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January 31, 2023

Mr. Phillip Tencick
Executive Director and CIO
St. Paul Teachers' Retirement Fund Association
2550 University Avenue W., Suite 312N
St. Paul, Minnesota 55114

Re: Projection of Contributions and Funding Status

Dear Mr. Tencick:

Attached are 30-year projections of estimated funded status, required contributions, and statutory contributions under three asset return scenarios for the St. Paul Teachers' Retirement Fund Association (SPTRFA). These projections, including the underlying investment return assumptions, are required by the Minnesota Standards for Actuarial Work. Unless noted otherwise, the estimates are based on participant data, assumptions, methods, and plan provisions as detailed in the SPTRFA Actuarial Valuation Report for funding purposes as of July 1, 2022.

<u>Basis for Projections</u>
For all enclosed projections, liabilities are determined using the statutory investment return assumption of 7.5%. As required by the Minnesota Standards for Actuarial Work, the projections reflect three asset return scenarios (7.5%, 6.0%, and 9.0%). Note that we believe the 7.5% and 9.0% rate of return assumptions are outside of the range of reasonable expected returns for this plan.

The estimates are based on the actuarial value of assets with five-year smoothing of investment gains or losses.

Payroll is assumed to increase approximately 3.0% per year over the long term, consistent with the valuation assumption for total payroll growth.

The projection is an open group projection; meaning, active members projected to retire or otherwise terminate in the future are replaced with new active members so that the total active membership of the fund remains at 3,528 members. The profile of these new members is the same as new members hired between July 1, 2016 and June 30, 2021. Average salary at hire increases at the assumed payroll growth rate.

- Average age at hire is 34.2
- Average salary at hire is $59,800
- Approximately 77% female, 23% male

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If actuarial accrued liability exceeds assets, the unfunded actuarial accrued liability is amortized through June 30, 2048 per Minnesota Statute 356.215, Subdivision 11. Per Minnesota Statute 356.215, Subdivision 11 (l), a negative unfunded actuarial accrued liability (i.e., when assets exceed liability) is amortized over a rolling 30-year period.

Annual supplemental contributions of $15.665 million are assumed to continue until the earlier of 100% funding on an actuarial value of assets basis or June 30, 2048. The supplemental contributions are projected to be eliminated in fiscal years ending 2035, 2041, and 2049 in the 9.0%, 7.5%, and 6.0% investment return scenarios, respectively.

Comments

The reader should keep the following in mind when reviewing these results:

- Statutory contributions are defined in statutes as a fixed percentage of payroll plus any statutory supplemental contributions and represent the amount that is actually contributed to the plan. Required contributions are defined in statutes and the LCPR Standard for Actuarial Work and represent the amount needed to fully fund the plan by June 30, 2048 (normal cost, expenses, and a payment to amortize the unfunded liability).

- Investment experience that has occurred since the measurement date is not reflected in this report.

- The enclosed projections are based on assumptions as outlined in the SPTRFA actuarial funding valuation as of July 1, 2022. Please see that report for comments regarding the 7.5% statutory investment return assumption, and sensitivity test results based on alternate assumptions

- Actual payroll growth has consistently fallen short of the 3.0% assumption; average growth over the last 10 years (ending June 30, 2022) was 2.4%, which was up significantly from the previous 10-year average of 1.6% (average payroll growth for the 10-year period ending June 30, 2021). Covered payroll increased 8.7% during fiscal year 2022, from $280 million to $304 million. Approximately $11 million of that increase was due to the district's payment of one-time bonuses. SPTRFA's preliminary projected payroll for fiscal year 2023 is $293 million. If actual payroll growth over the projection period is less than 3.0% per year, contributions to pay the unfunded actuarial accrued liability must increase over time to make up for the assumption not being met.

- Note that plan changes may result in behavior changes that are not anticipated in the current assumptions.

- A 2022 analysis of long-term rate of investment return and inflation assumptions concluded that the probability of exceeding the current 7.5% assumption over 10 years is only 35%. The statutory requirement for projections that are 1.5% above and 1.5% below the assumed rate may give the reader the impression that the 7.5% projection is an accurate (middle of the road) representation of the expected future results. Based on our modeling, the 7.5% scenario is optimistic and not representative of the expected (median) result. We caution against adjusting contribution rates without full consideration of the median results.

- In the 7.5% and 9.0% investment return scenarios, surplus assets reduce the projected required contributions to amounts less than normal cost. We typically recommend the contribution be at least equal to the normal cost of the plan and suggest that plans with considerable surplus assets investigate the pros and cons of reducing the risk of the plan's investment allocation to preserve surplus assets.

Disclosures

The purpose of this report is to estimate the Fund's funding progress and required contribution rates over a 30-year period according to prescribed assumptions and the Minnesota Standards for Actuarial Work. 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.

This report should not be relied upon for any purpose other than the purpose described herein. 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. GRS is not responsible for the consequences of any unauthorized use.

The valuation was based upon data and information through June 30, 2022 furnished by the SPTRFA staff concerning Retirement Fund benefits, financial transactions, plan provisions and active members, terminated members, retirees and beneficiaries. We checked for internal and year-to-year consistency but did not audit the data. We are not responsible for the accuracy or completeness of the information provided by SPTRFA.

The contribution rates shown in this report have been determined using the actuarial assumptions and methods disclosed in Section 4 of the July 1, 2022 valuation report. That valuation report includes risk metrics on pages 8 through 11, but does not include a robust assessment of the risks of future experience not meeting the actuarial assumptions. Additional assessment of risks was outside the scope of this assignment.

The projections assumed the continuing ability of the plan sponsor to make the contributions necessary to fund this plan. A determination regarding whether or not the plan sponsor is actually able to do so is outside our scope of expertise and was not performed.

Actuarial assumptions, including discount rates, mortality tables, and others identified in this report, are prescribed by Minnesota Statutes Section 356.215, the Legislative Commission on Pensions and Retirement (LCPR), and the Board of Trustees. These parties are responsible for selecting the plan's funding policy, actuarial valuation methods, asset valuation methods, and assumptions. The policies, methods and assumptions used in this valuation are those that have been so prescribed and are described in the Actuarial Basis section of the valuation report. SPTRFA is solely responsible for communicating to GRS any changes required thereto.

In a 2022 analysis of long-term rate of investment return and inflation assumptions, GRS suggested that an investment return assumption in the range of 5.85% to 6.73% would be reasonable for this valuation. This implies that the 7.5% and 9.0% rate of return assumptions would be outside the range of reasonable returns for this plan. Please see the experience study report dated December 8, 2022 for additional information. For informational purposes, results based on a 6.5% discount rate are shown on page 6 of the July 1, 2022 valuation report.

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 our assignment, we did not perform an analysis of the potential range of such future measurements.

This report was prepared using our proprietary valuation model and related software which, in our professional judgment, has the capability to provide results that are consistent with the purposes of the valuation and has no material limitations or known weaknesses. We performed tests to ensure that the model reasonably represents that which is intended to be modeled.

This report reflects the impact of COVID-19 through June 30, 2022. It does not reflect the ongoing impact of COVID-19, which is likely to influence demographic and investment experience, at least in the short term. We will continue to monitor these developments and their impact on the plan.

Professional Qualifications
This report has been prepared by actuaries who have substantial experience valuing public employee retirement systems. To the best of our knowledge and belief, the information contained in this report is accurate and fairly presents the actuarial position of the St. Paul Teachers' Retirement Fund Association as of the valuation date and was performed in accordance with the requirements of Minnesota Statutes Section 356.215, and the requirements of the Standards for Actuarial Work established by the LCPR. All calculations have been made in conformity with generally accepted actuarial principles and practices, and with the Actuarial Standards of Practice issued by the Actuarial Standards Board and with applicable statutes.

Bonita J. Wurst and Sheryl L. Christensen 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 signing actuaries are independent of the plan sponsor. We are not aware of any relationship that would impair the objectivity of our work.

Sincerely,
Gabriel, Roeder, Smith & Company

Bonita J. Wurst

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

Sheryl Christensen

Sheryl L. Christensen, FSA, EA, FCA, MAAA

BJW/SLC:dj
Enclosure

Other Observations

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

Given the plan's contribution allocation procedure, if there are no changes in benefits, Chapter 356 required contributions are made, and all actuarial assumptions are met (including the assumption of the plan earning 7.5% on an actuarial value of assets basis, as prescribed by statutes), it is expected that:

1) The normal cost of the plan is expected to remain approximately level as a percent of pay;
2) The funded status of the plan is expected to gradually improve and is expected to be 100% funded within the next 26 years; and
3) The unfunded liability will grow initially as a dollar amount before beginning to decline.

Limitations of Funded Status Measurements

Unless otherwise indicated, a funded status measurement presented in this report is based upon the actuarial accrued liability and the actuarial value of assets. Unless otherwise indicated, with regard to any funded status measurements presented in this report:

1) The measurement is inappropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations; in other words, of transferring the obligations to an unrelated third party in an arm's length market value type transaction.
2) The measurement is dependent upon the actuarial cost method which, in combination with the plan's amortization policy, affects the timing and amounts of future contributions. The amounts of future contributions will most certainly differ from those assumed in this report due to future actual experience differing from assumed experience based upon the actuarial assumptions. A funded status measurement in this report of 100% is not synonymous with no required future contributions. If the funded status were 100%, the plan would still require future normal cost contributions (i.e., contributions to cover the cost of the active membership accruing an additional year of service credit).
3) The measurement would produce a different result if the market value of assets were used instead of the actuarial value of assets.

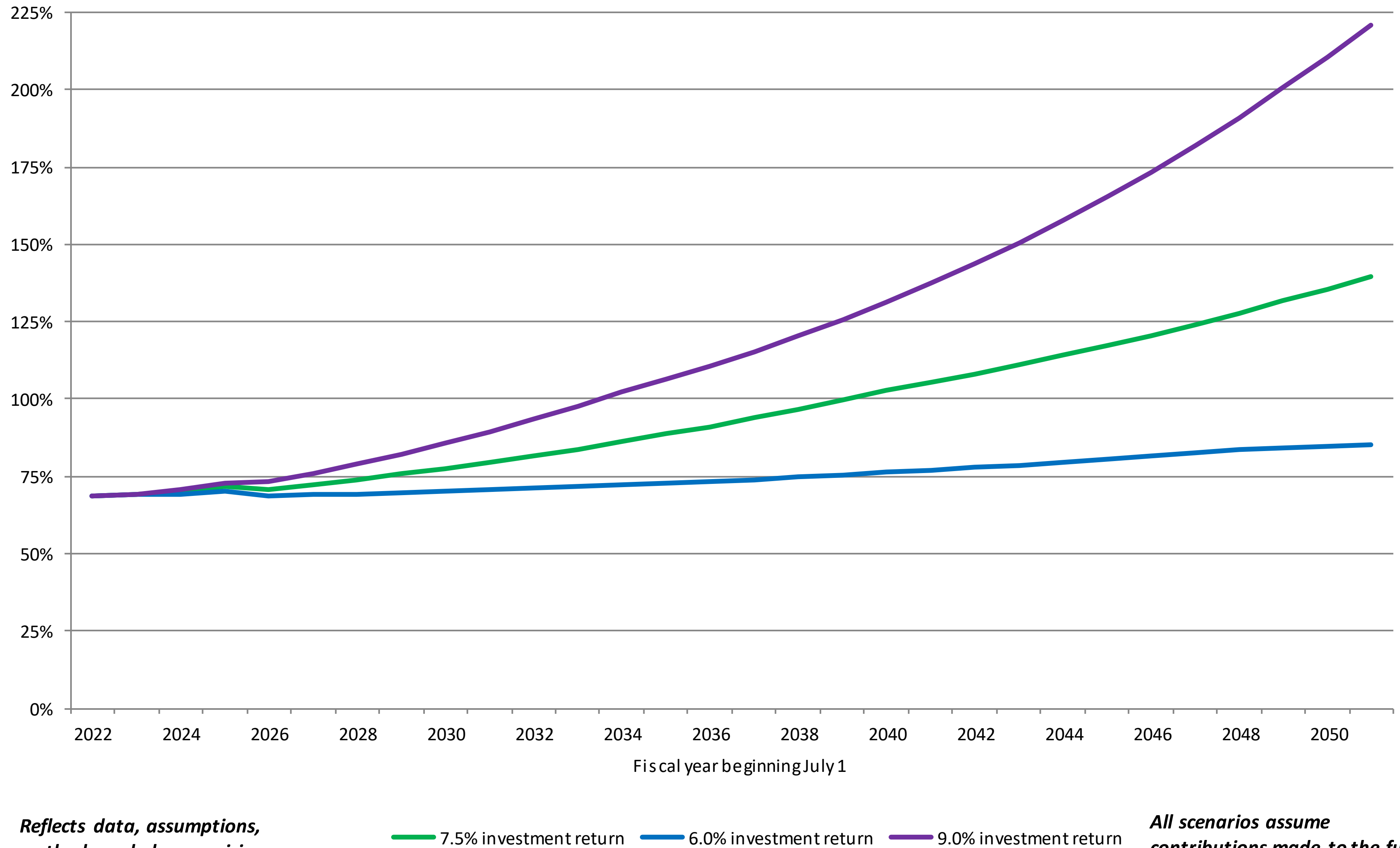
Limitations of Project Scope

Actuarial standards to not require the actuary to evaluate the ability of the plan sponsor or other contributing entity to make required contributions to the plan when due. Such an evaluation was not within the scope of this project and is not within the actuary's domain of expertise. Consequently, the actuary performed no such evaluation.

This exhibit should only be viewed in conjunction with GRS' January 31, 2023 letter.

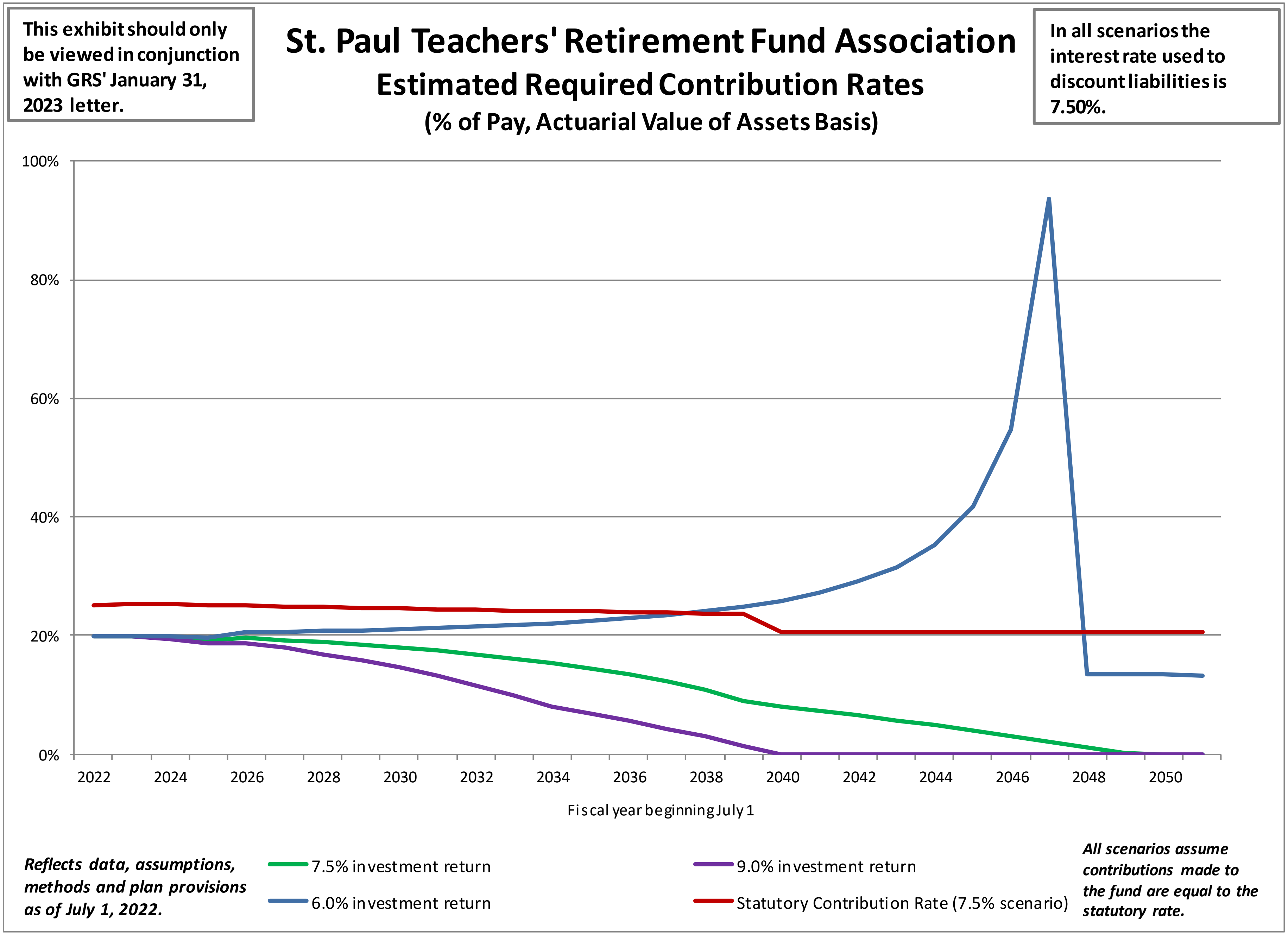
St. Paul Teachers' Retirement Fund Association
Estimated Accrued Liability Funded Ratio
(Actuarial Value of Assets Basis)

In all scenarios the interest rate used to discount liabilities is 7.50%.



Reflects data, assumptions, methods and plan provisions as of July 1, 2022.

All scenarios assume contributions made to the fund are equal to the statutory rate.


This exhibit should only be viewed in conjunction with GRS' January 31, 2023 letter.
St. Paul Teachers' Retirement Fund Association
Estimated Required Contribution Rates
(% of Pay, Actuarial Value of Assets Basis)
In all scenarios the interest rate used to discount liabilities is 7.50%.
100%
80%
60%
40%
20%
0%
2022
2024
2026
2028
2030
2032
2034
2036
2038
2040
2042
2044
2046
2048
2050
Fiscal year beginning July 1
Reflects data, assumptions, methods and plan provisions as of July 1, 2022.
7.5% investment return
6.0% investment return
9.0% investment return
Statutory Contribution Rate (7.5% scenario)
All scenarios assume contributions made to the fund are equal to the statutory rate.

This exhibit should only be viewed in conjunction with GRS' January 31, 2023 letter.

St. Paul Teachers' Retirement Fund Association

Scenario: 7.5% Investment Return for All Years

Fiscal Year Beginning July 1

$ in Thousands	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Contributions (% of Payroll)										
Statutory - Chapter 354A	25.13%	25.43%	25.30%	25.17%	25.04%	24.92%	24.80%	24.68%	24.57%	24.46%
Required - Chapter 356 (AVA)	19.96%	19.89%	19.72%	19.23%	19.66%	19.28%	18.87%	18.42%	17.94%	17.41%
Sufficiency / (Deficiency)	5.17%	5.54%	5.58%	5.94%	5.38%	5.64%	5.93%	6.26%	6.63%	7.05%
Contributions										
Statutory - Chapter 354A	$ 78,870	$ 82,258	$ 84,180	$ 86,130	$ 88,141	$ 90,203	$ 92,352	$ 94,541	$ 96,770	$ 99,046
Required - Chapter 356 (AVA)	62,639	64,326	65,613	65,817	69,186	69,787	70,272	70,580	70,680	70,513
Sufficiency / (Deficiency)	16,231	17,932	18,566	20,313	18,955	20,416	22,080	23,960	26,091	28,533
Funding Ratios										
Current Assets (AVA)	$1,203,096	$1,232,166	$1,267,067	$1,319,024	$1,328,282	$1,379,557	$1,435,071	$1,495,182	$1,560,289	$1,630,499
Actuarial Accrued Liability (AAL)	1,750,421	1,781,185	1,810,759	1,840,595	1,871,305	1,903,289	1,936,859	1,972,137	2,009,295	2,048,198
Unfunded AAL	547,325	549,018	543,692	521,571	543,023	523,732	501,789	476,955	449,006	417,699
Funding Ratio	68.7%	69.2%	70.0%	71.7%	71.0%	72.5%	74.1%	75.8%	77.7%	79.6%
Benefit Payments	$ 122,934	$ 127,062	$ 129,722	$ 131,825	$ 133,648	$ 135,301	$ 136,999	$ 138,685	$ 140,669	$ 142,857
Ratio of Assets to Benefit Payments	9.79	9.70	9.77	10.01	9.94	10.20	10.48	10.78	11.09	11.41

Numbers may not add due to rounding.

The interest rate used to discount liabilities was 7.5%.

This exhibit should only be viewed in conjunction with GRS' January 31, 2023 letter.

St. Paul Teachers' Retirement Fund Association

Scenario: 7.5% Investment Return for All Years

Fiscal Year Beginning July 1

$ in Thousands	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041
Contributions (% of Payroll)										
Statutory - Chapter 354A	24.35%	24.25%	24.15%	24.06%	23.96%	23.87%	23.78%	23.69%	20.59%	20.59%
Required - Chapter 356 (AVA)	16.82%	16.15%	15.39%	14.52%	13.49%	12.29%	10.84%	9.07%	8.07%	7.33%
Sufficiency / (Deficiency)	7.53%	8.10%	8.76%	9.54%	10.47%	11.58%	12.94%	14.62%	12.52%	13.26%
Contributions										
Statutory - Chapter 354A	$ 101,377	$ 103,762	$ 106,219	$ 108,749	$ 111,361	$ 114,056	$ 116,853	$ 119,765	$ 107,109	$ 110,212
Required - Chapter 356 (AVA)	70,019	69,111	67,691	65,622	62,717	58,721	53,278	45,871	41,982	39,243
Sufficiency / (Deficiency)	31,358	34,651	38,528	43,126	48,644	55,335	63,575	73,893	65,127	70,970
Funding Ratios										
Current Assets (AVA)	$1,706,029	$1,787,021	$1,873,986	$1,967,413	$2,067,769	$2,175,542	$2,291,237	$2,415,569	$2,549,613	$2,677,757
Actuarial Accrued Liability (AAL)	2,088,794	2,130,924	2,174,774	2,220,475	2,268,105	2,317,728	2,369,392	2,423,303	2,479,982	2,539,493
Unfunded AAL	382,765	343,903	300,788	253,062	200,336	142,186	78,154	7,734	(69,631)	(138,264)
Funding Ratio	81.7%	83.9%	86.2%	88.6%	91.2%	93.9%	96.7%	99.7%	102.8%	105.4%
Benefit Payments	$ 145,350	$ 147,796	$ 150,274	$ 152,841	$ 155,521	$ 158,329	$ 161,123	$ 163,618	$ 166,293	$ 168,866
Ratio of Assets to Benefit Payments	11.74	12.09	12.47	12.87	13.30	13.74	14.22	14.76	15.33	15.86

Numbers may not add due to rounding.

The interest rate used to discount liabilities was 7.5%.

This exhibit should only be viewed in conjunction with GRS' January 31, 2023 letter.

St. Paul Teachers' Retirement Fund Association

Scenario: 7.5% Investment Return for All Years

Fiscal Year Beginning July 1

$ in Thousands	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051
Contributions (% of Payroll)										
Statutory - Chapter 354A	20.59%	20.59%	20.59%	20.59%	20.59%	20.59%	20.59%	20.59%	20.59%	20.59%
Required - Chapter 356 (AVA)	6.56%	5.75%	4.90%	4.02%	3.10%	2.14%	1.13%	0.08%	0.00%	0.00%
Sufficiency / (Deficiency)	14.03%	14.84%	15.69%	16.57%	17.49%	18.45%	19.46%	20.51%	20.59%	20.59%
Contributions										
Statutory - Chapter 354A	$ 113,414	$ 116,714	$ 120,121	$ 123,640	$ 127,296	$ 131,066	$ 134,973	$ 139,022	$ 143,212	$ 147,531
Required - Chapter 356 (AVA)	36,123	32,591	28,613	24,149	19,161	13,598	7,415	558	-	-
Sufficiency / (Deficiency)	77,291	84,122	91,507	99,491	108,135	117,468	127,558	138,464	143,212	147,531
Funding Ratios										
Current Assets (AVA)	$2,816,015	$2,965,052	$3,125,373	$3,297,885	$3,483,387	$3,682,939	$3,897,341	$4,127,452	$4,374,617	$4,640,143
Actuarial Accrued Liability (AAL)	2,602,187	2,668,150	2,737,262	2,809,753	2,885,690	2,965,331	3,048,627	3,135,514	3,226,338	3,321,333
Unfunded AAL	(213,827)	(296,902)	(388,111)	(488,132)	(597,696)	(717,608)	(848,714)	(991,939)	(1,148,280)	(1,318,810)
Funding Ratio	108.2%	111.1%	114.2%	117.4%	120.7%	124.2%	127.8%	131.6%	135.6%	139.7%
Benefit Payments	$ 171,624	$ 174,772	$ 177,966	$ 181,383	$ 184,850	$ 188,677	$ 192,882	$ 197,067	$ 201,365	$ 206,287
Ratio of Assets to Benefit Payments	16.41	16.97	17.56	18.18	18.84	19.52	20.21	20.94	21.72	22.49

Numbers may not add due to rounding.

The interest rate used to discount liabilities was 7.5%.

This exhibit should only be viewed in conjunction with GRS' January 31, 2023 letter.

St. Paul Teachers' Retirement Fund Association

Scenario: 6.0% Investment Return for All Years

Fiscal Year Beginning July 1

$ in Thousands	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**
Contributions (% of Payroll)										
Statutory - Chapter 354A	25.13%	25.43%	25.30%	25.17%	25.04%	24.92%	24.80%	24.68%	24.57%	24.46%
Required - Chapter 356 (AVA)	19.96%	19.96%	19.95%	19.73%	20.52%	20.62%	20.74%	20.88%	21.05%	21.25%
Sufficiency / (Deficiency)	5.17%	5.47%	5.35%	5.44%	4.52%	4.30%	4.06%	3.80%	3.52%	3.21%
Contributions										
Statutory - Chapter 354A	$ 78,870	$ 82,258	$ 84,180	$ 86,130	$ 88,141	$ 90,203	$ 92,352	$ 94,541	$ 96,770	$ 99,046
Required - Chapter 356 (AVA)	62,639	64,551	66,395	67,527	72,240	74,658	77,242	79,982	82,908	86,041
Sufficiency / (Deficiency)	16,231	17,707	17,784	18,603	15,900	15,545	15,110	14,559	13,862	13,004
Funding Ratios										
Current Assets (AVA)	$1,203,096	$1,228,770	$1,255,539	$1,294,437	$1,285,507	$1,313,247	$1,343,040	$1,375,057	$1,409,489	$1,446,217
Actuarial Accrued Liability (AAL)	1,750,421	1,781,185	1,810,759	1,840,595	1,871,305	1,903,289	1,936,859	1,972,137	2,009,295	2,048,198
Unfunded AAL	547,325	552,414	555,220	546,158	585,798	590,042	593,819	597,080	599,805	601,981
Funding Ratio	68.7%	69.0%	69.3%	70.3%	68.7%	69.0%	69.3%	69.7%	70.2%	70.6%
Benefit Payments	$ 122,934	$ 127,062	$ 129,722	$ 131,825	$ 133,648	$ 135,301	$ 136,999	$ 138,685	$ 140,669	$ 142,857
Ratio of Assets to Benefit Payments	9.79	9.67	9.68	9.82	9.62	9.71	9.80	9.91	10.02	10.12

Numbers may not add due to rounding.

The interest rate used to discount liabilities was 7.5%.

This exhibit should only be viewed in conjunction with GRS' January 31, 2023 letter.

St. Paul Teachers' Retirement Fund Association

Scenario: 6.0% Investment Return for All Years

Fiscal Year Beginning July 1

$ in Thousands	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041
Contributions (% of Payroll)										
Statutory - Chapter 354A	24.35%	24.25%	24.15%	24.06%	23.96%	23.87%	23.78%	23.69%	23.60%	23.52%
Required - Chapter 356 (AVA)	21.48%	21.75%	22.07%	22.45%	22.90%	23.44%	24.09%	24.90%	25.92%	27.25%
Sufficiency / (Deficiency)	2.87%	2.50%	2.08%	1.61%	1.06%	0.43%	(0.31)%	(1.21)%	(2.32)%	(3.73)%
Contributions										
Statutory - Chapter 354A	$ 101,377	$ 103,762	$ 106,219	$ 108,749	$ 111,361	$ 114,056	$ 116,853	$ 119,765	$ 122,774	$ 125,877
Required - Chapter 356 (AVA)	89,419	93,079	97,083	101,506	106,440	112,013	118,410	125,892	134,840	145,855
Sufficiency / (Deficiency)	11,958	10,683	9,136	7,243	4,921	2,043	(1,558)	(6,127)	(12,066)	(19,978)
Funding Ratios										
Current Assets (AVA)	$1,485,212	$1,526,348	$1,569,851	$1,615,902	$1,664,636	$1,716,182	$1,770,659	$1,828,361	$1,889,909	$1,955,453
Actuarial Accrued Liability (AAL)	2,088,794	2,130,924	2,174,774	2,220,475	2,268,105	2,317,728	2,369,392	2,423,303	2,479,982	2,539,493
Unfunded AAL	603,582	604,577	604,924	604,573	603,470	601,546	598,733	594,942	590,073	584,040
Funding Ratio	71.1%	71.6%	72.2%	72.8%	73.4%	74.1%	74.7%	75.5%	76.2%	77.0%
Benefit Payments	$ 145,350	$ 147,796	$ 150,274	$ 152,841	$ 155,521	$ 158,329	$ 161,123	$ 163,618	$ 166,293	$ 168,866
Ratio of Assets to Benefit Payments	10.22	10.33	10.45	10.57	10.70	10.84	10.99	11.17	11.36	11.58

Numbers may not add due to rounding.

The interest rate used to discount liabilities was 7.5%.

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St. Paul Teachers' Retirement Fund Association

Scenario: 6.0% Investment Return for All Years

Fiscal Year Beginning July 1

$ in Thousands	**2042**	**2043**	**2044**	**2045**	**2046**	**2047**	**2048**	**2049**	**2050**	**2051**
Contributions (% of Payroll)										
Statutory - Chapter 354A	23.43%	23.35%	23.28%	23.20%	23.12%	23.05%	20.59%	20.59%	20.59%	20.59%
Required - Chapter 356 (AVA)	29.04%	31.57%	35.40%	41.82%	54.72%	93.56%	13.53%	13.45%	13.37%	13.27%
Sufficiency / (Deficiency)	(5.61)%	(8.22)%	(12.12)%	(18.62)%	(31.60)%	(70.51)%	7.06%	7.14%	7.22%	7.32%
Contributions										
Statutory - Chapter 354A	$ 129,079	$ 132,379	$ 135,786	$ 139,305	$ 142,961	$ 146,731	$ 134,973	$ 139,022	$ 143,212	147,531
Required - Chapter 356 (AVA)	159,951	178,952	206,506	251,117	338,299	595,568	88,715	90,826	92,963	95,113
Sufficiency / (Deficiency)	(30,871)	(46,573)	(70,720)	(111,812)	(195,339)	(448,837)	46,259	48,196	50,249	52,418
Funding Ratios										
Current Assets (AVA)	$2,025,436	$2,100,036	$2,179,228	$2,263,346	$2,352,566	$2,447,281	$2,547,563	$2,637,264	$2,731,975	$2,832,068
Actuarial Accrued Liability (AAL)	2,602,187	2,668,150	2,737,262	2,809,753	2,885,690	2,965,331	3,048,627	3,135,514	3,226,338	3,321,333
Unfunded AAL	576,752	568,114	558,033	546,407	533,124	518,051	501,064	498,249	494,363	489,265
Funding Ratio	77.8%	78.7%	79.6%	80.6%	81.5%	82.5%	83.6%	84.1%	84.7%	85.3%
Benefit Payments	$ 171,624	$ 174,772	$ 177,966	$ 181,383	$ 184,850	$ 188,677	$ 192,882	$ 197,067	$ 201,365	$ 206,287
Ratio of Assets to Benefit Payments	11.80	12.02	12.25	12.48	12.73	12.97	13.21	13.38	13.57	13.73

Numbers may not add due to rounding.

The interest rate used to discount liabilities was 7.5%.

This exhibit should only be viewed in conjunction with GRS' January 31, 2023 letter.

St. Paul Teachers' Retirement Fund Association

Scenario: 9.0% Investment Return for All Years

Fiscal Year Beginning July 1

$ in Thousands	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Contributions (% of Payroll)										
Statutory - Chapter 354A	25.13%	25.43%	25.30%	25.17%	25.04%	24.92%	24.80%	24.68%	24.57%	24.46%
Required - Chapter 356 (AVA)	19.96%	19.82%	19.48%	18.72%	18.76%	17.88%	16.90%	15.81%	14.58%	13.20%
Sufficiency / (Deficiency)	5.17%	5.61%	5.82%	6.45%	6.28%	7.04%	7.90%	8.87%	9.99%	11.26%
Contributions										
Statutory - Chapter 354A	$ 78,870	$ 82,258	$ 84,180	$ 86,130	$ 88,141	$ 90,203	$ 92,352	$ 94,541	$ 96,770	$ 99,046
Required - Chapter 356 (AVA)	62,639	64,101	64,824	64,076	66,043	64,723	62,934	60,549	57,447	53,466
Sufficiency / (Deficiency)	16,231	18,157	19,355	22,054	22,097	25,480	29,417	33,992	39,323	45,580
Funding Ratios										
Current Assets (AVA)	$1,203,096	$1,235,562	$1,278,697	$1,344,068	$1,372,292	$1,448,497	$1,531,957	$1,623,361	$1,723,471	$1,832,802
Actuarial Accrued Liability (AAL)	1,750,421	1,781,185	1,810,759	1,840,595	1,871,305	1,903,289	1,936,859	1,972,137	2,009,295	2,048,198
Unfunded AAL	547,325	545,623	532,062	496,527	499,012	454,792	404,902	348,776	285,824	215,397
Funding Ratio	68.7%	69.4%	70.6%	73.0%	73.3%	76.1%	79.1%	82.3%	85.8%	89.5%
Benefit Payments	$ 122,934	$ 127,062	$ 129,722	$ 131,825	$ 133,648	$ 135,301	$ 136,999	$ 138,685	$ 140,669	$ 142,857
Ratio of Assets to Benefit Payments	9.79	9.72	9.86	10.20	10.27	10.71	11.18	11.71	12.25	12.83

Numbers may not add due to rounding.

The interest rate used to discount liabilities was 7.5%.

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St. Paul Teachers' Retirement Fund Association

Scenario: 9.0% Investment Return for All Years

Fiscal Year Beginning July 1

$ in Thousands	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**	**2041**
Contributions (% of Payroll)										
Statutory - Chapter 354A	24.35%	24.25%	20.59%	20.59%	20.59%	20.59%	20.59%	20.59%	20.59%	20.59%
Required - Chapter 356 (AVA)	11.63%	9.82%	8.12%	6.93%	5.67%	4.34%	2.92%	1.43%	0.00%	0.00%
Sufficiency / (Deficiency)	12.72%	14.43%	12.47%	13.66%	14.92%	16.25%	17.67%	19.16%	20.59%	20.59%
Contributions										
Statutory - Chapter 354A	$ 101,377	$ 103,762	$ 90,554	$ 93,084	$ 95,696	$ 98,391	$ 101,188	$ 104,100	$ 107,109	$ 110,212
Required - Chapter 356 (AVA)	48,407	42,011	35,714	31,339	26,363	20,727	14,371	7,228	-	-
Sufficiency / (Deficiency)	52,970	61,751	54,840	61,744	69,333	77,664	86,817	96,872	107,109	110,212
Funding Ratios										
Current Assets (AVA)	$1,952,018	$2,081,756	$2,223,069	$2,360,765	$2,510,943	$2,674,645	$2,852,993	$3,047,379	$3,259,648	$3,491,319
Actuarial Accrued Liability (AAL)	2,088,794	2,130,924	2,174,774	2,220,475	2,268,105	2,317,728	2,369,392	2,423,303	2,479,982	2,539,493
Unfunded AAL	136,776	49,168	(48,294)	(140,290)	(242,837)	(356,917)	(483,602)	(624,076)	(779,666)	(951,827)
Funding Ratio	93.5%	97.7%	102.2%	106.3%	110.7%	115.4%	120.4%	125.8%	131.4%	137.5%
Benefit Payments	$ 145,350	$ 147,796	$ 150,274	$ 152,841	$ 155,521	$ 158,329	$ 161,123	$ 163,618	$ 166,293	$ 168,866
Ratio of Assets to Benefit Payments	13.43	14.09	14.79	15.45	16.15	16.89	17.71	18.62	19.60	20.68

Numbers may not add due to rounding.

The interest rate used to discount liabilities was 7.5%.

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St. Paul Teachers' Retirement Fund Association

Scenario: 9.0% Investment Return for All Years

Fiscal Year Beginning July 1

$ in Thousands	**2042**	**2043**	**2044**	**2045**	**2046**	**2047**	**2048**	**2049**	**2050**	**2051**
Contributions (% of Payroll)										
Statutory - Chapter 354A	20.59%	20.59%	20.59%	20.59%	20.59%	20.59%	20.59%	20.59%	20.59%	20.59%
Required - Chapter 356 (AVA)	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Sufficiency / (Deficiency)	20.59%	20.59%	20.59%	20.59%	20.59%	20.59%	20.59%	20.59%	20.59%	20.59%
Contributions										
Statutory - Chapter 354A	$ 113,414	$ 116,714	$ 120,121	$ 123,640	$ 127,296	$ 131,066	$ 134,973	$ 139,022	$ 143,212	$ 147,531
Required - Chapter 356 (AVA)	-	-	-	-	-	-	-	-	-	-
Sufficiency / (Deficiency)	113,414	116,714	120,121	123,640	127,296	131,066	134,973	139,022	143,212	147,531
Funding Ratios										
Current Assets (AVA)	$ 3,744,338	$ 4,020,532	$ 4,321,678	$ 4,650,089	$ 5,008,103	$ 5,398,474	$ 5,823,858	$ 6,287,156	$ 6,791,949	$ 7,342,002
Actuarial Accrued Liability (AAL)	2,602,187	2,668,150	2,737,262	2,809,753	2,885,690	2,965,331	3,048,627	3,135,514	3,226,338	3,321,333
Unfunded AAL	(1,142,151)	(1,352,381)	(1,584,417)	(1,840,336)	(2,122,413)	(2,433,143)	(2,775,232)	(3,151,642)	(3,565,612)	(4,020,669)
Funding Ratio	143.9%	150.7%	157.9%	165.5%	173.6%	182.1%	191.0%	200.5%	210.5%	221.1%
Benefit Payments	$ 171,624	$ 174,772	$ 177,966	$ 181,383	$ 184,850	$ 188,677	$ 192,882	$ 197,067	$ 201,365	$ 206,287
Ratio of Assets to Benefit Payments	21.82	23.00	24.28	25.64	27.09	28.61	30.19	31.90	33.73	35.59

Numbers may not add due to rounding.

The interest rate used to discount liabilities was 7.5%.