Alameda County Employees' Retirement Association
BOARD OF RETIREMENT

ACTUARIAL COMMITTEE/BOARD MEETING NOTICE and AGENDA

ACERA MISSION:

To provide ACERA members and employers with flexible, cost-effective, participant-oriented benefits through prudent investment management and superior member services.

Thursday, December 21, 2023
11:00 am

LOCATION AND TELECONFERENCE	COMMITTEE MEMBERS	
ACERA **C.G. "BUD" QUIST BOARD ROOM** **475 14TH STREET, 10TH FLOOR** **OAKLAND, CALIFORNIA 94612-1900** **MAIN LINE: 510.628.3000** **FAX: 510.268.9574** **The public can observe the meeting and offer public comment by using the below Webinar ID and Passcode after clicking on the below link or calling the below call-in number.** https://zoom.us/join Call-In Number: 1 699 900 6833 Webinar ID: 879 6337 8479 Passcode: 699406 For help joining a Zoom meeting, see:https://support.zoom.us/hc/en-us/articles/201362193	**OPHELIA BASGAL, CHAIR**	**APPOINTED**
	HENRY LEVY, VICE CHAIR	**TREASURER**
	KEITH CARSON	**APPOINTED**
	ROSS CLIPPINGER	**ELECTED SAFETY**
	GEORGE WOOD	**ELECTED GENERAL**

The Alternate Retired Member votes in the absence of the Elected Retired Member, or, if the Elected Retired Member is present, then votes if both Elected General members, or the Safety Member and an Elected General member, are absent.

The Alternate Safety Member votes in the absence of the Elected Safety, either of the two Elected General Members, or both the Retired and Alternate Retired members.

This is a meeting of the Actuarial Committee if a quorum of the Actuarial Committee attends, and it is a meeting of the Board if a quorum of the Board attends. This is a joint meeting of the Actuarial Committee and the Board if a quorum of each attends.

Board and Committee agendas and minutes and all documents distributed to the Board or a Committee in connection with a public meeting (unless exempt from disclosure) are posted online at www.acera.org and also may be inspected at 475 14th Street, 10th Floor, Oakland, CA 94612-1900.

Public comments are limited to four (4) minutes per person in total. The order of the items on the agenda is subject to change without notice.

Note regarding accommodations: If you require a reasonable modification or accommodation for a disability, please contact ACERA between 9:00 a.m. and 5:00 p.m. at least 72 hours prior to the meeting at accommodation@acera.org or at 510-628-3000.

ACTUARIAL COMMITTEE/BOARD MEETING

Call to Order: 11:00 am

Roll Call

Public Input

Action Items: Matters for Discussion and Possible Motion by the Committee

1. **Discussion and possible motion to adopt the Triennial Actuarial Experience Study for years 2020-2022.**

   -Lisa Johnson
   -Andy Yeung, Segal
   -Eva Yum, Segal

   Recommendation
   Staff recommends that the Actuarial Committee recommend to the Board of Retirement that the Board adopt the proposed Triennial Actuarial Experience Study for the years 2020-2022 to be used in conducting ACERA's December 31, 2023 through December 31, 2025, annual actuarial valuations.

Information Items: These items are not presented for Committee action but consist of status updates and cyclical reports

1. **Presentation and discussion of Cavanaugh MacDonald Consulting, LLC's replication of the 2021 Actuarial Valuation and peer review of the 2022 Triennial Study, 2021 GASB 67 Report, 2021 GASB 68 Report, 2021 GASB 74 Report, and GASB 75 Report.**

   -Lisa Johnson
   -Brent Banister
   -Larry Langer

Trustee Input

Future Discussion Items

April

- Presentation and discussion of the Actuarial Valuation and Review as of December 31, 2023

Establishment of Next Meeting Date

Thursday, April 18, 2024 at 11:00 am

Adjournment

MEMORANDUM TO THE ACTUARIAL COMMITTEE

DATE: December 21, 2023

TO: Members of the Actuarial Committee

FROM: Lisa Johnson, Assistant Chief Executive Officer

SUBJECT: Triennial Actuarial Experience Study (2020-2022)

Executive Summary

The Segal Group (Segal) presented ACERA's Triennial Actuarial Experience Study for the period of December 1, 2019[1] to November 30, 2022 at the September 21, 2023 Actuarial Committee meeting. The report contained proposed economic and non-economic assumptions that would be used in conducting ACERA's December 31, 2023 through December 31, 2025, annual actuarial valuations. A summary of the major actuarial assumption categories are outlined in the enclosed attachment.

A participating employers meeting was held October 4, 2023. Representatives from each participating employer attended the meeting. As part of the CEO's recommendations, employers were advised to contact ACERA with any concerns or questions regarding the results of the study. As of the date of distribution, no employers have come forth with any concerns or questions. Therefore, staff is bringing forth its recommendations to the committee to approve the Triennial Actuarial Experience Study.

Summary

The final results of the study are provided in the accompanying actuarial report and will be further discussed by the actuaries, if needed. The information provided in the chart below is the estimated financial impact of the proposed assumption changes as if they were applied to the December 31, 2022, actuarial valuation.

Cost Impact of Recommended Assumptions		
Change in Costs	**Contribution Rate**	**Estimated Annual Dollars Amount in 000s**
Employer	(0.38%)	($5,414)
Member	(0.23%)	($3,135)
Total	**(0.61%)**	**($8,549)**
Impact on UAAL and Funded Percentage		
Decrease in UAAL	($85million)	
Change in Funded Status	From 86.9% to 87.6%	

[1] For clarity, the December 1, 2019, date reflects the start of the 2020 actuarial year. The experience study covers calendar years 2020 to 2022

Recommendation

Staff recommends that the Actuarial Committee recommend to the Board of Retirement that the Board adopt the proposed Triennial Actuarial Experience Study for the years 2020-2022 to be used in conducting ACERA's December 31, 2023 through December 31, 2025, annual actuarial valuations.

Attachment:
Summary of Major Assumption

Attachment
Summary of Major Assumption

Economic Assumption Compendium (See p.5 of experience study for more detail)	
Category	**Abridged Recommendation**
a) Inflation Assumption	a) Reduce from 2.75% to 2.50% per annum
b) Retiree Cost-of-Living	b) Maintain the COLA at 2.75% per annum for those tiers with a 3.00% maximum adjustment and maintain the COLA at 2.00% per annum for those tiers with 2.00% maximum adjustment
c) Investment Return Assumption	c) Maintain the 7.00% per annum
d) Salary Increase Assumption	d) Slight reduction in aggregate salary increase assumption (decrease in inflation component from 3.25% to 3.00% offset by increase in merit and promotion component)
Demographic Assumption Compendium (See pp. 6- 8 of experience study for more detail)	
Category	**Abridged Recommendation**
Retirement Rates	Separate set of age-based retirement assumptions, with separate age-based assumptions for under and over 30 years of service for some tiers
Other Retirement Related Assumptions: a) Retirement age for deferred vested members b) Future reciprocal members and reciprocal salary increases; and c) Percent married and spousal age differences for members not yet retired.	a) Maintain the General and Safety deferred vested retirement age assumption for General and Safety reciprocal members and increase the vested retirement age assumption for General and Safety non-reciprocal members b) Reduce proportion of future reciprocal members. Reciprocal salary increase assumption is reduced from 3.65% to 3.45% for General members and from 4.05% to 4.00% for Safety members; and c) Maintain the married at retirement and the spouse age difference assumptions
Mortality Rates	Recommendations vary depending on category of membership. Refer to pp. 6 -8
Termination Rates	Increase the termination rate assumption for certain service groups while decreasing the termination rate assumption for other service groups. Overall, the proposed rates represent an increase from the current rates for both General and Safety members.

Demographic Assumption Compendium - Continued	
Category	**Abridged Recommendation**
Disability Incidence Rates	Decrease the disability rate assumption for General members and increase the disability rate assumption for Safety members. Increase the percentage of anticipated General member disabilities to be service connected from 65% to 70%, and maintain the service connected disability assumption at 100% for Safety members.
Sick Leave Conversion	Maintain the current assumption at .003 years of additional service credit at retirement for each year of employment for General members and decrease from .007 to .006 years for Safety members.
Retiree Health Assumptions	Reduce the percentage of new male retirees expected to cover a spouse from 40% to 35% and the percentage of new females retirees expected to cover a spouse from 20% to 15%. Furthermore, decrease the percentage of new retirees under age 65 expected to enroll in medical coverage from 80% to 75%.

Please see the Triennial Actuarial Experience Study for 2020-2022 from the September 21, 2023 Actuarial Committee packet.

MEMORANDUM TO THE ACTUARIAL COMMITTEE

DATE: December 21, 2023

TO: Members of the Actuarial Committee

FROM: Lisa Johnson, Assistant Chief Executive Officer

SUBJECT: Staff Review of Cavanaugh Macdonald's Audit of Segal's Actuarial Valuation and Review as of December 31, 2021, Actuarial Review of GASB reports 67, 68, 74, and 75 as of December 31, 2022, and Segal's Triennial Experience Study (2020 – 2022)

Executive Summary

Staff has reviewed Cavanaugh Macdonald's audit report[1] reviewing the Actuarial Valuation as of December 31, 2021; GASB Reports 67, 68, 74, and 75, and the Triennial Experience Study (2020 – 2022). Staff has prepared comments on the points raised in Cavanaugh Macdonald's report. Cavanaugh Macdonald will present their actuarial audit results and recommendations today. Following that presentation, Segal will provide an oral response to Cavanaugh Macdonald's recommendations and follow-up with a formal written report after the Actuarial Committee meeting.

The audit report contains eight sections. The first section is the Executive Summary. Staff have provided comments below to summarize the results of sections two through eight. While there were some opportunities for improvement of clarity and additional transparency, there were no findings of any material differences that call for change.

Actuarial Valuation and Review as of December 31,2021

- ***Section 2, Actuarial Assumptions*** — Overall the actuarial assumptions were noted as reasonable. The role and importance of the two general assumptions, Economic and Demographic Actuarial Assumptions and the detailed sub-categories of assumptions were described for context and understanding. Cavanaugh Macdonald provides a good overview of the goal and validity of using each of the specific assumptions and the role it plays in our actuary's work.

- ***Section 3, Actuarial Methods*** — Cavanaugh Macdonald's opinion on this area is that the actuarial cost method employed by Segal is appropriate and will systematically fund the prospective pension benefits on an actuarially sound basis if all actuarial assumptions are realized and the actuarial required contributions are made. Some suggestions have been provided regarding this area. Cavanaugh Macdonald reviewed the calculations, and concluded calculations are being applied properly. Looking ahead, we are reminded that for future valuations, the ASOP 4 revisions in guidance to actuaries when selecting an output smoothing method and a contribution lag policy will be important. ASOP 4 revisions are effective December 31, 2023, and Segal is aware of upcoming revisions to guidance in these areas.

- ***Section 4, Data Review*** – Cavanaugh Macdonald reviewed ACERA's raw data against Segal's data files provided and are comfortable with the processed data that was used for the December 31, 2021, actuarial valuation.

- ***Section 5, Actuarial Valuation Results Review*** – Actuarial liabilities and normal cost measures were found to be reasonable. One observation Cavanaugh Macdonald provided in their analysis is the projection of the final compensation for the calculation of the reciprocity benefit. Specifically, they took a closer look at the compensation limit projection assumption. For members over the pay limit, they recommend limiting pay for the reciprocal benefit to the compensation limit with the 2.75% projection assumption. However, Cavanaugh Macdonald anticipates that changing this current practice would not have a significant impact on the results. Their conclusion in this area is that member contribution rates are reasonable.

- ***Section 6, Valuation Results Review*** – Cavanaugh Macdonald found the report to be in compliance with ASOP.

Review of GASB 67, 68, 74, and 75 Reports as of December 31, 2022

- ***Section7, GASB Reports Review*** - For this reporting, Cavanaugh Macdonald did not delve into accounting centered opinions but looked at it purely from an actuarial perspective. From an actuarial perspective, there is a recommendation for Segal to include more information on the foundation that informed the discount rate setting approach and for there to be more information on benefits following the anticipated funding exhaustion date.

Analysis of Actuarial Experience During the Period December 1, 2019 through November 30, 2022.

- ***Section 8, The Triennial Experience Study (2020 - 2022)*** - Regarding the Segal Triennial Experience Study report, it complies with relevant Actuarial Standards of Practice in the development and presentation of the proposed actuarial assumptions and methods. Cavanaugh Macdonald believes the use of these in future actuarial work would be appropriate.

Conclusion

Staff does appreciate the thoroughness of Cavanaugh Macdonald's review and analysis of Segal's work. Cavanaugh Macdonald worked from a perspective of doing the detailed work to verify there were no material errors in Segal's actuarial work, validating the accuracy of calculations, completeness and reliability of reporting and verifying compliance with generally acceptable actuarial practices and standards of practice in all the work reviewed.

Cavanaugh Macdonald found the actuarial valuation and other reports results to be generally reasonable and accurate based on the assumptions used. The actuarial audit work was performed by qualified actuaries and was performed in accordance with the principles and practices prescribed by the Actuarial Standards Board.

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[1] See attachment

Attachment:
Cavanaugh Macdonald Consulting, LLC Actuarial Audit Review Report for Alameda County Employees' Retirement Association – Review of Valuation as of December 31, 2021, GASB 67, 68, 74, 75 Reports as of December 31, 2021, and Triennial Experience Study (2020 – 2022)

Cavanaugh Macdonald
CONSULTING, LLC
The experience and dedication you deserve

ACTUARIAL REVIEW REPORT FOR

ALAMEDA COUNTY EMPLOYEES' RETIREMENT ASSOCIATION

Prepared December 13, 2023

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CONSULTING, LLC
The experience and dedication you deserve

December 13, 2023

Board of Retirement
Alameda County Employees' Retirement Association
475 14th Street, Suite 1000
Oakland, CA 94612

Dear Members of the Board:

Cavanaugh Macdonald Consulting, LLC has performed an independent review of the December 31, 2021 actuarial valuation of the Alameda County Employees' Retirement Association. As an independent reviewing or auditing actuary, we have been asked to express an opinion regarding the reasonableness and accuracy of the actuarial assumptions, actuarial cost methods, and valuation results. We also reviewed the related accounting (GASB) reports and the 2019-2022 experience study.

Our opinion on the valuation results was based on a replication valuation of the December 31, 2021 actuarial valuations and a review of the other reports. We would like to thank Segal, the retained actuary for the Association, for their cooperation and assistance in providing the required information to us. **We find the actuarial valuation and other reports results to be generally reasonable and accurate based on the assumptions used. The actuarial work 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.

If you need anything else, please do not hesitate to give us a call. The undersigned 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 in this report.

Sincerely,

Larry Langer, ASA, FCA, MAAA, EA
Principal and Consulting Actuary

Brent A. Banister, PhD, FSA, FCA, MAAA, EA
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 work performed by Segal for the Alameda County Employees' Retirement Association (ACERA). The work to be reviewed included:

- The December 31, 2021 Actuarial Valuation and Review
- GASB 67 Report as of December 31, 2022
- GASB 68 Report as of December 31, 2022
- GASB 74 Report as of December 31, 2022
- GASB 75 Report as of December 31, 2022
- Actuarial Experience Study - Analysis of Actuarial Experience During the Period December 1, 2019 through November 30, 2022

We requested full participant and financial data of the pertinent employee groups from ACERA along with reports, plan descriptions and applicable statutes pertaining to the plans. We also requested from Segal participant data as reconciled for the December 31, 2021 actuarial valuation as well as complete descriptions of assumptions, methods and valuation procedures.

It is our belief that an audit should not focus on finding differences between actuarial processes and procedures utilized by two different actuaries, but rather to verify there are no material errors and to find improvements to the process and procedures utilized by the Association's actuary. In performing this audit, we attempt to limit discussions concerning differing opinions and focus more on the accuracy of calculations, the completeness and reliability of reporting, and the compliance with generally acceptable actuarial practices and standards of practice in all the work reviewed.

CONCLUSIONS

As described in our report, we have determined that the actuarial methods, assumptions, processes, and reports are consistent with the applicable Actuarial Standards of Practice and our understanding of GASB Statements 67, 68, 74 and 75. Throughout the report, we have noted a few areas where we believe there are opportunities for improvement, but that we believe would not have a material impact on the results of the December 31, 2021 valuation. There is no urgency for change. Therefore, such suggestions and recommendations could be considered when the next experience study is performed or when the December 31, 2023 valuation is prepared.

Additional details on our audit findings can be found in the remaining sections of this report.

- In Section 2 of our report, we analyze the set of actuarial assumptions used by Segal. The actuarial assumptions are a critical component of the valuation process and, thus, were reviewed as part of the audit. In our opinion, these assumptions are reasonable and appropriate for use in the valuation process.

1. EXECUTIVE SUMMARY

- In Section 3 of our report, we review the actuarial methods that are used to develop the actuarial contribution rate. In our opinion, these methods are reasonable and appropriate for systematically funding the benefits.

- In Section 4 of our report, we compare the data provided by ACERA with the data used by Segal. We find that the data is consistent and appropriate.

- In Section 5 of our report, we independently calculated the liabilities of ACERA. We reviewed the cost calculations and accounting calculations and found them to be appropriate.

- In Section 6, we provide our analysis of the valuation report produced by Segal. We found it to be substantially in compliance with the ASOPs, and we offered a few suggestions for improvement.

- In Section 7, we provide our analysis of the GASB accounting reports produced by Segal. We found the reports to be substantially in compliance with the ASOPs, and we offered a few suggestions for improvement.

- In Section 8 of our report, we discuss our review and observations of the 2019-2022 Analysis of Actuarial Experience. We find this experience study to be consistent with the ASOPs and believe the proposed assumptions and methods to appropriate for the actuarial work that Segal performs for the Association. We offer sone suggestions and ideas for consideration in enhancing future studies.

Because of the complexity of actuarial work, we would not expect to match Segal's results exactly, nor would we necessarily expect our opinions regarding the selection of assumptions and methods to be the same as the opinions of Segal. Our differences of opinion are not material.

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

2. ACTUARIAL ASSUMPTIONS

BACKGROUND ON ACTUARIAL ASSUMPTIONS

The actuarial assumptions form the basis of any actuarial valuation or cost study. Since it is not possible to know in advance how each member's career will evolve in terms of salary growth, future service, or cause of termination, the actuary must develop assumptions in an attempt to estimate future patterns. These assumptions enable the actuary to value the amounts of benefits earned and to reasonably estimate when and how long these benefits will be paid. Similarly, the actuary must make an assumption about the future investment earnings of the trust fund. In developing the assumptions, the actuary examines the past experience and considers future expectations to make the best estimate of the anticipated experience under the plan.

There are two general types of actuarial assumptions:

- ***Economic assumptions:*** These include the valuation interest rate (expected return on plan assets), assumed rates of salary increase, price inflation, wage inflation, and increases in total payroll. The selection of economic assumptions should conform to ASOP No. 27 *"Selection of Economic Assumptions for Measuring Pension Obligations".*

- ***Demographic assumptions:*** These include the assumed rates of retirement, mortality, termination, and disability. The selection of demographic assumptions should conform to ASOP No. 35 *"Selection of Demographic and Other Noneconomic Assumptions for Measuring Pension Obligations".*

The December 31, 2021 valuation which we are auditing used assumptions developed in the 2016-2019 Actuarial Experience Study. Recently, Segal prepared their Analysis of Actuarial Experience for 2019 through 2022. We specifically review that study and its proposed changes in Section 8. The remaining portion of this section is our analysis of the current assumptions (from the 2016-2019 report) that we used in replicating the December 31, 2021 valuation.

2. ACTUARIAL ASSUMPTIONS

ECONOMIC ASSUMPTIONS

Actuarial Standards of Practice (ASOPs) are issued by the Actuarial Standards Board to provide guidance to actuaries with respect to certain aspects of performing their work. As mentioned earlier, ASOP 27 is the actuarial standard that addresses the selection of or recommendations regarding economic assumptions for measuring pension obligations (liabilities) under defined benefit plans. We discuss the assumptions used by Segal below:

Price Inflation: Price inflation impacts the assumptions for investment return, salary and payroll growth, and cost-of-living-adjustments (COLA). The underlying price inflation component in all of these should be consistent in accordance with the guidance provided in ASOP 27. The assumption used for the December 31, 2021 valuation was 2.75%. We believe this was a reasonable assumption for the valuation.

Retiree Cost-of-Living Increases: Connected with price inflation, but an assumption which needs to be independently set, is the expected Cost-of-Living Adjustment (COLA) received by retirees. The provisions of Tiers 1 and 3 allow for a COLA of up to 3%, while Tiers 2 and 4 receive no more than a 2% COLA. Segal assumes a COLA of 2.75% for Tiers 1 and 3 and a 2.0% COLA for Tiers 2 and 4. We believe this assumption is reasonable.

Investment Return Assumption: The investment return assumption should represent the long-term compound rate of return expected on the plan assets, considering the asset allocation, the real rate of return on each asset class, and the underlying inflation rate, all net of expenses paid from the trust.

The long-term relationship between price inflation and investment return has long been recognized by economists. The basic principle is that the investor demands a more or less level "real return" – the excess of actual investment return over price inflation. If inflation rates are expected to be high, investment return rates are also expected to be high, while low inflation rates will result in lower expected investment returns, at least in the long run.

The period considered for pension funding represents a very long time horizon. In reviewing this assumption, the actuary should consider asset allocation policy, historical returns, and expectations of future returns. Frequently, asset advisors focus on no more than the next 5 to 10 years since they are most concerned with how to invest the funds currently to maximize returns. While actuaries are projecting benefits to be paid for the next 50 to 100 years, the short term is also relevant, especially for funds with negative cash flows. This difference in perspective can significantly influence how investment advisors and actuaries derive an investment return assumption.

In the prior experience study, Segal used the capital market assumptions of both Verus, the advisor to ACERA, and other consultants who Segal works with as part of their California public plan

work. Based on these considerations, they arrived at an assumption of 7%. Given the asset allocation of the Association, we find this assumption reasonable.

General Wage Increases: The general wage growth or wage inflation assumption consists of price inflation and real wage growth (also called productivity). As the price of goods and services increase, we expect wages to increase as well. Productivity is a measure of how much wages increase across the whole labor pool in excess of the rate of price inflation. Both of these items tend to be a function of the general economy rather than system specific. Segal assumes a real wage growth of 0.50% and so the general wage increase assumption is 3.25%. Based on our experience with public employment, we find this to be reasonable.

Individual Salary Scale: There are two factors that generally affect salary increases and are typically reflected in the individual salary scale. The first is the wage inflation or the total wage growth assumption. The second component, frequently identified as merit scale, reflects the portion of salary increases provided at the individual level, including promotion, increased skills, longevity pay, and other similar items. The combination of these components is reflected in the total individual salary scale.

Segal has developed merit scales for general and safety members, reflecting that these two groups of members experience different patterns of pay increases. The assumptions are also service based, reflecting that members typically receive their largest pay increases in their early years. We find their assumptions to be reasonable based upon our experience with similar plans.

Payroll Growth Assumption: The Unfunded Actuarial Accrued Liability (UAAL) is amortized as a level percentage of payroll over the amortization period. As a result, a payroll growth assumption is necessary to develop the UAAL contribution rate. Segal assumes that payroll will grow at 3.25%, which is the same as the general wage inflation assumption. This is reasonable because as members retire or terminate, they are replaced by new members with lower salaries on average. We find the assumption reasonable.

Additional Cash Out Assumption: The non-CalPEPRA members of ACERA may cash out vacation accruals, subject to certain rules, and use payout as part of their final average compensation calculation. Since this option can change the amount of the retirement benefit, it is appropriate to make an assumption regarding how this provision will be used in the future. The assumption varies by tier and is different for service retirements compared with disability retirements. Segal has developed an assumption based on historical observations, and we believe that it is reasonable.

2. ACTUARIAL ASSUMPTIONS

DEMOGRAPHIC ASSUMPTIONS

The major demographic assumptions are the assumed rates of retirement, withdrawal (with or without a vested benefit), disability, and mortality (death before or after retirement). There are also various minor assumptions that sometimes are developed with a significant component of professional judgment since useful data is not always readily available.

In the following paragraphs, we make specific comments on the demographic assumptions.

Rates of Retirement: Segal has developed retirement rates that vary by employment type and tier. Within those groups, rates are age-based. Further, General Tiers 2 and 4 and Safety Tiers 2, 2C, and 4, the rates vary by service above or below 30 years. The need for the different sets of rates follows from the ACERA benefit structure and plan coverage. We believe that Segal's structure for the assumption and the developed rates are reasonable.

Rates of Mortality: One of the most important demographic assumptions in the pension valuation is mortality because it projects how long benefit payments are expected to be made. The longer retirees live and receive benefits, the larger the liability of the system, thus increasing the contributions required to fund the system. In addition, if members live longer than expected based on the assumption, the true cost of future benefit obligations will be understated, and contributions will increase as the unfavorable experience unfolds.

Constructing mortality tables requires a significant amount of data, and so almost all retirement systems rely on mortality tables published by the Society of Actuaries. Segal uses Pub-2010 family of tables with the MP-2019 projection scale. We find this assumption reasonable.

Rates of Termination: The termination rates used by Segal are service-based tables and vary by employment type. In our experience, such a set of tables is commonly made and very appropriate. As is very common, no terminations are assumed once a member is eligible for retirement. We find the rates reasonable considering similar plans we have worked with.

As part of the termination assumption, Segal assumes a portion of the terminating members elect a refund of contributions rather than waiting for a deferred retirement benefit. This assumption is the same for both General and Safety members, with a different probability based on whether or not the member has reached five years of service. We find this to be reasonable.

Rates of Disability: Disability rates are typically low, but they are still appropriate to reflect. The rates used by Segal are age-based, with separate tables for general and safety employment groups. We reviewed the general patterns and magnitude of the rates and find them reasonable.

Probability of Marriage, Age Difference of Spouse and Other Minor Assumptions: There are several minor assumptions that Segal sets relative to family composition, election of retiree medical benefits, and unused sick leave. We find these assumptions to be reasonable.

3. ACTUARIAL METHODS

BACKGROUND ON ACTUARIAL METHODS

Actuarial methods are used to provide for systematic funding of a retirement plan. There are four broad considerations when establishing a funding policy for a pension plan:

- ***Sufficiency:*** The funding target should be the value of benefits accrued to date so that benefits can be paid when due.
- ***Intergenerational equity***: Taxpayers and members should pay for workers' pensions while those workers are providing their services. The goal is to accumulate the funds for the worker's benefits over the worker's career.
- ***Stability of contributions:*** Generally governmental entities prefer predictable funding patterns. While stable contributions are easy to budget for, stability should not be achieved at the expense of the first two considerations.
- ***Accountability and transparency***: Each component of the funding policy should be clear on the intent and effect.

Generally, a funding policy is composed of the following actuarial methods:

- Actuarial Cost Method
- Asset Valuation Method
- Amortization of Unfunded Actuarial Accrued Liability Method
- Output Smoothing Methods
- Contribution Lag Policy

Note that not all of these elements are necessary for a complete funding policy. We discuss each component of the actuarial methods for ACERA and how these components satisfy the four broad considerations when establishing a funding policy below.

3. ACTUARIAL METHODS

ACTUARIAL COST METHOD

For all pension plans, whether defined benefit or defined contribution, the basic retirement funding equation is:

$$C + I = B + E$$

Where:

- C = employer and member contributions
- I = investment income
- B = benefits paid
- E = expenses paid from the fund, if any.

As can be seen from the formula, for a given level of benefits and expenses the greater "I" is, the smaller "C" is. This is the underlying reason for advance funding a pension plan, and historically investment income pays for 75% to 80% of the benefit dollars received by plan members. In other words, for every dollar paid to a member only 20 to 25 cents comes from contributions.

Of course, the problem with the formula is that in order to figure out exactly how much to contribute, the plan would have to be closed to new members and allowed to operate until all retirees were deceased. At that point, the benefits and expenses actually paid out, and the investment income actually earned would be known and, using the equation above, the true cost could be determined. Since the vast majority of plans are ongoing and have no intention of closing, and since even with a closed plan it takes a very long time before all benefits are finally paid out, plan sponsors hire actuaries to estimate the cost of their plans and to create a budget for systematic contributions to meet that cost.

In order to determine the contributions needed, the actuary's first step is to estimate on a given date (the valuation date) the value of all benefits (and expenses) that will be paid to the existing active and retired membership over their remaining lifetimes based on the plan's current benefit structure. This estimation requires the use of assumptions regarding both future events (termination, disability, retirement, death, etc.) and future economic conditions (return on assets, inflation, salary growth, etc.). The ACERA assumptions were covered in the previous section.

By combining the assumptions for future events and the salary growth assumption, the actuary generates an expected benefit payment stream. In other words, a string of annual payments expected to be made to the current active and retired members from the valuation date until all members are no longer living. Then the actuary applies the investment return assumption to discount each year's payments to the valuation date, creating the present value of all future benefits or the total liability of the plan.

3. ACTUARIAL METHODS

The difference between the total liability and the current assets of the plan represents the present value of future contributions (PVFC) that have to be made by either members or the employers. Usually the members and employers cannot contribute the entire difference in one year, but rather desire a relatively smooth contribution pattern over time that also meets any external constraints. In order to budget for the PVFC, the actuary applies an actuarial cost method. There are several acceptable cost methods, but it's important to recognize that they are nothing more than budgeting tools.

Different actuarial cost methods can provide for faster funding earlier in a plan's existence, more level funding over time, or more flexibility in funding. The choice of an actuarial cost method will determine the pattern or pace of the funding and, therefore, should be linked to the long-term financing objectives of the system and benefit security considerations.

The actuarial cost method used by ACERA is the level percent of pay entry age normal method. This cost method determines the normal cost as a level percentage of pay or dollar amount which, if paid from entry into the plan to the last assumed retirement age, will accumulate to an amount sufficient to pay the expected benefit. Entry age normal tends to result in reasonably stable contribution rates, a feature that has helped make it the most commonly used cost method for public plans. The use of the entry age normal cost method satisfies the sufficiency and intergenerational equity components discussed above by developing contributions for taxpayers and members for workers' pensions while those workers are providing their services. The goal is to fund the worker's benefits over the worker's career by paying for the cost of benefit accrued. An additional cost is determined by amortizing the unfunded actuarial accrued liability (discussed later in this section).

In our opinion, the actuarial cost method employed by Segal is appropriate and will systematically fund the prospective pension benefits on an actuarially sound basis if all actuarial assumptions are realized and the actuarial required contributions are made.

3. ACTUARIAL METHODS

ASSET VALUATION METHOD

Since the purpose of actuarial funding is to build up an asset pool (remember the importance of "I" in "C + I = B + E") actuaries need to value the current asset pool on each valuation date. The market value could be used, but it would tend to create too much volatility from valuation date to valuation date, and a single day's measurement is not necessarily indicative of the true underlying value of the investments held by the plan. Thus, most actuaries use an asset valuation method which smooths out these fluctuations in pursuit of achieving more stable funding measures and (when relevant) developing more level contributions. A good asset valuation method places values on a plan's assets which are related to current market value, but which will also produce a smooth pattern of costs. This is a question of balancing fit (measured against market value) and smoothness.

The goal of the actuarial asset valuation method is thus to smooth or reduce investment market fluctuations. This is particularly important during periods of volatile capital markets in which abrupt changes in asset values, when factored into the funding valuation, produce sudden unnecessary changes in contribution levels. In this case, "unnecessary" implies that the change in asset values is not necessarily a true revaluing of the assets involved, but rather a fluctuation reflecting a current economic climate or a short-term reaction to specific news.

In our opinion, desirable characteristics of an actuarial asset valuation method include the following:

- The method should be simple to operate. It should be readily calculable from financial statements.
- The method should be easy to explain to all interested parties.
- The theoretical underpinnings should be solid and not produce a long-term lag to the fair value of assets. The value produced should account for market values.
- The method should smooth the effect of market fluctuations.
- Investment decisions should not be affected by the actuarial asset valuation method, and vice versa.
- The value produced should be realistic; the price tag placed on assets should be sensible and should not cause other variables to be adjusted to account for unrealistic asset values.

3. ACTUARIAL METHODS

The use of an asset valuation method satisfies the stability of contributions component by providing for contribution stability which is not achieved at the expense of the sufficiency and intergenerational equity components of a sound funding policy.

ACERA Asset Valuation Method: The asset valuation method used by Segal in the valuation is a variation of a method commonly used by other public sector retirement systems. The smoothing method finds the difference between the actual investment return on the market value of assets and the expected investment return on the market value of assets. The differences are developed semi-annually over a five-year period. This difference is then recognized equally over 10 semiannual periods covering the last five years. This preliminary actuarial value of assets is further constrained by a corridor to be within 60% and 140% of the market value of assets. Finally, various non-valuation reserves are subtracted from the final actuarial value of assets to arrive at the valuation value of assets which is used to develop the unfunded actuarial accrued liability.

We note that this is a variation of a method commonly used by other public sector retirement systems. Typically, the calculation of the difference between the actual and expected investment returns is done on an annual basis as opposed to semi-annual development done here. Based on a conversation with Segal, the use of semi-annual interest crediting is in accordance with Section 31615 of the CERL.

We reviewed the calculations, and they are being applied properly. The amount of the expected and actual semi-annual returns is included by Segal in the development of the actuarial value. The derivation of the expected amount is not included, and consideration can be given to including the calculation. Using the semi-annual financials contained near the end of the report, we were able to replicate the amount of the expected and actual semi-annual returns within tolerance.

Compliance with ASOP 44: Actuarial Standard of Practice Number 44, "*Selection and Use of Asset Valuation Methods for Pension Valuations"*, provides guidance to the actuary when selecting an asset valuation method for purposes of a defined benefit pension plan actuarial valuation. When considering the use of an asset valuation method other than market value, ASOP 44 states the actuary should select an asset valuation method that is designed to produce actuarial values of assets that bear a reasonable relationship to the corresponding market values. Further guidance states that the asset valuation method must satisfy both of the following criteria:

- The asset values fall within a reasonable range around the corresponding market value.

  AND

- Any differences between the actuarial value of assets and the market value of assets are recognized within a reasonable period of time.

In lieu of satisfying both (a) and (b) above, an asset valuation method meets ASOP 44 requirements if, in the actuary's professional judgment, the asset valuation method either:

- Produces values within a sufficiently narrow range around market value OR
- Recognizes differences from market value in a sufficiently short period.

Several of the terms in the criteria of ASOP 44 such as "reasonable" and "sufficiently narrow" are not well defined. As we consider the current asset valuation method used by ACERA in light of ASOP 44, we believe it satisfies these requirements. The asset valuation method includes a 60%/140% corridor which is allowed under ASOP 44. The five-year phase in of the difference between actual and expected semi-annual returns is sufficiently short enough to not require a corridor. Use of a corridor can result in volatility in the unfunded actuarial accrued liability and resulting contributions. As such, consideration can be given to the elimination of the corridor.

The current asset valuation method is reasonable and complies with actuarial standards.

3. ACTUARIAL METHODS

UNFUNDED ACTUARIAL ACCRUED LIABILITY (UAAL) AMORTIZATION METHOD

The UAAL amortization method determines the length of time and the structure of the increase or decrease in contributions required to systematically fund the UAAL. Amortization payment schedules are maintained for each of the following groups:

- General (Excluding LARPD & Office of Education)
- General (LARPD)
- Safety
- Total of the above
- General (Office of Education)

The UAAL amortization method used for the calculated contribution rates is as follows:

Amortization period: The period over which the UAAL is paid off. After January 1, 2012, any new UAAL resulting from:

- Plan amendments – 15 years;
- Early Retirement Incentive Programs (ERIPs) - 5 years;
- Assumption and method changes – 20 years;
- Experience gains/losses – 20 years.

Closed or open amortization: Under a closed amortization the amortization period decreases by one each year and the associated UAAL is "paid off"; under an open amortization, the UAAL is amortized over the same amortization period and the associated UAAL is not "paid off". A closed period is used for ACERA, which complements the policy of amortization layers that is used.

Single base or amortization layers: Under a single base all UAAL is amortized as one component; under amortization layers the UAAL is broken down into several layers, with new layers added each valuation. An amortization layers policy is used for ACERA.

Level dollar or level percent of payroll: Under level dollar the payments are calculated so the payment is the same dollar amount in the future; under level percent of payroll the payments are projected to increase each year. For ACOE, the payments stay level. For all other plans, the payments increase at 3.25% per year.

We were able to confirm the calculations used for the tables of amortization bases in exhibit H of the actuarial valuation report.

The UAAL amortization method also includes a policy if overfunding exists, which we refer to as a surplus management policy. If the funded ratio exceeds 120%, any prior UAAL bases are fully

recognized. Any surplus in excess of 120% of the actuarial accrued liability is amortized over an open 30-year period. This has the effect of contributing the employer normal cost when the funded ratio is between 100 and 120%, and something less than the employer normal cost when the funded ratio is above 120%, with the potential for no employer contribution at some point. We find this policy to be reasonable. While this policy is in the ACERA Actuarial Funding Policy. we encourage Segal to include a brief summary of this policy in the actuarial report.

Compliance with ASOP 4: Note that ASOP 4 has been revised and will not be effective until the December 31, 2023 ACERA actuarial valuation. The version of ASOP 4 applicable for the December 31, 2021 valuation is silent on amortization methods so we are basing our review on the ASOP to be in effect for the December 31, 2023 valuation.

Revised Actuarial Standard of Practice Number 4, "*Measuring Pension Obligations and Determining Pension Plan Costs or Contributions"*, which is effective for the December 31, 2023 actuarial valuation of ACERA, provides guidance to the actuary when selecting an amortization policy in section 3.14:

- The actuary should select an amortization method for each amortization base that is expected to produce amortization payments that fully amortize the amortization base within a reasonable time period or reduce the outstanding balance by a reasonable amount each year.
- For purposes of determining a reasonable time period or a reasonable amount, the actuary should take into account factors including, but not limited to, the following, if applicable:
    a. Whether the amortization method is open or closed;
    b. the source of the amortization base;
    c. the anticipated pattern of the amortization payments, including the length of time until amortization payments exceed nominal interest on the outstanding balance;
    d. whether the amortization base is positive or negative;
    e. the duration of the actuarial accrued liability;
    f. the average remaining service lifetime of active plan participants; and
    g. the asset values fall within a reasonable range around the corresponding market value.

The UAAL Amortization Method used by Segal for the ACERA Actuarial Valuations appears to take this guidance into consideration, in particular the choice of an amortization policy that fully amortizes the UAAL. Additional guidance on parameters can be found in Actuarial Funding Policies and Practices for Public Pension Plans written by the Conference of Consulting Actuaries

Public Plans Community in October 2014. We find that the amortization method complies with relevant ASOPS and the guidance from the Public Plans Community.

We believe these amortization methods are generally reasonable.

Like the amortization method, the following two items are effective with the December 31, 2023 actuarial valuation and are included here as considerations for future valuations if the need arises.

OUTPUT SMOOTHING METHODS

The revised ASOP 4 provides guidance to the actuary when selecting an output smoothing method in section 3.16. Output smoothing methods can be used to reduce volatility of the employer contribution. Common output smoothing methods include:

- Phasing in the impact of assumption changes on contributions,
- Placing a corridor around changes in the dollar amount, contribution rate, or percentage change in contributions from year to year, and
- Amortization base management where similar amortization bases are combined to reduce potential large changes in future employer contributions.

The use of Output Smoothing Methods is not required and must be coordinated with relevant statutory requirements, but we offer these thoughts for consideration for use in future valuations as the need arises.

CONTRIBUTION LAG POLICY

The revised ASOP 4 provides guidance to the actuary when selecting a contribution lag policy in section 3.20:

> *When calculating an actuarially determined contribution, the actuary should consider reflecting the passage of time between the measurement date and the expected timing of actual contributions.*

For the December 31, 2021 ACERA actuarial valuation, the rates developed as of December 31, 2021 are unadjusted for the passage of time for employer contributions for year ended June 30, 2023. Since this results in a relatively short contribution lag of six months and the rates are applied to payroll for year ended June 30, 2023, adjustments to the rates for the contribution lag are not really necessary.

3. ACTUARIAL METHODS

We believe these actuarial methods used are generally reasonable. We provide some suggestions for consideration in future valuations.

4. DATA REVIEW

DATA ANALYSIS

We requested and received the participant data files that ACERA provided to Segal for the December 31, 2021 valuation. Segal also supplied us with their processed active, inactive, terminated vested, retired and beneficiary data files as they used the data for the December 31, 2021 valuation. Our review of the data was to assure that the processing performed by Segal results in data sets that may be reasonably used for the intended calculations.

As is typical with most plans, the raw and processed data did not match exactly. There may be elements in the data administration system that need some sort of adjustment in order to be used in an actuarial context or other items that are needed for the valuation that are not available from the administration system. It is not uncommon to see adjustments made to the same records year after year because the information needed for the valuation is either not contained in the data administration system or is not in the format needed for the actuarial valuation. We observed a very limited number of discrepancies, as would be expected following Segal's screening and review process, which would typically include clarification by ACERA of certain unusual, missing, or inaccurate data items.

We also considered the data elements provided by ACERA to determine if the data contained sufficient detail to be able to adequately assess the liabilities of the Association. We did not identify any issues that were of concern to us.

Upon review of the data we are comfortable with the processed data that is being used for the actuarial valuation. The following table provides a comparison of the raw data with the data processed by Segal for the valuation.

4. Data Review

Raw vs. Processed Data Analysis

	(1) Valuation Report or Segal Data Files	(2) ACERA Raw Data Files	(1) / (2)
Active Members			
Count	11,326	11,335	99.92%
Average Age	47.1	47.1	100.00%
Average Service	11.3	11.3	100.00%
Average Annualized Salary	105,172	105,216	99.96%
Inactive Vested Members			
Count	3,265	3,233	100.99%
Average Age	47.2	47.2	100.00%
Retired Members			
Count	8,264	8,264	100.00%
Average Age	72.5	72.5	100.00%
Average Monthly Benefit	4,667	4,649	100.39%
Disabled Members			
Count	977	977	100.00%
Average Age	65.4	65.4	100.00%
Average Monthly Benefit	3,950	3,937	100.34%
Beneficiaries			
Count	1,295	1,295	100.00%
Average Age	75.7	75.7	100.00%
Average Monthly Benefit	2,703	2,724	99.23%

Our analysis of the 12/31/2021 valuation data includes comparisons of relevant data fields in the raw data files provided by ACERA to the final valuation data used by Segal for 100% of the records. Some examples of data fields reviewed include date of birth, service, salary, plan tier, benefit amount, and form of payment. We did not find any concerning issues with the data during our review.

5. ACTUARIAL VALUATION RESULTS REVIEW

REASONABLENESS OF THE ACTUARIAL VALUATION RESULTS

This section of our review discusses the reasonableness and accuracy of the valuation liabilities and costs.

Generally accepted actuarial standards and practices provide actuaries with the basic mathematics and the framework for calculating the actuarial results. When it comes to applying those actuarial standards to complex calculations, differences may exist due to individual opinion on the best way to make those complex calculations. Although these factors may lead to variance in the calculated results, it should not be material. Differences may also arise from the actuarial software used to make these calculations not only in the actual pieces of the benefits being calculated, but also in the allocation of liabilities between past and future service for active members. Generally, differences in the present value of benefits of 1% to 2% or less and differences in the actuarial liabilities of 5% or less are considered reasonable. The normal cost rate should generally be within 5-7% as well, but it is also important that it be consistent with the relationship of the present value of benefits and the actuarial liability.

In this particular audit, the differences in the normal cost amounts are slightly larger than we normally want in a replication. We determined that much of this difference is simply due to CMC's actuarial software being unable to accommodate Segal's decrement timing in the calculation of the present value of future salaries and the timing of the employee contributions being deposited into the member accounts. By performing manual calculations, we have been able to reasonably match Segal's normal cost for a number of individuals and are therefore comfortable with the reasonableness and accuracy of Segal's overall values.

As part of the actuarial audit, CMC used the data provided by Segal to reproduce the valuation liabilities used for the cost calculations. We have presented a summary of the results at the end of this section. Note that we looked at a finer level of detail than is displayed, examining results by status (in-pay, beneficiaries, actives, etc.) and decrement status (retirement, disability, etc.) within each subgroup. This allowed us to make sure that there were no situations in which there was a proportionately large difference that would not be detectable in total.

Based on the results of our review, overall, we find the actuarial liabilities and normal cost measures to be reasonable.

One recommendation we came across in our analysis is the projection of the Final Compensation for the calculation of the reciprocity benefit. Segal is projecting the Final Compensation to either age 55 at 4.05% for Safety employees or to age 61 at 3.65% for General employees. For a member whose Final Compensation is based on pay limited by the Compensation Limit during the projection period this method in effect projects the Compensation Limit at 3.65% or 4.05% for the

reciprocity benefit as opposed to the 2.75% Compensation Limit projection assumption. For members over the pay limit, we recommend limiting pay for the reciprocal benefit to the Compensation Limit with the 2.75% projection assumption. We do not anticipate that correcting this will have a significant impact on results.

We replicated a stratified sample of the member contribution rates, recognizing that our limitations in software for the calculation of normal cost will prevent exact matching. We found a consistency in the comparison that gave us assurance of the reasonableness of the Segal results. We further reviewed the member contribution rates by comparing them to the normal costs of the respective employment groups and adjusting for plan provisions and the relevant provisions of Act 1937 as well as patterns across entry age. We found the differences in member contribution rates across employer groups to be reasonable based on the provisions of Articles 6 and 6.8 of the 1937 Act, and the variation by age was also consistent with our expectations and stratified replication. Based on this analysis, we find the member contribution rates to be reasonable.

As the tables on the following page indicate, we matched most subgroups within very reasonable tolerances, taking into consideration the timing differences on normal cost noted above.

Comparison of December 31, 2021 Liability Measures
(in thousands)

Present Value of Future Benefits

General	Segal	CMC	Difference	Safety	Segal	CMC	Difference
Tier 1	$2,518,588	$2,490,974	-1.10%	Tier 1	$ 985,462	$ 974,994	-1.06%
Tier 2	5,581,588	5,548,993	-0.58%	Tier 2	2,113,512	2,108,720	-0.23%
Tier 3	40,725	40,459	-0.65%	Tier 2C	18,951	18,886	-0.34%
Tier 4	1,150,539	1,125,841	-2.15%	Tier 2D	120,452	120,407	-0.04%
	$9,291,440	$9,206,267	-0.92%	Tier 4	316,963	315,956	-0.32%
					$3,555,340	$3,538,963	-0.46%

Actuarial Accrued Liability

General	Segal	CMC	Difference	Safety	Segal	CMC	Difference
Tier 1	$2,512,870	$2,484,373	-1.13%	Tier 1	$ 985,462	$ 974,994	-1.06%
Tier 2	4,929,462	4,888,095	-0.84%	Tier 2	1,898,521	1,879,249	-1.02%
Tier 3	38,334	37,898	-1.14%	Tier 2C	11,719	11,504	-1.83%
Tier 4	398,292	403,831	1.39%	Tier 2D	67,686	67,896	0.31%
	$7,878,958	$7,814,197	-0.82%	Tier 4	87,589	86,078	-1.73%
					$3,050,977	$3,019,721	-1.02%

Normal Cost

General	Segal	CMC	Difference	Safety	Segal	CMC	Difference
Tier 1	$ 1,840	$ 1,531	-16.79%	Tier 1	$ 214	$ -	-100.00%
Tier 2	95,409	83,608	-12.37%	Tier 2	38,532	34,130	-11.42%
Tier 3	539	461	-14.47%	Tier 2C	1,113	974	-12.49%
Tier 4	84,084	71,729	-14.69%	Tier 2D	6,456	5,652	-12.45%
	$ 181,872	$ 157,329	-13.49%	Tier 4	22,615	20,146	-10.92%
					$ 68,930	$ 60,902	-11.65%

CONTENT OF THE ACTUARIAL REPORTS

The American Academy of Actuaries has issued Actuarial Standards of Practice which deal with measuring pension obligations and communicating the results (ASOP No. 4, 23, 27, 35, 41, 44, 51, and 56). Those standards list specific elements to be included, either directly or by reference to other documents, in pension actuarial communications. Some of the 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.

The December 31, 2021 Actuarial Valuation Reports for ACERA generally provide sufficient information for another actuary to understand what was done and to assess the reasonableness of the results. We compared the contents of the reports to over 40 specific items detailed for pension actuarial work in ASOPs 4, 41, 51, and 56. ***In our review of the report, we found it to be in compliance with the applicable ASOPs***.

We note that a revision of ASOP 4 is now in place that will affect the December 31, 2023 valuation. This revision will result in some changes to your report regarding the disclosure of a low-default-risk obligation liability measurement, and some additional disclosures regarding amortization progress. There may also be a requirement to disclose a "reasonable actuarially determined contribution" that would likely need to reflect a discount rate assumption that considered the excess earnings allocation. We anticipate that Segal has been, or will be, discussing these issues with you.

SECTION 7 – GASB REPORTS REVIEW

CONTENT OF THE GASB REPORTS

In their work for ACERA, Segal provides accounting disclosures to comply with Governmental Accounting Standards Board (GASB) Statements 67, 68, 74, and 75. We note that the GASB statements relate to the accounting treatment and disclosures of retirement plans by the plan sponsor and the contributing employer. Some of the items needed for the accounting work to be completed are numbers which are calculated by actuaries. Like other actuarial firms, Segal provides many of the exhibits needed by the plan sponsor and employers, even though some of these items are not particularly actuarial in nature. In our review, we focused especially on the parts that are actuarial in nature. The four reports prepared as of a Measurement Date of December 31, 2022 rely on the liabilities derived from the December 31, 2021 actuarial funding valuation, and so we reviewed these four reports to be consistent with the liabilities we were replicating.

Because the GASB reports are prepared with plan membership data from 13 months before, Segal develops the Total Pension Liability (TPL) and the Total OPEB Liability (TOL) as of December 31, 2022 using roll-forward techniques. This is a common practice for GASB reports, and we found the TPL and TOL as of the Measurement Date to be consistent with the liabilities from the funding December 31, 2021 funding valuation work. We also confirmed the reasonableness of the service cost values in the GASB reports.

We reviewed the GASB reports for disclosures such as the sensitivity analysis, the expense development, the recognition of the deferred inflows and outflows, etc. and found the calculation to be reasonable and transparent. We note that the various allocations by employer in the GASB 68 and 75 reports are quite complex. We did not have all the details needed to fully check the allocation determination, but the description of methodology made sense and the results appeared reasonable. Note that this allocation is not necessarily an actuarial calculation.

REVIEW RESULTS

In our review, we found two items that we wish to note. The first item relates to the OPEB benefits in the GASB 74 and 75 reports. Because the benefits are provided to the extent that they are funded, Segal does not reflect benefits following the anticipated funding exhaustion date. The determination to not value these benefits is an accounting question, not an actuarial question, and so we only observe that some actuaries handle the issue of funding-dependent benefits differently by including all future years. We defer to the accounting professionals on this issue, however, because it is accounting in nature. Segal clearly discloses what they did and why, and we believe their calculations are consistent with their stated approach.

The second issue we wish to raise relates to the discount rate used. The requirements for the discount rate in the GASB statements call for using the long-term expected rate of return. Segal

uses the same 7% discount rate as they use for funding in these accounting reports. This decision was made several years ago by the Association in consultation with stakeholders, accounting professionals, actuaries, and the GASB itself. We note the GASB statements provide guidance for accounting professionals, and so as actuaries, we generally defer to the accounting professionals on such matters. We would, however, encourage Segal to include a brief, appropriate summary of this decision in their reports. The requirements of the Actuarial Standards of Practice require sufficient disclosure that another actuary who is familiar with the practice areas to be able to form an opinion on the reasonableness of the work. We believe that a brief explanation would make it easier for another actuary to do this.

SECTION 8 – EXPERIENCE STUDY REPORT REVIEW

OVERVIEW

In addition to reviewing the December 31, 2021 actuarial valuation and the correspond GASB reports, we also reviewed the most recent Actuarial Experience Study prepared by Segal using data from 2019 through 2022. This study recommends assumptions and methods to be used beginning with the December 31, 2023 actuarial valuation. We have reviewed the methods and conclusions of this report and formed an opinion on the report. We did not replicate the calculations in the report since that was beyond the scope of our assignment.

As discussed in section 2, the actuarial assumptions form the basis of any actuarial valuation or cost study. There are two general types of actuarial assumptions: economic and demographic. In this section, we review each the assumptions analyzed and by Segal and consider their recommendation. We the review their recommended changes to actuarial methods and finally comment upon the report itself.

ECONOMIC ASSUMPTIONS

Actuarial Standards of Practice (ASOPs) are issued by the Actuarial Standards Board to provide guidance to actuaries with respect to certain aspects of performing their work. As mentioned earlier, ASOP 27 is the actuarial standard that addresses the selection of or recommendations regarding economic assumptions for measuring pension obligations (liabilities) under defined benefit plans. We discuss the assumptions studied by Segal below:

Price Inflation: Price inflation impacts the assumptions for investment return, salary and payroll growth, and cost-of-living-adjustments (COLA). The underlying price inflation component in all of these should be consistent in accordance with the guidance provided in ASOP 27.

Segal considers a variety of sources, including historical inflation, the forecasts of investment advisors, the Social Security Administration, and the inflation estimate inherent in the bond market in arriving at their recommendation to reduce the inflation assumption from 2.75% to 2.50%. We believe that Segal's methodology and sources in setting this assumption are reasonable. Because inflation increased dramatically in 2021 following a number of years of being low, we understand that the decision to lower the long-term inflation assumption might seem surprising to some people. Despite what has been observed recently, the bond markets have consistently reflected an expectation that the low rates we have observed for the last 20-30 years will return before long. Consequently, our opinion is that Segal's recommendation is reasonable.

Retiree Cost-of-Living Increases: Connected with price inflation, but an assumption which needs to be independently set, is the expected Cost-of-Living Adjustment (COLA) received by retirees.

The provisions of Tiers 1 and 3 allow for a COLA of up to 3%, while Tiers 2 and 4 receive no more than a 2% COLA. Segal currently assumes a COLA of 2.75% for Tiers 1 and 3 and a 2.0% COLA for Tiers 2 and 4. They consider both local and national historical price inflation, and also consider the impact of inflation being variable. Including a margin for higher COLAs, they recommend that the current assumptions be kept. We believe this margin for adverse deviation is wise and believe their recommended assumption is reasonable.

Investment Return Assumption: The investment return assumption should represent the long-term compound rate of return expected on the plan assets, considering the asset allocation, the real rate of return on each asset class, and the underlying inflation rate, all net of expenses paid from the trust.

The long-term relationship between price inflation and investment return has long been recognized by economists. The basic principle is that the investor demands a more or less level "real return" – the excess of actual investment return over price inflation. If inflation rates are expected to be high, investment return rates are also expected to be high, while low inflation rates will result in lower expected investment returns, at least in the long run.

The period considered for pension funding represents a very long time horizon. In reviewing this assumption, the actuary should consider asset allocation policy, historical returns, and expectations of future returns. Frequently, asset advisors focus on no more than the next 5 to 10 years since they are most concerned with how to invest the funds currently to maximize returns. While actuaries are projecting benefits to be paid for the next 50 to 100 years, the short term is also relevant, especially for funds with negative cash flows. This difference in perspective can significantly influence how investment advisors and actuaries derive an investment return assumption.

Segal considers the capital market assumptions of both Verus, the advisor to ACERA, and other consultants who Segal works with as part of their California public plan work. Both sets of assumptions are then applied to the asset allocation of the ACERA portfolio to estimate an expected annual return. Both sets of assumptions yield a similar expectation. Segal later adjusts this expected return for what the term a "risk adjustment" which reflects the mathematical reality that the average compound return (geometric mean) of a portfolio is less than the average annual return (arithmetic mean). This is a needed adjustment. Alternatively, it would be possible to directly calculate the compound return directly from the capital market assumptions by using a statistical distribution assumption (the log-normal distribution) and observed correlations between investment classes. Because these should lead to about the same result, we do not have a preference for method.

Segal also makes an adjustment to the return assumption to reflect the administrative expenses of the Association. (Investment expenses are typically netted out of investment income and are not directly reflected.) While this approach is one way to reflect the administrative expenses, an alternative approach is to directly reflect expected expenses as a part of the contribution rate and then use the resulting higher investment return assumption which lowers the contribution calculation. Because both ways of handling expenses result in contributions over time to fund expenses, there is not a compelling actuarial reason for one over the other. We note that after the Governmental Accounting Standards Board (GASB) issued their statements 67 and 68 which call for certain treatments of administrative expenses there has been a slight movement toward the direct recognition of administrative expenses in contributions among public retirement systems.

After considering these adjustments, Segal arrives at a recommended investment return assumption of 7.00%. They estimate that there is a 54% chance of meeting or exceeding this return over time (as a compound return). We find their approach and results to be reasonable.

Segal further notes that based on their understanding of California statutes, they have not considered the requirement that 50% of the "excess earnings" are to be allocated to the Supplemental Retiree Benefits Reserve (SRBR). Segal does note both in the experience study and in the actuarial valuation as an informational item that if this SRBR allocation were considered, the expected return would be lower, the actuarial liability would be greater, and contributions would need to be higher. We wish to stress that this is an important concept for the ACERA Board, staff, and interested parties to understand. The fact that assets are expected to be removed from future investment earnings to provide benefits without anticipating those benefits means that there is an expectation of future actuarial losses that will need to be made up in some manner.

General Wage Increases: The general wage growth or wage inflation assumption consists of price inflation and real wage growth (also called productivity). As the price of goods and services increase, we expect wages to increase as well. Productivity is a measure of how much wages increase across the whole labor pool in excess of the rate of price inflation. Both of these items tend to be a function of the general economy rather than system specific. Segal assumes a real wage growth of 0.50% and in keeping with their change in price inflation, recommends changing the general wage increase from 3.25% to 3.00%. Based on our experience with public employment, we find this to be reasonable.

Individual Salary Scale: There are two factors that generally affect salary increases and are typically reflected in the individual salary scale. The first is the wage inflation or the total wage growth assumption. The second component, frequently identified as merit scale, reflects the portion of salary increases provided at the individual level, including promotion, increased skills, longevity pay, and other similar items. The combination of these components is reflected in the total individual salary scale.

Segal has developed merit scales for general and safety members, reflecting that these two groups of members experience different patterns of pay increases. The assumptions are also service based, reflecting that members typically receive their largest pay increases in their early years. To improve the credibility of the data, Segal not only considered the last three years' data, but also looked at the last six years as well. They then used these observations to make adjustments to the current assumptions. We find their method and proposed assumptions to be reasonable.

One suggestion we have for future consideration would be to reduce the merit piece to 0% at 25 or 30 years of service. Currently, the merit component is 0.45% for general members and 1.00% for safety members for years eleven and over. At some point, employees have generally mastered their jobs and have been promoted to a point where they remain until retirement. From a theoretical standpoint, there are no merit increases at this point, and the observed pay raises are due to wage growth. Because of the earlier retirement eligibility in public safety jobs, there may still be merit through all service levels, so the on-going merit component may be reasonable for this group. We do not believe that the current approach used by Segal is inappropriate but offer this idea as a possible refinement.

Payroll Growth Assumption: The UAAL is amortized as a level percentage of payroll over the amortization period. As a result, a payroll growth assumption is necessary to develop the UAAL contribution rate. Segal assumes that payroll will grow at 3.00% (reduced from 3.25%), which is the same as the general wage inflation assumption. This is reasonable because as members retire or terminate, they are replaced by new members with lower salaries on average. We find the assumption reasonable, but also note that some systems use a payroll growth assumption that is less than wage inflation to provide for some conservatism, especially as the last part of the Baby Boomers are retiring.

Additional Cash Out Assumption: The non-CalPEPRA members of ACERA may cash out vacation accruals, subject to certain rules, and use payout as part of their final average compensation calculation. Since this option can change the amount of the retirement benefit, it is appropriate to make an assumption regarding how this provision will be used in the future. Because there was a change of the rules on June 17, 2021, Segal only considered retirements since that date in determining what the assumption should be. Segal examined how the behavior varied by tier within General and Safety members. We reviewed their methodology and analysis in arriving at how to modify this assumption and believe that it is reasonable.

DEMOGRAPHIC ASSUMPTIONS

The major demographic assumptions are the assumed rates of retirement, withdrawal (with or without a vested benefit), disability, and mortality (death before or after retirement). There are also various minor assumptions that sometimes are developed with a significant component of professional judgment since useful data is not always readily available.

In the following paragraphs, we make specific comments on the demographic assumptions.

Rates of Retirement: Segal has developed retirement rates that vary by employment type and tier. Within those groups, rates are age-based. Further, General Tiers 2 and 4 and Safety Tiers 2, 2C, and 4, the rates vary by service above or below 30 years. The need for the different sets of rates follows from the ACERA benefit structure and plan coverage.

Segal tabulated the current assumed retirement rates and the actual retirement rates observed during the study period and then made adjustments to the assumed rates, typically moving part way between the current assumption and the observed experience with consideration for smooth patterns of behavior. We note that this methodology is commonly used and we believe that Segal's approach and resulting rates are reasonable.

We have some observations that we believe could be helpful for the next study. First, it would be helpful to provide some context of how many exposures and retirements occurred at the various ages in the tables and graphs. All the information is shown as rates only, so there is no easy way for a reader to determine which ages had many exposures and retirements and which had few. Changes when there is more data available can be made more confidently than changes with less data. The table for General Tier 3, for instance, has actual rates that suggest there were very limited numbers of exposure (probably under five exposures at any age). This set of rates might be reasonably set entirely by professional judgement and reference to similar tiers.

Another consideration in this study would be some discussion regarding to what extent the Covid pandemic might have affected retirement patterns. In our review of systems across the country, there has not been a uniform impact – sometimes it appears that there have been additional retirements, sometimes there have been fewer retirements, and sometimes there is no clear change from prior patterns. Further, there is no way to know whether these observed changes are short-term in nature as people responded to a significant societal disruption, or if these changes are the new normal. Adding a column of the observed rates of retirement in the prior study would have helped indicate whether we are observing a trend or just a brief experience.

Rates of Mortality: One of the most important demographic assumptions in the pension valuation is mortality because it projects how long benefit payments are expected to be made. The longer

retirees live and receive benefits, the larger the liability of the system, thus increasing the contributions required to fund the system. In addition, if members live longer than expected based on the assumption, the true cost of future benefit obligations will be understated, and contributions will increase as the unfavorable experience unfolds.

Constructing mortality tables requires a significant amount of data, and so almost all retirement systems rely on mortality tables published by the Society of Actuaries. ACERA has been using the Pub-2010 family of tables, and Segal recommended their continued use. Since these tables were developed using public plan retirement data, we are in full support of this. Further, because of the relatively small number of deaths in any given year, Segal aggregated the past twelve years to perform their analysis.

As noted, Pub-2010 is a family of tables. Segal selected tables based on general membership or public safety, as well as the membership status (healthy retirees, disabled retirees, contingent survivors, or active employees). While ACERA is not large, there is sufficient data that Segal has determined that the use of the "Above Median" tables are appropriate, indicating a generally longer life expectancy than the standard table. Finally, because of the correlation between benefit amounts and mortality, most pension tables are based on benefit-weighted experience, and Segal has used those tables. However, for the medical benefits provided in the SRBR valuation, they recommend using a headcount-weighted table which is very appropriate since the benefits paid by the plan are not expected to be correlated with longevity. We agree with all of these decisions.

In some cases, Segal recommended increasing or decreasing the mortality rates by 5% or 10%. This is a standard technique used to improve the quality of the fit to the table to the observed data. We note that Segal does not attempt to finely tune the fit and we believe that is very appropriate in light of the amount of data available.

Segal assumes that mortality will increase in keeping with the MP-2021 scale, the most recent mortality projection scale published by the Society of Actuaries. We believe this is appropriate and concur with Segal's practice of not updating this each year.

Finally, Segal describes their recommended methodology of developing optional form and other factors. They project the rates out 30 years from the table base year of 2010. We typically use a similar approach and find Segal's approach reasonable.

Rates of Termination: The termination rates developed by Segal are service-based tables and vary by employment type. In our experience, such a set of tables is commonly made and very appropriate. As is also very common, no terminations are assumed once a member is eligible for retirement.

As with retirement, Segal tabulated the current assumed termination rates and the actual termination rates observed during the study period and then adjusted the assumed rates, typically moving part way between the current assumption and the observed experience with consideration for smooth patterns of behavior. We note that this methodology is commonly used, and we believe that Segal's approach and resulting rates are reasonable.

Also as with retirement, we believe it would have been appropriate to indicate an awareness of the Covid pandemic and consider whether any of the observed experience was related to that. For safety members in particular, the actual rates were higher, and may be partly a result of higher police terminations that we have seen around the country in recent years.

As part of the termination analysis, Segal analyzed what portion of the terminating members elect a refund of contributions rather than waiting for a deferred retirement benefit. This assumption is the same for both General and Safety members, with a different probability based on whether or not the member has reached five years of service. Segal recommended reducing the assumption for those with over five years of service, moving part way from the current assumption towards the observed experience. We find this to be reasonable.

While the current approach to the refund assumption is fine, we offer two possible alternatives for consideration. First, it is likely that the rate of refund for those over five years declines with greater service. We would suggest looking at the rate of refund compared with service to see if that would fit better. Alternatively, to provide a small amount of conservatism, the refund assumption could be to assume that each member makes the refund decision based on whether the refund is more or less valuable than the present value of the deferred benefit. While that is not how people actually make the decision, it does protect the Association from losses. Neither of these alternatives is likely to be of significant cost consequence.

Rates of Disability: In most retirement systems, disability retirements are relatively rare, making it difficult to set rates. The rates used by Segal are age-based, with separate tables for general and safety employment groups. Sometimes separate tables are developed for males and females, but because of the relatively low incidence of disabilities for a plan of ACERA's size, it is doubtful that a credible and meaningful distinction could be made.

We do not have any concerns with the incidence of disability rates based on our experience. We note that Segal made changes to these tables that were intended to match the observed experience. While we usually agree with the effort to move part way, we would suggest considering adjusting the entire table of rates by applying a scaling factor to the entire table to move the actual to expected ratio towards 100%. This helps preserve the shape of the table rather than letting the adjusting different age groups differently following what is possibly more a function of randomness amidst overall disability changes rather than assuming changes are occurring differently for different ages.

Probability of Marriage, Age Difference of Spouse and Other Minor Assumptions: There are several minor assumptions that Segal sets relative to family composition, election of retiree medical benefits, and unused sick leave. While some of these are sometimes based on professional judgment, we note that Segal gathered sufficient data to make a reasonable estimate. We find this methodology and the resulting assumptions to be reasonable.

ACTUARIAL METHODS

Actuarial methods are sometimes, but not always, reviewed as part of an experience study, but they are not changed with the same frequency that the actuarial assumptions are revised. Because In Section 3 of our report, we examined each of the major methods in depth and confirmed their appropriateness.

In the experience study, Segal does not directly discuss most of the actuarial methods. They do, however, recommend three minor technical changes to the application of the Entry Age cost allocation method in that study:

- An improvement in reflecting the timing of decrements in calculating the total normal cost rate for each plan.
- The use the individual (instead of the aggregate) version of the Entry Age cost allocation method to determine the normal cost of the COLA benefits.
- A refinement to the entry age calculation in how the service is rounded.

These changes are to be implemented with the next actuarial valuation and so we could not confirm that they were implemented. However, we agree the cost would be minor as noted in the Segal report. We note that many actuaries might not disclose these changes because they are so minor and technical in nature. We commend Segal for being transparent with these changes.

EXPERIENCE STUDY REPORT

The Actuarial Standards of Practice do not provide much guidance relative to the contents of an experience study. Rather, the focus is on the substance of the analysis. The report prepared by Segal is laid out in a logical manner as it systematically considers the appropriate assumptions. We found the description of the assumption to be clear and the analysis was succinctly provided. We would encourage Segal to consider providing detailed summaries of exposures and decrements, probably in an appendix. This is a preference on our part, and not an expectation of the ASOPs.

CONCLUSION

As noted in the discussion of the assumptions, there are a few places where we think the analysis could be enhanced with the disclosure of the numbers of exposures and decrements. We also offered some alternative considerations regarding the form that some of these assumptions could take. We view all of these suggestions as a way to enhance the report rather than as a needed change.

In our opinion, the Segal experience study report complies with relevant Actuarial Standards of Practice in the development and presentation of the proposed actuarial assumptions and methods. We believe the use of these in future actuarial work would be appropriate.