

Orange County Employees Retirement System

Actuarial Valuation and Review

As of December 31, 2019



This report has been prepared at the request of the Board of Retirement to assist in administering the Fund. This valuation report may not otherwise be copied or reproduced in any form without the consent of the Board of Retirement and may only be provided to other parties in its entirety, unless expressly authorized by Segal. The measurements shown in this actuarial valuation may not be applicable for other purposes.

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Segal



180 Howard Street, Suite 1100
San Francisco, CA 94105-6147
segalco.com
T 415.263.8200

June 4, 2020

Board of Retirement
Orange County Employees Retirement System
2223 Wellington Avenue
Santa Ana, CA 92701

Dear Board Members:

We are pleased to submit this Actuarial Valuation and Review as of December 31, 2019. It summarizes the actuarial data used in the valuation, analyzes the preceding year's experience, and establishes the funding requirements for fiscal year 2021-2022.

This report was prepared in accordance with generally accepted actuarial principles and practices at the request of the Board to assist in administering the Retirement System. The census information and financial information on which our calculations were based was prepared by the staff of the System. That assistance is gratefully acknowledged.

The actuarial calculations were directed under the supervision of Andy Yeung, ASA, MAAA, FCA and Enrolled Actuary. We are members of the American Academy of Actuaries and we meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion herein. To the best of our knowledge, the information supplied in this actuarial valuation is complete and accurate. Further, in our opinion, the assumptions as approved by the Board are reasonably related to the experience of and the expectations for the System.

We look forward to reviewing this report at your next meeting and to answering any questions.

Sincerely,
Segal

Paul Angelo, FSA, EA, MAAA, FCA
Senior Vice President and Actuary

Andy Yeung, ASA, EA, MAAA, FCA
Vice President and Actuary

JY/jl

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Section 1: Actuarial Valuation Summary

Purpose and Basis

This report was prepared by Segal to present a valuation of the Orange County Employees Retirement System (“OCERS” or “the System”) as of December 31, 2019. The valuation was performed to determine whether the assets and contribution rates are sufficient to provide the prescribed benefits. The measurements shown in this actuarial valuation may not be applicable for other purposes. In particular, the measures herein are not necessarily appropriate for assessing the sufficiency of current Plan assets to cover the estimated cost of settling the Plan’s accrued benefit obligations.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements; and changes in plan provisions or applicable law.

The contribution requirements presented in this report are based on:

- The benefit provisions of the Plan, as administered by the Board of Retirement;
- The characteristics of covered active members, inactive vested members, and retired members and beneficiaries as of December 31, 2019, provided by OCERS;
- The assets of the Plan as of December 31, 2019, provided by OCERS;
- Economic assumptions regarding future salary increases and investment earnings adopted by the Board for the December 31, 2019 valuation;
- Other actuarial assumptions regarding employee terminations, retirement, death, etc. adopted by the Board for the December 31, 2019 valuation and
- The funding policy adopted by the Board of Retirement.

One of the general goals of an actuarial valuation is to establish contributions which fully fund the System’s liabilities, and which, as a percentage of payroll, remain as level as possible for each generation of active members. Annual actuarial valuations measure the progress toward this goal, as well as test the adequacy of the contribution rates.

Section 1: Actuarial Valuation Summary

In preparing this valuation, we have employed generally accepted actuarial methods and assumptions to evaluate the System's liabilities and future contribution requirements. Our calculations are based upon member data and financial information provided to us by the System's staff. This information has not been audited by us, but it has been reviewed and found to be consistent, both internally and with prior year's information.

The contribution requirements are determined as a percentage of payroll. The System's employer rates provide for both Normal Cost and a contribution to amortize any unfunded or overfunded actuarial accrued liabilities. In this valuation, we have applied the funding policy adopted by the Board in 2014 (and reaffirmed in 2018). Details of the funding policy are provided in *Section 4, Exhibit I* starting on page 104.

A schedule of current amortization balances and payments may be found in *Section 3, Exhibit H* starting on page 86. A graphical projection of the Unfunded Actuarial Accrued Liability (UAAL) amortization balances and payments has been included in *Section 3, Exhibit I* on pages 98 and 99.

The rates calculated in this report may be adopted by the Board for the fiscal year that extends from July 1, 2021 through June 30, 2022.

Section 1: Actuarial Valuation Summary

Valuation Highlights

- Pg. 50 1. The ratio of the Valuation Value of Assets to Actuarial Accrued Liabilities increased from 72.4% to 73.2%. The funded ratio measured on a market value basis increased from 69.3% to 75.4%. The UAAL increased from \$5,708.9 million as of December 31, 2018 to \$5,879.9 million as of December 31, 2019. The increase in UAAL is primarily due to actual contributions less than expected and COLA increases greater than expected. A complete reconciliation of the System's UAAL is provided in *Section 2, Subsection E*. A schedule of the current UAAL amortization amounts is provided in *Section 3, Exhibit H*. A graphical projection of the UAAL amortization bases and payments is provided in *Section 3, Exhibit I*.
- Pg. 29
Pgs. 86-97
Pgs. 98-99
- Pg. 31 2. The aggregate employer contribution rate calculated in this valuation increased from 39.48% of payroll to 41.49% of payroll. This change was primarily due to the final year of the three-year phase-in of the UAAL cost impact due to assumption changes in the December 31, 2017 valuation, actual contributions less than expected and COLA increases greater than expected. A complete reconciliation of the System's aggregate employer rate is provided in *Section 2, Subsection F*.
- The Board approved a three-year phase-in of the UAAL employer cost impact due to assumption changes in the December 31, 2017 valuation. The employer contribution rates as of December 31, 2018 shown in this report reflect two-thirds of the UAAL cost impact from these changes while the employer contribution rates as of December 31, 2019 reflect the full UAAL cost impact.
3. As directed recently by OCERS, starting with this valuation Segal is only showing the "net" UAAL contribution rates for the active employers in Rate Group #1 (i.e., the County and O.C. IHSS Public Authority) after adjustments to exclude the UAAL paid by O.C. Vector Control, Cypress Recreation and Parks, U.C.I. and Department of Education. The UAAL contributions required to be paid by O.C. Vector Control and Cypress Recreation and Parks are subject to the Board's Withdrawing Employer Policy. The UAAL contributions required to be paid by U.C.I. and Department of Education are subject to the Board's Declining Employer Payroll Policy. The UAAL contributions for these employers will be provided in separate side letters following the administrative practice established by OCERS in the prior valuations.
- Pg. 32 4. The aggregate member rate calculated in this valuation has increased from 12.29% of payroll to 12.31% of payroll. A complete reconciliation of the System's average member rate is provided in *Section 2, Subsection F*.
- The individual member rates have been updated to reflect the valuation as of December 31, 2019. The detailed member rates are provided in *Section 4, Exhibit III* of this report.
- Pg. 25 5. The rate of return on the Market Value of Assets was 14.79% for the 2019 plan year. The return on the Valuation Value of Assets was 6.66% for the same period after considering the recognition of prior years' investment gains and losses. This resulted in an actuarial loss when measured against the assumed rate of return of 7.00%. This actuarial investment loss increased the average employer contribution rate by 0.18% of pay.

Section 1: Actuarial Valuation Summary

- Pg. 21 6. As indicated in *Section 2, Subsection B* of this report, the total unrecognized investment gain as of December 31, 2019 was \$479.2 million (as compared to an unrecognized loss of \$644.7 million in the December 31, 2018 valuation). This investment gain will be recognized in the determination of the Actuarial Value of Assets for funding purposes over the next few years, and will offset a portion of any investment losses that may occur after December 31, 2019. This implies that earning the assumed rate of investment return of 7.00% per year (net of expenses) on a market value basis will result in investment gains on the Actuarial Value of Assets in the next few years. Therefore, if the actual market return is equal to the assumed 7.00% rate and all other actuarial assumptions are met, the employer contribution requirements would generally decrease over the next few years. The potential impact associated with the net deferred investment gains may be illustrated as follows:
- a. If the net deferred gains in this year's valuation were recognized immediately and entirely in the Valuation Value of Assets, the funded ratio would increase from 73.2% to 75.4%.
For comparison purposes, if all the net deferred losses in the December 31, 2018 valuation had been recognized immediately in the December 31, 2018 valuation, the funded ratio in last year's valuation would have decreased from 72.4% to 69.3%.
 - b. If the net deferred gains in this year's valuation were recognized immediately and entirely in the Valuation Value of Assets, the aggregate employer contribution rate would decrease from 41.5% to 39.7%.
For comparison purposes, if all the net deferred losses in the December 31, 2018 valuation had been recognized immediately in the December 31, 2018 valuation, the aggregate employer contribution rate in last year's valuation would have increased from 40.0% to 42.5%.
7. The actuarial valuation report as of December 31, 2019 is based on financial information as of that date. Changes in the value of assets subsequent to that date are not reflected. Declines in asset values will increase the actuarial cost of the plan, while increases will decrease the actuarial cost of the plan.
8. This report reflects the \$8.1 million in additional contributions made by O.C. Sanitation District to pay off their UAAL. The \$8.1 million¹ of additional contributions has been used to eliminate their UAAL rates for FY 20-21. In addition, O.C. Sanitation District made a \$29.9 million additional contribution to the O.C. Sanitation District UAAL deferred account to go towards paying their losses as they arise in future valuations to continue to eliminate their UAAL rate in those valuations. As of December 31, 2019, a transfer of \$18.6 million was required from this account to fully offset the actuarial losses (primarily from salary experience and COLA experience) during 2019. The balance in the O.C. Sanitation District UAAL deferred account after the transfer is \$12,057,000 as of December 31, 2019.

¹ \$8.1 million in additional contributions were made by O.C. Sanitation District on September 9, 2019. After adjusting with interest, those contributions have a value of \$8.3 million as of December 31, 2019.

Section 1: Actuarial Valuation Summary

This report also reflects the \$12.8 million additional contributions made by Transportation Corridor Agency to pay off their UAAL. The \$12.8 million¹ of additional contributions has been used to eliminate their UAAL rates for FY 20-21.

9. This report reflects the \$19.0 million in additional contributions made by OCFA towards their UAAL. The \$19.0 million² of additional contributions made by OCFA has been amortized as a level percent of pay over a period of twenty years effective on December 31, 2019 and used to reduce their UAAL rates for fiscal year 2021-2022.
10. During 2019, a request was made by City of San Juan Capistrano to spinoff certain City utility employees to leave OCERS and join CalPERS. Such spinoff has not taken place as of December 31, 2019.
11. The Actuarial Standards Board approved Actuarial Standard of Practice No. 51 (ASOP 51) regarding risk assessment, which was first effective with OCERS' December 31, 2018 actuarial valuation. ASOP 51 requires actuaries to identify risks that "may reasonably be anticipated to significantly affect the plan's future financial condition". Investment risk, asset/liability mismatch risk, interest rate risk, longevity and other demographic risks and contribution risk are also cited as examples in ASOP 51. The standard does not require the actuary to evaluate the likelihood of contributing entities to make contributions when due, nor does it require the actuary to assess the likelihood or consequences of future changes in applicable law.

The actuary's assessment can be qualitative or quantitative (e.g., based on numerical demonstrations). The actuary may use non-numerical methods for assessing risks that might take the form of commentary about potential adverse experience and the likely effect on future results. While the standard does not require that every valuation include a quantitative risk assessment, the actuary may recommend that a more detailed risk assessment be performed. When making that decision, the actuary will take into account such factors as the Plan's design, maturity, size, funded status, asset allocation, cash flow, possible insolvency and current market conditions.

A copy of the risk assessment report including the analysis recommended by Segal in consultation with OCERS staff will be provided in a separate stand-alone report.

12. Segal strongly recommends an actuarial funding method that targets 100% funding of the actuarial accrued liability. Generally, this implies payments that are ultimately at least enough to cover normal cost, interest on the unfunded actuarial accrued liability and the principal balance. The funding policy adopted by the Board meets this standard.

¹ \$12.8 million in additional contributions were made by Transportation Corridor Agency on July 1, 2019. After adjusting with interest, those contributions have a value of \$13.3 million as of December 31, 2019.

² \$19.0 million in additional contributions were made by OCFA continuously throughout the year. After adjusting with interest, those contributions have a value of \$19.2 million as of December 31, 2019.

Section 1: Actuarial Valuation Summary

13. This report constitutes an actuarial valuation for the purpose of determining the actuarially determined contribution under the Plan's funding policy and measuring the progress of that funding policy. The Net Pension Liability (NPL) and Pension Expense under Governmental Accounting Standards Board (GASB) Statements No. 67 and No. 68, for inclusion in the plan and employer's financial statements as of December 31, 2019, will be provided separately. The accounting disclosures will utilize different methodologies from those employed in the funding valuation, as required by the GASB. However, the actuarially determined contribution in this valuation is expected to be used as the actuarially determined contribution (ADC) for GASB financial.
14. It is important to note that this actuarial valuation is based on plan assets as of December 31, 2019. Due to the COVID-19 pandemic, market conditions have changed significantly since the valuation date. The Plan's actuarial status does not reflect short-term fluctuations of the market, but rather is based on the market values on the last day of the Plan Year. While it is impossible to determine how the market will perform over the next several months, and how that will affect the results of next year's valuation, Segal is available to prepare projections of potential outcomes upon request.

Section 1: Actuarial Valuation Summary

Summary of Key Valuation Results

	December 31, 2019		December 31, 2018	
	Total Rate	Estimated Annual Dollar Amount ¹ (\$ in '000s)	Total Rate ^{2,3,4}	Estimated Annual Dollar Amount ¹ (\$ in '000s)
Aggregate Employer Contribution Rates:				
• Rate Group #1 – Plans A, B and U (non-OCTA, non-OCSD)	15.49%	\$14,040	15.35%	\$13,909
• Rate Group #2 – Plans I, J, O, P, S, T, U and W (County et al.)	39.35%	456,528	37.03%	429,586
• Rate Group #3 – Plans B, G, H and U (OCSD)	11.93%	9,110	11.97%	9,147
• Rate Group #5 – Plans A, B and U (OCTA)	31.42%	35,501	30.47%	34,422
• Rate Group #9 – Plans M, N and U (TCA)	13.22%	970	12.98%	952
• Rate Group #10 – Plans I, J, M, N and U (OCFA)	26.70%	8,436	27.60%	8,721
• Rate Group #11 – Plans M and N, future service, and U (Cemetery)	14.84%	248	12.13%	203
• Rate Group #12 – Plans G, H, future service, and U (Law Library)	13.68%	153	15.35%	172
• Rate Group #6 – Plans E, F and V (Probation)	59.69%	37,659	55.23%	34,845
• Rate Group #7 – Plans E, F, Q, R and V (Law Enforcement)	67.55%	175,621	64.79%	168,423
• Rate Group #8 – Plans E, F, Q, R and V (OCFA)	48.71%	71,845	47.84%	70,569
All Categories Combined	41.49%	\$810,111	39.48%	\$770,949
Average Member Contribution Rates:				
• Rate Group #1 – Plans A, B and U (non-OCTA, non-OCSD)	9.72%	\$8,808	9.70%	\$8,790
• Rate Group #2 – Plans I, J, O, P, S, T, U and W (County et al.)	10.99%	127,511	10.97%	127,279
• Rate Group #3 – Plans B, G, H and U (OCSD)	11.62%	8,877	11.64%	8,892
• Rate Group #5 – Plans A, B and U (OCTA)	10.30%	11,637	10.28%	11,614
• Rate Group #9 – Plans M, N and U (TCA)	10.86%	797	10.85%	796
• Rate Group #10 – Plans I, J, M, N and U (OCFA)	11.42%	3,609	11.42%	3,609
• Rate Group #11 – Plans M and N, future service, and U (Cemetery)	10.13%	170	10.16%	170
• Rate Group #12 – Plans G, H, future service, and U (Law Library)	13.33%	149	13.23%	148
• Rate Group #6 – Plans E, F and V (Probation)	16.63%	10,492	16.56%	10,448
• Rate Group #7 – Plans E, F, Q, R and V (Law Enforcement)	17.22%	44,767	17.30%	44,975
• Rate Group #8 – Plans E, F, Q, R and V (OCFA)	15.90%	23,453	15.74%	23,217
All Categories Combined	12.31%	\$240,270	12.29%	\$239,938

¹ Based on December 31, 2019 projected annual compensation.

² These rates reflect 2/3 phase-in UAAL cost impact of the changes in actuarial assumptions from the December 31, 2017 valuation.

³ For those Rate Groups with plan specific contribution rates, the total rates shown above have been recalculated by applying the plan specific contribution rates determined in the December 31, 2018 valuation to the corresponding projected payrolls reported as of December 31, 2019.

⁴ Average December 31, 2018 member contribution rates have been recalculated by applying the individual entry age based rates determined in the December 31, 2018 valuation to the System membership as of December 31, 2019.

Section 1: Actuarial Valuation Summary

Summary of Key Valuation Results (continued)

		December 31, 2019 (\$ in '000s)	December 31, 2018 (\$ in '000s)
Actuarial Accrued Liability as of December 31:	<ul style="list-style-type: none"> Retired members and beneficiaries Inactive vested members¹ Active members Total Actuarial Accrued Liability Normal Cost for plan year beginning December 31 	\$12,631,182 500,271 <u>8,785,277</u> \$21,916,730 529,849	\$11,569,064 449,290 <u>8,684,995</u> \$20,703,349 516,408
Assets as of December 31:	<ul style="list-style-type: none"> Market Value of Assets (MVA)^{2,3} Valuation Value of Assets (VVA)² 	\$16,516,024 16,036,953	\$14,349,705 14,994,420
Funded status as of December 31:	<ul style="list-style-type: none"> Unfunded Actuarial Accrued Liability on Market Value of Assets basis Funded percentage on MVA basis Unfunded Actuarial Accrued Liability on Valuation Value of Assets basis Funded percentage on VVA basis 	\$5,400,706 75.36% \$5,879,861 73.17%	\$6,353,644 69.31% \$5,708,929 72.43%
Key assumptions:	<ul style="list-style-type: none"> Net investment return Price Inflation Payroll growth increase 	7.00% 2.75% 3.25%	7.00% 2.75% 3.25%

¹ Includes members who chose to leave their contributions on deposit even though they have less than five years of service.

² Excludes County Investment Account (funded by pension obligation bond proceeds held by OCERS), prepaid employer contributions account, O.C. Sanitation District UAAL Deferred Account (after transfer) and non-valuation reserves.

³ Based on the preliminary unaudited financial statement provided by OCERS for this valuation.

Section 1: Actuarial Valuation Summary

Summary of Key Valuation Results (continued)

	December 31, 2019	December 31, 2018	Change From Prior Year
Demographic data as of December 31:			
Active Members:			
• Number of members	22,257	21,929	1.5%
• Average age	44.9	45.1	-0.2
• Average service	12.5	12.8	-0.3
• Total projected compensation	\$1,952,534,335	\$1,875,371,661	4.1%
• Average projected compensation	\$87,727	\$85,520	2.6%
Retired Members and Beneficiaries:			
• Number of members:			
– Service retired	14,449	13,827	4.5%
– Disability retired	1,505	1,482	1.6%
– Beneficiaries	2,466	2,365	4.3%
– Total	18,420	17,674	4.2%
• Average age	70.1	70.0	0.1
• Average monthly benefit ¹	\$4,077	\$3,913	4.2%
Inactive Vested Members:			
• Number of members ²	6,520	6,026	8.2%
• Average Age	44.7	44.9	-0.2
Total Members:	47,197	45,629	3.4%

¹ Excludes monthly benefits payable from the STAR COLA.

² Includes members who chose to leave their contributions on deposit even though they have less than five years of service.

Section 1: Actuarial Valuation Summary

Important Information About Actuarial Valuations

An actuarial valuation is a budgeting tool with respect to the financing of future projected obligations of a pension plan. It is an estimated forecast – the actual long-term cost of the plan will be determined by the actual benefits and expenses paid and the actual investment experience of the plan.

In order to prepare a valuation, Segal relies on a number of input items. These include:

Plan of benefits	Plan provisions define the rules that will be used to determine benefit payments, and those rules, or the interpretation of them, may change over time. Even where they appear precise, outside factors may change how they operate. It is important to keep Segal informed with respect to plan provisions and administrative procedures, and to review the plan summary included in our report to confirm that Segal has correctly interpreted the plan of benefits.
Participant data	An actuarial valuation for a plan is based on data provided to the actuary by the System. Segal does not audit such data for completeness or accuracy, other than reviewing it for obvious inconsistencies compared to prior data and other information that appears unreasonable. It is important for Segal to receive the best possible data and to be informed about any known incomplete or inaccurate data.
Assets	The valuation is based on the Market Value of Assets as of the valuation date, as provided by the System. The System uses a “Valuation Value of Assets” that differs from market value to gradually reflect year-to-year changes in the Market Value of Assets in determining the contribution requirements.
Actuarial assumptions	In preparing an actuarial valuation, Segal projects the benefits to be paid to existing plan participants for the rest of their lives and the lives of their beneficiaries. This projection requires actuarial assumptions as to the probability of death, disability, termination, and retirement of each participant for each year. In addition, the benefits projected to be paid for each of those events in each future year reflect actuarial assumptions as to salary increases and cost-of-living adjustments. The projected benefits are then discounted to a present value, based on the assumed rate of return that is expected to be achieved on the plan’s assets. There is a reasonable range for each assumption used in the projection and the results may vary materially based on which assumptions are selected. It is important for any user of an actuarial valuation to understand this concept. Actuarial assumptions are periodically reviewed to ensure that future valuations reflect emerging plan experience. While future changes in actuarial assumptions may have a significant impact on the reported results, that does not mean that the previous assumptions were unreasonable.

Section 1: Actuarial Valuation Summary

The user of Segal's actuarial valuation (or other actuarial calculations) should keep the following in mind:

The actuarial valuation is prepared at the request of the System. Segal is not responsible for the use or misuse of its report, particularly by any other party.

An actuarial valuation is a measurement of the plan's assets and liabilities at a specific date. Accordingly, except where otherwise noted, Segal did not perform an analysis of the potential range of future financial measures. The actual long-term cost of the plan will be determined by the actual benefits and expenses paid and the actual investment experience of the plan. Future contribution requirements may differ from those determined in the valuation because of:

- Differences between actual experience and anticipated experience;
- Changes in actuarial assumptions or methods; and
- Changes in statutory provisions.

Some actuarial results in this report are not rounded, but that does not imply precision.

If the System is aware of any event or trend that was not considered in this valuation that may materially change the results of the valuation, Segal should be advised, so that we can evaluate it.

Segal does not provide investment, legal, accounting, or tax advice. Segal's valuation is based on our understanding of applicable guidance in these areas and of the plan's provisions, but they may be subject to alternative interpretations. The System should look to their other advisors for expertise in these areas.

As Segal has no discretionary authority with respect to the management or assets of the Plan, it is not a fiduciary in its capacity as actuaries and consultants with respect to the Plan.

Section 2: Actuarial Valuation Results

A. Member Data

The Actuarial Valuation and Review considers the number and demographic characteristics of covered members, including active members, inactive vested members, retired members and beneficiaries.

This section presents a summary of significant statistical data on these member groups.

More detailed information for this valuation year and the preceding valuation can be found in *Section 3, Exhibits A, B, and C*.

Member Population: 2010 – 2019

Year Ended December 31	Active Members	Inactive Vested Members ¹	Retired Members and Beneficiaries	Total Non-Actives	Ratio of Non-Actives to Actives	Ratio of Retired Members and Beneficiaries to Actives
2010	21,742	4,308	12,762	17,070	0.79	0.59
2011	21,421	4,406	13,289	17,695	0.83	0.62
2012	21,256	4,415	13,947	18,362	0.86	0.66
2013	21,368	4,613	14,505	19,118	0.89	0.68
2014	21,459	4,789	15,169	19,958	0.93	0.71
2015	21,525	5,091	15,810	20,901	0.97	0.73
2016	21,746	5,370	16,369	21,739	1.00	0.75
2017	21,721	5,803	16,947	22,750	1.05	0.78
2018	21,929	6,026	17,674	23,700	1.08	0.81
2019	22,257	6,520	18,420	24,940	1.12	0.83

¹ Includes members who chose to leave their contributions on deposit even though they have less than five years of service.

Section 2: Actuarial Valuation Results

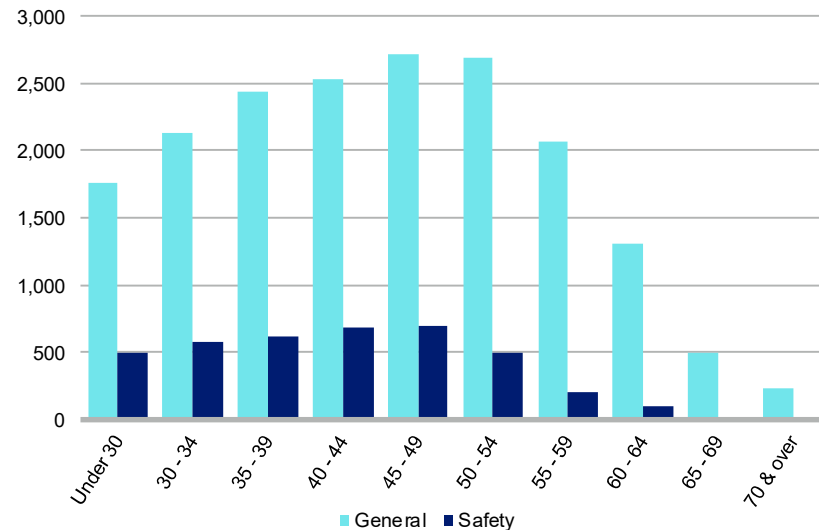
Active Members

Plan costs are affected by the age, years of service and compensation of active members. In this year's valuation, there were 22,257 active members with an average age of 44.9, average years of service of 12.5 years and average compensation of \$87,727. The 21,929 active members in the prior valuation had an average age of 45.1, average service of 12.8 years and average compensation of \$85,520.

Among the active members, there were none with unknown age information.

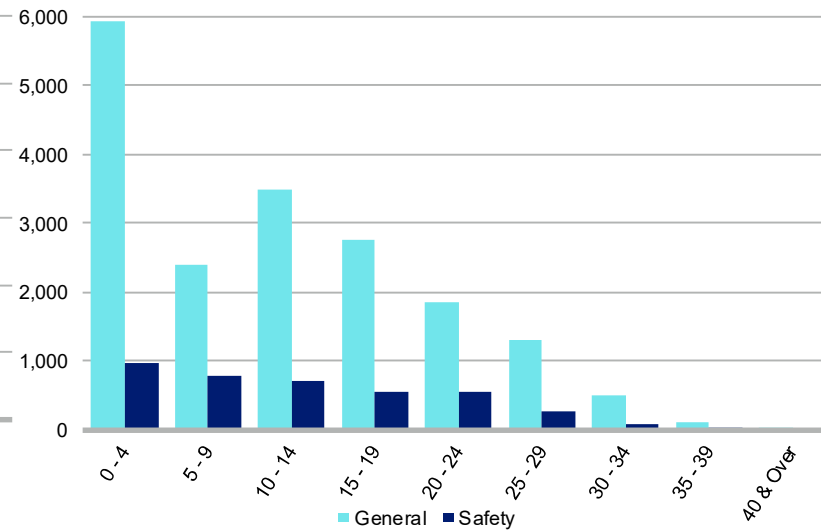
Distribution of Active Members as of December 31, 2019

Actives by Age



Average age	44.9
Prior year average age	45.1
Difference	-0.2

Actives by Years of Service



Average years of service	12.5
Prior year average years of service	12.8
Difference	-0.3

Inactive Members

In this year's valuation, there were 6,520 members with a vested right to a deferred or immediate vested benefit or entitled to a return of their member contributions versus 6,026 in the prior valuation.

Section 2: Actuarial Valuation Results

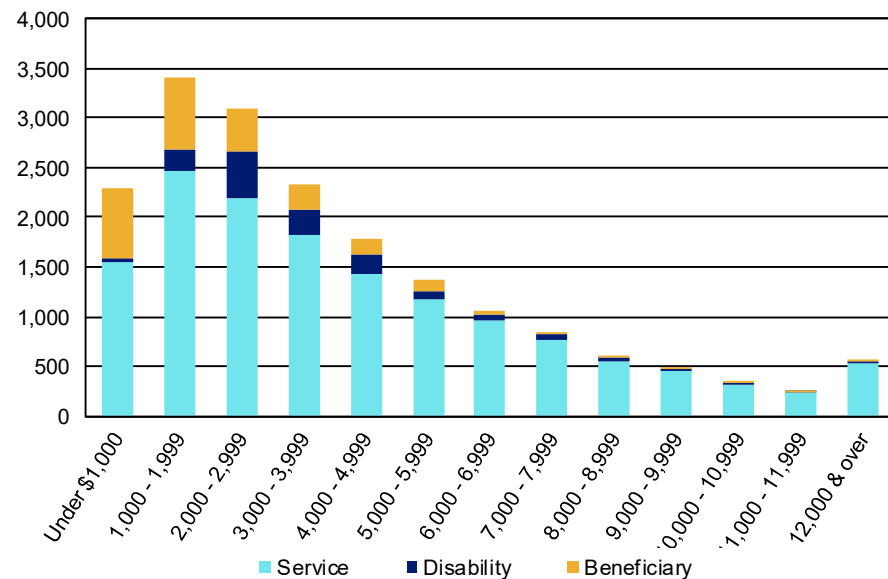
Retired Members and Beneficiaries

As of December 31, 2019, 15,954 retired members and 2,466 beneficiaries were receiving total monthly benefits of \$75,094,136. For comparison, in the previous valuation, there were 15,309 retired members and 2,365 beneficiaries receiving monthly benefits of \$69,152,036. These monthly benefits exclude benefits payable from the Supplemental Targeted Adjustment for Retirees Cost of Living Adjustment (STAR COLA).

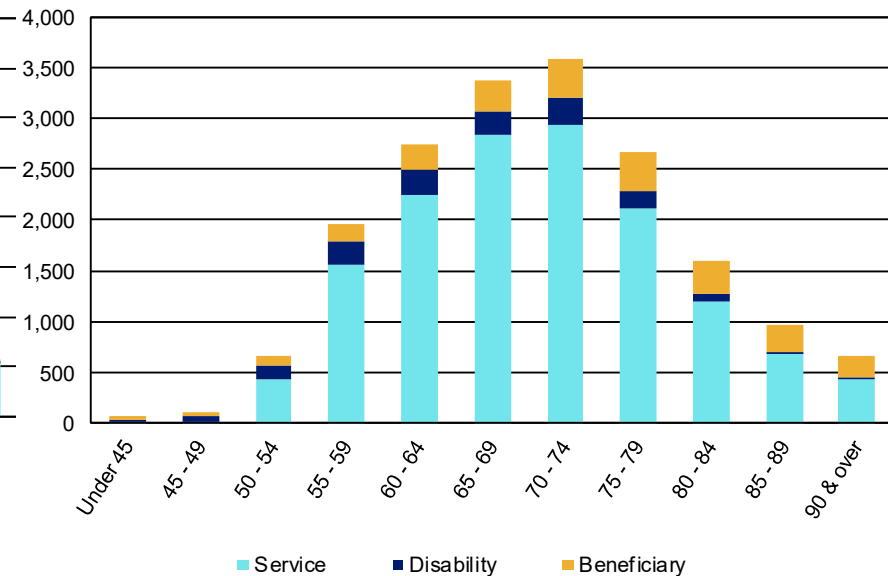
As of December 31, 2019, the average monthly benefit for retired members and beneficiaries is \$4,077, compared to \$3,913 in the previous valuation. The average age for retired members and beneficiaries is 70.1 in the current valuation, compared with 70.0 in the prior valuation.

Distribution of Retired Members and Beneficiaries as of December 31, 2019

Retired Members and Beneficiaries
by Type and Monthly Amount



Retired Members and Beneficiaries
by Type and Age



Section 2: Actuarial Valuation Results

Historical Plan Population

The chart below demonstrates the stability of the active population over the last ten years. The chart also shows the growth among the retired population over the same time period.

Member Data Statistics: 2010 – 2019

Year Ended December 31	Active Members			Retired Members and Beneficiaries		
	Count	Average Age	Average Service	Count	Average Age	Average Monthly Amount
2010	21,742	45.1	12.6	12,762	68.8	\$2,988
2011	21,421	45.4	13.0	13,289	69.0	3,099
2012	21,256	45.5	13.1	13,947	69.0	3,247
2013	21,368	45.6	13.2	14,505	69.2	3,366
2014	21,459	45.6	13.2	15,169	69.4	3,455
2015	21,525	45.5	13.1	15,810	69.5	3,560
2016	21,746	45.4	12.9	16,369	69.7	3,637
2017	21,721	45.3	12.9	16,947	69.8	3,745
2018	21,929	45.1	12.8	17,674	70.0	3,913
2019	22,257	44.9	12.5	18,420	70.1	4,077

Section 2: Actuarial Valuation Results

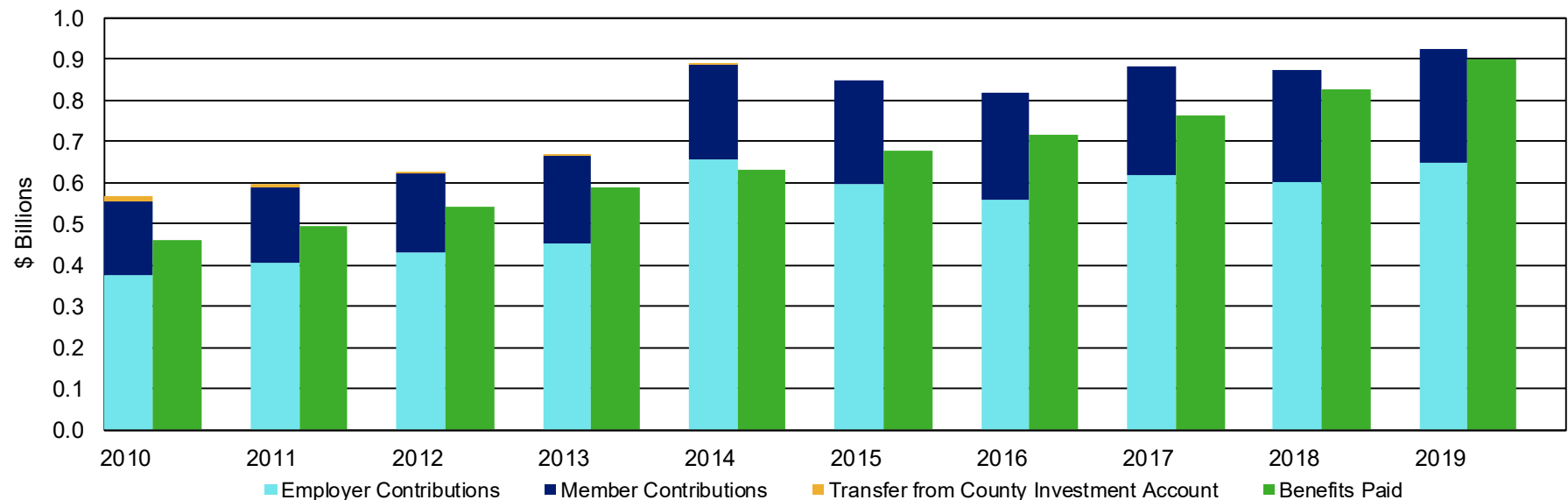
B. Financial Information

Retirement plan funding anticipates that, over the long term, both contributions and investment earnings (less investment fees and administrative expenses) will be needed to cover benefit payments. Retirement plan assets change as a result of the net impact of these income and expense components.

Additional financial information, including a summary of transactions for the valuation year, is presented in *Section 3, Exhibits D, E, F and G*.

It is desirable to have level and predictable plan costs from one year to the next. For this reason, the Board has approved an asset valuation method that gradually adjusts to market value. Under this valuation method, the full value of market fluctuations is not recognized in a single year and, as a result, the valuation asset value and the plan costs are more stable. The amount of the adjustment to recognize market value is treated as income, which may be positive or negative. Realized and unrealized gains and losses are treated equally and, therefore, the sale of assets has no immediate effect on the actuarial value.

Comparison of Contributions Made with Benefits for Years Ended December 31, 2010 – 2019



Section 2: Actuarial Valuation Results

Determination of Actuarial Value of Assets for Year Ended December 31, 2019

1	Market Value of Assets^{1,2}					\$16,516,108,000
2	Calculation of unrecognized return	Actual Return	Expected Return	Original Amount	Percent Deferred	Unrecognized Amount
a)	Year ended December 31, 2015	\$(51,601,000)	\$833,757,000	\$(885,358,000)	0%	\$0
b)	Year ended December 31, 2016	1,010,548,000	840,469,000	170,079,000	20	34,016,000
c)	Year ended December 31, 2017	1,878,172,000	920,426,000	957,746,000	40	383,098,000
d)	Year ended December 31, 2018	(361,321,000)	1,026,583,000	(1,387,904,000)	60	(832,742,000)
e)	Year ended December 31, 2019	2,123,258,000	1,004,779,000	1,118,479,000	80	<u>894,783,000</u>
f)	Total unrecognized return ³					\$479,155,000
3	Actuarial Value of Assets (1) - (2f)					\$16,036,953,000
4	Ratio of Actuarial Value to Market Value					97.1%
5	Non-valuation reserves:					
a)	Unclaimed member deposit					\$0
b)	Medicare medical insurance reserve					<u>84,000</u>
c)	Subtotal					\$84,000
6	Valuation Value of Assets (3) – (5c)					\$16,036,869,000

¹ Excludes \$150,416,000 in County Investment Account (funded by pension obligation bond proceeds held by OCERS), \$259,285,000 in Prepaid Employer Contributions and \$12,057,000 in O.C. Sanitation District UAAL Deferred Account (after transfer).

² Based on the preliminary unaudited financial statement provided by OCERS for this valuation.

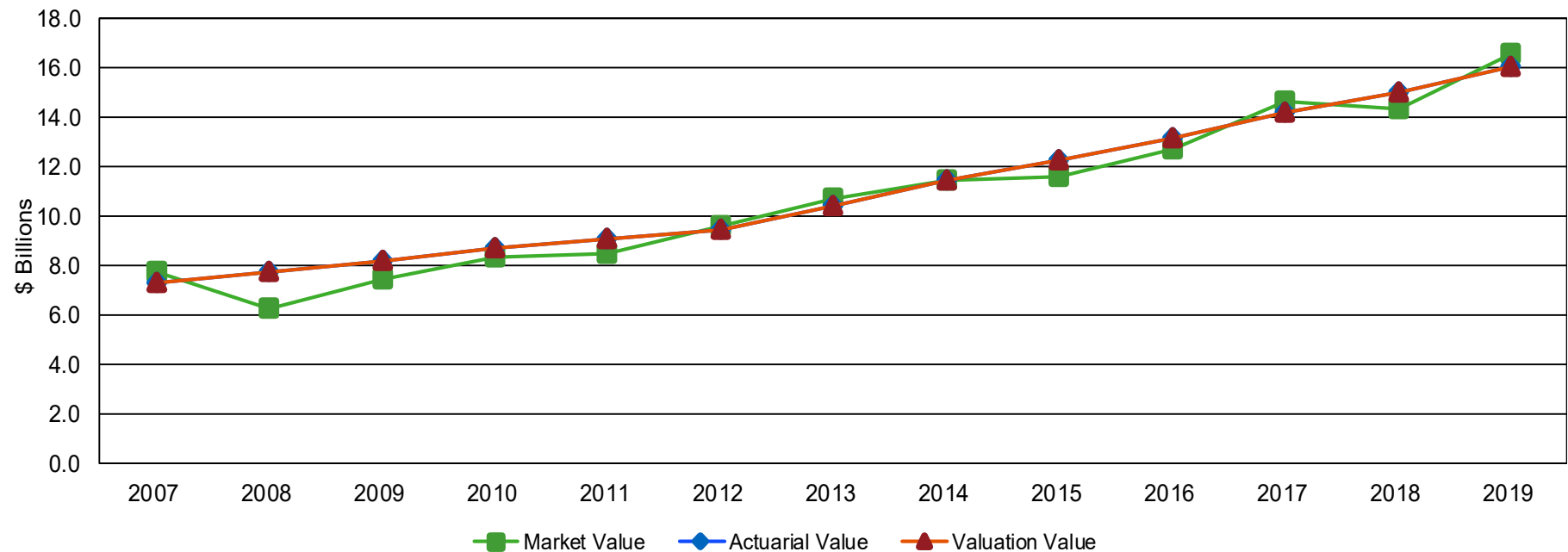
³ Deferred return as of December 31, 2019 recognized in each of the next four years:

(a)	Amount recognized on December 31, 2020	\$171,680,000
(b)	Amount recognized on December 31, 2021	137,664,000
(c)	Amount recognized on December 31, 2022	(53,885,000)
(d)	Amount recognized on December 31, 2023	<u>223,696,000</u>
(e)	Total unrecognized return as of December 31, 2019	\$479,155,000

Section 2: Actuarial Valuation Results

The Market Value, Actuarial Value and Valuation Value of Assets are representations of the Plan's financial status. As investment gains and losses are gradually taken into account, the Actuarial Value of Assets tracks the Market Value of Assets. The Valuation Value of Assets is the actuarial value, excluding any non-valuation reserves. The Valuation Value of Assets is significant because the Plan's liabilities are compared to these assets to determine what portion, if any, remains unfunded. Amortization of the unfunded actuarial accrued liability is an important element in determining the contribution requirement.

Market Value, Actuarial Value, and Valuation Value of Assets as of December 31, 2007 – 2019



Section 2: Actuarial Valuation Results

C. Actuarial Experience

To calculate any actuarially determined contribution, assumptions are made about future events that affect the amount and timing of benefits to be paid and assets to be accumulated. Each year actual experience is measured against the assumptions. If overall experience is more favorable than anticipated (an actuarial gain), the actuarially determined contribution will decrease from the previous year. On the other hand, the actuarially determined contribution will increase if overall actuarial experience is less favorable than expected (an actuarial loss).

Taking account of experience gains or losses in one year without making a change in assumptions reflects the belief that the single year's experience was a short-term development and that, over the long term, experience will return to the original assumptions. For contribution requirements to remain stable, assumptions should approximate experience.

If assumptions are changed, the contribution requirement is adjusted to take into account a change in experience anticipated for all future years. There are no assumption changes reflected in this report.

The total loss is \$290.1 million, which includes \$50.5 million from investment losses, a net loss of \$83.5 million from contribution experience (including a gain of \$23.3 million from additional UAAL payments from Vector Control and OCFA and anticipated payments from DOE and U.C.I.¹, a gain of \$18.6 million from transfer from O.C. Sanitation UAAL Deferred Account and a loss of \$125.4 million from all other contribution experience) and \$156.1 million in losses from all other sources. The net experience variation from individual sources other than investments and contributions was 0.7% of the Actuarial Accrued Liability. A discussion of the major components of the actuarial experience is on the following pages.

Actuarial Experience for Year Ended December 31, 2019

1	Net loss from investments ²	\$(50,514,000)
2	Net loss from contribution experience ³	(83,457,000)
3	Net loss from other experience ³	<u>(156,137,000)</u>
4	Net experience loss: 1 + 2 + 3	\$(290,108,000)

¹ Segal provided separate letters for DOE and UCI with regard to their required UAAL contributions based on the Board's withdrawing employer policy. These contributions have not been reflected in the valuation.

² Details on next page.

³ See *Subsection E* for further details. Does not include the effect of plan or assumption changes, if any.

Section 2: Actuarial Valuation Results

Investment Experience

A major component of projected asset growth is the assumed rate of return. The assumed return should represent the expected long-term rate of return, based on the Plan's investment policy. The rate of return on the Market Value of Assets was 14.79% for the year ended December 31, 2019.

For valuation purposes, the assumed rate of return on the Valuation Value of Assets is 7.00%. The actual rate of return on a valuation basis for the 2019 plan year was 6.66%. Since the actual return for the year was less than the assumed return, the Plan experienced an actuarial loss during the year ended December 31, 2019 with regard to its investments.

Investment Experience for Year Ended December 31, 2019

	Market Value	Actuarial Value	Valuation Value
1 Net investment income	\$2,123,258,000	\$999,388,000	\$999,389,000
2 Average value of assets	14,353,980,000 ¹	14,998,695,000	14,998,610,000
3 Rate of return: 1 ÷ 2	14.79% ¹	6.66%	6.66%
4 Assumed rate of return	7.00%	7.00%	7.00%
5 Expected investment income: 2 x 4	\$1,004,779,000	\$1,049,909,000	\$1,049,903,000
6 Actuarial gain/(loss): 1 - 5	\$1,118,479,000	\$(50,521,000)	\$(50,514,000)

¹ Return on market value was calculated using a modified dollar-weighted approach based on pension plan assets net of accounting liabilities. Actual investment income on net pension plan assets was \$2,123,258,000 during 2019 after including both the administrative expenses and discount for prepaid contributions while excluding the income credited to County Investment Account and O.C. Sanitation District UAAL Deferred Account. Without these adjustments, the actual investment income was \$2,183,808,000.

Section 2: Actuarial Valuation Results

Because actuarial planning is long term, it is useful to see how the assumed investment rate of return has followed actual experience over time. The chart below shows the rate of return on an actuarial and valuation basis compared to the actual market value investment return for the last ten years, including averages over select time periods.

Investment Return – Market Value, Actuarial Value and Valuation Value: 2010 – 2019

Year Ended December 31	Market Value Investment Return ¹		Actuarial Value Investment Return ¹		Valuation Value Investment Return ¹	
	Amount ²	Percent	Amount ²	Percent	Amount ²	Percent
2010	\$787,215,000	10.47%	\$411,960,000	5.02%	\$412,046,000	5.02%
2011	3,236,000	0.04%	286,585,000	3.28%	287,241,000	3.29%
2012	1,014,471,000	11.92%	318,033,000	3.49%	318,043,000	3.49%
2013	1,031,118,000	10.73%	866,402,000	9.11%	866,402,000	9.11%
2014	487,104,000	4.52%	771,049,000	7.34%	771,174,000	7.34%
2015	(51,601,000)	(0.45%)	606,190,000	5.26%	606,191,000	5.26%
2016	1,010,548,000	8.72%	776,627,000	6.33%	776,628,000	6.33%
2017	1,878,172,000	14.79%	977,128,000	7.44%	977,130,000	7.44%
2018	(361,321,000)	(2.46%)	738,790,000	5.20%	738,791,000	5.20%
2019	2,123,258,000	14.79%	999,388,000	6.66%	999,389,000	6.66%
Most recent five-year average return		6.82%	6.17%		6.17%	
Most recent ten-year average return		7.13%	5.90%		5.90%	

Note: Return on market value was calculated using a modified dollar-weighted approach based on pension plan assets net of accounting liabilities. Each year's yield is weighted by the average asset value in that year.

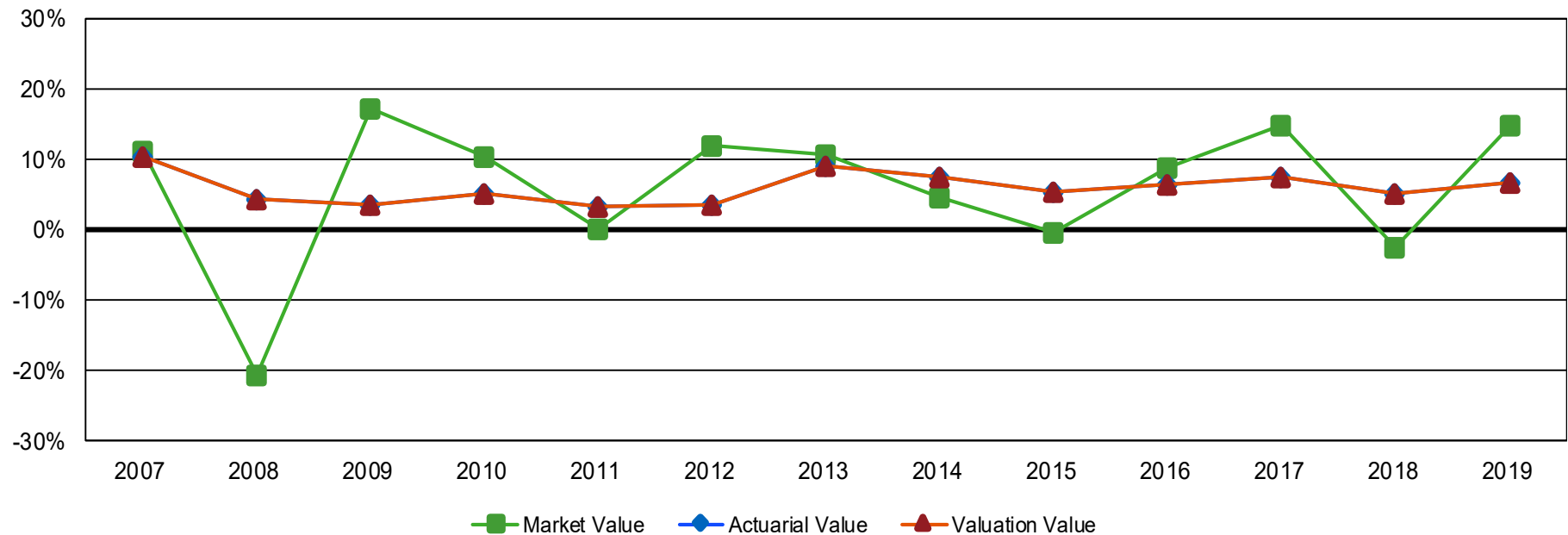
¹ Net of administrative and investment expenses.

² The dollar amount of return on market value is net of the return on the County Investment Account (funded by pension obligation bond proceeds held by OCERS), prepaid employer contributions account and O.C. Sanitation District UAAL Deferred Account (after transfer), if any.

Section 2: Actuarial Valuation Results

Section 2, Subsection B described the actuarial asset valuation method that gradually recognizes fluctuations in the market value rate of return. The goal of this is to stabilize the actuarial rate of return and to produce more level pension plan costs.

Market, Actuarial and Valuation Rates of Return for Years Ended December 31, 2007 – 2019



Section 2: Actuarial Valuation Results

Contributions

Contributions for the year ended December 31, 2019 totaled \$923.0 million¹, compared to the projected amount of \$1,002.6 million. This resulted in a net loss of \$83.5 million from contribution experience for the year, when adjusted for timing.

Non-Investment Experience

There are other differences between the expected and the actual experience that appear when the new valuation is compared with the projections from the previous valuation. These include:

- the extent of turnover among participants,
- retirement experience (earlier or later than projected),
- mortality (more or fewer deaths than projected),
- the number of disability retirements (more or fewer than projected), and
- salary increases (greater or smaller than projected),
- cost-of-living adjustments (COLAs) higher or lower than anticipated.

The net loss from this other experience for the year ended December 31, 2019 amounted to \$156.1 million, which is 0.7% of the Actuarial Accrued Liability. See Subsection E for a detailed development of the Unfunded Actuarial Accrued Liability.

¹ Excluding \$20.1 million in additional contributions made by O.C. Sanitation District and Transportation Corridor Agency to pay off their UAAL as of December 31, 2018 and including the \$18.6 million transfer from O.C. Sanitation District UAAL Deferred Account

Section 2: Actuarial Valuation Results

D. Other Changes in the Actuarial Accrued Liability

The Actuarial Accrued Liability as of December 31, 2019 is 21.9 billion, an increase of \$1.2 billion, or 5.9%, from the Actuarial Accrued Liability as of the prior valuation date. The liability is expected to grow each year with Normal Cost and interest, and to decline due to benefit payments made. Additional fluctuations can occur due to actual experience that differs from expected (as discussed in the previous subsection).

Actuarial Assumptions

There are no assumption changes reflected in this report.

Details on actuarial assumptions and methods are in *Section 4, Exhibit I*.

Plan Provisions

There were no changes in plan provisions since the prior valuation.

A summary of plan provisions is in *Section 4, Exhibit II*.

Section 2: Actuarial Valuation Results

E. Development of Unfunded Actuarial Accrued Liability

Development for Year Ended December 31, 2019

1	Unfunded actuarial accrued liability at beginning of year (before adjustments for additional UAAL contributions)	\$5,708,929,000
	a) Additional UAAL contributions from OCSD and TCA ¹	<u>(20,143,000)</u>
2	Unfunded actuarial accrued liability at beginning of year after adjustments for additional UAAL contributions)	\$5,688,786,000
3	Normal cost at middle of year	516,408,000
4	Expected employer and member contributions	(1,002,599,000)
5	Interest	<u>387,158,000</u>
6	Expected Unfunded Actuarial Accrued Liability at end of year	\$5,589,753,000
7	Changes due to:	
	a) Investment losses (on smoothed value of assets)	\$50,514,000
	b) Additional UAAL payments from Vector Control and OCFA and anticipated payments ² from DOE and U.C.I.	(23,327,000)
	c) Transfer from O.C. Sanitation District UAAL Deferred Account	(18,631,000)
	d) Difference in actual versus expected contributions (including loss from phase-in)	125,415,000 ³
	e) Difference in actual versus expected salary increases	(52,716,000)
	f) Difference in actual versus expected COLA increases	131,220,000 ⁴
	g) Other experience loss	<u>77,633,000</u>
	Total changes	<u>\$290,108,000</u>
8	Unfunded actuarial accrued liability at end of year	\$5,879,861,000

Note: The sum of items 7b, 7c and 7d equals the “Net loss from contribution experience” shown in Subsection C.

The sum of items 7e, 7f and 7g equals the “Net loss from other experience” shown in Subsection C.

¹ Effect of \$8 million in additional contributions for O.C. Sanitation District and \$12 million in additional contributions for Transportation Corridor Agency to pay off their UAAL as of December 31, 2018.

² Segal provided separate letters for DOE and UCI with regard to their required UAAL contributions based on the Board’s withdrawing employer policy. These contributions have not been anticipated in the prior valuation.

³ Includes \$24 million contribution loss from the phase-in of the UAAL cost impact due to changes in actuarial assumptions in 2017.

⁴ Includes an actual loss from the payment of 0.25% higher COLA (relative to the 2.75% inflation assumption) for the December 31, 2019 valuation plus an anticipated 0.25% for each of the next four years because of an accumulation of a 1.00% COLA Bank in this valuation.

Section 2: Actuarial Valuation Results

F. Recommended Contribution

The recommended contribution is equal to the employer Normal Cost payment and a payment on the Unfunded Actuarial Accrued Liability. As of December 31, 2019, the average recommended employer contribution is 41.49% of compensation.

The Board sets the funding policy used to calculate the recommended contribution based on layered amortization periods. See *Section 4, Exhibit I* for further details on the funding policy.

The contribution requirement as of December 31, 2019 is based on the data previously described, the actuarial assumptions and Plan provisions described in *Section 4*, including all changes affecting future costs adopted at the time of the actuarial valuation, actuarial gains and losses, and changes in the actuarial assumptions.

Average Recommended Employer Contribution for Year Ended December 31

	2019		2018	
	Amount (\$ in '000s)	% of Projected Compensation	Amount (\$ in '000s)	% of Projected Compensation
1 Total normal cost	\$529,849	27.14%	\$516,408	27.54%
2 Expected member normal cost contributions	(240,270)	(12.31%)	(233,805)	(12.47%)
3 Employer normal cost: (1) + (2)	\$289,579	14.83%	\$282,603	15.07%
4 Actuarial accrued liability	21,916,730		20,703,349	
5 Valuation Value of Assets	16,036,869		14,994,420	
6 Unfunded actuarial accrued liability (UAAL): (4) - (5)	\$5,879,861		\$5,708,929	
7 Payment on UAAL	\$520,532	26.66%	\$467,926	24.95% ¹
9 Projected compensation	\$1,952,534		\$1,875,370	
10 Total average recommended employer contribution: (3) + (7)	\$810,111	41.49%	\$750,529	40.02%

Note: Contributions are assumed to be paid at the middle of the year.

¹ These rates reflect 2/3 phase-in UAAL cost impact of the changes in actuarial assumptions from the December 31, 2017 valuation.

Section 2: Actuarial Valuation Results

Reconciliation of Average Recommended Employer Contribution Rate

The chart below details the changes in the average recommended employer contribution from the prior valuation to the current year's valuation.

Reconciliation from December 31, 2018 to December 31, 2019

	Contribution Rate	Estimated Annual Dollar Amount ¹ (\$ in '000s)
Average Recommended Employer Contribution as of December 31, 2018 (before adjustments for additional UAAL contributions and phase-in)	40.80%	\$796,667
• Adjustment to FY20-21 rates for additional UAAL contributions from OCSD and TCA	(0.09%)	(1,779)
• Effect of three-year phase-in of UAAL cost impact due to changes in actuarial assumptions	<u>(1.23%)</u>	<u>(23,939)</u>
Average Recommended Employer Contribution as of December 31, 2018 (after adjustments for additional UAAL contributions and phase-in)	39.48%	\$770,949
• Effect of investment loss (after smoothing)	0.18%	\$3,515
• Effect of additional UAAL contributions from OCFA	(0.07%)	(1,367)
• Effect of \$18.6 million asset transfer from O.C. Sanitation District UAAL Deferred Account	(0.07%)	(1,367)
• Effect of difference in actual versus expected contributions (including loss from phase-in)	0.46% ²	8,982
• Effect of difference in actual versus expected COLA increases	0.48% ³	9,372
• Effect of difference in actual versus expected salary increases	(0.19%)	(3,710)
• Effect of growth in total payroll greater than expected	(0.21%)	(4,100)
• Effect of other experience loss	0.20% ⁴	3,898
• Effect of three-year phase-in of UAAL cost impact due to changes in actuarial assumptions	<u>1.23%</u>	<u>23,939</u>
Total change	2.01%	\$39,162
Average Recommended Employer Contribution as of December 31, 2019	41.49%	\$810,111

¹ Based on December 31, 2018 projected annual compensation of \$1,952,534,000.

² Includes 0.09% of pay contribution loss from the phase-in of the UAAL cost impact due to changes in actuarial assumptions in 2017.

³ Includes an actual loss from the payment of 0.25% higher COLA (relative to the 2.75% inflation assumption) for the December 31, 2019 valuation plus an anticipated 0.25% for each of the next four years because of an accumulation of a 1.00% COLA Bank in this valuation.

⁴ Includes an adjustment of 0.11% to reflect the anticipated contribution loss due to the 18-month delay between date of valuation and date of rate implementation.

Section 2: Actuarial Valuation Results

Reconciliation of Average Recommended Member Contribution Rate

The chart below details the changes in the average recommended member contribution rate from the prior valuation to the current year's valuation.

Reconciliation from December 31, 2018 to December 31, 2019

	Contribution Rate	Estimated Annual Dollar Amount ¹ (\$ in '000s)
Average Recommended Member Contribution as of December 31, 2018²	12.29%	\$239,938
• Effect of changes in member demographics	<u>0.02%</u>	<u>332</u>
Total change	0.02%	\$332
Average Recommended Member Contribution as of December 31, 2019	12.31%	\$240,270

¹ Based on December 31, 2019 projected annual compensation of \$1,952,534,000.

² Rates have been recalculated by applying the individual entry age based rates determined in the December 31, 2018 valuation to the System membership as of December 31, 2019.

Section 2: Actuarial Valuation Results

Recommended Employer Contribution Rate

	December 31, 2019 Actuarial Valuation		December 31, 2018 Actuarial Valuation	
	Contribution Rate	Estimated Annual Dollar Amount ² (\$ in '000s)	Contribution Rate ¹	Estimated Annual Dollar Amount ² (\$ in '000s)
Rate Group #1 – Plans A and B (2.0% @ 57 and 1.6667% @ 57.5 – non-OCTA, non-OCSD)				
Normal Cost	10.68%	\$4,348	10.73%	\$4,368
UAAL ^{3,4}	5.16%	2,101	5.06%	2,060
Total Contribution	15.84%	\$6,449	15.79%	\$6,428
Rate Group #1 – Plan U (2.5% @ 67 PEPRA)⁶				
Normal Cost	10.05%	\$5,016	9.93%	\$4,956
UAAL ^{3,4}	5.16%	2,575	5.06%	2,525
Total Contribution	15.21%	\$7,591	14.99%	\$7,481
Rate Group #1 – Plans A, B and U Combined				
Normal Cost	10.33%	\$9,364	10.29%	\$9,324
UAAL ^{3,4}	5.16%	4,676	5.06%	4,585
Total Contribution	15.49%	\$14,040	15.35%	\$13,909

¹ These rates reflect 2/3 phase-in UAAL cost impact of the changes in actuarial assumptions from the December 31, 2017 valuation.

² Amounts are based on December 31, 2019 projected compensation as shown on the page 45.

³ UAAL rate has been adjusted to reflect 18-month delay between date of valuation and date of rate implementation.

⁴ These are “net” UAAL contribution rate for County and IHSS Public Authority without reflecting the UAAL contributions required for Vector Control, Cypress Parks and Recreation, U.C.I. and DOE.

⁶ Applicable for members hired on or after January 1, 2013.

Section 2: Actuarial Valuation Results

Recommended Employer Contribution Rate (continued)

	December 31, 2019 Actuarial Valuation		December 31, 2018 Actuarial Valuation	
	Contribution Rate	Estimated Annual Dollar Amount ² (\$ in '000s)	Contribution Rate ¹	Estimated Annual Dollar Amount ² (\$ in '000s)
Rate Group #2 – Plans I and J (2.7% @ 55 – non-OCFA, non-Children and Families Commission)				
Normal Cost	14.34%	\$111,223	14.36%	\$111,378
UAAL ³	27.38%	212,363	25.05%	194,291
Total Contribution	41.72%	\$323,586	39.41%	\$305,669
Rate Group #2 – Plans I and J (2.7% @ 55 – non-OCFA, Children and Families Commission)				
Normal Cost	14.34%	\$79	14.36%	\$80
UAAL ^{3,4}	5.36%	30	3.26%	18
Total Contribution	19.70%	\$109	17.62%	\$98
Rate Group #2 – Plans O and P (1.62% @ 65)				
Normal Cost	6.10%	\$917	6.23%	\$937
UAAL ³	27.38%	4,116	25.05%	3,766
Total Contribution	33.48%	\$5,033	31.28%	\$4,703
Rate Group #2 – Plan S (2.0% @ 57)				
Normal Cost	12.61%	\$247	12.13%	\$237
UAAL ³	27.38%	536	25.05%	490
Total Contribution	39.99%	\$783	37.18%	\$727
Rate Group #2 – Plan T (1.62% @ 65 PEPR A)⁵				
Normal Cost	7.14%	\$24,248	7.12%	\$24,180
UAAL ³	27.38%	92,985	25.05%	85,072
Total Contribution	34.52%	\$117,233	32.17%	\$109,252

Note: For Orange County Employees Retirement System (the employer) with future service only benefit improvements under 2.7% @ 55, refer to the employer rates on page 46.

¹ These rates reflect 2/3 phase-in UAAL cost impact of the changes in actuarial assumptions from the December 31, 2017 valuation.

² Amounts are based on December 31, 2019 projected compensation as shown on the page 45.

³ UAAL rate has been adjusted to reflect 18-month delay between date of valuation and date of rate implementation.

⁴ UAAL rate has been adjusted to reflect future service only benefit improvement under 2.7% @ 55.

⁵ Applicable for members hired on or after January 1, 2013 except for County Attorneys, San Juan Capistrano members, OCERS management members and Children and Families members.

Section 2: Actuarial Valuation Results

Recommended Employer Contribution Rate (continued)

	December 31, 2019 Actuarial Valuation		December 31, 2018 Actuarial Valuation	
	Contribution Rate	Estimated Annual Dollar Amount ² (\$ in '000s)	Contribution Rate ¹	Estimated Annual Dollar Amount ² (\$ in '000s)
Rate Group #2 – Plan U (2.5% @ 67 PEPRA, non-Children and Families Commission)⁵				
Normal Cost	8.81%	\$2,343	8.78%	\$2,335
UAAL ³	27.38%	7,283	25.05%	6,663
Total Contribution	36.19%	\$9,626	33.83%	\$8,998
Rate Group #2 – Plan U (2.5% @ 67 PEPRA, Children and Families Commission)⁵				
Normal Cost	8.81%	\$64	8.78%	\$64
UAAL ^{3,4}	5.36%	39	3.26%	24
Total Contribution	14.17%	\$103	12.04%	\$88
Rate Group #2 – Plan W (1.62% @ 65 PEPRA)⁶				
Normal Cost	8.54%	\$13	8.73%	\$13
UAAL ³	27.38%	42	25.05%	38
Total Contribution	35.92%	\$55	33.78%	\$51
Rate Group #2 – Plans I, J, O, P, S, T, U and W Combined				
Normal Cost	11.99%	\$139,134	12.00%	\$139,224
UAAL ³	27.36%	317,394	25.03%	290,362
Total Contribution	39.35%	\$456,528	37.03%	\$429,586

Note: For Orange County Employees Retirement System (the employer) with future service only benefit improvements under 2.7% @ 55, refer to the employer rates on page 46.

¹ These rates reflect 2/3 phase-in UAAL cost impact of the changes in actuarial assumptions from the December 31, 2017 valuation.

² Amounts are based on December 31, 2019 projected compensation as shown on the page 45.

³ UAAL rate has been adjusted to reflect 18-month delay between date of valuation and date of rate implementation.

⁴ UAAL rate has been adjusted to reflect future service only benefit improvement under 2.7% @ 55.

⁵ Applicable for County Attorneys, San Juan Capistrano members, OCERS management members and Children and Families members hired on or after January 1, 2013.

⁶ Applicable for members hired on or after January 1, 2013.

Section 2: Actuarial Valuation Results

Recommended Employer Contribution Rate (continued)

	December 31, 2019 Actuarial Valuation		December 31, 2018 Actuarial Valuation	
	Contribution Rate ¹	Estimated Annual Dollar Amount ³ (\$ in '000s)	Contribution Rate ²	Estimated Annual Dollar Amount ³ (\$ in '000s)
Rate Group #3 – Plans G and H (2.5% @ 55 – OCSD)				
Normal Cost	13.22%	\$5,844	13.24%	\$5,853
UAAL ⁴	0.00%	0	0.00%	0
Total Contribution	13.22%	\$5,844	13.24%	\$5,853
Rate Group #3 – Plan B (1.64% @ 57 – OCSD)				
Normal Cost	11.23%	\$714	11.11%	\$706
UAAL	0.00%	0	0.00%	0
Total Contribution	11.23%	\$714	11.11%	\$706
Rate Group #3 – Plan U (2.5% @ 67 PEPRAs)⁵				
Normal Cost	9.88%	\$2,552	10.02%	\$2,588
UAAL	0.00%	0	0.00%	0
Total Contribution	9.88%	\$2,552	10.02%	\$2,588
Rate Group #3 – Plans B, G, H and U Combined				
Normal Cost	11.93%	\$9,110	11.97%	\$9,147
UAAL	0.00%	0	0.00%	0
Total Contribution	11.93%	\$9,110	11.97%	\$9,147

¹ These rates are after adjustment for \$18,631,000 asset transfer from O.C. Sanitation District UAAL Deferred Account.

² These rates are after adjustment to the contribution rates for FY 20-21 for additional UAAL contributions made during calendar year 2019.

³ Amounts are based on December 31, 2019 projected compensation as shown on the page 45.

⁴ UAAL rate has been adjusted to reflect 18-month delay between date of valuation and date of rate implementation.

⁵ Applicable for members hired on or after January 1, 2013.

Section 2: Actuarial Valuation Results

Recommended Employer Contribution Rate (continued)

	December 31, 2019 Actuarial Valuation		December 31, 2018 Actuarial Valuation	
	Contribution Rate	Estimated Annual Dollar Amount ² (\$ in '000s)	Contribution Rate ¹	Estimated Annual Dollar Amount ² (\$ in '000s)
Rate Group #5 – Plans A and B (2.0% @ 57 and 1.6667% @ 57.5 – OCTA)				
Normal Cost	11.97%	\$10,434	12.03%	\$10,486
UAAL ³	19.54%	17,033	18.60%	16,213
Total Contribution	31.51%	\$27,467	30.63%	\$26,699
Rate Group #5 – Plan U (2.5% @ 67 PEPR)⁴				
Normal Cost	11.59%	\$2,991	11.32%	\$2,922
UAAL ³	19.54%	5,043	18.60%	4,801
Total Contribution	31.13%	\$8,034	29.92%	\$7,723
Rate Group #5 – Plans A, B and U Combined				
Normal Cost	11.88%	\$13,425	11.87%	\$13,408
UAAL ³	19.54%	22,076	18.60%	21,014
Total Contribution	31.42%	\$35,501	30.47%	\$34,422

¹ These rates reflect 2/3 phase-in UAAL cost impact of the changes in actuarial assumptions from the December 31, 2017 valuation.

² Amounts are based on December 31, 2019 projected compensation as shown on the page 45.

³ UAAL rate has been adjusted to reflect 18-month delay between date of valuation and date of rate implementation.

⁴ Applicable for members hired on or after January 1, 2015.

Section 2: Actuarial Valuation Results

Recommended Employer Contribution Rate (continued)

	December 31, 2019 Actuarial Valuation		December 31, 2018 Actuarial Valuation	
	Contribution Rate	Estimated Annual Dollar Amount ² (\$ in '000s)	Contribution Rate ¹	Estimated Annual Dollar Amount ² (\$ in '000s)
Rate Group #9 – Plans M and N (2.0% @ 55 – TCA)				
Normal Cost	14.23%	\$569	14.51%	\$580
UAAL ³	0.39%	16	0.00%	0
Total Contribution	14.62%	\$585	14.51%	\$580
Rate Group #9 – Plan U (2.5% @ 67 PEPR)⁴				
Normal Cost	11.14%	\$372	11.13%	\$372
UAAL ³	0.39%	13	0.00%	0
Total Contribution	11.53%	\$385	11.13%	\$372
Rate Group #9 – Plans M, N and U Combined				
Normal Cost	12.83%	\$941	12.98%	\$952
UAAL ³	0.39%	29	0.00%	0
Total Contribution	13.22%	\$970	12.98%	\$952

¹ These rates are after adjustment to the contribution rates for FY 20-21 for additional UAAL contributions made during calendar year 2019.

² Amounts are based on December 31, 2019 projected compensation as shown on the page 45.

³ UAAL rate has been adjusted to reflect 18-month delay between date of valuation and date of rate implementation.

⁴ Applicable for members hired on or after January 1, 2013.

Section 2: Actuarial Valuation Results

Recommended Employer Contribution Rate (continued)

	December 31, 2019 Actuarial Valuation		December 31, 2018 Actuarial Valuation	
	Contribution Rate	Estimated Annual Dollar Amount ² (\$ in '000s)	Contribution Rate ¹	Estimated Annual Dollar Amount ² (\$ in '000s)
Rate Group #10 – Plans I and J (2.7% @ 55 – OCFA)				
Normal Cost	14.75%	\$2,056	14.71%	\$2,050
UAAL ³	14.06%	1,960	14.96%	2,085
Total Contribution	28.81%	\$4,016	29.67%	\$4,135
Rate Group #10 – Plans M and N (2.0% @ 55 – OCFA)				
Normal Cost	13.68%	\$611	13.50%	\$603
UAAL ³	14.06%	628	14.96%	669
Total Contribution	27.74%	\$1,239	28.46%	\$1,272
Rate Group #10 – Plan U (2.5% @ 67 PEPR)⁴				
Normal Cost	10.05%	\$1,326	10.16%	\$1,340
UAAL ³	14.06%	1,855	14.96%	1,974
Total Contribution	24.11%	\$3,181	25.12%	\$3,314
Rate Group #10 – Plans I, J, M, N and U Combined				
Normal Cost	12.64%	\$3,993	12.64%	\$3,993
UAAL ³	14.06%	4,443	14.96%	4,728
Total Contribution	26.70%	\$8,436	27.60%	\$8,721

¹ These rates reflect 2/3 phase-in UAAL cost impact of the changes in actuarial assumptions from the December 31, 2017 valuation.

² Amounts are based on December 31, 2019 projected compensation as shown on the page 45.

³ UAAL rate has been adjusted to reflect 18-month delay between date of valuation and date of rate implementation.

⁴ Applicable for members hired on or after January 1, 2013.

Section 2: Actuarial Valuation Results

Recommended Employer Contribution Rate (continued)

	December 31, 2019 Actuarial Valuation		December 31, 2018 Actuarial Valuation	
	Contribution Rate	Estimated Annual Dollar Amount ² (\$ in '000s)	Contribution Rate ¹	Estimated Annual Dollar Amount ² (\$ in '000s)
Rate Group #11 – Plans M and N, future service (2.0% @ 55 – Cemetery)				
Normal Cost	11.62%	\$133	12.05%	\$138
UAAL ^{3,4}	3.01%	34	0.00%	0
Total Contribution	14.63%	\$167	12.05%	\$138
Rate Group #11 – Plan U (2.5% @ 67 PEPRA)⁵				
Normal Cost	12.25%	\$65	12.33%	\$65
UAAL ^{3,4}	3.01%	16	0.00%	0
Total Contribution	15.26%	\$81	12.33%	\$65
Rate Group #11 – Plans M, N and U Combined				
Normal Cost	11.83%	\$198	12.13%	\$203
UAAL ^{3,4}	3.01%	50	0.00%	0
Total Contribution	14.84%	\$248	12.13%	\$203

¹ These rates reflect 2/3 phase-in UAAL cost impact of the changes in actuarial assumptions from the December 31, 2017 valuation.

² Amounts are based on December 31, 2019 projected compensation as shown on the page 45.

³ UAAL rate has been adjusted to reflect 18-month delay between date of valuation and date of rate implementation.

⁴ December 31, 2018 UAAL rates after the phase-in is negative. Under CalPEPRA, the employer's contribution rate cannot be less than the Normal Cost unless the funded ratio is over 120% and other conditions in CalPEPRA are met.

⁵ Applicable for members hired on or after January 1, 2013.

Section 2: Actuarial Valuation Results

Recommended Employer Contribution Rate (continued)

	December 31, 2019 Actuarial Valuation		December 31, 2018 Actuarial Valuation	
	Contribution Rate	Estimated Annual Dollar Amount ¹ (\$ in '000s)	Contribution Rate	Estimated Annual Dollar Amount ¹ (\$ in '000s)
Rate Group #12 – Plans G and H, future service (2.5% @ 55 – Law Library)				
Normal Cost	14.20%	\$130	14.28%	\$131
UAAL ^{2,3}	0.19%	2	1.77%	16
Total Contribution	14.39%	\$132	16.05%	\$147
Rate Group #12 – Plan U (2.5% @ 67 PEPR A)⁴				
Normal Cost	10.37%	\$21	10.32%	\$21
UAAL ^{2,3}	0.19%	0	1.77%	4
Total Contribution	10.56%	\$21	12.09%	\$25
Rate Group #12 – Plans G, H, future service, and U Combined				
Normal Cost	13.49%	\$151	13.58%	\$152
UAAL ^{2,3}	0.19%	2	1.77%	20
Total Contribution	13.68%	\$153	15.35%	\$172

¹ Amounts are based on December 31, 2019 projected compensation as shown on the page 45.

² UAAL rate has been adjusted to reflect 18-month delay between date of valuation and date of rate implementation.

³ UAAL rate has been adjusted to reflect future service only benefit improvement under 2.7% @ 55.

⁴ Applicable for members hired on or after January 1, 2013.

Section 2: Actuarial Valuation Results

Recommended Employer Contribution Rate (continued)

	December 31, 2019 Actuarial Valuation		December 31, 2018 Actuarial Valuation	
	Contribution Rate	Estimated Annual Dollar Amount ² (\$ in '000s)	Contribution Rate ¹	Estimated Annual Dollar Amount ² (\$ in '000s)
Rate Group #6 – Plans E and F (3% @ 50 – Probation)				
Normal Cost	23.25%	\$13,569	23.45%	\$13,686
UAAL ³	36.92%	21,547	32.28%	18,839
Total Contribution	60.17%	\$35,116	55.73%	\$32,525
Rate Group #6 – Plan V (2.7% @ 57 PEPR)⁴				
Normal Cost	16.82%	\$796	16.76%	\$793
UAAL ³	36.92%	1,747	32.28%	1,527
Total Contribution	53.74%	\$2,543	49.04%	\$2,320
Rate Group #6 – Plans E, F and V Combined				
Normal Cost	22.77%	\$14,365	22.95%	\$14,479
UAAL ³	36.92%	23,294	32.28%	20,366
Total Contribution	59.69%	\$37,659	55.23%	\$34,845

¹ These rates reflect 2/3 phase-in UAAL cost impact of the changes in actuarial assumptions from the December 31, 2017 valuation.

² Amounts are based on December 31, 2019 projected compensation as shown on the page 45.

³ UAAL rate has been adjusted to reflect 18-month delay between date of valuation and date of rate implementation.

⁴ Applicable for members hired on or after January 1, 2013.

Section 2: Actuarial Valuation Results

Recommended Employer Contribution Rate (continued)

	December 31, 2019 Actuarial Valuation		December 31, 2018 Actuarial Valuation	
	Contribution Rate	Estimated Annual Dollar Amount ² (\$ in '000s)	Contribution Rate ¹	Estimated Annual Dollar Amount ² (\$ in '000s)
Rate Group #7 – Plans E and F (3% @ 50 – Law Enforcement)				
Normal Cost	26.57%	\$38,282	26.64%	\$38,382
UAAL ³	43.65%	62,890	40.71%	58,654
Total Contribution	70.22%	\$101,172	67.35%	\$97,036
Rate Group #7 – Plans Q and R (3% @ 55 – Law Enforcement)				
Normal Cost	23.58%	\$11,375	23.48%	\$11,327
UAAL ³	43.65%	21,057	40.71%	19,639
Total Contribution	67.23%	\$32,432	64.19%	\$30,966
Rate Group #7 – Plan V (2.7% @ 57 PEPR)⁴				
Normal Cost	18.46%	\$12,488	19.04%	\$12,881
UAAL ³	43.65%	29,529	40.71%	27,540
Total Contribution	62.11%	\$42,017	59.75%	\$40,421
Rate Group #7 – Plans E, F, Q, R and V Combined				
Normal Cost	23.90%	\$62,145	24.08%	\$62,590
UAAL ³	43.65%	113,476	40.71%	105,833
Total Contribution	67.55%	\$175,621	64.79%	\$168,423

¹ These rates reflect 2/3 phase-in UAAL cost impact of the changes in actuarial assumptions from the December 31, 2017 valuation.

² Amounts are based on December 31, 2019 projected compensation as shown on the page 45.

³ UAAL rate has been adjusted to reflect 18-month delay between date of valuation and date of rate implementation.

⁴ Applicable for members hired on or after January 1, 2013.

Section 2: Actuarial Valuation Results

Recommended Employer Contribution Rate (continued)

	December 31, 2019 Actuarial Valuation		December 31, 2018 Actuarial Valuation	
	Contribution Rate	Estimated Annual Dollar Amount ² (\$ in '000s)	Contribution Rate ¹	Estimated Annual Dollar Amount ² (\$ in '000s)
Rate Group #8 – Plans E and F (3% @ 50 – OCFA)				
Normal Cost	27.48%	\$27,411	26.97%	\$26,903
UAAL ³	23.79%	23,731	23.84%	23,780
Total Contribution	51.27%	\$51,142	50.81%	\$50,683
Rate Group #8 – Plans Q and R (3% @ 55 – OCFA)				
Normal Cost ⁴	25.77%	\$4,749	21.83%	\$4,023
UAAL ³	23.79%	4,384	23.84%	4,393
Total Contribution	49.56%	\$9,133	45.67%	\$8,416
Rate Group #8 – Plan V (2.7% @ 57 PEPRA)⁵				
Normal Cost	15.66%	\$4,593	15.27%	\$4,478
UAAL ³	23.79%	6,977	23.84%	6,992
Total Contribution	39.45%	\$11,570	39.11%	\$11,470
Rate Group #8 – Plans E, F, Q, R and V Combined				
Normal Cost	24.92%	\$36,753	24.00%	\$35,404
UAAL ³	23.79%	35,092	23.84%	35,165
Total Contribution	48.71%	\$71,845	47.84%	\$70,569

¹ These rates reflect 2/3 phase-in UAAL cost impact of the changes in actuarial assumptions from the December 31, 2017 valuation.

² Amounts are based on December 31, 2019 projected compensation as shown on the page 45.

³ UAAL rate has been adjusted to reflect 18-month delay between date of valuation and date of rate implementation.

⁴ The increase in the employer Normal Cost rate from last year to this year is primarily due to the 61 new hires from the City of Garden Grove. The average entry age has changed from 26.4 to 32.0.

⁵ Applicable for members hired on or after January 1, 2013.

Section 2: Actuarial Valuation Results

Recommended Employer Contribution Rate (continued)

	December 31, 2019 Actuarial Valuation		December 31, 2018 Actuarial Valuation	
	Contribution Rate	Estimated Annual Dollar Amount ² (\$ in '000s)	Contribution Rate ¹	Estimated Annual Dollar Amount ² (\$ in '000s)
Rate Groups #1 – #12				
Normal Cost	14.83%	\$289,579	14.79%	\$288,876
UAAL ³	26.66%	520,532	24.69%	482,073
Total Contribution	41.49%	\$810,111	39.48%	\$770,949

¹ These rates reflect 2/3 phase-in UAAL cost impact of the changes in actuarial assumptions from the December 31, 2017 valuation.

² Amounts are based on December 31, 2019 projected compensation (\$ in '000s):

General Employers		General Employers		Safety Employers	
Rate Group #1 – Plans A and B	\$40,712	Rate Group #3 – Plans G and H	\$44,209	Rate Group #6 – Plans E and F	\$58,362
Rate Group #1 – Plan U	49,908	Rate Group #3 – Plan B	6,357	Rate Group #6 – Plan V	4,731
Rate Group #2 – Plans I and J		Rate Group #3 – Plan U	25,826	Rate Group #7 – Plans E and F	144,078
non-Children and Families Commission	775,614	Rate Group #5 – Plans A and B	87,168	Rate Group #7 – Plans Q and R	48,241
Rate Group #2 – Plans I and J		Rate Group #5 – Plan U	25,811	Rate Group #7 – Plan V	67,650
Children and Families Commission	554	Rate Group #9 – Plans M and N	3,996	Rate Group #8 – Plans E and F	99,750
Rate Group #2 – Plans O and P	15,033	Rate Group #9 – Plan U	3,339	Rate Group #8 – Plans Q and R	18,428
Rate Group #2 – Plan S	1,956	Rate Group #10 – Plans I and J	13,937	Rate Group #8 – Plan V	29,328
Rate Group #2 – Plan T	339,610	Rate Group #10 – Plans M and N	4,470		
Rate Group #2 – Plan U		Rate Group #10 – Plan U	13,192		
non-Children and Families Commission	26,599	Rate Group #11 – Plans M and N	1,143		
Rate Group #2 – Plan U		Rate Group #11 – Plan U	531		
Children and Families Commission	730	Rate Group #12 – Plans G and H	917		
Rate Group #2 – Plan W	152	Rate Group #12 – Plan U	202		
				Total Combined	\$1,952,534

³ UAAL rate has been adjusted to reflect 18-month delay between date of valuation and date of rate implementation.

Section 2: Actuarial Valuation Results

Recommended Employer Contribution Rate (continued)

	December 31, 2019 Actuarial Valuation		December 31, 2018 Actuarial Valuation	
	Contribution Rate ²	Contribution Rate ³	Contribution Rate ^{1,2}	Contribution Rate ^{1,3}
Rate Group #2 – Plans I and J (2.7% @ 55 – non-OCFA)				
Normal Cost	14.34%	14.34%	14.36%	14.36%
UAAL ⁴	<u>26.16%</u>	<u>27.38%</u>	<u>23.91%</u>	<u>25.05%</u>
Total Contributions	40.50%	41.72%	38.27%	39.41%
Rate Group #2 – Plan U (2.5% @ 67 PEPRA)⁵				
Normal Cost	8.81%	8.81%	8.78%	8.78%
UAAL ⁴	<u>26.16%</u>	<u>27.38%</u>	<u>23.91%</u>	<u>25.05%</u>
Total Contributions	34.97%	36.19%	32.69%	33.83%

¹ These rates reflect 2/3 phase-in UAAL cost impact of the changes in actuarial assumptions from the December 31, 2017 valuation.

² These rates are after reflecting future service only benefit improvements under 2.7% @ 55.

³ These rates are before reflecting future service only benefit improvements under 2.7% @ 55.

⁴ UAAL rate has been adjusted to reflect 18-month delay between date of valuation and date of rate implementation.

⁵ Applicable for Orange County Employees Retirement System members hired on or after January 1, 2013.

Section 2: Actuarial Valuation Results

“Pick-Up” Discount Percentages for Non-PEPRA Tier Members

For every dollar of member contribution “picked up” by the employer for non-PEPRA tier members and not deposited in the member’s contribution account, the employer can contribute less than a dollar. This is because the “pick-up” amount is not deposited in the member’s contribution account and so is not payable to a member who withdraws his or her contributions following termination of employment, and is not payable as an additional death benefit. The contribution discount percentages are as follows:

	December 31, 2019 Pick Up Percentage		December 31, 2018 Pick Up Percentage	
General Members				
Rate Group #1 Plan A/B (non-OCTA, non-OCSD)	Plan A: 100.00%	Plan B: 98.37%	Plan A: 100.00%	Plan B: 98.28%
Rate Group #2 (2.7% @ 55 – non-OCFA)	Plan I: 99.40%	Plan J: 98.52%	Plan I: 99.38%	Plan J: 98.45%
Rate Group #2 (1.62% @ 65)	Plan O: N/A	Plan P: 97.76%	Plan O: N/A	Plan P: 97.56%
Rate Group #2 (2.0% @ 57)		Plan S: 97.94%		Plan S: 97.92%
Rate Group #3 (2.5% @ 55 – OCSD)	Plan G: 100.00%	Plan H: 98.67%	Plan G: 100.00%	Plan H: 98.61%
Rate Group #3 (1.64% @ 57 – OCSD)		Plan B: 97.83%		Plan B: 97.71%
Rate Group #5 Plan A/B (OCTA)	Plan A: 100.00%	Plan B: 97.77%	Plan A: 100.00%	Plan B: 97.63%
Rate Group #9 (2.0% @ 55 – TCA)	Plan M: N/A	Plan N: 98.59%	Plan M: N/A	Plan N: 98.39%
Rate Group #10 (2.7% @ 55 – OCFA)	Plan I: N/A	Plan J: 98.71%	Plan I: N/A	Plan J: 98.62%
Rate Group #10 (2.0% @ 55 – OCFA)	Plan M: N/A	Plan N: 97.70%	Plan M: N/A	Plan N: 97.50%
Rate Group #11 (2.0% @ 55 – Cemetery)	Plan M: N/A	Plan N: 98.69%	Plan M: N/A	Plan N: 98.61%
Rate Group #12 (2.5% @ 55 – Law Library)	Plan G: N/A	Plan H: 98.82%	Plan G: N/A	Plan H: 98.86%
Safety Members				
Rate Group #6 (3.0% @ 50 – Probation)	Plan E: N/A	Plan F: 99.49%	Plan E: N/A	Plan F: 99.47%
Rate Group #7 (3.0% @ 50 – Law Enforcement)	Plan E: N/A	Plan F: 99.73%	Plan E: N/A	Plan F: 99.71%
Rate Group #7 (3.0% @ 55 – Law Enforcement)	Plan Q: N/A	Plan R: 99.47%	Plan Q: N/A	Plan R: 99.42%
Rate Group #8 (3.0% @ 50 – OCFA)	Plan E: N/A	Plan F: 99.66%	Plan E: N/A	Plan F: 99.64%
Rate Group #8 (3.0% @ 55 – OCFA)	Plan Q: N/A	Plan R: 99.33%	Plan Q: N/A	Plan R: 99.43%

Section 2: Actuarial Valuation Results

“Pick-Up” Average Entry Age

The following table provides the average entry age by employer used in determining the “pick-up” contributions under Section 31581.1.

Employer	Code	Average Entry Age for All non PEPRA Members
General		
Orange County	101	31
Cemetery District	102	28
Law Library	103	41
Retirement System	105	31
OCFA	106	33
Transportation Corridor Agency	109	36
City of San Juan Capistrano	110	33
Sanitation District	111	33
OCTA	112	35
Children & Families Commission	118	27
Local Agency Formation Commission	119	38
Superior Court	121	32
IHSS Public Authority	122	42
Safety		
Probation	101	27
Law Enforcement	101	27
OCFA	106	29

Section 2: Actuarial Valuation Results

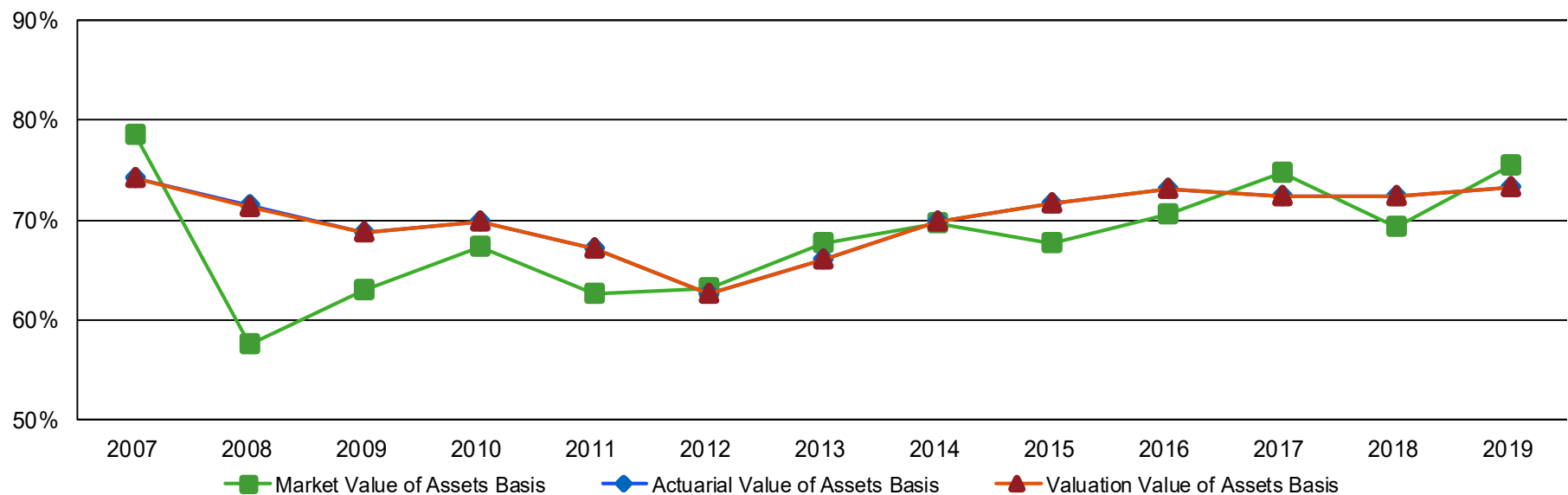
G. Funded Status

A commonly reported piece of information regarding the Plan's financial status is the funded ratio. These ratios compare the Market and Valuation Value of Assets to the Actuarial Accrued Liability of the Plan. Higher ratios indicate a relatively well-funded plan while lower ratios may indicate recent changes to actuarial assumptions, funding of the plan below actuarial requirements, poor asset performance, or a variety of other changes.

The chart below depicts a history of the funded ratio for the Plan. The chart on the next page shows the Plan's schedule of funding progress for the last ten years.

The funded status measures shown in this valuation are appropriate for assessing the need for or amount of future contributions. However, they are not necessarily appropriate for assessing the sufficiency of Plan assets to cover the estimated cost of settling the Plan's benefit obligations. As the chart below shows, the measures are different depending on whether the Market or Valuation Value of Assets is used.

Funded Ratio for Years Ended December 31, 2007 – 2019



Section 2: Actuarial Valuation Results

Schedule of Funding Progress for Years Ended December 31, 2010 – 2019

Actuarial Valuation Date as of December 31	Valuation Value of Assets (a)	Actuarial Accrued Liability (AAL) (b)	Unfunded AAL (UAAL) (b) - (a)	Funded Ratio (%) (a) / (b)	Projected Covered Payroll (c)	UAAL as a Percentage of Projected Covered Payroll (%) [(b) - (a)] / (c)
2010	\$8,672,592,000	\$12,425,873,000	\$3,753,281,000	69.79%	\$1,579,239,000	237.66%
2011	9,064,355,000	13,522,978,000	4,458,623,000	67.03%	1,619,474,000	275.31%
2012	9,469,208,000	15,144,888,000	5,675,680,000	62.52%	1,609,600,000	352.55%
2013	10,417,125,000	15,785,042,000	5,367,917,000	65.99%	1,604,496,000	334.55%
2014	11,449,911,000	16,413,124,000	4,963,213,000	69.76%	1,648,160,000	301.14%
2015	12,228,009,000	17,050,357,000	4,822,348,000	71.72%	1,633,112,000	295.29%
2016	13,102,978,000	17,933,461,000	4,830,483,000	73.06%	1,759,831,000	274.49%
2017	14,197,125,000	19,635,427,000	5,438,302,000	72.30%	1,811,877,000	300.15%
2018	14,994,420,000	20,703,349,000	5,708,929,000	72.43%	1,875,370,000	304.42%
2019	16,036,869,000	21,916,730,000	5,879,861,000	73.17%	1,952,534,000	301.14%

For informational purposes only, we have also developed the funded ratio determined using the historical market value of assets after adjustment for amounts in the County Investment Account (funded by pension obligation bond proceeds held by OCERS), prepaid employer contributions, O.C. Sanitation District UAAL Deferred Account (after transfer), unclaimed member reserve and Medicare Medical Insurance Reserve.

Actuarial Valuation Date December 31	Funded Ratio Based on Net Market Value of Assets	Actuarial Valuation Date December 31	Funded Ratio Based on Net Market Value of Assets
2010	67.25%	2015	67.73%
2011	62.60%	2016	70.58%
2012	63.17%	2017	74.62%
2013	67.65%	2018	69.31%
2014	69.63%	2019	75.36%

Section 2: Actuarial Valuation Results

H. Actuarial Balance Sheet

An overview of the Plan's funding is given by an Actuarial Balance Sheet. In this approach, first the amount and timing of all future payments that will be made by the Plan for current participants is determined. Then these payments are discounted at the valuation interest rate to the date of the valuation, thereby determining the present value, referred to as the Actuarial Present Value of Future Benefits of the Plan.

Second, this Actuarial Present Value of Future Benefits is compared to the assets. The "assets" for this purpose include the net amount of assets already accumulated by the Plan, the present value of future member contributions, the present value of future employer Normal Cost contributions, and the present value of future employer amortization payments for the Unfunded Actuarial Accrued Liability.

Actuarial Balance Sheet

	Year Ended	
	December 31, 2019 (\$ in '000s)	December 31, 2018 (\$ in '000s)
Actuarial present value of future benefits		
• Present value of benefits for retired members and beneficiaries	\$12,631,182	\$11,569,064
• Present value of benefits for inactive vested members	500,271	449,290
• Present value of benefits for active members	<u>13,405,109</u>	<u>13,159,391</u>
Total actuarial present value of future benefits	<u>\$26,536,562</u>	<u>\$25,177,745</u>
Current and future assets		
• Total Valuation Value of Assets	\$16,036,869	\$14,994,420
• Present value of future contributions by members ¹	\$2,130,254	2,048,080
• Present value of future employer contributions for:		
• Entry age normal cost	2,489,578	2,426,316
• Unfunded actuarial accrued liability	<u>5,879,861</u>	<u>5,708,929</u>
Total of current and future assets	<u>\$26,536,562</u>	<u>\$25,177,745</u>

¹ This includes members who chose to leave their contributions on deposit even though they have less than five years of service.

Section 2: Actuarial Valuation Results

I. Volatility Ratios

Retirement plans are subject to volatility in the level of required contributions. This volatility tends to increase as retirement plans become more mature.

The Asset Volatility Ratio (AVR), which is equal to the Market Value of Assets divided by total payroll, provides an indication of the potential contribution volatility for any given level of investment volatility. A higher AVR indicates that the plan is subject to a greater level of contribution volatility. This is a current measurement since it is based on the current level of assets.

The current AVR is about 8.5. This means that a 1% asset gain or loss (relative to the assumed investment return) translates to about 8.5% of one year's payroll. Since actuarial gains and losses are amortized over 20 years, there would be a 0.5% of payroll decrease/(increase) in the required contribution for each 1% asset gain/(loss).

The Liability Volatility Ratio (LVR), which is equal to the Actuarial Accrued Liability divided by payroll, provides an indication of the longer-term potential for contribution volatility for any given level of investment volatility. This is because, over an extended period of time, the plan's assets should track the plan's liabilities.

The LVR also indicates how volatile contributions will be in response to changes in the Actuarial Accrued Liability due to actual experience or to changes in actuarial assumptions. The current total plan LVR is about 11.2, but is 9.9 for General compared to 15.3 for Safety. This means that assumption changes will have a greater impact on employer contribution rates for Safety than for General.

The chart on the next page shows how the asset and liability volatility ratios have varied over time.

Section 2: Actuarial Valuation Results

Volatility Ratios for Years Ended 2010 – 2019

Year Ended December 31	Asset Volatility Ratio			Liability Volatility Ratio		
	General	Safety	Total	General	Safety	Total
2010	4.7	7.3	5.3	7.0	10.9	7.9
2011	4.7	7.1	5.2	7.6	10.9	8.4
2012	5.3	8.1	5.9	8.6	12.3	9.4
2013	6.0	8.9	6.7	9.0	12.6	9.8
2014	6.2	9.4	6.9	8.9	13.6	10.0
2015	6.3	9.6	7.1	9.3	14.3	10.4
2016	6.4	9.9	7.2	9.0	14.2	10.2
2017	7.2	11.0	8.1	9.6	14.8	10.8
2018	6.8	10.5	7.7	9.8	15.2	11.0
2019	7.5	11.5	8.5	9.9	15.3	11.2

Section 2: Actuarial Valuation Results

J. Risk Assessment

Since the actuarial valuation results are dependent on a fixed set of assumptions and data as of a specific date, there is risk that emerging results may differ, perhaps significantly, as actual experience is fluid and will not exactly track current assumptions. This potential divergence may have a significant impact on the future financial condition of the plan.

This report does not contain a detailed analysis of the potential range of future measurements, but does include a concise discussion of some of the primary risks that may affect the Plan's future financial condition. We recommend a more detailed assessment of the risks to provide the Board with a better understanding of the risks inherent in the Plan that can inform both financial preparation and future decision making. This assessment would enable us to work with the Board to highlight and illustrate particular risks or potential future outcomes they may be interested in discussing and could include scenario testing, sensitivity testing, stress testing and stochastic modeling. As noted in the valuation highlights section of this report the results of our more detailed risk assessment will be provided in a separate stand-alone report. We will include within that report investment return scenarios that demonstrate the effects of short-term market volatility on funded status and contribution rates, which may aid in illustrating the effect on the plan of market volatility that can result from events such as COVID-19.

This section provides descriptions and basic assessments of the primary risks that are likely to have an ongoing influence on the Plan's financial health, as well as a discussion of historical trends and maturity measures:

Risk Assessments

- Asset/Liability Mismatch Risk (the potential that future plan experience does not affect asset and liability values in the same way, causing them to diverge)

The most significant asset/liability mismatch risk to the Plan is investment risk, as discussed below. In fact, investment risk has the potential to impact asset/liability mismatch in two ways. The first mismatch is evident in annual valuations: when asset values deviate from assumptions they are typically independent from liability changes. The second mismatch can be caused when systemic asset deviations from assumptions may signal the need for an assumption change, which causes liability values and contribution rates to move in the opposite direction from any change in the expected experience of asset growth rates.

Asset/liability mismatch can also be caused by demographic assumption risk such as longevity, which affects liabilities but have no impact on asset levels. This risk is also discussed below.

- Investment Risk (the risk that investment returns will be different than expected)

The investment return assumption is a long-term, static assumption for valuation purposes even though in reality market experience can be quite volatile in any given year. That volatility can cause significant changes in the financial condition of the Plan, affecting both funded status and contribution rates. The inherent year-to-year volatility is reduced by smoothing through the Actuarial Value of Assets,

Section 2: Actuarial Valuation Results

however investment experience can still have a sizable impact. As discussed in *Section 2, Subsection I, Volatility Ratios*, on page 52, a 1% asset gain or loss (relative to the assumed investment return) translates to about 8.5 of one-year's payroll. Since actuarial gains and losses are amortized over 20 years, there would be a 0.5% of payroll decrease/(increase) in the required contribution for each 1% asset gain/(loss).

The year-by-year market value rate of return over the last 10 years has ranged from a low of -2.46% to a high of 14.79%.

- Longevity Risk (the risk that mortality experience will be different than expected)

The actuarial valuation includes current life expectancy assumptions and an expectation of future improvement in life expectancy, which are significant assumptions given the relatively long duration of liabilities for pension plans. Emerging plan experience that does not match these expectations will result in increases or decreases in the actuarially determined contribution over time. This risk can be reduced by using tables appropriate for the Plan (public experience tables) that are weighted by benefit levels, and by using generational mortality projections.

- Other Risks

In addition to longevity, the valuation includes a variety of other assumptions that are unlikely to match future experience exactly. One example is projected salary scales over time. As salary is central to the determination of benefits paid in retirement, deviations from the projected salary scales could have a material impact on the benefits anticipated for each member. Examples of demographic assumptions include retirement, termination and disability assumptions, and will likely vary in significance for different groups (for example, disability assumptions are typically more significant for Safety groups).

Some plans also carry significant contribution risk, defined as the potential for actual future contributions deviating from expected future contributions. However, the employer has a proven track-record of making the Actuarially Determined Contributions based on the Board's Actuarial Funding Policy, so contribution risk is minimal.

Evaluation of Historical Trends

Past experience can help demonstrate the sensitivity of key results to the Plan's actual experience. Over the past ten years:

- The funded percentage on the Valuation Value of Assets has increased from 69.8% to 73.2%. This is primarily due to contributions made to amortize the UAAL (i.e., amortizing each gain/loss layer of UAAL over 20 years). For a more detailed history see *Section 2, Subsection G, Funded Status* starting on page 49.
- The geometric average investment return on the Actuarial Value of Assets over the last 10 years was 5.90%. This includes a high of 9.11% return and a low of 3.28%. The average over the last 5 years was 6.17%. For more details see the Investment Return table in *Section 2, Subsection C* on page 25.

Section 2: Actuarial Valuation Results

- Beyond investment losses, the primary source of new UAAL was the strengthening of assumptions through multiple assumption changes. While the assumption changes in 2014 decreased the unfunded liability by \$103 million, the assumption changes in 2017 that changed the discount rate from 7.25% to 7.00% (as well as various other changes) added \$822 million in unfunded liability. For more details on unfunded liability changes see *Section 3, Exhibit H, Table of Amortization Bases* starting on page 86. A graphical representation of historical changes in UAAL by source will be included in the stand-alone risk assessment report.
- The plan's funding policy effectively deals with these unfunded liabilities over time. This can be seen most clearly in the *Section 3, Exhibit I, Projection of UAAL Balances and Payments* provided on pages 98 and 99.

Maturity Measures

In the last 10 years the ratio of members in pay status to active participants has increased from 0.59 to 0.83. An increased ratio indicates that the plan has grown in maturity over time. This is to be expected, but is also informative to understanding plan sensitivity to particular risks. For more details see *Section 2, Subsection A, Member Data* on page 16.

As pension plans mature, the cash needed to fulfill benefit obligations will increase over time. Therefore, cash flow projections and analysis should be performed to assure that the Plan's asset allocation is aligned to meet emerging pension liabilities. Over the past year, benefits paid and contributions received were relatively equal despite the plan having a funded ratio of 73.2%, since the ratio of members in pay status to active participants is still below 1. However, this may change as the plan matures and the ratio of members in pay status to active participants increases to above 1. For more details on historical cash flows see the Comparison of Contributions Made with Benefits in *Section 2, Subsection B* on page 20.

A further discussion of plan maturity measures and how they relate to changes in assets and liabilities is included in *Section 2, Subsection I, Volatility Ratios* on page 53.

Section 3: Supplemental Information

Exhibit A: Table of Plan Coverage

Total Plan

Category	Year Ended December 31		Change From Prior Year
	2019	2018	
Active members in valuation:			
• Number	22,257	21,929	1.5%
• Average age	44.9	45.1	-0.2
• Average years of service	12.5	12.8	-0.3
• Total projected compensation	\$1,952,534,335	\$1,875,371,661	4.1%
• Average projected compensation	\$87,727	\$85,520	2.6%
• Account balances	\$3,116,706,969	\$2,980,107,630	4.6%
• Total active vested members	15,717	15,903	-1.2%
Inactive vested members: ¹			
• Number	6,520	6,026	8.2%
• Average Age	44.7	44.9	-0.2
Retired members:			
• Number in pay status	14,449	13,827	4.5%
• Average age	70.1	70.0	0.1
• Average monthly benefit ²	\$4,413	\$4,237	4.2%
Disabled members:			
• Number in pay status	1,505	1,482	1.6%
• Average age	65.7	65.5	0.2
• Average monthly benefit ²	\$3,911	\$3,750	4.3%
Beneficiaries:			
• Number in pay status	2,466	2,365	4.3%
• Average age	73.1	72.9	0.2
• Average monthly benefit ²	\$2,205	\$2,116	4.2%

¹ Includes members who chose to leave their contributions on deposit even though they have less than five years of service.

² Excludes monthly benefits payable from the STAR COLA.

Section 3: Supplemental Information

Exhibit A: Table of Plan Coverage (continued)

Rate Group #1 for Plans A, B and U (Non-OCTA, Non-OCSD)

Category	Year Ended December 31		Change From Prior Year
	2019	2018	
Active members in valuation:			
• Number	1,650	1,613	2.3%
• Average age	42.9	43.0	-0.1
• Average years of service	9.3	9.7	-0.4
• Total projected compensation	\$90,620,091	\$88,176,419	2.8%
• Average projected compensation	\$54,921	\$54,666	0.5%
• Account balances	\$64,253,545	\$60,833,185	5.6%
• Total active vested members	970	911	6.5%
Inactive vested members: ¹			
• Number	581	516	12.6%
• Average Age	41.9	41.8	0.1
Retired members:			
• Number in pay status	650	636	2.2%
• Average age	75.2	75.0	0.2
• Average monthly benefit ²	\$2,768	\$2,709	2.2%
Disabled members:			
• Number in pay status	38	37	2.7%
• Average age	68.1	67.2	0.9
• Average monthly benefit ²	\$2,438	\$2,408	1.2%
Beneficiaries:			
• Number in pay status	98	98	0.0%
• Average age	76.7	76.5	0.2
• Average monthly benefit ²	\$1,571	\$1,438	9.2%

¹ Includes members who chose to leave their contributions on deposit even though they have less than five years of service.

² Excludes monthly benefits payable from the STAR COLA.

Section 3: Supplemental Information

Exhibit A: Table of Plan Coverage (continued)

Rate Group #2 for Plans I, J, O, P, S, T, U AND W

Category	Year Ended December 31		Change From Prior Year
	2019	2018	
Active members in valuation:			
• Number	14,339	14,267	0.5%
• Average age	45.4	45.6	-0.2
• Average years of service	12.6	12.8	-0.2
• Total projected compensation	\$1,160,247,859	\$1,127,951,040	2.9%
• Average projected compensation	\$80,916	\$79,060	2.3%
• Account balances	\$2,114,331,924	\$2,035,013,710	3.9%
• Total active vested members	10,068	10,201	-1.3%
Inactive vested members: ¹			
• Number	4,371	4,078	7.2%
• Average Age	44.7	44.9	-0.2
Retired members:			
• Number in pay status	9,828	9,432	4.2%
• Average age	71.1	71.0	0.1
• Average monthly benefit ²	\$3,939	\$3,787	4.0%
Disabled members:			
• Number in pay status	570	575	-0.9%
• Average age	67.0	67.0	0
• Average monthly benefit ²	\$2,666	\$2,558	4.2%
Beneficiaries:			
• Number in pay status	1,553	1,489	4.3%
• Average age	75.2	75.0	0.2
• Average monthly benefit ²	\$1,983	\$1,907	4.0%

¹ Includes members who chose to leave their contributions on deposit even though they have less than five years of service.

² Excludes monthly benefits payable from the STAR COLA.

Section 3: Supplemental Information

Exhibit A: Table of Plan Coverage (continued)

Rate Group #3 for Plans B, G, H and U (OCSD)

Category	Year Ended December 31		Change From Prior Year
	2019	2018	
Active members in valuation:			
• Number	608	616	-1.3%
• Average age	47.3	47.3	0.0
• Average years of service	12.3	12.3	0.0
• Total projected compensation	\$76,392,296	\$73,563,905	3.8%
• Average projected compensation	\$125,645	\$119,422	5.2%
• Account balances	\$95,709,705	\$93,152,393	2.7%
• Total active vested members	432	433	-0.2%
Inactive vested members: ¹			
• Number	135	117	15.4%
• Average Age	46.7	47.3	-0.6
Retired members:			
• Number in pay status	410	390	5.1%
• Average age	68.4	68.2	0.2
• Average monthly benefit ²	\$5,823	\$5,575	4.4%
Disabled members:			
• Number in pay status	19	17	11.8%
• Average age	65.9	65.8	0.1
• Average monthly benefit ²	\$3,830	\$3,586	6.8%
Beneficiaries:			
• Number in pay status	79	79	0.0%
• Average age	70.2	70.3	-0.1
• Average monthly benefit ²	\$2,536	\$2,406	5.4%

¹ Includes members who chose to leave their contributions on deposit even though they have less than five years of service.

² Excludes monthly benefits payable from the STAR COLA.

Section 3: Supplemental Information

Exhibit A: Table of Plan Coverage (continued)

Rate Group #5 for Plans A, B and U (OCTA)

Category	Year Ended December 31		Change From Prior Year
	2019	2018	
Active members in valuation:			
• Number	1,350	1,279	5.6%
• Average age	49.6	50.1	-0.5
• Average years of service	12.8	13.7	-0.9
• Total projected compensation	\$112,979,357	\$105,327,147	7.3%
• Average projected compensation	\$83,688	\$82,351	1.6%
• Account balances	\$134,348,956	\$130,715,191	2.8%
• Total active vested members	959	993	-3.4%
Inactive vested members: ¹			
• Number	636	590	7.8%
• Average Age	49.7	49.6	0.1
Retired members:			
• Number in pay status	992	965	2.8%
• Average age	70.6	70.1	0.5
• Average monthly benefit ²	\$2,659	\$2,568	3.5%
Disabled members:			
• Number in pay status	268	261	2.7%
• Average age	66.9	66.5	0.4
• Average monthly benefit ²	\$2,483	\$2,373	4.6%
Beneficiaries:			
• Number in pay status	187	176	6.3%
• Average age	72.3	71.4	0.9
• Average monthly benefit ²	\$1,452	\$1,380	5.2%

¹ Includes members who chose to leave their contributions on deposit even though they have less than five years of service.

² Excludes monthly benefits payable from the STAR COLA.

Section 3: Supplemental Information

Exhibit A: Table of Plan Coverage (continued)

Rate Group #9 for Plans M, N and U (TCA)

Category	Year Ended December 31		Change From Prior Year
	2019	2018	
Active members in valuation:			
• Number	61	62	-1.6%
• Average age	48.7	48.8	-0.1
• Average years of service	9.2	8.3	0.9
• Total projected compensation	\$7,334,734	\$7,061,833	3.9%
• Average projected compensation	\$120,242	\$113,901	5.6%
• Account balances	\$5,992,102	\$5,011,037	19.6%
• Total active vested members	33	31	6.5%
Inactive vested members: ¹			
• Number	67	62	8.1%
• Average Age	45.8	44.9	0.9
Retired members:			
• Number in pay status	51	50	2.0%
• Average age	69.5	68.9	0.6
• Average monthly benefit ²	\$3,276	\$3,073	6.6%
Disabled members:			
• Number in pay status	0	0	N/A
• Average age	N/A	N/A	N/A
• Average monthly benefit ²	N/A	N/A	N/A
Beneficiaries:			
• Number in pay status	4	4	0.0%
• Average age	72.0	71.0	1.0
• Average monthly benefit ²	\$478	\$464	3.0%

¹ Includes members who chose to leave their contributions on deposit even though they have less than five years of service.

² Excludes monthly benefits payable from the STAR COLA.

Section 3: Supplemental Information

Exhibit A: Table of Plan Coverage (continued)

Rate Group #10 for Plans I, J, M, N and U (OCFA)

Category	Year Ended December 31		Change From Prior Year
	2019	2018	
Active members in valuation:			
• Number	310	274	13.1%
• Average age	44.7	45.5	-0.8
• Average years of service ¹	10.2	11.2	-1.0
• Total projected compensation	\$31,598,713	\$27,222,325	16.1%
• Average projected compensation	\$101,931	\$99,352	2.6%
• Account balances	\$30,922,866	\$28,959,317	6.8%
• Total active vested members	173	171	1.2%
Inactive vested members: ²			
• Number	209	178	17.4%
• Average Age	41.9	42.1	-0.2
Retired members:			
• Number in pay status	172	162	6.2%
• Average age	66.4	66.0	0.4
• Average monthly benefit ³	\$4,662	\$4,550	2.5%
Disabled members:			
• Number in pay status	11	11	0.0%
• Average age	62.2	61.2	1.0
• Average monthly benefit ³	\$3,004	\$2,660	12.9%
Beneficiaries:			
• Number in pay status	13	12	8.3%
• Average age	63.7	65.7	-2.0
• Average monthly benefit ³	\$1,542	\$1,311	17.6%

¹ For some former Santa Ana members, service used in calculating the average above is only used for vesting purposes. Benefit service starts to accrue only effective April 2012.

² Includes members who chose to leave their contributions on deposit even though they have less than five years of service.

³ Excludes monthly benefits payable from the STAR COLA.

Section 3: Supplemental Information

Exhibit A: Table of Plan Coverage (continued)

Rate Group #11 for Plans M and N, Future Service, and U (Cemetery)

Category	Year Ended December 31		Change From Prior Year
	2019	2018	
Active members in valuation:			
• Number	24	25	-4.0%
• Average age	49.3	50.3	-1.0
• Average years of service	14.9	16.7	-1.8
• Total projected compensation	\$1,674,297	\$1,643,501	1.9%
• Average projected compensation	\$69,762	\$65,740	6.1%
• Account balances	\$2,226,124	\$2,483,310	-10.4%
• Total active vested members	16	18	-11.1%
Inactive vested members: ¹			
• Number	2	2	0.0%
• Average Age	41.1	40.1	1.0
Retired members:			
• Number in pay status	7	4	75.0%
• Average age	72.3	76.2	-3.9
• Average monthly benefit ²	\$3,065	\$2,730	12.3%
Disabled members:			
• Number in pay status	0	0	N/A
• Average age	N/A	N/A	N/A
• Average monthly benefit ²	N/A	N/A	N/A
Beneficiaries:			
• Number in pay status	6	5	20.0%
• Average age	76.5	80.2	-3.7
• Average monthly benefit ²	\$1,501	\$1,523	-1.4%

¹ Includes members who chose to leave their contributions on deposit even though they have less than five years of service.

² Excludes monthly benefits payable from the STAR COLA.

Section 3: Supplemental Information

Exhibit A: Table of Plan Coverage (continued)

Rate Group #12 for Plans G, H, Future Service, and U (Law Library)

Category	Year Ended December 31		Change From Prior Year
	2019	2018	
Active members in valuation:			
• Number	14	14	0.0%
• Average age	58.2	57.2	1.0
• Average years of service	17.4	16.4	1.0
• Total projected compensation	\$1,119,047	\$1,095,420	2.2%
• Average projected compensation	\$79,932	\$78,244	2.2%
• Account balances	\$2,652,511	\$2,390,529	11.0%
• Total active vested members	12	12	0.0%
Inactive vested members: ¹			
• Number	3	4	-25.0%
• Average Age	45.4	49.6	-4.2
Retired members:			
• Number in pay status	13	12	8.3%
• Average age	72.7	72.2	0.5
• Average monthly benefit ²	\$3,019	\$3,058	-1.3%
Disabled members:			
• Number in pay status	0	0	N/A
• Average age	N/A	N/A	N/A
• Average monthly benefit ²	N/A	N/A	N/A
Beneficiaries:			
• Number in pay status	0	0	N/A
• Average age	N/A	N/A	N/A
• Average monthly benefit ²	N/A	N/A	N/A

¹ Includes members who chose to leave their contributions on deposit even though they have less than five years of service.

² Excludes monthly benefits payable from the STAR COLA.

Section 3: Supplemental Information

Exhibit A: Table of Plan Coverage (continued)

Rate Group #6 for Plans E, F and V (Probation)

Category	Year Ended December 31		Change From Prior Year
	2019	2018	
Active members in valuation:			
• Number	736	764	-3.7%
• Average age	44.6	44.6	0.0
• Average years of service	17.2	17.1	0.1
• Total projected compensation	\$63,093,762	\$64,229,791	-1.8%
• Average projected compensation	\$85,725	\$84,070	2.0%
• Account balances	\$148,763,700	\$145,104,870	2.5%
• Total active vested members	669	713	-6.2%
Inactive vested members: ¹			
• Number	222	222	0.0%
• Average Age	42.4	41.9	0.5
Retired members:			
• Number in pay status	376	332	13.3%
• Average age	65.6	66.0	-0.4
• Average monthly benefit ²	\$5,672	\$5,632	0.7%
Disabled members:			
• Number in pay status	33	31	6.5%
• Average age	55.6	55.9	-0.3
• Average monthly benefit ²	\$3,052	\$2,973	2.7%
Beneficiaries:			
• Number in pay status	28	27	3.7%
• Average age	65.3	64.9	0.4
• Average monthly benefit ²	\$2,469	\$2,444	1.0%

¹ Includes members who chose to leave their contributions on deposit even though they have less than five years of service.

² Excludes monthly benefits payable from the STAR COLA.

Section 3: Supplemental Information

Exhibit A: Table of Plan Coverage (continued)

Rate Group #7 for Plans E, F, Q, R and V (Law Enforcement)

Category	Year Ended December 31		Change From Prior Year
	2019	2018	
Active members in valuation:			
• Number	2,059	2,027	1.6%
• Average age	40.5	40.9	-0.4
• Average years of service	12.6	13.1	-0.5
• Total projected compensation	\$259,968,109	\$246,706,193	5.4%
• Average projected compensation	\$126,259	\$121,710	3.7%
• Account balances	\$348,748,071	\$324,646,722	7.4%
• Total active vested members	1,554	1,608	-3.4%
Inactive vested members: ¹			
• Number	194	179	8.4%
• Average Age	43.3	43.3	0.0
Retired members:			
• Number in pay status	1,489	1,402	6.2%
• Average age	64.2	64.0	0.2
• Average monthly benefit ²	\$7,412	\$7,128	4.0%
Disabled members:			
• Number in pay status	370	368	0.5%
• Average age	63.8	63.4	0.4
• Average monthly benefit ²	\$5,465	\$5,266	3.8%
Beneficiaries:			
• Number in pay status	385	370	4.1%
• Average age	68.5	68.1	0.4
• Average monthly benefit ²	\$3,250	\$3,114	4.4%

¹ Includes members who chose to leave their contributions on deposit even though they have less than five years of service.

² Excludes monthly benefits payable from the STAR COLA.

Section 3: Supplemental Information

Exhibit A: Table of Plan Coverage (continued)

Rate Group #8 for Plans E, F, Q, R and V (OCFA)

Category	Year Ended December 31		Change From Prior Year
	2019	2018	
Active members in valuation:			
• Number	1,106	988	11.9%
• Average age	42.5	43.2	-0.7
• Average years of service ¹	12.5	13.9	-1.4
• Total projected compensation	\$147,506,069	\$132,394,088	11.4%
• Average projected compensation	\$133,369	\$134,002	-0.5%
• Account balances	\$168,757,464	\$151,797,366	11.2%
• Total active vested members	831	812	2.3%
Inactive vested members: ²			
• Number	100	78	28.2%
• Average Age	41.0	43.5	-2.5
Retired members:			
• Number in pay status	460	441	4.3%
• Average age	65.3	64.9	0.4
• Average monthly benefit ³	\$8,780	\$8,376	4.8%
Disabled members:			
• Number in pay status	196	182	7.7%
• Average age	65.2	65.0	0.2
• Average monthly benefit ²	\$7,035	\$6,912	1.8%
Beneficiaries:			
• Number in pay status	113	105	7.6%
• Average age	63.4	62.8	0.6
• Average monthly benefit ²	\$3,380	\$3,305	2.3%

¹ For some former Santa Ana members, service used in calculating the average above is only used for vesting purposes. Benefit service starts to accrue only effective April 2012. In addition, there were 61 members in Plan R hired from City of Garden Grove in 2019 whose benefit service starts to accrue only effective in calendar year 2019.

² Includes members who chose to leave their contributions on deposit even though they have less than five years of service.

³ Excludes monthly benefits payable from the STAR COLA.

Section 3: Supplemental Information

Exhibit B: Members in Active Service as of December 31, 2019 by Age, Years of Service, and Average Projected Compensation

Total Plan

Age	Years of Service									
	Total	0 – 4	5 – 9	10 – 14	15 – 19	20 – 24	25 – 29	30 – 34	35 – 39	40 & over
Under 25	376	373	3	--	--	--	--	--	--	--
	\$60,949	\$60,805	\$78,834	--	--	--	--	--	--	--
25 – 29	1,880	1,659	220	1	--	--	--	--	--	--
	67,613	65,707	81,707	\$128,464	--	--	--	--	--	--
30 – 34	2,703	1,662	775	260	6	--	--	--	--	--
	77,966	71,593	89,986	82,887	\$77,375	--	--	--	--	--
35 – 39	3,055	1,073	691	1,069	218	4	--	--	--	--
	86,849	76,922	95,320	91,754	84,942	\$79,157	--	--	--	--
40 – 44	3,218	688	434	991	824	277	4	--	--	--
	90,823	79,090	95,350	94,882	91,440	96,678	\$79,646	--	--	--
45 – 49	3,418	519	313	703	821	783	275	4	--	--
	96,259	81,998	97,388	91,956	96,900	105,605	103,802	\$135,461	--	--
50 – 54	3,184	427	276	466	594	598	634	189	--	--
	96,439	86,171	98,531	87,770	95,551	101,766	102,689	102,922	--	--
55 – 59	2,271	281	230	372	407	393	339	203	45	1
	93,527	87,627	105,229	89,234	90,376	97,017	93,265	99,210	\$80,804	\$75,640
60 – 64	1,403	145	172	219	252	223	225	120	42	5
	88,351	85,166	99,851	87,084	82,051	90,359	88,327	85,266	94,417	92,808
65 – 69	520	49	47	84	122	87	63	46	14	8
	85,112	95,320	88,065	77,723	84,775	91,621	76,473	88,008	81,464	74,956
70 & over	229	11	18	38	55	43	36	16	8	4
	76,344	69,599	81,075	70,738	81,057	71,284	78,624	81,538	65,256	97,310
Total	22,257	6,887	3,179	4,203	3,299	2,408	1,576	578	109	18
	\$87,727	\$73,964	\$94,322	\$90,607	\$91,816	\$99,649	\$97,149	\$96,399	\$84,993	\$84,920

Section 3: Supplemental Information

Exhibit B: Members in Active Service as of December 31, 2019 by Age, Years of Service, and Average Projected Compensation (continued)

Rate Group #1 for Plans A, B and U (Non-OCTA, Non-OCSD)

Age	Years of Service									
	Total	0 – 4	5 – 9	10 – 14	15 – 19	20 – 24	25 – 29	30 – 34	35 – 39	40 & over
Under 25	54	54	--	--	--	--	--	--	--	--
	\$60,137	\$60,137	--	--	--	--	--	--	--	--
25 – 29	210	180	30	--	--	--	--	--	--	--
	52,190	51,635	\$55,519	--	--	--	--	--	--	--
30 – 34	267	172	78	16	1	--	--	--	--	--
	52,649	50,562	56,551	\$56,181	\$50,857	--	--	--	--	--
35 – 39	227	104	65	46	11	1	--	--	--	--
	54,248	50,083	56,745	58,514	60,741	\$57,599	--	--	--	--
40 – 44	217	70	42	48	44	13	--	--	--	--
	55,009	48,860	57,414	58,141	58,326	57,553	--	--	--	--
45 – 49	213	43	35	46	42	31	16	--	--	--
	56,547	48,725	56,956	59,809	58,054	59,083	\$58,424	--	--	--
50 – 54	151	28	24	34	24	10	29	2	--	--
	56,279	48,735	56,153	57,100	57,904	58,617	60,493	\$57,106	--	--
55 – 59	124	22	30	17	17	13	18	6	1	--
	55,944	49,563	55,828	57,735	57,533	57,857	58,418	58,415	\$58,176	--
60 – 64	118	12	30	13	17	6	29	8	3	--
	57,043	50,236	56,632	58,684	57,355	57,543	58,311	59,994	58,387	--
65 – 69	47	4	8	7	6	2	11	7	1	1
	56,618	48,478	57,636	58,335	55,683	56,025	58,286	57,336	54,538	\$54,538
70 & over	22	1	3	4	3	4	4	3	--	--
	56,010	34,615	55,325	56,756	55,369	56,370	58,549	59,606	--	--
Total	1,650	690	345	231	165	80	107	26	5	1
	\$54,921	\$51,085	\$56,575	\$58,241	\$57,980	\$58,231	\$58,944	\$58,647	\$57,575	\$54,538

Section 3: Supplemental Information

Exhibit B: Members in Active Service as of December 31, 2019 by Age, Years of Service, and Average Projected Compensation (continued)

Rate Group #2 for Plans I, J, O, P, S, T, U and W

Age	Years of Service									
	Total	0 – 4	5 – 9	10 – 14	15 – 19	20 – 24	25 – 29	30 – 34	35 – 39	40 & over
Under 25	220	219	1	--	--	--	--	--	--	--
	\$52,693	\$52,706	\$49,842	--	--	--	--	--	--	--
25 – 29	1,113	1,010	103	--	--	--	--	--	--	--
	59,621	59,211	63,647	--	--	--	--	--	--	--
30 – 34	1,676	1,109	399	165	3	--	--	--	--	--
	70,671	69,160	76,516	\$66,679	\$71,186	--	--	--	--	--
35 – 39	1,940	707	390	691	150	2	--	--	--	--
	79,190	73,370	86,238	82,183	74,805	\$56,678	--	--	--	--
40 – 44	2,030	476	253	649	484	165	3	--	--	--
	83,152	77,946	86,741	86,704	82,212	81,627	\$73,592	--	--	--
45 – 49	2,197	341	186	502	555	450	160	3	--	--
	88,526	80,924	89,140	86,539	92,533	92,147	85,517	\$123,309	--	--
50 – 54	2,131	250	169	342	398	411	425	136	--	--
	88,321	81,150	88,713	85,018	89,411	93,538	89,592	86,403	--	--
55 – 59	1,556	184	113	282	266	292	239	144	35	1
	87,944	84,888	94,433	84,997	87,977	93,383	85,814	88,940	\$71,993	\$75,640
60 – 64	927	99	74	164	165	170	147	85	19	4
	83,381	84,318	89,768	83,868	79,788	84,947	83,986	78,923	83,068	77,712
65 – 69	368	34	24	65	86	73	41	32	7	6
	83,706	95,375	87,193	77,292	81,126	93,075	73,282	84,853	69,514	77,785
70 & over	181	9	11	32	47	36	25	10	8	3
	76,146	73,062	73,598	72,831	82,547	69,751	76,268	85,648	65,256	102,917
Total	14,339	4,438	1,723	2,892	2,154	1,599	1,040	410	69	14
	\$80,916	\$70,475	\$83,867	\$83,561	\$86,160	\$90,373	\$86,295	\$85,874	\$74,010	\$82,996

Section 3: Supplemental Information

Exhibit B: Members in Active Service as of December 31, 2019 by Age, Years of Service, and Average Projected Compensation (continued)

Rate Group #3 for Plans B, G, H and U (OCSD)

Age	Years of Service									
	Total	0 – 4	5 – 9	10 – 14	15 – 19	20 – 24	25 – 29	30 – 34	35 – 39	40 & over
Under 25	1	1	--	--	--	--	--	--	--	--
	\$87,249	\$87,249	--	--	--	--	--	--	--	--
25 – 29	32	28	4	--	--	--	--	--	--	--
	96,262	96,445	\$94,984	--	--	--	--	--	--	--
30 – 34	57	39	16	2	--	--	--	--	--	--
	103,624	98,899	114,240	\$110,845	--	--	--	--	--	--
35 – 39	101	52	23	19	7	--	--	--	--	--
	117,904	108,655	123,529	131,523	\$131,162	--	--	--	--	--
40 – 44	74	21	20	19	14	--	--	--	--	--
	122,005	112,405	122,857	137,226	114,529	--	--	--	--	--
45 – 49	77	24	13	20	10	2	8	--	--	--
	129,357	120,340	136,853	125,219	139,302	\$130,477	\$141,866	--	--	--
50 – 54	102	15	9	12	19	13	29	5	--	--
	140,524	120,041	142,976	148,930	139,231	151,338	143,553	\$136,612	--	--
55 – 59	84	12	13	19	13	10	13	3	1	--
	136,924	116,204	129,805	133,620	136,330	143,916	160,820	145,519	\$142,214	--
60 – 64	51	4	8	10	9	9	7	4	--	--
	135,763	127,384	125,749	114,255	129,326	153,142	156,682	156,710	--	--
65 – 69	21	5	3	0	6	2	3	1	1	--
	130,995	132,841	107,165	0	137,320	136,829	135,377	147,400	114,091	--
70 & over	8	0	1	0	1	1	3	2	0	--
	113,883	0	132,465	\$0	101,917	145,429	115,613	92,207	0	--
Total	608	201	110	101	79	37	63	15	2	--
	\$125,645	\$109,016	\$124,722	\$131,691	\$131,924	\$147,699	\$146,641	\$138,551	\$128,152	--

Section 3: Supplemental Information

Exhibit B: Members in Active Service as of December 31, 2019 by Age, Years of Service, and Average Projected Compensation (continued)

Rate Group #5 for Plans A, B and U (OCTA)

Age	Years of Service									
	Total	0 – 4	5 – 9	10 – 14	15 – 19	20 – 24	25 – 29	30 – 34	35 – 39	40 & over
Under 25	13	13	--	--	--	--	--	--	--	--
	\$62,119	\$62,119	--	--	--	--	--	--	--	--
25 – 29	76	70	6	--	--	--	--	--	--	--
	61,544	60,304	\$76,004	--	--	--	--	--	--	--
30 – 34	88	64	20	4	--	--	--	--	--	--
	71,631	67,757	82,333	\$80,113	--	--	--	--	--	--
35 – 39	106	50	19	29	8	--	--	--	--	--
	85,638	77,909	102,305	86,741	\$90,361	--	--	--	--	--
40 – 44	154	48	26	34	41	5	--	--	--	--
	84,757	76,472	88,910	88,747	84,492	\$117,755	--	--	--	--
45 – 49	180	56	24	41	39	14	6	--	--	--
	83,080	72,708	94,420	87,689	78,483	102,376	\$87,882	--	--	--
50 – 54	235	58	33	40	55	28	15	6	--	--
	84,312	65,990	100,852	86,331	86,116	86,871	101,180	\$86,344	--	--
55 – 59	247	29	21	38	73	30	30	21	5	--
	88,068	66,108	112,839	93,696	79,953	88,038	97,338	97,433	\$92,319	--
60 – 64	181	18	16	22	42	25	28	16	13	1
	91,471	78,361	87,890	92,848	81,354	101,421	105,453	94,000	87,273	\$153,189
65 – 69	58	3	6	10	18	7	5	4	4	1
	85,341	97,775	83,161	83,409	85,062	68,535	79,294	125,566	83,854	78,398
70 & over	12	1	2	1	3	2	2	--	--	1
	86,187	73,415	110,550	79,674	82,965	91,651	73,684	--	--	80,489
Total	1,350	410	173	219	279	111	86	47	22	3
	\$83,688	\$69,573	\$95,076	\$88,670	\$82,501	\$92,740	\$98,391	\$97,243	\$87,798	\$104,026

Section 3: Supplemental Information

Exhibit B: Members in Active Service as of December 31, 2019 by Age, Years of Service, and Average Projected Compensation (continued)

Rate Group #9 for Plans M, N and U (TCA)

Age	Years of Service									
	Total	0 – 4	5 – 9	10 – 14	15 – 19	20 – 24	25 – 29	30 – 34	35 – 39	40 & over
Under 25	1	1	--	--	--	--	--	--	--	--
	\$78,944	\$78,944	--	--	--	--	--	--	--	--
25 – 29	1	1	--	--	--	--	--	--	--	--
	64,660	64,660	--	--	--	--	--	--	--	--
30 – 34	3	3	--	--	--	--	--	--	--	--
	73,687	73,687	--	--	--	--	--	--	--	--
35 – 39	7	4	1	2	--	--	--	--	--	--
	93,958	94,765	\$101,116	\$88,767	--	--	--	--	--	--
40 – 44	7	3	1	2	1	--	--	--	--	--
	100,570	86,542	147,913	114,407	\$67,635	--	--	--	--	--
45 – 49	11	8	2	--	1	--	--	--	--	--
	124,707	119,287	151,549	--	114,389	--	--	--	--	--
50 – 54	13	5	1	2	3	2	--	--	--	--
	135,166	136,847	129,815	148,527	119,880	\$143,209	--	--	--	--
55 – 59	10	2	1	3	4	--	--	--	--	--
	144,696	151,549	157,552	102,715	169,542	--	--	--	--	--
60 – 64	8	2	2	--	3	1	--	--	--	--
	129,059	110,591	212,858	--	80,643	143,643	--	--	--	--
65 – 69	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
70 & over	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
Total	61	29	8	9	12	3	--	--	--	--
	\$120,242	\$109,178	\$158,151	\$112,394	\$121,813	\$143,353	--	--	--	--

Section 3: Supplemental Information

Exhibit B: Members in Active Service as of December 31, 2019 by Age, Years of Service, and Average Projected Compensation (continued)

Rate Group #10 for Plans I, J, M, N and U (OCFA)

Age	Years of Service									
	Total	0 – 4	5 – 9	10 – 14	15 – 19	20 – 24	25 – 29	30 – 34	35 – 39	40 & over
Under 25	5	5	--	--	--	--	--	--	--	--
	\$66,749	\$66,749	--	--	--	--	--	--	--	--
25 – 29	30	28	2	--	--	--	--	--	--	--
	74,470	73,723	\$84,933	--	--	--	--	--	--	--
30 – 34	33	30	3	--	--	--	--	--	--	--
	85,584	85,644	84,978	--	--	--	--	--	--	--
35 – 39	47	33	6	6	2	--	--	--	--	--
	94,822	91,941	113,772	\$105,977	\$52,042	--	--	--	--	--
40 – 44	45	23	6	9	6	1	--	--	--	--
	100,492	99,594	81,769	109,077	106,181	\$122,098	--	--	--	--
45 – 49	40	14	5	7	10	2	2	--	--	--
	112,826	98,398	133,069	124,703	114,611	146,506	\$79,037	--	--	--
50 – 54	47	8	7	4	13	8	7	--	--	--
	116,523	103,405	148,612	100,721	103,998	130,001	116,312	--	--	--
55 – 59	35	8	6	3	8	5	4	1	--	--
	112,485	124,041	132,664	121,161	90,868	127,556	86,734	\$73,506	--	--
60 – 64	22	4	2	2	11	1	2	--	--	--
	122,430	107,874	200,454	111,751	102,874	145,015	180,468	--	--	--
65 – 69	4	1	--	--	2	1	--	--	--	--
	112,110	71,146	--	--	108,358	160,581	--	--	--	--
70 & over	2	--	--	--	1	--	1	--	--	--
	79,659	--	--	--	61,519	--	\$97,800	--	--	--
Total	310	154	37	31	53	18	16	1	--	--
	\$101,931	\$90,856	\$121,637	\$112,269	\$101,435	\$133,250	\$111,121	\$73,506	--	--

Section 3: Supplemental Information

Exhibit B: Members in Active Service as of December 31, 2019 by Age, Years of Service, and Average Projected Compensation (continued)

Rate Group #11 for Plans M AND N, Future Service, and U (Cemetery)

Age	Years of Service									
	Total	0 – 4	5 – 9	10 – 14	15 – 19	20 – 24	25 – 29	30 – 34	35 – 39	40 & over
Under 25	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
25 – 29	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
30 – 34	2	2	--	--	--	--	--	--	--	--
	\$46,975	\$46,975	--	--	--	--	--	--	--	--
35 – 39	3	1	1	--	1	--	--	--	--	--
	57,242	48,493	\$55,909	--	\$67,326	--	--	--	--	--
40 – 44	4	--	--	2	--	2	--	--	--	--
	73,546	--	--	\$59,851	--	\$87,241	--	--	--	--
45 – 49	1	1	--	--	--	--	--	--	--	--
	106,108	106,108	--	--	--	--	--	--	--	--
50 – 54	9	2	1	1	1	2	--	2	--	--
	69,689	50,467	70,637	161,106	74,244	55,063	--	\$55,075	--	--
55 – 59	2	1	--	--	--	1	--	--	--	--
	78,747	57,233	--	--	--	100,261	--	--	--	--
60 – 64	1	0	--	--	--	1	--	--	--	--
	69,583	0	--	--	--	69,583	--	--	--	--
65 – 69	2	1	--	--	--	--	--	1	--	--
	77,025	53,790	--	--	--	--	--	100,261	--	--
70 & over	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
Total	24	8	2	3	2	6	--	3	--	--
	\$69,762	\$57,563	\$63,273	\$93,603	\$70,785	\$75,742	--	\$70,137	--	--

Section 3: Supplemental Information

Exhibit B: Members in Active Service as of December 31, 2019 by Age, Years of Service, and Average Projected Compensation (continued)

Rate Group #12 for Plans G, H, Future Service, and U (Law Library)

Age	Years of Service									
	Total	0 – 4	5 – 9	10 – 14	15 – 19	20 – 24	25 – 29	30 – 34	35 – 39	40 & over
Under 25	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
25 – 29	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
30 – 34	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
35 – 39	1	1	--	--	--	--	--	--	--	--
	\$54,682	\$54,682	--	--	--	--	--	--	--	--
40 – 44	2	--	--	1	1	--	--	--	--	--
	92,114	--	--	\$107,769	\$76,459	--	--	--	--	--
45 – 49	2	1	--	--	--	1	--	--	--	--
	106,586	147,130	--	--	--	\$66,043	--	--	--	--
50 – 54	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
55 – 59	3	--	--	--	1	1	1	--	--	--
	86,724	--	--	--	107,254	76,459	\$76,459	--	--	--
60 – 64	1	--	1	--	--	--	--	--	--	--
	54,614	--	\$54,614	--	--	--	--	--	--	--
65 – 69	3	--	--	--	1	2	--	--	--	--
	72,179	--	--	--	66,043	75,247	--	--	--	--
70 & over	2	--	--	1	--	--	--	1	--	--
	67,821	--	--	50,750	--	--	--	\$84,892	--	--
Total	14	2	1	2	3	4	1	1	--	--
	\$79,932	\$100,906	\$54,614	\$79,259	\$83,252	\$73,249	\$76,459	\$84,892	--	--

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Exhibit B: Members in Active Service as of December 31, 2019 by Age, Years of Service, and Average Projected Compensation (continued)

Rate Group #6 for Plans E, F and V (Probation)

Age	Years of Service									
	Total	0 – 4	5 – 9	10 – 14	15 – 19	20 – 24	25 – 29	30 – 34	35 – 39	40 & over
Under 25	7	7	--	--	--	--	--	--	--	--
	\$60,506	\$60,506	--	--	--	--	--	--	--	--
25 – 29	31	30	1	--	--	--	--	--	--	--
	61,386	60,469	\$88,904	--	--	--	--	--	--	--
30 – 34	39	23	11	4	1	--	--	--	--	--
	69,021	65,695	75,763	\$67,802	\$76,229	--	--	--	--	--
35 – 39	98	6	9	73	10	--	--	--	--	--
	79,413	74,058	69,411	79,905	88,038	--	--	--	--	--
40 – 44	207	1	3	55	115	32	1	--	--	--
	85,933	64,660	66,707	81,814	86,071	\$94,616	\$97,807	--	--	--
45 – 49	190	2	1	13	58	97	19	--	--	--
	90,977	61,773	51,413	76,233	82,581	95,889	106,778	--	--	--
50 – 54	110	3	--	8	24	37	31	7	--	--
	92,084	70,342	--	74,992	81,736	91,482	102,160	\$114,982	--	--
55 – 59	33	--	2	--	4	15	6	6	--	--
	96,394	--	89,080	--	86,126	90,693	91,434	124,890	--	--
60 – 64	17	--	1	1	2	4	6	1	2	--
	90,259	--	81,189	76,541	83,402	77,400	92,887	91,186	\$125,882	--
65 – 69	3	--	--	1	1	--	1	--	--	--
	92,265	--	--	74,202	95,551	--	107,042	--	--	--
70 & over	1	--	--	--	--	--	1	--	--	--
	97,554	--	--	--	--	--	97,554	--	--	--
Total	736	72	28	155	215	185	65	14	2	--
	\$85,725	\$63,780	\$73,496	\$79,650	\$84,711	\$93,966	\$101,601	\$117,529	\$125,882	--

Section 3: Supplemental Information

Exhibit B: Members in Active Service as of December 31, 2019 by Age, Years of Service, and Average Projected Compensation (continued)

Rate Group #7 for Plans E, F, Q, R and V (Law Enforcement)

Age	Years of Service									
	Total	0 – 4	5 – 9	10 – 14	15 – 19	20 – 24	25 – 29	30 – 34	35 – 39	40 & over
Under 25	61	59	2	--	--	--	--	--	--	--
	\$84,415	\$84,113	\$93,330	--	--	--	--	--	--	--
25 – 29	291	223	67	1	--	--	--	--	--	--
	97,170	91,446	115,754	\$128,464	--	--	--	--	--	--
30 – 34	368	112	199	56	1	--	--	--	--	--
	113,115	93,487	120,547	125,779	\$123,609	--	--	--	--	--
35 – 39	322	37	115	144	25	1	--	--	--	--
	124,139	102,710	123,336	128,742	132,175	\$145,674	--	--	--	--
40 – 44	274	14	29	102	79	50	--	--	--	--
	134,320	115,782	127,319	128,785	140,442	145,193	--	--	--	--
45 – 49	347	7	14	39	72	162	53	--	--	--
	144,687	113,988	130,651	133,462	140,103	147,990	\$156,841	--	--	--
50 – 54	256	50	9	14	29	67	69	18	--	--
	146,140	137,239	144,930	133,495	141,535	141,697	156,056	\$167,248	--	--
55 – 59	96	22	12	8	10	13	15	15	1	--
	145,927	142,706	147,408	148,540	135,207	146,828	140,602	161,184	\$124,618	--
60 – 64	40	3	21	7	--	4	3	2	--	--
	146,856	145,521	153,472	152,707	--	130,024	127,379	121,795	--	--
65 – 69	4	1	--	1	2	--	--	--	--	--
	159,512	151,549	--	188,145	149,177	--	--	--	--	--
70 & over	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
Total	2,059	528	468	372	218	297	140	35	1	--
	\$126,259	\$99,686	\$123,787	\$130,017	\$139,290	\$145,799	\$154,083	\$162,052	\$124,618	--

Section 3: Supplemental Information

Exhibit B: Members in Active Service as of December 31, 2019 by Age, Years of Service, and Average Projected Compensation (continued)

Rate Group #8 for Plans E, F, Q, R and V (OCFA)

Age	Years of Service									
	Total	0 – 4	5 – 9	10 – 14	15 – 19	20 – 24	25 – 29	30 – 34	35 – 39	40 & over
Under 25	14	14	--	--	--	--	--	--	--	--
	\$85,461	\$85,462	--	--	--	--	--	--	--	--
25 – 29	96	89	7	--	--	--	--	--	--	--
	99,559	97,230	\$129,163	--	--	--	--	--	--	--
30 – 34	170	108	49	13	--	--	--	--	--	--
	109,251	97,535	127,473	\$137,905	--	--	--	--	--	--
35 – 39	203	78	62	59	4	--	--	--	--	--
	124,621	104,485	130,835	142,462	\$157,797	--	--	--	--	--
40 – 44	204	32	54	70	39	9	--	--	--	--
	142,920	113,259	143,061	146,689	157,626	\$154,502	--	--	--	--
45 – 49	160	22	33	35	34	24	11	1	--	--
	149,170	109,107	151,960	150,930	152,034	169,257	\$160,576	\$171,920	--	--
50 – 54	130	8	23	9	28	20	29	13	--	--
	160,009	103,696	160,631	145,902	162,437	155,543	167,044	189,277	--	--
55 – 59	81	1	32	2	11	13	13	7	2	--
	152,784	109,445	153,104	142,669	144,127	149,518	151,070	179,788	\$164,909	--
60 – 64	37	3	17	--	3	2	3	4	5	--
	140,337	129,846	131,473	--	138,532	131,040	162,210	144,458	165,153	--
65 – 69	10	--	6	--	--	--	2	1	1	--
	135,898	--	127,482	--	--	--	131,225	181,784	149,854	--
70 & over	1	--	1	--	--	--	--	--	--	--
	130,222	--	130,222	--	--	--	--	--	--	--
Total	1,106	355	284	188	119	68	58	26	8	--
	\$133,369	\$101,089	\$139,880	\$145,464	\$155,437	\$158,373	\$160,752	\$178,871	\$163,180	--

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Exhibit C: Reconciliation of Member Data

	Active Members	Inactive Vested Members ¹	Retired Members	Disabled Members	Beneficiaries	Total
Number as of December 31, 2018	21,929	6,026	13,827	1,482	2,365	45,629
• New members	1,875	192	N/A	N/A	212	2,279
• Terminations – with vested rights	(607)	607	N/A	N/A	N/A	0
• Contribution refunds	(115)	-112	N/A	N/A	N/A	(227)
• Retirements	(821)	-128	949	N/A	N/A	0
• New disabilities	(26)	(7)	(31)	64	N/A	0
• Return to work	52	(49)	(3)	0	N/A	0
• Died with or without beneficiary	(30)	(9)	(304)	(43)	(99)	(485)
• Data adjustments	0	0	11	2	(12)	1
Number as of December 31, 2019	22,257	6,520	14,449	1,505	2,466	47,197

¹ Includes members who chose to leave their contributions on deposit even though they have less than five years of service.

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Exhibit D: Summary Statement of Income and Expenses on a Market Value Basis

	Year Ended December 31, 2019	Year Ended December 31, 2018
Net assets at market value at the beginning of the year¹	\$14,349,790,000	\$14,652,607,000
Contribution income:		
• Employer contributions ²	\$642,540,000	\$595,494,000
• Member contributions	279,373,000	270,070,000
• Discount for prepaid contributions	22,049,000	21,218,000
• Transfer from County Investment Account ³	<u>0</u>	<u>0</u>
Net contribution income	\$943,962,000	\$886,782,000
Investment income:		
• Interest, dividends and other income	\$2,248,759,000	\$(241,629,000)
• Less investment and administrative fees	<u>(125,501,000)</u>	<u>(119,692,000)</u>
Net investment income	\$2,123,258,000	\$(361,321,000)
Total income available for benefits	\$3,067,220,000	\$525,461,000
Less benefit payments:		
• Benefits paid	\$(887,653,000)	\$(814,345,000)
• Withdrawal of contributions	<u>(13,249,000)</u>	<u>(13,933,000)</u>
Net benefit payments	<u>\$(900,902,000)</u>	<u>\$(828,278,000)</u>
Change in net assets at market value	\$2,166,318,000	\$(302,817,000)
Net assets at market value at the end of the year¹	\$16,516,108,000	\$14,349,790,000

Note: Results may be slightly off due to rounding.

¹ See footnote 1 on next page for further detail.

² Excludes \$29,884,000 in contributions towards O.C. Sanitation District UAAL Deferred Account as of December 31, 2019. Includes asset transfers of \$18,631,000 and \$14,589,000 as of December 31, 2019 and December 31, 2018, respectively, from O.C. Sanitation District UAAL Deferred Account to valuation assets.

³ Funded by pension obligation bond proceeds held by OCERS.

Section 3: Supplemental Information

Exhibit E: Summary Statement of Plan Assets

	December 31, 2019	December 31, 2018
Cash equivalents	\$415,160,000	\$463,805,000
Accounts receivable:		
• Contributions	\$24,104,000	\$20,834,000
• Investment income	18,054,000	19,170,000
• Securities settlements	335,681,000	115,567,000
• All other	<u>5,462,000</u>	<u>3,223,000</u>
Total accounts receivable	\$383,301,000	\$158,794,000
Investments:		
• Equities	\$8,291,819,000	\$6,773,591,000
• Fixed income investments	2,787,092,000	2,578,702,000
• Alternative investments and diversified credit	5,440,774,000	5,062,529,000
• Security lending collateral	192,379,000	314,333,000
• Fixed assets net of accumulated depreciation	<u>16,060,000</u>	<u>18,542,000</u>
Total investments at market value	<u>\$16,728,124,000</u>	<u>\$14,747,697,000</u>
Total assets	\$17,526,585,000	\$15,370,296,000
Accounts payable:		
• Securities settlements	\$(301,621,000)	\$(228,647,000)
• Securities lending liability	(192,379,000)	(314,333,000)
• All other	<u>(94,719,000)</u>	<u>(99,503,000)</u>
Total accounts payable	\$(588,719,000)	\$(642,483,000)
Net assets at market value¹	\$16,516,108,000	\$14,349,790,000
Net assets at actuarial value	\$16,036,953,000	\$14,994,505,000
Net assets at valuation value	\$16,036,869,000	\$14,994,420,000

Note: Results may be slightly off due to rounding.

¹ The market value excludes \$150,416,000 and \$131,890,000 as of December 31, 2019 and December 31, 2018, respectively, in the County Investment Account (funded by pension obligation bond proceeds held by OCERS), \$259,285,000 and \$246,133,000 as of December 31, 2019 and December 31, 2018, respectively, in the prepaid employer contributions account, \$12,057,000 and \$0 as of December 31, 2019 and December 31, 2018, respectively in the O.C. Sanitation District UAAL Deferred Account (after transfer).

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Exhibit F: Summary of Reported Reserve Information as of December 31, 2019

	Reserves
Used in Development of Valuation Value of Assets:	
• Active Members Reserve (Book Value)	\$3,421,183,000
• Retired Members Reserve (Book Value)	11,728,494,000
• Employer Advanced Reserve (Book Value)	2,772,684,000
• O.C. Sanitation District UAAL Deferred Account Transfer	18,631,000
• ERI Contribution Reserve	12,292,000
• STAR COLA Contribution Reserve	0
• Unrealized Appreciation/(Depreciation) Included in Valuation Value of Assets	<u>(1,916,415,000)</u>
Subtotal: Valuation Value of Assets	\$16,036,869,000
Not Used in Development of Valuation Value of Assets:	
• RMBR	\$0
• Unclaimed Member Deposit	0
• Medicare Medical Insurance Reserve	<u>84,000</u>
Subtotal	\$84,000
Subtotal: Actuarial Value of Assets	\$16,036,953,000
• Unrecognized Investment Income	<u>479,155,000</u>
Subtotal: Market Value of Assets (Net of County Investment Account ¹ and Prepaid Employer Contributions)	\$16,516,108,000
• County Investment Account ¹	150,416,000
• Prepaid Employer Contributions	259,285,000
• O.C. Sanitation District UAAL Deferred Account ²	<u>12,057,000</u>
Total: Gross Market Value of Assets	\$ 16,937,866,000

Note: Results may be slightly off due to rounding.

¹ Funded by pension obligation bond proceeds held by OCERS.

² After asset transfer of \$18,631,000 from O.C. Sanitation District UAAL Deferred Account to valuation assets.

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Exhibit G: Development of the Fund through December 31, 2019

Year Ended December 31	Employer Contributions ¹	Member Contributions	Net Investment Return ^{2,3}	Benefit Payments	Market Value of Assets at Year-End	Valuation Value of Assets at Year-End	Valuation Value as a Percent of Market Value
2010	\$387,313,000	\$177,929,000	\$787,215,000	\$459,383,000	\$8,357,835,000	\$8,672,592,000	103.77%
2011	414,451,000	183,820,000	3,236,000	493,749,000	8,465,593,000	9,064,355,000	107.07%
2012	436,895,000	191,069,000	1,014,471,000	541,154,000	9,566,874,000	9,469,208,000	98.98%
2013	458,487,000	209,301,000	1,031,118,000	586,273,000	10,679,507,000	10,417,125,000	97.54%
2014	659,634,000	232,656,000	487,104,000	630,678,000	11,428,223,000	11,449,911,000	100.19%
2015	598,599,000	249,271,000	(51,601,000)	675,963,000	11,548,529,000	12,228,009,000	105.88%
2016	558,020,000	258,297,000	1,010,548,000	717,976,000	12,657,418,000	13,102,978,000	103.52%
2017	619,067,000	262,294,000	1,878,172,000	764,344,000	14,652,607,000	14,197,125,000	96.89%
2018	616,712,000	270,070,000	(361,321,000)	828,278,000	14,349,790,000	14,994,420,000	104.49%
2019	664,589,000	279,373,000	2,123,258,000	900,902,000	16,516,108,000	16,036,869,000	97.10%

¹ Includes discount for prepaid contributions, asset transfers from County Investment Account and asset transfer from O.C. Sanitation District UAAL Deferred Account, if any.

² On a market basis, net of investment fees and administrative expenses.

³ Actual investment loss on net pension plan assets includes both the administrative expenses and discount for prepaid contributions while excluding the investment gains or losses credited to County Investment Account and O.C. Sanitation District UAAL Deferred Account, if any.

Section 3: Supplemental Information

Exhibit H: Table of Amortization Bases

Rate Group #1 – Plans A, B and U (non-OCTA, non-OCSD) for Orange County and IHSS

Date Established	Source	Initial Amount (\$ in '000s)	Years Remaining	Outstanding Balance (\$ in '000s)	Annual Payment (\$ in '000s)
December 31, 2012	Restart amortization	\$70,164	14	\$66,190	\$6,120
December 31, 2013	Actuarial (gain) or loss	(5,744)	14	(5,419)	(501)
December 31, 2014	Actuarial (gain) or loss	(2,744)	15	(2,633)	(231)
December 31, 2014	Assumption changes	(6,545)	15	(6,278)	(551)
December 31, 2015	Actuarial (gain) or loss	(1,650)	16	(1,606)	(134)
December 31, 2016	Actuarial (gain) or loss	(9,719)	17	(9,552)	(764)
December 31, 2017	Actuarial (gain) or loss	(5,386)	18	(5,335)	(409)
December 31, 2017	Assumption changes	21,899	18	21,688	1,664
December 31, 2018	Actuarial (gain) or loss	44	19	44	3
December 31, 2019	Actuarial (gain) or loss	(6,588)	20	(6,588)	(470)
Subtotal				\$50,511	\$4,727
Rate Group #1 – Plans A, B and U (non-OCTA, non-OCSD) for O.C. Vector Control ¹				\$1,544	
Rate Group #1 – Plans A, B and U (non-OCTA, non-OCSD) for Department of Education ¹				\$3,576	
Rate Group #1 – Plans A, B and U (non-OCTA, non-OCSD) for U.C.I. ¹				\$33,469	
Rate Group #1 – Plans A, B and U (non-OCTA, non-OCSD) for Cypress Recreation and Parks ¹				\$521	
Rate Group #1 Subtotal				\$89,621	

¹ In determining the UAALs for the O.C. Vector Control District, Department of Education, U.C.I and Cypress Recreation and Parks, we first start by rolling forward the VVAs of these employers as of December 31, 2018 to December 31, 2019 to reflect the actual contributions, benefit payments and return on their VVAs during 2019. The AALs for these employers are obtained from internal valuation results.

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Exhibit H: Table of Amortization Bases (continued)

Rate Group #2 – Plans I, J, O, P, S, T, U and W

Date Established	Source	Initial Amount (\$ in '000s)	Years Remaining	Outstanding Balance (\$ in '000s)	Annual Payment (\$ in '000s)
December 31, 2012	Restart amortization	\$3,438,555	14	\$3,243,791	\$299,948
December 31, 2013	Actuarial (gain) or loss	(173,790)	14	(163,946)	(15,160)
December 31, 2014	Actuarial (gain) or loss	(78,001)	15	(74,833)	(6,565)
December 31, 2014	Assumption changes	(246,714)	15	(236,693)	(20,763)
December 31, 2015	Actuarial (gain) or loss	(65,063)	16	(63,299)	(5,291)
December 31, 2016	Actuarial (gain) or loss	39,445	17	38,767	3,099
Subtotal ¹				\$2,743,787	\$255,268
December 31, 2017	Actuarial (gain) or loss	\$(59,911)	18	\$(59,331)	\$(4,552)
December 31, 2017	Assumption changes	481,098	18	476,446	36,553
December 31, 2018	Actuarial (gain) or loss	207,573	19	206,843	15,274
December 31, 2019	Actuarial (gain) or loss	186,003	20	186,003	13,256
Subtotal ²				\$809,961	\$60,531
Rate Group #2 Subtotal				\$3,553,748	\$315,799

Note:

We have made an adjustment to the amortization bases to reflect the \$1.7 million additional contributions made by Children and Families Commission to pay off their UAAL as of December 31, 2016. With that adjustment, we have reduced the amortization layers established on or before December 31, 2016 for Rate Group #2 by that amount on a pro-rata basis. The UAAL contribution rate for Children and Families Commission is determined based on the amortization layers established on or after December 31, 2017.

¹ This amount is spread over the payroll for all employers in Rate Group #2 excluding the payroll for Children and Families Commission.

² This amount is spread over the payroll for all employers in Rate Group #2 including the payroll for Children and Families Commission.

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Exhibit H: Table of Amortization Bases (continued)

Rate Group #3 – Plans B, G, H and U (OCSD)

Date Established	Source	Initial Amount (\$ in '000s)	Years Remaining	Outstanding Balance (\$ in '000s)	Annual Payment (\$ in '000s)
December 31, 2019	Restart amortization ¹	\$0	0	<u>\$0</u>	<u>\$0</u>
Rate Group #3 Subtotal				\$0	\$0

¹ After transfer of \$18.6 million from O.C. Sanitation District UAAL Deferred Account.

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Exhibit H: Table of Amortization Bases (continued)

Rate Group #5 – Plans A, B and U (OCTA)

Date Established	Source	Initial Amount (\$ in '000s)	Years Remaining	Outstanding Balance (\$ in '000s)	Annual Payment (\$ in '000s)
December 31, 2012	Restart amortization	\$232,513	14	\$219,524	\$20,299
December 31, 2013	Actuarial (gain) or loss	(13,471)	14	(12,718)	(1,176)
December 31, 2014	Actuarial (gain) or loss	4,522	15	4,342	381
December 31, 2014	Assumption changes	(19,944)	15	(19,150)	(1,680)
December 31, 2015	Actuarial (gain) or loss	(933)	16	(909)	(76)
December 31, 2016	Actuarial (gain) or loss	(9,743)	17	(9,584)	(766)
December 31, 2017	Actuarial (gain) or loss	(9,948)	18	(9,852)	(756)
December 31, 2017	Assumption changes	43,481	18	43,060	3,304
December 31, 2018	Actuarial (gain) or loss	22,318	19	22,239	1,642
December 31, 2019	Actuarial (gain) or loss	12,234	20	12,234	872
Rate Group #5 Subtotal				\$249,186	\$22,044

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Exhibit H: Table of Amortization Bases (continued)

Rate Group #9 – Plans M, N and U (TCA)

Date Established	Source	Initial Amount (\$ in '000s)	Years Remaining	Outstanding Balance (\$ in '000s)	Annual Payment (\$ in '000s)
December 31, 2019	Restart amortization ¹ & Actuarial (gain) or loss	\$373	20	<u>\$373</u>	<u>\$27</u>
Rate Group #9 Subtotal				\$373	\$27

¹ After reflecting additional UAAL contribution of \$12.8 million made by TCA during 2019.

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Exhibit H: Table of Amortization Bases (continued)

Rate Group #10 – Plans I, J, M, N and U (OCFA)

Date Established	Source	Initial Amount (\$ in '000s)	Years Remaining	Outstanding Balance (\$ in '000s)	Annual Payment (\$ in '000s)
December 31, 2012	Restart amortization	\$72,750	14	\$68,685	\$6,351
December 31, 2013	Actuarial (gain) or loss	(2,659)	14	(2,510)	(232)
December 31, 2014	Actuarial (gain) or loss	(3,755)	15	(3,606)	(316)
December 31, 2014	Assumption changes	(4,489)	15	(4,311)	(378)
December 31, 2015	Actuarial (gain) or loss	626	16	609	51
December 31, 2016	Actuarial (gain) or loss	134	17	132	11
December 31, 2017	Actuarial (gain) or loss	(15,281)	18	(15,133)	(1,161)
December 31, 2017	Assumption changes	9,159	18	9,071	696
December 31, 2018	Actuarial (gain) or loss	(6,934)	19	(6,910)	(510)
December 31, 2019	Actuarial (gain) or loss	76	20	76	5
Rate Group #10 Subtotal				\$46,103	\$4,517

Section 3: Supplemental Information

Exhibit H: Table of Amortization Bases (continued)

Rate Group #11 – Plans M and N, future service, and U (Cemetery)

Date Established	Source	Initial Amount (\$ in '000s)	Years Remaining	Outstanding Balance (\$ in '000s)	Annual Payment (\$ in '000s)
December 31, 2017	Restart amortization & Assumption changes	\$281	18	\$278	\$21
December 31, 2018	Actuarial (gain) or loss	(244)	19	(243)	(18)
December 31, 2019	Actuarial (gain) or loss	613	20	<u>613</u>	<u>44</u>
Rate Group #11 Subtotal				\$648	\$47

Section 3: Supplemental Information

Exhibit H: Table of Amortization Bases (continued)

Rate Group #12 – Plans G, H, future service, and U (Law Library)

Date Established	Source	Initial Amount (\$ in '000s)	Years Remaining	Outstanding Balance (\$ in '000s)	Annual Payment (\$ in '000s)
December 31, 2017	Restart amortization & Assumption changes	\$13	18	\$12	\$1
December 31, 2018	Actuarial (gain) or loss	221	19	220	16
December 31, 2019	Actuarial (gain) or loss	(201)	20	(201)	(14)
Rate Group #12 Subtotal				\$31	\$3

Section 3: Supplemental Information

Exhibit H: Table of Amortization Bases (continued)

Rate Group #6 – Plans E, F and V (Probation)

Date Established	Source	Initial Amount (\$ in '000s)	Years Remaining	Outstanding Balance (\$ in '000s)	Annual Payment (\$ in '000s)
December 31, 2012	Restart amortization	\$192,912	14	\$182,134	\$16,842
December 31, 2013	Actuarial (gain) or loss	(14,039)	14	(13,256)	(1,226)
December 31, 2014	Actuarial (gain) or loss	(2,596)	15	(2,493)	(219)
December 31, 2014	Assumption changes	36,260	15	34,816	3,054
December 31, 2015	Actuarial (gain) or loss	(10,703)	16	(10,421)	(871)
December 31, 2016	Actuarial (gain) or loss	13,799	17	13,573	1,085
December 31, 2017	Actuarial (gain) or loss	(6,566)	18	(6,503)	(499)
December 31, 2017	Assumption changes	50,030	18	49,546	3,801
December 31, 2018	Actuarial (gain) or loss	8,046	19	8,018	592
December 31, 2019	Actuarial (gain) or loss	8,063	20	8,063	575
Rate Group #6 Subtotal				\$263,477	\$23,134

Section 3: Supplemental Information

Exhibit H: Table of Amortization Bases (continued)

Rate Group #7 – Plans E, F, Q, R and V (Law Enforcement)

Date Established	Source	Initial Amount (\$ in '000s)	Years Remaining	Outstanding Balance (\$ in '000s)	Annual Payment (\$ in '000s)
December 31, 2012	Restart amortization	\$988,833	14	\$933,589	\$86,327
December 31, 2013	Actuarial (gain) or loss	(51,652)	14	(48,766)	(4,509)
December 31, 2014	Actuarial (gain) or loss	(34,729)	15	(33,346)	(2,925)
December 31, 2014	Assumption changes	102,262	15	98,189	8,613
December 31, 2015	Actuarial (gain) or loss	23,666	16	23,043	1,926
December 31, 2016	Actuarial (gain) or loss	39,724	17	39,074	3,124
December 31, 2017	Actuarial (gain) or loss	(27,922)	18	(27,652)	(2,121)
December 31, 2017	Assumption changes	161,417	18	159,856	12,264
December 31, 2018	Actuarial (gain) or loss	69,329	19	69,085	5,102
December 31, 2019	Actuarial (gain) or loss	75,023	20	75,023	5,347
Rate Group #7 Subtotal				\$1,288,095	\$113,148

Section 3: Supplemental Information

Exhibit H: Table of Amortization Bases (continued)

Rate Group #8 – Plans E, F, Q, R and V (OCFA)

Date Established	Source	Initial Amount (\$ in '000s)	Years Remaining	Outstanding Balance (\$ in '000s)	Annual Payment (\$ in '000s)
December 31, 2012	Restart amortization	\$399,947	14	\$377,603	\$34,916
December 31, 2013	Actuarial (gain) or loss	(20,177)	14	(19,050)	(1,762)
December 31, 2014	Actuarial (gain) or loss	(35,400)	15	(33,990)	(2,982)
December 31, 2014	Assumption changes	35,957	15	34,526	3,029
December 31, 2015	Actuarial (gain) or loss	(22,228)	16	(21,644)	(1,809)
December 31, 2016	Actuarial (gain) or loss	(15,736)	17	(15,478)	(1,237)
December 31, 2017	Actuarial (gain) or loss	(43,031)	18	(42,615)	(3,269)
December 31, 2017	Assumption changes	53,637	18	53,118	4,075
December 31, 2018	Actuarial (gain) or loss	39,932	19	39,792	2,938
December 31, 2019	Actuarial (gain) or loss	16,317	20	16,317	1,163
Rate Group #8 Subtotal				\$388,579	\$35,062

Section 3: Supplemental Information

Exhibit H: Table of Amortization Bases (continued)

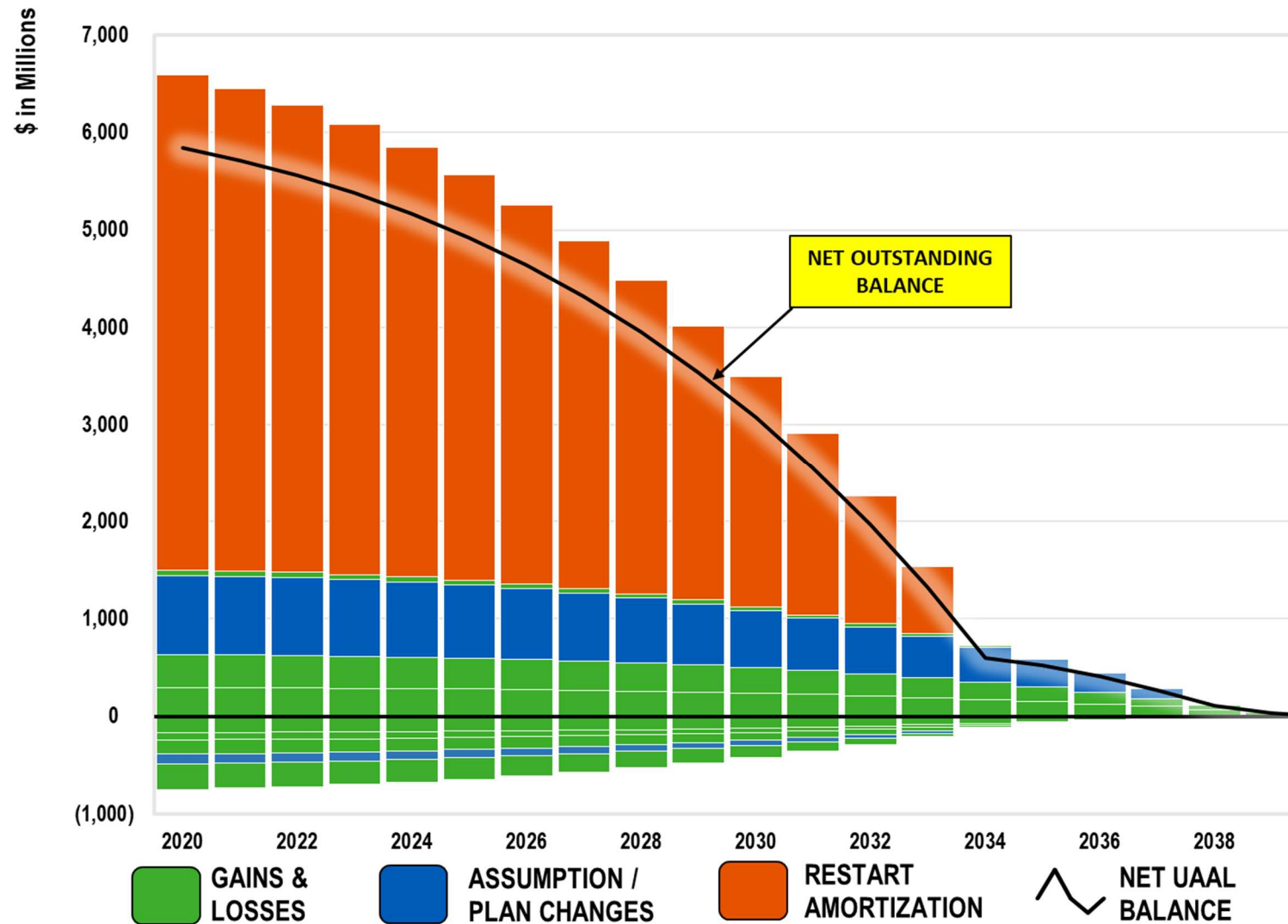
All Rate Groups Combined Excluding O.C. Vector Control,
Department of Education, U.C.I. and Cypress Recreation and Parks

Date Established	Source	Initial Amount (\$ in '000s)	Years Remaining	Outstanding Balance (\$ in '000s)	Annual Payment (\$ in '000s)
December 31, 2012	Restart amortization	\$5,395,674	14	\$5,091,516	\$470,803
December 31, 2013	Actuarial (gain) or loss	(281,532)	14	(265,665)	(24,566)
December 31, 2014	Actuarial (gain) or loss	(152,703)	15	(146,559)	(12,857)
December 31, 2014	Assumption changes	(103,213)	15	(98,901)	(8,676)
December 31, 2015	Actuarial (gain) or loss	(76,285)	16	(74,227)	(6,204)
December 31, 2016	Actuarial (gain) or loss	57,904	17	56,932	4,552
December 31, 2017	Actuarial (gain) or loss	(168,707)	18	(167,076)	(12,817)
December 31, 2017	Assumption changes	821,677	18	813,730	62,429
December 31, 2018	Actuarial (gain) or loss	340,285	19	339,088	25,039
December 31, 2019	Actuarial (gain) or loss	291,913	20	<u>291,913</u>	<u>20,805</u>
Subtotal				\$5,840,751	\$518,508
Rate Group #1 – Plans A, B and U (non-OCTA, non-OCSD) for O.C. Vector Control				\$1,544	
Rate Group #1 – Plans A, B and U (non-OCTA, non-OCSD) for Department of Education				\$3,576	
Rate Group #1 – Plans A, B and U (non-OCTA, non-OCSD) for U.C.I.				\$33,469	
Rate Group #1 – Plans A, B and U (non-OCTA, non-OCSD) for Cypress Recreation and Parks				\$521	
Total				\$5,879,861	

Section 3: Supplemental Information

Exhibit I: Projection of UAAL Balances and Payments

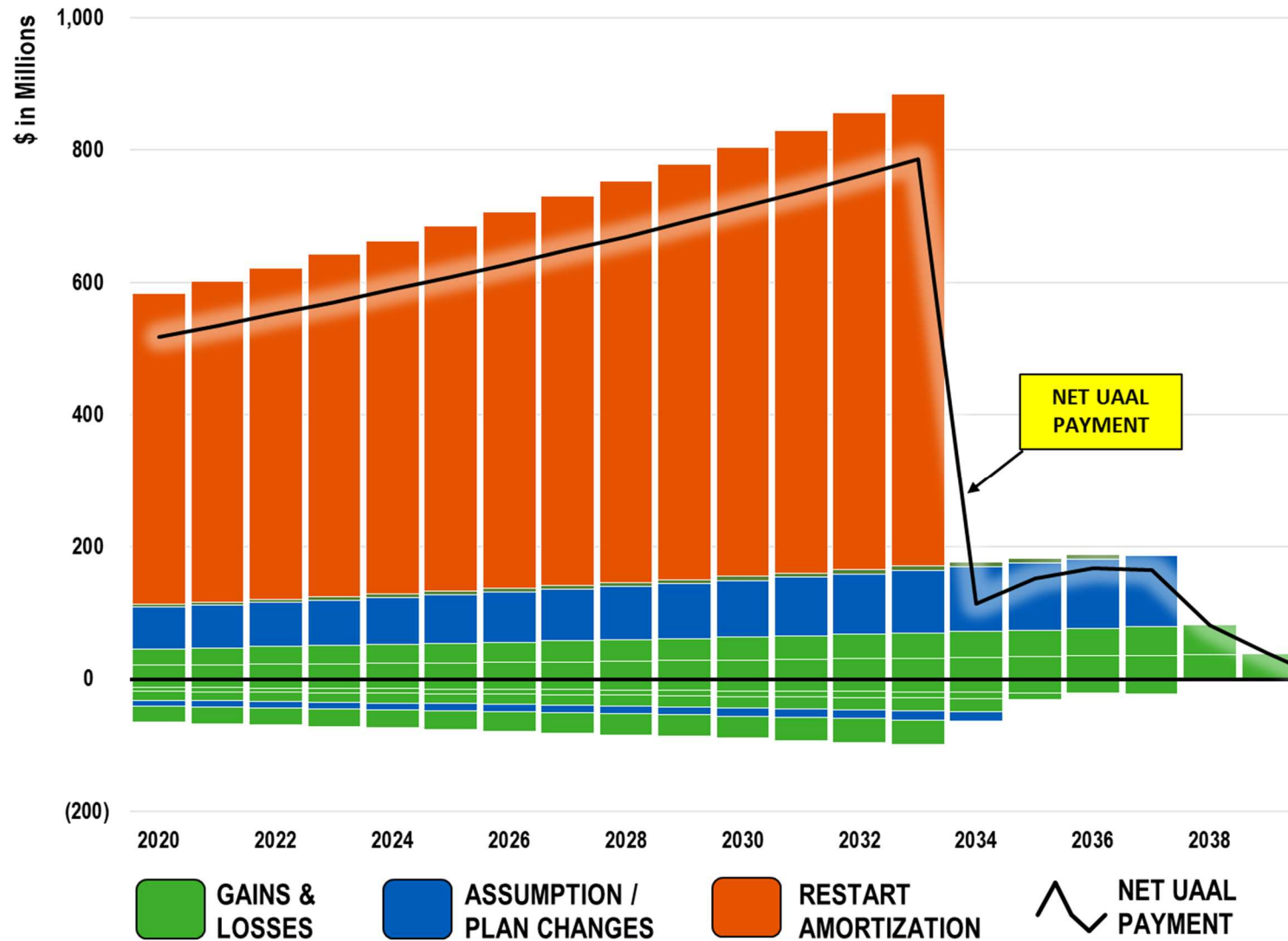
Outstanding Balance of \$5.9 Billion in Net UAAL as of December 31, 2019



Section 3: Supplemental Information

Exhibit I: Projection of UAAL Balances and Payments (continued)

Annual Payments Required to Amortize \$5.9 Billion in Net UAAL as of December 31, 2019



Section 3: Supplemental Information

Exhibit J: Definition of Pension Terms

The following list defines certain technical terms for the convenience of the reader:

Actuarial Accrued Liability for Actives:	The equivalent of the accumulated normal costs allocated to the years before the valuation date.
Actuarial Accrued Liability for Pensioners and Beneficiaries:	The single-sum value of lifetime benefits to existing pensioners and beneficiaries. This sum takes account of life expectancies appropriate to the ages of the annuitants and the interest that the sum is expected to earn before it is entirely paid out in benefits.
Actuarial Cost Method:	A procedure allocating the Actuarial Present Value of Future Benefits to various time periods; a method used to determine the Normal Cost and the Actuarial Accrued Liability that are used to determine the actuarially determined contribution.
Actuarial Gain or Loss:	A measure of the difference between actual experience and that expected based upon a set of Actuarial Assumptions, during the period between two Actuarial Valuation dates. Through the actuarial assumptions, rates of decrements, rates of salary increases, and rates of fund earnings have been forecasted. To the extent that actual experience differs from that assumed, Actuarial Accrued Liabilities emerge which may be the same as forecasted, or may be larger or smaller than projected. Actuarial gains are due to favorable experience, e.g., assets earn more than projected, salary increases are less than assumed, members retire later than assumed, etc. Favorable experience means actual results produce actuarial liabilities not as large as projected by the actuarial assumptions. On the other hand, actuarial losses are the result of unfavorable experience, i.e., actual results yield in actuarial liabilities that are larger than projected. Actuarial gains will shorten the time required for funding of the actuarial balance sheet deficiency while actuarial losses will lengthen the funding period.
Actuarially Equivalent:	Of equal actuarial present value, determined as of a given date and based on a given set of Actuarial Assumptions.
Actuarial Present Value (APV):	<p>The value of an amount or series of amounts payable or receivable at various times, determined as of a given date by the application of a particular set of Actuarial Assumptions. Each such amount or series of amounts is:</p> <p>Adjusted for the probable financial effect of certain intervening events (such as changes in compensation levels, marital status, etc.)</p> <p>Multiplied by the probability of the occurrence of an event (such as survival, death, disability, termination, etc.) on which the payment is conditioned, and</p> <p>Discounted according to an assumed rate (or rates) of return to reflect the time value of money.</p>

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Actuarial Present Value of Future Plan Benefits:	The Actuarial Present Value of benefit amounts expected to be paid at various future times under a particular set of Actuarial Assumptions, taking into account such items as the effect of advancement in age, anticipated future compensation, and future service credits. The Actuarial Present Value of Future Plan Benefits includes the liabilities for active members, retired members, beneficiaries receiving benefits, and inactive members entitled to either a refund or a future retirement benefit. Expressed another way, it is the value that would have to be invested on the valuation date so that the amount invested plus investment earnings would provide sufficient assets to pay all projected benefits and expenses when due.
Actuarial Valuation:	The determination, as of a valuation date, of the Normal Cost, Actuarial Accrued Liability, Actuarial Value of Assets, and related Actuarial Present Values for a plan. An Actuarial Valuation for a governmental retirement system typically also includes calculations of items needed for compliance with GASB, such as the Actuarially Determined Contribution (ADC) and the Net Pension Liability (NPL).
Actuarial Value of Assets (AVA):	The value of the Fund's assets as of a given date, used by the actuary for valuation purposes. This may be the market or fair value of plan assets, but commonly plans use a smoothed value in order to reduce the year-to-year volatility of calculated results, such as the funded ratio and the ADC.
Actuarially Determined:	Values that have been determined utilizing the principles of actuarial science. An actuarially determined value is derived by application of the appropriate actuarial assumptions to specified values determined by provisions of the law.
Actuarially Determined Contribution (ADC):	The employer's periodic required contributions, expressed as a dollar amount or a percentage of covered plan compensation, determined under the Plan's funding policy. The ADC consists of the Employer Normal Cost and the Amortization Payment.
Amortization Method:	A method for determining the Amortization Payment. The most common methods used are level dollar and level percentage of payroll. Under the Level Dollar method, the Amortization Payment is one of a stream of payments, all equal, whose Actuarial Present Value is equal to the UAAL. Under the Level Percentage of Pay method, the Amortization Payment is one of a stream of increasing payments, whose Actuarial Present Value is equal to the UAAL. Under the Level Percentage of Pay method, the stream of payments increases at the assumed rate at which total covered payroll of all active members will increase.
Amortization Payment:	The portion of the pension plan contribution, or ADC, that is designed to pay interest on and to amortize the Unfunded Actuarial Accrued Liability.

Section 3: Supplemental Information

Assumptions or Actuarial Assumptions:	<p>The estimates upon which the cost of the Fund is calculated, including:</p> <p><u>Investment return</u> - the rate of investment yield that the Fund will earn over the long-term future;</p> <p><u>Mortality rates</u> - the death rates of employees and pensioners; life expectancy is based on these rates;</p> <p><u>Retirement rates</u> - the rate or probability of retirement at a given age or service;</p> <p><u>Disability rates</u> - the probability of disability retirement at a given age;</p> <p><u>Termination rates</u> - the rates at which employees of various ages are expected to leave employment for reasons other than death, disability, or retirement;</p> <p><u>Salary increase rates</u> - the rates of salary increase due to inflation and productivity growth.</p>
Closed Amortization Period:	A specific number of years that is counted down by one each year, and therefore declines to zero with the passage of time. For example, if the amortization period is initially set at 20 years, it is 19 years at the end of one year, 18 years at the end of two years, etc. See Open Amortization Period.
Decrements:	Those causes/events due to which a member's status (active-inactive-retiree-beneficiary) changes, that is: death, retirement, disability, or termination.
Defined Benefit Plan:	A retirement plan in which benefits are defined by a formula applied to the member's compensation and/or years of service.
Defined Contribution Plan:	A retirement plan, such as a 401(k) plan, a 403(b) plan, or a 457 plan, in which the contributions to the plan are assigned to an account for each member, the plan's earnings are allocated to each account, and each member's benefits are a direct function of the account balance.
Employer Normal Cost:	The portion of the Normal Cost to be paid by the employer. This is equal to the Normal Cost less expected member contributions.
Experience Study:	A periodic review and analysis of the actual experience of the Fund that may lead to a revision of one or more actuarial assumptions. Actual rates of decrement and salary increases are compared to the actuarially assumed values and modified as deemed appropriate by the Actuary.
Funded Ratio:	The ratio of the Actuarial Value of Assets (AVA) to the actuarial accrued liability (AAL). Plans sometimes calculate a market funded ratio, using the Market Value of Assets (MVA), rather than the AVA.
Investment Return:	The rate of earnings of the Fund from its investments, including interest, dividends and capital gain and loss adjustments, computed as a percentage of the average value of the fund. For actuarial purposes, the investment return often reflects a smoothing of the capital gains and losses to avoid significant swings in the value of assets from one year to the next.

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Normal Cost:	That portion of the Actuarial Present Value of pension plan benefits and expenses allocated to a valuation year by the Actuarial Cost Method. Any payment in respect of an Unfunded Actuarial Accrued Liability is not part of Normal Cost (see Amortization Payment). For pension plan benefits that are provided in part by employee contributions, Normal Cost refers to the total of employee contributions and employer Normal Cost unless otherwise specifically stated.
Open Amortization Period:	An open amortization period is one which is used to determine the Amortization Payment but which does not change over time. If the initial period is set as 30 years, the same 30-year period is used in determining the Amortization Period each year. In theory, if an Open Amortization Period with level percentage of payroll is used to amortize the Unfunded Actuarial Accrued Liability, the UAAL will never decrease, but will become smaller each year, in relation to covered payroll, if the actuarial assumptions are realized.
Unfunded Actuarial Accrued Liability:	The excess of the Actuarial Accrued Liability over the Actuarial Value of Assets. This value may be negative, in which case it may be expressed as a negative Unfunded Actuarial Accrued Liability, also called the Funding Surplus.
Valuation Date or Actuarial Valuation Date:	The date as of which the value of assets is determined and as of which the Actuarial Present Value of Future Plan Benefits is determined. The expected benefits to be paid in the future are discounted to this date.
Valuation Value of Assets:	The Actuarial Value of Assets reduced by the value of non-valuation reserves.

Section 4: Actuarial Valuation Basis

Exhibit I: Actuarial Assumptions and Methods

Rationale for Assumptions:	The information and analysis used in selecting each assumption that has a significant effect on this actuarial valuation is shown in the January 1, 2014 through December 31, 2016 Actuarial Experience Study dated August 14, 2017 and PowerPoint presentation dated October 16, 2017. Unless otherwise noted, all actuarial assumptions and methods shown below apply to members for all tiers. These assumptions were adopted by the Board.
<u>Economic Assumptions</u>	
Net Investment Return:	7.00%; net of administrative and investment expenses. Based on the Actuarial Experience Study reference above, expected administrative and investment expenses represent about 0.80% of the Actuarial Value of Assets.
Member Contribution Crediting Rate:	5.00%, compounded semi-annually.
Consumer Price Index:	Increase of 2.75% per year, retiree COLA increases due to CPI subject to a 3.0% maximum change per year.
Payroll Growth:	Inflation of 2.75% per year plus “across the board” real salary increases of 0.50% per year.
Increase in Section 7522.10 Compensation Limit:	Increase of 2.75% per year from the valuation date.

Section 4: Actuarial Valuation Basis

Salary Increases:

- The annual rate of compensation increase includes: inflation at 2.75%, plus “across the board” salary increases of 0.50% per year, plus the following merit and promotion increases:

Years of Service	Rate (%)	
	General	Safety
Less than 1	9.00	14.00
1 - 2	7.25	10.00
2 - 3	6.00	7.75
3 - 4	5.00	6.00
4 - 5	4.00	5.50
5 - 6	3.50	4.50
6 - 7	2.50	3.75
7 - 8	2.25	3.25
8 - 9	1.75	2.50
9 - 10	1.50	2.25
10 - 11	1.50	1.75
11 - 12	1.50	1.75
12 - 13	1.50	1.75
13 - 14	1.50	1.75
14 - 15	1.50	1.75
15 - 16	1.50	1.75
16 - 17	1.00	1.50
17 - 18	1.00	1.50
18 - 19	1.00	1.50
19 - 20	1.00	1.50
20 & Over	1.00	1.50

In addition to the individual salary increase assumptions, we have applied an average of two hours of additional salary annually for leap-year salary adjustment.

Section 4: Actuarial Valuation Basis

Demographic Assumptions:

Post-Retirement Mortality Rates:

Healthy

- **General Members and All Beneficiaries:** Headcount-Weighted RP-2014 (RPH-2014) Healthy Annuitant Mortality Tables, projected generationally with the two-dimensional MP-2016 projection scale, with no setback for males and females.
- **Safety Members:** Headcount-Weighted RP-2014 (RPH-2014) Healthy Annuitant Mortality Tables, projected generationally with the two-dimensional MP-2016 projection scale, setback four years for males and females.

Disabled

- **General Members:** Headcount-Weighted RP-2014 (RPH-2014) Healthy Annuitant Mortality Tables, projected generationally with the two-dimensional MP-2016 projection scale, set forward five years for males and females.
- **Safety Members:** Headcount-Weighted RP-2014 (RPH-2014) Healthy Annuitant Mortality Tables, projected generationally with the two-dimensional MP-2016 projection scale, with no setback for males and females.

The RP-2014 mortality tables and adjustments as shown above reasonably reflect the mortality experience as of the measurement date. These mortality tables were adjusted to future years using the generational projection to reflect future mortality improvement between the measurement date and those years.

Pre-Retirement Mortality Rates:

- **General and Safety Members:** Headcount-Weighted RP-2014 (RPH-2014) Employee Mortality Tables multiplied by 80%, projected generationally with the two-dimensional MP-2016 projection scale.

Age	Rate (%) ¹			
	General		Safety	
	Male	Female	Male	Female
25	0.05	0.02	0.05	0.02
30	0.05	0.02	0.05	0.02
35	0.05	0.03	0.05	0.03
40	0.06	0.04	0.06	0.04
45	0.10	0.07	0.10	0.07
50	0.17	0.11	0.17	0.11
55	0.27	0.17	0.27	0.17
60	0.45	0.24	0.45	0.24
65	0.78	0.36	0.78	0.36

All General pre-retirement deaths are assumed to be non-service connected. For Safety, 90% of pre-retirement deaths are assumed to be non-service connected. The other 10% are assumed to be service connected.

¹ Generational projections beyond the base year (2014) are not reflected in the above mortality rates.

Section 4: Actuarial Valuation Basis

Mortality Rates for Member Contributions:

- **General Members:** Headcount-Weighted RP-2014 (RPH-2014) Healthy Annuitant Mortality Tables, projected 20 years with the two-dimensional mortality improvement Scale MP-2016, with no setback for males and females, weighted 40% male and 60% female.
- **Safety Members:** Headcount-Weighted RP-2014 (RPH-2014) Healthy Annuitant Mortality Tables, projected 20 years with the two-dimensional mortality improvement Scale MP-2016, setback four years for males and females, weighted 80% male and 20% female.

Mortality Rates for Optional Form of Benefits:

- **General Service Retirees:** Headcount-Weighted RP-2014 (RPH-2014) Healthy Annuitant Mortality Tables, projected 20 years with the two-dimensional mortality improvement Scale MP-2016, with no setback for males and females, weighted 40% male and 60% female.
- **Safety Service Retirees:** Headcount-Weighted RP-2014 (RPH-2014) Healthy Annuitant Mortality Tables, projected 20 years with the two-dimensional mortality improvement Scale MP-2016, setback four years for males and females, weighted 80% male and 20% female.
- **General Disabled Retirees:** Headcount-Weighted RP-2014 (RPH-2014) Healthy Annuitant Mortality Tables, projected 20 years with the two-dimensional mortality improvement Scale MP-2016, set forward five years for males and females, weighted 40% male and 60% female.
- **Safety Disabled Retirees:** Headcount-Weighted RP-2014 (RPH-2014) Healthy Annuitant Mortality Tables, projected 20 years with the two-dimensional mortality improvement Scale MP-2016, with no setback for males and females, weighted 80% male and 20% female.
- **General Service Beneficiaries:** Headcount-Weighted RP-2014 (RPH-2014) Healthy Annuitant Mortality Tables, projected 20 years with the two-dimensional mortality improvement Scale MP-2016, with no setback for males and females, weighted 60% male and 40% female.
- **Safety Service Beneficiaries:** Headcount-Weighted RP-2014 (RPH-2014) Healthy Annuitant Mortality Tables, projected 20 years with the two-dimensional mortality improvement Scale MP-2016, with no setback for males and females, weighted 20% male and 80% female.

Section 4: Actuarial Valuation Basis

Disability Incidence:

Age	Rate (%)			
	General All Other	General OCTA	Safety Law & Fire	Safety Probation
20	0.00	0.00	0.00	0.00
25	0.00	0.00	0.01	0.03
30	0.01	0.03	0.04	0.08
35	0.03	0.20	0.14	0.10
40	0.08	0.36	0.23	0.13
45	0.13	0.43	0.40	0.21
50	0.18	0.48	1.10	0.28
55	0.23	0.65	2.40	0.42
60	0.31	1.26	4.80	0.20

60% of General All Other disabilities are assumed to be service connected disabilities. The other 40% are assumed to be non-service connected.

65% of General OCTA disabilities are assumed to be service connected disabilities. The other 35% are assumed to be non-service connected.

100% of Safety Law Enforcement and Fire disabilities are assumed to be service connected disabilities.

75% of Safety Probation disabilities are assumed to be service connected disabilities. The other 25% are assumed to be non-service connected.

Section 4: Actuarial Valuation Basis

Termination:

Years of Service	Rate (%)			
	General All Other	General OCTA	Safety Law & Fire	Safety Probation
Less than 1	11.00	17.50	4.50	14.00
1 – 2	7.50	11.00	2.50	13.00
2 – 3	6.50	9.00	2.00	10.00
3 – 4	5.00	8.50	1.50	5.00
4 – 5	4.50	7.50	1.25	4.00
5 – 6	4.25	7.00	1.00	3.50
6 – 7	3.75	4.50	0.95	2.75
7 – 8	3.25	4.00	0.90	2.00
8 – 9	3.00	3.50	0.85	2.00
9 – 10	2.75	3.00	0.80	1.75
10 – 11	2.50	3.00	0.75	1.75
11 – 12	2.00	3.00	0.65	1.50
12 – 13	2.00	3.00	0.60	1.25
13 – 14	1.75	2.50	0.55	1.00
14 – 15	1.50	2.50	0.50	0.75
15 – 16	1.40	2.50	0.45	0.75
16 – 17	1.30	2.00	0.40	0.75
17 – 18	1.20	1.80	0.35	0.25
18 – 19	1.10	1.60	0.30	0.25
19 – 20	1.00	1.40	0.25	0.25
20 & Over	0.90	1.20	0.20	0.25

Election for Withdrawal of Contributions (%)

Age	Rate (%)			
	General All Other	General OCTA	Safety Law & Fire	Safety Probation
Less than 5	35.00	40.00	20.00	25.00
5 – 9	30.00	35.00	20.00	25.00
10 – 14	25.00	30.00	20.00	25.00
15 & Over	20.00	20.00	20.00	25.00

Section 4: Actuarial Valuation Basis

Retirement Rates:	Rate (%) ¹			
	Age	General Enhanced	General Non-Enhanced ²	Safety Law (31664.1) ³
	48	0.00	0.00	0.00
	49	30.00	25.00	12.00
	50	2.50	2.00	18.00
	51	2.00	2.00	18.00
	52	2.50	2.00	17.00
	53	2.50	2.75	17.00
	54	5.50	2.75	22.00
	55	15.00	3.25	22.00
	56	10.00	3.50	20.00
	57	10.00	5.50	20.00
	58	11.00	5.50	20.00
	59	11.00	6.50	26.00
	60	12.00	9.25	35.00
	61	12.00	12.00	35.00
	62	14.00	16.00	40.00
	63	16.00	16.00	40.00
	64	16.00	18.00	40.00
	65	22.00	22.00	100.00
	66	22.00	28.00	100.00
	67	23.00	24.00	100.00
	68	23.00	24.00	100.00
	69	23.00	20.00	100.00
	70	25.00	20.00	100.00
	71	25.00	25.00	100.00
	72	25.00	25.00	100.00
	73	25.00	25.00	100.00
	74	25.00	25.00	100.00
	75	100.00	100.00	100.00

¹ The retirement rates only apply to members that are eligible to retire at the age shown.

² These assumptions are also used for the CalPEPRA 1.62% @ 65 formula (Plan T and Plan W).

³ Retirement rate is 100% after a member accrues a benefit of 100% of final average earnings.

Section 4: Actuarial Valuation Basis

Retirement Rates (continued):

Age	Rate (%) ¹			
	Safety Law (31664.2) ²	Safety Fire (31664.1)	Safety Fire (31664.2)	Safety Probation ²
48	0.00	0.00	0.00	0.00
49	0.00	2.00	0.00	0.00
50	11.50	5.00	8.00	3.25
51	12.00	7.00	10.00	3.25
52	12.70	9.50	11.00	4.25
53	17.90	10.50	12.00	4.25
54	18.80	15.00	14.00	7.00
55	30.70	18.00	24.00	12.00
56	20.00	20.00	23.00	12.00
57	20.00	21.00	27.00	18.00
58	25.00	28.00	27.00	18.00
59	30.00	28.00	36.00	18.00
60	40.00	30.00	40.00	20.00
61	40.00	30.00	40.00	20.00
62	40.00	35.00	40.00	25.00
63	40.00	35.00	40.00	40.00
64	40.00	35.00	40.00	40.00
65	100.00	100.00	100.00	100.00
66	100.00	100.00	100.00	100.00
67	100.00	100.00	100.00	100.00
68	100.00	100.00	100.00	100.00
69	100.00	100.00	100.00	100.00
70	100.00	100.00	100.00	100.00
71	100.00	100.00	100.00	100.00
72	100.00	100.00	100.00	100.00
73	100.00	100.00	100.00	100.00
74	100.00	100.00	100.00	100.00
75	100.00	100.00	100.00	100.00

¹ The retirement rates only apply to members that are eligible to retire at the age shown.

² Retirement rate is 100% after a member accrues a benefit of 100% of final average earnings.

Section 4: Actuarial Valuation Basis

Retirement Rates (continued):

Age	Rate (%) ¹			
	CalPEPRA 2.5% @ 67 General Formula	CalPEPRA 2.7% @ 57 Safety Formula Probation ²	CalPEPRA 2.7% @ 57 Safety Formula Law ²	CalPEPRA 2.7% @ 57 Safety Formula Fire
50	0.00	2.50	11.00	6.00
51	0.00	2.50	11.50	7.00
52	4.00	3.00	12.00	9.00
53	1.50	3.00	16.00	10.00
54	1.50	5.50	17.00	11.50
55	2.50	10.00	28.00	21.00
56	3.50	10.00	18.00	20.00
57	5.50	15.00	17.50	22.00
58	7.50	20.00	22.00	25.00
59	7.50	20.00	26.00	30.00
60	7.50	40.00	40.00	40.00
61	7.50	40.00	40.00	40.00
62	14.00	40.00	40.00	40.00
63	14.00	40.00	40.00	40.00
64	14.00	40.00	40.00	40.00
65	18.00	100.00	100.00	100.00
66	22.00	100.00	100.00	100.00
67	23.00	100.00	100.00	100.00
68	23.00	100.00	100.00	100.00
69	23.00	100.00	100.00	100.00
70	25.00	100.00	100.00	100.00
71	25.00	100.00	100.00	100.00
72	25.00	100.00	100.00	100.00
73	25.00	100.00	100.00	100.00
74	25.00	100.00	100.00	100.00
75	100.00	100.00	100.00	100.00

¹ The retirement rates only apply to members that are eligible to retire at the age shown.

² Retirement rate is 100% after a member accrues a benefit of 100% of final average earnings.

Section 4: Actuarial Valuation Basis

Retirement Age and Benefit for Deferred Vested Members:	<p>General Retirement Age: 59 Safety Retirement Age: 53</p> <p>Future deferred vested members who terminate with less than five years of service and are not vested are assumed to retire at age 70 for both General and Safety if they decide to leave their contributions on deposit. 15% of future General and 25% of future Safety deferred vested members are assumed to continue to work for a reciprocal employer. For reciprocals, 4.25% and 4.75% compensation increases are assumed per annum for General and Safety, respectively.</p>
Liability Calculation for Current Deferred Vested Members:	<p>Liability for a current deferred vested member is calculated based on salary (adjusted with the additional cashout assumptions for non-CalPEPRA members), service, and eligibility for reciprocal benefit as provided by the Retirement System. For those members without salary information that have 3 or more years of service, we used an average salary. For those members without salary information that have less than 3 years of service or for those members without service information, we assumed a refund of account balance.</p>
Future Benefit Accruals:	<p>1.0 year of service per year of employment. There is no assumption to anticipate conversion of unused sick leave at retirement.</p>
Unknown Data for Members:	<p>Same as those exhibited by members with similar known characteristics. If not specified, members are assumed to be male.</p>
Form of Payment:	<p>All active and inactive members are assumed to elect the unmodified option at retirement.</p>
Percent Married:	<p>For all active and inactive members, 75% of male members and 55% of female members are assumed to be married at pre-retirement death or retirement.</p>
Age and Gender of Spouse:	<p>For all active and inactive members, male members are assumed to have a female spouse who is 3 years younger than the member and female members are assumed to have a male spouse who is 3 years older than the member.</p>

Section 4: Actuarial Valuation Basis

Terminal Pay Assumptions:

Additional compensation amounts are expected to be received during a member's final average earnings period. The percentages used in this valuation are:

Years of Service	Rate (%)	
	Final One Year Salary	Final Three Year Salary
General Non-CalPEPRA	3.00%	2.80%
Safety Probation Non-CalPEPRA	3.80%	3.40%
Safety Law Non-CalPEPRA	5.20%	4.60%
Safety Fire Non-CalPEPRA	2.00%	1.70%
General CalPEPRA	N/A	N/A
Safety Probation CalPEPRA	N/A	N/A
Safety Law CalPEPRA	N/A	N/A
Safety Fire CalPEPRA	N/A	N/A

The additional terminal pay assumptions are the same for service and disability retirements.

Actuarial Funding Policy

Actuarial Cost Method:

Entry Age Actuarial Cost Method. Entry Age is the age on the valuation date minus Vesting Credit. Normal Cost and Actuarial Accrued Liability are calculated on an individual basis and are based on costs allocated as a level percentage of compensation, as if the current benefit formula for each individual has always been in effect (i.e., "replacement life within a plan").

For Probation members who have prior benefit service in another OCERS plan, the normal cost rate for the current plan is calculated assuming their Entry Age is the date they entered service with their current plan.

Actuarial Value of Assets:

Market value of assets (MVA) less unrecognized returns in each of the last five annual accounting periods. Unrecognized returns are equal to the difference between the actual market return and the expected return on the market value, and are recognized annually over a five-year period.

Valuation Value of Assets:

The Actuarial Value of Assets reduced by the value of the non-valuation reserves.

Amortization Policy:

Effective December 31, 2013, the outstanding balance of the UAAL from the December 31, 2012 valuation was combined and re-amortized over a declining 20-year period (14 years remaining as of December 31, 2019).

Any new UAAL resulting from plan amendments are amortized over separate decreasing 15-year periods; early retirement incentive programs (ERIPs) are amortized over separate decreasing 5-year periods; assumption and method changes are amortized over separate decreasing 20-year periods; and experience gains/losses are also amortized over separate decreasing 20-year periods.

Section 4: Actuarial Valuation Basis

Other Actuarial Methods

Employer Contributions:

Employer contributions consist of two components:

Normal Cost

The annual contribution rate that, if paid annually from a member's first year of membership through the year of retirement, would accumulate to the amount necessary to fully fund the member's retirement-related benefits. Accumulation includes annual crediting of interest at the assumed investment earning rate. The contribution rate is determined as a level percentage of the member's compensation.

Contribution to the Unfunded Actuarial Accrued Liability (UAAL)

The annual contribution rate that, if paid annually over the UAAL amortization period, would accumulate to the amount necessary to fully fund the UAAL. Accumulation includes annual crediting of interest at the assumed investment earning rate. The contribution (or rate credit in the case of a negative UAAL) is calculated to remain as a level percentage of future active member payroll (including payroll for new members as they enter the System) assuming a constant number of active members. In order to remain as a level percentage of payroll, amortization payments (credits) are scheduled to increase at the annual payroll growth rate assumption.

The amortization policy is described on the previous page.

The recommended employer contributions are provided in *Section 2, Subsection F*.

Member Contributions:

Non-CalPEPRA Members

Articles 6 and 6.8 of the 1937 Act define the methodology to be used in the calculation of member basic contribution rates for General members and Safety members, respectively. The basic contribution rate is determined so that the accumulation of a member's basic contributions made in a given year until a certain age will be sufficient to fund an annuity at that age that is equal to:

- 1/200 of Final Average Salary for General Plan A;
- 1/120 of Final Average Salary for General Plan B;
- 1/100 of Final Average Salary for General Plans G, H, I, J, and S;
- 1/120 of Final Average Salary for General Plans M, N, O, and P;
- 1/200 of Final Average Salary for Safety Plans E and Q, and;
- 1/100 of Final Average Salary for Safety Plans F and R.

The annuity age is 60 for General Plans A, B, M, N, O, P and S, 55 for Plans G, H, I, and J, and 50 for Safety Plans E, F, Q, and R. It is assumed that contributions are made annually at the same rate, starting at entry age.

Section 4: Actuarial Valuation Basis

In addition to the basic contributions, members also pay one-half of the total normal cost necessary to fund cost-of-living benefits which is calculated separately for each rate group, with the exception of Rate Groups #9 and #11, which are developed on a combined or pooled basis as described in our Cost Sharing Structure letter dated July 30, 2010. Within each rate group, the COLA normal cost is either pooled for Tiers 1 and 2 because the same 3% COLA is provided for both Tiers, or it differs by a set formula based on past practice we carried over from the OCERS' prior actuary. Accumulation includes crediting of interest at the assumed investment earnings rate.

Effective with the December 31, 2014 valuation, for determining the cost of the total benefit (i.e., basic and COLA components), the effect of the assumed additional cashouts are recognized in the valuation as an employer and member cost.

CalPEPRA Members

Pursuant to Section 7522.30(a) of the Government Code, members in Plans T, U, V and W are required to contribute at least 50% of the Normal Cost rate. We have assumed that exactly 50% of the Normal Cost would be paid by the new members. Also of note is that based on our recommendation, OCERS decided to use the discretion made available by AB1380 to not round the member's contribution rate to the nearest ¼% as previously required by CalPEPRA.

For members in Plan T and Plan W, their basic rates have been calculated using a methodology similar to that used for Plan P. For members in Plan U or Plan V, their basic rates have been calculated using a methodology outlined in our letter dated December 4, 2012 that was previously approved by the Board.

The member contribution rates for all members are provided in *Section 4, Exhibit III*.

Internal Revenue Code Section 415:

Section 415 of the Internal Revenue Code (IRC) specifies the maximum benefits that may be paid to an individual from a defined benefit plan and the maximum amounts that may be allocated each year to an individual's account in a defined contribution plan.

A qualified pension plan may not pay benefits in excess of the Section 415 limits. The ultimate penalty for non-compliance is disqualification: active participants could be taxed on their vested benefits and the IRS may seek to tax the income earned on the plan's assets.

In particular, Section 415(b) of the IRC limits the maximum annual benefit payable at the Normal Retirement Age to a dollar limit of \$160,000 indexed for inflation. That limit is \$230,000 for 2020. Normal Retirement Age for these purposes is age 62. These are the limits in simplified terms. They must be adjusted based on each participant's circumstances, for such things as age at retirement, form of benefits chosen and after tax contributions.

Non-CalPEPRA benefits in excess of the limits may be paid through a qualified governmental excess plan that meets the requirements of Section 415(m).

Legal Counsel's review and interpretation of the law and regulations should be sought on any questions in this regard.

Non-CalPEPRA contribution rates determined in this valuation have not been reduced for the Section 415 limitations. Actual limitations will result in gains as they occur.

Section 4: Actuarial Valuation Basis

Justification for Change in Actuarial Assumptions:

There have been no changes in actuarial assumptions since the last valuation.

Section 4: Actuarial Valuation Basis

Exhibit II: Summary of Plan Provisions

This exhibit summarizes the major provisions of the Plan included in the valuation. It is not intended to be, nor should it be interpreted as, a complete statement of all plan provisions.

Plan Year:	January 1 through December 31
Membership Eligibility:	Membership with OCERS begins with the day of employment in an eligible position by the County or a participating employer.
Non-CalPEPRA General Plans	<u>2.5% @ 55 Plans (Orange County Sanitation District⁽¹⁾ and Law Library⁽²⁾)</u>
Plan G	General members hired before September 21, 1979.
Plan H	General members hired on or after September 21, 1979.
	<u>2.7% @ 55 Plans (City of San Juan Capistrano, Orange County Members except bargaining unit AFSCME members, Orange County Superior Court, Local Agency Formation Commission⁽²⁾, Orange County Employees Retirement System⁽³⁾, Children and Families Commission⁽⁴⁾ and Orange County OCFA)</u>
Plan I	General members hired before September 21, 1979.
Plan J	General members hired on or after September 21, 1979.
	<u>2.0% @ 55 Plans (Transportation Corridor Agency, Cemetery District⁽⁵⁾ and General OCFA)</u>
Plan M	General members hired before September 21, 1979 and General OCFA members hired on or after July 1, 2011.
Plan N	General members hired on or after September 21, 1979.
	<u>1.62% @ 65 Plans (Orange County Members, Orange County Superior Court, Local Agency Formation Commission and County Managers unit)</u>
Plan O	County OCEA members and Superior Court members rehired on or after May 7, 2010, LAFCO members rehired on or after July 1, 2010 and County Managers unit members rehired on or after August 17, 2010 and not electing to rejoin Plan I.
Plan P	County OCEA members and Superior Court members hired on or after May 7, 2010, LAFCO members hired on or after July 1, 2010 and County Managers unit members hired on or after August 17, 2010 and not electing Plan J.
	⁽¹⁾ Sanitation District members within Supervisors and Professional unit hired on or after October 1, 2010 are in Plan B.
	⁽²⁾ Improvement is prospective only for service after June 23, 2005.
	⁽³⁾ Improvement for management members is prospective only for service after June 30, 2005.
	⁽⁴⁾ Improvement is prospective only for service after December 22, 2005.
	⁽⁵⁾ Improvement is prospective only for service after December 7, 2007.

Section 4: Actuarial Valuation Basis

<i>Plan S</i>	<p><u>2.0% @ 57 Plan (City of San Juan Capistrano)</u></p> <p>General members hired on or after July 1, 2012.</p> <p><u>All Other General Employers</u></p>
<i>Plan A</i>	General members hired before September 21, 1979.
<i>Plan B</i>	General members hired on or after September 21, 1979 and Sanitation District members within Supervisors and Professional unit hired on or after October 1, 2010.
Non-CalPEPRA Safety Plans	<u>3.0% @ 50 Plans (Law Enforcement, OCFA and Probation Members)</u>
<i>Plan E</i>	Safety members hired before September 21, 1979.
<i>Plan F</i>	Safety members hired on or after September 21, 1979 and before April 9, 2010 for Law Enforcement, before July 1, 2011 for Safety members of OCFA Executive Management, and before July 1, 2012 for other OCFA Safety members.
	<u>3% @ 55 Plans (Law Enforcement, OCFA)</u>
<i>Plan Q</i>	Safety Law Enforcement members rehired on or after April 9, 2010, Safety members of OCFA Executive Management rehired on or after July 1, 2011, and other OCFA Safety members rehired on or after July 1, 2012 and previously in Plan E.
<i>Plan R</i>	Safety Law Enforcement members hired on or after April 9, 2010, Safety members of OCFA Executive Management hired on or after July 1, 2011, and other OCFA Safety members hired on or after July 1, 2012.
CalPEPRA General Plans	<u>1.62% @ 65 Plan (Orange County Members except County Attorneys, Orange County Employees Retirement System except Management Members, Local Agency Formation Commission, and Orange County Superior Court)</u>
<i>Plan T</i>	General members with membership dates on or after January 1, 2013.
	<u>2.5% @ 67 Plan (All Other General Employers, Orange County Attorneys, Orange County Employees Retirement System Management Members)</u>
<i>Plan U</i>	General Non-Orange County Transportation Authority members with membership dates on or after January 1, 2013 and Orange County Transportation Authority members with membership dates on or after January 1, 2015.
	<u>1.62% @ 65 Plan (City of San Juan Capistrano)</u>
<i>Plan W</i>	General members with membership dates on or after January 1, 2016 and not electing Plan U.
CalPEPRA Safety Plans	<u>2.7% @ 57 Plan (Law Enforcement, OCFA and Probation Members)</u>
<i>Plan V</i>	Safety members with membership dates on or after January 1, 2013.

Section 4: Actuarial Valuation Basis

Final Compensation for Benefit Determination:

<i>Plans A, E, G, I, M, O and Q</i>	Highest consecutive 12 months of compensation earnable (§31462.1) (FAS1).
<i>Plans B, F, H, J, N, P, R and S</i>	Highest consecutive 36 months of compensation earnable (§31462) (FAS3).
<i>Plans T</i>	Highest consecutive 36 months of pensionable compensation (§7522.32 and §7522.34) (FAS3).
<i>Plans U, V and W</i>	Highest consecutive 36 months of pensionable compensation (§7522.10(c), §7522.32 and §7522.34) (FAS3).

Service:	Years of service (Yrs) are generally based on a member's employment during a period of time for which deductions are made from their compensation.
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Service Retirement Eligibility:

General

<i>Plans A, B, G, H, I, J, M, N, O, P, S, T and W</i>	Age 50 with 10 years of service, or age 70 regardless of service, or after 30 years regardless of age (§31672). All part time members over age 55 with 10 years of employment may retire with 5 years of service.
<i>Plan U</i>	Age 52 with 5 years of service (§7522.20(a)) or age 70 regardless of service (§31672.3).

Safety

<i>Plans E, F, Q and R</i>	Age 50 with 10 years of service, or age 70 regardless of service, or after 20 years regardless of age (§31663.25). All part time members over age 55 with 10 years of employment may retire with 5 years of service.
<i>Plan V</i>	Age 50 with 5 years of service (§7522.25(d)) or age 70 regardless of service (§31672.3).

Section 4: Actuarial Valuation Basis

Benefit Formula:

General Plan G

2.5% @ 55 (§31676.18)

Retirement Age

50

55

60

62⁽¹⁾

65 and over⁽¹⁾

Benefit Formula

2.00% x FAS1 x Yrs

2.50% x FAS1 x Yrs

2.50% x FAS1 x Yrs

2.62% x FAS1 x Yrs

2.62% x FAS1 x Yrs

⁽¹⁾ Reflects benefit factors from Plan A as they provide a better benefit than those under 2.5% @ 55.

General Plan H

2.5% @ 55 (§31676.18)

Retirement Age

50

55 and over

Benefit Formula

2.00% x FAS3 x Yrs

2.50% x FAS3 x Yrs

General Plan I

2.7% @ 55 (§31676.19)

Retirement Age

50

55 and over

Benefit Formula

2.00% x FAS1 x Yrs

2.70% x FAS1 x Yrs

General Plan J

2.7% @ 55 (§31676.19)

Retirement Age

50

55 and over

Benefit Formula

2.00% x FAS3 x Yrs

2.70% x FAS3 x Yrs

General Plan M

2.0% @ 55 (§31676.16)

Retirement Age

50

55

60⁽²⁾

62⁽²⁾

65 and over⁽²⁾

Benefit Formula

1.43% x FAS1 x Yrs

2.00% x FAS1 x Yrs

2.34% x FAS1 x Yrs

2.62% x FAS1 x Yrs

2.62% x FAS1 x Yrs

⁽²⁾ Reflects benefit factors from Plan A as they provide a better benefit than those under 2.0% @ 55.

Section 4: Actuarial Valuation Basis

General Plan N
2.0% @ 55 (§31676.16)

Retirement Age	Benefit Formula
50	1.43% x FAS3 x Yrs
55	2.00% x FAS3 x Yrs
60	2.26% x FAS3 x Yrs
62	2.37% x FAS3 x Yrs
65 and over ⁽¹⁾	2.43% x FAS3 x Yrs

⁽¹⁾ Reflects benefit factors from Plan B as they provide a better benefit than those under 2.0% @ 55.

General Plan O
1.62% @ 65 (§31676.01)

Retirement Age	Benefit Formula
50	0.79% x FAS1 x Yrs
55	0.99% x FAS1 x Yrs
60	1.28% x FAS1 x Yrs
62	1.39% x FAS1 x Yrs
65 and over	1.62% x FAS1 x Yrs

General Plans P, T and W
1.62% @ 65 (§31676.01)

Retirement Age	Benefit Formula
50	0.79% x FAS3 x Yrs
55	0.99% x FAS3 x Yrs
60	1.28% x FAS3 x Yrs
62	1.39% x FAS3 x Yrs
65 and over	1.62% x FAS3 x Yrs

General Plan S
2.0% @ 57 (§31676.12)

Retirement Age	Benefit Formula
50	1.34% x FAS3 x Yrs
55	1.77% x FAS3 x Yrs
60	2.34% x FAS3 x Yrs
62	2.62% x FAS3 x Yrs
65 and over	2.62% x FAS3 x Yrs

Section 4: Actuarial Valuation Basis

General Plan A
2.0% @ 57 (§31676.12)

Retirement Age

50

55

60

62

65 and over

Benefit Formula

1.34% x FAS1 x Yrs

1.77% x FAS1 x Yrs

2.34% x FAS1 x Yrs

2.62% x FAS1 x Yrs

2.62% x FAS1 x Yrs

General Plan B (§31676.1)

Retirement Age

50

55

60

62

65 and over

Benefit Formula

1.18% x FAS3 x Yrs

1.49% x FAS3 x Yrs

1.92% x FAS3 x Yrs

2.09% x FAS3 x Yrs

2.43% x FAS3 x Yrs

General Plan U (§7522.20(a))

Retirement Age

52

55

60

62

65

67 and over

Benefit Formula

1.00% x FAS3 x Yrs

1.30% x FAS3 x Yrs

1.80% x FAS3 x Yrs

2.00% x FAS3 x Yrs

2.30% x FAS3 x Yrs

2.50% x FAS3 x Yrs

Safety Plan E
3.0% @ 50 (§31664.1)

Retirement Age

50 and over

Benefit Formula

3.00% x FAS1 x Yrs

Safety Plan F
3.0% @ 50 (§31664.1)

Retirement Age

50 and over

Benefit Formula

3.00% x FAS3 x Yrs

Safety Plan Q
3.0% @ 55 (§31664.2)

Retirement Age

50

55 and over

Benefit Formula

2.29% x FAS1 x Yrs

3.00% x FAS1 x Yrs

Section 4: Actuarial Valuation Basis

<i>Safety Plan R</i> 3.0% @ 55 (\$31664.2)	Retirement Age	Benefit Formula
	50	2.29% x FAS3 x Yrs
<i>Safety Plan V (\$7522.25(d))</i>	55 and over	3.00% x FAS3 x Yrs
	Retirement Age	Benefit Formula
	50	2.00% x FAS3 x Yrs
	55	2.50% x FAS3 x Yrs
	57 and over	2.70% x FAS3 x Yrs

Section 4: Actuarial Valuation Basis

Maximum Benefit:

<i>Plans A, B, E, F, G, H, I, J, M, N, O, P, Q, R, S, T and W</i>	100% of Highest Average Compensation (§31676.01, §31676.1, §31676.12, §31676.16, §31676.18, §31676.19, §31664.1, §31664.2).
<i>Plans U and V</i>	None.

Ordinary Disability:

General

Eligibility

Five years of service (§31720).

Benefit Formula

Plans A, G, I, M and O:

1.8% per year of service. If the benefit does not exceed one-third of Final Compensation, the service is projected to 62, but the total benefit cannot be more than one-third of Final Compensation. (§31727.1).

Plans B, H, J, N, P, S, T, U and W:

1.5% per year of service. If the benefit does not exceed one-third of Final Compensation, the service is projected to 65, but the total benefit cannot be more than one-third of Final Compensation. (§31727).

For all members, 100% of the Service Retirement benefit will be paid, if greater.

Safety

Eligibility

Five years of service (§31720).

Benefit Formula

1.8% per year of service. If the benefit does not exceed one-third of Final Compensation, the service is projected to 55, but the total benefit cannot be more than one-third of Final Compensation (§31727.2).

For all members, 100% of the Service Retirement benefit will be paid, if greater.

Line-of-Duty Disability:

All Members

Eligibility

No age or service requirements (§31720).

Benefit Formula

50% of the Final Compensation or 100% of Service Retirement benefit, if greater (§31727.4).

Section 4: Actuarial Valuation Basis

Pre-Retirement Death:

All Members

Eligibility

None.

Basic lump sum benefit

Refund of member contributions with interest, plus one month's compensation for each year of service, to a maximum of six months' compensation (§31781). A lump sum benefit in the amount of \$1,000 is payable upon the death of a member (with 10 years of service) to his/her eligible beneficiary (§31790).

Death in line of duty

50% of Final Compensation or 100% of Service Retirement benefit, if greater, payable to spouse or minor children (§31787).

Vested Members

Eligibility

Five years of service.

Basic benefit

60% of the greater of Service or Ordinary Disability Retirement benefit payable to surviving eligible spouse (§31765.1, §31781.1), in lieu of the basic lump sum benefit above (§31781).

Death After Retirement:

All Members

Service Retirement or Ordinary Disability Retirement

Unless another option was selected at retirement, 60% of member's unmodified allowance continues to eligible spouse (§31760.1). A lump sum benefit amount of \$1,000 is payable upon the death of a member (with 10 years of service) to his/her eligible beneficiary (§31790). An eligible spouse is a surviving spouse who was married to the member at least one year prior to the date of retirement (§31760.1). Certain surviving spouses or domestic partners may also be eligible if marriage or domestic partnership was at least two years prior to the date of death and the surviving spouse or domestic partner has attained age 55.

Line of Duty Disability

Unless another option was selected at retirement, 100% of member's allowance continued to eligible spouse (§31786). A lump sum benefit in the amount of \$1,000 is payable upon the death of a member (with 10 years of service) to his/her eligible beneficiary (§31790).

Withdrawal Benefits:

Less than Five Years of Service

Refund of accumulated employee contributions with interest, or benefit at age 70 (§31628). Effective January 1, 2003, a member may also elect to leave contributions on deposit in the retirement fund (§31629.5).

Five or More Years of Service

Refund of accumulated employee contributions with interest. If contributions left on deposit, a member is entitled to earned benefits commencing at any time after eligible to retire (§31700).

Section 4: Actuarial Valuation Basis

Post-retirement Cost-of-Living Benefits:	Annual adjustment based on Consumer Price Index to a maximum of 3% per year; excess “banked” (\$31870.1).
Supplemental Benefit:	Non-vested supplemental COLA benefit is also paid by the System to eligible retirees and survivors. This benefit has been excluded from this valuation.
Member Contributions:	Please refer to Section 4, Exhibit III for the specific rates.
<i>Plan A</i>	
<i>Basic</i>	Entry-age based rates that provide for an annuity at age 60 equal to 1/200 of FAS1 (\$31621.5).
<i>Cost-of-Living</i>	Entry-age based rates that provide for one-half of future Cost-of-Living costs.
<i>Plan B</i>	
<i>Basic</i>	Entry-age based rates that provide for an annuity at age 60 equal to 1/120 of FAS3 (\$31621).
<i>Cost-of-Living</i>	Entry-age based rates that provide for one-half of future Cost-of-Living costs.
<i>Plans G, H, I and J</i>	
<i>Basic</i>	Entry-age based rates that provide for an annuity at age 55 equal to 1/100 of FAS3 (FAS1 for Plans G and I) (\$31621.8).
<i>Cost-of-Living</i>	Entry-age based rates that provide for one-half of future Cost-of-Living costs.
<i>Plans M, N, O and P</i>	
<i>Basic</i>	Entry-age based rates that provide for an annuity at age 60 equal to 1/120 of FAS3 (FAS1 for Plans M and O) (\$31621).
<i>Cost-of-Living</i>	Entry-age based rates that provide for one-half of future Cost-of-Living costs.
<i>Plan S</i>	
<i>Basic</i>	Entry-age based rates that provide for an annuity at age 60 equal to 1/100 of FAS3 (\$31621.2).
<i>Cost-of-Living</i>	Entry-age based rates that provide for one-half of future Cost-of-Living costs.
<i>Plans E and Q</i>	
<i>Basic</i>	Entry-age based rates that provide for an annuity at age 50 equal to 1/200 of FAS1 (\$31639.5).
<i>Cost-of-Living</i>	Entry-age based rates that provide for one-half of future Cost-of-Living costs.
<i>Plans F and R</i>	
<i>Basic</i>	Entry-age based rates that provide for an annuity at age 50 equal to 1/100 of FAS3 (\$31639.25).
<i>Cost-of-Living</i>	Entry-age based rates that provide for one-half of future Cost-of-Living costs.

Section 4: Actuarial Valuation Basis

Plans T, U, V and W

Entry-age based rates that provide for one-half of the total Normal Cost rate.

Other Information:

Non-CalPEPRA Safety members with 30 or more years of service are exempt from paying member contributions. This also applies for General members hired on or before March 7, 1973.

Changes in Plan Provisions:

There have been no changes in plan provisions since the last valuation.

Note: The summary of major plan provisions is designed to outline principal plan benefits as interpreted for purposes of the actuarial valuation. If the System should find the plan summary not in accordance with the actual provisions, the System should alert the actuary so they can both be sure the proper provisions are valued.

Section 4: Actuarial Valuation Basis

Exhibit III: Member Contribution Rates

General Tier 1 Members' Contribution Rates Based on the December 31, 2019 Actuarial Valuation
(as a % of monthly payroll)

Entry Age	Plan I (2.7% @ 55)		Plan G (2.5% @ 55)		Plan M (2.0% @ 55) ⁽¹⁾		Plan A (OCTA)	
	Normal	Total	Normal	Total	Normal	Total	Normal	Total
15	7.51%	10.52%	7.51%	10.32%	5.46%	7.94%	3.28%	5.46%
16	7.51%	10.52%	7.51%	10.32%	5.46%	7.94%	3.28%	5.46%
17	7.63%	10.69%	7.63%	10.48%	5.55%	8.07%	3.33%	5.55%
18	7.75%	10.86%	7.75%	10.65%	5.64%	8.20%	3.38%	5.64%
19	7.87%	11.04%	7.87%	10.82%	5.73%	8.33%	3.44%	5.73%
20	8.00%	11.22%	8.00%	11.00%	5.82%	8.46%	3.49%	5.82%
21	8.13%	11.40%	8.13%	11.17%	5.92%	8.60%	3.55%	5.92%
22	8.26%	11.58%	8.26%	11.35%	6.01%	8.73%	3.61%	6.01%
23	8.39%	11.77%	8.39%	11.53%	6.11%	8.88%	3.67%	6.11%
24	8.53%	11.95%	8.53%	11.72%	6.21%	9.02%	3.72%	6.21%
25	8.66%	12.15%	8.66%	11.91%	6.31%	9.16%	3.78%	6.31%
26	8.81%	12.34%	8.81%	12.10%	6.41%	9.31%	3.84%	6.41%
27	8.95%	12.54%	8.95%	12.30%	6.51%	9.46%	3.91%	6.51%
28	9.09%	12.75%	9.09%	12.50%	6.61%	9.61%	3.97%	6.62%
29	9.24%	12.96%	9.24%	12.70%	6.72%	9.77%	4.03%	6.72%
30	9.39%	13.17%	9.39%	12.91%	6.83%	9.92%	4.10%	6.83%
31	9.55%	13.39%	9.55%	13.12%	6.94%	10.08%	4.16%	6.94%
32	9.71%	13.61%	9.71%	13.34%	7.05%	10.25%	4.23%	7.05%
33	9.87%	13.84%	9.87%	13.57%	7.17%	10.41%	4.30%	7.17%
34	10.04%	14.08%	10.04%	13.80%	7.28%	10.58%	4.37%	7.29%
35	10.21%	14.32%	10.21%	14.04%	7.40%	10.76%	4.44%	7.41%
36	10.39%	14.57%	10.39%	14.28%	7.53%	10.94%	4.52%	7.53%
37	10.58%	14.83%	10.58%	14.54%	7.65%	11.12%	4.59%	7.65%
38	10.77%	15.10%	10.77%	14.81%	7.78%	11.31%	4.67%	7.78%
39	10.92%	15.31%	10.92%	15.01%	7.91%	11.50%	4.75%	7.92%
40	11.08%	15.53%	11.08%	15.23%	8.05%	11.70%	4.83%	8.05%

Section 4: Actuarial Valuation Basis

Exhibit III: Member Contribution Rates (continued)

General Tier 1 Members' Contribution Rates Based on the December 31, 2019 Actuarial Valuation
(as a % of monthly payroll)

	Plan I (2.7% @ 55)		Plan G (2.5% @ 55)		Plan M (2.0% @ 55) ⁽¹⁾		Plan A (OCTA)	
Entry Age	Normal	Total	Normal	Total	Normal	Total	Normal	Total
41	11.24%	15.76%	11.24%	15.45%	8.19%	11.90%	4.92%	8.19%
42	11.41%	16.00%	11.41%	15.69%	8.34%	12.12%	5.00%	8.34%
43	11.59%	16.25%	11.59%	15.93%	8.49%	12.34%	5.10%	8.49%
44	11.79%	16.53%	11.79%	16.20%	8.61%	12.51%	5.17%	8.61%
45	12.00%	16.82%	12.00%	16.49%	8.73%	12.69%	5.24%	8.74%
46	12.20%	17.11%	12.20%	16.77%	8.86%	12.88%	5.32%	8.86%
47	12.37%	17.35%	12.37%	17.00%	9.00%	13.07%	5.40%	9.00%
48	12.54%	17.58%	12.54%	17.24%	9.14%	13.28%	5.48%	9.14%
49	12.63%	17.70%	12.63%	17.35%	9.29%	13.50%	5.58%	9.29%
50	12.68%	17.78%	12.68%	17.43%	9.46%	13.74%	5.67%	9.46%
51	12.66%	17.74%	12.66%	17.39%	9.62%	13.97%	5.77%	9.62%
52	12.55%	17.59%	12.55%	17.24%	9.75%	14.17%	5.85%	9.75%
53	12.32%	17.27%	12.32%	16.93%	9.88%	14.36%	5.93%	9.89%
54	11.86%	16.63%	11.86%	16.30%	9.95%	14.46%	5.97%	9.95%
55	11.86%	16.63%	11.86%	16.30%	10.00%	14.52%	6.00%	10.00%
56	11.86%	16.63%	11.86%	16.30%	9.98%	14.49%	5.99%	9.98%
57	11.86%	16.63%	11.86%	16.30%	9.89%	14.37%	5.93%	9.89%
58	11.86%	16.63%	11.86%	16.30%	9.71%	14.11%	5.83%	9.71%
59	11.86%	16.63%	11.86%	16.30%	9.35%	13.58%	5.61%	9.35%
60	11.86%	16.63%	11.86%	16.30%	9.35%	13.58%	5.61%	9.35%
COLA Loading:		40.19%	37.43%		45.29%		66.70%	

⁽¹⁾ Payable by members in Rate Group #9 and Rate Group #11.

Interest: 7.00% per annum

Mortality: See Section 4, Exhibit I

Salary Increase: Inflation (2.75%) + Across-the-Board Increase (0.50%) + Merit and Promotion (See Section 4, Exhibit I)

Additional Cashouts: See Section 4, Exhibit I

Section 4: Actuarial Valuation Basis

Exhibit III: Member Contribution Rates (continued)

General Tier 1 Members' Contribution Rates Based on the December 31, 2019 Actuarial Valuation
(as a % of monthly payroll)

Entry Age	Plan A (Non-OCTA)	
	Normal	Total
15	3.28%	5.37%
16	3.28%	5.37%
17	3.33%	5.46%
18	3.38%	5.55%
19	3.44%	5.64%
20	3.49%	5.73%
21	3.55%	5.82%
22	3.61%	5.91%
23	3.67%	6.01%
24	3.72%	6.10%
25	3.78%	6.20%
26	3.84%	6.30%
27	3.91%	6.40%
28	3.97%	6.50%
29	4.03%	6.61%
30	4.10%	6.72%
31	4.16%	6.82%
32	4.23%	6.93%
33	4.30%	7.05%
34	4.37%	7.16%
35	4.44%	7.28%
36	4.52%	7.40%
37	4.59%	7.52%
38	4.67%	7.65%
39	4.75%	7.78%
40	4.83%	7.92%

Section 4: Actuarial Valuation Basis

Exhibit III: Member Contribution Rates (continued)

General Tier 1 Members' Contribution Rates Based on the December 31, 2019 Actuarial Valuation
(as a % of monthly payroll)

<u>Plan A (Non-OCTA)</u>		
Entry Age	Normal	Total
41	4.92%	8.06%
42	5.00%	8.20%
43	5.10%	8.35%
44	5.17%	8.47%
45	5.24%	8.59%
46	5.32%	8.71%
47	5.40%	8.85%
48	5.48%	8.99%
49	5.58%	9.14%
50	5.67%	9.30%
51	5.77%	9.46%
52	5.85%	9.59%
53	5.93%	9.72%
54	5.97%	9.78%
55	6.00%	9.83%
56	5.99%	9.81%
57	5.93%	9.72%
58	5.83%	9.55%
59	5.61%	9.19%
60	5.61%	9.19%
COLA Loading:		63.87%

Interest: 7.00% per annum

Mortality: See Section 4, Exhibit I

Salary Increase: Inflation (2.75%) + Across-the-Board Increase (0.50%) + Merit and Promotion (See Section 4, Exhibit I)

Additional Cashouts: See Section 4, Exhibit I

Section 4: Actuarial Valuation Basis

Exhibit III: Member Contribution Rates (continued)

General Tier 2 Members' Contribution Rates Based on the December 31, 2019 Actuarial Valuation
(as a % of monthly payroll)

Entry Age	Plan J (2.7% @ 55 non OCFA)		Plan H (2.5% @ 55 OCSD)		Plan N (2.0% @ 55) ⁽¹⁾		Plan B (OCTA)	
	Normal	Total	Normal	Total	Normal	Total	Normal	Total
15	7.18%	10.07%	7.18%	9.87%	5.23%	7.60%	5.23%	7.32%
16	7.18%	10.07%	7.18%	9.87%	5.23%	7.60%	5.23%	7.32%
17	7.30%	10.23%	7.30%	10.03%	5.31%	7.72%	5.31%	7.44%
18	7.42%	10.40%	7.42%	10.19%	5.40%	7.84%	5.40%	7.56%
19	7.54%	10.56%	7.54%	10.36%	5.49%	7.97%	5.49%	7.68%
20	7.66%	10.73%	7.66%	10.52%	5.57%	8.10%	5.57%	7.80%
21	7.78%	10.90%	7.78%	10.69%	5.66%	8.23%	5.66%	7.93%
22	7.90%	11.08%	7.90%	10.86%	5.75%	8.36%	5.75%	8.06%
23	8.03%	11.26%	8.03%	11.03%	5.85%	8.49%	5.85%	8.19%
24	8.16%	11.44%	8.16%	11.21%	5.94%	8.63%	5.94%	8.32%
25	8.29%	11.62%	8.29%	11.39%	6.03%	8.77%	6.03%	8.45%
26	8.42%	11.81%	8.42%	11.58%	6.13%	8.91%	6.13%	8.58%
27	8.56%	12.00%	8.56%	11.76%	6.23%	9.05%	6.23%	8.72%
28	8.70%	12.19%	8.70%	11.95%	6.33%	9.20%	6.33%	8.86%
29	8.84%	12.39%	8.84%	12.15%	6.43%	9.34%	6.43%	9.00%
30	8.98%	12.59%	8.98%	12.35%	6.53%	9.49%	6.53%	9.15%
31	9.13%	12.80%	9.13%	12.55%	6.64%	9.65%	6.64%	9.30%
32	9.28%	13.01%	9.28%	12.76%	6.75%	9.80%	6.75%	9.45%
33	9.44%	13.23%	9.44%	12.97%	6.86%	9.96%	6.86%	9.60%
34	9.60%	13.46%	9.60%	13.19%	6.97%	10.12%	6.97%	9.75%
35	9.76%	13.69%	9.76%	13.42%	7.08%	10.29%	7.08%	9.91%
36	9.93%	13.92%	9.93%	13.65%	7.20%	10.46%	7.20%	10.08%
37	10.09%	14.15%	10.09%	13.87%	7.32%	10.63%	7.32%	10.24%
38	10.24%	14.36%	10.24%	14.08%	7.44%	10.81%	7.44%	10.42%
39	10.38%	14.56%	10.38%	14.27%	7.56%	10.99%	7.56%	10.59%
40	10.53%	14.76%	10.53%	14.47%	7.69%	11.18%	7.69%	10.77%

Section 4: Actuarial Valuation Basis

Exhibit III: Member Contribution Rates (continued)

General Tier 2 Members' Contribution Rates Based on the December 31, 2019 Actuarial Valuation
(as a % of monthly payroll)

Entry Age	Plan J (2.7% @ 55 non OCFA)		Plan H (2.5% @ 55 OCSD)		Plan N (2.0% @ 55) ⁽¹⁾		Plan B (OCTA)	
	Normal	Total	Normal	Total	Normal	Total	Normal	Total
41	10.68%	14.97%	10.68%	14.68%	7.83%	11.37%	7.83%	10.96%
42	10.84%	15.20%	10.84%	14.90%	7.95%	11.56%	7.95%	11.14%
43	11.01%	15.43%	11.01%	15.13%	8.07%	11.73%	8.07%	11.30%
44	11.18%	15.67%	11.18%	15.36%	8.18%	11.89%	8.18%	11.46%
45	11.34%	15.89%	11.34%	15.58%	8.30%	12.06%	8.30%	11.62%
46	11.48%	16.09%	11.48%	15.77%	8.42%	12.23%	8.42%	11.79%
47	11.58%	16.23%	11.58%	15.91%	8.54%	12.41%	8.54%	11.96%
48	11.63%	16.31%	11.63%	15.99%	8.68%	12.60%	8.68%	12.15%
49	11.63%	16.30%	11.63%	15.98%	8.81%	12.80%	8.81%	12.34%
50	11.56%	16.20%	11.56%	15.88%	8.93%	12.98%	8.93%	12.51%
51	11.40%	15.98%	11.40%	15.67%	9.05%	13.14%	9.05%	12.67%
52	11.12%	15.59%	11.12%	15.29%	9.12%	13.26%	9.12%	12.77%
53	11.48%	16.10%	11.48%	15.78%	9.17%	13.32%	9.17%	12.84%
54	11.86%	16.63%	11.86%	16.30%	9.17%	13.32%	9.17%	12.83%
55	11.86%	16.63%	11.86%	16.30%	9.11%	13.23%	9.11%	12.75%
56	11.86%	16.63%	11.86%	16.30%	8.98%	13.05%	8.98%	12.58%
57	11.86%	16.63%	11.86%	16.30%	8.77%	12.74%	8.77%	12.28%
58	11.86%	16.63%	11.86%	16.30%	9.05%	13.15%	9.05%	12.67%
59	11.86%	16.63%	11.86%	16.30%	9.35%	13.58%	9.35%	13.09%
60	11.86%	16.63%	11.86%	16.30%	9.35%	13.58%	9.35%	13.09%
COLA Loading:		40.19%		37.43%		45.29%		40.02%

⁽¹⁾ Payable by members in Rate Group #9 and Rate Group #11.

Interest: 7.00% per annum

Mortality: See Section 4, Exhibit I

Salary Increase: Inflation (2.75%) + Across-the-Board Increase (0.50%) + Merit and Promotion (See Section 4, Exhibit I)

Additional Cashouts: See Section 4, Exhibit I

Section 4: Actuarial Valuation Basis

Exhibit III: Member Contribution Rates (continued)

General Tier 2 Members' Contribution Rates Based on the December 31, 2019 Actuarial Valuation
(as a % of monthly payroll)

Entry Age	Plan B (non OCTA, non OCSD)		Plan J (2.7% @ 55 OCFA)		Plan P (1.62% @ 65)		Plan B (OCSD)	
	Normal	Total	Normal	Total	Normal	Total	Normal	Total
15	5.23%	7.23%	7.18%	10.05%	5.23%	6.64%	5.23%	7.28%
16	5.23%	7.23%	7.18%	10.05%	5.23%	6.64%	5.23%	7.28%
17	5.31%	7.35%	7.30%	10.21%	5.31%	6.75%	5.31%	7.40%
18	5.40%	7.47%	7.42%	10.38%	5.40%	6.85%	5.40%	7.52%
19	5.49%	7.59%	7.54%	10.54%	5.49%	6.96%	5.49%	7.64%
20	5.57%	7.71%	7.66%	10.71%	5.57%	7.08%	5.57%	7.76%
21	5.66%	7.83%	7.78%	10.88%	5.66%	7.19%	5.66%	7.88%
22	5.75%	7.96%	7.90%	11.06%	5.75%	7.30%	5.75%	8.01%
23	5.85%	8.09%	8.03%	11.23%	5.85%	7.42%	5.85%	8.14%
24	5.94%	8.22%	8.16%	11.41%	5.94%	7.54%	5.94%	8.27%
25	6.03%	8.35%	8.29%	11.60%	6.03%	7.66%	6.03%	8.40%
26	6.13%	8.48%	8.42%	11.78%	6.13%	7.78%	6.13%	8.53%
27	6.23%	8.62%	8.56%	11.97%	6.23%	7.91%	6.23%	8.67%
28	6.33%	8.75%	8.70%	12.17%	6.33%	8.03%	6.33%	8.81%
29	6.43%	8.89%	8.84%	12.36%	6.43%	8.16%	6.43%	8.95%
30	6.53%	9.04%	8.98%	12.57%	6.53%	8.29%	6.53%	9.10%
31	6.64%	9.18%	9.13%	12.77%	6.64%	8.43%	6.64%	9.24%
32	6.75%	9.33%	9.28%	12.99%	6.75%	8.56%	6.75%	9.39%
33	6.86%	9.48%	9.44%	13.20%	6.86%	8.70%	6.86%	9.54%
34	6.97%	9.64%	9.60%	13.43%	6.97%	8.84%	6.97%	9.70%
35	7.08%	9.79%	9.76%	13.66%	7.08%	8.99%	7.08%	9.86%
36	7.20%	9.96%	9.93%	13.89%	7.20%	9.14%	7.20%	10.02%
37	7.32%	10.12%	10.09%	14.12%	7.32%	9.29%	7.32%	10.19%
38	7.44%	10.29%	10.24%	14.33%	7.44%	9.44%	7.44%	10.36%
39	7.56%	10.46%	10.38%	14.53%	7.56%	9.60%	7.56%	10.53%
40	7.69%	10.64%	10.53%	14.73%	7.69%	9.77%	7.69%	10.71%

Section 4: Actuarial Valuation Basis

Exhibit III: Member Contribution Rates (continued)

General Tier 2 Members' Contribution Rates Based on the December 31, 2019 Actuarial Valuation
(as a % of monthly payroll)

Entry Age	Plan B (non OCTA, non OCSD)		Plan J (2.7% @ 55 OCFA)		Plan P (1.62% @ 65)		Plan B (OCSD)	
	Normal	Total	Normal	Total	Normal	Total	Normal	Total
41	7.83%	10.83%	10.68%	14.94%	7.83%	9.94%	7.83%	10.90%
42	7.95%	11.00%	10.84%	15.16%	7.95%	10.10%	7.95%	11.07%
43	8.07%	11.17%	11.01%	15.40%	8.07%	10.25%	8.07%	11.24%
44	8.18%	11.32%	11.18%	15.64%	8.18%	10.39%	8.18%	11.39%
45	8.30%	11.48%	11.34%	15.86%	8.30%	10.54%	8.30%	11.55%
46	8.42%	11.64%	11.48%	16.05%	8.42%	10.69%	8.42%	11.72%
47	8.54%	11.82%	11.58%	16.19%	8.54%	10.85%	8.54%	11.89%
48	8.68%	12.00%	11.63%	16.27%	8.68%	11.01%	8.68%	12.08%
49	8.81%	12.19%	11.63%	16.27%	8.81%	11.18%	8.81%	12.26%
50	8.93%	12.36%	11.56%	16.17%	8.93%	11.34%	8.93%	12.44%
51	9.05%	12.51%	11.40%	15.95%	9.05%	11.48%	9.05%	12.59%
52	9.12%	12.62%	11.12%	15.56%	9.12%	11.58%	9.12%	12.70%
53	9.17%	12.68%	11.48%	16.06%	9.17%	11.64%	9.17%	12.76%
54	9.17%	12.68%	11.86%	16.59%	9.17%	11.63%	9.17%	12.76%
55	9.11%	12.60%	11.86%	16.59%	9.11%	11.56%	9.11%	12.68%
56	8.98%	12.43%	11.86%	16.59%	8.98%	11.41%	8.98%	12.51%
57	8.77%	12.13%	11.86%	16.59%	8.77%	11.13%	8.77%	12.21%
58	9.05%	12.52%	11.86%	16.59%	9.05%	11.49%	9.05%	12.60%
59	9.35%	12.93%	11.86%	16.59%	9.35%	11.87%	9.35%	13.02%
60	9.35%	12.93%	11.86%	16.59%	9.35%	11.87%	9.35%	13.02%
COLA Loading:		38.32%		39.89%		26.95%		39.21%

Interest: 7.00% per annum

Mortality: See Section 4, Exhibit I

Salary Increase: Inflation (2.75%) + Across-the-Board Increase (0.50%) + Merit and Promotion (See Section 4, Exhibit I)

Additional Cashouts: See Section 4, Exhibit I

Section 4: Actuarial Valuation Basis

Exhibit III: Member Contribution Rates (continued)

General Tier 2 Members' Contribution Rates Based on the December 31, 2019 Actuarial Valuation
(as a % of monthly payroll)

Entry Age	Plan N (OCFA)		Plan S (City of SJC)		Plan H (2.5% @ 55 Law Library)	
	Normal	Total	Normal	Total	Normal	Total
15	5.23%	7.69%	6.28%	8.74%	7.18%	9.90%
16	5.23%	7.69%	6.28%	8.74%	7.18%	9.90%
17	5.31%	7.81%	6.38%	8.88%	7.30%	10.06%
18	5.40%	7.94%	6.48%	9.03%	7.42%	10.22%
19	5.49%	8.06%	6.58%	9.17%	7.54%	10.39%
20	5.57%	8.19%	6.69%	9.32%	7.66%	10.55%
21	5.66%	8.32%	6.80%	9.47%	7.78%	10.72%
22	5.75%	8.46%	6.90%	9.62%	7.90%	10.89%
23	5.85%	8.59%	7.02%	9.77%	8.03%	11.07%
24	5.94%	8.73%	7.13%	9.93%	8.16%	11.24%
25	6.03%	8.87%	7.24%	10.09%	8.29%	11.43%
26	6.13%	9.01%	7.36%	10.25%	8.42%	11.61%
27	6.23%	9.16%	7.47%	10.42%	8.56%	11.80%
28	6.33%	9.30%	7.59%	10.58%	8.70%	11.99%
29	6.43%	9.45%	7.72%	10.75%	8.84%	12.18%
30	6.53%	9.60%	7.84%	10.92%	8.98%	12.38%
31	6.64%	9.76%	7.97%	11.10%	9.13%	12.59%
32	6.75%	9.92%	8.10%	11.28%	9.28%	12.79%
33	6.86%	10.08%	8.23%	11.46%	9.44%	13.01%
34	6.97%	10.24%	8.36%	11.65%	9.60%	13.23%
35	7.08%	10.41%	8.50%	11.84%	9.76%	13.46%
36	7.20%	10.58%	8.64%	12.03%	9.93%	13.69%
37	7.32%	10.76%	8.78%	12.23%	10.09%	13.91%
38	7.44%	10.94%	8.93%	12.44%	10.24%	14.12%
39	7.56%	11.12%	9.08%	12.65%	10.38%	14.31%
40	7.69%	11.31%	9.23%	12.87%	10.53%	14.51%

Section 4: Actuarial Valuation Basis

Exhibit III: Member Contribution Rates (continued)

General Tier 2 Members' Contribution Rates Based on the December 31, 2019 Actuarial Valuation
(as a % of monthly payroll)

Entry Age	Plan N (OCFA)		Plan S (City of SJC)		Plan H (2.5% @ 55 Law Library)	
	Normal	Total	Normal	Total	Normal	Total
41	7.83%	11.51%	9.39%	13.09%	10.68%	14.72%
42	7.95%	11.69%	9.55%	13.30%	10.84%	14.94%
43	8.07%	11.87%	9.69%	13.50%	11.01%	15.17%
44	8.18%	12.03%	9.82%	13.69%	11.18%	15.41%
45	8.30%	12.20%	9.96%	13.88%	11.34%	15.62%
46	8.42%	12.38%	10.10%	14.08%	11.48%	15.82%
47	8.54%	12.56%	10.25%	14.29%	11.58%	15.95%
48	8.68%	12.75%	10.41%	14.51%	11.63%	16.03%
49	8.81%	12.95%	10.57%	14.73%	11.63%	16.03%
50	8.93%	13.13%	10.72%	14.94%	11.56%	15.93%
51	9.05%	13.30%	10.85%	15.12%	11.40%	15.71%
52	9.12%	13.41%	10.95%	15.25%	11.12%	15.33%
53	9.17%	13.48%	11.00%	15.33%	11.48%	15.83%
54	9.17%	13.47%	11.00%	15.32%	11.86%	16.35%
55	9.11%	13.39%	10.93%	15.23%	11.86%	16.35%
56	8.98%	13.21%	10.78%	15.02%	11.86%	16.35%
57	8.77%	12.89%	10.52%	14.66%	11.86%	16.35%
58	9.05%	13.31%	10.86%	15.14%	11.86%	16.35%
59	9.35%	13.74%	11.22%	15.63%	11.86%	16.35%
60	9.35%	13.74%	11.22%	15.63%	11.86%	16.35%
COLA Loading:		47.00%		39.34%		37.83%

Interest: 7.00% per annum

Mortality: See Section 4, Exhibit I

Salary Increase: Inflation (2.75%) + Across-the-Board Increase (0.50%) + Merit and Promotion (See Section 4, Exhibit I)

Additional Cashouts: See Section 4, Exhibit I

Section 4: Actuarial Valuation Basis

Exhibit III: Member Contribution Rates (continued)

General CalPEPRA Members' Contribution Rates Based on the December 31, 2019 Actuarial Valuation
(as a % of monthly payroll)

Entry Age	Rate Group 1 (Plan U)		Rate Group 2 (Plan T)		Rate Group 2 (Plan U)		Rate Group 2 (Plan W)	
	Normal	Total	Normal	Total	Normal	Total	Normal	Total
15	6.31%	8.54%	3.91%	5.24%	5.55%	7.55%	3.61%	4.72%
16	6.31%	8.54%	3.91%	5.24%	5.55%	7.55%	3.61%	4.72%
17	6.02%	8.15%	3.97%	5.33%	5.30%	7.20%	3.67%	4.80%
18	5.72%	7.74%	4.03%	5.41%	5.03%	6.84%	3.73%	4.88%
19	5.81%	7.87%	4.10%	5.50%	5.11%	6.95%	3.79%	4.95%
20	5.90%	8.00%	4.16%	5.59%	5.20%	7.06%	3.85%	5.03%
21	6.00%	8.13%	4.23%	5.68%	5.28%	7.18%	3.91%	5.11%
22	6.10%	8.26%	4.30%	5.77%	5.36%	7.30%	3.97%	5.20%
23	6.19%	8.39%	4.37%	5.86%	5.45%	7.41%	4.04%	5.28%
24	6.29%	8.53%	4.44%	5.96%	5.54%	7.53%	4.10%	5.37%
25	6.40%	8.66%	4.51%	6.05%	5.63%	7.65%	4.17%	5.45%
26	6.50%	8.80%	4.58%	6.15%	5.72%	7.78%	4.24%	5.54%
27	6.60%	8.94%	4.66%	6.25%	5.81%	7.90%	4.30%	5.63%
28	6.71%	9.09%	4.73%	6.35%	5.91%	8.03%	4.37%	5.72%
29	6.82%	9.23%	4.81%	6.45%	6.00%	8.16%	4.44%	5.81%
30	6.93%	9.38%	4.89%	6.56%	6.10%	8.29%	4.52%	5.90%
31	7.04%	9.53%	4.96%	6.66%	6.19%	8.42%	4.59%	6.00%
32	7.15%	9.69%	5.04%	6.77%	6.29%	8.56%	4.66%	6.10%
33	7.27%	9.84%	5.13%	6.88%	6.40%	8.70%	4.74%	6.20%
34	7.38%	10.00%	5.21%	6.99%	6.50%	8.84%	4.82%	6.30%
35	7.50%	10.16%	5.30%	7.11%	6.60%	8.98%	4.90%	6.40%
36	7.62%	10.33%	5.39%	7.23%	6.71%	9.12%	4.98%	6.51%
37	7.75%	10.49%	5.48%	7.35%	6.82%	9.27%	5.06%	6.62%
38	7.87%	10.66%	5.57%	7.47%	6.93%	9.42%	5.15%	6.73%
39	8.00%	10.84%	5.66%	7.60%	7.04%	9.57%	5.23%	6.85%
40	8.13%	11.01%	5.76%	7.73%	7.16%	9.73%	5.33%	6.97%
41	8.26%	11.19%	5.86%	7.87%	7.27%	9.89%	5.42%	7.09%

Section 4: Actuarial Valuation Basis

Exhibit III: Member Contribution Rates (continued)

General CalPEPRA Members' Contribution Rates Based on the December 31, 2019 Actuarial Valuation
(as a % of monthly payroll)

Entry Age	Rate Group 1 (Plan U)		Rate Group 2 (Plan T)		Rate Group 2 (Plan U)		Rate Group 2 (Plan W)	
	Normal	Total	Normal	Total	Normal	Total	Normal	Total
42	8.40%	11.38%	5.96%	8.00%	7.39%	10.05%	5.51%	7.20%
43	8.54%	11.57%	6.05%	8.12%	7.52%	10.22%	5.59%	7.31%
44	8.68%	11.76%	6.14%	8.24%	7.64%	10.39%	5.67%	7.42%
45	8.83%	11.96%	6.22%	8.35%	7.77%	10.57%	5.75%	7.52%
46	8.98%	12.17%	6.32%	8.48%	7.90%	10.75%	5.84%	7.64%
47	9.14%	12.38%	6.41%	8.61%	8.04%	10.94%	5.93%	7.75%
48	9.30%	12.60%	6.52%	8.75%	8.18%	11.13%	6.02%	7.88%
49	9.45%	12.80%	6.62%	8.89%	8.32%	11.31%	6.12%	8.01%
50	9.60%	13.00%	6.72%	9.02%	8.45%	11.48%	6.21%	8.13%
51	9.73%	13.18%	6.81%	9.14%	8.56%	11.65%	6.30%	8.24%
52	9.87%	13.37%	6.88%	9.23%	8.69%	11.81%	6.36%	8.32%
53	10.02%	13.57%	6.93%	9.30%	8.82%	11.99%	6.40%	8.37%
54	10.17%	13.78%	6.94%	9.31%	8.95%	12.17%	6.41%	8.39%
55	10.34%	14.00%	6.91%	9.28%	9.10%	12.37%	6.39%	8.36%
56	10.50%	14.23%	6.85%	9.19%	9.24%	12.57%	6.33%	8.28%
57	10.66%	14.44%	6.73%	9.03%	9.38%	12.76%	6.22%	8.13%
58	10.80%	14.63%	6.94%	9.32%	9.51%	12.93%	6.42%	8.39%
59	10.91%	14.78%	7.17%	9.63%	9.60%	13.06%	6.63%	8.67%
60	10.98%	14.88%	7.17%	9.63%	9.67%	13.14%	6.63%	8.67%
61	11.00%	14.90%	7.17%	9.63%	9.68%	13.17%	6.63%	8.67%
62	10.97%	14.85%	7.17%	9.63%	9.65%	13.12%	6.63%	8.67%
63	10.86%	14.71%	7.17%	9.63%	9.56%	12.99%	6.63%	8.67%
64	10.67%	14.45%	7.17%	9.63%	9.39%	12.76%	6.63%	8.67%
65	11.01%	14.91%	7.17%	9.63%	9.69%	13.18%	6.63%	8.67%
66 & Over	11.37%	15.41%	7.17%	9.63%	10.01%	13.61%	6.63%	8.67%
COLA Loading:		35.44%		34.21%		35.98%		30.78%

Section 4: Actuarial Valuation Basis

Interest: 7.00% per annum

Mortality: See *Section 4, Exhibit I*

Salary Increase: Inflation (2.75%) + Across-the-Board Increase (0.50%) + Merit and Promotion (See *Section 4, Exhibit I*)

It is our understanding that in the determination of pension benefits under the CalPEPRA 2.5% at 67 formula and the Plan W 1.62% at 65 formula, the compensation that can be taken into account for 2020 is equal to \$151,549 (reference: Section 7522.10). These amounts should be adjusted for changes to the Consumer Price Index for All Urban Consumers after 2020 (reference: Section 7522.10(d)).

Section 4: Actuarial Valuation Basis

Exhibit III: Member Contribution Rates (continued)

General CalPEPRA Members' Contribution Rates Based on the December 31, 2019 Actuarial Valuation
(as a % of monthly payroll)

Entry Age	Rate Group 3 (Plan U)		Rate Group 5 (Plan U)		Rate Group 9 (Plan U)		Rate Group 10 (Plan U)	
	Normal	Total	Normal	Total	Normal	Total	Normal	Total
15	5.84%	7.90%	6.60%	8.97%	6.03%	8.11%	6.05%	8.20%
16	5.84%	7.90%	6.60%	8.97%	6.03%	8.11%	6.05%	8.20%
17	5.57%	7.54%	6.30%	8.56%	5.75%	7.73%	5.77%	7.82%
18	5.29%	7.16%	5.98%	8.13%	5.46%	7.34%	5.48%	7.43%
19	5.37%	7.27%	6.08%	8.26%	5.55%	7.46%	5.57%	7.55%
20	5.46%	7.39%	6.18%	8.40%	5.64%	7.59%	5.66%	7.67%
21	5.55%	7.51%	6.28%	8.53%	5.73%	7.71%	5.76%	7.80%
22	5.64%	7.63%	6.38%	8.67%	5.83%	7.83%	5.85%	7.92%
23	5.73%	7.76%	6.49%	8.81%	5.92%	7.96%	5.94%	8.05%
24	5.82%	7.88%	6.59%	8.96%	6.02%	8.09%	6.04%	8.18%
25	5.92%	8.01%	6.70%	9.10%	6.11%	8.22%	6.14%	8.31%
26	6.01%	8.14%	6.81%	9.25%	6.21%	8.35%	6.24%	8.45%
27	6.11%	8.27%	6.91%	9.40%	6.31%	8.49%	6.34%	8.58%
28	6.21%	8.40%	7.03%	9.55%	6.41%	8.62%	6.44%	8.72%
29	6.31%	8.54%	7.14%	9.70%	6.52%	8.76%	6.54%	8.86%
30	6.41%	8.68%	7.25%	9.86%	6.62%	8.90%	6.65%	9.00%
31	6.51%	8.82%	7.37%	10.01%	6.73%	9.05%	6.75%	9.15%
32	6.62%	8.96%	7.49%	10.18%	6.83%	9.19%	6.86%	9.30%
33	6.72%	9.10%	7.61%	10.34%	6.94%	9.34%	6.97%	9.44%
34	6.83%	9.25%	7.73%	10.51%	7.06%	9.49%	7.09%	9.60%
35	6.94%	9.40%	7.86%	10.67%	7.17%	9.64%	7.20%	9.75%
36	7.05%	9.55%	7.98%	10.85%	7.29%	9.80%	7.32%	9.91%
37	7.17%	9.70%	8.11%	11.02%	7.40%	9.96%	7.43%	10.07%
38	7.28%	9.86%	8.24%	11.20%	7.52%	10.12%	7.55%	10.23%
39	7.40%	10.02%	8.38%	11.38%	7.65%	10.28%	7.68%	10.40%
40	7.52%	10.18%	8.51%	11.57%	7.77%	10.45%	7.80%	10.57%
41	7.65%	10.35%	8.65%	11.76%	7.90%	10.62%	7.93%	10.74%

Section 4: Actuarial Valuation Basis

Exhibit III: Member Contribution Rates (continued)

General CalPEPRA Members' Contribution Rates Based on the December 31, 2019 Actuarial Valuation
(as a % of monthly payroll)

Entry Age	Rate Group 3 (Plan U)		Rate Group 5 (Plan U)		Rate Group 9 (Plan U)		Rate Group 10 (Plan U)	
	Normal	Total	Normal	Total	Normal	Total	Normal	Total
42	7.77%	10.52%	8.80%	11.95%	8.03%	10.80%	8.06%	10.92%
43	7.90%	10.70%	8.94%	12.15%	8.16%	10.98%	8.19%	11.10%
44	8.03%	10.88%	9.09%	12.35%	8.30%	11.16%	8.33%	11.29%
45	8.17%	11.06%	9.25%	12.56%	8.44%	11.35%	8.47%	11.48%
46	8.31%	11.25%	9.40%	12.78%	8.58%	11.54%	8.62%	11.67%
47	8.45%	11.44%	9.57%	13.00%	8.73%	11.74%	8.77%	11.88%
48	8.60%	11.65%	9.74%	13.23%	8.89%	11.95%	8.92%	12.09%
49	8.75%	11.84%	9.90%	13.45%	9.03%	12.15%	9.07%	12.28%
50	8.88%	12.02%	10.05%	13.65%	9.17%	12.33%	9.21%	12.47%
51	9.00%	12.19%	10.19%	13.84%	9.30%	12.51%	9.34%	12.65%
52	9.13%	12.36%	10.34%	14.04%	9.43%	12.69%	9.47%	12.83%
53	9.27%	12.55%	10.49%	14.25%	9.57%	12.87%	9.61%	13.02%
54	9.41%	12.74%	10.65%	14.47%	9.72%	13.07%	9.76%	13.22%
55	9.56%	12.94%	10.82%	14.70%	9.88%	13.28%	9.92%	13.43%
56	9.72%	13.15%	11.00%	14.94%	10.04%	13.50%	10.08%	13.65%
57	9.86%	13.35%	11.16%	15.17%	10.19%	13.70%	10.23%	13.86%
58	10.00%	13.53%	11.31%	15.37%	10.33%	13.89%	10.37%	14.04%
59	10.10%	13.67%	11.43%	15.52%	10.43%	14.02%	10.47%	14.18%
60	10.16%	13.76%	11.50%	15.63%	10.50%	14.12%	10.54%	14.28%
61	10.18%	13.78%	11.52%	15.65%	10.51%	14.14%	10.56%	14.30%
62	10.15%	13.73%	11.48%	15.60%	10.48%	14.09%	10.52%	14.25%
63	10.05%	13.60%	11.37%	15.45%	10.38%	13.95%	10.42%	14.11%
64	9.87%	13.36%	11.17%	15.17%	10.19%	13.71%	10.23%	13.86%
65	10.19%	13.79%	11.53%	15.67%	10.52%	14.15%	10.57%	14.31%
66 & Over	10.52%	14.24%	11.91%	16.18%	10.87%	14.62%	10.91%	14.78%
COLA Loading:		35.35%		35.88%		34.48%		35.45%

Section 4: Actuarial Valuation Basis

Interest: 7.00% per annum

Mortality: See *Section 4, Exhibit I*

Salary Increase: Inflation (2.75%) + Across-the-Board Increase (0.50%) + Merit and Promotion (See *Section 4, Exhibit I*)

It is our understanding that in the determination of pension benefits under the CalPEPRA 2.5% at 67 formula and the Plan W 1.62% at 65 formula, the compensation that can be taken into account for 2020 is equal to \$151,549 (reference: Section 7522.10). These amounts should be adjusted for changes to the Consumer Price Index for All Urban Consumers after 2020 (reference: Section 7522.10(d)).

Section 4: Actuarial Valuation Basis

Exhibit III: Member Contribution Rates (continued)

General CalPEPRA Members' Contribution Rates Based on the December 31, 2019 Actuarial Valuation
(as a % of monthly payroll)

Entry Age	Rate Group 11 (Plan U)		Rate Group 12 (Plan U)	
	Normal	Total	Normal	Total
15	6.62%	8.90%	5.85%	7.76%
16	6.62%	8.90%	5.85%	7.76%
17	6.32%	8.49%	5.58%	7.40%
18	6.00%	8.06%	5.30%	7.03%
19	6.10%	8.19%	5.38%	7.15%
20	6.20%	8.33%	5.47%	7.26%
21	6.30%	8.46%	5.56%	7.38%
22	6.40%	8.60%	5.65%	7.50%
23	6.51%	8.74%	5.74%	7.62%
24	6.61%	8.88%	5.83%	7.74%
25	6.72%	9.02%	5.93%	7.87%
26	6.83%	9.17%	6.02%	8.00%
27	6.94%	9.32%	6.12%	8.13%
28	7.05%	9.47%	6.22%	8.26%
29	7.16%	9.62%	6.32%	8.39%
30	7.28%	9.77%	6.42%	8.52%
31	7.39%	9.93%	6.52%	8.66%
32	7.51%	10.09%	6.63%	8.80%
33	7.63%	10.25%	6.73%	8.94%
34	7.75%	10.42%	6.84%	9.08%
35	7.88%	10.58%	6.95%	9.23%
36	8.01%	10.75%	7.07%	9.38%
37	8.14%	10.93%	7.18%	9.53%
38	8.27%	11.11%	7.30%	9.69%
39	8.40%	11.29%	7.41%	9.84%
40	8.54%	11.47%	7.54%	10.00%
41	8.68%	11.66%	7.66%	10.17%

Section 4: Actuarial Valuation Basis

Exhibit III: Member Contribution Rates (continued)

General Tier 2 Members' Contribution Rates Based on the December 31, 2019 Actuarial Valuation
(as a % of monthly payroll)

Entry Age	Rate Group 11 (Plan U)		Rate Group 12 (Plan U)	
	Normal	Total	Normal	Total
42	8.82%	11.85%	7.79%	10.34%
43	8.97%	12.05%	7.91%	10.51%
44	9.12%	12.25%	8.05%	10.68%
45	9.27%	12.46%	8.18%	10.86%
46	9.43%	12.67%	8.32%	11.05%
47	9.60%	12.89%	8.47%	11.24%
48	9.77%	13.12%	8.62%	11.44%
49	9.93%	13.33%	8.76%	11.63%
50	10.08%	13.54%	8.89%	11.81%
51	10.22%	13.73%	9.02%	11.97%
52	10.37%	13.93%	9.15%	12.15%
53	10.52%	14.13%	9.28%	12.33%
54	10.68%	14.35%	9.43%	12.52%
55	10.85%	14.58%	9.58%	12.72%
56	11.03%	14.82%	9.73%	12.92%
57	11.20%	15.04%	9.88%	13.12%
58	11.35%	15.24%	10.01%	13.29%
59	11.46%	15.39%	10.11%	13.43%
60	11.54%	15.49%	10.18%	13.51%
61	11.55%	15.52%	10.20%	13.54%
62	11.52%	15.47%	10.16%	13.49%
63	11.40%	15.32%	10.06%	13.36%
64	11.20%	15.04%	9.88%	13.12%
65	11.56%	15.53%	10.20%	13.55%
66 & Over	11.94%	16.04%	10.54%	13.99%
COLA Loading:		34.33%	32.76%	

Section 4: Actuarial Valuation Basis

Interest: 7.00% per annum

Mortality: See *Section 4, Exhibit I*

Salary Increase: Inflation (2.75%) + Across-the-Board Increase (0.50%) + Merit and Promotion (See *Section 4, Exhibit I*)

It is our understanding that in the determination of pension benefits under the CalPEPRA 2.5% at 67 formula and the Plan W 1.62% at 65 formula, the compensation that can be taken into account for 2020 is equal to \$151,549 (reference: Section 7522.10). These amounts should be adjusted for changes to the Consumer Price Index for All Urban Consumers after 2020 (reference: Section 7522.10(d)).

Section 4: Actuarial Valuation Basis

Exhibit III: Member Contribution Rates (continued)

Safety Tier 2 Members' Contribution Rates Based on the December 31, 2019 Actuarial Valuation
(as a % of monthly payroll)

Entry Age	Plan F (OCFA)		Plan F (Law Enforcement)		Plan F (Probation)	
	Normal	Total	Normal	Total	Normal	Total
15	8.87%	15.06%	9.11%	15.59%	9.01%	15.05%
16	8.87%	15.06%	9.11%	15.59%	9.01%	15.05%
17	8.99%	15.26%	9.22%	15.80%	9.13%	15.24%
18	9.10%	15.46%	9.34%	16.00%	9.24%	15.44%
19	9.22%	15.67%	9.47%	16.21%	9.37%	15.65%
20	9.35%	15.87%	9.59%	16.43%	9.49%	15.85%
21	9.47%	16.09%	9.72%	16.64%	9.62%	16.06%
22	9.60%	16.30%	9.85%	16.86%	9.74%	16.28%
23	9.73%	16.52%	9.98%	17.09%	9.87%	16.50%
24	9.86%	16.75%	10.11%	17.32%	10.01%	16.72%
25	10.00%	16.98%	10.25%	17.55%	10.14%	16.95%
26	10.13%	17.21%	10.39%	17.79%	10.28%	17.18%
27	10.28%	17.45%	10.53%	18.04%	10.43%	17.42%
28	10.42%	17.70%	10.68%	18.29%	10.57%	17.67%
29	10.57%	17.96%	10.83%	18.56%	10.73%	17.92%
30	10.73%	18.22%	10.99%	18.82%	10.88%	18.18%
31	10.89%	18.50%	11.15%	19.10%	11.05%	18.45%
32	11.05%	18.77%	11.31%	19.38%	11.21%	18.72%
33	11.21%	19.04%	11.47%	19.65%	11.36%	18.99%
34	11.37%	19.31%	11.63%	19.92%	11.52%	19.25%
35	11.53%	19.59%	11.80%	20.20%	11.69%	19.52%
36	11.71%	19.89%	11.97%	20.50%	11.86%	19.82%
37	11.90%	20.21%	12.16%	20.82%	12.05%	20.13%
38	12.08%	20.52%	12.34%	21.13%	12.23%	20.44%
39	12.26%	20.83%	12.51%	21.43%	12.41%	20.73%
40	12.41%	21.07%	12.65%	21.66%	12.55%	20.96%

Section 4: Actuarial Valuation Basis

Exhibit III: Member Contribution Rates (continued)

Safety Tier 2 Members' Contribution Rates Based on the December 31, 2019 Actuarial Valuation
(as a % of monthly payroll)

Entry Age	Plan F (OCFA)		Plan F (Law Enforcement)		Plan F (Probation)	
	Normal	Total	Normal	Total	Normal	Total
41	12.52%	21.27%	12.75%	21.83%	12.65%	21.14%
42	12.59%	21.38%	12.80%	21.92%	12.71%	21.24%
43	12.60%	21.40%	12.79%	21.91%	12.71%	21.24%
44	12.56%	21.33%	12.72%	21.79%	12.66%	21.14%
45	12.44%	21.13%	12.57%	21.52%	12.52%	20.91%
46	12.21%	20.73%	12.28%	21.03%	12.25%	20.47%
47	11.77%	19.99%	11.77%	20.16%	11.77%	19.67%
48	12.14%	20.62%	12.14%	20.80%	12.14%	20.29%
49	12.54%	21.29%	12.54%	21.47%	12.54%	20.94%
50	12.54%	21.29%	12.54%	21.47%	12.54%	20.94%
51	12.54%	21.29%	12.54%	21.47%	12.54%	20.94%
52	12.54%	21.29%	12.54%	21.47%	12.54%	20.94%
53	12.54%	21.29%	12.54%	21.47%	12.54%	20.94%
54	12.54%	21.29%	12.54%	21.47%	12.54%	20.94%
55	12.54%	21.29%	12.54%	21.47%	12.54%	20.94%
56	12.54%	21.29%	12.54%	21.47%	12.54%	20.94%
57	12.54%	21.29%	12.54%	21.47%	12.54%	20.94%
58	12.54%	21.29%	12.54%	21.47%	12.54%	20.94%
59	12.54%	21.29%	12.54%	21.47%	12.54%	20.94%
60	12.54%	21.29%	12.54%	21.47%	12.54%	20.94%
COLA Loading:		69.84%		71.26%		67.06%

Interest: 7.00% per annum

Mortality: See Section 4, Exhibit I

Salary Increase: Inflation (2.75%) + Across-the-Board Increase (0.50%) + Merit and Promotion (See Section 4, Exhibit I)

Additional Cashouts: See Section 4, Exhibit I

Section 4: Actuarial Valuation Basis

Exhibit III: Member Contribution Rates (continued)

Safety Tier 2 Members' Contribution Rates Based on the December 31, 2019 Actuarial Valuation
(as a % of monthly payroll)

Entry Age	Plan R (OCFA)		Plan R (Law Enforcement)	
	Normal	Total	Normal	Total
15	8.87%	14.70%	9.11%	14.62%
16	8.87%	14.70%	9.11%	14.62%
17	8.99%	14.89%	9.22%	14.81%
18	9.10%	15.09%	9.34%	15.00%
19	9.22%	15.29%	9.47%	15.20%
20	9.35%	15.49%	9.59%	15.40%
21	9.47%	15.70%	9.72%	15.60%
22	9.60%	15.91%	9.85%	15.81%
23	9.73%	16.12%	9.98%	16.02%
24	9.86%	16.34%	10.11%	16.23%
25	10.00%	16.57%	10.25%	16.45%
26	10.13%	16.80%	10.39%	16.68%
27	10.28%	17.03%	10.53%	16.91%
28	10.42%	17.27%	10.68%	17.15%
29	10.57%	17.52%	10.83%	17.39%
30	10.73%	17.78%	10.99%	17.64%
31	10.89%	18.05%	11.15%	17.91%
32	11.05%	18.32%	11.31%	18.16%
33	11.21%	18.58%	11.47%	18.42%
34	11.37%	18.84%	11.63%	18.67%
35	11.53%	19.12%	11.80%	18.94%
36	11.71%	19.41%	11.97%	19.22%
37	11.90%	19.72%	12.16%	19.51%
38	12.08%	20.03%	12.34%	19.81%
39	12.26%	20.33%	12.51%	20.08%
40	12.41%	20.57%	12.65%	20.30%

Section 4: Actuarial Valuation Basis

Exhibit III: Member Contribution Rates (continued)

Safety Tier 2 Members' Contribution Rates Based on the December 31, 2019 Actuarial Valuation
(as a % of monthly payroll)

Entry Age	Plan R (OCFA)		Plan R (Law Enforcement)	
	Normal	Total	Normal	Total
41	12.52%	20.75%	12.75%	20.47%
42	12.59%	20.86%	12.80%	20.55%
43	12.60%	20.88%	12.79%	20.53%
44	12.56%	20.82%	12.72%	20.43%
45	12.44%	20.62%	12.57%	20.18%
46	12.21%	20.23%	12.28%	19.72%
47	11.77%	19.51%	11.77%	18.90%
48	12.14%	20.13%	12.14%	19.49%
49	12.54%	20.78%	12.54%	20.12%
50	12.54%	20.78%	12.54%	20.12%
51	12.54%	20.78%	12.54%	20.12%
52	12.54%	20.78%	12.54%	20.12%
53	12.54%	20.78%	12.54%	20.12%
54	12.54%	20.78%	12.54%	20.12%
55	12.54%	20.78%	12.54%	20.12%
56	12.54%	20.78%	12.54%	20.12%
57	12.54%	20.78%	12.54%	20.12%
58	12.54%	20.78%	12.54%	20.12%
59	12.54%	20.78%	12.54%	20.12%
60	12.54%	20.78%	12.54%	20.12%
COLA Loading:				
		65.75%	60.53%	

Interest: 7.00% per annum

Mortality: See Section 4, Exhibit I

Salary Increase: Inflation (2.75%) + Across-the-Board Increase (0.50%) + Merit and Promotion (See Section 4, Exhibit I)

Additional Cashouts: See Section 4, Exhibit I

Section 4: Actuarial Valuation Basis

Exhibit III: Member Contribution Rates (continued)

Safety CalPEPRA Members' Contribution Rates Based on the December 31, 2019 Actuarial Valuation
(as a % of monthly payroll)

Entry Age	Rate Group 6 (Plan V)		Rate Group 7 (Plan V)		Rate Group 8 (Plan V)	
	Normal	Total	Normal	Total	Normal	Total
15	9.83%	14.01%	10.51%	15.05%	9.20%	13.24%
16	9.83%	14.01%	10.51%	15.05%	9.20%	13.24%
17	9.96%	14.20%	10.64%	15.24%	9.32%	13.42%
18	10.09%	14.38%	10.78%	15.44%	9.44%	13.59%
19	10.22%	14.57%	10.92%	15.64%	9.57%	13.77%
20	10.35%	14.76%	11.07%	15.85%	9.69%	13.95%
21	10.49%	14.95%	11.21%	16.05%	9.82%	14.13%
22	10.63%	15.15%	11.36%	16.26%	9.95%	14.32%
23	10.77%	15.35%	11.51%	16.48%	10.08%	14.50%
24	10.91%	15.55%	11.66%	16.70%	10.21%	14.69%
25	11.05%	15.75%	11.81%	16.92%	10.34%	14.89%
26	11.20%	15.96%	11.97%	17.14%	10.48%	15.09%
27	11.35%	16.18%	12.13%	17.37%	10.62%	15.29%
28	11.50%	16.39%	12.29%	17.60%	10.76%	15.49%
29	11.65%	16.61%	12.46%	17.84%	10.91%	15.70%
30	11.81%	16.84%	12.62%	18.08%	11.06%	15.91%
31	11.97%	17.07%	12.80%	18.33%	11.21%	16.13%
32	12.14%	17.30%	12.97%	18.58%	11.36%	16.35%
33	12.31%	17.55%	13.16%	18.84%	11.52%	16.58%
34	12.48%	17.79%	13.34%	19.11%	11.68%	16.82%
35	12.66%	18.05%	13.53%	19.38%	11.85%	17.06%
36	12.85%	18.31%	13.73%	19.66%	12.02%	17.31%
37	13.04%	18.59%	13.93%	19.96%	12.20%	17.56%
38	13.24%	18.87%	14.15%	20.26%	12.39%	17.83%
39	13.43%	19.15%	14.36%	20.56%	12.57%	18.10%
40	13.63%	19.43%	14.57%	20.86%	12.76%	18.36%
41	13.82%	19.70%	14.77%	21.16%	12.94%	18.62%

Section 4: Actuarial Valuation Basis

Exhibit III: Member Contribution Rates (continued)

Safety CalPEPRA Members' Contribution Rates Based on the December 31, 2019 Actuarial Valuation
(as a % of monthly payroll)

Entry Age	Rate Group 6 (Plan V)		Rate Group 7 (Plan V)		Rate Group 8 (Plan V)	
	Normal	Total	Normal	Total	Normal	Total
42	14.03%	20.00%	14.99%	21.47%	13.13%	18.90%
43	14.25%	20.31%	15.23%	21.81%	13.34%	19.19%
44	14.48%	20.64%	15.48%	22.17%	13.56%	19.51%
45	14.72%	20.98%	15.73%	22.52%	13.77%	19.82%
46	14.94%	21.29%	15.97%	22.87%	13.98%	20.13%
47	15.12%	21.56%	16.16%	23.15%	14.16%	20.38%
48	15.27%	21.77%	16.32%	23.38%	14.29%	20.57%
49	15.36%	21.90%	16.42%	23.52%	14.38%	20.70%
50	15.39%	21.94%	16.45%	23.56%	14.41%	20.74%
51	15.37%	21.90%	16.42%	23.52%	14.38%	20.70%
52	15.25%	21.73%	16.30%	23.34%	14.27%	20.54%
53	14.99%	21.37%	16.03%	22.95%	14.04%	20.20%
54	14.52%	20.69%	15.51%	22.22%	13.59%	19.56%
55	14.97%	21.34%	16.00%	22.92%	14.02%	20.17%
56 & Over	15.46%	22.03%	16.52%	23.66%	14.47%	20.82%
COLA Loading:		42.55%		43.21%		43.94%

Interest: 7.00% per annum

Mortality: See Section 4, Exhibit I

Salary Increase: Inflation (2.75%) + Across-the-Board Increase (0.50%) + Merit and Promotion (See Section 4, Exhibit I)

It is our understanding that in the determination of pension benefits under the CalPEPRA 2.7% at 57 formula, the compensation that can be taken into account for 2020 is equal to \$151,549 (reference: Section 7522.10). These amounts should be adjusted for changes to the Consumer Price Index for All Urban Consumers after 2020 (reference: Section 7522.10(d)).

Section 4: Actuarial Valuation Basis

Exhibit IV: Funded Percentages By Rate Group

The funded percentages on a valuation value of assets basis by rate group provided for informational purposes only are as follows:

	December 31, 2019 Valuation	December 31, 2018 Valuation
General Members		
Rate Group #1 – Plans A, B and U (non-OCTA, non-OCSD)	82.53%	80.75%
Rate Group #2 – Plans I, J, O, P, S, T, U and W (County et al.)	70.64%	70.14%
Rate Group #3 – Plans B, G, H and U (OCSD) ¹	100.00%	98.91%
Rate Group #5 – Plans A, B and U (OCTA)	75.38%	75.00%
Rate Group #9 – Plans M, N and U (TCA)	99.29%	74.02%
Rate Group #10 – Plans I, J, M, N and U (OCFA)	82.58%	80.62%
Rate Group #11 – Plans M and N, future service, and U (Cemetery)	94.39%	99.65%
Rate Group #12 – Plans G, H, future service, and U (Law Library)	99.72%	97.84%
Safety Members		
Rate Group #6 – Plans E, F and V (Probation)	71.80%	70.34%
Rate Group #7 – Plans E, F, Q, R and V (Law Enforcement)	70.33%	69.67%
Rate Group #8 – Plans E, F, Q, R and V (OCFA)	79.69%	78.70%

² Reflects asset transfers of \$18,631,000 and \$14,589,000 as of December 31, 2019 and December 31, 2018, respectively, from O.C. Sanitation District UAAL Deferred Account to valuation assets.

Section 4: Actuarial Valuation Basis

Exhibit V: Reconciliation of Employer Contribution Rates by Rate Group

The reconciliation of the employer contribution rates for the General Rate Groups #1 to #5 are as follows:

	RG #1 ¹	RG #2	RG #3	RG #5
Average Recommended Employer Contribution as of December 31, 2018 (before adjustments for additional UAAL contributions and phase-in)	16.09%	38.22%	12.83%	31.63%
• Adjustment to FY20-21 rates for additional UAAL contributions from OCSD and TCA	0.00%	0.00%	(0.86%)	0.00%
• Effect of three-year phase-in of UAAL cost impact due to changes in actuarial assumptions	<u>(0.74%)</u>	<u>(1.19%)</u>	<u>0.00%</u>	<u>(1.16%)</u>
Average Recommended Employer Contribution as of December 31, 2018 (after adjustments for additional UAAL contributions and phase-in)	15.35%	37.03%	11.97%	30.47%
• Effect of investment loss (after smoothing)	0.08%	0.17%	0.22%	0.15%
• Effect of additional UAAL contributions from OCFA	0.00%	0.00%	0.00%	0.00%
• Effect of \$18.6 million asset transfer from O.C. Sanitation District UAAL Deferred Account	0.00%	0.00%	(1.74%)	0.00%
• Effect of difference in actual versus expected contributions (including loss from phase-in)	0.14%	0.55%	0.15%	0.51%
• Effect of difference in actual versus expected COLA increases	0.14%	0.44%	0.46%	0.41%
• Effect of difference in actual versus expected salary increases	(0.60%)	(0.35%)	0.46%	(0.25%)
• Effect of growth in total payroll greater than expected	0.03%	0.10%	0.00%	(0.73%)
• Effect of other experience (gain)/loss ²	(0.39%)	0.22%	0.41%	(0.30%)
• Effect of three-year phase-in of UAAL cost impact due to changes in actuarial assumptions	<u>0.74%</u>	<u>1.19%</u>	<u>0.00%</u>	<u>1.16%</u>
Total change	0.14%	2.32%	(0.04%)	0.95%
Average Recommended Employer Contribution as of December 31, 2019	15.49%	39.35%	11.93%	31.42%

¹ Includes only the "net" UAAL contribution rate for County and IHSS Public Authority without reflecting the UAAL contributions required for Vector Control, Cypress Parks and Recreation, U.C.I. and DOE.

² Net of an adjustment to reflect 18-month delay between date of valuation and date of rate implementation for all actuarial experience.

Section 4: Actuarial Valuation Basis

Exhibit V: Reconciliation of Employer Contribution Rates by Rate Group (continued)

The reconciliation of the employer contribution rates for the General Rate Groups #9 to #12 are as follows:

	RG #9	RG #10	RG #11	RG #12
Average Recommended Employer Contribution as of December 31, 2018 (before adjustments for additional UAAL contributions and phase-in)	28.27%	28.54%	12.35%	15.35%
• Adjustment to FY20-21 rates for additional UAAL contributions from OCSD and TCA	(15.29%)	0.00%	0.00%	0.00%
• Effect of three-year phase-in of UAAL cost impact due to changes in actuarial assumptions	<u>0.00%</u>	<u>(0.94%)</u>	<u>(0.22%)¹</u>	<u>0.00%</u>
Average Recommended Employer Contribution as of December 31, 2018 (after adjustments for additional UAAL contributions and phase-in)	12.98%	27.60%	12.13%	15.35%
• Effect of investment loss (after smoothing)	0.14%	0.15%	0.14%	0.22%
• Effect of additional UAAL contributions from OCFA	0.00%	(1.55%)	0.00%	0.00%
• Effect of \$18.6 million asset transfer from O.C. Sanitation District UAAL Deferred Account	0.00%	0.00%	0.00%	0.00%
• Effect of difference in actual versus expected contributions (including loss from phase-in)	(0.31%)	(0.20%)	0.12%	0.25%
• Effect of difference in actual versus expected COLA increases	0.29%	0.52%	0.18%	0.38%
• Effect of difference in actual versus expected salary increases	0.16%	0.44%	(0.17%)	(0.71%)
• Effect of growth in total payroll greater than expected	(0.09%)	(1.77%)	0.00%	0.02%
• Effect of other experience (gain)/loss ^{2,3}	0.05%	0.57%	2.22%	(1.83%)
• Effect of three-year phase-in of UAAL cost impact due to changes in actuarial assumptions	<u>0.00%</u>	<u>0.94%</u>	<u>0.22%¹</u>	<u>0.00%</u>
Total change	0.24%	(0.90%)	2.71%	(1.67%)
Average Recommended Employer Contribution as of December 31, 2019	13.22%	26.70%	14.84%	13.68%

¹ The phase-in adjustment for Rate Group #11 has been adjusted from -0.48% to -0.22% so that the UAAL contribution won't become negative after applying the phase-in (we have limited that to 0%).

² Net of an adjustment to reflect 18-month delay between date of valuation and date of rate implementation for all actuarial experience.

³ Effect of other experience (gain)/loss for RG #11 includes: 1.21% due to retirement loss and 1.07% due to previous unreported beneficiary. RG #12 includes: -0.76% due to retirement gain and -0.22% due to termination gain.

Section 4: Actuarial Valuation Basis

Exhibit V: Reconciliation of Employer Contribution Rates by Rate Group (continued)

The reconciliation of the employer contribution rates for the Safety Rate Groups are as follows:

	RG #6	RG #7	RG #8
Average Recommended Employer Contribution as of December 31, 2018 (before adjustments for additional UAAL contributions and phase-in)	57.36%	66.64%	48.99%
• Adjustment to FY20-21 rates for additional UAAL contributions from OCSD and TCA	0.00%	0.00%	0.00%
• Effect of three-year phase-in of UAAL cost impact due to changes in actuarial assumptions	<u>(2.13%)</u>	<u>(1.85%)</u>	<u>(1.15%)</u>
Average Recommended Employer Contribution as of December 31, 2018 (after adjustments for additional UAAL contributions and phase-in)	55.23%	64.79%	47.84%
• Effect of investment loss (after smoothing)	0.24%	0.26%	0.23%
• Effect of additional UAAL contributions from OCFA	0.00%	0.00%	(0.60%)
• Effect of \$18.6 million asset transfer from O.C. Sanitation District UAAL Deferred Account	0.00%	0.00%	0.00%
• Effect of difference in actual versus expected contributions (including loss from phase-in)	0.90%	0.41%	0.16%
• Effect of difference in actual versus expected COLA increases	0.53%	0.73%	0.52%
• Effect of difference in actual versus expected salary increases	(0.87%)	0.31%	0.30%
• Effect of growth in total payroll greater than expected	1.74%	(0.85%)	(1.82%)
• Effect of other experience (gain)/loss ^{1,2}	(0.21%)	0.05%	0.93%
• Effect of three-year phase-in of UAAL cost impact due to changes in actuarial assumptions	<u>2.13%</u>	<u>1.85%</u>	<u>1.15%</u>
Total change	4.46%	2.76%	0.87%
Average Recommended Employer Contribution as of December 31, 2019	59.69%	67.55%	48.71%

¹ Net of an adjustment to reflect 18-month delay between date of valuation and date of rate implementation for all actuarial experience.

² Effect of other experience (gain)/loss for RG #8 includes: 0.92% increase in the employer Normal Cost rate due to the 61 new hires from the City of Garden Grove. The average entry age has changed from 26.4 to 32.0.

Section 4: Actuarial Valuation Basis

Exhibit VI: Reconciliation of UAAL by Rate Group

The reconciliation of UAAL for the General Rate Groups #1 to #5 are as follows (\$ in '000s):

	RG #1	RG #2	RG #3	RG #5
1 Unfunded Actuarial Accrued Liability at beginning of year (before adjustments for additional UAAL contributions)	\$96,456	\$3,429,915	\$7,753	\$241,221
a) Additional UAAL contributions from OCSD and TCA ¹	<u>0</u>	<u>0</u>	<u>(7,753)</u>	<u>0</u>
2 Unfunded Actuarial Accrued Liability at beginning of year (after adjustments for additional UAAL contributions)	\$96,456	\$3,429,915	\$0	\$241,221
3 Total Normal Cost at middle of year	17,606	266,198	17,605	23,263
4 Expected employer and member contributions	(22,720)	(561,925)	(17,605)	(44,075)
5 Interest	<u>6,672</u>	<u>233,557</u>	<u>0</u>	<u>16,543</u>
6 Expected Unfunded Actuarial Accrued Liability at end of year	\$98,014	\$3,367,745	\$0	\$236,952
7 Changes due to:				
a) Investment losses (on smoothed value of assets)	\$1,338	\$27,067	\$2,347	\$2,422
b) Effect of additional UAAL contributions from OCFA, Vector Control, DOE, and UCI	(4,100)	0	0	0
c) Transfer from O.C. Sanitation District UAAL Deferred Account	0	0	(18,631)	0
d) Difference in actual versus expected contributions (including loss from phase-in)	1,801	88,824	1,603	8,112
e) Difference in actual versus expected salary increases	(7,606)	(57,650)	4,962	(3,953)
f) Difference in actual versus expected COLA increases	2,862	72,275	4,887	6,575
g) Other experience (gain)/loss	<u>(2,688)</u>	<u>55,487</u>	<u>4,832</u>	<u>(922)</u>
Total changes	\$(8,393)	\$186,003	\$0	\$12,234
8 Unfunded Actuarial Accrued Liability at end of year	\$89,621	\$3,553,748	\$0	\$249,186

¹ Effect of \$8 million in additional contributions for O.C. Sanitation District to pay off their UAAL as of December 31, 2018.

Section 4: Actuarial Valuation Basis

Exhibit VI: Reconciliation of UAAL by Rate Group (continued)

The reconciliation of UAAL for the General Rate Groups #9 to #12 are as follows (\$ in '000s):

	RG #9	RG #10	RG #11	RG #12
1 Unfunded Actuarial Accrued Liability at beginning of year (before adjustments for additional UAAL contributions)	\$12,390	\$47,228	\$36	\$233
a) Additional UAAL contributions from OCSD and TCA ¹	<u>(12,390)</u>	<u>0</u>	<u>0</u>	<u>0</u>
2 Unfunded Actuarial Accrued Liability at beginning of year (after adjustments for additional UAAL contributions)	\$0	\$47,228	\$36	\$233
3 Total Normal Cost at middle of year	1,685	6,720	364	294
4 Expected employer and member contributions	(1,685)	(11,048)	(368)	(314)
5 Interest	<u>0</u>	<u>3,127</u>	<u>3</u>	<u>19</u>
6 Expected Unfunded Actuarial Accrued Liability at end of year	\$0	\$46,027	\$35	\$232
7 Changes due to:				
a) Investment losses (on smoothed value of assets)	\$146	\$667	\$34	\$35
b) Effect of additional UAAL contributions from OCFA, Vector Control, DOE, and UCI	0	(6,855)	0	0
c) Transfer from O.C. Sanitation District UAAL Deferred Account	0	0	0	0
d) Difference in actual versus expected contributions (including loss from phase-in)	(323)	(879)	29	39
e) Difference in actual versus expected salary increases	168	1,951	(39)	(112)
f) Difference in actual versus expected COLA increases	303	2,285	42	59
g) Other experience (gain)/loss	<u>79</u>	<u>2,907</u>	<u>547</u>	<u>(222)</u>
Total changes	\$373	\$76	\$613	\$(201)
8 Unfunded Actuarial Accrued Liability at end of year	\$373	\$46,103	\$648	\$31

¹ Effect of \$12 million in additional contributions for Transportation Corridor Agency to pay off their UAAL as of December 31, 2018.

Section 4: Actuarial Valuation Basis

Exhibit VI: Reconciliation of UAAL by Rate Group (continued)

The reconciliation of UAAL for the Safety Rate Groups are as follows (\$ in '000s):

		RG #6	RG #7	RG #8
1	Unfunded Actuarial Accrued Liability at beginning of year (before adjustments for additional UAAL contributions)	\$259,769	\$1,234,367	\$379,561
	a) Additional UAAL contributions from OCSD and TCA	<u>0</u>	<u>0</u>	<u>0</u>
2	Unfunded Actuarial Accrued Liability at beginning of year (after adjustments for additional UAAL contributions)	\$259,769	\$1,234,367	\$379,561
3	Total Normal Cost at middle of year	25,530	102,992	54,151
4	Expected employer and member contributions	(47,632)	(207,991)	(87,236)
5	Interest	17,747	83,704	25,786
6	Expected Unfunded Actuarial Accrued Liability at end of year	\$255,414	\$1,213,072	\$372,262
7	Changes due to:			
	a) Investment losses (on smoothed value of assets)	\$2,098	\$9,602	\$4,758
	b) Effect of additional UAAL contributions from OCFA, Vector Control, DOE, and UCI	0	0	(12,372)
	c) Transfer from O.C. Sanitation District UAAL Deferred Account	0	0	0
	d) Difference in actual versus expected contributions (including loss from phase-in)	7,992	14,963	3,254
	e) Difference in actual versus expected salary increases	(7,746)	11,137	6,172
	f) Difference in actual versus expected COLA increases	4,695	26,520	10,717
	g) Other experience (gain)/loss	<u>1,024</u>	<u>12,801</u>	<u>3,788</u>
	Total changes	\$8,063	\$75,023	\$16,317
8	Unfunded Actuarial Accrued Liability at end of year	\$263,477	\$1,288,095	\$388,579

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