



State of Washington Pension Funding Council LEOFF 2 Board

Actuarial Audit of June 30, 2021 Actuarial Valuation

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August 16, 2022

Shawn Merchant
Legislative & Stakeholder Relations Director
Department of Retirement Services

Steve Nelsen
Executive Director
LEOFF Plan 2 Retirement Board

Re: **Actuarial Audit of June 30, 2021 Actuarial Valuation**

Dear Shawn and Steve:

The enclosed report presents the findings and comments resulting from a detailed review of the June 30, 2021 actuarial valuation performed by the Office of the State Actuary (OSA) for the Pension Funding Council (PFC) and the LEOFF 2 Board. An overview of our findings is included in the Executive Summary section of the report. More detailed commentary on our review process is included in the latter sections.

All calculations for the actuarial valuation are based on the Revised Code of Washington (RCW) and the actuarial demographic assumptions based on the 2013-2018 experience study and the economic assumptions from the 2021 Report on Financial Condition and Economic Experience Study for use in the June 30, 2021 actuarial valuation. These assumptions have been approved by both the PFC and LEOFF 2 Board.

As discussed in our report, we believe the package of actuarial assumptions and methods is reasonable (taking into account the experience of Washington State retirement systems and reasonable expectations). Nevertheless, the emerging costs will vary from those presented in this report to the extent that actual experience differs from that projected by the actuarial assumptions. Future actuarial measurements may differ significantly from the current measurements presented in this report due to factors such as the following:

- Plan experience differing from the actuarial assumptions,
- Future changes in the actuarial assumptions,
- Increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as potential additional contribution requirements due to changes in the plan's funded status), and
- Changes in the plan provisions or accounting standards.

Due to the scope of this assignment, we did not perform an analysis of the potential range of such measurements.

The results developed in this actuarial audit used models intended for valuations that use standard actuarial techniques.

In preparing this report, we relied, without audit, on information (some oral and some in writing) supplied by the OSA's staff and the Department of Retirement Systems (DRS)'s staff. This includes information supplied to the OSA by the Washington State Investment Board (WSIB). This information includes, but is not limited to, statutory provisions, employee data, and financial information. In our examination of these data, we have found them to be reasonably consistent and comparable with data used for other purposes. Since the audit results are dependent on the integrity of the data supplied, the results can be expected to differ if the underlying data is incomplete or missing. It should be noted that if any data or other information is inaccurate or incomplete, our calculations may need to be revised.

On the basis of the foregoing, we hereby certify that, to the best of our knowledge and belief, this report is complete and accurate and has been prepared in accordance with generally recognized and accepted actuarial principles and practices which are consistent with the principles prescribed by the Actuarial Standards Board and the Code of Professional Conduct and Qualification Standards for Actuaries Issuing Statements of Actuarial Opinion in the United States of the American Academy of Actuaries.

Milliman's work product was prepared exclusively for the Pension Funding Council and the LEOFF 2 Board for a specific and limited purpose. It is a complex, technical analysis that assumes a high level of knowledge concerning the operations of the Washington State retirement systems, and uses DRS's census data, which Milliman has not audited. It is not for the use or benefit of any third party for any purpose. Any third-party recipient of Milliman's work product who desires professional guidance should not rely upon Milliman's work product, but should engage qualified professionals for advice appropriate to its own specific needs.

The consultants who worked on this assignment are retirement actuaries. Milliman's advice is not intended to be a substitute for qualified legal or accounting counsel.

The signing actuaries are independent of the plan sponsor. We are not aware of any relationship that would impair the objectivity of our work.

We would like to express our appreciation to the OSA's and DRS's staff for their assistance in supplying the data and information on which this report is based.

We are members of the American Academy of Actuaries and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

We respectfully submit the following report, and we look forward to discussing it with you.

Sincerely,

A handwritten signature in black ink, appearing to read "Nick Collier", written over a horizontal line.

Nick J. Collier, ASA, EA, MAAA
Consulting Actuary

A handwritten signature in black ink, appearing to read "Daniel Wade", written over a horizontal line.

Daniel R. Wade, FSA, EA, MAAA
Consulting Actuary

A handwritten signature in blue ink, appearing to read "Gary Deeth", written over a horizontal line.

Gary Deeth, ASA, EA, MAAA
Consulting Actuary

Table of Contents

1. Summary of the Findings	1
2. Membership Data	7
Exhibit 2-1 Member Statistics as of June 30, 2021	8
3. Actuarial Value of Assets	16
Exhibit 3-1 Comparison of Actuarial Value of Assets by Plan	17
4. Actuarial Liabilities	18
Exhibit 4-1 Present Value of Future Benefits by Benefit Type	19
Exhibit 4-2 Present Value of Future Benefits by System	20
Exhibit 4-3 Comparison of Entry Age Normal Accrued Liability	21
Exhibit 4-4 Present Value of Future Salaries and EANC Rate	21
5. Funding.....	22
6. Preliminary Report, Risk Disclosures, and Recommendations from Prior Audit	30

1. Summary of the Findings

Purpose and Scope of the Actuarial Audit

This actuarial audit reviews the June 30, 2021 actuarial valuation performed by the Office of the State Actuary (OSA). The purpose of this audit is to verify that the results of the valuation are accurate and that the assumptions the valuation is based upon are reasonable. The following tasks were performed in this audit:

- Evaluation of the data used in the valuation
- Full independent replication of the key valuation results
- Evaluation of the reasonableness of the assumptions used in the valuation
- Analysis of valuation results and reconciliation of material differences (if any)
- Analysis of the written work product

Audit Conclusion

The results of this audit are very positive. Specifically, we want to highlight the following:

- Reasonable Assumptions:
 - The demographic assumptions were all reviewed as part of the 2013 – 2018 Demographic Experience study. Milliman completed an actuarial audit of that study and based on our findings in that audit, we believe that all the recommended assumptions used to value liabilities are reasonable. Please see our report dated May 1, 2020 for more information about our findings. In addition, Milliman reviewed the assumptions added as part of the revision to the LEOFF 2 benefit formula pursuant to SHB 1701 and found them to be reasonable.
 - The economic assumptions were reviewed as part of this year's audit. We reviewed the assumptions recommended by the OSA in its 2021 Report on Financial Condition and Economic Experience Study and adopted by the Pension Funding Council (PFC) and LEOFF 2 Board. We found all assumptions used to be reasonable.
- Contributions toward Funding: Washington State has funding that is superior to that of most statewide systems. The use of the aggregate actuarial cost method, along with relatively short amortization periods for PERS and TRS Plans 1, limits the contributions deferred to future generations in comparison to what is done in most other states.
- Accurate Calculations: Our independent calculations matched OSA's closely in all material aspects of the valuation.
- Compliance with Actuarial Standards of Practice: We found the work performed by OSA to be in compliance with the relevant actuarial standards of practice.

Based upon our review of the June 30, 2021 actuarial valuation, we found the actuarial work performed by OSA was reasonable, appropriate, and accurate. We closely matched the assets, liabilities, and contribution rates calculated by OSA.

Statement of Key Findings

Membership Data

We performed tests on both the raw data supplied by the Department of Retirement Systems (DRS) and the processed data used by the OSA in the June 30, 2021 actuarial valuation. We found that there was an excellent match between the data supplied by DRS and the data used by OSA. Based on this review, we concluded that the individual member data used is complete. A summary is shown in the table below:

All Plans			
	OSA	Milliman	Ratio OSA/Milliman
Active Members			
Total Number	334,165	334,187	100.0%
Total Salaries (millions)	\$ 25,376	\$ 25,376	100.0%
Average Age	46.4	46.4	100.0%
Average Service	11.1	11.1	100.0%
Average Salary	\$ 75,933	\$ 75,932	100.0%
Retirees and Survivors			
Total Number	207,844	207,845	100.0%
Average Monthly Pension	\$ 2,093	\$ 2,092	100.0%
Terminated Members			
Total Number Vested	65,692	65,694	100.0%
Total Number Non-Vested	159,398	159,404	100.0%

Actuarial Value of Assets

We have reviewed the calculations for the actuarial value of assets used for each plan in the June 30, 2021 valuation. We found the calculations to be accurate and the methodology to be reasonable and in compliance with Actuarial Standards of Practice.

In accordance with SHB 1701, the balance of the LEOFF 2 benefits improvement account (LEOFF 2 BIA) will be transferred to the LEOFF 2 Retirement Fund by August 31, 2022. For purposes of calculating the funded status for LEOFF Plan 2 at the June 30, 2021 actuarial valuation date, the OSA included the June 30, 2021 LEOFF 2 BIA value of \$450 million in the actuarial value of assets. This did not have an effect on the calculated contribution rates for the 2023-25 biennium.

The actuarial value of assets is discussed in more detail in Section 3 of this report.

Actuarial Liabilities

We independently calculated the Present Value of Benefits, Normal Cost, and Actuarial Accrued Liability under the Entry Age Normal actuarial cost method for all systems. We found that all significant benefit provisions were accounted for in an accurate manner, the actuarial assumptions and methods are being applied as reported, and that our total liabilities matched those calculated by OSA closely. This was true both in aggregate and by individual plan.

A summary of the results for each system is shown in the table below. Note that, with the exception of the new LEOFF 2 benefit improvements under SHB 1701, the results below do not include changes for the laws of 2022. Further breakdowns are shown in Section 4.

	OSA	Milliman	Ratio OSA/Milliman
Present Value All Future Benefits (in \$Millions)			
PERS 1	\$ 11,216.3	\$ 11,201.5	100.1%
PERS 2/3	63,346.5	63,398.7	99.9%
TRS 1	8,093.8	8,090.5	100.0%
TRS 2/3	29,255.9	29,338.5	99.7%
SERS 2/3	9,905.7	9,916.2	99.9%
PSERS 2	2,048.6	2,051.8	99.8%
LEOFF 1	4,032.4	4,057.1	99.4%
LEOFF 2	21,074.5	21,134.4	99.7%
WSPRS	<u>1,889.4</u>	<u>1,893.2</u>	<u>99.8%</u>
Total PVB	\$ 150,863.1	\$ 151,081.9	99.9%

Benefits Changes during Current Biennium

There are several changes to benefits reflected in the calculated 2023-25 contribution rates. Based on our review, we find that the additional costs of these benefits are appropriately reflected. In particular, we verified the new LEOFF 2 benefit formula is accurately reflected in OSA's calculations. Under SHB 1701, the new LEOFF 2 benefit formula reflects an increase in the benefit accrual rate from 2.0% to 2.5% for years of service from 15 years to 25 years.

Funding

We reviewed the funding methods and their application. We find them reasonable and consistent with the Actuarial Standards of Practice and the objectives stated in RCW 41.45.010. Based on the Systems' funding methods and assumptions, we believe the employer contribution rates for each membership class are appropriately calculated.

Using the liabilities, present value of future salaries, and actuarial assets calculated by OSA, we matched OSA's calculations of the contribution rates.

Using the liabilities, present value of future salaries, and actuarial assets calculated by Milliman, the results were close to OSA's calculated contribution rates, as shown below. It should be noted that there is a more noticeable difference between the OSA calculated employer contribution rates for WSPRS and Milliman's estimate. This difference is caused by the leveraged nature of the calculation for WSPRS as discussed in more detail in Section 5. Given this leveraging and that Milliman was within about 0.2% of OSA's calculation of the Present Value of All Future Benefits, we found the difference in the two calculations of the WSPRS employer contribution rate to be reasonable.

Employer Contribution Rates

	OSA	Milliman	Difference OSA - Milliman
Employer Contribution Rates (Percent of Member Pay)			
PERS 1/2/3	11.05%	11.04%	0.01%
TRS 1/2/3	16.16%	16.28%	-0.12%
SERS 2/3	12.32%	12.36%	-0.04%
PSERS 2	11.31%	11.23%	0.08%
WSPRS	24.10%	24.42%	-0.32%
LEOFF 1	0.00%	0.00%	0.00%
LEOFF 2*	5.96%	5.96%	0.00%

* Based on a LEOFF 2 contribution rate structure of 100% of Entry Age Normal Cost rate with a 50%/30%/20% share for the member, employer, and the state, respectively.

Member Contribution Rates

	OSA	Milliman	Difference OSA - Milliman
Member Contribution Rates (Percent of Member Pay)			
PERS 1	6.00%	6.00%	0.00%
PERS 2	7.20%	7.19%	0.01%
TRS 1	6.00%	6.00%	0.00%
TRS 2	8.64%	8.64%	0.00%
SERS 2	8.47%	8.51%	-0.04%
PSERS 2	7.46%	7.48%	-0.02%
WSPRS	8.61%	8.61%	0.00%
LEOFF 1	0.00%	0.00%	0.00%
LEOFF 2*	9.94%	9.94%	0.00%

* Based on a LEOFF 2 contribution rate structure of 100% of Entry Age Normal Cost rate with a 50%/30%/20% share for the member, employer, and the state, respectively.

Funding is discussed in more detail in Section 5.

2023-25 Contribution Rates

The calculated 2023-25 contribution rates represent an increase over the 2021-23 contribution rates for all groups. It is our understanding that the Pension Funding Council supported an approach to cap the contribution rates at the current level at their October 2021 meeting. If this approach is adopted, this would result in no change in the contribution rates for the affected plans.

As specified in SHB 1701, the 2023-25 LEOFF 2 contribution rates may not exceed the contribution rates adopted for the 2021-23 biennium.

Plan 1 ad hoc Cost-of-Living Adjustments (COLAs)

SB 5676 provides a one-time 3% benefit increase to PERS plan 1 and TRS plan 1 retirees, up to a maximum of \$110 per month. The benefit increase goes into effect on July 1, 2022. The increase only applies for members who are not receiving a minimum benefit.

Previously, a one-time benefit increase of 1.5%, up to a maximum of \$62.50 per month was provided in 2018, and a one-time benefit increase of 3%, up to a maximum increase of \$62.50 per month, was provided in 2020.

Per SSB 6161 from the 2009 legislative session, all Plan 1 benefit improvements are paid within a fixed ten-year period. Per RCW 41.45.060(6-8), the amounts required for these benefit increases are not subject to, and are collected in addition to, any minimum contribution rates. As of the 2021 actuarial valuation, the contribution rates for benefit increases are 0.35% for PERS Plan 1 and 0.71% for TRS Plan 1. The Plan 1 PERS rates are paid by employers on all PERS, PSERS, and SERS payroll, while the TRS Plan 1 rates are paid by employers on all TRS payroll. When combined with the PERS Plan 1 minimum contribution rate of 3.50% and the TRS Plan 1 minimum contribution rate of 5.75%, the rates calculated in the actuarial valuation are 3.85% and 6.46%, respectively.

These three benefit increases are included in the 2021 actuarial valuation and will be included in projections of future contributions done by the OSA. However, the valuation and projections do not include the effect of any possible future ad hoc COLAs. It is our understanding of RCW 41.45.070 that possible future COLAs should not be reflected in the current contribution rates. Any future ad hoc COLAs would result in additional actuarial liability and additional employer contributions when compared to what is anticipated by the current valuation and projections.

Please note that under the requirements of Governmental Accounting Standards Board 67 and 68, financial reporting for pensions must reflect all projected benefit payments. From the GASB 68 implementation guide, "Projected benefit payments should include the effects of automatic cost-of-living adjustments (automatic COLAs). In addition, projected benefit payments should include the effects of...ad hoc COLAs, to the extent that they are considered substantively automatic." GASB states that "considerations that might be relevant to determining whether such changes are substantively automatic include the historical pattern of granting the changes, the consistency of the amounts of the changes or the changes relative to a defined inflation index."

With the Legislature granting COLAs in three consecutive legislative sessions, consideration should be given to the determination of whether the pattern indicates that the COLAs are substantively automatic. If they are, then the total pension liability for financial reporting will be increased to reflect future COLAs.

Actuarial Assumptions

We reviewed the assumptions used in the valuation and found them to be reasonable. A complete analysis of the demographic assumptions was done in 2020 for the 2013-2018 Demographic Experience Study. Please see our report dated May 1, 2020 for more information. In addition, Milliman reviewed the assumptions added as part of the revision to the LEOFF 2 benefit formula pursuant to SHB 1701 and found them to be reasonable.

The economic assumptions used were based on the OSA's 2021 Report on Financial Condition and Economic Experience Study completed in September 2021. While a full audit of that report is beyond the scope of our assignment, an actuarial audit would be incomplete without a review of the important economic assumptions used in the actuarial valuation.

We have the following comments regarding the economic assumptions:

- The expected return assumption of 7.00% recommended by the OSA is reasonable based on the future expectations of WSIB and reflecting the 2.35% long-term national inflation assumption.
- The inflation assumption of 2.35% nationwide and 2.75% for Washington state is reasonable, as is the real wage growth assumption of 0.50% for productivity. The general salary increase assumption of 3.25% is the sum of the Washington state inflation assumption and the real wage growth assumption. It should be noted that recent inflation has been significantly higher. At this point, we believe this increase is primarily a short-term spike. The long-term effect is less clear, but should continue to be monitored going forward.
- OSA assumes annual growth in active membership of 1.00%. Most public sector pension plans assume no future growth in system membership. Please note that this assumption only impacts the amortization of the Plan 1 Unfunded Actuarial Accrued Liability (UAAL) over 10 years. The small membership growth assumption over the 10-year amortization period has a modest impact on the calculated contribution rates.

Review of Preliminary Report

Because the final 2021 Actuarial Valuation reports have not been completed at this time, we base the comments on the preliminary report. Overall, we found OSA's report to be very thorough. We have made comments for consideration for the upcoming reports that may enhance an outside reader's understanding. These comments are related to additional disclosure and do not impact any of the actuarial calculations. Please see Section 6 of this report for more information about our comments.

Recommendations from Prior Audit

We have also reviewed the comments from our prior actuarial audit and reported on the incorporation of those comments. Our one recommendation pertaining to the valuation calculations was implemented.

Recommendations and Other Considerations

Recommended Changes to the 2021 Preliminary Valuation

None

Recommended Changes for Future Valuations with a Material Financial Impact

None

Recommended Changes for Future Valuations and Experience Studies with a Non-Material Financial Impact

None

Considerations for Future Valuations and Experience Studies with No Financial Impact

Please see Section 6 of this report for potential changes to the content disclosed in the valuation report and risk disclosures to be considered for future valuations. Each of these suggestions are informational only and would not affect the funding valuation results.

2. Membership Data

Audit Conclusion and Comments

We performed tests on both the raw data supplied by DRS and the processed data used by OSA in the June 30, 2021 actuarial valuation. We found that the data used by OSA was consistent with the data supplied by DRS.

Based on this review, we found that the individual member data used was appropriate and complete.

Overall, the data process appears to be thorough and accurate. We would add the following comments:

- **Raw Data:** DRS provided us with the files that were given to OSA, as well as the processed data files used by OSA in the actuarial valuation.

Completeness: The data that DRS provided to OSA contained all the necessary fields to perform the actuarial valuation.

Quality: Although we did not audit the data at the source, we performed some independent checks to confirm the overall reasonableness of the data. We compared the total retiree and beneficiary benefit amounts with the actual benefit payments made, as reported in the asset statements.

We also compared the total active member compensation on the DRS data with the estimated active payroll for 2020-2021. The actual member contribution amounts in the asset statements provided by DRS were divided by the applicable contribution rates for the prior year for each plan. This results in an estimated payroll for each plan. Based on this analysis, we found the compensation data to be reasonable.

- **Parallel Data Processing:** We performed independent edits on the raw data provided by DRS and then compared our results with the valuation data used by OSA, as summarized in the preliminary participant data summary on the OSA's website.

Our results do not match exactly, but do match very well. This is understandable, as some adjustments were made to annualize salaries for those with less than one year of service during the valuation period, and other adjustments were made for a few data elements outside of the expected range. Overall, each key data component matched very well, and we believe the individual member data used by the OSA was appropriate for valuation purposes.

A summary of the data for each plan is shown in Exhibit 2-1. In all cases, the summarized totals for our edited data matched those for OSA's valuation data closely. The "Milliman" column reflects the DRS data after adjustments by Milliman. The "OSA" column reflects the actual data used in the OSA's valuation as summarized in the preliminary participant data summary on the OSA's website.

**Exhibit 2-1
Member Statistics as of June 30, 2021**

All Plans			
	OSA	Milliman	Ratio OSA/Milliman
Active Members			
Total Number	334,165	334,187	100.0%
Total Salaries (millions)	\$ 25,376	\$ 25,376	100.0%
Average Age	46.4	46.4	100.0%
Average Service	11.1	11.1	100.0%
Average Salary	\$ 75,933	\$ 75,932	100.0%
Retirees and Survivors			
Total Number	207,844	207,845	100.0%
Average Monthly Pension	\$ 2,093	\$ 2,092	100.0%
Terminated Members			
Total Number Vested	65,692	65,694	100.0%
Total Number Non-Vested	159,398	159,404	100.0%

PERS 1			
	OSA	Milliman	Ratio OSA/Milliman
Active Members			
Total Number	875	875	100.0%
Total Salaries (millions)	\$ 62	\$ 62	100.0%
Average Age	68.4	68.6	99.7%
Average Service	26.2	26.2	100.0%
Average Salary	\$ 70,726	\$ 70,726	100.0%
Retirees and Survivors			
Total Number	42,726	42,726	100.0%
Average Monthly Pension	\$ 2,284	\$ 2,283	100.0%
Terminated Members			
Total Number Vested	240	240	100.0%
Total Number Non-Vested	2,275	2,275	100.0%

PERS 2			
	OSA	Milliman	Ratio OSA/Milliman
Active Members			
Total Number	124,648	124,660	100.0%
Total Salaries (millions)	\$ 9,430	\$ 9,430	100.0%
Average Age	47.3	47.3	100.0%
Average Service	11.6	11.6	100.0%
Average Salary	\$ 75,650	\$ 75,648	100.0%
Retirees and Survivors			
Total Number	63,481	63,481	100.0%
Average Monthly Pension	\$ 1,986	\$ 1,985	100.1%
Terminated Members			
Total Number Vested	29,001	29,001	100.0%
Total Number Non-Vested	122,008	122,013	100.0%

PERS 3			
	OSA	Milliman	Ratio OSA/Milliman
Active Members			
Total Number	38,109	38,111	100.0%
Total Salaries (millions)	\$ 2,739	\$ 2,739	100.0%
Average Age	44.2	44.2	100.0%
Average Service	8.8	8.8	100.0%
Average Salary	\$ 71,871	\$ 71,870	100.0%
Retirees and Survivors			
Total Number	7,157	7,157	100.0%
Average Monthly Pension	\$ 1,087	\$ 1,086	100.1%
Terminated Members			
Total Number Vested	6,705	6,705	100.0%
Total Number Non-Vested	-	-	100.0%

TRS 1			
	OSA	Milliman	Ratio OSA/Milliman
Active Members			
Total Number	164	164	100.0%
Total Salaries (millions)	\$ 18	\$ 18	100.0%
Average Age	70.1	70.3	99.7%
Average Service	34.4	34.4	100.0%
Average Salary	\$ 110,479	\$ 110,479	100.0%
Retirees and Survivors			
Total Number	30,683	30,683	100.0%
Average Monthly Pension	\$ 2,362	\$ 2,362	100.0%
Terminated Members			
Total Number Vested	82	82	100.0%
Total Number Non-Vested	224	224	100.0%

TRS 2			
	OSA	Milliman	Ratio OSA/Milliman
Active Members			
Total Number	24,166	24,167	100.0%
Total Salaries (millions)	\$ 2,027	\$ 2,027	100.0%
Average Age	41.7	41.7	100.0%
Average Service	7.8	7.8	100.0%
Average Salary	\$ 83,869	\$ 83,868	100.0%
Retirees and Survivors			
Total Number	6,571	6,571	100.0%
Average Monthly Pension	\$ 2,282	\$ 2,282	100.0%
Terminated Members			
Total Number Vested	3,042	3,043	100.0%
Total Number Non-Vested	7,852	7,852	100.0%

TRS 3			
	OSA	Milliman	Ratio OSA/Milliman
Active Members			
Total Number	55,127	55,128	100.0%
Total Salaries (millions)	\$ 5,422	\$ 5,422	100.0%
Average Age	46.8	46.8	100.0%
Average Service	14.7	14.7	100.0%
Average Salary	\$ 98,350	\$ 98,351	100.0%
Retirees and Survivors			
Total Number	16,892	16,892	100.0%
Average Monthly Pension	\$ 1,411	\$ 1,410	100.1%
Terminated Members			
Total Number Vested	8,503	8,503	100.0%
Total Number Non-Vested	-	-	100.0%

SERS 2			
	OSA	Milliman	Ratio OSA/Milliman
Active Members			
Total Number	28,686	28,686	100.0%
Total Salaries (millions)	\$ 1,185	\$ 1,185	100.0%
Average Age	49.0	49.0	100.0%
Average Service	8.5	8.5	100.0%
Average Salary	\$ 41,295	\$ 41,295	100.0%
Retirees and Survivors			
Total Number	12,219	12,219	100.0%
Average Monthly Pension	\$ 1,006	\$ 1,006	100.0%
Terminated Members			
Total Number Vested	6,662	6,662	100.0%
Total Number Non-Vested	19,773	19,773	100.0%

SERS 3			
	OSA	Milliman	Ratio OSA/Milliman
Active Members			
Total Number	33,509	33,512	100.0%
Total Salaries (millions)	\$ 1,403	\$ 1,403	100.0%
Average Age	49.6	49.6	100.0%
Average Service	10.1	10.1	100.0%
Average Salary	\$ 41,873	\$ 41,873	100.0%
Retirees and Survivors			
Total Number	12,320	12,320	100.0%
Average Monthly Pension	\$ 566	\$ 566	100.0%
Terminated Members			
Total Number Vested	9,405	9,405	100.0%
Total Number Non-Vested	-	-	100.0%

PSERS 2			
	OSA	Milliman	Ratio OSA/Milliman
Active Members			
Total Number	9,132	9,133	100.0%
Total Salaries (millions)	\$ 684	\$ 684	100.0%
Average Age	40.8	40.8	100.0%
Average Service	5.8	5.8	100.0%
Average Salary	\$ 74,920	\$ 74,920	100.0%
Retirees and Survivors			
Total Number	459	459	100.0%
Average Monthly Pension	\$ 1,092	\$ 1,092	100.0%
Terminated Members			
Total Number Vested	796	796	100.0%
Total Number Non-Vested	4,521	4,521	100.0%

LEOFF 1			
	OSA	Milliman	Ratio OSA/Milliman
Active Members			
Total Number	13	13	100.0%
Total Salaries (millions)	\$ 2	\$ 2	100.0%
Average Age	68.3	68.3	100.0%
Average Service	43.2	43.2	100.0%
Average Salary	\$ 126,512	\$ 122,559	103.2%
Retirees and Survivors			
Total Number	6,516	6,516	100.0%
Average Monthly Pension	\$ 4,719	\$ 4,719	100.0%
Terminated Members			
Total Number Vested	-	-	100.0%
Total Number Non-Vested	26	26	100.0%

LEOFF 2			
	OSA	Milliman	Ratio OSA/Milliman
Active Members			
Total Number	18,683	18,685	100.0%
Total Salaries (millions)	\$ 2,289	\$ 2,289	100.0%
Average Age	42.3	42.3	100.0%
Average Service	13.1	13.1	100.0%
Average Salary	\$ 122,513	\$ 122,507	100.0%
Retirees and Survivors			
Total Number	7,574	7,575	100.0%
Average Monthly Pension	\$ 4,684	\$ 4,689	99.9%
Terminated Members			
Total Number Vested	1,115	1,116	99.9%
Total Number Non-Vested	2,626	2,627	100.0%

WSPRS 1			
	OSA	Milliman	Ratio OSA/Milliman
Active Members			
Total Number	318	318	100.0%
Total Salaries (millions)	\$ 40	\$ 40	100.0%
Average Age	50.4	50.4	100.0%
Average Service	23.6	23.6	100.0%
Average Salary	\$ 126,512	\$ 126,512	100.0%
Retirees and Survivors			
Total Number	1,243	1,243	100.0%
Average Monthly Pension	\$ 4,996	\$ 4,996	100.0%
Terminated Members			
Total Number Vested*	97	97	100.0%
Total Number Non-Vested	16	16	100.0%

* Includes 35 disability retired members currently receiving benefits from outside the pension funds

WSPRS 2			
	OSA	Milliman	Ratio OSA/Milliman
Active Members			
Total Number	735	735	100.0%
Total Salaries (millions)	\$ 75	\$ 75	100.0%
Average Age	34.7	34.7	100.0%
Average Service	8.6	8.6	100.0%
Average Salary	\$ 101,438	\$ 101,438	100.0%
Retirees and Survivors			
Total Number	3	3	100.0%
Average Monthly Pension	\$ 959	\$ 959	100.0%
Terminated Members			
Total Number Vested	44	44	100.0%
Total Number Non-Vested	77	77	100.0%

Members Receiving TAP Annuities			
	OSA	Milliman	Ratio OSA/Milliman
PERS 3			
Total Number	964	964	100.0%
Average Age	67.2	67.3	99.9%
Average Monthly Benefit	\$ 1,392	\$ 1,396	99.7%
TRS 3			
Total Number	2,053	2,053	100.0%
Average Age	68.0	68.1	99.9%
Average Monthly Benefit	\$ 1,508	\$ 1,511	99.8%
SERS 3			
Total Number	1,158	1,158	100.0%
Average Age	69.2	69.2	100.0%
Average Monthly Benefit	\$ 750	\$ 755	99.3%
All Members			
Total Number	4,175	4,175	100.0%
Average Age	68.1	68.2	99.9%
Average Monthly Benefit	\$ 1,271	\$ 1,275	99.7%

3. Actuarial Value of Assets

Audit Conclusion and Comments

We have reviewed the calculations for the actuarial value of assets used for each plan in the June 30, 2021 valuation. We found the calculations to be reasonable and the methodology to be appropriate and in compliance with Actuarial Standards of Practice.

The method used to determine the actuarial value of assets smooths investment gains and losses by reflecting a portion of the difference between the actual market value of assets and the expected market value for every fiscal year. For each year and each plan, a base for smoothed recognition over time is established equal to that difference.

The larger the deviation from expectation, the longer the recognition period for that base, with a level dollar amount recognized for each year of that period. For the largest deviations (more than 7% above or below the assumption), the gains or losses are recognized over eight years, whereas when the actual return is within 1% of the assumption, the gain or loss is recognized immediately. Additionally, a “corridor” is applied to make sure that the smoothed actuarial value of assets stays within 30% of the market value of assets.

Although it is unusual to recognize investment gains and losses over different periods, we found it to be a reasonable approach since the maximum smoothing period is reasonable and the method allows the actuarial value of assets to converge to market more rapidly if gains and losses are small.

We independently calculated the actuarial value of assets for each plan based on financial information provided by DRS and the Washington State Investment Board (WSIB). DRS and WSIB both provide market values of assets by plan. Note that there are small differences between the values provided by DRS and WSIB. Per prior conversations with OSA, the DRS values are used for the market value of assets. The WSIB data is only used to determine the monthly cash flows (contributions minus benefit payments) needed to calculate the expected value of assets.

A change has been made from previous valuations in the treatment of the scheduled transfer from the LEOFF 2 benefits improvement account (LEOFF 2 BIA) to LEOFF Plan 2 assets. In accordance with SHB 1701, by August 31, 2022, the balance of the LEOFF 2 BIA will be transferred to the LEOFF 2 Retirement Fund. For purposes of calculating the funded status for LEOFF Plan 2 at the June 30, 2021 actuarial valuation, the OSA included the June 30, 2021 LEOFF 2 BIA value of \$450 million in the actuarial value of assets. This did not have an effect on the calculated contribution rates for the 2023-25 biennium.

We used the information from DRS, WSIB, along with the outstanding gain/loss bases as published in the 2021 Actuarial Valuation Report. With this information and the asset methodology, our independent calculations were within 0.01% of the OSA’s calculation for every plan.

See the following exhibit for a comparison.

**Exhibit 3-1
Comparison of Actuarial Value of Assets by Plan**

AVA (millions)				
	OSA	Milliman		Ratio OSA/Milliman
PERS				
Plan 1	\$ 8,064	\$ 8,064		100.0%
Plan 2/3 (DB)	\$ 49,729	\$ 49,724		100.0%
TRS				
Plan 1	\$ 6,001	\$ 6,001		100.0%
Plan 2/3 (DB)	\$ 19,748	\$ 19,742		100.0%
SERS				
Plan 2/3 (DB)	\$ 7,430	\$ 7,429		100.0%
PSERS				
Plan 2	\$ 1,013	\$ 1,013		100.0%
LEOFF				
Plan 1	\$ 6,143	\$ 6,142		100.0%
Plan 2	\$ 16,045	\$ 16,044		100.0%
WSPRS				
Plan 1 & 2	\$ 1,483	\$ 1,483		100.0%

Note: the LEOFF Plan 2 value above does not include the LEOFF 2 BIA.

As discussed above, OSA uses an asset smoothing method to reduce volatility. A five-year smoothing method is the most commonly used method among large public retirement systems. OSA uses a variable length of smoothing period, with eight years as the longest possible period. We find the use of an asset smoothing method is appropriate, and we generally recommend this to our clients, particularly in systems where contribution rates change annually or biennially.

When a smoothing method is used, the actuarial value of assets will deviate from the market value of assets. Many public retirement systems apply a corridor so that the actuarial value of assets is not allowed to deviate from the market value by more than a certain percentage. The potential downside of using a corridor is that it can cause significant contribution rate volatility when the assets are outside the corridor. OSA applies a corridor of 30% (if applicable).

Typically, the longer the recognition period, the more important it is to have a corridor. We believe that the eight-year smoothing period, coupled with the application of the corridor, is in compliance with ASOP No. 44, the actuarial standard of practice for the selection and use of asset valuation methods for pension valuations.

4. Actuarial Liabilities

Audit Conclusion and Comments

We independently calculated the present value of future benefits and future salaries, and the Entry Age Normal Cost rates for the Washington State retirement systems. We found that all significant benefit provisions were accounted for in an accurate manner and the actuarial assumptions and methods are being applied correctly. Our total liabilities closely matched those calculated by OSA. This was true both in aggregate and by System.

Note that there will always be differences in the calculated liabilities when calculated by different actuaries; however, the results should not deviate significantly. The level of consistency we found in this audit provides a high level of assurance that the results of the valuation accurately reflect the liabilities of the Washington State retirement systems based on the plan provisions, assumptions, methods, and census and financial data.

We incorporated the following information into our valuation system:

- **Data** – We used the same valuation data used by OSA. As discussed in Section 2, we confirmed that this data was very consistent with the data provided by DRS.
- **Assumptions and Methods** – We used the assumptions and methods used by OSA for the June 30, 2021 actuarial valuation. This was supplemented by discussions between OSA and Milliman on the technical application of these methods.
- **Benefit Provisions** – We obtained this information from the Revised Code of Washington and various member handbooks.

We then performed an independent parallel valuation as of June 30, 2021. Based on this valuation, we completed a detailed comparison of the Present Value of Future Benefits (PVFB) computed in our independent valuation and the amounts calculated by OSA. Exhibit 4-1 shows a summary of this analysis broken down by benefit type. Exhibit 4-2 shows a summary of this analysis broken down by System. The results were reasonable, and our calculated PVFB values match closely with those calculated by OSA.

Exhibit 4-1
Present Value of Future Benefits by Benefit Type

(in \$Millions)	All Systems in Aggregate		
	OSA	Milliman	O / M Ratio
Present Value All Future Benefits			
Retirement	\$70,119.1	\$70,188.8	99.9%
Termination	9,996.6	10,069.4	99.3%
Death	860.8	851.4	101.1%
Disability	<u>892.0</u>	<u>889.9</u>	<u>100.2%</u>
Total Actives	\$81,868.5	\$81,999.5	99.8%
Terminated Vested	\$6,714.5	\$6,789.0	98.9%
Terminated Not Vested	<u>578.1</u>	<u>577.9</u>	<u>100.0%</u>
Total Inactive, not in Payment	\$7,292.6	\$7,366.9	99.0%
Retired	\$55,220.0	\$55,178.0	100.1%
Disabled	2,174.1	2,206.7	98.5%
Survivor	3,084.4	3,104.1	99.4%
LOP Liability	<u>245.0</u>	<u>245.5</u>	<u>99.8%</u>
Total Annuitants	\$60,723.5	\$60,734.3	100.0%
Total Members	\$149,884.6	\$150,100.7	99.9%

**Exhibit 4-2
Present Value of Future Benefits by System**

	OSA	Milliman	Ratio OSA/Milliman
Present Value All Future Benefits (in \$Millions)			
PERS 1			
Active Members	\$ 318.7	\$ 317.7	100.3%
Inactive Members	<u>10,897.6</u>	<u>10,883.9</u>	<u>100.1%</u>
Total	\$ 11,216.3	\$ 11,201.5	100.1%
PERS 2/3			
Active Members	\$ 38,450.4	\$ 38,494.0	99.9%
Inactive Members	<u>24,896.1</u>	<u>24,904.7</u>	<u>100.0%</u>
Total	\$ 63,346.5	\$ 63,398.7	99.9%
TRS 1			
Active Members	\$ 98.9	\$ 98.7	100.1%
Inactive Members	<u>7,995.0</u>	<u>7,991.8</u>	<u>100.0%</u>
Total	\$ 8,093.8	\$ 8,090.5	100.0%
TRS 2/3			
Active Members	\$ 20,855.3	\$ 20,917.2	99.7%
Inactive Members	<u>8,400.6</u>	<u>8,421.3</u>	<u>99.8%</u>
Total	\$ 29,255.9	\$ 29,338.5	99.7%
SERS 2/3			
Active Members	\$ 5,888.6	\$ 5,891.3	100.0%
Inactive Members	<u>4,017.0</u>	<u>4,024.9</u>	<u>99.8%</u>
Total	\$ 9,905.7	\$ 9,916.2	99.9%
PSERS 2			
Active Members	\$ 1,861.9	\$ 1,863.3	99.9%
Inactive Members	<u>186.8</u>	<u>188.5</u>	<u>99.1%</u>
Total	\$ 2,048.6	\$ 2,051.8	99.8%
LEOFF 1			
Active Members	\$ 19.7	\$ 20.8	94.9%
Inactive Members	<u>4,012.7</u>	<u>4,036.3</u>	<u>99.4%</u>
Total	\$ 4,032.4	\$ 4,057.1	99.4%
LEOFF 2			
Active Members	\$ 13,601.3	\$ 13,621.6	99.9%
Inactive Members	<u>7,473.3</u>	<u>7,512.8</u>	<u>99.5%</u>
Total	\$ 21,074.5	\$ 21,134.4	99.7%
WSPRS			
Active Members	\$ 774.0	\$ 774.9	99.9%
Inactive Members	<u>1,115.4</u>	<u>1,118.3</u>	<u>99.7%</u>
Total	\$ 1,889.4	\$ 1,893.2	99.8%

We also looked at the Entry Age Normal Accrued Liability (EAN AL). EAN AL is used by OSA to measure the funded ratios and is described in Section 5 of this report. Exhibit 4.3 shows the audit had a good match of EAN AL. The EAN AL is consistent with the requirements of GASB No. 67 and GASB No. 68.

Exhibit 4-3
Comparison of Entry Age Normal Accrued Liability

	OSA	Milliman	Ratio OSA/Milliman
Entry Age Normal Accrued Liability (EAN AL) (in \$Millions)			
PERS 1	\$ 11,190.9	\$ 11,177.0	100.1%
PERS 2/3	52,039.3	52,057.0	100.0%
TRS 1	8,088.3	8,085.2	100.0%
TRS 2/3	21,312.3	21,492.9	99.2%
SERS 2/3	7,958.1	7,975.2	99.8%
PSERS 2	1,038.4	1,042.3	99.6%
LEOFF 1	4,032.0	4,056.5	99.4%
LEOFF 2	15,818.8	15,867.5	99.7%
WSPRS	1,619.8	1,623.4	99.8%
Total EAN AL	\$123,097.8	\$ 123,377.0	99.8%

Lastly, we looked at both the present value of future salaries and the Entry Age Normal Cost (EANC) rates, which are used in the determination of the minimum contribution rates.

Exhibit 4-4
Present Value of Future Salaries and EANC Rate

(in \$Millions)	All Systems in Aggregate		
	OSA	Milliman	O / M Ratio
Present Value of Future Salaries	\$249,456.1	\$250,111.1	99.7%
Entry Age Normal Cost Rate	11.24%	11.10%	101.3%

Recommendations

No changes are recommended to the calculations of the liabilities and normal cost rate in the 2021 valuation.

5. Funding

Audit Conclusion and Comments

We reviewed the funding methods and their application. We find them reasonable and consistent with the Actuarial Standards of Practice and the objectives stated in RCW 41.45.010. Based on the Systems' funding methods and assumptions, we believe the employer contribution rates for each membership class are appropriately calculated.

When we used the liabilities, present value of future salaries, and actuarial assets calculated by OSA, we matched OSA's contribution rate calculations. When we used the liabilities, present value of future salaries, and actuarial assets calculated by Milliman, the results were close to OSA's calculated contribution rates, as shown below.

It should be noted that there is a more noticeable difference between the OSA calculated employer contribution rate for WSPRS and Milliman's estimate. This difference is caused by the leveraged nature of the calculation for WSPRS. There is leverage to the employer contribution rates for WSPRS because the employee rate is limited by the member maximum rate. This results in an employer contribution in excess of the 50% share of the Present Value of Future Contributions. In addition, there is more leverage for the WSPRS Plan because, due to the Plan's maturity, the Present Value of Future Salaries that provide the base for future contributions are a smaller percentage of the actuarial value of assets than that percentage for the other Plans. Given this leveraging and that Milliman was within about 0.2% of OSA's calculation of the Present Value of All Future Benefits, we conclude that the difference in the two calculations of the WSPRS employer contribution rate is reasonable.

Employer Contribution Rates

	OSA	Milliman	Difference OSA - Milliman
Employer Contribution Rates (Percent of Member Pay)			
PERS 1/2/3	11.05%	11.04%	0.01%
TRS 1/2/3	16.16%	16.28%	-0.12%
SERS 2/3	12.32%	12.36%	-0.04%
PSERS 2	11.31%	11.23%	0.08%
WSPRS	24.10%	24.42%	-0.32%
LEOFF 1	0.00%	0.00%	0.00%
LEOFF 2*	5.96%	5.96%	0.00%

* Based on a LEOFF 2 contribution rate structure of 100% of Entry Age Normal Cost rate with a 50%/30%/20% share for the member, employer, and the state, respectively.

Member Contribution Rates

	OSA	Milliman	Difference OSA - Milliman
Member Contribution Rates (Percent of Member Pay)			
PERS 1	6.00%	6.00%	0.00%
PERS 2	7.20%	7.19%	0.01%
TRS 1	6.00%	6.00%	0.00%
TRS 2	8.64%	8.64%	0.00%
SERS 2	8.47%	8.51%	-0.04%
PSERS 2	7.46%	7.48%	-0.02%
WSPRS	8.61%	8.61%	0.00%
LEOFF 1	0.00%	0.00%	0.00%
LEOFF 2*	9.94%	9.94%	0.00%

* Based on a LEOFF 2 contribution rate structure of 100% of Entry Age Normal Cost rate with a 50%/30%/20% share for the member, employer, and the state, respectively.

2023-25 Contribution Rates

The calculated 2023-25 contribution rates represent increase over the 2021-23 contributions for all groups. It is our understanding that the Pension Funding Council supported an approach to cap the contribution level at the current level at their October 2021 meeting. If this approach is adopted, this would result in no change in the contribution rates for the affected plans.

As specified in SHB 1701, the 2023-25 LEOFF 2 contribution rates may not exceed the contribution rates adopted for the 2021-23 biennium.

Plan 1 ad hoc Cost-of-Living Adjustments (COLAs)

SB 5676 provides a one-time 3% benefit increase to PERS plan 1 and TRS plan 1 retirees, up to a maximum of \$110 per month. The benefit increase goes into effect on July 1, 2022. The increase only applies for members who are not receiving a minimum benefit.

Previously, a one-time benefit increase of 1.5%, up to a maximum of \$62.50 per month was provided in 2018, and a one-time benefit increase of 3%, up to a maximum increase of \$62.50 per month, was provided in 2020.

Per SSB 6161 from the 2009 legislative session, all Plan 1 benefit improvements are paid within a fixed ten-year period. Per RCW 41.45.060(6-8), the amounts required for these benefit increases are not subject to, and are collected in addition to, any minimum contribution rates. As of the 2021 actuarial valuation, the contribution rates for benefit increases are 0.35% for PERS Plan 1 and 0.71% for TRS Plan 1. The Plan 1 PERS rates are paid by employers on all PERS, PSERS, and SERS payroll, while the TRS Plan 1 rates are paid by employers on all TRS payroll. When combined with the PERS Plan 1 minimum contribution rate of 3.50% and the TRS Plan 1 minimum contribution rate of 5.75%, the rates calculated in the actuarial valuation are 3.85% and 6.46%, respectively.

These three benefit increases are included in the 2021 actuarial valuation and will be included in projections of future contributions done by the OSA. However, the valuation and projections do not include the effect of any possible future ad hoc COLAs. It is our understanding of RCW 41.45.070 that possible future COLAs should not

be reflected in the current contribution rates. Any future ad hoc COLAs would result in additional actuarial liability and additional employer contributions when compared to what is anticipated by the current valuation and projections.

Please note that under the requirements of Governmental Accounting Standards Board 67 and 68, financial reporting for pensions must reflect all projected benefit payments. From the GASB 68 implementation guide, "Projected benefit payments should include the effects of automatic cost-of-living adjustments (automatic COLAs). In addition, projected benefit payments should include the effects of...ad hoc COLAs, to the extent that they are considered substantively automatic." GASB states that "considerations that might be relevant to determining whether such changes are substantively automatic include the historical pattern of granting the changes, the consistency of the amounts of the changes or the changes relative to a defined inflation index."

With the Legislature granting COLAs in three consecutive legislative sessions, consideration should be given to the determination of whether the pattern indicates that the COLAs are substantively automatic. If they are, then the total pension liability for financial reporting will be increased to reflect future COLAs.

Policy Objectives

The remainder of this section describes in detail why we believe the funding policies used to calculate contribution rates are reasonable and consistent with the objectives described in the RCW.

The contribution rate calculations for the Washington State retirement systems are complex. Much of this complexity is due to efforts to conform to articulated policy objectives. RCW 41.45.010 states that it is the intent of the legislature to provide a dependable and systematic process for funding the benefits provided to members and retirees of the State's retirement systems and sets out five specific goals:

1. To fully fund the Plans 2 and 3 as provided by law;
2. To fully amortize LEOFF Plan 1 costs not later than June 30, 2024;
3. To fully amortize the unfunded actuarial accrued liability for PERS and TRS Plans 1 within a rolling 10-year period, using methods and assumptions that balance needs for increased benefit security, decreased contribution rate volatility, and affordability of pension contribution rates;
4. To establish long-term employer contribution rates which will remain a relatively predictable proportion of the future state budgets; and
5. To fund, to the extent feasible, all benefits for Plans 2 and 3 members over the working lives of those members so that the cost of those benefits are paid by the taxpayers who receive the benefit of those members' service.

Although not specifically stated in RCW 41.45.010, the funding policies also achieve the following goals:

1. The same employer contribution rate is maintained for all members in the same class regardless of Plan. For example: employers make the same contribution for all TRS members regardless of whether the individual members are in Plans 1, 2, or 3. There is an exception to this rule for LEOFF Plans 1 and 2.
2. Funding risk is shared by both employers and members. In Plan 2, both employer and member contribution rates vary based on plan experience. In Plan 3, members take the risk associated with their contributions since they are deposited in the defined contribution plan.

Actuarial Cost Methods

The funding policies of the Washington State retirement systems are based on two actuarial cost methods: the Aggregate cost method and the Entry Age Normal cost method. The Funded Ratios are measured based on the Entry Age Normal cost method. The following text describes these methods.

Purpose of a Cost Method and Normal Cost

The purpose of any actuarial cost method is to allocate the cost of future benefits to specific time periods, typically during a member's projected working career. In this way, benefits are financed during the time in which services are provided.

The cost assigned to a specific year is called the Normal Cost.

Aggregate Cost Method

Under the Aggregate cost method, the Normal Cost rate is equal to the level percentage of pay necessary to fund the difference between the present value of all future benefits for current members (PVFB) and the actuarial value of assets (AVA). The difference between PVFB and AVA is funded by future contributions. Each year, the Normal Cost spreads all required future contributions evenly over the present value of future salaries for current members. When actual experience is better or worse than expected experience, the Normal Cost in subsequent years will go down or up, respectively. The contribution calculated by the Aggregate cost method is therefore equal to the Aggregate Normal Cost.

Note that while appropriate for funding, this method does not result in a calculation of the liability independent of assets and therefore does not provide a meaningful "Funded Ratio." OSA currently addresses this by use of the Entry Age Normal cost method. That method is used to calculate the Funded Ratio and is used for GASB accounting and financial reporting.

With the exception of LEOFF 2, the Plans 2 and 3 employer and member contribution rates are primarily set using the Aggregate cost method.

Entry Age Normal Actuarial Cost Method

The Entry Age Normal cost method is the most common method used by public plans. The goal of the Entry Age Normal cost method is the theoretical allocation of projected benefit costs as a level percent of pay over the members' entire working lifetimes. The Entry Age Normal Cost (EANC) is the theoretical level percent of pay which, if contributed from the members' dates of hire to their dates of projected retirement, would exactly fund their benefits if all experience exactly matched the actuarial assumptions. Actual experience better or worse than expected will not change the EANC. The EANC as a percentage of pay is not anticipated to increase or decrease from year to year. Experience better or worse than expected creates a positive or negative Unfunded Actuarial Accrued Liability (UAAL), which is funded separately from the EANC.

Therefore, systems using the Entry Age Normal cost method have two components to their calculated costs: (1) the EANC, which is meant to be a level % of pay, and (2) the UAAL amortization contribution, which is the balancing item that makes sure all future benefits are financed if future experience follows the assumptions, and contributions are made according to schedule.

For the purposes of the Washington State plans, the Entry Age Normal cost method is only used to set minimum contribution rates based on the EANC. This is a logical use of EANC and should increase contribution stability since it represents the theoretical level percentage of pay contribution required to fund benefits if future experience follows the actuarial assumptions. Specifically, RCW sets minimum contribution rates as follows:

- PERS, TRS, SERS and PSERS Plans 2 and 3 employers and Plan 2 members have a minimum contribution rate based on sharing 80% of EANC. [RCW 41.45.155 and RCW 41.45.158]
- WSPRS employers and members have a minimum contribution rate based on sharing 70% of EANC [RCW 41.45.0631].
- SHB 1701 established a policy that sets minimum contribution rates based on a percentage of EANC for LEOFF Plan 2. If the funded status (ratio of actuarial value of assets to the Actuarial Accrued Liability under the Entry Age Normal cost method) is less than 105%, then the minimum total contribution rates for members, the state, and employers will be 100% of the Plan 2 normal cost rate as calculated under the Entry Age Normal cost method. Similarly, if the funded status is between 105% and 110%, then the minimum is 90% of the EANC and when the funded status is greater than 110%, then the minimum contribution is equal to 80% of EANC. Currently, the contribution is paid 50% by members, 30% by employers, and 20% by the state per RCW 41.26.725.

Plans 2 and 3 Funding Policy

In general, the Plans 2 and 3 funding policies for PERS, TRS, SERS, PSERS, and WSPRS are based on the Aggregate Cost method and work as described below. Note that where the following text makes references to “Plans 2 and 3” the references should be substituted with “Plans 1 and 2” for WSPRS. Also, please note that PSERS has no Plan 3. RCW 41.45 describes the actuarial funding of state retirement systems. The primary references for Plans 1, 2, and 3 funding are [RCW 41.45.060 Basic State and Employer Contribution Rates], [RCW 41.45.061 Required Contribution Rates for Plan 2 Members] and [RCW 41.45.0631 Washington State Patrol Retirement System].

1. First, the remaining Plans 2 and 3 “past liability balances,” which are financed entirely by employer contributions, are determined. For PERS, TRS and SERS, these are due to gain sharing, and for WSPRS these are due to distributions under RCW 43.43.270(2) for survivors of members who became disabled under RCW 43.43.040(2) prior to July 1, 2006.

The remaining past liability balances are determined by taking the prior year’s balance, adding interest, and subtracting employer contributions based on the corresponding supplemental employer percent of pay contribution rates. The SERS balance was depleted during the 2017-2019 biennium and the PERS and TRS balances are scheduled to be depleted during the 2019-2021 biennium. This means that the gain sharing balances do not result in supplemental employer contributions for the rates calculated with the July 1, 2019 actuarial valuation for SERS, PERS, or TRS. WSPRS continues with the rate of 1.32% for the survivors of members who became disabled prior to July 1, 2006.

2. The Plans 2 and 3 Present Value of Future Contributions shared by employers and members is calculated as:

	Present Value All Future Benefits
minus	Actuarial Value of Assets
minus	Past Liability Balance
	Present Value of Future Contributions

3. The Plans 2 and 3 Aggregate Normal Cost Rate is determined by spreading the present value of future contributions shared by employers and members over the present value of future member salaries for Plans 2 and 3. The calculation takes into account that Plan 3 members do not contribute to the defined benefit plans.

- Plans 2 and 3 minimum employer and member contribution rates are applied based on the EANC. The minimum rate for PERS, TRS, SERS, and PSERS is 80% of EANC. The minimum rate for WSPRS is 70% of EANC. As mentioned above, LEOFF 2 contributions have a minimum of 80%-100% of EANC depending on the Plan funded ratio.
- Plans 2 maximum member contribution rates are applied to TRS [RCW 41.45.061] and both Plans 1 and 2 of WSPRS [RCW 41.45.0631]. For both WSPRS and TRS, the 50% share of the Present Value of Future Contributions described in item 2 above for the 2021 valuation is more than the maximum member contribution rate, so the maximum rate applies for this valuation year. The employer rate is higher than 50% of the Present Value of Future Contributions. Note that this adds leverage to the employer contribution rate calculation. OSA's calculation of the Present Value of Future Benefits was 99.8% of Milliman's calculation, but the calculated employer contribution rate was 24.10% compared to Milliman's estimate of 24.42%.
- The Plans 2 and 3 employer rates are increased by the supplemental contributions rates used to finance past liability balances. As described above, these are: WSPRS 0.35%. Note that these supplemental contribution rates will be sufficient to amortize the past liability balance at the end of the 2023-25 biennium.
- PSERS rates are also adjusted for benefit improvements effective in the year 2022. There was as calculated liability of \$10.9 million for HB 1669 concerning disability benefits in the PSERS system.

LEOFF 2 Funding Policy

The LEOFF 2 funding policy follows the same general pattern as the other Plans 2 and 3 with fewer details. The total contribution is paid 50% by members, 30% by employers, and 20% by the state [RCW 41.26.725].

SHB 1701 established minimum contribution rates based on the funded ratio and the EANC. The minimum contribution rate is 100% of EANC when the funded ratio is less than 105% based on the Entry Age Normal cost method. If the funded ratio is between 105% and 110%, the minimum contribution rate is 90% of the EANC and when the funded ratio is greater than 110%, there is a minimum contribution rate of 80% of the EANC. Our understanding of Board policy is that the minimum contribution rate is compared to the contribution rate determined by the Aggregate cost method. Note that for the 2023-25 biennium, the rates are capped at the rates from the 2021-23 biennium.

This funding approach works well to establish a stable contribution rate (EANC-based rate) while ensuring liabilities are financed over a responsible period (Aggregate Normal Cost).

Plans 1 Funding Policy (PERS, TRS, SERS and PSERS)

PERS and TRS Plans 1 have both been closed to new members since 1977. The PERS and TRS Plans 1 funding policies have been designed to produce equal total contribution rates for PERS and TRS employers regardless of whether their employees are in Plans 1, 2, or 3, and to share the responsibility of PERS Plan 1 benefits with SERS and PSERS employers. It works as follows:

- All remaining active PERS and TRS Plans 1 members have fixed contribution rates equal to 6.00% of pay.
- The remaining balances for any liability from Plan 1 benefit improvements effective after June 30, 2009 are determined. These liabilities are financed based on rates that were calculated to amortize them over a fixed 10-year period using combined Plans 1, 2, and 3 salaries. The remaining balances are determined by taking the prior year's balance, adding interest, and subtracting employer contributions. PERS and TRS Plan 1 members had three separate cost-of-living (COLA) benefit increases effective July 1, 2018; July 1, 2020; and July 1, 2022. For PERS, SERS, and PSERS employers, there are contributions of 0.10% of payroll, 0.11% of payroll, and 0.14% of payroll for the three recent COLA increases, for a total of 0.35%. For TRS employers, the amounts are 0.21%, 0.23%, and 0.27% for a total of 0.71%. The balances for benefit improvements prior to the July 1, 2018 COLAs have now been exhausted.

3. The Present Value of Future Normal Costs (PVFNC) is determined. The Plan 1 funding policy defines this to be the present value of future contributions made by Plan 1 employees plus the present value of future employer contributions made as a percent of Plan 1 member pay based on the Plans 2 and 3 employer contribution rates calculated above. This must be considered to keep the contribution rates equal for Plans 1, 2, and 3.
4. The Plan 1 UAAL is calculated as:

	Present Value All Future Benefits
minus	PVFNC
minus	Actuarial Value of Assets
minus	Balance Post 2009 Improvements
	Unfunded Actuarial Accrued Liability
5. The UAAL Rate is calculated as the percent of Plans 1, 2, and 3 member pay to amortize the Plan 1 UAAL over 10 years as a level percentage of projected payroll. This is based on a rolling 10-year period which means every year the UAAL is amortized over a new 10-year period. This helps to keep rates stable while amortizing a material portion of the remaining UAAL each year.
6. Minimum contribution rates of 3.50% of pay for PERS 1 UAAL and 5.75% of pay for TRS 1 UAAL are applied. Note that the payments for the post-2009 benefit increases are added to the minimum contribution rates. As of now, the post-2009 benefit increases are the three recent ad hoc COLAs. As of the 2021 valuation, the minimum contribution rates exceed the contribution rates calculated based on a 10-year amortization of the UAAL. This means that the PERS 1 UAAL rate is equal to 3.85% (3.50% minimum plus 0.35% for COLAs) and the TRS 1 UAAL rate is 6.46% (5.75% minimum plus 0.71% for the COLAs).

Conference of Consulting Actuaries White Paper

In October 2014, the Conference of Consulting Actuaries (CCA) issued a white paper titled Actuarial Funding Policies and Practices for Public Pension Plans. The white paper was composed by a group of public plan actuaries from the major consulting firms that work with public plans and was the result of an extensive series of meetings which lasted for over two years. The white paper was not meant as a replacement for the actuarial standards of practice. The white paper focuses on a Level Cost Allocation Model (LCAM) and provides detailed analysis for classifying each of the three major components of LCAM funding policies: (a) cost methods, (b) asset methods and (c) amortization methods. The classification system uses the following terms:

Categories Under CCA Guidelines	
Model Practices	Those practices most consistent with the Level Cost Allocation Model (LCAM).
Acceptable Practices	Generally those which, while not consistent with the LCAM, are well established in practice and typically do not require additional analysis.
Acceptable Practices with Conditions	May be acceptable in some circumstances either to reflect different policy objectives or on the basis of additional analysis.
Non-Recommended Practices	Systems using these practices should acknowledge the policy concerns identified in the CCA Guidelines or acknowledge they reflect different policy objectives.
Unacceptable Practices	No description provided by CCA, but implication is that these should not be used.

We will refer to the CCA white paper in our discussion below.

Evaluation of Funding Policy

As stated earlier, we believe the funding policies described above are consistent with Actuarial Standards of Practice and with the intended policy objectives. Additional specific comments follow below.

The Aggregate cost method is used as the foundation for the funding policies. The Aggregate cost method is classified as “Acceptable” by the CCA white paper, is well established in practice, and is consistent with the objectives in that document.

The Aggregate cost method is specifically designed to fully fund all future benefits for current members (that are not financed by accumulated assets) over the remaining projected working lifetimes of those members. This represents excellent “demographic matching,” which is to say benefits are funded over the working lifetimes of the members receiving them. It is also excellent at avoiding “agency risk” issues, which means use of the Aggregate method makes it very difficult to push the cost of benefits for current members onto future generations.

The Aggregate method is also consistent with the policy objectives identified in RCW 41.45.010, which is particularly evidenced by how well the fifth policy objective is satisfied: to fund, to the extent feasible, all benefits for Plans 2 and 3 members over the working lives of those members so that the cost of those benefits are paid by the taxpayers who receive the benefit of those members' service.

The Aggregate method's primary shortcoming is that it passes all gains and losses through to the Normal Cost, which pays for them over the comparatively short period of the active members' projected remaining working lifetimes. The downside of this is that it can decrease the stability of short-term costs.

This shortcoming is addressed in the funding policy by smoothing asset gains and losses over as much as eight years, as well as by applying the minimum contribution rates. Eight-year asset smoothing is longer than five years, which is the most common length of asset smoothing. The comparatively longer asset smoothing period helps partially offset the comparatively shorter financing period for gains and losses under the Aggregate cost method. The minimum contribution rates equal to 70% or 80% of the EANC help avoid temporary large decreases in contributions due to good investment experience at the peak of a market cycle.

The Plans 1 policy of contributing at a level which finances the UAAL over a rolling 10-year period based on the pay of Plans 1, 2, and 3 is a rough equivalent of the Aggregate Cost Method. The 10-year rolling period bears a very general similarity to financing UAAL over the members' projected remaining working lifetimes. When the minimum contribution rates of 3.50% for PERS 1 and 5.75% for TRS are added, the policy also has an element that will help to get the UAAL for the Plans 1 completely financed over a reasonable period instead of indefinitely re-amortizing it over a rolling 10-year period. The funding policy is very consistent with the third policy objective listed in RCW 41.45.010, which is to fully amortize the UAAL for PERS and TRS Plans 1 within a rolling 10-year period, using methods and assumptions that balance needs for increased benefit security, decreased contribution rate volatility, and affordability of pension contribution rates.

Paying 80% or more of EANC for LEOFF Plan 2 avoids making contributions which are significantly less than the expected long-term cost of benefits. Short-term rate stability is increased since rates will not fluctuate every year due to gains and losses, particularly investment gains and losses, being reflected in the Aggregate Normal Cost. Some margin is provided for adverse experience since the rates are higher than the Aggregate Normal Cost.

6. Preliminary Report, Risk Disclosures, and Recommendations from Prior Audit

Audit Conclusion and Comments Regarding OSA's Reports and Risk Disclosures

This section focuses on (a) compliance with Actuarial Standards of Practice and (b) suggestions of potential changes to the content shown in the valuation report and risk disclosures which may improve the usefulness of OSA's communications.

OSA's report meets the applicable Actuarial Standards of Practice. We feel that the amount of disclosure included in the report is commensurate with the size and complexity of the Washington State retirement systems. We found the page of links at the back of the report to be particularly useful in accessing the important information that the OSA provides. We are recommending a handful of items to be considered in the future.

Actuarial Standard of Practice No. 51 (ASOP 51)

Actuaries are required to follow the applicable Actuarial Standards of Practice (ASOPs) for certain work, such as actuarial valuations. ASOP 51 provides actuaries with guidance for assessing and disclosing the risk associated with measuring pension liabilities and the determination of pension plan contributions. ASOP 51 is a relatively new ASOP that was adopted by the Actuarial Standards Board in September of 2017 and was effective for work products with measurement dates on or after November 1, 2018.

Specifically, ASOP 51 directs the actuary to:

- Identify risks that may be significant to the plan.
- Assess the risks identified as significant to the plan. The assessment does not need to include numerical calculations.
- Disclose plan maturity measures and historical information that are significant to understanding the plan's risks.

ASOP 51 states that if in the actuary's professional judgment, a more detailed assessment would be significantly beneficial in helping the individuals responsible for the plan to understand the risks identified by the actuary, then the actuary should recommend that such an assessment be performed.

OSA provides a discussion of risk in the actuarial report, along with links to where more detailed information on risk can be found on the web. The OSA has also included a discussion of risk with recent fiscal notes. In our opinion, OSA's work product is consistent with ASOP 51.

Commentary on Risk Webpage

The [Commentary on Risk webpage](#) (underline indicates link to webpage) which is directly referenced and linked in the actuarial valuation is the primary tool for organizing the risk disclosure information on the various web pages. The information available through this organization satisfies the requirements of ASOP 51. It is divided into five easy to expand/collapse sections on: (1) Ways to Measure Risk, (2) Risk Measurements for Washington's Public Pension Plans, (3) Demographic Risks, (4) Historical Information, and (5) Plan Maturity Measures. This page contains a large amount of valuable information.

Since our prior actuarial audit, there have been updates to the Commentary on Risk webpage to include more plan-specific information and provide an expanded summary.

Summary of Considerations for the Future – New to this Report

Each of these suggestions are informational only and would not affect the funding valuation results. Note that our comments are based on the preliminary valuation report, so the final OSA report may address our comments related to the valuation report.

- **Financial Reporting: Monitor Plan 1 COLA Pattern.** Under GASB 67 and 68 financial reporting, if there is a historical pattern of granting ad hoc COLAs, it should be determined whether these COLAs are substantively automatic. Given COLAs have been granted to Plan 1 members each of the last 3 biennia, this determination should be reviewed closely. Our understanding is that OSA is monitoring the COLA pattern in this context. If Plan 1 COLAs are deemed to be substantively automatic at some point in the future, this would impact the GASB valuation reports. The total pension liability would increase, and the funded status would decrease if the Plan 1 COLAs are deemed to be substantively automatic.
- **Valuation Report: Disclose assumption for LEOFF 2 form of payment.** Certain LEOFF 2 members have the option of receiving either the 0.5% increase in the percentage formula or a lump sum payment based on months of service. The valuation assumes that members with 15 years or less of service at time of retirement will elect the lump sum option and those with more than 15 years of service will select the increase in the percentage formula. We agree this is a reasonable approach to valuing this benefit. Our suggestion is to explicitly disclose this assumption in the methods or assumptions section of the valuation report. It is our understanding that the OSA will be doing this in the final version of the actuarial valuation report.

Summary of Considerations for the Future – From Prior Actuarial Audit Report

Each of these suggestions are informational only and would not affect the funding valuation results. Although not necessary, we believe these continue to be worth considering.

- **Risk Discussion: Provide separate LEOFF 2 information.** The LEOFF 2 Board administers a separate System. Risk disclosure information that combines all Plans is not as useful for them as information provided separately for their Plan. As an example, the [Percentage of GF-S Allocated to Pensions](#) graph would be more useful to the LEOFF 2 Board if LEOFF 2 was provided separately.
- **Risk Discussion: Provide LEOFF 2 information as a % of pay instead of as a % of GF-S.** Some information such as the graph showing the probability of different contribution levels over the next 50 years presents contributions as a percent of GF-S. We compliment OSA for using this metric since it likely addresses the Legislature's most direct need, and we do not often see the metric of contributions as a % of the General Fund used. However, the LEOFF 2 Board's goal is to maintain contribution rates at a percent of pay that is as stable as practical. Therefore, showing this information as a percent of pay would be more useful for the LEOFF 2 Board.
- **Risk Discussion: Provide LEOFF 2 probability of funded statuses.** It is our understanding that the LEOFF 2 Board found the information provided by OSA on slide 12 of the [October 2019 OSA Board Presentation](#) and slide 6 of the [November 2019 Funding Work Session](#) materials to be extremely useful in making funding policy decisions. Specifically, the chart showing the probability of having different levels of future funded status for the current funding policy is a metric that could be useful for them to review every year. This could perhaps be added to the table of [Select Measures of Pension Risk](#) referred to as a key metric above or could be provided in combination with that table.
- **Valuation Report: Adjust the age service distributions so the number of retirement eligible members can be determined.** This request came from discussion with the LEOFF 2 Board Staff. Knowing how many members are eligible for retirement can be useful for planning purposes.

- **Historical Data Webpage: Provide graphs by plan for historical data by plan.** Tables with useful historical data are available on the [Historical Data Webpage](#). Information provided such as the ratio of actives to annuitants can help track maturity. However, it can be hard to visualize the trends using numbers, so providing the information in graphical form would likely be helpful. Also, columns in the tables often alternate between Plan 1 and Plan 2/3 making it harder to follow the trend for a specific plan. Providing graphs for some of the more important information by plan would enhance the ability to follow trends.

Lastly, since most of these suggestions are intended to help the PFC, the LEOFF 2 Board, and their respective staffs in their use of risk disclosures, we encourage direct communication between the OSA, PFC, and LEOFF 2 Board concerning their opinions on our suggestions.

Recommendations Addressed from Prior Actuarial Audit

The OSA has incorporated all of Milliman's prior recommendations. None of these changes materially affected the results of the 2021 valuation.