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LOS ANGELES COUNTY
EMPLOYEES RETIREMENT ASSOCIATION

ACTUARIAL REVIEW REPORT FOR THE JUNE 30, 2019 ACTUARIAL VALUATION OF RETIREMENT BENEFITS

Prepared by Cavanaugh Macdonald Consulting
March 2, 2020

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March 2, 2020

Mr. Richard Bendall
Chief, Internal Audit
Los Angeles County Employees Retirement Association
300 North Lake Avenue, Suite 820
Pasadena, CA 91101

Dear Mr. Bendall:

Cavanaugh Macdonald Consulting, LLC (CMC) has performed an independent review of the June 30, 2019 actuarial valuation of retirement benefits for the Los Angeles County Employees Retirement Association (LACERA). As an independent reviewing, or auditing, actuary, we have been asked to express an opinion regarding the reasonableness and accuracy of the valuation results, including a review of sample lives as well as a full independent replication of the key valuation results.

Our opinion on the valuation results is based on an independent replication of the June 30, 2019 actuarial valuation of LACERA and a review of detailed sample lives. We previously reviewed the 2019 Experience Study, prepared by Milliman. Our report, dated January 30, 2020, includes our opinion that the actuarial assumptions and methods recommended in the study were reasonable for purposes of performing the actuarial funding valuation. With respect to this audit report, we would like to thank Milliman, LACERA's retained actuary, for their cooperation and assistance in providing the required information to us in a timely fashion. **We find the June 30, 2019 actuarial valuation results to be reasonable and accurate, based on the assumptions and methods used. The valuation was performed by qualified actuaries and was performed in accordance with the principles and practices prescribed by the Actuarial Standards Board.** This report documents the detailed results of our review.

Additional Information and Disclosures

This report has been prepared for LACERA and its stakeholders by CMC, and is intended to assist LACERA as it validates the reasonability of the liabilities, costs, and other calculations for retirement benefits, determined as of June 30, 2019. Additionally, the findings, conclusions, and recommendations presented in this report are specific to LACERA, LACERA's retirement benefits, and the work produced by Milliman. CMC may produce different findings or arrive at different conclusions in other situations or even in cases involving other similar retirement benefit plans. As such, it is important to keep in mind that the use of this information for purposes other than those expressed here may not be appropriate.

In preparing this review, we have relied on the following information provided by LACERA and/or Milliman:

- Milliman's draft report titled, *Los Angeles County Employees Retirement Association June 30, 2019 Actuarial Valuation of Retirement Benefits* (2019 LACERA Actuarial Valuation);
- A report produced by Segal Consulting on May 9, 2017 titled, *Los Angeles County Employees Retirement Association Audit of the June 30, 2016 Actuarial Valuation;*
- Raw retirement plan actuarial valuation census data as of June 30, 2019, provided by LACERA;
- Milliman's processed retirement plan actuarial valuation census data as of June 30, 2019;
- Detailed sample lives prepared by Milliman; and
- Complete tables of actuarial assumptions used in the valuation, provided by Milliman.

While we cannot verify the accuracy of all of this information, the supplied information was reviewed for reasonableness and consistency and we have no reason to doubt the substantial accuracy or completeness of the information. We believe that it is reliable for the purpose of conducting this review. The results and conclusions contained in this report depend on the integrity of this information, and if any of the supplied information or analyses change, our results and conclusions may be different and this report may need to be revised.

The undersigned are familiar with the funding aspects of public retirement plan valuations and meet the Qualification Standards of the American Academy of Actuaries necessary to render the actuarial opinions contained in this report. All sections of this report, including any appendices and attachments, are considered an integral part of the actuarial opinions.

CMC does not provide legal, investment, or accounting advice. Thus, the information in this report is not intended to supersede or supplant the advice and interpretations of LACERA or its external consultants.

Sincerely,

Patrice Beckham   Brent A. Banister

Patrice Beckham, FSA, EA, MAAA, FCA
Principal and Consulting Actuary

Brent A. Banister, Ph.D., FSA, EA, MAAA, FCA
Chief Actuary

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1. Executive Summary

As an independent auditing actuary, Cavanaugh Macdonald Consulting, LLC (CMC) has been tasked to provide a general overview and express an opinion of the reasonableness and soundness of the actuarial work performed by Milliman for the Los Angeles County Employees Retirement Association (LACERA). The specific work product to be reviewed was the June 30, 2019 Actuarial Valuation of Retirement Benefits. The specific items to be included in the actuarial audit include:

(1) Evaluation of the data used in the performance of the valuation, including the degree to which the data is sufficient and appropriate for the purpose of an actuarial valuation, as well as the appropriateness of any assumptions used in creating the member data file;
(2) Independent parallel valuation as of June 30, 2019 using the actuarial assumptions, methodologies and funding methods used by the retained actuary in their performance of the June 30, 2019 actuarial valuation;
(3) Evaluation of our parallel valuation results compared to the major valuation results in the June 30, 2019 valuation report prepared by Milliman and a reconciliation of any material discrepancies in the findings, assumptions, methodologies, or other calculations found in the retained actuary's work.
(4) A detailed review of selected sample lives.
(5) Review of the June 30, 2019 actuarial valuation report.

Our audit findings are based on actuarial reports, member census data, and supplemental information provided by both LACERA and Milliman.

In the following sections, we have summarized the key points from the report details.

Data Analysis

Underlying the results of any actuarial valuation is the census or membership data including details of each member entitled to a benefit payment in the future. If the data are not accurate, then results drawn from the data may not be accurate, either. We confirmed that the census data provided to the actuary by LACERA contains the necessary elements to perform an actuarial valuation, although we did not audit the data itself. The second part of this step was to ensure that Milliman used the data appropriately.

We requested the original member census data provided to Millman for the 2019 valuation directly from LACERA. We also requested member data, as reconciled for the 2019 valuation, from Milliman along with complete descriptions of assumptions, methods and valuation procedures. Our comparison of the census data used by Milliman for the June 30, 2019 actuarial valuation with the original data produced by LACERA indicated that Milliman's data is substantially consistent with the LACERA data. **We find that the data is consistent, complete and appropriate for the purpose for which it is being used.**

Parallel Valuation Results

The key findings and recommendations resulting from our audit of Milliman's June 30, 2019 actuarial valuation are discussed below. We matched well overall and reasonably well on the various component pieces. We do not expect to be able to match Milliman's results exactly because we are using independent approaches to valuing the liabilities.

There are three key metrics in the actuarial valuation:

- Present Value of Future Benefits (PVB),
- Actuarial Accrued Liability (AAL),
- Normal Cost (NC).

The PVB is a measure of all benefits expected to be ultimately paid for all current members of the Plan in the future. The AAL reflects the portion of the PVB attributable to service already performed as of the valuation date. The Normal Cost is the portion of the PVB allocated to the current plan year. Of the three measures, we expect to match the PVB the closest, typically within 1% to 3%, while the AAL is often not quite as close, and the Normal Cost often reflects the greatest difference, with variance of 3% to 6% at times. This wider range is a consequence of the mathematics involved in which small variants in approach have a larger impact on the results.

In Section 3 of this report, the detailed results of our independent parallel valuation of the LACERA liabilities are compared with the June 30, 2019 valuation results prepared by Milliman. We were able to match all key measurements within a reasonable range. **We find the calculation results in the June 30, 2019 valuation to be reasonable and appropriate for their intended purposes.**

Overall, our parallel valuation results were very close to Milliman's, particularly for the present value of future benefits which is the most important metric from a funding perspective. The following exhibit illustrates the ratio of Cavanaugh Macdonald's results to Milliman's for all three of the key valuation metrics. A ratio near 100% indicates a very close match. For some of the older plans, there are relatively few active members and differences in approach can have a larger impact on the overall numbers so the ratios may be further from 100% for those groups, particularly for the normal cost.

Plan	Ratio of CMC Results to Milliman's: Present Value of Benefits	Actuarial Accrued Liability	Normal Cost
General – A	100%	100%	97%
General – B	99%	99%	97%
General – C	100%	100%	99%
General – D	99%	98%	100%
General – E	100%	99%	100%
General – G	98%	97%	97%
Safety – A	100%	100%	98%
Safety – B	99%	99%	97%
Safety – C	98%	95%	96%
All Plans	99%	99%	99%

Based on our auditing experience and professional judgment, Cavanaugh Macdonald believes all of the variances shown in the table above are within an acceptable range and the result confirm the reliability of the June 30, 2019 valuation results prepared by Milliman.

As indicated in our *Actuarial Audit of the 2019 Experience Investigation Report*, dated January 30, 2020, we found the actuarial assumptions and methods recommended by Milliman to be reasonable and in accordance with applicable Actuarial Standards of Practice. The assumptions used in this valuation, including a 7.0% investment return assumption, are those that were approved by LACERA's Board of Investments at their January 2020 meeting. We verified that the correct set of actuarial assumptions was used to produce the June 30, 2019 valuation results.

Because of the change to the actuarial assumptions, the employee contribution rates for non-PEPRA Plans, both normal and cost-of-living contributions, were re-determined in the June 30, 2019 valuation report. Based on the methodology described in the report, we verified that the contribution rates shown are reasonable.

As part of this audit, Cavanaugh Macdonald also reviewed the actuarial audit report, prepared by Segal Consulting and dated May 9, 2017, including specific recommendations made for future valuations. After reviewing Milliman's current valuation process and report, we are pleased to report that all changes recommended in Segal's report have been full addressed and there are no outstanding issues.

Review of Selected Individuals

As part of our review, we examined results for a number of individual members. By focusing on a limited number of individuals, it is often possible to detect differences that have a smaller impact that are not apparent in the overall replication results. In this case, however, we found that the liability measures reported by Milliman for each of the individual test lives were consistent with our calculations.

Review of Report

As part of our review of the report, we verified the key calculations shown in the exhibits. We also verified the reasonableness of the member contribution rates that are provided in the report. We did not observe any significant issues.

The impact of the assumption changes on the employer contribution rates is being phased in over three years. We agree with the calculation of the phase-in for the employer contribution rates as shown in the June 30, 2019 valuation report. In addition, the projection of the employer contribution rate on page 3 of Milliman's valuation report is helpful in disclosing the expected increase in the employer contribution rate due to both the phase-in of the assumption changes as well as the impact of deferred investment experience.

We reviewed the June 30, 2019 Actuarial Valuation Report produced by Milliman in detail. We confirmed that the report contains the basic model disclosures recommended by the California Actuarial Advisory Panel (CAAP). We also reviewed the report for compliance with Actuarial Standards of Practice, including the new standard first required to be included in the 2019 valuation report, *ASOP 51, Assessment and Disclosure of Risk in Measuring Pension Obligations*. **We found the report to be well written, comprehensive in content, and in compliance with the ASOPs.** We offer a few comments and suggestions for improvement, but all are minor.

Conclusion

It is our belief that an audit should not focus on finding trivial differences between actuarial processes, procedures, philosophies, or styles utilized by two different actuaries, but rather to verify there are no material errors, and to identify potential improvements to the process and procedures utilized by LACERA's actuary. Actuarial work draws on professional judgment, so there is a subjective component that must be considered alongside the objective component of matching numerical results. In performing this audit, we attempt to limit discussions concerning stylistic preferences and focus more on the significant philosophical approaches, the accuracy of calculations, the completeness and reliability of reporting, and the compliance with generally acceptable actuarial practices and standards of practice in all of the work reviewed.

Because of the complexity of actuarial work, we would not expect to match Milliman's valuation results exactly, nor would we necessarily expect our opinions regarding the results to be the same as those of Milliman. While we offer some different viewpoints or ideas, we believe that Milliman's work provides an appropriate assessment of the status of the retirement benefits for purposes of determining contribution rates.

***Audit Finding*: We find the actuarial calculations in the June 30, 2019 actuarial valuation to be reasonable, based on the actuarial assumptions and methods used. The valuation was performed by qualified actuaries and was performed in accordance with the principles and practices prescribed by the Actuarial Standards Board.** Furthermore, the valuation report complies with applicable Actuarial Standards of Practice and the basic model disclosures recommended by the California Actuarial Advisory Panel.

The remainder of this report provides the basis for our findings for each of the requested tasks, including our recommendations.

2. DATA REVIEW

Milliman and LACERA each supplied CMC with the member data used for the June 30, 2019 actuarial valuation. This included both the raw data prepared by LACERA and the processed data used by Milliman for its actuarial software. We compared the records and are comfortable with the data processing being performed by Milliman.

There is minimal data scrubbing performed by Milliman, so we were generally able to confirm that the processed records used by Milliman were consistent with the data provided by LACERA. We further tested that the manner in which records were selected for inclusion or exclusion in the valuation or assignment of valuation status was appropriate.

We tested the member counts by status and the totals of selected key fields to be sure they were reasonably close. The following tables contain some additional detail summarizing our review. In most cases, the matching is quite close, considering rounding issues. For the Safety C plans, our compensation numbers do not quite match Milliman's, although we do match their input numbers. We have determined that this is due to some adjustments that were made by Milliman for new hires. This has no meaningful impact on the total results since these individuals have virtually no actuarial accrued liability.

We believe that the data provided by LACERA is sufficient for Milliman to reasonably perform its work. We did not audit the data, but simply determined whether Milliman was using the data appropriately and that it was consistent with the raw data provided by LACERA. ***Overall, we are comfortable that the data Milliman uses to perform its valuation is complete and appropriate for the purposes of an actuarial funding valuation, as well as consistent with the data supplied by LACERA.***

ANALYSIS OF ACTIVE DATA

		Number	Annual Salary	Average Age	Average Monthly Salary	Average Service
General Members						
Plan A	LACERA Data	105	$10,691,184	70.5	$8,485	39.4
	Milliman Data	105	$10,691,184	70.5	$8,485	39.4
	% Difference	0.00%	0.00%	0.00%	0.00%	0.00%
Plan B	LACERA Data	34	$3,793,008	65.4	$9,297	36.9
	Milliman Data	34	$3,793,008	65.4	$9,296	36.9
	% Difference	0.00%	0.00%	0.00%	-0.01%	0.00%
Plan C	LACERA Data	42	$3,941,880	65.3	$7,821	38.6
	Milliman Data	42	$3,941,880	65.2	$7,821	38.6
	% Difference	0.00%	0.00%	-0.15%	0.00%	0.00%
Plan D	LACERA Data	41,736	$3,701,354,112	50.3	$7,390	18.3
	Milliman Data	41,732	$3,702,074,880	50.2	$7,393	18.3
	% Difference	-0.01%	0.02%	-0.20%	0.03%	0.00%
Plan E	LACERA Data	17,335	$1,349,166,408	54.8	$6,486	22.5
	Milliman Data	17,331	$1,349,156,568	54.7	$6,487	22.5
	% Difference	-0.02%	0.00%	-0.18%	0.02%	0.00%
Plan G	LACERA Data	27,148	$1,745,933,604	37.8	$5,359	2.9
	Milliman Data	27,148	$1,745,933,604	37.7	$5,359	2.9
	% Difference	0.00%	0.00%	-0.26%	0.00%	0.00%
Total	LACERA Data	86,400	$6,814,880,196	47.3	$6,573	14.4
	Milliman Data	86,392	$6,815,591,124	47.3	$6,574	14.4
	% Difference	-0.01%	0.01%	0.00%	0.02%	0.00%
Safety Members						
Plan A	LACERA Data	5	$717,780	64.0	$11,963	37.2
	Milliman Data	5	$717,780	64.0	$11,963	37.2
	% Difference	0.00%	0.00%	0.00%	0.00%	0.00%
Plan B	LACERA Data	9,727	$1,261,456,104	45.5	$10,807	18.9
	Milliman Data	9,725	$1,261,192,104	45.5	$10,807	18.9
	% Difference	-0.02%	-0.02%	0.00%	0.00%	0.00%
Plan C	LACERA Data	3,064	$278,277,156	30.9	$7,568	2.8
	Milliman Data	3,064	$278,277,156	30.9	$7,568	2.8
	% Difference	0.00%	0.00%	0.00%	0.00%	0.00%
Total	LACERA Data	12,796	$1,540,451,040	42.0	$10,032	15.0
	Milliman Data	12,794	$1,540,187,040	42.0	$10,032	15.1
	% Difference	-0.02%	-0.02%	0.00%	0.00%	0.67%
Total	LACERA Data	99,196	$8,355,331,236	46.6	$7,019	14.5
	Milliman Data	99,186	$8,355,778,164	46.6	$7,020	14.5
	% Difference	-0.01%	0.01%	0.00%	0.01%	0.00%

ANALYSIS OF VESTED FORMER MEMBER DATA

		Number	Average Age
General Members			
Plan A	LACERA Data	68	71.8
	Milliman Data	68	71.7
	% Difference	0.00%	-0.14%
Plan B	LACERA Data	15	68.8
	Milliman Data	15	68.8
	% Difference	0.00%	0.00%
Plan C	LACERA Data	18	65.1
	Milliman Data	18	65.1
	% Difference	0.00%	0.00%
Plan D	LACERA Data	7,837	48.2
	Milliman Data	7,912	48.2
	% Difference	0.96%	0.00%
Plan E	LACERA Data	3,437	56.5
	Milliman Data	3,360	56.7
	% Difference	-2.24%	0.35%
Plan G	LACERA Data	3,200	37.0
	Milliman Data	3,200	37.0
	% Difference	0.00%	0.00%
Total	LACERA Data	14,575	47.9
	Milliman Data	14,573	47.8
	% Difference	-0.01%	-0.21%
Safety Members			
Plan A	LACERA Data	4	66.8
	Milliman Data	4	67.0
	% Difference	0.00%	0.30%
Plan B	LACERA Data	816	43.7
	Milliman Data	818	43.7
	% Difference	0.25%	0.00%
Plan C	LACERA Data	172	31.4
	Milliman Data	172	31.4
	% Difference	0.00%	0.00%
Total	LACERA Data	992	41.7
	Milliman Data	994	41.6
	% Difference	0.20%	-0.24%
Total	LACERA Data	15,567	47.5
	Milliman Data	15,567	47.4
	% Difference	0.00%	-0.21%

Note: Inactive vested counts from the LACERA data are not adjusted for suspended active records.

ANALYSIS OF IN-PAY MEMBER DATA

		Number	Annual Allowances	Average Age	Average Monthly Benefit
General Members					
Plan A	LACERA Data	21,168	$1,184,871,149	79.6	$4,665
	Milliman Data	21,168	$1,184,808,424	79.6	$4,664
	% Difference	0.00%	-0.01%	0.00%	-0.02%
Plan B	LACERA Data	744	$41,178,970	74.2	$4,612
	Milliman Data	744	$41,178,970	74.2	$4,612
	% Difference	0.00%	0.00%	0.00%	0.00%
Plan C	LACERA Data	495	$23,115,737	73.7	$3,892
	Milliman Data	495	$23,115,737	73.7	$3,892
	% Difference	0.00%	0.00%	0.00%	0.00%
Plan D	LACERA Data	16,952	$676,963,686	68.6	$3,328
	Milliman Data	16,952	$676,556,924	68.5	$3,326
	% Difference	0.00%	-0.06%	-0.15%	-0.06%
Plan E	LACERA Data	14,169	$389,685,748	72.0	$2,292
	Milliman Data	14,173	$389,948,152	71.9	$2,293
	% Difference	0.03%	0.07%	-0.14%	0.04%
Plan G	LACERA Data	28	$386,254	66.3	$1,150
	Milliman Data	28	$386,569	66.3	$1,151
	% Difference	0.00%	0.08%	0.00%	0.09%
Total	LACERA Data	53,556	$2,316,201,544	74.0	$3,604
	Milliman Data	53,560	$2,315,994,776	73.9	$3,603
	% Difference	0.01%	-0.01%	-0.14%	-0.03%
Safety Members					
Plan A	LACERA Data	6,809	$630,440,117	76.7	$7,716
	Milliman Data	6,810	$630,158,797	76.7	$7,711
	% Difference	0.01%	-0.04%	0.00%	-0.06%
Plan B	LACERA Data	6,130	$553,506,460	59.7	$7,525
	Milliman Data	6,130	$553,135,542	59.7	$7,520
	% Difference	0.00%	-0.07%	0.00%	-0.07%
Plan C	LACERA Data	7	$621,238	50.8	$7,396
	Milliman Data	7	$621,244	50.9	$7,396
	% Difference	0.00%	0.00%	0.20%	0.00%
Total	LACERA Data	12,946	$1,184,567,815	68.6	$7,625
	Milliman Data	12,947	$1,183,915,583	68.6	$7,620
	% Difference	0.01%	-0.06%	0.00%	-0.07%
Total	LACERA Data	66,502	$3,500,769,359	72.9	$4,387
	Milliman Data	66,507	$3,499,910,359	72.9	$4,385
	% Difference	0.01%	-0.02%	0.00%	-0.05%

ANALYSIS OF IN-PAY MEMBER DATA – HEALTHY RETIREES

		Number	Annual Benefits (in thousands)	Average Monthly Benefit
General Members				
Plan A	LACERA Data	15,190	$965,285	$5,296
	Milliman Data	15,190	$965,291	$5,296
	% Difference	0.00%	0.00%	0.00%
Plan B	LACERA Data	618	$36,876	$4,972
	Milliman Data	618	$36,876	$4,972
	% Difference	0.00%	0.00%	0.00%
Plan C	LACERA Data	377	$19,844	$4,386
	Milliman Data	377	$19,844	$4,386
	% Difference	0.00%	0.00%	0.00%
Plan D	LACERA Data	13,459	$574,575	$3,558
	Milliman Data	13,458	$574,354	$3,556
	% Difference	-0.01%	-0.04%	-0.06%
Plan E	LACERA Data	12,996	$373,089	$2,392
	Milliman Data	12,996	$373,101	$2,392
	% Difference	0.00%	0.00%	0.00%
Plan G	LACERA Data	25	$323	$1,076
	Milliman Data	25	$323	$1,077
	% Difference	0.00%	0.00%	0.09%
Safety Members				
Plan A	LACERA Data	2,224	$237,909	$8,914
	Milliman Data	2,224	$237,911	$8,915
	% Difference	0.00%	0.00%	0.01%
Plan B	LACERA Data	2,625	$263,407	$8,362
	Milliman Data	2,625	$263,301	$8,359
	% Difference	0.00%	-0.04%	-0.04%
Plan C	LACERA Data	4	$518	$10,798
	Milliman Data	4	$518	$10,798
	% Difference	0.00%	0.00%	0.00%
Total	LACERA Data	47,518	$2,471,826	$4,335
	Milliman Data	47,517	$2,471,519	$4,334
	% Difference	0.00%	-0.01%	-0.02%

ANALYSIS OF IN-PAY MEMBER DATA – DISABLED RETIREES

		Number	Annual Benefits (in thousands)	Average Monthly Benefit
General Members				
Plan A	LACERA Data	1,509	$61,160	$3,378
	Milliman Data	1,509	$61,160	$3,378
	% Difference	0.00%	0.00%	0.00%
Plan B	LACERA Data	58	$2,107	$3,027
	Milliman Data	58	$2,107	$3,027
	% Difference	0.00%	0.00%	0.00%
Plan C	LACERA Data	51	$1,714	$2,800
	Milliman Data	51	$1,714	$2,800
	% Difference	0.00%	0.00%	0.00%
Plan D	LACERA Data	2,054	$70,175	$2,847
	Milliman Data	2,054	$70,264	$2,851
	% Difference	0.00%	0.13%	0.14%
Plan E	LACERA Data	N/A	N/A	N/A
	Milliman Data	N/A	N/A	N/A
	% Difference	N/A	N/A	N/A
Plan G	LACERA Data	1	$49	$4,056
	Milliman Data	1	$49	$4,056
	% Difference	0.00%	0.00%	0.00%
Safety Members				
Plan A	LACERA Data	2,999	$286,460	$7,960
	Milliman Data	2,999	$286,460	$7,960
	% Difference	0.00%	0.00%	0.00%
Plan B	LACERA Data	3,216	$273,077	$7,076
	Milliman Data	3,216	$273,258	$7,081
	% Difference	0.00%	0.07%	0.07%
Plan C	LACERA Data	3	$103	$2,859
	Milliman Data	3	$103	$2,859
	% Difference	0.00%	0.00%	0.00%
Total	LACERA Data	9,891	$694,845	$5,854
	Milliman Data	9,891	$695,115	$5,856
	% Difference	0.00%	0.04%	0.03%

ANALYSIS OF IN-PAY MEMBER DATA – BENEFICIARIES

		Number	Annual Benefits (in thousands)	Average Monthly Benefit
General Members				
Plan A	LACERA Data	4,469	$158,427	$2,954
	Milliman Data	4,469	$158,357	$2,953
	% Difference	0.00%	-0.04%	-0.03%
Plan B	LACERA Data	68	$2,196	$2,691
	Milliman Data	68	$2,196	$2,691
	% Difference	0.00%	0.00%	0.00%
Plan C	LACERA Data	67	$1,558	$1,938
	Milliman Data	67	$1,558	$1,938
	% Difference	0.00%	0.00%	0.00%
Plan D	LACERA Data	1,439	$32,214	$1,866
	Milliman Data	1,440	$31,940	$1,848
	% Difference	0.07%	-0.85%	-0.96%
Plan E	LACERA Data	1,173	$16,597	$1,179
	Milliman Data	1,177	$16,847	$1,193
	% Difference	0.34%	1.51%	1.19%
Plan G	LACERA Data	2	$15	$619
	Milliman Data	2	$15	$619
	% Difference	0.00%	0.00%	0.00%
Safety Members				
Plan A	LACERA Data	1,586	$106,072	$5,573
	Milliman Data	1,587	$105,788	$5,555
	% Difference	0.06%	-0.27%	-0.32%
Plan B	LACERA Data	289	$17,022	$4,908
	Milliman Data	289	$16,576	$4,780
	% Difference	0.00%	-2.62%	-2.61%
Plan C	LACERA Data	0	$0	N/A
	Milliman Data	0	$0	N/A
	% Difference	0.00%	0.00%	N/A
Total	LACERA Data	9,093	$334,101	$3,062
	Milliman Data	9,099	$333,277	$3,052
	% Difference	0.07%	-0.25%	-0.33%

This section of our review discusses the reasonableness and accuracy of the liabilities and contribution rates developed in Milliman's June 30, 2019 actuarial valuation of LACERA. We independently programmed the various types of benefits provided to members by LACERA using standard actuarial approaches.

The retirement benefits offered by LACERA are generally more complex than many other systems, partly because of the number of groups and benefit tiers covering the members. Different actuaries could reasonably use different approaches to modeling the liabilities of the different Plans. In order to be able to meaningfully compare our results to Milliman's results and to perform a useful sample life audit, we chose certain approaches to mimic those used by Milliman. However, we made an effort to minimize this type of information in order to maintain our independence. While Milliman was responsive to our questions, they were also careful not to provide any information that would have provided inappropriate insight into their processes. As a result, we believe that the results we obtained are a meaningful test of the reliability of the work performed by Milliman.

As the following summary shows, our independent valuation results matched those of Milliman well overall and by the various Plans. As with any audit, we do not expect to match results exactly because we know are using independent approaches to modeling the liabilities. In particular, ancillary benefits such as active death and disability benefits are generally harder to match without coordinated effort, which loses a degree of the independence that is desired in an actuarial audit. These ancillary benefits, however, are typically of less significant from a liability and cost perspective.

Results in the following tables are shown for the Present Value of Benefits (PVB), the Actuarial Accrued Liability (AAL), and the Normal Cost. The PVB is a measure of the value of all benefits expected to be ultimately paid for all current members of the system. The AAL reflects the portion of the PVB attributable to service already performed, and is the measure typically used for funding and accounting purposes. The Normal Cost is the portion of the PVB allocated to the current plan year. Of the three measures, we typically expect to match the PVB the closest, typically within 1% to 3%, while the AAL is often not quite as close, and the Normal Cost often varies by 3% to 6%. Based on the results shown in the following tables, we are satisfied that the June 30, 2019 results presented in Milliman's valuation report provide a fair representation of LACERA's current funded status and the contribution rates needed to fund the Plan.

3. ACTUARIAL VALUATION RESULTS REVIEW

	General											
	Plan A		Plan B		Plan C		Plan D		Plan E		Plan G	
	Milliman	CMC	Milliman	CMC	Milliman	CMC	Milliman	CMC	Milliman	CMC	Milliman	CMC
Present Value of Future Benefits (PVB):												
Actives	$109	$107	$39	$38	$42	$42	$22,689	$22,360	$6,803	$6,768	$5,586	$5,466
Inactive Vesteds	9	9	2	2	1	1	596	606	450	447	29	29
Retirees	11,576	11,541	470	468	274	274	8,594	8,576	4,080	4,092	5	5
Total	$11,694	$11,657	$511	$508	$317	$317	$31,879	$31,542	$11,333	$11,307	$5,620	$5,500
Actuarial Accrued Liability	$11,689	$11,652	$509	$506	$316	$316	$25,500	$25,052	$10,162	$10,109	$984	$957
Normal Cost Rate	23.39%	22.73%	18.45%	17.96%	15.28%	15.10%	17.26%	17.22%	10.74%	10.76%	18.22%	17.64%
Ratio (CMC/Milliman)												
PVB:												
Actives		98%		97%		100%		99%		99%		98%
Inactive Vesteds		100%		100%		100%		102%		99%		100%
Retirees		100%		100%		100%		100%		100%		100%
Total		100%		99%		100%		99%		100%		98%
Actuarial Accrued Liability		100%		99%		100%		98%		99%		97%
Normal Cost Rate		97%		97%		99%		100%		100%		97%

Note: Dollars in millions.

3. ACTUARIAL VALUATION RESULTS REVIEW

	Safety							
	Plan A		Plan B		Plan C		Total	
	Milliman	CMC	Milliman	CMC	Milliman	CMC	Milliman	CMC
Present Value of Future Benefits (PVB):								
Actives	$10	$10	$12,161	$11,969	$1,609	$1,580	$49,048	$48,340
Inactive Vesteds	0	1	125	123	2	2	1,214	1,220
Retirees	7,304	7,307	8,709	8,701	9	9	41,021	40,973
Total	$7,314	$7,318	$20,995	$20,793	$1,620	$1,591	$91,283	$90,533
Actuarial Accrued Liability	$7,314	$7,318	$17,948	$17,699	$213	$202	$74,635	$73,811
Normal Cost Rate	29.75%	29.27%	28.48%	27.75%	29.08%	28.05%	18.54%	18.30%
Ratio (CMC/Milliman)								
PVB:								
Actives		100%		98%		98%		99%
Inactive Vesteds		N/A		98%		100%		100%
Retirees		100%		100%		100%		100%
Total		100%		99%		98%		99%
Actuarial Accrued Liability		100%		99%		95%		99%
Normal Cost Rate		98%		97%		96%		99%

Note: Dollars in millions.

4. SAMPLE LIFE REVIEW

In addition to the replication of results discussed in Section 3, we were also asked by LACERA to perform a review of sample lives. These samples included 16 active (or suspended active) members, 5 deferred (or contingent deferred) vested members, and 7 in-pay members (including healthy retirees, disabled retirees, and beneficiaries). We selected these records to provide a reliable sampling of plans, payment options, age, sex, and service levels of the Plans. Certain records were specifically selected to allow an in-depth review of unusual provisions. We were provided with detail of the present value of benefits for all of the sample lives, as well as actuarial liability, normal cost, and present value of future salary for the active members. Furthermore, for active members, all of the amounts were further broken down by decrement (termination, death, disability) to allow for more detailed analysis.

In our review of these individual records, we did not observe any issues of concern. For the majority of individuals, we matched the present value of future benefits within 2%. Overall, we observed:

- PVB – We matched Milliman total within 1.8%.
- Actuarial Liability – We matched Milliman total within 2.0%.
- Normal cost – We matched Milliman total within 1.5%.
- Present value of future salary – We matched Milliman total within 1.1%.

This consistency among a small number of records helps support the pattern observed in the aggregate and further demonstrates that Milliman's calculation of LACERA's liabilities is reasonable.

CONTENT OF THE ACTUARIAL REPORTS

The Actuarial Standard Board has issued a number of Actuarial Standards of Practice (ASOP) which provide guidance on measuring retirement benefit obligations and communicating the results (ASOP Nos. 1, 4, 23, 27, 35, 41, 44 and 51). The guidance in those standards include specific elements to be included in actuarial communications regarding retirement benefits, either directly or by reference to other documents. Some elements would not be pertinent in all communications, but since an actuarial valuation report is the most complete picture of the actuarial status of the plan, all of the elements listed should be covered in the report, even if only briefly.

We reviewed the June 30, 2019 actuarial valuation report to confirm that it provides sufficient information for another actuary to understand the valuation process and to assess the reasonableness of the results, as required under Actuarial Standards of Practice. We also reviewed the report for compliance with Actuarial Standards of Practice, including a new standard first required to be included in the 2019 valuation report, *ASOP 51, Assessment and Disclosure of Risk in Measuring Pension Obligations*. Milliman created a separate section of the valuation report which discusses the various risks faced by LACERA in funding the Plan.

We also compared the contents of the draft valuation report to over 30 specific items detailed for pension actuarial work in the various ASOPs listed above. ***In our review of the report, we found it to be in compliance with the applicable ASOPs***. We identified one area where we believe more explicit comments might be helpful to clarify compliance. ASOP 4, Paragraph 4.1(q) and its subparagraphs call for certain information regarding the disclosure of funded status. In particular, there should be statements clarifying what the status information might or might not signify regarding settling plan liabilities or plan contributions. Based on language added to the final report, Milliman fully addressed this suggestion.

The California Actuarial Advisory Panel (CAAP) has published a document entitled *"Model Disclosure Elements for Actuarial Valuation Reports on Public Retirement Systems in California*". The disclosure elements are organized as basic disclosures generally suitable for the regular actuarial valuation report and enhanced disclosures that may be appropriate for inclusion in either the regular actuarial valuation report or in other reports specific to a certain purpose. We reviewed the June 30, 2019 Actuarial Valuation Report produced by Milliman and confirmed that the report contains all of the basic model disclosures recommended by the California Actuarial Advisory Panel. It also includes many of the enhanced disclosure items set out in the CAAP document.

The valuation report is generally well written and organized. We have just a few suggestions for Milliman's consideration. These points are raised for discussion purposes only. Final decisions should be based on LACERA's needs after discussing them with their retained actuary.

- Include an exhibit that shows the projection of the unfunded actuarial accrued liability to June 30, 2020. This would make the calculation easier to understand and verify. We generally include such an exhibit in our reports and have found it to be helpful.

- We would suggest creating separate amortization bases for the change in the actuarial accrued liability due to assumption changes rather than including it with the gain/loss base. One advantage of the layered amortization method is transparency regarding the events that have impacted the current amount of the unfunded actuarial accrued liability. By including the impact from the assumption change with the gain/loss for that year, the relative magnitude of the assumption change is not clear. While some of this information is currently available in Exhibit 8b, over the longer term information regarding the significant impact of the assumption changes in 2016 and 2019 will be lost. Showing the initial impact and the remaining balance for the assumption changes in the amortization schedule provides insight into the impact these changes have had on LACERA's current funding. While we realize this creates more layers, we believe the value added more than offsets any downside. If LACERA and Milliman agree with a revision in disclosing the amortization bases for assumption changes, the change could be implemented by creating separate assumption bases only for 2016 and 2019 since the impact of those two assumption changes was significant. The new approach can be used for all future years as well.

- Although not required by Actuarial Standards of Practice or the California Actuarial Advisory Panel, we would suggest projections of funded status and employer contribution rates be included in the risk section of the report, if a model is produced by Milliman as part of the annual retainer services. We have found such projections to be most useful in helping interested parties better understand the potential funding risks.

- We would suggest adding additional detail in the assumptions section of the report regarding assumed decrement timing, as well as technical data items with regards to how missing or unusable data elements are handled in the valuation process.

- We would suggest providing greater detail as to how the Normal Plus Cost of Living member contribution rates are determined. While we were able to match Milliman's numbers closely, we were not able to do so without some additional detail by Milliman that is not readily deduced from the described methodology. This detail only needs to be sufficient for another actuary to understand the process, and would not necessarily need to be grasped by other readers.

None of these suggestions are critical in nature and certain suggestions may not be deemed to be an improvement by LACERA. To the extent the recommended changes are determined to be appropriate and beneficial, they could be implemented in the next valuation report.