis in the same format as that used when plan or assumption changes are considered by the Trustees. For any legislative proposals, it may be necessary to follow-up with a more in-depth analysis to comply with the *Standards for Actuarial Work*. We will provide the additional information upon request.

Comment 9 — Please see our report, the *General Employees Retirement Plan of Minnesota 4-Year Experience Study*, dated June 27, 2019, for recommended changes to the *Standards for Actuarial Work*.

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Date: February 26, 2020

To: Susan Lenczewski
Executive Director, LCPR

From: J. Michael Stoffel
Executive Director, TRA

Subject: Experience Study Recommendations - Actuarial Assumption Revisions

In accordance with Minnesota Statutes, Section 356.214, subd. 1(d), Cavanaugh Macdonald Consulting (CMC) performed a four-year experience study of TRA actuarial valuation assumptions and methods. The study covered a review of actual experience during the four-year period July 1, 2014 through June 30, 2018. The actuaries from CMC presented the results and recommendations at the August 14, 2019 TRA Board meeting. The recommendations were considered again at the September 18, 2019 TRA Board meeting and were unanimously approved.

The recommendations involve three minor changes to demographic assumptions:

- **Mortality:** Changes to the mortality tables used for active members, reflecting higher rates of death for males and lower rates for females, to better match actual experience. The recommendation is to use the RP-2014 White Collar Employee Mortality Table, male rates set back 5 years and female rates set back 7 years.
- **Termination of employment:** Changes to the rates of termination of employment in the first five years of employment to better match observed experience.
- **Optional annuity form election:** At retirement date, changes to the probability that new female retirees elect either the Straight Life (No Refund) Annuity or the 100% Joint & Survivor plan were refined to reflect actual experience.

Attached is a table showing current assumptions/rates and the new, proposed assumptions/rates.

The impact of the recommendations on required contributions is very small. CMC estimates it would increase required contributions by 0.02 percent of covered payroll. For fiscal year 2019, 0.02 percent of covered payroll is approximately \$1.03 million. Total required contribution before the assumption changes is \$888.76 million.

The TRA Board of Trustees respectfully requests that the Legislative Commission on Pensions and Retirement review and approve the new assumptions adopted by the TRA Board. Ideally, LCPR approval would occur in time for the TRA to use the new set of assumptions for the July 1, 2020 actuarial valuation. That work will begin in the summer of 2020.

Please let me know if you or commission members have any questions or need additional information.

Teachers Retirement Association: Experience Study 2019

Table A: Pre-Retirement Mortality

(expressed in terms of thousands)

Negative = More Deaths Assumed Positive = Fewer Deaths Assumed

<u>Age</u>	<u>Current</u>	<u>Proposed</u>	<u>Difference</u>	<u>Current</u>	<u>Proposed</u>	<u>Difference</u>
	<u>Male</u>	<u>Male</u>		<u>Female</u>	<u>Female</u>	
20	0.023	0.022	0.001	0.013	0.013	0
25	0.026	0.029	-0.003	0.014	0.013	0.001
30	0.036	0.034	0.002	0.014	0.014	0
35	0.031	0.032	-0.001	0.018	0.017	0.001
40	0.035	0.037	-0.002	0.024	0.022	0.002
45	0.041	0.044	-0.003	0.033	0.029	0.004
50	0.061	0.068	-0.007	0.055	0.045	0.010
55	0.105	0.118	-0.013	0.092	0.076	0.016
60	0.175	0.196	-0.021	0.140	0.121	0.019
65	0.292	0.329	-0.037	0.204	0.177	0.027

Table B: Termination of Employment Rates

<u>Service Years</u>	<u>Current</u>	<u>Proposed</u>	<u>Difference</u>	<u>Current</u>	<u>Proposed</u>	<u>Difference</u>
	<u>Male</u>	<u>Male</u>		<u>Female</u>	<u>Female</u>	
< 1	32.00%	32.00%	0.00%	29.00%	29.00%	0.00%
1	15.00%	14.00%	-1.00%	13.00%	12.00%	-1.00%
2	11.00%	10.00%	-1.00%	11.00%	10.00%	-1.00%
3	8.50%	7.50%	-1.00%	9.00%	8.00%	-1.00%
4	6.25%	5.75%	-0.50%	7.00%	6.50%	-0.50%
5	5.25%	5.00%	-0.25%	5.50%	5.25%	-0.25%
6	4.60%	4.60%	0.00%	4.00%	4.00%	0.00%
7	4.10%	4.10%	0.00%	3.50%	3.50%	0.00%
8	2.80%	2.80%	0.00%	3.00%	3.00%	0.00%
9	2.30%	2.30%	0.00%	2.50%	2.50%	0.00%
10	2.00%	2.00%	0.00%	2.10%	2.10%	0.00%
15	1.10%	1.10%	0.00%	1.10%	1.10%	0.00%
20	0.60%	0.60%	0.00%	0.60%	0.60%	0.00%
25	0.50%	0.50%	0.00%	0.50%	0.50%	0.00%
30	0.50%	0.50%	0.00%	0.50%	0.50%	0.00%
> 30	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Teachers Retirement Association: Experience Study 2019

Table C: Optional Annuity Form Election

	Current	Proposed
	<u>Assumption</u>	<u>Assumption</u>
<u>Males:</u>		
• 50% Joint and Survivor (J & S) Option	10.0%	10.0%
• 75% Joint and Survivor (J & S) Option	10.0%	10.0%
• 100% Joint and Survivor (J & S) Option	60.0%	60.0%
• Straight Life (No Refund) Option	20.0%	20.0%
<u>Females:</u>		
• 50% Joint and Survivor (J & S) Option	13.5%	13.5%
• 75% Joint and Survivor (J & S) Option	6.5%	6.5%
• 100% Joint and Survivor (J & S) Option	35.0%	38.0%
• Straight Life (No Refund) Option	45.0%	42.0%