

**Contra Costa County Employees'
Retirement Association**

**Actuarial Valuation and Review as of
December 31, 2018**



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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October 16, 2019

Board of Retirement
Contra Costa County Employees' Retirement Association
1200 Concord Avenue, Suite 300
Concord, CA 94520

Dear Board Members:

We are pleased to submit this Actuarial Valuation and Review as of December 31, 2018. It summarizes the actuarial data used in the valuation, analyzes the preceding year's experience, and establishes the funding requirements for fiscal year 2020-2021.

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 Association. The census information and financial information on which our calculations were based was prepared by the staff of the Association. That assistance is gratefully acknowledged.

The actuarial calculations were directed under the supervision of John Monroe, ASA, MAAA 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 Association.

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

Sincerely,

Segal Consulting, a Member of The Segal Group, Inc.

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

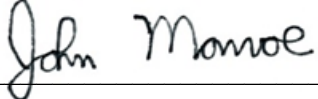

John Monroe, ASA, MAAA, EA
Vice President and Actuary

Table of Contents

Contra Costa County Employees' Retirement Association Actuarial Valuation and Review as of December 31, 2018

Section 1: Actuarial Valuation Summary

Purpose and Basis	4
Significant Issues	6
Summary of Key Valuation Results	9
Important Information About Actuarial Valuations	13

Section 2: Actuarial Valuation Results

A. Member Data	15
B. Financial Information	19
C. Actuarial Experience.....	22
D. Other Changes in the Actuarial Accrued Liability	27
E. Development of Unfunded Actuarial Accrued Liability	28
F. Recommended Contribution.....	29
G. Funded Status	42
H. Actuarial Balance Sheet	44
I. Volatility Ratios	45
J. Risk Assessment.....	47

Section 3: Supplemental Information

Exhibit A – Table of Plan Coverage.....	50
Exhibit B – Members in Active Service as of December 31, 2018 ...	62
Exhibit C – Retired Members and Beneficiaries as of December 31, 2018	75
Exhibit D – Reconciliation of Member Data	82
Exhibit E – Summary Statement of Income and Expenses on a Market Value Basis.....	83
Exhibit F – Summary Statement of Plan Assets	84
Exhibit G – Summary of Total Allocated Reserves.....	85
Exhibit H – Development of the Fund Through December 31, 2018	86
Exhibit I – Table of Amortization Bases	87
Exhibit J – Projection of UAAL Balances and Payments.....	100
Exhibit K – Definition of Pension Terms	102

Section 4: Actuarial Valuation Basis

Exhibit I – Actuarial Assumptions and Methods	106
Exhibit II – Summary of Plan Provisions.....	128
Exhibit III – Member Contribution Rates.....	136
Exhibit IV – Refundability Factors.....	162
Exhibit V – Summary of Cost Groups and Employers.....	163
Exhibit VI – Allocation of Valuation Value of Assets as of December 31, 2018	165

Section 1: Actuarial Valuation Summary

Purpose and Basis

This report was prepared by Segal Consulting (“Segal”) to present a valuation of the Contra Costa County Employees’ Retirement Association (“the Plan”) as of December 31, 2018. 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 pension plan, as administered by the Board;
- The characteristics of covered active members, inactive vested members, and retired members and beneficiaries as of December 31, 2018, provided by the Retirement Association;
- The assets of the Plan as of December 31, 2018, provided by the Retirement Association;
- Economic assumptions regarding future salary increases and investment earnings adopted by the Board for the December 31, 2018 valuation;
- Other actuarial assumptions regarding employee terminations, retirement, death, etc. adopted by the Board for the December 31, 2018 valuation and
- The funding policy adopted by the Board.

One of the general goals of an actuarial valuation is to establish contributions which fully fund the Association’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.

In preparing this valuation, we have employed generally accepted actuarial methods and assumptions to evaluate the Association's liabilities and future contribution requirements. Our calculations are based upon member data and financial information provided to us by the Association'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 Association'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 on February 26, 2014, and most recently amended on May 22, 2019. Details of the funding policy are provided in *Section 4, Exhibit I on page 116*.

A schedule of current amortization balances and payments may be found in *Section 3, Exhibit I on page 87*. A graphical projection of the Unfunded Actuarial Accrued Liability (UAAL) amortization balances and payments has been included in *Section 3, Exhibit J on page 100*.

The rates calculated in this report may be adopted by the Board for the fiscal year that extends from July 1, 2020 through June 30, 2021.

Significant Issues

- Ref: Pg. 106*
1. The results of this valuation reflect changes in the actuarial assumptions as recommended by Segal and adopted by the Board for the December 31, 2018 valuation. These changes were documented in our Actuarial Experience Study and are also outlined in *Section 4, Exhibit I* of this report. These assumption changes resulted in a decrease in the average employer rate of 1.26% of payroll and a decrease in the aggregate member rate of 0.03% of payroll. Of the 1.26% decrease in the employer rate, 0.46% is due to a decrease in the Normal Cost and 0.80% is due to a decrease in the UAAL rate.
- Ref: Pg. 43
Ref: Pg. 28*
2. The ratio of the Valuation Value of Assets to the Actuarial Accrued Liability increased from 88.5% to 89.3% while the ratio of the Market Value of Assets to the Actuarial Accrued Liability decreased from 90.8% to 84.2%. The Association's UAAL (which is based on the Valuation Value of Assets) has decreased from \$1.1 billion to \$1.0 billion. This decrease is mainly due to contributions paying down a portion of the UAAL and the changes in actuarial assumptions, offset to some degree by an investment return on actuarial value (i.e. after smoothing) less than the 7.00% assumed rate, and higher than expected COLA increases for retirees and beneficiaries. A reconciliation of the Association's UAAL is provided in *Section 2, Exhibit E*.
- Ref: Pg. 30*
3. The average employer rate calculated in this valuation (excluding any employer subvention of member rates or member subvention of employer rates) has decreased from 36.07% of payroll to 35.73% of payroll. This decrease is due to the changes in actuarial assumptions and the effect of changes in member demographics on Normal Cost, partially offset by an investment return on actuarial value (i.e. after smoothing) less than the 7.00% assumed rate and higher than expected COLA increases for retirees and beneficiaries. A complete reconciliation of the Association's aggregate employer rate is provided in *Section 2, Subsection F*.
- Ref: Pg. 32*
- Separate employer contribution rates are shown for members with membership dates before January 1, 2013 (non-PEPRA members) and on or after January 1, 2013 (PEPRA members). However, the average employer contribution rates shown in *Section 1* are based on all members regardless of their membership date. A detailed schedule of the employer contribution rates is provided in *Section 2, Subsection F*.
- Ref: Pg. 31*
4. The average member rate calculated in this valuation has decreased from 12.03% of payroll to 11.97% of payroll. A complete reconciliation of the Association's aggregate member rate is provided in *Section 2, Subsection F*.
- The detailed member rates are provided in *Section 4, Exhibit III* of this report. They are shown by cost group.
- Ref: Pg. 20*
5. The total unrecognized net investment loss as of December 31, 2018 is about \$517 million as compared to an unrecognized net investment gain of \$195 million in the previous valuation. This deferred investment loss of \$517 million will be recognized in the determination of the Actuarial Value of Assets for funding purposes in the next few years as shown in *Section 2, Subsection B*.

The net deferred losses of \$517 million represent about 6.3% of the Market Value of Assets. Unless offset by future investment gains or other favorable experience, the recognition of the \$517 million market losses is expected to have an impact on the Association's future funded ratio and contribution rate requirements. This potential impact may be illustrated as follows:

- a. If the net deferred losses were recognized immediately in the valuation value of assets, the funded percentage would decrease from 89.3% to 84.0%.

For comparison purposes, if all the deferred gains in the December 31, 2017 valuation had been recognized immediately in the December 31, 2017 valuation, the funded percentage would have increased from 88.5% to 90.6%.

- b. If the net deferred losses were recognized immediately in the valuation value of assets, the average employer contribution rate would increase from 35.73% to about 40.15% of payroll.

For comparison purposes, if all the deferred gains in the December 31, 2017 valuation had been recognized immediately in the December 31, 2017 valuation, the average employer contribution rate would have decreased from 36.1% to 34.3% of payroll.

6. The actuarial valuation report as of December 31, 2018 is based on financial information as of that date. Changes in the assets subsequent to that date, to the extent that they exist, 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.
7. This valuation reflects the \$254,000 additional contributions made by San Ramon Valley Fire Department towards their UAAL. Based on CCCERA's funding policy, this amount will be amortized as a level percent of pay (credit) over a period of eighteen years beginning with the December 31, 2018 valuation to reduce the employer UAAL contributions.
8. The Actuarial Standards Board approved a new Actuarial Standard of Practice No. 51 (ASOP 51) regarding risk assessment. ASOP 51 is effective with CCCERA's December 31, 2018 actuarial valuation. ASOP 51 requires actuaries to identify and assess risks that "may reasonably be anticipated to significantly affect the plan's future financial condition". Examples of key risks listed that are particularly relevant to CCCERA are asset/liability mismatch risk, investment risk, and longevity risk. The standard also requires an actuary to consider if there is any ongoing contribution risk to the plan, however it does not require the actuary to evaluate the particular ability or willingness 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 initial assessment can be strictly a qualitative discussion about potential adverse experience and the possible effect on future results, but it may also include quantitative numerical demonstrations where informative. The actuary is also encouraged to consider a recommendation as to whether a more detailed assessment or risk report would be significantly beneficial for the intended user in order to examine particular financial risks. When making that recommendation, the actuary will take into account such factors as the plan's design, risk profile, maturity, size, funded status, asset allocation, cash flow, possible insolvency and current market conditions.

Ref: Pg. 47

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. We have not been engaged to perform a detailed analysis of the potential range of the impact of risk relative to the Association's future financial condition, but have included a brief discussion of key risks that may affect the Association in *Section 2, Subsection J*. A more detailed assessment of the risks tailored to specific interests or concerns of the Board would provide the Board with a better understanding of the inherent risks and is recommended. This assessment would further discuss and highlight information and risks particular to CCCERA such as detailed historical experience and key events, growing plan maturity, heightened contribution sensitivity to asset and liability changes, and projected sensitivity to potential future investment returns through selected scenario or stress test projections.

Summary of Key Valuation Results

		December 31, 2018		December 31, 2017	
		Total Rate	Estimated Annual Dollar Amount ⁽¹⁾ (\$ in '000s)	Total Rate	Estimated Annual Dollar Amount ⁽¹⁾ (\$ in '000s)
Average Employer Contribution Rates: ⁽¹⁾	General				
	• Cost Group #1 – County and Small Districts (Tier 1 and 4)	31.11%	\$7,730	31.10%	\$7,606
	• Cost Group #2 – County and Small Districts (Tier 3 and 5)	26.42%	172,333	26.36%	165,291
	• Cost Group #3 – Central Contra Costa Sanitary District	49.86%	17,672	49.57%	17,028
	• Cost Group #4 – Contra Costa Housing Authority	42.22%	2,420	41.91%	2,340
	• Cost Group #5 – Contra Costa County Fire Protection District	32.80%	1,885	31.82%	1,637
	• Cost Group #6 – Small Districts (Non-Enhanced Tier 1 and 4)	15.60%	147	16.59%	141
	Safety				
	• Cost Group #7 – County (Tier A and D)	70.32%	\$41,860	71.94%	\$43,932
	• Cost Group #8 – Contra Costa and East Fire Protection Districts	69.14%	27,814	75.59%	26,987
	• Cost Group #9 – County (Tier C and E)	61.10%	24,607	62.56%	22,116
	• Cost Group #10 – Moraga-Orinda Fire District	70.81%	5,251	69.74%	5,128
	• Cost Group #11 – San Ramon Valley Fire District	75.79%	16,380	75.25%	16,211
	• Cost Group #12 – Rodeo-Hercules Fire Protection District	85.28%	2,073	92.28%	2,023
	All Employers Combined	35.73%	\$320,172	36.07%	\$310,439

Note: Pages 163 and 164 contain a summary that shows which employers are in each cost group.

⁽¹⁾ Based on projected compensation for each valuation date shown. These rates do not include any employer subvention of member contributions or any member subvention of employer contributions.

Summary of Key Valuation Results (continued)

		December 31, 2018		December 31, 2017	
		Total Rate	Estimated Annual Dollar Amount ⁽¹⁾ (\$ in '000s)	Total Rate	Estimated Annual Dollar Amount ⁽¹⁾ (\$ in '000s)
Average Member Contribution Rates: ⁽¹⁾	General				
	• Cost Group #1 – County and Small Districts (Tier 1 and 4)	10.82%	\$2,688	10.89%	\$2,664
	• Cost Group #2 – County and Small Districts (Tier 3 and 5)	10.70%	69,785	10.76%	67,469
	• Cost Group #3 – Central Contra Costa Sanitary District	11.29%	4,001	11.45%	3,933
	• Cost Group #4 – Contra Costa Housing Authority	11.54%	661	11.70%	653
	• Cost Group #5 – Contra Costa County Fire Protection District	11.32%	651	11.08%	570
	• Cost Group #6 – Small Districts (Non-Enhanced Tier 1 and 4)	13.22%	124	13.31%	113
	Safety				
	• Cost Group #7 – County (Tier A and D)	17.99%	\$10,709	17.92%	\$10,944
	• Cost Group #8 – Contra Costa and East Fire Protection Districts	17.25%	6,940	17.54%	6,261
	• Cost Group #9 – County (Tier C and E)	16.02%	6,452	16.20%	5,727
	• Cost Group #10 – Moraga-Orinda Fire District	17.30%	1,283	17.26%	1,269
	• Cost Group #11 – San Ramon Valley Fire District	16.99%	3,672	16.75%	3,608
	• Cost Group #12 – Rodeo-Hercules Fire Protection District	13.39%	326	15.52%	340
All Categories Combined	11.97%	\$107,291	12.03%	\$103,551	

Note: Pages 163 and 164 contain a summary that shows which employers are in each cost group.

⁽¹⁾ Based on projected compensation for each valuation date shown. These rates do not include any employer subvention of member contributions or any member subvention of employer contributions.

Summary of Key Valuation Results (continued)

		December 31, 2018	December 31, 2017
Actuarial Accrued Liability as of December 31:	• Retired members and beneficiaries	\$6,186,518,515	\$5,873,017,531
	• Inactive vested members ⁽¹⁾	299,877,080	295,691,337
	• Active members	3,195,748,155	3,070,538,052
	• Total Actuarial Accrued Liability	\$9,682,143,750	\$9,239,246,920
	• Normal Cost including administrative expenses for plan year beginning December 31	\$248,942,638	\$246,099,386
Assets as of December 31:	• Market Value of Assets (MVA)	\$8,149,985,793	\$8,390,581,049
	• Actuarial Value of Assets (AVA)	8,666,778,056	8,195,516,541
	• Actuarial Value of Assets as a percentage of Market Value of Assets	106.3%	97.7%
	• Valuation Value of Assets (VVA)	\$8,650,178,226	\$8,179,891,191
Funded status as of December 31:	• Unfunded Actuarial Accrued Liability on Market Value of Assets basis	\$1,532,157,957	\$848,665,871
	• Funded percentage on MVA basis	84.2%	90.8%
	• Unfunded Actuarial Accrued Liability on Valuation Value of Assets basis	\$1,031,965,524	\$1,059,355,729
	• Funded percentage on VVA basis	89.3%	88.5%
Key assumptions:	• Net investment return	7.00%	7.00%
	• Price Inflation	2.75%	2.75%
	• Payroll growth increase	3.25%	3.25%

⁽¹⁾ Includes inactive members with member contributions on deposit.

Summary of Key Valuation Results (continued)

		December 31, 2018	December 31, 2017	Change From Prior Year
Demographic data as of December 31:	Active Members:			
	• Number of members	10,021	10,038	-0.2%
	• Average age	46.2	46.0	0.2
	• Average service	9.9	9.8	0.1
	• Total projected compensation	\$896,390,768	\$860,624,612	4.2%
	• Average projected compensation	\$89,451	\$85,737	4.3%
	Retired Members and Beneficiaries:			
	• Number of members:			
	– Service retired	7,214	6,973	3.5%
	– Disability retired	908	896	1.3%
	– Beneficiaries	1,425	1,398	1.9%
	– Total	9,547	9,267	3.0%
	• Average age	70.4	70.3	0.1
	• Average monthly benefit	\$3,986	\$3,892	2.4%
	Inactive Vested Members:			
	• Number of members ⁽¹⁾	3,477	3,327	4.5%
	• Average Age	46.5	46.5	0.0
Total Members:	23,045	22,632	1.8%	

⁽¹⁾ Includes 1,847 inactive members with member contributions on deposit as of December 31, 2018 and 1,696 as of December 31, 2017.

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 Consulting (“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 Association. 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 Association. The Association uses a “Valuation Value of Assets” that differs from market value to gradually reflect six-month 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.

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 Association. 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;
 - Changes in statutory provisions; and
 - Differences between the contribution rates determined by the valuation and those adopted by the Board.
- If the Association 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 Association should look to their other advisors for expertise in these areas.

As Segal Consulting 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: 2009 – 2018

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
2009	8,938	2,209	7,292	9,501	1.06	0.82
2010	8,811	2,231	7,559	9,790	1.11	0.86
2011	8,629	2,214	8,085	10,299	1.19	0.94
2012	8,640	2,288	8,517	10,805	1.25	0.99
2013	9,124	2,345	8,625	10,970	1.20	0.95
2014	9,159	2,647	8,871	11,518	1.26	0.97
2015	9,642	2,790	9,068	11,858	1.23	0.94
2016	9,848	3,089	9,100	12,189	1.24	0.92
2017	10,038	3,327	9,267	12,594	1.25	0.92
2018	10,021	3,477	9,547	13,024	1.30	0.95

⁽¹⁾ Includes inactive members with member contributions on deposit.

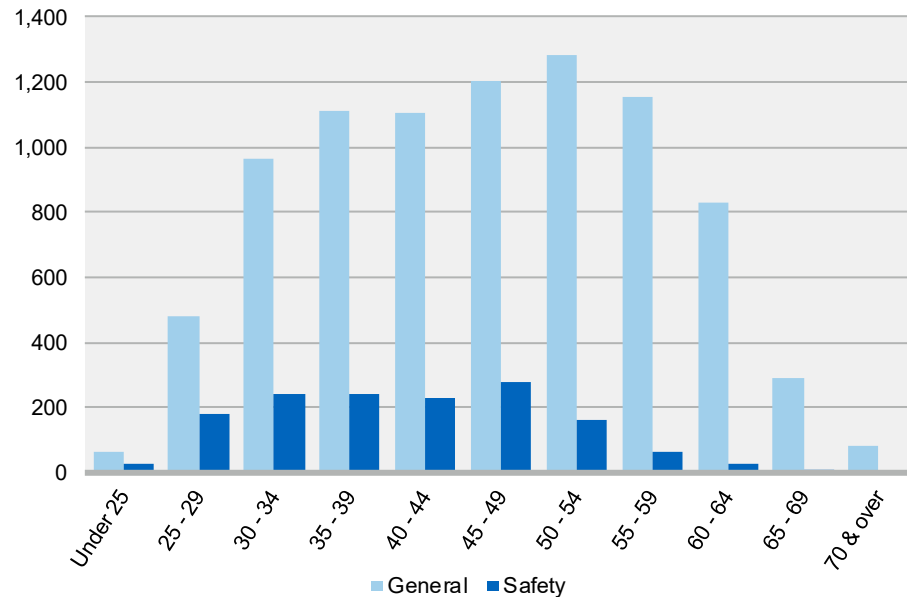
Active Members

Plan costs are affected by the age, years of service and compensation of active members. In this year's valuation, there were 10,021 active members with an average age of 46.2, average years of service of 9.9 years and average compensation of \$89,451. The 10,038 active members in the prior valuation had an average age of 46.0, average service of 9.8 years and average compensation of \$85,737.

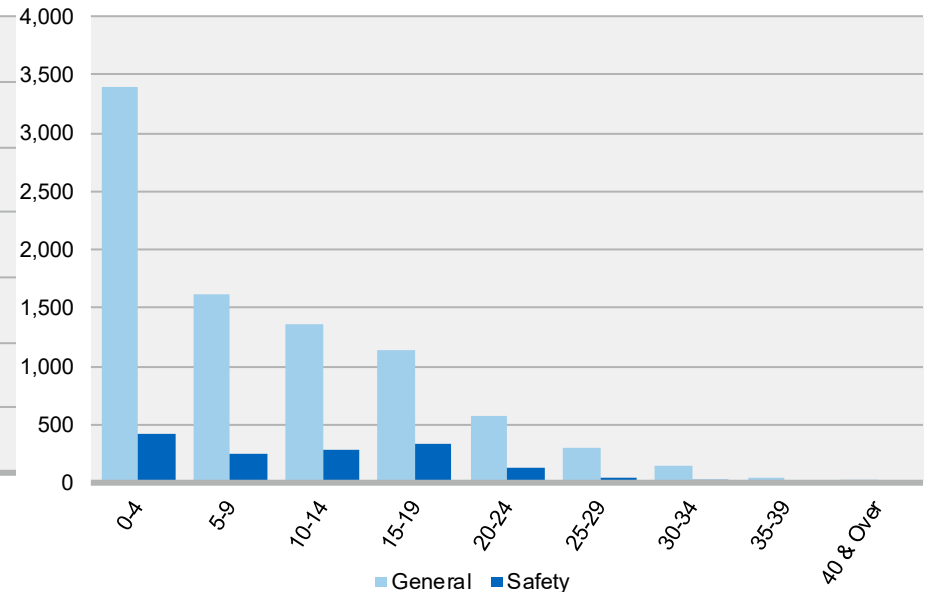
Among the active members, there were none with unknown age information.

Distribution of Active Participants as of December 31, 2018

ACTIVES BY AGE



ACTIVES BY YEARS OF SERVICE



Inactive Members

In this year's valuation, there were 3,477 members with a vested right to a deferred or immediate vested benefit or entitled to a return of their member contributions versus 3,327 in the prior valuation.

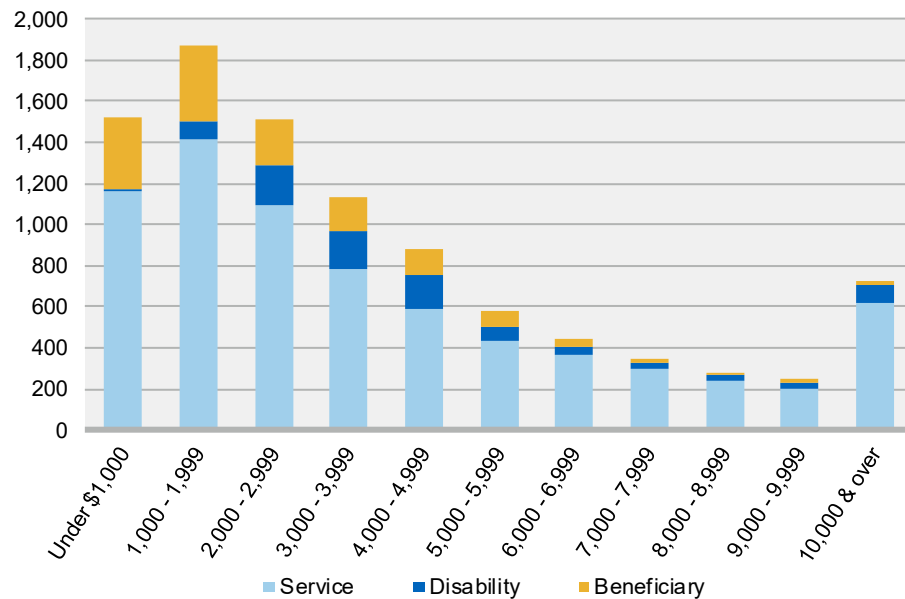
Retired Members and Beneficiaries

As of December 31, 2018, 8,122 retired members and 1,425 beneficiaries were receiving total monthly benefits of \$38,057,250. For comparison, in the previous valuation, there were 7,869 retired members and 1,398 beneficiaries receiving monthly benefits of \$36,067,626.

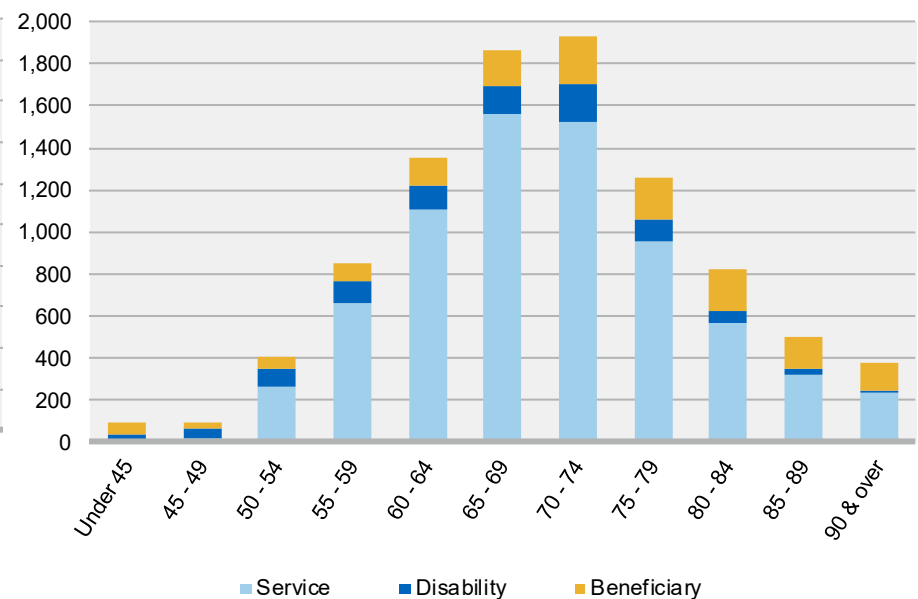
As of December 31, 2018, the average monthly benefit for retired members is \$3,986, compared to \$3,892 in the previous valuation. The average age for retired members is 70.4 in the current valuation, compared with 70.3 in the prior valuation.

Distribution of Retired Members and Beneficiaries as of December 31, 2018

RETIRED MEMBERS AND BENEFICIARIES BY TYPE AND MONTHLY AMOUNT



RETIRED MEMBERS AND BENEFICIARIES BY TYPE AND AGE



Historical Plan Population

The chart below demonstrates the progression 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 STATISTICS: 2009 – 2018

Year Ended December 31	Active Participants			Retired Members and Beneficiaries		
	Count	Average Age	Average Service	Count	Average Age	Average Monthly Amount
2009	8,938	46.4	11.0	7,292	69.2	\$3,111
2010	8,811	46.6	11.1	7,559	69.3	3,248
2011	8,629	46.2	10.7	8,085	69.1	3,381
2012	8,640	45.9	10.2	8,517	69.0	3,518
2013	9,124	45.8	10.1	8,625	69.3	3,579
2014	9,159	45.8	9.9	8,871	69.4	3,669
2015	9,642	45.9	9.9	9,068	69.9	3,706
2016	9,848	45.9	9.9	9,100	70.0	3,799
2017	10,038	46.0	9.8	9,267	70.3	3,892
2018	10,021	46.2	9.9	9,547	70.4	3,986

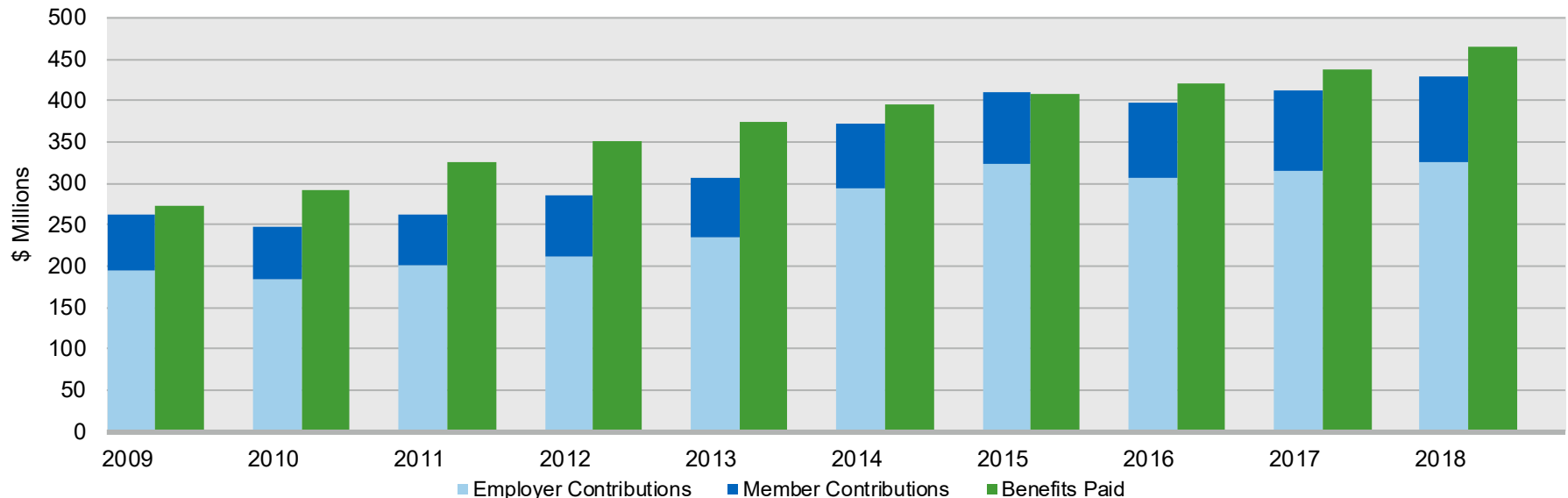
B. Financial Information

Retirement plan funding anticipates that, over the long term, both contributions (less administrative expenses) and investment earnings (less investment fees) 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 E, F, G and H.*

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 WITH BENEFITS FOR YEARS ENDED DECEMBER 31, 2009 – 2018



DETERMINATION OF ACTUARIAL VALUE OF ASSETS

1 Market Value of Assets						\$8,149,985,793
2 Calculation of unrecognized return		Expected Return	Actual Return	Original Amount	Percent Deferred	Unrecognized Amount
a)	Period ended December 31, 2013	\$227,909,702	\$588,758,958	\$360,849,256	0%	\$0
b)	Period ended June 30, 2014	249,636,410	347,257,106	97,620,696	0%	0
c)	Period ended December 31, 2014	241,361,743	125,727,585	(115,634,158)	10%	(11,563,416)
d)	Period ended June 30, 2015	246,283,585	207,439,920	(38,843,665)	20%	(7,768,733)
e)	Period ended December 31, 2015	253,672,471	(142,612,600)	(396,285,071)	30%	(118,885,521)
f)	Period ended June 30, 2016	239,907,822	297,615,324	57,707,502	40%	23,083,001
g)	Period ended December 31, 2016	249,584,567	196,258,919	(53,325,648)	50%	(26,662,824)
h)	Period ended June 30, 2017	255,728,819	488,764,245	233,035,426	60%	139,821,255
i)	Period ended December 31, 2017	271,873,066	498,651,736	226,778,670	70%	158,745,069
j)	Period ended June 30, 2018	288,460,475	63,645,390	(224,815,085)	80%	(179,852,068)
k)	Period ended December 31, 2018	289,889,306	(258,676,279)	(548,565,585)	90%	(493,709,026)
l)	Total unrecognized return ⁽²⁾					\$(516,792,263)
3 Actuarial Value of Assets 1 – 2l						\$8,666,778,056
4 Actuarial Value of Assets as a percentage of Market Value of Assets						106.3%
5 Non-valuation reserves and designations:						
a)	Post Retirement Death Benefit					\$15,757,910
b)	Statutory Contingency					0
c)	Additional One Percent Contingency					0
d)	Unrestricted Designation					0
e)	Total					\$15,757,910
6 Valuation Value of Assets 3 – 5e						\$8,651,020,146
7 Adjustment for Pre-Paid Contributions ⁽²⁾						841,920
8 Final Valuation Value of Assets 6 – 7						\$8,650,178,226

Note: Results may be slightly off due to rounding.

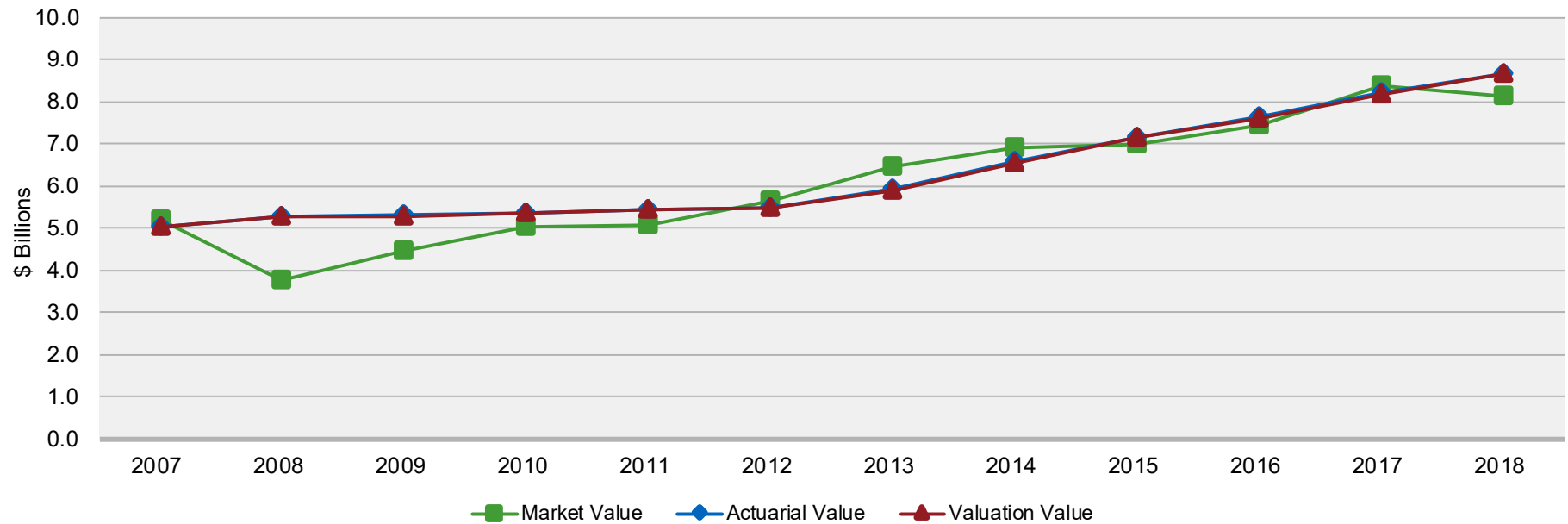
(1) Deferred return as of December 31, 2018 recognized in each of the next five years:

(a)	Amount recognized on December 31, 2019	\$(160,426,107)
(b)	Amount recognized on December 31, 2020	(101,465,451)
(c)	Amount recognized on December 31, 2021	(68,045,880)
(d)	Amount recognized on December 31, 2022	(131,998,267)
(e)	Amount recognized on December 31, 2023	(54,856,558)
(f)	Total unrecognized return as of December 31, 2018	\$(516,792,263)

(2) This adjustment is to exclude 6 months of contributions made by Rodeo-Hercules Fire Protection District during the 2018 calendar year that were pre-paid for the 2019 calendar year. These contributions will be reflected in the next valuation.

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 generally 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 – 2018



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. This valuation reflects changes in actuarial assumptions adopted by the Board.

The total loss is \$161.2 million, which includes \$55.3 million from investment losses, a gain of \$13.2 million from contribution experience and \$119.1 in losses from all other sources. The net experience variation from individual sources other than investments and contributions was 1.2% 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, 2018

1	Net loss from investments ⁽¹⁾	\$(55,252,687)
2	Net gain from contribution experience	13,173,304
3	Net loss from other experience ⁽²⁾	<u>(119,141,111)</u>
4	Net experience loss: 1 + 2 + 3	\$(161,220,494)

⁽¹⁾ Details on next page.

⁽²⁾ See *Subsection E* for further details. Does not include the effect of plan or assumption changes, if any.

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 -2.33% for the year ended December 31, 2018.

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 2018 plan year was 6.32%. 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, 2018 with regard to its investments.

INVESTMENT EXPERIENCE FOR YEAR ENDED DECEMBER 31, 2018

	Market Value	Actuarial Value	Valuation Value
1 Net investment income	\$(195,030,888)	\$516,825,883	\$515,766,323
2 Average value of assets	8,367,640,787	8,172,576,279	8,157,414,429
3 Rate of return: 1 ÷ 2	-2.33%	6.32%	6.32%
4 Assumed rate of return	7.00%	7.00%	7.00%
5 Expected investment income: 2 x 4	<u>\$585,734,855</u>	<u>\$572,080,339</u>	<u>\$571,019,010</u>
6 Actuarial gain/(loss): 1 – 5	<u>\$(780,765,743)</u>	<u>\$(55,254,456)</u>	<u>\$(55,252,687)</u>

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.

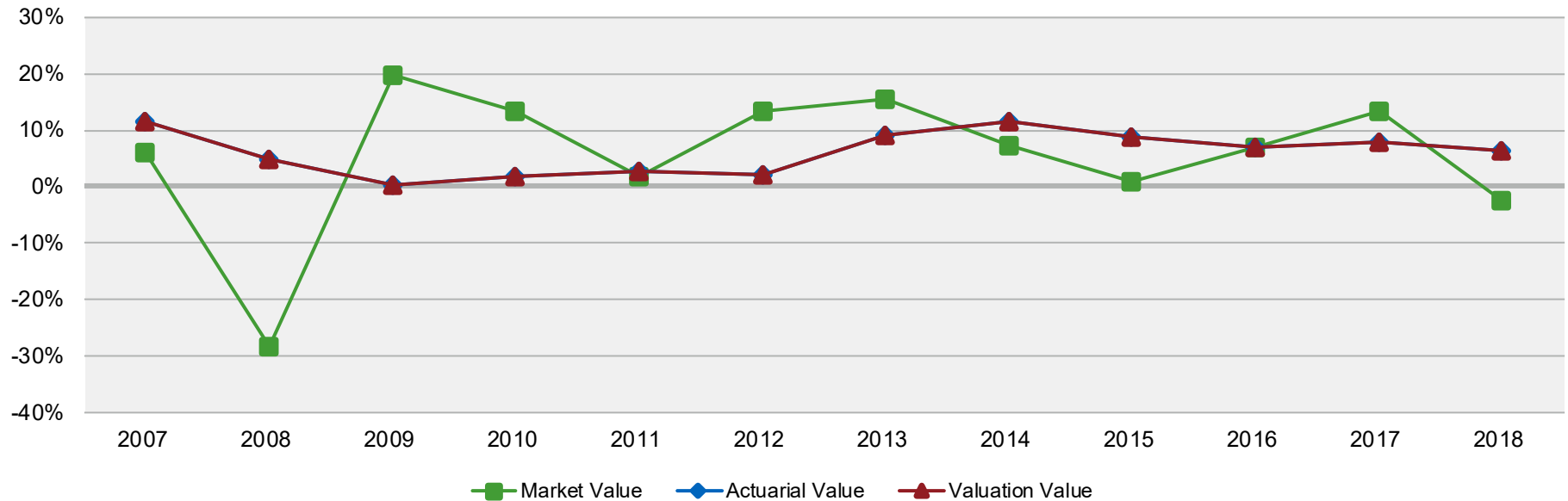
INVESTMENT RETURN – MARKET VALUE, ACTUARIAL VALUE AND VALUATION VALUE: 2009 – 2018

Year Ended December 31	Market Value Investment Return		Actuarial Value Investment Return		Valuation Value Investment Return	
	Amount	Percent	Amount	Percent	Amount	Percent
2009	\$736,956,891	19.68%	\$18,226,933	0.34%	\$17,021,116	0.32%
2010	594,637,090	13.35%	95,918,913	1.82%	94,835,030	1.80%
2011	88,042,268	1.76%	148,058,548	2.78%	146,988,614	2.77%
2012	668,138,997	13.31%	121,921,302	2.25%	120,826,177	2.24%
2013	870,984,744	15.50%	492,503,802	9.01%	491,324,308	9.02%
2014	473,522,261	7.35%	673,040,867	11.39%	671,957,212	11.40%
2015	65,495,657	0.95%	577,199,123	8.78%	576,151,245	8.79%
2016	493,874,242	7.10%	502,352,173	7.04%	501,328,149	7.04%
2017	987,415,981	13.31%	608,519,874	8.00%	607,477,597	8.00%
2018	(195,030,888)	-2.33%	516,825,883	6.32%	515,766,323	6.32%
Most recent five-year geometric average return		5.06%	8.13%		8.13%	
Most recent ten-year geometric average return		7.98%	6.03%		6.03%	

Note: Each year's yield is weighted by the average asset value in that year.

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 – 2018



Contributions

Contributions for the year ended December 31, 2018 totaled \$427.8 million (after excluding the pre-paid contributions by Rodeo-Hercules Fire Protection District for the 2019 calendar year), compared to the projected amount of \$415.1 million. This resulted in a gain of \$13.2 million for the year, when adjusted for timing.

Other 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),
- salary increases (greater or smaller than projected),
- cost-of-living adjustments (COLAs) higher or lower than anticipated, and
- administrative expenses different than assumed.

The net loss from this other experience for the year ended December 31, 2018 amounted to \$119.1 million, which is 1.2% of the Actuarial Accrued Liability. This loss was mainly due to higher than expected COLA increases and higher than expected individual salary increases for actives. See *Subsection E* for a detailed development of the Unfunded Actuarial Accrued Liability.

D. Other Changes in the Actuarial Accrued Liability

The Actuarial Accrued Liability as of December 31, 2018 is \$9.7 billion, an increase of \$0.4 billion, or 4.8%, 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

- The assumption changes reflected in this report were based on the January 1, 2015 through December 31, 2017 Actuarial Experience Study report dated April 23, 2019.
 - These changes decreased the Actuarial Accrued Liability by about \$90 million (or a 0.9% decrease) and decreased the total Normal Cost by 0.49% of payroll (a decrease of about 1.8%). The total (employer and member) contribution rate decrease as a result of the assumption changes was 1.29% of payroll.
 - The assumption changes include changes to merit and promotion salary increases, retirement from active employment, mortality, disability incidence, termination, retirement age for deferred vested members, percent of members assumed to go on to work for a reciprocal system, reciprocal salary increases, percent married, leave cashouts and sick leave conversions.
- 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*.

E. Development of Unfunded Actuarial Accrued Liability

DEVELOPMENT FOR YEAR ENDED DECEMBER 31, 2018

1	Unfunded Actuarial Accrued Liability at beginning of year	\$1,059,355,729
2	Total Normal Cost at middle of year ⁽¹⁾	238,009,508
3	Expected administrative expenses	9,725,065
4	Expected employer and member contributions	(415,080,401)
5	Interest	<u>68,607,565</u>
6	Expected Unfunded Actuarial Accrued Liability at end of year	\$960,617,466
7	Changes due to:	
	a) Investment return less than expected	\$55,252,687
	b) Actual contributions greater than expected	(12,911,803)
	c) Gain from additional UAAL contributions	(261,501)
	d) Individual salary increases higher than expected	20,984,310
	e) COLA increases higher than expected	67,057,526
	f) Retirement experience loss on actives (earlier retirements than expected)	17,409,557
	g) Other experience loss ⁽²⁾	13,689,718
	h) Assumption changes	<u>(89,872,436)</u>
	Total changes	<u>\$71,348,058</u>
8	Unfunded Actuarial Accrued Liability at end of year	<u>\$1,031,965,524</u>

Note: The sum of items 7d through 7g equals the "Net loss from other experience" shown in *Subsection C*.

⁽¹⁾ Excludes administrative expense load.

⁽²⁾ Other differences in actual versus expected experience including (but not limited to) disability, termination and leave cashout experience.

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, 2018, the average recommended employer contribution is 35.73% 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, 2018 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 ENDING DECEMBER 31

All Tiers Combined	2018		2017	
	Amount (\$ in '000s)	% of Projected Compensation	Amount (\$ in '000s)	% of Projected Compensation
1 Total Normal Cost	\$248,942	27.78%	\$246,099	28.59%
2 Expected member contributions	<u>107,291</u>	<u>11.97%</u>	<u>103,551</u>	<u>12.03%</u>
3 Employer Normal Cost: 1 – 2	\$141,651	15.81%	\$142,548	16.56%
4 Actuarial Accrued Liability	9,682,144		9,239,247	
5 Valuation Value of Assets	<u>8,650,178</u>		<u>8,179,891</u>	
6 Unfunded Actuarial Accrued Liability: 4 – 5	\$1,031,966		1,059,356	
7 Payment on Unfunded Actuarial Accrued Liability	178,521	19.92%	167,891	19.51%
8 Total average recommended employer contribution: 3 + 7	<u>\$320,172</u>	<u>35.73%</u>	\$310,439	<u>36.07%</u>
9 Projected compensation	\$896,391		\$860,625	

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

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 OF AVERAGE RECOMMENDED EMPLOYER CONTRIBUTION RATE FROM DECEMBER 31, 2017 TO DECEMBER 31, 2018

	Contribution Rate ⁽¹⁾	Estimated Annual Dollar Amount ⁽²⁾
Average Recommended Employer Contribution as of December 31, 2017	36.07%	\$310,439,414
• Effect of investment return less than expected	0.47%	\$4,213,037
• Effect of actual contributions greater than expected	(0.11%)	(986,030)
• Effect of additional UAAL contributions	0.00%	(20,062)
• Effect of individual salary increases higher than expected	0.18%	1,613,503
• Effect of amortizing prior year's UAAL over a larger than expected projected total payroll	(0.14%)	5,403,862 ⁽³⁾
• Effect of COLA increases higher than expected	0.57%	5,109,427
• Effect of retirement experience loss on actives (earlier retirements than expected)	0.15%	1,344,586
• Effect of changes in member demographics on Normal Cost	(0.30%)	(2,689,172)
• Effect of change in administrative expense load	(0.03%)	(268,917)
• Effect of other losses ⁽⁴⁾	0.13%	(3,718,486)
• Effect of change in assumptions	<u>(1.26%)</u>	<u>(268,917)</u>
Total change	(0.34%)	\$9,732,831
Average Recommended Employer Contribution as of December 31, 2018	35.73%	\$320,172,245

⁽¹⁾ These rates do not include any employer subvention of member contributions, or member subvention of employer contributions.

⁽²⁾ Based on projected compensation for each valuation date shown.

⁽³⁾ Represents the dollar increase in UAAL amortization payments for amortization bases established prior to the December 31, 2018 valuation.

⁽⁴⁾ Other differences in actual versus expected experience including (but not limited to) disability, mortality, termination and leave cashout experience. Estimated annual dollar cost also reflects changes in payroll from prior valuation.

Reconciliation of Average Recommended Member Contribution

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

RECONCILIATION OF AVERAGE RECOMMENDED MEMBER CONTRIBUTION FROM DECEMBER 31, 2017 TO DECEMBER 31, 2018

	Contribution Rate ⁽¹⁾	Estimated Annual Dollar Amount ⁽²⁾
Average Recommended Member Contribution as of December 31, 2017	12.03%	\$103,551,307
• Effect of change in administrative expense load	0.00%	\$0
• Effect of changes in member demographics ⁽³⁾	(0.03%)	4,009,046
• Effect of change in assumptions	<u>(0.03%)</u>	<u>(268,917)</u>
Total change	(0.06%)	\$3,740,129
Average Recommended Member Contribution as of December 31, 2018	11.97%	\$107,291,436

⁽¹⁾ These rates do not include any employer subvention of member contributions, or member subvention of employer contributions.

⁽²⁾ Based on projected compensation for each valuation date shown.

⁽³⁾ Includes changes in demographic profile of active membership. Estimated annual dollar cost also reflects change in payroll from prior valuation.

Recommended Employer Contribution Rates

Cost Group #1	December 31, 2018 Actuarial Valuation ⁽¹⁾ Recommended Rates for FY 2020-21				December 31, 2017 Actuarial Valuation ⁽²⁾ Recommended Rates for FY 2019-20			
	Basic	COLA	Total	Estimated Annual Dollar Amount	Basic	COLA	Total	Estimated Annual Dollar Amount
County General Tier 1 w/ Courts								
Normal Cost	11.55%	3.40%	14.95%	\$1,676,698	12.35%	3.55%	15.90%	\$1,874,629
UAAL	<u>11.08%</u>	<u>1.95%</u>	<u>13.03%</u>	<u>1,461,363</u>	<u>10.71%</u>	<u>1.65%</u>	<u>12.36%</u>	<u>1,457,259</u>
Total Contributions	22.63%	5.35%	27.98%	\$3,138,061	23.06%	5.20%	28.26%	\$3,331,888
District General Tier 1 w/o POB								
Normal Cost	11.55%	3.40%	14.95%	\$1,048,146	12.35%	3.55%	15.90%	\$1,082,621
UAAL	<u>16.13%</u>	<u>6.00%</u>	<u>22.13%</u>	<u>1,551,537</u>	<u>15.79%</u>	<u>5.72%</u>	<u>21.51%</u>	<u>1,464,602</u>
Total Contributions	27.68%	9.40%	37.08%	\$2,599,683	28.14%	9.27%	37.41%	\$2,547,223
District General Tier 1 w/ POB (Moraga)								
Normal Cost	11.55%	3.40%	14.95%	\$104,439	12.35%	3.55%	15.90%	\$89,206
UAAL	<u>9.07%</u>	<u>1.91%</u>	<u>10.98%</u>	<u>76,705</u>	<u>8.47%</u>	<u>1.48%</u>	<u>9.95%</u>	<u>55,824</u>
Total Contributions	20.62%	5.31%	25.93%	\$181,144	20.82%	5.03%	25.85%	\$145,030
District General Tier 1 w/ UAAL Prepayment (First Five)								
Normal Cost	11.55%	3.40%	14.95%	\$223,366	12.35%	3.55%	15.90%	\$238,733
UAAL	<u>11.31%</u>	<u>2.35%</u>	<u>13.66%</u>	<u>204,093</u>	<u>10.56%</u>	<u>1.76%</u>	<u>12.32%</u>	<u>184,980</u>
Total Contributions	22.86%	5.75%	28.61%	\$427,459	22.91%	5.31%	28.22%	\$423,713
District General Tier 1 w/ UAAL Prepayment (LAFCO)								
Normal Cost	11.55%	3.40%	14.95%	\$35,495	12.35%	3.55%	15.90%	\$36,570
UAAL	<u>15.38%</u>	<u>5.72%</u>	<u>21.10%</u>	<u>50,096</u>	<u>15.04%</u>	<u>5.44%</u>	<u>20.48%</u>	<u>47,104</u>
Total Contributions	26.93%	9.12%	36.05%	\$85,591	27.39%	8.99%	36.38%	\$83,674
County General Tier 4 (3% COLA) w/ Courts								
Normal Cost	8.80%	2.96%	11.76%	\$0	8.95%	3.01%	11.96%	\$0
UAAL	<u>11.08%</u>	<u>1.95%</u>	<u>13.03%</u>	<u>0</u>	<u>10.71%</u>	<u>1.65%</u>	<u>12.36%</u>	<u>0</u>
Total Contributions	19.88%	4.91%	24.79%	\$0	19.66%	4.66%	24.32%	\$0

⁽¹⁾ The Basic Normal Cost and UAAL rates shown for each cost group include an explicit administrative expense load of 0.47% and 0.16% of payroll, respectively.

⁽²⁾ The Basic Normal Cost and UAAL rates shown for each cost group include an explicit administrative expense load of 0.47% and 0.19% of payroll, respectively.

Recommended Employer Contribution Rates (continued)

Cost Group #1	December 31, 2018 Actuarial Valuation ⁽¹⁾ Recommended Rates for FY 2020-21				December 31, 2017 Actuarial Valuation ⁽²⁾ Recommended Rates for FY 2019-20			
	Basic	COLA	Total	Estimated Annual Dollar Amount	Basic	COLA	Total	Estimated Annual Dollar Amount
District General Tier 4 (3% COLA) w/o POB								
Normal Cost	8.80%	2.96%	11.76%	\$328,749	8.95%	3.01%	11.96%	\$277,255
UAAL	<u>16.13%</u>	<u>6.00%</u>	<u>22.13%</u>	<u>618,641</u>	<u>15.79%</u>	<u>5.72%</u>	<u>21.51%</u>	<u>498,642</u>
Total Contributions	24.93%	8.96%	33.89%	\$947,390	24.74%	8.73%	33.47%	\$775,897
District General Tier 4 (3% COLA) w/ POB (Moraga)								
Normal Cost	8.80%	2.96%	11.76%	\$15,569	8.95%	3.01%	11.96%	\$25,744
UAAL	<u>9.07%</u>	<u>1.91%</u>	<u>10.98%</u>	<u>14,537</u>	<u>8.47%</u>	<u>1.48%</u>	<u>9.95%</u>	<u>21,417</u>
Total Contributions	17.87%	4.87%	22.74%	\$30,106	17.42%	4.49%	21.91%	\$47,161
District General Tier 4 (3% COLA) w/ UAAL Prepayment (First Five)								
Normal Cost	8.80%	2.96%	11.76%	\$148,254	8.95%	3.01%	11.96%	\$123,847
UAAL	<u>11.31%</u>	<u>2.35%</u>	<u>13.66%</u>	<u>172,206</u>	<u>10.56%</u>	<u>1.76%</u>	<u>12.32%</u>	<u>127,575</u>
Total Contributions	20.11%	5.31%	25.42%	\$320,460	19.51%	4.77%	24.28%	\$251,422
District General Tier 4 (3% COLA) w/ UAAL Prepayment (LAFCO)								
Normal Cost	8.80%	2.96%	11.76%	\$0	8.95%	3.01%	11.96%	\$0
UAAL	<u>15.38%</u>	<u>5.72%</u>	<u>21.10%</u>	<u>0</u>	<u>15.04%</u>	<u>5.44%</u>	<u>20.48%</u>	<u>0</u>
Total Contributions	24.18%	8.68%	32.86%	\$0	23.99%	8.45%	32.44%	\$0
County General Tier 4 (2% COLA) w/ Courts								
Normal Cost	8.68%	1.99%	10.67%	\$0	8.80%	2.02%	10.82%	\$0
UAAL	<u>11.08%</u>	<u>1.95%</u>	<u>13.03%</u>	<u>0</u>	<u>10.71%</u>	<u>1.65%</u>	<u>12.36%</u>	<u>0</u>
Total Contributions	19.76%	3.94%	23.70%	\$0	19.51%	3.67%	23.18%	\$0

⁽¹⁾ The Basic Normal Cost and UAAL rates shown for each cost group include an explicit administrative expense load of 0.47% and 0.16% of payroll, respectively.

⁽²⁾ The Basic Normal Cost and UAAL rates shown for each cost group include an explicit administrative expense load of 0.47% and 0.19% of payroll, respectively.

Recommended Employer Contribution Rates (continued)

Cost Group #2	December 31, 2018 Actuarial Valuation ⁽¹⁾ Recommended Rates for FY 2020-21				December 31, 2017 Actuarial Valuation ⁽²⁾ Recommended Rates for FY 2019-20			
	Basic	COLA	Total	Estimated Annual Dollar Amount	Basic	COLA	Total	Estimated Annual Dollar Amount
County General Tier 3 w/ Courts								
Normal Cost	11.84%	3.34%	15.18%	\$61,280,878	12.31%	3.43%	15.74%	\$65,050,705
UAAL	<u>11.08%</u>	<u>1.95%</u>	<u>13.03%</u>	<u>52,601,439</u>	<u>10.71%</u>	<u>1.65%</u>	<u>12.36%</u>	<u>51,081,748</u>
Total Contributions	22.92%	5.29%	28.21%	\$113,882,317	23.02%	5.08%	28.10%	\$116,132,453
District General Tier 3 w/o POB								
Normal Cost	11.84%	3.34%	15.18%	\$468,789	12.31%	3.43%	15.74%	\$508,194
UAAL	<u>16.13%</u>	<u>6.00%</u>	<u>22.13%</u>	<u>683,418</u>	<u>15.79%</u>	<u>5.72%</u>	<u>21.51%</u>	<u>694,489</u>
Total Contributions	27.97%	9.34%	37.31%	\$1,152,207	28.10%	9.15%	37.25%	\$1,202,683
County General Tier 5 (3%/4% COLA) w/ Courts								
Normal Cost	8.39%	2.76%	11.15%	\$6,456,452	8.42%	2.79%	11.21%	\$6,476,314
UAAL	<u>11.08%</u>	<u>1.95%</u>	<u>13.03%</u>	<u>7,545,073</u>	<u>10.71%</u>	<u>1.65%</u>	<u>12.36%</u>	<u>7,140,700</u>
Total Contributions	19.47%	4.71%	24.18%	\$14,001,525	19.13%	4.44%	23.57%	\$13,617,014
District General Tier 5 (3%/4% COLA) w/o POB								
Normal Cost	8.39%	2.76%	11.15%	\$91,197	8.42%	2.79%	11.21%	\$58,359
UAAL	<u>16.13%</u>	<u>6.00%</u>	<u>22.13%</u>	<u>181,003</u>	<u>15.79%</u>	<u>5.72%</u>	<u>21.51%</u>	<u>111,980</u>
Total Contributions	24.52%	8.76%	33.28%	\$272,200	24.21%	8.51%	32.72%	\$170,339
County General Tier 5 (2% COLA) w/ Courts								
Normal Cost	8.16%	1.84%	10.00%	\$18,635,938	8.20%	1.87%	10.07%	\$15,302,813
UAAL	<u>11.08%</u>	<u>1.95%</u>	<u>13.03%</u>	<u>24,282,627</u>	<u>10.71%</u>	<u>1.65%</u>	<u>12.36%</u>	<u>18,782,797</u>
Total Contributions	19.24%	3.79%	23.03%	\$42,918,565	18.91%	3.52%	22.43%	\$34,085,610
District General Tier 5 (2% COLA) w/o POB								
Normal Cost	8.16%	1.84%	10.00%	\$33,189	8.20%	1.87%	10.07%	\$26,380
UAAL	<u>16.13%</u>	<u>6.00%</u>	<u>22.13%</u>	<u>73,448</u>	<u>15.79%</u>	<u>5.72%</u>	<u>21.51%</u>	<u>56,350</u>
Total Contributions	24.29%	7.84%	32.13%	\$106,637	23.99%	7.59%	31.58%	\$82,730

⁽¹⁾ The Basic Normal Cost and UAAL rates shown for each cost group include an explicit administrative expense load of 0.47% and 0.16% of payroll, respectively.

⁽²⁾ The Basic Normal Cost and UAAL rates shown for each cost group include an explicit administrative expense load of 0.47% and 0.19% of payroll, respectively.

Recommended Employer Contribution Rates (continued)

Cost Group #3	December 31, 2018 Actuarial Valuation ⁽¹⁾ Recommended Rates for FY 2020-21				December 31, 2017 Actuarial Valuation ⁽²⁾ Recommended Rates for FY 2019-20			
	Basic	COLA	Total	Estimated Annual Dollar Amount	Basic	COLA	Total	Estimated Annual Dollar Amount
CCCSD General Tier 1								
Normal Cost	12.36%	3.67%	16.03%	\$4,562,037	13.30%	3.88%	17.18%	\$4,947,250
UAAL	<u>23.23%</u>	<u>11.58%</u>	<u>34.81%</u>	<u>9,906,707</u>	<u>22.99%</u>	<u>10.43%</u>	<u>33.42%</u>	<u>9,623,812</u>
Total Contributions	35.59%	15.25%	50.84%	\$14,468,744	36.29%	14.31%	50.60%	\$14,571,062
CCCSD General Tier 4 (3% COLA)								
Normal Cost	8.23%	2.83%	11.06%	\$772,346	8.03%	2.80%	10.83%	\$601,334
UAAL	<u>23.23%</u>	<u>11.58%</u>	<u>34.81%</u>	<u>2,430,863</u>	<u>22.99%</u>	<u>10.43%</u>	<u>33.42%</u>	<u>1,855,640</u>
Total Contributions	31.46%	14.41%	45.87%	\$3,203,209	31.02%	13.23%	44.25%	\$2,456,974
Cost Group #4								
Contra Costa Housing Authority General Tier 1								
Normal Cost	12.77%	3.65%	16.42%	\$685,017	13.24%	3.74%	16.98%	\$694,627
UAAL	<u>16.44%</u>	<u>10.57%</u>	<u>27.01%</u>	<u>1,126,815</u>	<u>16.36%</u>	<u>9.71%</u>	<u>26.07%</u>	<u>1,066,486</u>
Total Contributions	29.21%	14.22%	43.43%	\$1,811,832	29.60%	13.45%	43.05%	\$1,761,113
Contra Costa Housing Authority General Tier 4 (3% COLA)								
Normal Cost	8.96%	3.02%	11.98%	\$186,734	9.49%	3.24%	12.73%	\$189,928
UAAL	<u>16.44%</u>	<u>10.57%</u>	<u>27.01%</u>	<u>421,010</u>	<u>16.36%</u>	<u>9.71%</u>	<u>26.07%</u>	<u>388,957</u>
Total Contributions	25.40%	13.59%	38.99%	\$607,744	25.85%	12.95%	38.80%	\$578,885

⁽¹⁾ The Basic Normal Cost and UAAL rates shown for each cost group include an explicit administrative expense load of 0.47% and 0.16% of payroll, respectively.

⁽²⁾ The Basic Normal Cost and UAAL rates shown for each cost group include an explicit administrative expense load of 0.47% and 0.19% of payroll, respectively.

Recommended Employer Contribution Rates (continued)

Cost Group #5	December 31, 2018 Actuarial Valuation ⁽¹⁾ Recommended Rates for FY 2020-21				December 31, 2017 Actuarial Valuation ⁽²⁾ Recommended Rates for FY 2019-20			
	Basic	COLA	Total	Estimated Annual Dollar Amount	Basic	COLA	Total	Estimated Annual Dollar Amount
CCCFPD General Tier 1								
Normal Cost	11.75%	3.45%	15.20%	\$584,464	12.27%	3.52%	15.79%	\$606,975
UAAL	<u>10.53%</u>	<u>7.93%</u>	<u>18.46%</u>	<u>709,817</u>	<u>10.12%</u>	<u>6.84%</u>	<u>16.96%</u>	<u>651,951</u>
Total Contributions	22.28%	11.38%	33.66%	\$1,294,281	22.39%	10.36%	32.75%	\$1,258,926
CCCFPD General Tier 4 (3% COLA)								
Normal Cost	11.38%	3.79%	15.17%	\$27,024	11.44%	3.90%	15.34%	\$25,753
UAAL	<u>10.53%</u>	<u>7.93%</u>	<u>18.46%</u>	<u>32,885</u>	<u>10.12%</u>	<u>6.84%</u>	<u>16.96%</u>	<u>28,473</u>
Total Contributions	21.91%	11.72%	33.63%	\$59,909	21.56%	10.74%	32.30%	\$54,226
CCCFPD General Tier 4 (2% COLA)								
Normal Cost	10.07%	2.27%	12.34%	\$212,717	9.46%	2.19%	11.65%	\$131,956
UAAL	<u>10.53%</u>	<u>7.93%</u>	<u>18.46%</u>	<u>318,213</u>	<u>10.12%</u>	<u>6.84%</u>	<u>16.96%</u>	<u>192,101</u>
Total Contributions	20.60%	10.20%	30.80%	\$530,930	19.58%	9.03%	28.61%	\$324,057

⁽¹⁾ The Basic Normal Cost and UAAL rates shown for each cost group include an explicit administrative expense load of 0.47% and 0.16% of payroll, respectively.

⁽²⁾ The Basic Normal Cost and UAAL rates shown for each cost group include an explicit administrative expense load of 0.47% and 0.19% of payroll, respectively.

Recommended Employer Contribution Rates (continued)

Cost Group #6	December 31, 2018 Actuarial Valuation ⁽¹⁾ Recommended Rates for FY 2020-21				December 31, 2017 Actuarial Valuation ⁽²⁾ Recommended Rates for FY 2019-20			
	Basic	COLA	Total	Estimated Annual Dollar Amount	Basic	COLA	Total	Estimated Annual Dollar Amount
Non-Enhanced District General Tier 1								
Normal Cost	12.58%	3.84%	16.42%	\$114,839	13.27%	3.95%	17.22%	\$114,214
UAAL	<u>0.16%</u>	<u>0.00%</u>	<u>0.16%</u>	<u>1,119</u>	<u>0.19%</u>	<u>0.00%</u>	<u>0.19%</u>	<u>1,260</u>
Total Contributions	12.74%	3.84%	16.58%	\$115,958	13.46%	3.95%	17.41%	\$115,474
Non-Enhanced District General Tier 4 (3% COLA)								
Normal Cost	9.39%	3.21%	12.60%	\$30,355	10.01%	3.47%	13.48%	\$25,266
UAAL	<u>0.16%</u>	<u>0.00%</u>	<u>0.16%</u>	<u>385</u>	<u>0.19%</u>	<u>0.00%</u>	<u>0.19%</u>	<u>356</u>
Total Contributions	9.55%	3.21%	12.76%	\$30,740	10.20%	3.47%	13.67%	\$25,622
Cost Group #7								
County Safety Tier A								
Normal Cost	22.36%	7.06%	29.42%	\$16,438,118	23.00%	7.35%	30.35%	\$17,463,315
UAAL	<u>22.01%</u>	<u>19.47%</u>	<u>41.48%</u>	<u>23,176,517</u>	<u>22.59%</u>	<u>19.54%</u>	<u>42.13%</u>	<u>24,241,498</u>
Total Contributions	44.37%	26.53%	70.90%	\$39,614,635	45.59%	26.89%	72.48%	\$41,704,813
County Safety Tier D								
Normal Cost	14.31%	5.73%	20.04%	\$731,500	14.86%	6.13%	20.99%	\$740,793
UAAL	<u>22.01%</u>	<u>19.47%</u>	<u>41.48%</u>	<u>1,514,104</u>	<u>22.59%</u>	<u>19.54%</u>	<u>42.13%</u>	<u>1,486,879</u>
Total Contributions	36.32%	25.20%	61.52%	\$2,245,604	37.45%	25.67%	63.12%	\$2,227,672

⁽¹⁾ The Basic Normal Cost and UAAL rates shown for each cost group include an explicit administrative expense load of 0.47% and 0.16% of payroll, respectively.

⁽²⁾ The Basic Normal Cost and UAAL rates shown for each cost group include an explicit administrative expense load of 0.47% and 0.19% of payroll, respectively.

Recommended Employer Contribution Rates (continued)

Cost Group #8	December 31, 2018 Actuarial Valuation ⁽¹⁾ Recommended Rates for FY 2020-21				December 31, 2017 Actuarial Valuation ⁽²⁾ Recommended Rates for FY 2019-20			
	Basic	COLA	Total	Estimated Annual Dollar Amount	Basic	COLA	Total	Estimated Annual Dollar Amount
CCCFPD Safety Tier A								
Normal Cost	21.94%	7.00%	28.94%	\$8,890,908	22.60%	7.30%	29.90%	\$8,634,767
UAAL	<u>11.91%</u>	<u>26.53%</u>	<u>38.44%</u>	<u>11,809,485</u>	<u>14.63%</u>	<u>28.36%</u>	<u>42.99%</u>	<u>12,415,004</u>
Total Contributions	33.85%	33.53%	67.38%	\$20,700,393	37.23%	35.66%	72.89%	\$21,049,771
East CCCFPD Safety Tier A								
Normal Cost	21.94%	7.00%	28.94%	\$854,868	22.60%	7.30%	29.90%	\$767,350
UAAL	<u>37.82%</u>	<u>46.30%</u>	<u>84.12%</u>	<u>2,484,849</u>	<u>42.84%</u>	<u>49.87%</u>	<u>92.71%</u>	<u>2,379,297</u>
Total Contributions	59.76%	53.30%	113.06%	\$3,339,717	65.44%	57.17%	122.61%	\$3,146,647
CCCFPD Safety Tier D								
Normal Cost	13.05%	5.35%	18.40%	\$330,875	14.28%	6.00%	20.28%	\$359,801
UAAL	<u>11.91%</u>	<u>26.53%</u>	<u>38.44%</u>	<u>691,242</u>	<u>14.63%</u>	<u>28.36%</u>	<u>42.99%</u>	<u>762,715</u>
Total Contributions	24.96%	31.88%	56.84%	\$1,022,117	28.91%	34.36%	63.27%	\$1,122,516
East CCCFPD Safety Tier D								
Normal Cost	13.05%	5.35%	18.40%	\$71,748	14.28%	6.00%	20.28%	\$62,491
UAAL	<u>37.82%</u>	<u>46.30%</u>	<u>84.12%</u>	<u>328,012</u>	<u>42.84%</u>	<u>49.87%</u>	<u>92.71%</u>	<u>285,676</u>
Total Contributions	50.87%	51.65%	102.52%	\$399,760	57.12%	55.87%	112.99%	\$348,167
CCCFPD Safety Tier E								
Normal Cost	12.09%	3.32%	15.41%	\$673,206	13.90%	3.90%	17.80%	\$386,348
UAAL	<u>11.91%</u>	<u>26.53%</u>	<u>38.44%</u>	<u>1,679,302</u>	<u>14.63%</u>	<u>28.36%</u>	<u>42.99%</u>	<u>933,095</u>
Total Contributions	24.00%	29.85%	53.85%	\$2,352,508	28.53%	32.26%	60.79%	\$1,319,443

⁽¹⁾ The Basic Normal Cost and UAAL rates shown for each cost group include an explicit administrative expense load of 0.47% and 0.16% of payroll, respectively.

⁽²⁾ The Basic Normal Cost and UAAL rates shown for each cost group include an explicit administrative expense load of 0.47% and 0.19% of payroll, respectively.

Recommended Employer Contribution Rates (continued)

Cost Group #9	December 31, 2018 Actuarial Valuation ⁽¹⁾ Recommended Rates for FY 2020-21				December 31, 2017 Actuarial Valuation ⁽²⁾ Recommended Rates for FY 2019-20			
	Basic	COLA	Total	Estimated Annual Dollar Amount	Basic	COLA	Total	Estimated Annual Dollar Amount
County Safety Tier C								
Normal Cost	20.48%	4.38%	24.86%	\$3,551,798	21.06%	4.51%	25.57%	\$3,445,978
UAAL	<u>22.01%</u>	<u>19.47%</u>	<u>41.48%</u>	<u>5,926,330</u>	<u>22.59%</u>	<u>19.54%</u>	<u>42.13%</u>	<u>5,677,710</u>
Total Contributions	42.49%	23.85%	66.34%	\$9,478,128	43.65%	24.05%	67.70%	\$9,123,688
County Safety Tier E								
Normal Cost	13.17%	3.57%	16.74%	\$4,350,068	13.50%	3.76%	17.26%	\$3,775,786
UAAL	<u>22.01%</u>	<u>19.47%</u>	<u>41.48%</u>	<u>10,779,022</u>	<u>22.59%</u>	<u>19.54%</u>	<u>42.13%</u>	<u>9,216,330</u>
Total Contributions	35.18%	23.04%	58.22%	\$15,129,090	36.09%	23.30%	59.39%	\$12,992,116
Cost Group #10								
Moraga-Orinda FD Safety Tier A								
Normal Cost	20.36%	6.75%	27.11%	\$1,624,580	21.38%	7.06%	28.44%	\$1,825,642
UAAL	<u>14.05%</u>	<u>31.41%</u>	<u>45.46%</u>	<u>2,724,213</u>	<u>13.83%</u>	<u>28.67%</u>	<u>42.50%</u>	<u>2,728,192</u>
Total Contributions	34.41%	38.16%	72.57%	\$4,348,793	35.21%	35.73%	70.94%	\$4,553,834
Moraga-Orinda FD Safety Tier D								
Normal Cost	12.70%	5.23%	17.93%	\$255,138	13.33%	5.65%	18.98%	\$177,156
UAAL	<u>14.05%</u>	<u>31.41%</u>	<u>45.46%</u>	<u>646,881</u>	<u>13.83%</u>	<u>28.67%</u>	<u>42.50%</u>	<u>396,687</u>
Total Contributions	26.75%	36.64%	63.39%	\$902,019	27.16%	34.32%	61.48%	\$573,843

⁽¹⁾ The Basic Normal Cost and UAAL rates shown for each cost group include an explicit administrative expense load of 0.47% and 0.16% of payroll, respectively.

⁽²⁾ The Basic Normal Cost and UAAL rates shown for each cost group include an explicit administrative expense load of 0.47% and 0.19% of payroll, respectively.

Recommended Employer Contribution Rates (continued)

Cost Group #11	December 31, 2018 Actuarial Valuation ⁽¹⁾ Recommended Rates for FY 2020-21				December 31, 2017 Actuarial Valuation ⁽²⁾ Recommended Rates for FY 2019-20			
	Basic	COLA	Total	Estimated Annual Dollar Amount	Basic	COLA	Total	Estimated Annual Dollar Amount
San Ramon FD Safety Tier A								
Normal Cost	21.64%	6.92%	28.56%	\$4,960,173	22.22%	7.08%	29.30%	\$5,421,031
UAAL	<u>29.75%</u>	<u>19.92%</u>	<u>49.67%</u>	<u>8,626,464</u>	<u>28.83%</u>	<u>18.71%</u>	<u>47.54%</u>	<u>8,795,761</u>
Total Contributions	51.39%	26.84%	78.23%	\$13,586,637	51.05%	25.79%	76.84%	\$14,216,792
San Ramon FD Safety Tier D								
Normal Cost	11.44%	4.71%	16.15%	\$685,315	12.66%	5.40%	18.06%	\$549,052
UAAL	<u>29.75%</u>	<u>19.92%</u>	<u>49.67%</u>	<u>2,107,714</u>	<u>28.83%</u>	<u>18.71%</u>	<u>47.54%</u>	<u>1,445,289</u>
Total Contributions	41.19%	24.63%	65.82%	\$2,793,029	41.49%	24.11%	65.60%	\$1,994,341
Cost Group #12								
Non-Enhanced Rodeo-Hercules FPD Safety Tier A								
Normal Cost	17.29%	5.00%	22.29%	\$420,617	14.89%	5.21%	20.10%	\$371,801
UAAL ^{(3), (4)}	<u>37.31%</u>	<u>26.98%</u>	<u>64.29%</u>	<u>1,213,165</u>	<u>42.63%</u>	<u>30.04%</u>	<u>72.67%</u>	<u>1,344,216</u>
Total Contributions	54.60%	31.98%	86.58%	\$1,633,782	57.52%	35.25%	92.77%	\$1,716,017
Non-Enhanced Rodeo-Hercules FPD Safety Tier D								
Normal Cost	11.65%	4.82%	16.47%	\$89,598	11.92%	5.07%	16.99%	\$58,095
UAAL ^{(3), (4)}	<u>37.31%</u>	<u>26.98%</u>	<u>64.29%</u>	<u>349,743</u>	<u>42.63%</u>	<u>30.04%</u>	<u>72.67%</u>	<u>248,483</u>
Total Contributions	48.96%	31.80%	80.76%	\$439,341	54.55%	35.11%	89.66%	\$306,578
Total All Employers Combined (Aggregate)								
Normal Cost	12.30%	3.51%	15.81%	\$141,651,202	12.87%	3.69%	16.56%	\$142,548,079
UAAL	<u>13.56%</u>	<u>6.36%</u>	<u>19.92%</u>	<u>178,521,043</u>	<u>13.45%</u>	<u>6.06%</u>	<u>19.51%</u>	<u>167,891,335</u>
Total Contributions	25.86%	9.87%	35.73%	\$320,172,245	26.32%	9.75%	36.07%	\$310,439,414

⁽¹⁾ The Basic Normal Cost and UAAL rates shown for each cost group include an explicit administrative expense load of 0.47% and 0.16% of payroll, respectively.

⁽²⁾ The Basic Normal Cost and UAAL rates shown for each cost group include an explicit administrative expense load of 0.47% and 0.19% of payroll, respectively.

⁽³⁾ The total UAAL dollar contribution for Rodeo-Hercules FPD is \$1,639,716 for FY 2020-21. It is based on the UAAL rate shown above multiplied by estimated payroll for FY 2020-21. The estimated payroll for FY 2020-21 was determined by increasing payroll amounts shown on the following page for 2019 by 18-months of assumed wage inflation.

⁽⁴⁾ The total UAAL dollar contribution for Rodeo-Hercules FPD is \$1,670,971 for FY 2019-20. It is based on the UAAL rate shown above multiplied by estimated payroll for FY 2019-20. The estimated payroll for FY 2019-20 was determined by increasing payroll amounts for 2018 by 18-months of assumed wage inflation.

Recommended Employer Contribution Rates (continued)

The projected compensation for the 2019 calendar year that is used to estimate the annual dollar amount shown on the prior pages as of December 31, 2018 are as follows:

Cost Group #1	Projected Compensation
County General Tier 1 w/ Courts	\$11,215,371
District General Tier 1 w/o POB	7,011,012
District General Tier 1 w/ POB (Moraga)	698,585
District General Tier 1 w/ UAAL Prepayment (First Five)	1,494,090
District General Tier 1 w/ UAAL Prepayment (LAFCO)	237,423
County General Tier 4 (3% COLA) w/ Courts	0
District General Tier 4 (3% COLA) w/o POB	2,795,484
District General Tier 4 (3% COLA) w/ POB (Moraga)	132,392
District General Tier 4 (3% COLA) w/ UAAL Prepayment (First Five)	1,260,660
District General Tier 4 (3% COLA) w/ UAAL Prepayment (LAFCO)	0
County General Tier 4 (2% COLA) w/ Courts	0
Cost Group #2	Projected Compensation
County General Tier 3 w/ Courts	\$403,694,851
District General Tier 3 w/o POB	3,088,198
County General Tier 5 (3%/4% COLA) w/ Courts	57,905,395
District General Tier 5 (3%/4% COLA) w/o POB	817,909
County General Tier 5 (2% COLA) w/ Courts	186,359,376
District General Tier 5 (2% COLA) w/o POB	331,894
Cost Group #3	Projected Compensation
CCCSD General Tier 1	\$28,459,370
CCCSD General Tier 4 (3% COLA)	6,983,233
Cost Group #4	Projected Compensation
Contra Costa Housing Authority General Tier 1	\$4,171,844
Contra Costa Housing Authority General Tier 4 (3% COLA)	1,558,718
Cost Group #5	Projected Compensation
CCCFPD General Tier 1	\$3,845,161
CCCFPD General Tier 4 (3% COLA)	178,144
CCCFPD General Tier 4 (2% COLA)	1,723,800

Cost Group #6	Projected Compensation
Non-Enhanced District General Tier 1	\$699,386
Non-Enhanced District General Tier 4 (3% COLA)	240,911
Cost Group #7	Projected Compensation
County Safety Tier A	\$55,873,955
County Safety Tier D	3,650,202
Cost Group #8	Projected Compensation
CCCFPD Safety Tier A	\$30,721,866
East CCCFPD Safety Tier A	2,953,933
CCCFPD Safety Tier D	1,798,236
East CCCFPD Safety Tier D	389,934
CCCFPD Safety Tier E	4,368,632
Cost Group #9	Projected Compensation
County Safety Tier C	\$14,287,199
County Safety Tier E	25,986,071
Cost Group #10	Projected Compensation
Moraga-Orinda FD Safety Tier A	\$5,992,550
Moraga-Orinda FD Safety Tier D	1,422,967
Cost Group #11	Projected Compensation
San Ramon FD Safety Tier A	\$17,367,553
San Ramon FD Safety Tier D	4,243,434
Cost Group #12	Projected Compensation
Non-Enhanced Rodeo-Hercules FPD Safety Tier A	\$1,887,019
Non-Enhanced Rodeo-Hercules FPD Safety Tier D	544,009
Total All Employers Combined (Aggregate)	\$896,390,767

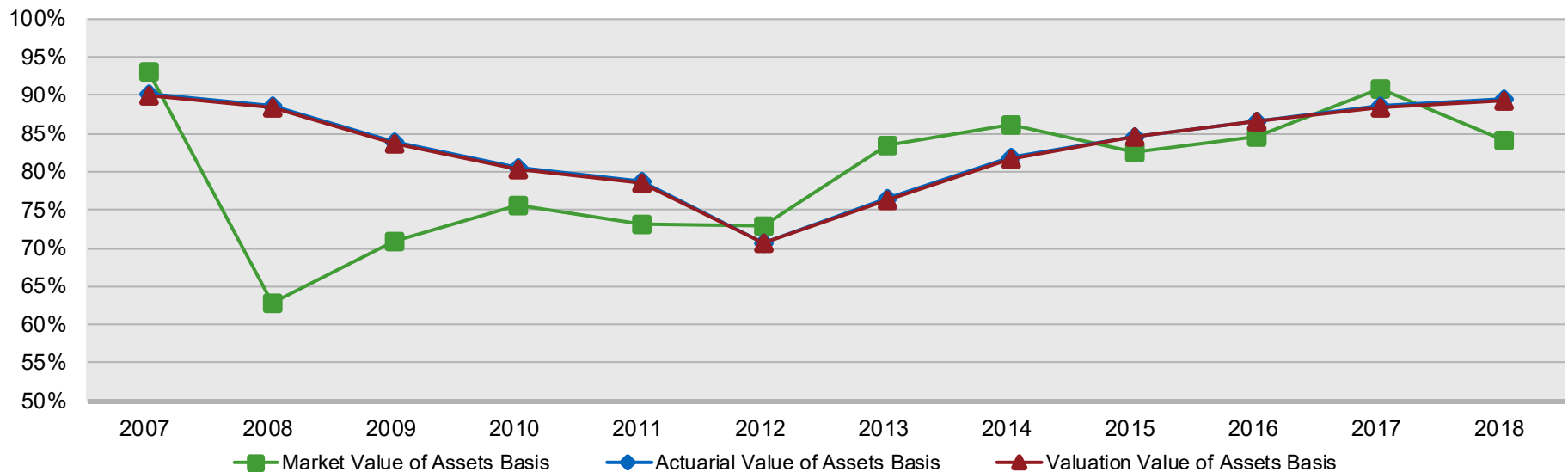
G. Funded Status

A commonly reported piece of information regarding the Plan's financial status is the funded ratio. These ratios compare the Market, Actuarial and Valuation Value of Assets to the Actuarial Accrued Liability of the Plan. High ratios indicate a well-funded plan with assets sufficient to cover the Plan's Actuarial Accrued Liability. Lower ratios may indicate recent changes to benefit structures, 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 Actuarial, Valuation or Market Value of Assets is used.

**FUNDED RATIO
FOR PLAN YEARS ENDING DECEMBER 31, 2007 – 2018**



**SCHEDULE OF FUNDING PROGRESS
FOR PLAN YEARS ENDING DECEMBER 31, 2009 – 2018**

Actuarial Valuation Date as of December 31	Valuation Value of Assets ⁽¹⁾ (a)	Actuarial Accrued Liability (AAL) ⁽²⁾ (b)	Unfunded/ (Overfunded) AAL (UAAL) (b) - (a)	Funded Ratio (%) (a) / (b)	Covered Payroll (c)	UAAL as a Percentage of Covered Payroll (%) [(b) - (a)] / (c)
2009	\$5,290,114,102	\$6,314,787,187	\$1,024,673,085	83.8%	\$694,443,999	147.6%
2010	5,341,821,711	6,654,036,801	1,312,215,090	80.3	687,443,206	190.9
2011	5,426,719,066	6,915,311,649	1,488,592,583	78.5	666,394,146	223.4
2012	5,482,257,062	7,761,315,535	2,279,058,473	70.6	652,312,180	349.4
2013	5,907,416,432	7,731,097,407	1,823,680,975	76.4	679,428,911	268.4
2014	6,557,496,101	8,027,438,213	1,469,942,112	81.7	697,831,837	210.6
2015	7,136,801,380	8,448,624,096	1,311,822,716	84.5	746,352,663	175.8
2016	7,606,997,530	8,794,434,139	1,187,436,609	86.5	784,412,260	151.4
2017	8,179,891,191	9,239,246,920	1,059,355,729	88.5	860,624,613	123.1
2018	8,650,178,226	9,682,143,750	1,031,965,524	89.3	896,390,768	115.1

⁽¹⁾ Excludes assets for non-valuation reserves.

⁽²⁾ Excludes liabilities for non-valuation reserves.

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 FOR YEAR ENDED DECEMBER 31, 2018

	Basic	COLA	Total
Actuarial Present Value of Future Benefits ⁽¹⁾			
• Present value of benefits for retired members and beneficiaries	\$3,496,942,367	\$2,689,576,148	\$6,186,518,515
• Present value of benefits for inactive vested members ⁽²⁾	221,617,079	78,260,001	299,877,080
• Present value of benefits for active members	<u>3,635,330,717</u>	<u>1,306,933,032</u>	<u>4,942,263,749</u>
Total Actuarial Present Value of Future Benefits	<u>\$7,353,890,163</u>	<u>\$4,074,769,181</u>	<u>\$11,428,659,344</u>
Current and future assets ⁽¹⁾			
• Total Valuation Value of Assets	\$5,328,283,167	\$3,321,895,059	\$8,650,178,226
• Present value of future contributions by members	559,803,121	230,920,636	790,723,757
• Present value of future employer contributions for:			
» Entry age Normal Cost	737,739,664	218,052,173	955,791,837
» Unfunded Actuarial Accrued Liability	<u>728,064,211</u>	<u>303,901,313</u>	<u>1,031,965,524</u>
Total of current and future assets	<u>\$7,353,890,163</u>	<u>\$4,074,769,181</u>	<u>\$11,428,659,344</u>

⁽¹⁾ Excludes administrative expenses.

⁽²⁾ Includes inactive members with member contributions on deposit.

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 9.0. This means that a 1% asset gain or loss (relative to the assumed investment return) translates to about 9.0% of one-year's payroll. Since actuarial gains and losses are amortized over 18 years, there would be a 0.7% 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 LVR is about 10.7, but is 8.1 for General compared to 21.8 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.

VOLATILITY RATIOS FOR YEARS ENDED DECEMBER 31, 2009 – 2018

Year Ended December 31	Asset Volatility Ratio			Liability Volatility Ratio		
	General	Safety	Total	General	Safety	Total
2009	5.0	11.4	6.4	7.0	16.0	9.1
2010	5.6	13.1	7.3	7.5	17.2	9.7
2011	5.9	13.6	7.6	8.0	18.6	10.4
2012	6.7	16.2	8.7	9.0	22.5	11.9
2013	7.3	18.2	9.5	8.6	22.3	11.4
2014	7.5	19.7	9.9	8.6	23.5	11.5
2015	7.1	18.7	9.3	8.4	23.3	11.3
2016	7.2	19.0	9.5	8.3	23.1	11.1
2017	7.4	19.6	9.7	8.0	22.2	10.7
2018	6.9	18.0	9.0	8.1	21.8	10.7

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 section 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 it may be interested in discussing and could include tailored scenario testing, sensitivity testing, stress testing and stochastic modeling.

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 changes 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 health of the system, affecting both funded status and contribution rates. The inherent year-to-year volatility is reduced by smoothing through the Actuarial Value of Assets, however investment experience can still have a sizable impact. As discussed in *Section 2, Subsection I, Volatility Ratios*, on page 45, a 1% asset gain or loss (relative to the assumed investment return) translates to about 9.0% of one-year's payroll. Since

actuarial gains and losses are amortized over 18 years, there would be a 0.7% of payroll decrease/(increase) in the required contribution for each 1% asset gain/(loss).

The market value rate of return over the last 10 years has ranged from a low of -2.33% to a high of 19.68%.

➤ 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 cost 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 employers have 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 basis has increased from 83.8% to 89.3%. This is primarily due to contributions made to amortize the UAAL (i.e., amortizing each layer of UAAL over 18 years as a level percentage of pay) and average investment return over recent years higher than the assumption on a smoothed basis. For a more detailed history see *Section 2, Subsection G, Funded Status* starting on page 42.
- The average geometric investment return on the Valuation Value of Assets over the last 10 years was 6.03%. This includes a high of a 11.40% return and a low of 0.32%. The average over the last 5 years 8.13%. For more details see the Investment Return table in *Section 2, Subsection B* on page 24.

- The primary source of new UAAL was the strengthening of assumptions through multiple assumption changes. For example, the assumption change in 2012 changed the discount rate from 7.75% to 7.25% and updated mortality tables, adding \$567 million in unfunded liability. The assumption change in 2015 changed the discount rate from 7.25% to 7.00% and updated mortality tables, adding \$114 million in unfunded liability. For more details on the unfunded liability changes see *Section 3, Exhibit I, Table of Amortization Bases* starting on page 87.
- The plan's funding policy effectively deals with these unfunded liabilities over time. This can be seen most clearly in *Section 3, Exhibit J, Projection of UAAL Balances and Payments* provided on pages 100 and 101.

Maturity Measures

In the last 10 years the ratio of members in pay status to active participants has increased from 0.82 to 0.95. This ratio has fluctuated between 0.82 and 0.99 during the last 10 years. An increased ratio indicates that the plan has grown in maturity over time. This is to be expected, but is also informative for understanding plan sensitivity to particular risks. For more details see *Section 2, Subsection A, Member Data* on page 15.

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. For the prior year benefits paid were \$36 million more than contributions received. Plans with high levels of negative cash flows have a need for a larger allocation to income generating assets, which can create a drag on investment return. However, this plan currently has relatively low levels of negative cash flows. For more details on historical cash flows see the Comparison of Contributions with Benefits in *Section 2, Subsection B, Financial Information* on page 19.

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* starting on page 45.

Section 3: Supplemental Information

EXHIBIT A – TABLE OF PLAN COVERAGE TOTAL PLAN

Category	Year Ended December 31		Change From Prior Year
	2018	2017	
Active members in valuation:			
• Number	10,021	10,038	-0.2%
• Average age	46.2	46.0	0.2
• Average years of service	9.9	9.8	0.1
• Total projected compensation ⁽¹⁾	\$896,390,768	\$860,624,612	4.2%
• Average projected compensation	\$89,451	\$85,737	4.3%
• Account balances	\$1,104,621,126	\$1,035,022,113	6.7%
• Total active vested members	6,225	6,089	2.2%
Inactive vested members:⁽²⁾			
• Number	3,477	3,327	4.5%
• Average age	46.5	46.5	0.0
Retired members:⁽²⁾			
• Number in pay status	7,214	6,973	3.5%
• Average age	70.5	70.4	0.1
• Average monthly benefit	\$4,147	\$4,067	2.0%
Disabled members:⁽²⁾			
• Number in pay status ⁽³⁾	908	896	1.3%
• Average age	66.3	66.2	0.1
• Average monthly benefit	\$4,818	\$4,627	4.1%
Beneficiaries:⁽²⁾			
• Number in pay status	1,425	1,398	1.9%
• Average age	72.6	72.3	0.3
• Average monthly benefit	\$2,645	\$2,551	3.7%

⁽¹⁾ Calculated by increasing actual calendar year salaries by the assumed salary scale.

⁽²⁾ Includes members from terminated employers.

⁽³⁾ For 2018, includes 742 members receiving a service-connected disability and 166 members receiving a non-service connected disability.

**EXHIBIT A – TABLE OF PLAN COVERAGE (CONTINUED)
GENERAL TIER 1**

Category	Year Ended December 31		Change From Prior Year
	2018	2017	
Active members in valuation:			
• Number	504	529	-4.7%
• Average age	50.8	50.5	0.3
• Average years of service	17.5	16.5	1.0
• Total projected compensation ⁽¹⁾	\$57,832,242	\$58,286,293	-0.8%
• Average projected compensation	\$114,747	\$110,182	4.1%
• Account balances	\$71,819,994	\$66,823,081	7.5%
• Total active vested members	497	512	-2.9%
Inactive vested members:⁽²⁾			
• Number	229	233	-1.7%
• Average age	52.5	52.2	0.3
Retired members:⁽²⁾			
• Number in pay status	2,363	2,437	-3.0%
• Average age	75.2	74.9	0.3
• Average monthly benefit	\$4,402	\$4,247	3.6%
Disabled members:⁽²⁾			
• Number in pay status ⁽³⁾	247	255	-3.1%
• Average age	72.5	71.7	0.8
• Average monthly benefit	\$2,961	\$2,890	2.5%
Beneficiaries:⁽²⁾			
• Number in pay status	683	686	-0.4%
• Average age	78.2	78.0	0.2
• Average monthly benefit	\$2,413	\$2,336	3.3%

⁽¹⁾ Calculated by increasing actual calendar year salaries by the assumed salary scale.

⁽²⁾ Includes members from terminated employers.

⁽³⁾ For 2018, includes 180 members receiving a service-connected disability and 67 members receiving a non-service connected disability.

**EXHIBIT A – TABLE OF PLAN COVERAGE (CONTINUED)
GENERAL TIER 2**

Category	Year Ended December 31		Change From Prior Year
	2018	2017	
Active members in valuation:			
• Number ⁽¹⁾	0	0	N/A
• Average age	N/A	N/A	N/A
• Average years of service	N/A	N/A	N/A
• Total projected compensation	N/A	N/A	N/A
• Average projected compensation	N/A	N/A	N/A
• Account balances	N/A	N/A	N/A
• Total active vested members	N/A	N/A	N/A
Inactive vested members:⁽²⁾			
• Number	172	201	-14.4%
• Average age	58.5	57.6	0.9
Retired members:⁽²⁾			
• Number in pay status	425	420	1.2%
• Average age	75.3	75.2	0.1
• Average monthly benefit	\$867	\$857	1.2%
Disabled members:⁽²⁾			
• Number in pay status ⁽³⁾	40	42	-4.8%
• Average age	72.2	71.6	0.6
• Average monthly benefit	\$2,319	\$2,323	-0.2%
Beneficiaries:⁽²⁾			
• Number in pay status	101	102	-1.0%
• Average age	69.6	68.7	0.9
• Average monthly benefit	\$933	\$891	4.7%

⁽¹⁾ As of the December 31, 2005 valuation, there are no longer any Tier 2 active members as they have all transferred to Tier 3.

⁽²⁾ Includes members from terminated employers.

⁽³⁾ For 2018, includes 21 members receiving a service-connected disability and 19 members receiving a non-service connected disability.

**EXHIBIT A – TABLE OF PLAN COVERAGE (CONTINUED)
GENERAL TIER 3**

Category	Year Ended December 31		Change From Prior Year
	2018	2017	
Active members in valuation:			
• Number	4,436	4,738	-6.4%
• Average age	51.2	50.7	0.5
• Average years of service	14.6	13.9	0.7
• Total projected compensation ⁽¹⁾	\$406,783,049	\$416,511,431	-2.3%
• Average projected compensation	\$91,700	\$87,909	4.3%
• Account balances	\$553,049,509	\$523,594,120	5.6%
• Total active vested members	4,304	4,507	-4.5%
Inactive vested members:			
• Number	1,745	1,743	0.1%
• Average age	48.7	48.2	0.5
Retired members:			
• Number in pay status	3,124	2,878	8.5%
• Average age	68.1	67.8	0.3
• Average monthly benefit	\$2,854	\$2,778	2.7%
Disabled members:			
• Number in pay status ⁽²⁾	84	83	1.2%
• Average age	62.5	62.6	-0.1
• Average monthly benefit	\$2,489	\$2,390	4.1%
Beneficiaries:			
• Number in pay status	218	204	6.9%
• Average age	62.1	61.0	1.1
• Average monthly benefit	\$1,593	\$1,556	2.4%

⁽¹⁾ Calculated by increasing actual calendar year salaries by the assumed salary scale.

⁽²⁾ For 2018, includes 26 members receiving a service-connected disability and 58 members receiving a non-service connected disability.

EXHIBIT A – TABLE OF PLAN COVERAGE (CONTINUED)
GENERAL TIER 4 – 2% COLA

Category	Year Ended December 31		Change From Prior Year
	2018	2017	
Active members in valuation:			
• Number	25	18	38.9%
• Average age	45.5	43.1	2.4
• Average years of service	1.9	1.5	0.4
• Total projected compensation ⁽¹⁾	\$1,723,800	\$1,132,669	52.2%
• Average projected compensation	\$68,952	\$62,926	9.6%
• Account balances	\$302,280	\$147,903	104.4%
• Total active vested members	1	0	N/A
Inactive vested members:			
• Number	4	4	0.0%
• Average age	44.8	48.3	-3.5
Retired members:			
• Number in pay status	0	0	N/A
• Average age	N/A	N/A	N/A
• Average monthly benefit	N/A	N/A	N/A
Disabled members:			
• Number in pay status	0	0	N/A
• Average age	N/A	N/A	N/A
• Average monthly benefit	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	N/A	N/A	N/A

⁽¹⁾ Calculated by increasing actual calendar year salaries by the assumed salary scale.

EXHIBIT A – TABLE OF PLAN COVERAGE (CONTINUED)
GENERAL TIER 4 – 3% COLA

Category	Year Ended December 31		Change From Prior Year
	2018	2017	
Active members in valuation:			
• Number	148	129	14.7%
• Average age	40.9	41.1	-0.2
• Average years of service	2.6	2.2	0.4
• Total projected compensation ⁽¹⁾	\$13,149,543	\$10,968,716	19.9%
• Average projected compensation	\$88,848	\$85,029	4.5%
• Account balances	\$3,308,530	\$1,994,064	65.9%
• Total active vested members	15	2	650.0%
Inactive vested members:			
• Number	19	14	35.7%
• Average age	39.2	37.0	2.2
Retired members:			
• Number in pay status	0	0	N/A
• Average age	N/A	N/A	N/A
• Average monthly benefit	N/A	N/A	N/A
Disabled members:			
• Number in pay status	0	0	N/A
• Average age	N/A	N/A	N/A
• Average monthly benefit	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	N/A	N/A	N/A

⁽¹⁾ Calculated by increasing actual calendar year salaries by the assumed salary scale.

EXHIBIT A – TABLE OF PLAN COVERAGE (CONTINUED)
GENERAL TIER 5 – 2% COLA

Category	Year Ended December 31		Change From Prior Year
	2018	2017	
Active members in valuation:			
• Number	2,679	2,350	14.0%
• Average age	40.7	39.9	0.8
• Average years of service	2.0	1.5	0.5
• Total projected compensation ⁽¹⁾	\$186,691,270	\$152,226,351	22.6%
• Average projected compensation	\$69,687	\$64,777	7.6%
• Account balances	\$34,572,429	\$20,015,213	72.7%
• Total active vested members	30	12	150.0%
Inactive vested members:			
• Number	591	417	41.7%
• Average age	39.6	39.6	0.0
Retired members:			
• Number in pay status	3	0	N/A
• Average age	67.9	N/A	N/A
• Average monthly benefit	\$279	N/A	N/A
Disabled members:			
• Number in pay status	0	0	N/A
• Average age	N/A	N/A	N/A
• Average monthly benefit	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	N/A	N/A	N/A

⁽¹⁾ Calculated by increasing actual calendar year salaries by the assumed salary scale.

EXHIBIT A – TABLE OF PLAN COVERAGE (CONTINUED)
GENERAL TIER 5 – 3% COLA

Category	Year Ended December 31		Change From Prior Year
	2018	2017	
Active members in valuation:			
• Number	770	801	-3.9%
• Average age	44.0	43.1	0.9
• Average years of service	4.5	3.6	0.9
• Total projected compensation ⁽¹⁾	\$58,723,304	\$58,293,249	0.7%
• Average projected compensation	\$76,264	\$72,776	4.8%
• Account balances	\$26,327,954	\$20,237,024	30.1%
• Total active vested members	334	3	11033.3%
Inactive vested members:			
• Number	286	274	4.4%
• Average age	42.4	41.5	0.9
Retired members:			
• Number in pay status	8	0	N/A
• Average age	62.8	N/A	N/A
• Average monthly benefit	\$422	N/A	N/A
Disabled members:			
• Number in pay status	0	0	N/A
• Average age	N/A	N/A	N/A
• Average monthly benefit	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	N/A	N/A	N/A

⁽¹⁾ Calculated by increasing actual calendar year salaries by the assumed salary scale.

**EXHIBIT A – TABLE OF PLAN COVERAGE (CONTINUED)
SAFETY TIER A**

Category	Year Ended December 31		Change From Prior Year
	2018	2017	
Active members in valuation:			
• Number	874	945	-7.5%
• Average age	45.6	45.2	0.4
• Average years of service	16.2	15.8	0.4
• Total projected compensation ⁽¹⁾	\$114,796,876	\$115,755,798	-0.8%
• Average projected compensation	\$131,347	\$122,493	7.2%
• Account balances	\$380,680,946	\$377,672,109	0.8%
• Total active vested members	865	935	-7.5%
Inactive vested members:⁽²⁾			
• Number	297	314	-5.4%
• Average age	45.9	45.2	0.7
Retired members:⁽²⁾			
• Number in pay status	1,289	1,238	4.1%
• Average age	66.4	66.2	0.2
• Average monthly benefit	\$7,929	\$7,796	1.7%
Disabled members:⁽²⁾			
• Number in pay status ⁽³⁾	528	509	3.7%
• Average age	64.0	63.9	0.1
• Average monthly benefit	\$6,268	\$6,063	3.4%
Beneficiaries:⁽²⁾			
• Number in pay status	423	406	4.2%
• Average age	69.7	69.2	0.5
• Average monthly benefit	\$3,969	\$3,833	3.5%

⁽¹⁾ Calculated by increasing actual calendar year salaries by the assumed salary scale.

⁽²⁾ Includes members from terminated employers.

⁽³⁾ For 2018, includes 507 members receiving a service-connected disability and 21 members receiving a non-service connected disability.

**EXHIBIT A – TABLE OF PLAN COVERAGE (CONTINUED)
SAFETY TIER C**

Category	Year Ended December 31		Change From Prior Year
	2018	2017	
Active members in valuation:			
• Number	127	128	-0.8%
• Average age	38.2	37.4	0.8
• Average years of service	8.7	7.6	1.1
• Total projected compensation ⁽¹⁾	\$14,287,199	\$13,476,643	6.0%
• Average projected compensation	\$112,498	\$105,286	6.8%
• Account balances	\$15,289,277	\$12,548,377	21.8%
• Total active vested members	124	118	5.1%
Inactive vested members:			
• Number	72	74	-2.7%
• Average age	35.2	34.5	0.7
Retired members:			
• Number in pay status	2	0	N/A
• Average age	63.1	N/A	N/A
• Average monthly benefit	\$1,902	N/A	N/A
Disabled members:			
• Number in pay status ⁽²⁾	8	7	14.3%
• Average age	42.9	43.1	-0.2
• Average monthly benefit	\$3,665	\$3,758	-2.5%
Beneficiaries:			
• Number in pay status	0	0	N/A
• Average age	N/A	N/A	N/A
• Average monthly benefit	N/A	N/A	N/A

⁽¹⁾ Calculated by increasing actual calendar year salaries by the assumed salary scale.

⁽²⁾ For 2018, includes 7 members receiving a service-connected disability and 1 member receiving a non-service connected disability.

EXHIBIT A – TABLE OF PLAN COVERAGE (CONTINUED)
SAFETY TIER D

Category	Year Ended December 31		Change From Prior Year
	2018	2017	
Active members in valuation:			
• Number	122	115	6.1%
• Average age	34.2	33.6	0.6
• Average years of service	3.6	2.8	0.8
• Total projected compensation ⁽¹⁾	\$12,048,783	\$9,927,039	21.4%
• Average projected compensation	\$98,761	\$86,322	14.4%
• Account balances	\$7,062,683	\$4,701,883	50.2%
• Total active vested members	26	0	N/A
Inactive vested members:			
• Number	22	21	4.8%
• Average age	35.3	33.4	1.9
Retired members:			
• Number in pay status	0	0	N/A
• Average age	N/A	N/A	N/A
• Average monthly benefit	N/A	N/A	N/A
Disabled members:			
• Number in pay status ⁽²⁾	1	0	N/A
• Average age	56.2	N/A	N/A
• Average monthly benefit	\$2,160	N/A	N/A
Beneficiaries:			
• Number in pay status	0	0	N/A
• Average age	N/A	N/A	N/A
• Average monthly benefit	N/A	N/A	N/A

⁽¹⁾ Calculated by increasing actual calendar year salaries by the assumed salary scale.

⁽²⁾ For 2018, includes 1 member receiving a service-connected disability.

**EXHIBIT A – TABLE OF PLAN COVERAGE (CONTINUED)
SAFETY TIER E**

Category	Year Ended December 31		Change From Prior Year
	2018	2017	
Active members in valuation:			
• Number	336	285	17.9%
• Average age	32.6	31.9	0.7
• Average years of service	2.7	2.2	0.5
• Total projected compensation ⁽¹⁾	\$30,354,703	\$24,046,424	26.2%
• Average projected compensation	\$90,341	\$84,373	7.1%
• Account balances	\$12,207,525	\$7,288,339	67.5%
• Total active vested members	29	0	N/A
Inactive vested members:			
• Number	40	32	25.0%
• Average age	31.5	31.3	0.2
Retired members:			
• Number in pay status	0	0	N/A
• Average age	N/A	N/A	N/A
• Average monthly benefit	N/A	N/A	N/A
Disabled members:			
• Number in pay status	0	0	N/A
• Average age	N/A	N/A	N/A
• Average monthly benefit	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	N/A	N/A	N/A

⁽¹⁾ Calculated by increasing actual calendar year salaries by the assumed salary scale.

**EXHIBIT B – MEMBERS IN ACTIVE SERVICE AS OF DECEMBER 31, 2018
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	93	93	--	--	--	--	--	--	--	--
	\$61,317	\$61,317	--	--	--	--	--	--	--	--
25 - 29	661	619	41	1	--	--	--	--	--	--
	\$70,820	\$69,786	\$86,763	\$57,237	--	--	--	--	--	--
30 - 34	1,205	849	303	53	--	--	--	--	--	--
	\$80,955	\$76,046	\$90,901	\$102,737	--	--	--	--	--	--
35 - 39	1,351	649	340	306	56	--	--	--	--	--
	\$89,561	\$79,105	\$96,435	\$102,569	\$97,921	--	--	--	--	--
40 - 44	1,336	473	267	298	256	42	--	--	--	--
	\$94,063	\$79,010	\$94,677	\$107,384	\$105,749	\$93,950	--	--	--	--
45 - 49	1,479	428	234	297	325	154	39	2	--	--
	\$96,415	\$74,955	\$91,812	\$101,887	\$110,215	\$117,953	\$118,816	\$77,163	--	--
50 - 54	1,443	332	217	243	304	187	113	41	5	1
	\$95,139	\$76,863	\$89,064	\$93,688	\$103,872	\$107,494	\$108,786	\$119,713	\$140,378	\$93,164
55 - 59	1,216	271	191	177	222	153	105	61	30	6
	\$91,826	\$76,751	\$83,685	\$90,619	\$94,964	\$100,547	\$110,630	\$118,726	\$82,478	\$173,069
60 - 64	857	173	147	161	144	94	69	32	25	12
	\$88,046	\$74,254	\$85,776	\$88,634	\$86,945	\$95,537	\$98,532	\$112,150	\$91,975	\$128,565
65 - 69	300	42	84	61	41	36	21	8	4	3
	\$88,027	\$77,005	\$80,837	\$89,586	\$96,322	\$99,058	\$88,687	\$97,664	\$99,774	\$120,235
70 & over	80	14	16	22	18	4	3	2	1	--
	\$78,163	\$59,612	\$86,216	\$84,232	\$77,789	\$89,798	\$67,677	\$89,385	\$44,698	--
Total	10,021	3,943	1,840	1,619	1,366	670	350	146	65	22
	\$89,451	\$75,447	\$90,620	\$98,544	\$101,687	\$105,226	\$106,877	\$115,436	\$91,068	\$137,957

**EXHIBIT B – MEMBERS IN ACTIVE SERVICE AS OF DECEMBER 31, 2018 (CONTINUED)
BY AGE, YEARS OF SERVICE, AND AVERAGE PROJECTED COMPENSATION
GENERAL TIER 1 NON-ENHANCED**

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	--	--	--	--	--	--	--	--	--	--
40 - 44	--	--	--	--	--	--	--	--	--	--
45 - 49	2	--	--	1	1	--	--	--	--	--
	\$146,070	--	--	\$85,239	\$206,901	--	--	--	--	--
50 - 54	1	--	--	--	--	1	--	--	--	--
	\$80,198	--	--	--	--	\$80,198	--	--	--	--
55 - 59	4	--	3	1	--	--	--	--	--	--
	\$81,762	--	\$75,678	\$100,014	--	--	--	--	--	--
60 - 64	--	--	--	--	--	--	--	--	--	--
65 - 69	--	--	--	--	--	--	--	--	--	--
70 & over	--	--	--	--	--	--	--	--	--	--
Total	7	--	3	2	1	1	--	--	--	--
	\$99,912	--	\$75,678	\$92,627	\$206,901	\$80,198	--	--	--	--

**EXHIBIT B – MEMBERS IN ACTIVE SERVICE AS OF DECEMBER 31, 2018 (CONTINUED)
BY AGE, YEARS OF SERVICE, AND AVERAGE PROJECTED COMPENSATION
GENERAL TIER 1 ENHANCED**

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	3	--	3	--	--	--	--	--	--	--
	\$134,182	--	\$134,182	--	--	--	--	--	--	--
30 - 34	23	2	17	4	--	--	--	--	--	--
	\$115,928	\$104,663	\$116,552	\$118,909	--	--	--	--	--	--
35 - 39	51	8	17	20	6	--	--	--	--	--
	\$115,789	\$111,813	\$112,104	\$124,570	\$102,258	--	--	--	--	--
40 - 44	63	9	15	18	19	2	--	--	--	--
	\$115,709	\$133,124	\$107,514	\$121,374	\$110,968	\$92,855	--	--	--	--
45 - 49	74	3	13	15	28	13	2	--	--	--
	\$119,893	\$132,292	\$122,972	\$118,591	\$121,003	\$112,570	\$123,103	--	--	--
50 - 54	106	4	9	20	40	16	13	4	--	--
	\$118,346	\$115,480	\$155,007	\$108,350	\$122,063	\$104,874	\$108,401	\$137,752	--	--
55 - 59	91	5	9	17	26	10	13	8	3	--
	\$112,482	\$109,123	\$128,815	\$103,586	\$112,511	\$103,494	\$126,100	\$121,074	\$67,279	--
60 - 64	60	2	12	10	10	11	8	4	1	2
	\$106,228	\$116,921	\$118,778	\$111,261	\$111,830	\$91,023	\$106,385	\$105,481	\$60,251	\$74,536
65 - 69	23	1	4	3	8	1	2	--	1	3
	\$112,106	\$104,458	\$109,579	\$130,415	\$107,981	\$62,350	\$98,101	--	\$161,309	\$120,235
70 & over	3	--	--	2	1	--	--	--	--	--
	\$88,099	--	--	\$67,886	\$128,524	--	--	--	--	--
Total	497	34	99	109	138	53	38	16	5	5
	\$114,955	\$118,961	\$120,395	\$114,663	\$116,149	\$102,371	\$114,263	\$121,345	\$84,680	\$101,955

**EXHIBIT B – MEMBERS IN ACTIVE SERVICE AS OF DECEMBER 31, 2018 (CONTINUED)
BY AGE, YEARS OF SERVICE, AND AVERAGE PROJECTED COMPENSATION
GENERAL TIER 3 ENHANCED**

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	11	--	11	--	--	--	--	--	--	--
	\$63,797	--	\$63,797	--	--	--	--	--	--	--
30 - 34	180	28	124	28	--	--	--	--	--	--
	\$79,647	\$79,951	\$78,648	\$83,767	--	--	--	--	--	--
35 - 39	453	37	185	196	35	--	--	--	--	--
	\$91,827	\$91,241	\$95,738	\$90,108	\$81,395	--	--	--	--	--
40 - 44	592	38	183	206	133	32	--	--	--	--
	\$93,833	\$91,294	\$94,556	\$99,107	\$87,848	\$83,632	--	--	--	--
45 - 49	694	27	158	220	174	92	21	2	--	--
	\$93,227	\$90,770	\$90,106	\$93,429	\$91,456	\$104,021	\$86,651	\$77,163	--	--
50 - 54	860	33	162	203	211	134	79	32	5	1
	\$92,981	\$92,079	\$86,075	\$89,150	\$92,241	\$100,637	\$96,792	\$109,161	\$140,378	\$93,164
55 - 59	788	22	136	154	171	136	87	49	27	6
	\$93,682	\$106,705	\$83,450	\$88,260	\$87,986	\$98,255	\$105,077	\$115,749	\$84,167	\$173,069
60 - 64	575	13	93	142	130	78	59	27	23	10
	\$90,085	\$92,585	\$86,907	\$85,403	\$84,294	\$94,339	\$93,729	\$111,323	\$93,015	\$139,370
65 - 69	220	5	65	55	31	34	19	8	3	--
	\$87,718	\$72,848	\$81,900	\$86,307	\$90,387	\$99,291	\$87,696	\$97,664	\$79,262	--
70 & over	63	2	14	20	17	4	3	2	1	--
	\$79,649	\$36,043	\$83,653	\$85,866	\$74,804	\$89,798	\$67,677	\$89,385	\$44,698	--
Total	4,436	205	1,131	1,224	902	510	268	120	59	17
	\$91,700	\$90,539	\$88,043	\$90,897	\$88,677	\$98,407	\$97,042	\$110,708	\$91,461	\$148,546

**EXHIBIT B – MEMBERS IN ACTIVE SERVICE AS OF DECEMBER 31, 2018 (CONTINUED)
BY AGE, YEARS OF SERVICE, AND AVERAGE PROJECTED COMPENSATION
GENERAL TIER 4 – 2% COLA**

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	3	3	--	--	--	--	--	--	--	--
	\$65,299	\$65,299	--	--	--	--	--	--	--	--
30 - 34	3	3	--	--	--	--	--	--	--	--
	\$70,037	\$70,037	--	--	--	--	--	--	--	--
35 - 39	3	3	--	--	--	--	--	--	--	--
	\$53,084	\$53,084	--	--	--	--	--	--	--	--
40 - 44	1	1	--	--	--	--	--	--	--	--
	\$44,445	\$44,445	--	--	--	--	--	--	--	--
45 - 49	3	3	--	--	--	--	--	--	--	--
	\$106,910	\$106,910	--	--	--	--	--	--	--	--
50 - 54	7	6	1	--	--	--	--	--	--	--
	\$64,460	\$64,830	\$62,243	--	--	--	--	--	--	--
55 - 59	4	4	--	--	--	--	--	--	--	--
	\$62,608	\$62,608	--	--	--	--	--	--	--	--
60 - 64	1	1	--	--	--	--	--	--	--	--
	\$91,712	\$91,712	--	--	--	--	--	--	--	--
65 - 69	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
70 & over	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
Total	25	24	1	--	--	--	--	--	--	--
	\$68,952	\$69,232	\$62,243	--	--	--	--	--	--	--

**EXHIBIT B – MEMBERS IN ACTIVE SERVICE AS OF DECEMBER 31, 2018 (CONTINUED)
BY AGE, YEARS OF SERVICE, AND AVERAGE PROJECTED COMPENSATION
GENERAL TIER 4 – 3% COLA**

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	--	--	--	--	--	--	--	--
	\$85,743	\$85,743	--	--	--	--	--	--	--	--
25 - 29	24	24	--	--	--	--	--	--	--	--
	\$75,268	\$75,268	--	--	--	--	--	--	--	--
30 - 34	25	23	2	--	--	--	--	--	--	--
	\$92,623	\$94,030	\$76,442	--	--	--	--	--	--	--
35 - 39	24	23	1	--	--	--	--	--	--	--
	\$95,839	\$97,439	\$59,025	--	--	--	--	--	--	--
40 - 44	25	25	--	--	--	--	--	--	--	--
	\$87,266	\$87,266	--	--	--	--	--	--	--	--
45 - 49	16	15	1	--	--	--	--	--	--	--
	\$91,395	\$89,248	\$123,592	--	--	--	--	--	--	--
50 - 54	15	11	4	--	--	--	--	--	--	--
	\$92,485	\$89,093	\$101,815	--	--	--	--	--	--	--
55 - 59	12	10	2	--	--	--	--	--	--	--
	\$90,468	\$90,477	\$90,424	--	--	--	--	--	--	--
60 - 64	5	4	1	--	--	--	--	--	--	--
	\$88,422	\$84,793	\$102,939	--	--	--	--	--	--	--
65 - 69	1	1	--	--	--	--	--	--	--	--
	\$82,710	\$82,710	--	--	--	--	--	--	--	--
70 & over	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
Total	148	137	11	--	--	--	--	--	--	--
	\$88,848	\$88,489	\$93,322	--	--	--	--	--	--	--

**EXHIBIT B – MEMBERS IN ACTIVE SERVICE AS OF DECEMBER 31, 2018 (CONTINUED)
BY AGE, YEARS OF SERVICE, AND AVERAGE PROJECTED COMPENSATION
GENERAL TIER 5 – 2% COLA**

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	59	59	--	--	--	--	--	--	--	--
	\$51,277	\$51,277	--	--	--	--	--	--	--	--
25 - 29	396	396	--	--	--	--	--	--	--	--
	\$62,062	\$62,062	--	--	--	--	--	--	--	--
30 - 34	600	592	8	--	--	--	--	--	--	--
	\$71,512	\$70,917	\$115,510	--	--	--	--	--	--	--
35 - 39	416	413	3	--	--	--	--	--	--	--
	\$73,488	\$73,119	\$124,180	--	--	--	--	--	--	--
40 - 44	311	311	--	--	--	--	--	--	--	--
	\$72,616	\$72,616	--	--	--	--	--	--	--	--
45 - 49	318	315	2	1	--	--	--	--	--	--
	\$70,182	\$69,903	\$93,033	\$112,446	--	--	--	--	--	--
50 - 54	221	221	--	--	--	--	--	--	--	--
	\$70,665	\$70,665	--	--	--	--	--	--	--	--
55 - 59	184	180	3	--	1	--	--	--	--	--
	\$71,202	\$71,180	\$54,863	--	\$124,180	--	--	--	--	--
60 - 64	133	127	6	--	--	--	--	--	--	--
	\$68,960	\$68,972	\$68,707	--	--	--	--	--	--	--
65 - 69	31	28	3	--	--	--	--	--	--	--
	\$71,379	\$72,733	\$58,739	--	--	--	--	--	--	--
70 & over	10	10	--	--	--	--	--	--	--	--
	\$60,758	\$60,758	--	--	--	--	--	--	--	--
Total	2,679	2,652	25	1	1	--	--	--	--	--
	\$69,687	\$69,464	\$89,430	\$112,446	\$124,180	--	--	--	--	--

**EXHIBIT B – MEMBERS IN ACTIVE SERVICE AS OF DECEMBER 31, 2018 (CONTINUED)
BY AGE, YEARS OF SERVICE, AND AVERAGE PROJECTED COMPENSATION
GENERAL TIER 5 – 3% COLA**

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	3	3	--	--	--	--	--	--	--	--
	\$47,402	\$47,402	--	--	--	--	--	--	--	--
25 - 29	42	29	12	1	--	--	--	--	--	--
	\$62,216	\$57,988	\$72,846	\$57,237	--	--	--	--	--	--
30 - 34	132	77	55	--	--	--	--	--	--	--
	\$75,180	\$77,406	\$72,064	--	--	--	--	--	--	--
35 - 39	164	92	71	1	--	--	--	--	--	--
	\$79,018	\$81,372	\$76,225	\$60,690	--	--	--	--	--	--
40 - 44	112	65	47	--	--	--	--	--	--	--
	\$83,152	\$85,227	\$80,282	--	--	--	--	--	--	--
45 - 49	95	54	41	--	--	--	--	--	--	--
	\$76,848	\$81,758	\$70,382	--	--	--	--	--	--	--
50 - 54	74	41	33	--	--	--	--	--	--	--
	\$77,039	\$79,959	\$73,410	--	--	--	--	--	--	--
55 - 59	72	43	29	--	--	--	--	--	--	--
	\$71,514	\$74,440	\$67,176	--	--	--	--	--	--	--
60 - 64	54	22	31	1	--	--	--	--	--	--
	\$71,669	\$78,676	\$67,338	\$51,772	--	--	--	--	--	--
65 - 69	18	7	11	--	--	--	--	--	--	--
	\$77,139	\$92,324	\$67,475	--	--	--	--	--	--	--
70 & over	4	2	2	--	--	--	--	--	--	--
	\$90,807	\$77,452	\$104,163	--	--	--	--	--	--	--
Total	770	435	332	3	--	--	--	--	--	--
	\$76,264	\$78,704	\$73,245	\$56,566	--	--	--	--	--	--

**EXHIBIT B – MEMBERS IN ACTIVE SERVICE AS OF DECEMBER 31, 2018 (CONTINUED)
BY AGE, YEARS OF SERVICE, AND AVERAGE PROJECTED COMPENSATION
SAFETY TIER A NON-ENHANCED**

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	2	--	2	--	--	--	--	--	--	--
	\$132,559	--	\$132,559	--	--	--	--	--	--	--
40 - 44	2	--	--	--	2	--	--	--	--	--
	\$138,440	--	--	--	\$138,440	--	--	--	--	--
45 - 49	2	--	--	--	2	--	--	--	--	--
	\$144,886	--	--	--	\$144,886	--	--	--	--	--
50 - 54	5	--	1	--	--	--	3	1	--	--
	\$142,938	--	\$130,885	--	--	--	\$143,618	\$152,949	--	--
55 - 59	2	--	--	--	--	--	1	1	--	--
	\$170,281	--	--	--	--	--	\$203,023	\$137,539	--	--
60 - 64	--	--	--	--	--	--	--	--	--	--
65 - 69	--	--	--	--	--	--	--	--	--	--
70 & over	--	--	--	--	--	--	--	--	--	--
Total	13	--	3	--	4	--	4	2	--	--
	\$145,155	--	\$132,001	--	\$141,663	--	\$158,469	\$145,244	--	--

**EXHIBIT B – MEMBERS IN ACTIVE SERVICE AS OF DECEMBER 31, 2018 (CONTINUED)
BY AGE, YEARS OF SERVICE, AND AVERAGE PROJECTED COMPENSATION
SAFETY TIER A ENHANCED**

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	2	1	1	--	--	--	--	--	--	--
	\$112,015	\$113,320	\$110,709	--	--	--	--	--	--	--
30 - 34	67	17	34	16	--	--	--	--	--	--
	\$118,769	\$107,708	\$119,821	\$128,285	--	--	--	--	--	--
35 - 39	139	16	31	77	15	--	--	--	--	--
	\$124,930	\$110,876	\$121,655	\$127,255	\$134,748	--	--	--	--	--
40 - 44	190	5	12	64	101	8	--	--	--	--
	\$128,616	\$152,293	\$121,210	\$128,928	\$127,580	\$135,496	--	--	--	--
45 - 49	252	3	9	55	120	49	16	--	--	--
	\$137,152	\$136,448	\$144,143	\$129,716	\$133,515	\$145,540	\$160,496	--	--	--
50 - 54	133	1	4	17	53	36	18	4	--	--
	\$138,041	\$130,653	\$117,303	\$126,630	\$136,448	\$134,942	\$155,894	\$177,780	--	--
55 - 59	48	1	4	5	24	7	4	3	--	--
	\$128,956	\$91,133	\$110,631	\$117,316	\$124,459	\$140,865	\$158,039	\$154,812	--	--
60 - 64	23	--	2	8	4	5	2	1	1	--
	\$128,985	--	\$122,681	\$122,312	\$110,899	\$124,145	\$208,787	\$161,137	\$99,774	--
65 - 69	7	--	1	3	2	1	--	--	--	--
	\$121,125	--	\$110,080	\$108,877	\$141,663	\$127,837	--	--	--	--
70 & over	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
Total	861	44	98	245	319	106	40	8	1	--
	\$131,138	\$116,159	\$122,193	\$127,679	\$131,267	\$139,698	\$160,594	\$167,087	\$99,774	--

**EXHIBIT B – MEMBERS IN ACTIVE SERVICE AS OF DECEMBER 31, 2018 (CONTINUED)
BY AGE, YEARS OF SERVICE, AND AVERAGE PROJECTED COMPENSATION
SAFETY TIER C**

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	7	--	7	--	--	--	--	--	--	--
	\$111,294	--	\$111,294	--	--	--	--	--	--	--
30 - 34	44	2	37	5	--	--	--	--	--	--
	\$110,782	\$98,216	\$110,990	\$114,271	--	--	--	--	--	--
35 - 39	35	2	21	12	--	--	--	--	--	--
	\$110,775	\$102,052	\$109,464	\$114,523	--	--	--	--	--	--
40 - 44	19	1	7	10	1	--	--	--	--	--
	\$109,288	\$20,056	\$113,022	\$114,813	\$117,131	--	--	--	--	--
45 - 49	12	--	7	5	--	--	--	--	--	--
	\$116,291	--	\$114,345	\$119,016	--	--	--	--	--	--
50 - 54	6	--	3	3	--	--	--	--	--	--
	\$140,740	--	\$165,134	\$116,347	--	--	--	--	--	--
55 - 59	2	--	2	--	--	--	--	--	--	--
	\$110,835	--	\$110,835	--	--	--	--	--	--	--
60 - 64	2	1	1	--	--	--	--	--	--	--
	\$109,271	\$107,607	\$110,935	--	--	--	--	--	--	--
65 - 69	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
70 & over	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
Total	127	6	85	35	1	--	--	--	--	--
	\$112,498	\$88,033	\$112,988	\$115,368	\$117,131	--	--	--	--	--

**EXHIBIT B – MEMBERS IN ACTIVE SERVICE AS OF DECEMBER 31, 2018 (CONTINUED)
BY AGE, YEARS OF SERVICE, AND AVERAGE PROJECTED COMPENSATION
SAFETY TIER D**

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	3	3	--	--	--	--	--	--	--	--
	\$71,032	\$71,032	--	--	--	--	--	--	--	--
25 - 29	33	32	1	--	--	--	--	--	--	--
	\$95,859	\$96,330	\$80,775	--	--	--	--	--	--	--
30 - 34	46	33	13	--	--	--	--	--	--	--
	\$99,846	\$100,692	\$97,698	--	--	--	--	--	--	--
35 - 39	22	18	4	--	--	--	--	--	--	--
	\$100,990	\$96,560	\$120,925	--	--	--	--	--	--	--
40 - 44	9	7	2	--	--	--	--	--	--	--
	\$92,118	\$83,799	\$121,231	--	--	--	--	--	--	--
45 - 49	3	1	2	--	--	--	--	--	--	--
	\$113,446	\$85,594	\$127,373	--	--	--	--	--	--	--
50 - 54	2	2	--	--	--	--	--	--	--	--
	\$116,445	\$116,446	--	--	--	--	--	--	--	--
55 - 59	3	2	1	--	--	--	--	--	--	--
	\$104,312	\$114,872	\$83,194	--	--	--	--	--	--	--
60 - 64	1	--	1	--	--	--	--	--	--	--
	\$142,442	--	\$142,442	--	--	--	--	--	--	--
65 - 69	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
70 & over	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
Total	122	98	24	--	--	--	--	--	--	--
	\$98,761	\$96,851	\$106,558	--	--	--	--	--	--	--

**EXHIBIT B – MEMBERS IN ACTIVE SERVICE AS OF DECEMBER 31, 2018 (CONTINUED)
BY AGE, YEARS OF SERVICE, AND AVERAGE PROJECTED COMPENSATION
SAFETY TIER E**

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	27	27	--	--	--	--	--	--	--	--
	\$82,821	\$82,821	--	--	--	--	--	--	--	--
25 - 29	140	134	6	--	--	--	--	--	--	--
	\$88,209	\$87,620	\$101,382	--	--	--	--	--	--	--
30 - 34	85	72	13	--	--	--	--	--	--	--
	\$91,373	\$89,563	\$101,396	--	--	--	--	--	--	--
35 - 39	42	37	5	--	--	--	--	--	--	--
	\$89,896	\$88,313	\$101,604	--	--	--	--	--	--	--
40 - 44	12	11	1	--	--	--	--	--	--	--
	\$90,656	\$89,739	\$100,741	--	--	--	--	--	--	--
45 - 49	8	7	1	--	--	--	--	--	--	--
	\$93,107	\$92,016	\$100,741	--	--	--	--	--	--	--
50 - 54	13	13	--	--	--	--	--	--	--	--
	\$106,921	\$106,921	--	--	--	--	--	--	--	--
55 - 59	6	4	2	--	--	--	--	--	--	--
	\$104,080	\$104,274	\$103,691	--	--	--	--	--	--	--
60 - 64	3	3	--	--	--	--	--	--	--	--
	\$126,578	\$126,578	--	--	--	--	--	--	--	--
65 - 69	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
70 & over	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
Total	336	308	28	--	--	--	--	--	--	--
	\$90,341	\$89,323	\$101,547	--	--	--	--	--	--	--

**EXHIBIT C – RETIRED MEMBERS AND BENEFICIARIES AS OF DECEMBER 31, 2018
BY AGE, YEARS OF RETIREMENT, AND AVERAGE MONTHLY BENEFIT
TOTAL PLAN**

Age	Years of Retirement									
	Total	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 & over
Under 30	17	6	3	3	1	2	1	--	1	--
	\$963	\$165	\$1,253	\$1,468	\$719	\$368	\$1,511	--	\$4,245	--
30 - 34	15	7	3	1	2	2	--	--	--	--
	\$1,258	\$1,366	\$1,058	\$918	\$1,981	\$624	--	--	--	--
35 - 39	18	4	4	3	2	3	2	--	--	--
	\$1,948	\$2,577	\$3,752	\$649	\$1,425	\$805	\$1,270	--	--	--
40 - 44	47	15	11	10	1	5	4	--	1	--
	\$2,905	\$3,755	\$3,092	\$3,523	\$1,706	\$682	\$1,199	--	\$1,050	--
45 - 49	97	37	16	17	14	8	5	--	--	--
	\$3,459	\$4,500	\$3,057	\$4,213	\$2,453	\$1,123	\$1,038	--	--	--
50 - 54	402	293	57	22	16	8	6	--	--	--
	\$4,570	\$4,585	\$5,701	\$3,900	\$3,440	\$2,436	\$1,364	--	--	--
55 - 59	848	378	368	37	32	21	7	5	--	--
	\$4,186	\$3,192	\$5,460	\$3,411	\$3,391	\$3,303	\$2,909	\$1,937	--	--
60 - 64	1,358	441	562	242	56	26	19	7	4	1
	\$4,194	\$3,013	\$4,819	\$5,338	\$3,761	\$2,695	\$2,723	\$3,622	\$2,255	\$412
65 - 69	1,864	397	665	486	206	50	32	17	6	5
	\$4,116	\$2,802	\$4,469	\$4,990	\$4,055	\$3,017	\$3,188	\$3,001	\$2,571	\$1,495
70 - 74	1,927	150	490	541	451	169	53	36	21	16
	\$4,258	\$2,225	\$3,919	\$5,004	\$5,301	\$2,732	\$3,424	\$2,950	\$2,856	\$2,727
75 - 79	1,258	22	139	320	364	217	120	42	23	11
	\$3,857	\$1,818	\$2,986	\$3,452	\$4,593	\$4,573	\$3,304	\$3,012	\$2,977	\$3,376
80 - 84	820	4	22	72	193	215	163	106	30	15
	\$3,609	\$1,966	\$2,474	\$2,630	\$3,517	\$4,122	\$4,415	\$2,526	\$3,560	\$3,225
85 - 89	497	--	2	9	27	111	127	112	72	37
	\$3,184	--	\$2,020	\$3,070	\$2,019	\$3,692	\$3,669	\$2,968	\$2,477	\$2,973
90 & Over	379	--	1	2	3	21	82	98	100	72
	\$3,066	--	\$969	\$4,819	\$1,902	\$2,328	\$3,258	\$3,277	\$2,850	\$3,102
Total	9,547	1,754	2,343	1,765	1,368	858	621	423	258	157
	\$3,986	\$3,202	\$4,487	\$4,579	\$4,426	\$3,643	\$3,586	\$2,932	\$2,823	\$2,996

Note: Total retired benefit \$38,057,250, average age 70.4, and average years of retirement 14.1. Includes members from terminated employers.

**EXHIBIT C – RETIRED MEMBERS AND BENEFICIARIES AS OF DECEMBER 31, 2018 (CONTINUED)
BY AGE, YEARS OF RETIREMENT, AND AVERAGE MONTHLY BENEFIT
GENERAL TIER 1**

Age	Years of Retirement									
	Total	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 & over
Under 30	1	--	--	--	--	1	--	--	--	--
	\$448	--	--	--	--	\$448	--	--	--	--
30 - 34	5	1	3	--	--	1	--	--	--	--
	\$889	\$824	\$1,058	--	--	\$448	--	--	--	--
35 - 39	2	--	--	--	--	2	--	--	--	--
	\$927	--	--	--	--	\$927	--	--	--	--
40 - 44	7	2	--	--	--	3	1	--	1	--
	\$881	\$1,076	--	--	--	\$638	\$1,053	--	\$1,050	--
45 - 49	5	--	1	1	--	2	1	--	--	--
	\$1,554	--	\$2,014	\$2,519	--	\$1,088	\$1,060	--	--	--
50 - 54	28	18	3	1	3	2	1	--	--	--
	\$1,972	\$2,082	\$2,217	\$2,250	\$1,531	\$1,027	\$2,183	--	--	--
55 - 59	104	45	37	6	4	6	2	4	--	--
	\$2,538	\$3,417	\$2,012	\$1,562	\$1,739	\$1,817	\$1,540	\$1,347	--	--
60 - 64	313	81	155	42	12	9	7	3	3	1
	\$3,821	\$3,328	\$4,785	\$2,421	\$2,956	\$2,493	\$1,888	\$1,750	\$2,019	\$412
65 - 69	547	51	210	162	75	16	19	6	4	4
	\$4,314	\$3,435	\$5,517	\$4,377	\$2,568	\$2,942	\$2,815	\$2,103	\$1,934	\$836
70 - 74	661	19	86	230	193	81	22	12	9	9
	\$4,538	\$2,502	\$5,753	\$5,845	\$4,220	\$2,156	\$2,422	\$3,043	\$1,950	\$1,851
75 - 79	517	1	15	86	190	113	70	22	16	4
	\$4,159	\$3,328	\$6,281	\$5,330	\$5,172	\$3,204	\$2,151	\$2,170	\$2,716	\$1,937
80 - 84	453	1	1	14	87	148	97	80	15	10
	\$3,868	\$351	\$264	\$5,331	\$5,567	\$4,523	\$3,110	\$1,908	\$2,683	\$2,843
85 - 89	341	--	--	2	9	73	99	88	51	19
	\$3,198	--	--	\$8,607	\$3,499	\$4,575	\$3,770	\$2,391	\$1,637	\$2,140
90 & Over	309	--	--	--	3	10	69	89	85	53
	\$2,894	--	--	--	\$1,902	\$4,240	\$3,618	\$3,020	\$2,288	\$2,516
Total	3,293	219	511	544	576	467	388	304	184	100
	\$3,881	\$3,151	\$5,041	\$4,999	\$4,441	\$3,580	\$3,099	\$2,432	\$2,142	\$2,306

Note: Total retired benefit \$12,781,939, average age 75.6, and average years of retirement 19.4. Includes members from terminated employers.

**EXHIBIT C – RETIRED MEMBERS AND BENEFICIARIES AS OF DECEMBER 31, 2018 (CONTINUED)
BY AGE, YEARS OF RETIREMENT, AND AVERAGE MONTHLY BENEFIT
GENERAL TIER 2**

Age	Years of Retirement									
	Total	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 & over
Under 30	--	--	--	--	--	--	--	--	--	--
30 - 34	--	--	--	--	--	--	--	--	--	--
35 - 39	2	--	--	--	1	1	--	--	--	--
40 - 44	\$852	--	--	--	\$1,145	\$560	--	--	--	--
45 - 49	4	--	--	--	--	2	2	--	--	--
50 - 54	\$964	--	--	--	--	\$749	\$1,179	--	--	--
55 - 59	12	--	--	--	2	6	4	--	--	--
60 - 64	\$1,044	--	--	--	\$798	\$1,135	\$1,032	--	--	--
65 - 69	7	2	--	1	--	2	2	--	--	--
70 - 74	\$906	\$269	--	\$663	--	\$1,303	\$1,266	--	--	--
75 - 79	28	16	10	--	--	2	--	--	--	--
80 - 84	\$476	\$356	\$244	--	--	\$2,596	--	--	--	--
85 - 89	54	17	10	13	6	6	2	--	--	--
90 & Over	\$800	\$383	\$469	\$762	\$1,622	\$1,554	\$1,512	--	--	--
Total	68	9	11	19	21	7	1	--	--	--
	\$903	\$782	\$513	\$837	\$929	\$1,552	\$2,418	--	--	--
	109	3	12	25	29	32	6	2	--	--
	\$960	\$1,017	\$691	\$707	\$974	\$1,032	\$1,812	\$1,749	--	--
	101	--	1	15	39	38	7	1	--	--
	\$1,098	--	\$87	\$673	\$1,429	\$1,000	\$925	\$497	--	--
	94	--	1	3	39	37	11	3	--	--
	\$1,094	--	\$964	\$1,214	\$1,136	\$1,078	\$1,027	\$907	--	--
	62	--	--	--	13	30	16	2	1	--
	\$1,134	--	--	--	\$1,158	\$1,200	\$1,125	\$425	\$418	--
	25	--	--	--	--	11	12	1	1	--
	\$975	--	--	--	--	\$590	\$1,365	\$912	\$594	--
Total	566	47	45	76	150	174	63	9	2	--
	\$981	\$486	\$492	\$762	\$1,169	\$1,093	\$1,230	\$942	\$506	--

Note: Total retired benefit \$555,382, average age 74.1, and average years of retirement 17.7. Includes members from terminated employers.

**EXHIBIT C – RETIRED MEMBERS AND BENEFICIARIES AS OF DECEMBER 31, 2018 (CONTINUED)
BY AGE, YEARS OF RETIREMENT, AND AVERAGE MONTHLY BENEFIT
GENERAL TIER 3**

Age	Years of Retirement									
	Total	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 & over
Under 30	10	6	3	--	1	--	--	--	--	--
	\$547	\$165	\$1,253	--	\$719	--	--	--	--	--
30 - 34	7	4	--	--	2	1	--	--	--	--
	\$1,037	\$625	--	--	\$1,981	\$800	--	--	--	--
35 - 39	5	1	--	3	1	--	--	--	--	--
	\$832	\$509	--	\$649	\$1,706	--	--	--	--	--
40 - 44	10	2	4	3	1	--	--	--	--	--
	\$1,941	\$3,403	\$1,900	\$1,099	\$1,706	--	--	--	--	--
45 - 49	14	5	3	2	4	--	--	--	--	--
	\$1,513	\$1,976	\$1,741	\$952	\$1,045	--	--	--	--	--
50 - 54	109	94	6	7	2	--	--	--	--	--
	\$1,751	\$1,681	\$2,625	\$2,107	\$1,179	--	--	--	--	--
55 - 59	367	251	105	6	5	--	--	--	--	--
	\$2,275	\$2,549	\$1,663	\$2,361	\$1,240	--	--	--	--	--
60 - 64	658	319	261	67	11	--	--	--	--	--
	\$2,942	\$2,948	\$3,205	\$1,955	\$2,555	--	--	--	--	--
65 - 69	912	322	390	165	35	--	--	--	--	--
	\$2,958	\$2,708	\$3,505	\$2,481	\$1,417	--	--	--	--	--
70 - 74	774	122	376	212	63	1	--	--	--	--
	\$3,130	\$2,260	\$3,506	\$3,366	\$1,793	\$2,181	--	--	--	--
75 - 79	411	20	117	202	71	--	1	--	--	--
	\$2,544	\$1,762	\$2,581	\$2,843	\$1,867	--	\$1,558	--	--	--
80 - 84	132	2	17	55	58	--	--	--	--	--
	\$1,926	\$2,122	\$2,357	\$2,020	\$1,703	--	--	--	--	--
85 - 89	14	--	2	7	5	--	--	--	--	--
	\$1,602	--	\$2,020	\$1,489	\$1,593	--	--	--	--	--
90 & Over	3	--	1	2	--	--	--	--	--	--
	\$3,536	--	\$969	\$4,819	--	--	--	--	--	--
Total	3,426	1,148	1,285	731	259	2	1	--	--	--
	\$2,765	\$2,566	\$3,172	\$2,730	\$1,740	\$1,491	\$1,558	--	--	--

Note: Total retired benefit \$9,472,274, average age 67.6, and average years of retirement 7.6.

**EXHIBIT C – RETIRED MEMBERS AND BENEFICIARIES AS OF DECEMBER 31, 2018 (CONTINUED)
BY AGE, YEARS OF RETIREMENT, AND AVERAGE MONTHLY BENEFIT
GENERAL TIER 5**

Age	Years of Retirement									
	Total	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 & over
Under 30	--	--	--	--	--	--	--	--	--	--
30 - 34	--	--	--	--	--	--	--	--	--	--
35 - 39	--	--	--	--	--	--	--	--	--	--
40 - 44	--	--	--	--	--	--	--	--	--	--
45 - 49	--	--	--	--	--	--	--	--	--	--
50 - 54	1	1	--	--	--	--	--	--	--	--
	\$470	\$470	--	--	--	--	--	--	--	--
55 - 59	3	3	--	--	--	--	--	--	--	--
	\$207	\$207	--	--	--	--	--	--	--	--
60 - 64	1	1	--	--	--	--	--	--	--	--
	\$409	\$409	--	--	--	--	--	--	--	--
65 - 69	3	3	--	--	--	--	--	--	--	--
	\$530	\$530	--	--	--	--	--	--	--	--
70 - 74	3	3	--	--	--	--	--	--	--	--
	\$372	\$372	--	--	--	--	--	--	--	--
75 - 79	--	--	--	--	--	--	--	--	--	--
80 - 84	--	--	--	--	--	--	--	--	--	--
85 - 89	--	--	--	--	--	--	--	--	--	--
90 & Over	--	--	--	--	--	--	--	--	--	--
Total	11	11	--	--	--	--	--	--	--	--
	\$383	\$383	--	--	--	--	--	--	--	--

Note: Total retired benefit \$4,208, average age 64.2, and average years of retirement 0.5.

**EXHIBIT C – RETIRED MEMBERS AND BENEFICIARIES AS OF DECEMBER 31, 2018 (CONTINUED)
BY AGE, YEARS OF RETIREMENT, AND AVERAGE MONTHLY BENEFIT
SAFETY TIER A AND TIER C**

Age	Years of Retirement									
	Total	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 & over
Under 30	6	--	--	3	--	1	1	--	1	--
	\$1,741	--	--	\$1,468	--	\$288	\$1,511	--	\$4,245	--
30 - 34	3	2	--	1	--	--	--	--	--	--
	\$2,386	\$3,120	--	\$918	--	--	--	--	--	--
35 - 39	9	3	4	--	--	--	2	--	--	--
	\$3,038	\$3,266	\$3,752	--	--	--	\$1,270	--	--	--
40 - 44	26	11	7	7	--	--	1	--	--	--
	\$4,119	\$4,306	\$3,773	\$4,562	--	--	\$1,382	--	--	--
45 - 49	66	32	12	14	8	--	--	--	--	--
	\$4,455	\$4,894	\$3,473	\$4,800	\$3,571	--	--	--	--	--
50 - 54	257	178	48	13	11	4	3	--	--	--
	\$6,163	\$6,443	\$6,303	\$5,242	\$4,371	\$3,706	\$1,156	--	--	--
55 - 59	345	62	216	25	23	13	5	1	--	--
	\$7,057	\$6,518	\$8,138	\$4,107	\$4,146	\$4,098	\$3,457	\$4,297	--	--
60 - 64	332	23	136	120	27	11	10	4	1	--
	\$7,593	\$4,874	\$8,275	\$8,743	\$5,086	\$3,483	\$3,549	\$5,026	\$2,964	--
65 - 69	334	12	54	140	75	27	12	11	2	1
	\$7,638	\$4,740	\$8,161	\$9,218	\$7,648	\$3,441	\$3,843	\$3,491	\$3,845	\$4,132
70 - 74	380	3	16	74	166	55	25	22	12	7
	\$7,044	\$2,138	\$6,193	\$8,534	\$8,644	\$4,580	\$4,692	\$3,008	\$3,536	\$3,853
75 - 79	229	1	6	17	64	66	42	19	7	7
	\$6,750	\$1,417	\$3,126	\$3,639	\$7,826	\$8,974	\$5,664	\$4,119	\$3,574	\$4,199
80 - 84	141	1	3	--	9	30	55	23	15	5
	\$6,029	\$3,268	\$4,374	--	\$5,702	\$5,897	\$7,392	\$4,888	\$4,437	\$3,989
85 - 89	80	--	--	--	--	8	12	22	20	18
	\$4,993	--	--	--	--	\$4,976	\$6,223	\$5,508	\$4,722	\$3,852
90 & Over	42	--	--	--	--	--	1	8	14	19
	\$5,538	--	--	--	--	--	\$1,115	\$6,437	\$6,426	\$4,737
Total	2,250	328	502	414	383	215	169	110	72	57
	\$6,774	\$5,949	\$7,651	\$7,991	\$7,493	\$5,863	\$5,594	\$4,476	\$4,629	\$4,206

Note: Total retired benefit \$15,241,288, average age 66.3, and average years of retirement 15.4. Includes members from terminated employers.

**EXHIBIT C – RETIRED MEMBERS AND BENEFICIARIES AS OF DECEMBER 31, 2018 (CONTINUED)
BY AGE, YEARS OF RETIREMENT, AND AVERAGE MONTHLY BENEFIT
SAFETY TIER D AND TIER E**

Age	Years of Retirement									
	Total	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 & over
Under 30	--	--	--	--	--	--	--	--	--	--
30 - 34	--	--	--	--	--	--	--	--	--	--
35 - 39	--	--	--	--	--	--	--	--	--	--
40 - 44	--	--	--	--	--	--	--	--	--	--
45 - 49	--	--	--	--	--	--	--	--	--	--
50 - 54	--	--	--	--	--	--	--	--	--	--
55 - 59	1	1	--	--	--	--	--	--	--	--
60 - 64	\$2,160	\$2,160	--	--	--	--	--	--	--	--
65 - 69	--	--	--	--	--	--	--	--	--	--
70 - 74	--	--	--	--	--	--	--	--	--	--
75 - 79	--	--	--	--	--	--	--	--	--	--
80 - 84	--	--	--	--	--	--	--	--	--	--
85 - 89	--	--	--	--	--	--	--	--	--	--
90 & Over	--	--	--	--	--	--	--	--	--	--
Total	1	1	--	--	--	--	--	--	--	--
	\$2,160	\$2,160	--	--	--	--	--	--	--	--

Note: Total retired benefit \$2,160, average age 56.2, and average years of retirement 1.6.

EXHIBIT D – RECONCILIATION OF MEMBER DATA

	Active Members	Inactive Vested Members ⁽¹⁾	Retired Members	Disabled Members	Beneficiaries	Total
Number as of December 31, 2017	10,038	3,327	6,973	896	1,398	22,632
• New members	799	100	0	0	104	1,003
• Terminations – with vested rights	(310)	310	0	0	0	0
• Contribution refunds	(175)	(133)	0	0	0	(308)
• Retirements	(319)	(92)	411	0	0	0
• New disabilities	(33)	(2)	(5)	40	0	0
• Return to work	27	(27)	0	0	0	0
• Died with or without beneficiary	(7)	(6)	(164)	(27)	(71)	(275)
• Data adjustments	<u>1</u>	<u>0</u>	<u>(1)</u>	<u>(1)</u>	<u>(6)</u>	<u>(7)</u>
Number as of December 31, 2018	10,021	3,477	7,214	908	1,425	23,045

⁽¹⁾ Includes inactive members with member contributions on deposit.

EXHIBIT E – SUMMARY STATEMENT OF INCOME AND EXPENSES ON A MARKET VALUE BASIS

	Year Ended December 31, 2018	Year Ended December 31, 2017
Net assets at market value at the beginning of the year	\$8,390,581,049	\$7,438,519,504
Contribution income:		
• Employer contributions	\$325,117,103	\$314,836,561
• Member contributions	103,541,529	96,466,906
• Less administrative expenses	<u>(9,337,053)</u>	<u>(9,146,115)</u>
Net contribution income	\$419,321,579	\$402,157,352
Investment income:		
• Interest, dividends and other income	\$122,028,712	\$216,736,117
• Asset appreciation	(271,910,965)	813,544,847
• Less investment fees	<u>(45,148,635)</u>	<u>(42,864,983)</u>
Net investment income	<u>\$(195,030,888)</u>	<u>\$987,415,981</u>
Total income available for benefits	\$224,290,691	\$1,389,573,333
Less benefit payments:		
• Benefits paid	\$(451,371,645)	\$(429,574,195)
• Refunds of contributions	(9,232,894)	(5,980,405)
• Adjustments, transfers or other expenses	<u>(4,281,407)</u>	<u>(1,957,188)</u>
Net benefit payments	<u>\$(464,885,947)</u>	<u>\$(437,511,788)</u>
Change in net assets at market value	\$(240,595,256)	\$952,061,545
Net assets at market value at the end of the year	\$8,149,985,793	\$8,390,581,049

Note: Results may be slightly off due to rounding.

EXHIBIT F – SUMMARY STATEMENT OF PLAN ASSETS

	Year Ended December 31, 2018	Year Ended December 31, 2017
Cash equivalents	\$653,279,987	\$690,793,803
Accounts receivable:		
• Investment trades	\$16,983,472	\$22,462,322
• Investment income	20,229,623	20,293,645
• Employer and member contributions	9,982,077	9,805,486
• Additional contributions	<u>12,317,664</u>	<u>14,367,397</u>
Total accounts receivable	\$59,512,836	\$66,928,850
Investments:		
• Stocks	\$3,202,523,490	\$3,899,074,060
• Bonds	2,611,979,915	2,385,460,866
• Real estate	644,587,626	652,385,617
• Alternative investments and real assets	<u>1,440,993,833</u>	<u>1,216,666,285</u>
Total investments at market value	\$7,900,084,864	\$8,153,586,828
Other assets	<u>500,284</u>	<u>516,754</u>
Total assets	\$8,613,377,971	\$8,911,826,235
Accounts payable:		
• Investment trades	\$(20,576,922)	\$(25,352,546)
• Security lending	(243,358,031)	(294,005,415)
• Employer contributions unearned	(151,748,113)	(155,492,320)
• Other	<u>(47,709,112)</u>	<u>(46,394,905)</u>
Total accounts payable	\$(463,392,178)	\$(521,245,186)
Net assets at market value	\$8,149,985,793	\$8,390,581,049
Net assets at actuarial value	\$8,666,778,056	\$8,195,516,541
Net assets at valuation value	\$8,650,178,226	\$8,179,891,191

Note: Results may be slightly off due to rounding.

EXHIBIT G – SUMMARY OF TOTAL ALLOCATED RESERVES

	December 31, 2018	December 31, 2017
Member Deposits ⁽¹⁾	\$852,464,738	\$795,727,498
Member Cost of Living ⁽¹⁾	449,161,645	420,388,707
Employer Advance ^{(1) (2)}	2,295,152,786	2,063,002,259
Employer Cost of Living ^{(1) (2)}	1,032,587,045	928,964,628
Retired Members ^{(1) (2)}	3,468,067,211	3,363,343,722
Retired Cost of Living ^{(1) (2)}	2,565,742,215	2,444,582,495
Dollar Power Cost of Living Supplement Pre-Funding ⁽¹⁾	2,649,181	3,946,603
Post Retirement Death Benefit ⁽³⁾	15,757,910	15,625,350
Statutory Contingency (one percent) ⁽³⁾	0	0
Additional One Percent Contingency Designation ⁽³⁾	0	0
Contra Tracking Account ⁽¹⁾	<u>(2,014,804,675)</u>	<u>(1,840,064,721)</u>
Total Allocated Reserves	\$8,666,778,056	\$8,195,516,541
Total Deferred Return	(516,792,263)	195,064,508
Net Market Value	\$8,149,985,793	\$8,390,581,049

Note: Results may be slightly off due to rounding.

⁽¹⁾ Included in valuation value of assets.

⁽²⁾ Both December 31, 2018 and December 31, 2017 information reflect a “true-up” of retired reserves.

⁽³⁾ Not included in valuation value of assets.

EXHIBIT H – DEVELOPMENT OF THE FUND THROUGH DECEMBER 31, 2018

Year Ended December 31	Employer Contributions ⁽¹⁾	Member Contributions ⁽¹⁾	Administrative Expenses ⁽²⁾	Net Investment Return ⁽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
2009	\$195,613,673	\$66,536,161	N/A	\$736,956,891	\$272,076,007	\$4,476,729,530	\$5,290,114,102	118.2%
2010	183,950,930	64,330,484	N/A	594,637,090	292,490,835	5,027,157,199	5,341,821,711	106.3%
2011	200,388,994	61,575,376	N/A	88,042,268	324,874,379	5,052,289,458	5,426,719,066	107.4%
2012	212,321,325	73,361,712	N/A	668,138,997	351,530,368	5,654,581,124	5,482,257,062	97.0%
2013	235,017,452	72,373,254	N/A	870,984,744	374,638,978	6,458,317,596	5,907,416,432	91.5%
2014	293,760,413	78,257,665	N/A	473,522,261	394,947,705	6,908,910,230	6,557,496,101	94.9%
2015	323,720,270	85,360,637	N/A	65,495,657	406,904,366	6,976,582,428	7,136,801,380	102.3%
2016	307,457,143	89,240,172	\$8,486,463	493,874,242	420,148,018	7,438,519,504	7,606,997,530	102.3%
2017	314,836,561	96,466,906	9,146,115	987,415,981	437,511,788	8,390,581,049	8,179,891,191	97.5%
2018	325,117,103	103,541,529	9,337,053	(195,030,888)	464,885,947	8,149,985,793	8,650,178,226	106.1%

⁽¹⁾ Prior to 2017, employer contributions include “employer subvention of member contributions” and exclude “member subvention of employer contributions”.

⁽²⁾ Prior to 2016, administrative expenses were shown as an offset to the net investment return.

⁽³⁾ On a market basis, net of investment fees beginning with the year ended December 31, 2016. Prior to 2016, shown net of investment fees and administrative expenses.

EXHIBIT I – TABLE OF AMORTIZATION BASES

Type	Date Established	Initial Amount	Initial Period	Outstanding Balance	Years Remaining	Annual Payment ⁽¹⁾
Cost Groups #1 and #2 – General County and Small Districts						
Restart of Amortization	December 31, 2007	\$785,069,153	15	\$379,529,498	4	\$103,746,644
Actuarial Loss	December 31, 2008	80,033,199	18	60,688,514	8	8,885,623
Actuarial Loss	December 31, 2009	165,041,323	18	132,918,130	9	17,594,180
Assumption Change	December 31, 2009	39,563,826	18	31,863,231	9	4,217,690
Depooling Implementation	December 31, 2009	(74,701,913)	18	(60,162,136)	9	(7,963,575)
Actuarial Loss	December 31, 2010	153,070,543	18	129,349,285	10	15,671,171
Actuarial Loss	December 31, 2011	94,750,078	18	83,177,779	11	9,315,719
Actuarial Loss	December 31, 2012	117,029,116	18	105,855,175	12	11,049,719
Assumption Change	December 31, 2012	288,802,882	18	261,227,980	12	27,268,348
Actuarial Gain	December 31, 2013	(134,810,112)	18	(125,193,021)	13	(12,263,943)
Assumption Change ⁽²⁾	December 31, 2013	(107,553,289)	18	(99,880,647)	13	(9,784,336)
Actuarial Gain	December 31, 2014	(171,898,812)	18	(162,939,617)	14	(15,066,745)
Actuarial Gain	December 31, 2015	(105,003,533)	18	(101,080,296)	15	(8,867,025)
Assumption Change	December 31, 2015	39,814,884	18	38,327,284	15	3,362,169
Actuarial Gain	December 31, 2016	(28,579,026)	18	(27,964,829)	16	(2,337,391)
Actuarial Gain	December 31, 2017	(17,937,638)	18	(17,773,694)	17	(1,420,886)
Actuarial Loss	December 31, 2018	75,264,047	18	75,264,047	18	5,774,195
Assumption Change	December 31, 2018	(6,021,683)	18	(6,021,683)	18	(461,978)
Subtotal – Cost Groups #1 and #2				\$697,184,998		\$148,719,579

Note: Results may be slightly off due to rounding.

⁽¹⁾ As of middle of year.

⁽²⁾ Effective with the December 31, 2010 valuation, leave cashout (terminal pay) assumptions are now based on cost groups. Effective with the December 31, 2013 valuation, the leave cashout assumptions were reduced to reflect AB 197.

EXHIBIT I – TABLE OF AMORTIZATION BASES (CONTINUED)

Type	Date Established	Initial Amount	Initial Period	Outstanding Balance	Years Remaining	Annual Payment ⁽¹⁾
Cost Group #3 – Central Contra Costa Sanitary District						
Restart of Amortization	December 31, 2007	\$36,185,000	15	\$17,493,077	4	\$4,781,836
Actuarial Loss	December 31, 2008	3,709,835	18	2,813,137	8	411,882
Actuarial Loss	December 31, 2009	10,118,261	18	8,148,870	9	1,078,654
Assumption Change	December 31, 2009	2,003,000	18	1,613,142	9	213,529
Depooling Implementation	December 31, 2009	20,037,235	18	16,137,242	9	2,136,063
Actuarial Loss	December 31, 2010	18,178,489	18	15,361,379	10	1,861,091
Assumption Change ⁽²⁾	December 31, 2010	11,479,648	18	9,700,653	10	1,175,272
Actuarial Loss	December 31, 2011	10,514,535	18	9,230,343	11	1,033,777
Actuarial Loss	December 31, 2012	12,564,241	18	11,364,607	12	1,186,297
Assumption Change	December 31, 2012	22,455,342	18	20,311,306	12	2,120,201
UAAL Prepayment	December 31, 2012	(4,666,477)	18	(4,220,922)	12	(440,602)
Actuarial Loss	December 31, 2013	582,962	18	541,375	13	53,033
Assumption Change ⁽²⁾	December 31, 2013	(14,950,866)	18	(13,884,300)	13	(1,360,110)
UAAL Prepayment	December 31, 2013	(4,662,899)	18	(4,330,257)	13	(424,193)
Actuarial Gain	December 31, 2014	(11,848,823)	18	(11,231,275)	14	(1,038,537)
UAAL Prepayment	December 31, 2014	(2,331,896)	18	(2,210,360)	14	(204,388)
Actuarial Gain	December 31, 2015	(6,504,510)	18	(6,261,483)	15	(549,273)
Assumption Change	December 31, 2015	44,220	18	42,568	15	3,734
Actuarial Gain	December 31, 2016	(1,522,932)	18	(1,490,203)	16	(124,556)
Actuarial Gain	December 31, 2017	(1,621,926)	18	(1,607,103)	17	(128,477)
Actuarial Loss	December 31, 2018	5,331,336	18	5,331,336	18	409,016
Assumption Change	December 31, 2018	1,129,709	18	<u>1,129,709</u>	18	<u>86,670</u>
Subtotal – Cost Group #3				\$73,982,842		\$12,280,919

Note: Results may be slightly off due to rounding.

⁽¹⁾ As of middle of year.

⁽²⁾ Effective with the December 31, 2010 valuation, leave cashout (terminal pay) assumptions are now based on cost groups. Effective with the December 31, 2013 valuation, the leave cashout assumptions were reduced to reflect AB 197.

EXHIBIT I – TABLE OF AMORTIZATION BASES (CONTINUED)

Type	Date Established	Initial Amount	Initial Period	Outstanding Balance	Years Remaining	Annual Payment ⁽¹⁾
Cost Group #4 – Contra Costa Housing Authority						
Restart of Amortization	December 31, 2007	\$7,770,000	15	\$3,756,286	4	\$1,026,803
Actuarial Loss	December 31, 2008	1,573,513	18	1,193,182	8	174,698
Actuarial Loss	December 31, 2009	1,277,079	18	1,028,512	9	136,143
Assumption Change	December 31, 2009	425,000	18	342,279	9	45,307
Depooling Implementation	December 31, 2009	(189,275)	18	(152,435)	9	(20,178)
Actuarial Loss	December 31, 2010	619,697	18	523,663	10	63,444
Assumption Change ⁽²⁾	December 31, 2010	(920,656)	18	(777,982)	10	(94,256)
Actuarial Loss	December 31, 2011	1,059,328	18	929,947	11	104,152
Actuarial Loss	December 31, 2012	1,912,999	18	1,730,346	12	180,623
Assumption Change	December 31, 2012	3,722,862	18	3,367,403	12	351,507
Actuarial Gain	December 31, 2013	(2,220,704)	18	(2,062,283)	13	(202,022)
Assumption Change ⁽²⁾	December 31, 2013	(1,077,289)	18	(1,000,437)	13	(98,003)
Actuarial Gain	December 31, 2014	(1,360,021)	18	(1,289,138)	14	(119,204)
Actuarial Gain	December 31, 2015	(875,294)	18	(842,591)	15	(73,914)
Assumption Change	December 31, 2015	432,801	18	416,630	15	36,548
Actuarial Gain	December 31, 2016	(297,092)	18	(290,707)	16	(24,298)
Actuarial Loss	December 31, 2017	53,895	18	53,403	17	4,269
Actuarial Loss	December 31, 2018	527,741	18	527,741	18	40,488
Assumption Change	December 31, 2018	86,577	18	<u>86,577</u>	18	<u>6,642</u>
Subtotal – Cost Group #4				\$7,540,395		\$1,538,749

Note: Results may be slightly off due to rounding.

⁽¹⁾ As of middle of year.

⁽²⁾ Effective with the December 31, 2010 valuation, leave cashout (terminal pay) assumptions are now based on cost groups. Effective with the December 31, 2013 valuation, the leave cashout assumptions were reduced to reflect AB 197.

EXHIBIT I – TABLE OF AMORTIZATION BASES (CONTINUED)

Type	Date Established	Initial Amount	Initial Period	Outstanding Balance	Years Remaining	Annual Payment ⁽¹⁾
Cost Group #5 – Contra Costa County Fire Protection District						
Restart of Amortization	December 31, 2007	\$(1,011,000)	15	\$(488,752)	4	\$(133,603)
Actuarial Loss	December 31, 2008	45,963	18	34,853	8	5,103
Actuarial Loss	December 31, 2009	1,614,180	18	1,300,000	9	172,079
Assumption Change	December 31, 2009	336,000	18	270,602	9	35,819
Depooling Implementation	December 31, 2009	2,142,538	18	1,725,520	9	228,405
Actuarial Loss	December 31, 2010	2,722,306	18	2,300,432	10	278,706
Actuarial Loss	December 31, 2011	1,350,620	18	1,185,662	11	132,791
Actuarial Loss	December 31, 2012	1,787,426	18	1,616,762	12	168,766
Assumption Change	December 31, 2012	3,184,172	18	2,880,147	12	300,645
Actuarial Gain	December 31, 2013	(2,500,665)	18	(2,322,273)	13	(227,490)
Assumption Change ⁽²⁾	December 31, 2013	(985,653)	18	(915,338)	13	(89,667)
Actuarial Gain	December 31, 2014	(2,215,758)	18	(2,100,275)	14	(194,209)
Actuarial Gain	December 31, 2015	(756,551)	18	(728,284)	15	(63,887)
Assumption Change	December 31, 2015	355,946	18	342,647	15	30,058
Actuarial Loss	December 31, 2016	1,591,375	18	1,557,174	16	130,154
Actuarial Loss	December 31, 2017	1,476,313	18	1,462,820	17	116,943
Actuarial Loss	December 31, 2018	1,495,430	18	1,495,430	18	114,728
Assumption Change	December 31, 2018	606,920	18	<u>606,920</u>	18	<u>46,562</u>
Subtotal – Cost Group #5				\$10,224,049		\$1,051,903

Note: Results may be slightly off due to rounding.

⁽¹⁾ As of middle of year.

⁽²⁾ Effective with the December 31, 2010 valuation, leave cashout (terminal pay) assumptions are now based on cost groups. Effective with the December 31, 2013 valuation, the leave cashout assumptions were reduced to reflect AB 197.

EXHIBIT I – TABLE OF AMORTIZATION BASES (CONTINUED)

Type	Date Established	Initial Amount	Initial Period	Outstanding Balance	Years Remaining	Annual Payment ⁽¹⁾
Cost Group #6 – Small Districts (General Non-Enhanced)						
Actuarial Surplus ⁽²⁾	December 31, 2018	\$(498,374)		<u>\$(498,374)</u>	N/A	<u>\$0</u>
Subtotal – Cost Group #6				<u>\$(498,374)</u>		<u>\$0</u>

Note: Results may be slightly off due to rounding.

⁽¹⁾ As of middle of year.

⁽²⁾ Consistent with CCCERA's Actuarial Funding Policy, all prior UAAL layers are considered fully amortized due to surplus.

EXHIBIT I – TABLE OF AMORTIZATION BASES (CONTINUED)

Type	Date Established	Initial Amount	Initial Period	Outstanding Balance	Years Remaining	Annual Payment ⁽¹⁾
Cost Groups #7 and #9 – County Safety						
Restart of Amortization	December 31, 2007	\$127,662,439	15	\$61,716,425	4	\$16,870,552
Actuarial Loss	December 31, 2008	25,619,265	18	19,426,877	8	2,844,359
Actuarial Loss	December 31, 2009	55,134,940	18	44,403,626	9	5,877,644
Assumption Change	December 31, 2009	11,076,665	18	8,920,733	9	1,180,825
Depooling Implementation	December 31, 2009	23,852,078	18	19,209,574	9	2,542,743
Actuarial Loss	December 31, 2010	57,287,975	18	48,410,089	10	5,865,071
Actuarial Loss	December 31, 2011	45,209,350	18	39,687,707	11	4,444,932
Actuarial Loss	December 31, 2012	53,258,503	18	48,173,381	12	5,028,590
Assumption Change	December 31, 2012	138,353,562	18	125,143,562	12	13,063,142
Actuarial Gain	December 31, 2013	(35,024,912)	18	(32,526,304)	13	(3,186,286)
Assumption Change ⁽²⁾	December 31, 2013	(43,771,706)	18	(40,649,118)	13	(3,981,999)
Actuarial Gain	December 31, 2014	(61,815,393)	18	(58,593,636)	14	(5,418,052)
Assumption Change ⁽³⁾	December 31, 2014	(51,701)	18	(49,006)	14	(4,531)
Actuarial Gain	December 31, 2015	(58,489,966)	18	(56,304,611)	15	(4,939,186)
Assumption Change	December 31, 2015	39,291,409	18	37,823,368	15	3,317,964
Actuarial Gain	December 31, 2016	(13,557,811)	18	(13,266,438)	16	(1,108,852)
Actuarial Gain	December 31, 2017	(8,178,240)	18	(8,103,494)	17	(647,819)
Actuarial Loss	December 31, 2018	41,037,406	18	41,037,406	18	3,148,355
Assumption Change	December 31, 2018	(47,713,599)	18	(47,713,599)	18	(3,660,547)
Subtotal – Cost Groups #7 and #9				\$236,746,543		\$41,236,905

Note: Results may be slightly off due to rounding.

⁽¹⁾ As of middle of year.

⁽²⁾ Effective with the December 31, 2010 valuation, leave cashout (terminal pay) assumptions are now based on cost groups. Effective with the December 31, 2013 valuation, the leave cashout assumptions were reduced to reflect AB 197.

⁽³⁾ Effective with the December 31, 2014 valuation, leave cashout (terminal pay) assumptions were eliminated for Cost Group #9.

EXHIBIT I – TABLE OF AMORTIZATION BASES (CONTINUED)

Type	Date Established	Initial Amount	Initial Period	Outstanding Balance	Years Remaining	Annual Payment ⁽¹⁾
Cost Group #8 – Contra Costa and East Fire Protection Districts						
Restart of Amortization	December 31, 2007	\$124,138,710	15	\$60,012,933	4	\$16,404,892
Actuarial Loss	December 31, 2008	6,780,436	18	5,141,549	8	752,793
Actuarial Loss	December 31, 2009	27,018,706	18	21,759,859	9	2,880,321
Assumption Change	December 31, 2009	4,945,000	18	3,982,519	9	527,160
Depooling Implementation	December 31, 2009	47,818,666	18	38,511,371	9	5,097,694
Actuarial Loss	December 31, 2010	38,165,445	18	32,250,967	10	3,907,331
Assumption Change ⁽²⁾	December 31, 2010	(1,599,051)	18	(1,351,247)	10	(163,709)
Actuarial Loss	December 31, 2011	26,533,166	18	23,292,539	11	2,608,711
Actuarial Loss	December 31, 2012	31,501,440	18	28,493,682	12	2,974,320
Assumption Change	December 31, 2012	68,193,356	18	61,682,254	12	6,438,717
Actuarial Gain	December 31, 2013	(22,661,640)	18	(21,045,003)	13	(2,061,574)
Assumption Change ⁽²⁾	December 31, 2013	(17,910,676)	18	(16,632,963)	13	(1,629,370)
Actuarial Gain	December 31, 2014	(29,217,962)	18	(27,695,151)	14	(2,560,923)
Actuarial Gain	December 31, 2015	(19,005,510)	18	(18,295,409)	15	(1,604,921)
Assumption Change	December 31, 2015	24,296,846	18	23,389,045	15	2,051,748
Actuarial Gain	December 31, 2016	(8,297,685)	18	(8,119,358)	16	(678,642)
Actuarial Gain	December 31, 2017	(10,658,502)	18	(10,561,087)	17	(844,287)
Actuarial Loss	December 31, 2018	19,301,243	18	19,301,243	18	1,480,775
Assumption Change	December 31, 2018	(23,503,820)	18	(23,503,820)	18	(1,803,193)
Subtotal – Cost Group #8				\$190,613,921		\$33,777,843

Note: Results may be slightly off due to rounding.

⁽¹⁾ As of middle of year.

⁽²⁾ Effective with the December 31, 2010 valuation, leave cashout (terminal pay) assumptions are now based on cost groups. Effective with the December 31, 2013 valuation, the leave cashout assumptions were reduced to reflect AB 197.

EXHIBIT I – TABLE OF AMORTIZATION BASES (CONTINUED)

Type	Date Established	Initial Amount	Initial Period	Outstanding Balance	Years Remaining	Annual Payment ⁽¹⁾
Cost Group #10 – Moraga-Orinda Fire District						
Restart of Amortization	December 31, 2007	\$(2,591,000)	15	\$(1,252,579)	4	\$(342,400)
Actuarial Loss	December 31, 2008	2,002,150	18	1,518,214	8	222,287
Actuarial Loss	December 31, 2009	5,671,684	18	4,567,763	9	604,628
Assumption Change	December 31, 2009	1,012,000	18	815,027	9	107,884
Depooling Implementation	December 31, 2009	4,873,631	18	3,925,041	9	519,552
Actuarial Loss	December 31, 2010	5,334,964	18	4,508,208	10	546,187
Assumption Change ⁽²⁾	December 31, 2010	806,018	18	681,110	10	82,519
Actuarial Loss	December 31, 2011	6,791,005	18	5,961,586	11	667,684
Actuarial Loss	December 31, 2012	8,924,598	18	8,072,478	12	842,648
Assumption Change	December 31, 2012	12,149,892	18	10,989,820	12	1,147,175
Actuarial Gain	December 31, 2013	(1,027,440)	18	(954,144)	13	(93,468)
Assumption Change ⁽²⁾	December 31, 2013	(3,613,981)	18	(3,356,167)	13	(328,771)
Actuarial Gain	December 31, 2014	(4,813,045)	18	(4,562,193)	14	(421,858)
Actuarial Gain	December 31, 2015	(8,490,806)	18	(8,173,565)	15	(717,006)
Assumption Change	December 31, 2015	3,844,347	18	3,700,711	15	324,636
Actuarial Loss	December 31, 2016	1,028,690	18	1,006,582	16	84,133
Actuarial Gain	December 31, 2017	(422,995)	18	(419,129)	17	(33,506)
Actuarial Loss	December 31, 2018	6,029,055	18	6,029,055	18	462,544
Assumption Change	December 31, 2018	(4,116,542)	18	(4,116,542)	18	(315,818)
Subtotal – Cost Group #10				\$28,941,275		\$3,359,050

Note: Results may be slightly off due to rounding.

⁽¹⁾ As of middle of year.

⁽²⁾ Effective with the December 31, 2010 valuation, leave cashout (terminal pay) assumptions are now based on cost groups. Effective with the December 31, 2013 valuation, the leave cashout assumptions were reduced to reflect AB 197.

EXHIBIT I – TABLE OF AMORTIZATION BASES (CONTINUED)

Type	Date Established	Initial Amount	Initial Period	Outstanding Balance	Years Remaining	Annual Payment ⁽¹⁾
Cost Group #11 – San Ramon Valley Fire District						
Restart of Amortization	December 31, 2007	\$58,766,000	15	\$28,409,511	4	\$7,765,909
Actuarial Loss	December 31, 2008	10,216,694	18	7,747,235	8	1,134,301
Actuarial Loss	December 31, 2009	9,262,105	18	7,459,354	9	987,384
Assumption Change	December 31, 2009	2,453,000	18	1,975,555	9	261,501
Depooling Implementation	December 31, 2009	(20,174,500)	18	(16,247,790)	9	(2,150,696)
Actuarial Loss	December 31, 2010	6,585,812	18	5,565,212	10	674,247
Assumption Change ⁽²⁾	December 31, 2010	5,093,420	18	4,304,095	10	521,458
Actuarial Loss	December 31, 2011	5,513,071	18	4,839,732	11	542,039
Actuarial Loss	December 31, 2012	14,600,741	18	13,206,662	12	1,378,581
Assumption Change	December 31, 2012	26,672,143	18	24,125,486	12	2,518,345
Actuarial Gain	December 31, 2013	(4,492,900)	18	(4,172,385)	13	(408,728)
Assumption Change ⁽²⁾	December 31, 2013	(12,984,002)	18	(12,057,749)	13	(1,181,180)
Actuarial Gain	December 31, 2014	(13,850,852)	18	(13,128,960)	14	(1,214,012)
Actuarial Gain	December 31, 2015	(9,008,582)	18	(8,671,995)	15	(760,730)
Assumption Change	December 31, 2015	5,533,144	18	5,326,410	15	467,246
Actuarial Loss	December 31, 2016	2,020,042	18	1,976,629	16	165,213
UAAL Prepayment	December 31, 2017	(303,806)	18	(301,029)	17	(24,065)
Actuarial Gain	December 31, 2017	(1,837,378)	18	(1,820,585)	17	(145,543)
UAAL Prepayment	December 31, 2018	(261,501)	18	(261,501)	18	(20,062)
Actuarial Loss	December 31, 2018	11,681,729	18	11,681,729	18	896,212
Assumption Change	December 31, 2018	(9,240,163)	18	(9,240,163)	18	(708,898)
Subtotal – Cost Group #11				\$50,715,454		\$10,698,522

Note: Results may be slightly off due to rounding.

⁽¹⁾ As of middle of year.

⁽²⁾ Effective with the December 31, 2010 valuation, leave cashout (terminal pay) assumptions are now based on cost groups. Effective with the December 31, 2013 valuation, the leave cashout assumptions were reduced to reflect AB 197.

EXHIBIT I – TABLE OF AMORTIZATION BASES (CONTINUED)

Type	Date Established	Initial Amount	Initial Period	Outstanding Balance	Years Remaining	Annual Payment ⁽¹⁾
Cost Group #12 – Rodeo-Hercules Fire Protection District						
Restart of Amortization	December 31, 2007	\$3,960,000	15	\$1,914,401	4	\$523,313
Actuarial Loss	December 31, 2008	957,150	18	725,799	8	106,267
Actuarial Loss	December 31, 2009	2,872,360	18	2,313,292	9	306,207
Assumption Change	December 31, 2009	1,154,000	18	929,389	9	123,022
Depooling Implementation	December 31, 2009	(1,809,374)	18	(1,457,202)	9	(192,888)
Actuarial Loss	December 31, 2010	1,502,503	18	1,269,661	10	153,824
Assumption Change ⁽²⁾	December 31, 2010	662,085	18	559,482	10	67,783
Actuarial Loss	December 31, 2011	2,067,217	18	1,814,738	11	203,246
Actuarial Loss	December 31, 2012	2,246,131	18	2,031,670	12	212,076
Assumption Change	December 31, 2012	3,018,796	18	2,730,561	12	285,030
Actuarial Loss	December 31, 2013	413,088	18	383,619	13	37,579
Assumption Change ⁽²⁾	December 31, 2013	(1,169,821)	18	(1,086,368)	13	(106,421)
Actuarial Loss	December 31, 2014	315,937	18	299,470	14	27,692
Actuarial Gain	December 31, 2015	(990,379)	18	(953,376)	15	(83,633)
Assumption Change	December 31, 2015	775,874	18	746,885	15	65,519
Actuarial Gain	December 31, 2016	(270,731)	18	(264,913)	16	(22,142)
Actuarial Gain	December 31, 2017	(836,969)	18	(829,319)	17	(66,298)
Actuarial Gain	December 31, 2018	(71,915)	18	(71,915)	18	(5,517)
Assumption Change	December 31, 2018	(985,876)	18	(985,876)	18	(75,636)
Subtotal – Cost Group #12				\$10,069,997		\$1,559,023

Note: Results may be slightly off due to rounding.

⁽¹⁾ As of middle of year.

⁽²⁾ Effective with the December 31, 2010 valuation, leave cashout (terminal pay) assumptions are now based on cost groups. Effective with the December 31, 2013 valuation, the leave cashout assumptions were reduced to reflect AB 197.

EXHIBIT I – TABLE OF AMORTIZATION BASES (CONTINUED)

Type	Date Established	Initial Amount	Initial Period	Outstanding Balance	Years Remaining	Annual Payment ⁽¹⁾
Special Adjustments						
County General POBs	December 31, 2007	\$(453,973,319)	15	\$(219,465,612)	4	\$(59,992,229)
Moraga General POBs	December 31, 2007	(701,412)	15	(339,085)	4	(92,691)
CCCFPD Safety POBs	December 31, 2007	(127,509,711)	15	(61,642,383)	4	(16,850,312)
First Five UAAL Prepayment	December 31, 2011	(1,794,205)	11	(814,898)	4	(233,191)
LAFCO UAAL Prepayment	December 31, 2017	(30,817)	18	(30,535)	17	(2,441)
Subtotal – Special Adjustments				\$(282,292,513)		\$(77,170,864)

Note: Results may be slightly off due to rounding.

⁽¹⁾ As of middle of year. The annual payment amounts shown for the Special Adjustments represent the credit allocated to the employer to reflect the receipt of the proceeds for Pension Obligation Bonds (POBs) or any other special contributions. These adjustments serve to reduce the UAAL contribution rate for these employers. The cost of debt service associated with the POBs is not reflected in this report.

EXHIBIT I – TABLE OF AMORTIZATION BASES (CONTINUED)

Type	Date Established	Initial Amount	Initial Period	Outstanding Balance	Years Remaining	Annual Payment ⁽¹⁾
All Cost Groups Combined						
Restart of Amortization	December 31, 2007	\$1,139,949,302	15	\$551,090,799	4	\$150,643,946
County General POBs ⁽²⁾	December 31, 2007	(453,973,319)	15	(219,465,612)	4	(59,992,229)
Moraga General POBs ⁽²⁾	December 31, 2007	(701,412)	15	(339,085)	4	(92,691)
CCCFPD Safety POBs ⁽²⁾	December 31, 2007	(127,509,711)	15	(61,642,383)	4	(16,850,312)
Actuarial Loss	December 31, 2008	130,938,206	18	99,289,360	8	14,537,313
Actuarial Loss	December 31, 2009	278,010,637	18	223,899,405	9	29,637,240
Assumption Change	December 31, 2009	62,968,491	18	50,712,476	9	6,712,737
Depooling Implementation	December 31, 2009	1,849,086	18	1,489,185	9	197,120
Actuarial Loss	December 31, 2010	283,467,735	18	239,538,896	10	29,021,072
Assumption Change ⁽³⁾	December 31, 2010	15,521,464	18	13,116,111	10	1,589,067
Actuarial Loss	December 31, 2011	193,788,371	18	170,120,032	11	19,053,051
First Five UAAL Prepayment ⁽²⁾	December 31, 2011	(1,794,205)	11	(814,898)	4	(233,191)
Actuarial Loss	December 31, 2012	243,825,195	18	220,544,763	12	23,021,620
Assumption Change	December 31, 2012	566,553,007	18	512,458,520	12	53,493,110
Sanitary UAAL Prepayment	December 31, 2012	(4,666,477)	18	(4,220,922)	12	(440,602)
Actuarial Gain	December 31, 2013	(201,742,323)	18	(187,350,419)	13	(18,352,899)
Assumption Change ⁽³⁾	December 31, 2013	(204,017,283)	18	(189,463,087)	13	(18,559,857)
Sanitary UAAL Prepayment	December 31, 2013	(4,662,899)	18	(4,330,257)	13	(424,193)
Actuarial Gain	December 31, 2014	(296,704,729)	18	(281,240,774)	14	(26,005,848)
Assumption Change ⁽⁴⁾	December 31, 2014	(51,701)	18	(49,006)	14	(4,531)
Sanitary UAAL Prepayment	December 31, 2014	(2,331,896)	18	(2,210,360)	14	(204,388)

Note: Results may be slightly off due to rounding.

⁽¹⁾ As of middle of year. The annual payment amounts shown for the Special Adjustments represent the credit allocated to the employer to reflect the receipt of the proceeds for Pension Obligation Bonds (POBs) or any other special contributions. These adjustments serve to reduce the UAAL contribution rate for these employers. The cost of debt service associated with the POBs is not reflected in this report.

⁽²⁾ Includes remaining balance of POBs and any other special contributions made by the County (including Courts), First 5 – Children & Families Commission, Local Agency Formation Commission, or Moraga-Orinda Fire District that have been allocated to the County General cost groups or for Contra Costa Fire Protection District that have been allocated to their Safety cost group.

⁽³⁾ Effective with the December 31, 2010 valuation, leave cashout (terminal pay) assumptions are now based on cost groups. Effective with the December 31, 2013 valuation, the leave cashout assumptions were reduced to reflect AB 197.

⁽⁴⁾ Effective with the December 31, 2014 valuation, leave cashout (terminal pay) assumptions were eliminated for Cost Group #9.

EXHIBIT I – TABLE OF AMORTIZATION BASES (CONTINUED)

Type	Date Established	Initial Amount	Initial Period	Outstanding Balance	Years Remaining	Annual Payment ⁽¹⁾
All Cost Groups Combined (continued)						
Actuarial Gain	December 31, 2015	\$(209,125,132)	18	\$(201,311,609)	15	\$(17,659,575)
Assumption Change	December 31, 2015	114,389,471	18	110,115,548	15	9,659,622
Actuarial Gain	December 31, 2016	(47,885,171)	18	(46,856,063)	16	(3,916,381)
San Ramon UAAL Prepayment	December 31, 2017	(303,806)	18	(301,029)	17	(24,065)
LAFCO UAAL Prepayment ⁽²⁾	December 31, 2017	(30,817)	18	(30,535)	17	(2,441)
Actuarial Gain	December 31, 2017	(39,963,440)	18	(39,598,187)	17	(3,165,604)
San Ramon UAAL Prepayment	December 31, 2018	(261,501)	18	(261,501)	18	(20,062)
Actuarial Loss	December 31, 2018	160,596,072	18	160,596,072	18	12,320,796
Assumption Change	December 31, 2018	(89,758,477)	18	(89,758,477)	18	(6,886,196)
CG #6 Actuarial Surplus ⁽⁵⁾	December 31, 2018	(498,374)	N/A	(498,374)	N/A	0
Subtotal – All Cost Groups				\$1,023,228,588		\$177,051,629
Terminated Employers ⁽⁶⁾				8,736,936		
Total CCCERA				\$1,031,965,524		

Note: Results may be slightly off due to rounding.

- (1) As of middle of year. The annual payment amounts shown for the Special Adjustments represent the credit allocated to the employer to reflect the receipt of the proceeds for Pension Obligation Bonds (POBs) or any other special contributions. These adjustments serve to reduce the UAAL contribution rate for these employers. The cost of debt service associated with the POBs is not reflected in this report.
- (2) Includes remaining balance of POBs and any other special contributions made by the County (including Courts), First 5 – Children & Families Commission, Local Agency Formation Commission, or Moraga-Orinda Fire District that have been allocated to the County General cost groups or for Contra Costa Fire Protection District that have been allocated to their Safety cost group.
- (3) Effective with the December 31, 2010 valuation, leave cashout (terminal pay) assumptions are now based on cost groups. Effective with the December 31, 2013 valuation, the leave cashout assumptions were reduced to reflect AB 197.
- (4) Effective with the December 31, 2014 valuation, leave cashout (terminal pay) assumptions were eliminated for Cost Group #9.
- (5) Consistent with CCCERA's Actuarial Funding Policy, all prior UAAL layers are considered fully amortized due to surplus.
- (6) Starting with the December 31, 2016 valuation, the three terminated employers (i.e., Diablo Water District, Delta Diablo Sanitation District and City of Pittsburg) have been moved from Cost Groups #1, #2 and #7 to their own Terminated Employers Cost Group.

EXHIBIT J – PROJECTION OF UAAL BALANCES AND PAYMENTS

Outstanding Balance of \$1,023 Million in Net UAAL as of December 31, 2018
Excludes Terminated Employers

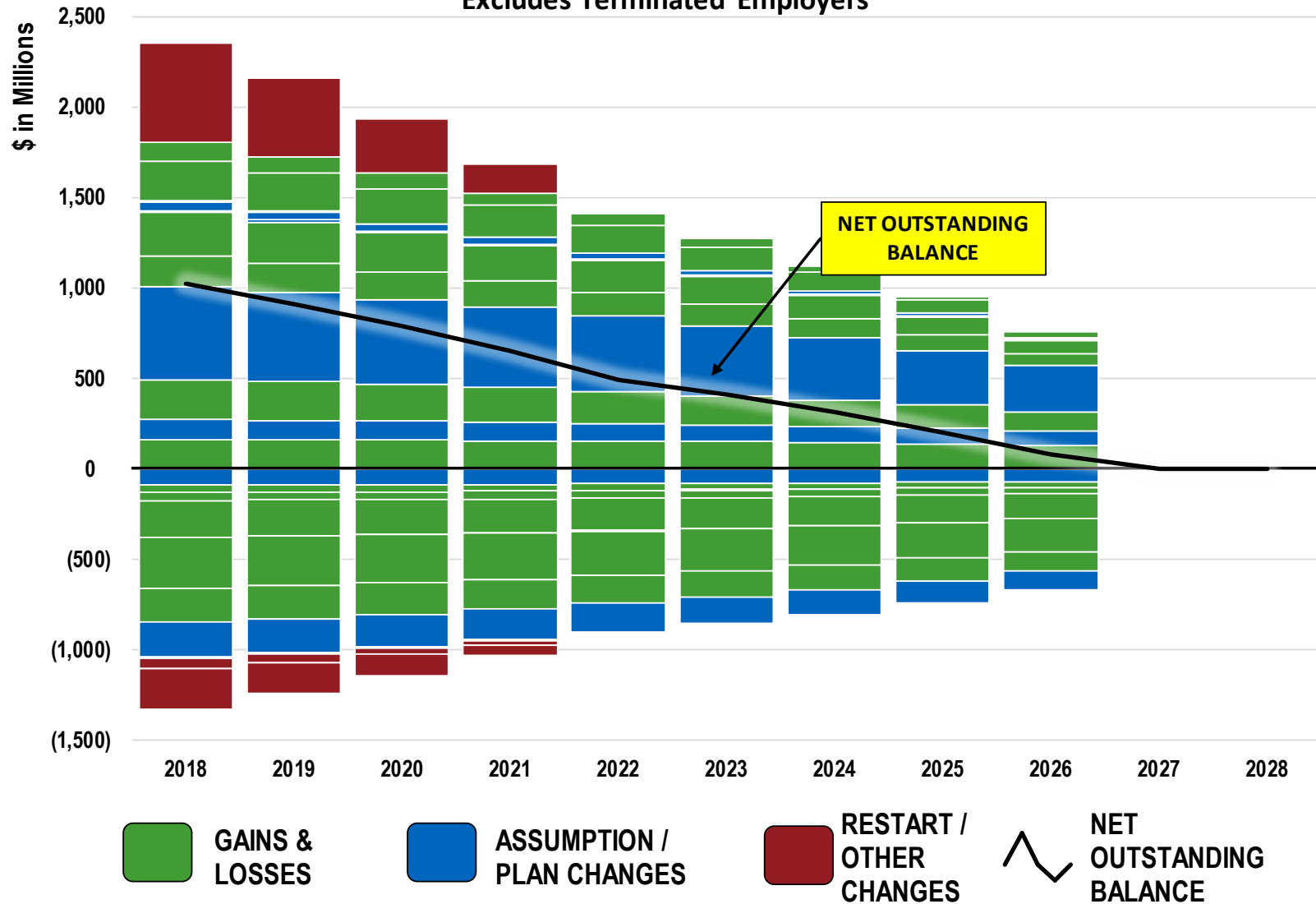


EXHIBIT J – PROJECTION OF UAAL BALANCES AND PAYMENTS (CONTINUED)

Annual Payments Required to Amortize \$1,023 Million in Net UAAL as of December 31, 2018

Excludes Terminated Employers

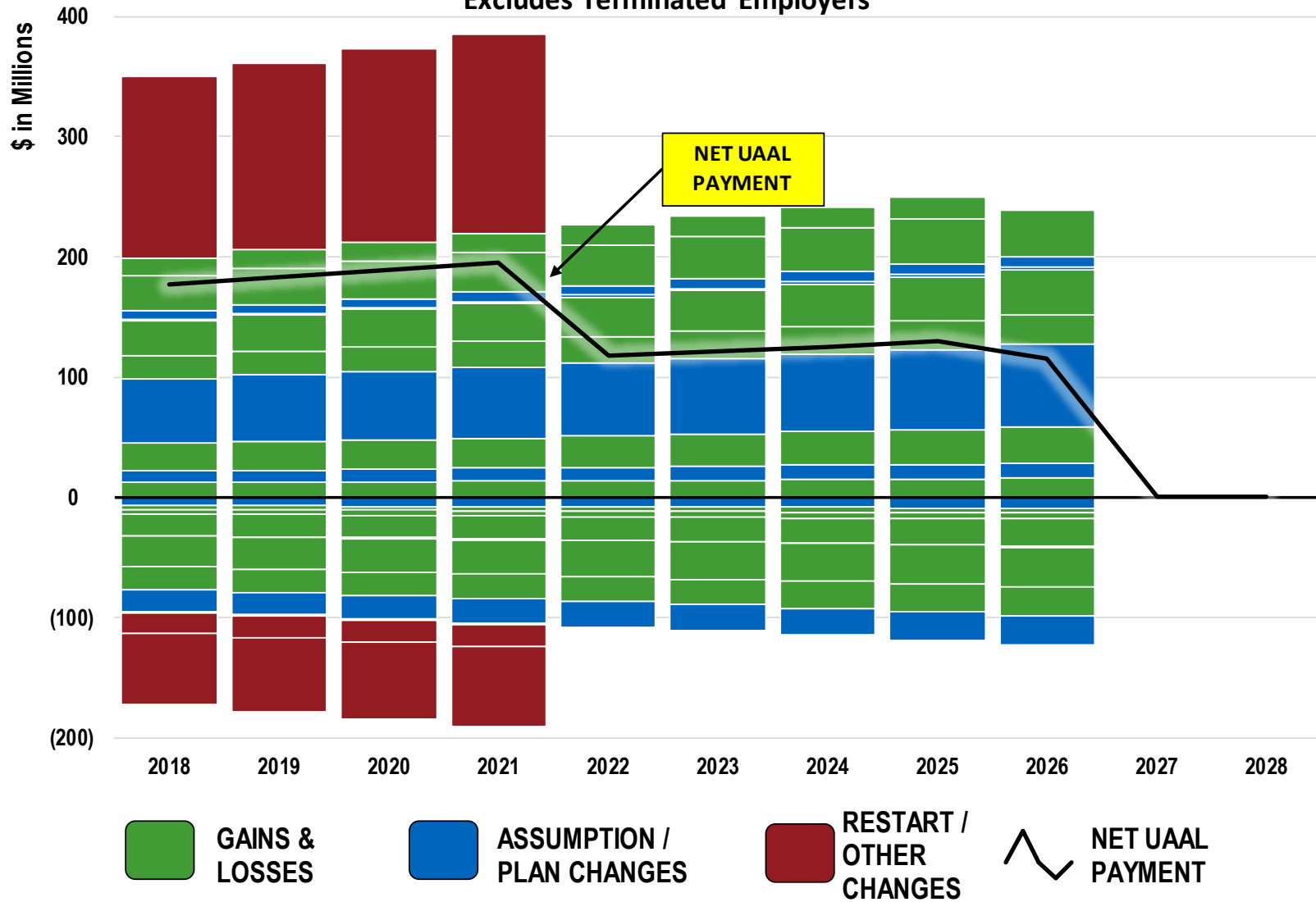


EXHIBIT K – DEFINITION OF PENSION TERMS

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:	Actuarial Present 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 recommended 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. 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 actuarial liabilities that are larger than projected.
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> <ul style="list-style-type: none"> Adjusted for the probable financial effect of certain intervening events (such as changes in compensation levels, marital status, etc.) Multiplied by the probability of the occurrence of an event (such as survival, death, disability, termination, etc.) on which the payment is conditioned, and Discounted according to an assumed rate (or rates) of return to reflect the time value of money.

Actuarial Present Value of Future 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 Benefits includes the liabilities for active members, retired members, beneficiaries receiving benefits, and inactive members entitled to either a refund of member contributions 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, as well as Actuarially Determined Contributions.
Actuarial Value of Assets (AVA):	The value of the Plan'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 Actuarially Determined Contribution.
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 Plan.
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 Unfunded Actuarial Accrued Liability. 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 Unfunded Actuarial Accrued Liability. 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 intended to payoff the Unfunded Actuarial Accrued Liability.

Assumptions or Actuarial Assumptions:	The estimates upon which the cost of the Plan is calculated, including: <u>Investment return</u> - the rate of investment yield that the Plan will earn over the long-term future; <u>Mortality rates</u> - the rate or probability of death at a given age for employees and pensioners; <u>Retirement rates</u> - the rate or probability of retirement at a given age or service; <u>Disability rates</u> – the rate or probability of disability retirement at a given age; <u>Termination rates</u> - the rate or probability at which employees of various ages are expected to leave employment for reasons other than death, disability, or retirement; <u>Salary increase rates</u> - the rates of salary increase due to inflation, real wage growth and merit and promotion increases.
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 based on the member's compensation, age 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.
Experience Study:	A periodic review and analysis of the actual experience of the Plan 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 based on recommendations from the Actuary.
Funded Ratio:	The ratio of the Valuation Value of Assets (VVA) to the Actuarial Accrued Liability (AAL). Plans sometimes also calculate a market funded ratio, using the Market Value of Assets (MVA), rather than the VVA.
Investment Return:	The rate of earnings of the Plan 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.
Normal Cost:	The portion of the Actuarial Present Value of Future Benefits and expenses allocated to a valuation year by the Actuarial Cost Method. Any payment with respect to an Unfunded Actuarial Accrued Liability is not part of the Normal Cost (see Amortization Payment). For pension plan benefits that are provided in part by employee contributions, Normal Cost refers to the total of member 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 each future year in determining the Amortization Period.
Unfunded Actuarial Accrued Liability:	The excess of the Actuarial Accrued Liability over the Valuation 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 or an Overfunded Actuarial Accrued Liability.
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 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, 2015 through December 31, 2017 Actuarial Experience Study report dated April 23, 2019. Unless otherwise noted, all actuarial assumptions and methods shown below apply to all tiers. These assumptions were adopted by the Board.

Economic Assumptions

Net Investment Return: 7.00%; net of investment expenses.
Based on the Actuarial Experience Study referenced above, expected investment expenses represent about 0.65% of the Actuarial Value of Assets.

Administrative Expenses: 1.10% of payroll allocated to both the employer and the member based on normal cost (before expenses) for the employer and member. This assumption changes each year based on the actual administrative expenses as a percent of actual compensation during the calendar year leading up to the valuation date.
For the 2018 calendar year, actual administrative expenses were \$9,337,053 and actual payroll was \$850,929,106. This results in the administrative expense assumption of 1.10% of payroll, allocated between employers and members as shown below:

	Average Normal Cost Rate Before Administrative Expense	Weighting	Total Loading
Employer	15.34%	57.15%	0.63%
Member	11.50%	42.85%	0.47%
Total		100.00%	1.10%

The employer Normal Cost rate is then increased by the same percent of payroll as the basic member rate with the remaining employer loading allocated to the employer UAAL rate. This is done to maintain a 50/50 sharing of Normal Cost for those in the PEPRA tiers. The table below shows this allocation.

Allocation of Administrative Expense Load as a % of Payroll	
Addition to Employer Basic Normal Cost Rate	0.47%
Addition to Employer Basic UAAL Rate	0.16%
Addition to Member Basic Rate	0.47%
Total Addition to Contribution Rates	1.10%

Employee Contribution Crediting Rate:	7.00%, compounded semi-annually.
Consumer Price Index:	<p>Increases of 2.75% per year.</p> <p>Benefits for General Tier 1, Tier 3 (non-disability), Tier 4 and Tier 5 (non-disability) and Safety Tier A and Tier D are subject to a 3.00% maximum COLA increase due to CPI per year (valued as a 2.75% increase).</p> <p>Benefits for General Tier 2, Tier 3 (disability) and Tier 5 (disability) are subject to a 4.00% maximum change per year (valued as a 2.75% increase).</p> <p>Benefits for General Tier 4 and Tier 5 members covered under certain memoranda of understanding and Safety Tier C and Tier E are subject to a 2.00% maximum change per year (valued as a 2.00% increase).</p> <p>For members that have COLA banks, they are reflected in projected future COLAs.</p> <p>The actual COLA granted by CCCERA on April 1, 2019 has been reflected for nonactive members in the December 31, 2018 valuation.</p>
Payroll Growth:	Inflation of 2.75% per year plus “across the board” real salary increases of 0.50% per year, used to amortize the Unfunded Actuarial Accrued Liability as a level percentage of payroll.
Increase in Internal Revenue Code Section 401(a)(17) Compensation Limit:	Increase of 2.75% per year from the valuation date.
Increase in Section 7522.10 Compensation Limit:	Increase of 2.75% per year from the valuation date.

Salary Increases:

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

Merit and Promotion Increases		
Years of Service	Rate (%)	
	General	Safety
Less than 1	12.00	13.00
1 – 2	7.00	8.00
2 – 3	5.25	5.75
3 – 4	3.75	4.75
4 – 5	2.75	2.75
5 – 6	2.25	2.00
6 – 7	1.75	1.75
7 – 8	1.50	1.50
8 – 9	1.40	1.40
9 – 10	1.30	1.30
10 – 11	1.20	1.25
11 – 12	1.10	1.20
12 – 13	1.00	1.15
13 – 14	0.90	1.10
14 – 15	0.80	1.05
15 – 16	0.75	1.00
16 – 17	0.70	1.00
17 – 18	0.65	1.00
18 – 19	0.60	1.00
19 – 20	0.55	1.00
20 & Over	0.50	1.00

The average total assumed salary increase for active members in the December 31, 2018 actuarial valuation is 5.7%.

Demographic Assumptions

Post-Retirement Mortality Rates:

Healthy

- **General Members:** Pub-2010 General Healthy Retiree Amount-Weighted Above-Median Mortality Table (separate tables for males and females), projected generationally with the two-dimensional mortality improvement scale MP-2018.
- **Safety Members:** Pub-2010 Safety Healthy Retiree Amount-Weighted Above-Median Mortality Table (separate tables for males and females) multiplied by 105% for males and 100% for females, projected generationally with the two-dimensional mortality improvement scale MP-2018.
- **All Beneficiaries:** Pub-2010 Contingent Survivor Amount-Weighted Above-Median Mortality Table (separate tables for males and females) multiplied by 105% for males and females, projected generationally with the two-dimensional mortality improvement scale MP-2018.

Disabled

- **General Members:** Pub-2010 Non-Safety Disabled Retiree Amount-Weighted Mortality Table (separate tables for males and females) multiplied by 105% for males and 100% for females, projected generationally with the two-dimensional mortality improvement scale MP-2018.
- **Safety Members:** Pub-2010 Safety Disabled Retiree Amount-Weighted Mortality Table (separate tables for males and females) multiplied by 105% for males and 100% for females, projected generationally with the two-dimensional mortality improvement scale MP-2018.

The Pub-2010 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 Members:** Pub-2010 General Employee Amount-Weighted Above-Median Mortality Table (separate tables for males and females), projected generationally with the two-dimensional mortality improvement scale MP-2018.
- **Safety Members:** Pub-2010 Safety Employee Amount-Weighted Above-Median Mortality Table (separate tables for males and females), projected generationally with the two-dimensional mortality improvement scale MP-2018.

Age	Rate (%)			
	General ⁽¹⁾		Safety ⁽¹⁾	
	Male	Female	Male	Female
20	0.04	0.01	0.04	0.02
25	0.02	0.01	0.03	0.02
30	0.03	0.01	0.04	0.02
35	0.04	0.02	0.04	0.03
40	0.06	0.03	0.05	0.04
45	0.09	0.05	0.07	0.06
50	0.13	0.08	0.10	0.08
55	0.19	0.11	0.15	0.11
60	0.28	0.17	0.23	0.14
65	0.41	0.27	0.35	0.20
70	0.61	0.44	0.66	0.39

⁽¹⁾ Generational projections beyond the base year (2010) are not reflected in the above mortality rates.

All pre-retirement deaths are assumed to be non-service connected.

Mortality Rates for Member Contributions:

- **General Members:** Pub-2010 General Healthy Retiree Amount-Weighted Above-Median Mortality Table (separate tables for males and females), projected 30 years with the two-dimensional mortality improvement scale MP-2018, weighted 30% male and 70% female.
- **Safety Members:** Pub-2010 Safety Healthy Retiree Amount-Weighted Above-Median Mortality Table (separate tables for males and females) multiplied by 105% for males and 100% for females, projected 30 years with the two-dimensional mortality improvement scale MP-2018, weighted 85% male and 15% female.

Disability Incidence:

Disability Incidence			
Rate (%)			
Age	General Tier 1 and Tier 4	General Tier 3 and Tier 5	Safety
20	0.01	0.01	0.02
25	0.02	0.02	0.16
30	0.04	0.03	0.32
35	0.08	0.05	0.46
40	0.22	0.08	0.56
45	0.36	0.11	0.90
50	0.52	0.13	2.54
55	0.60	0.16	3.80
60	0.60	0.22	4.30
65	0.60	0.25	4.50
70	0.60	0.25	4.50

60% of General Tier 1 and Tier 4 disabilities are assumed to be service connected disabilities. The other 40% are assumed to be non-service connected disabilities.

30% of General Tier 3 and Tier 5 disabilities are assumed to be service connected disabilities. The other 70% are assumed to be non-service connected disabilities.

100% of Safety disabilities are assumed to be service connected disabilities.

Termination:

Years of Service	Termination	
	Rate (%)	
	General	Safety
Less than 1	14.00	12.50
1 – 2	9.50	10.00
2 – 3	9.25	8.25
3 – 4	6.50	5.75
4 – 5	5.25	5.00
5 – 6	5.00	4.25
6 – 7	4.50	3.50
7 – 8	4.25	3.25
8 – 9	3.75	3.00
9 – 10	3.50	2.50
10 – 11	3.25	2.25
11 – 12	3.00	2.10
12 – 13	2.75	2.00
13 – 14	2.50	1.90
14 – 15	2.50	1.80
15 – 16	2.25	1.70
16 – 17	2.25	1.60
17 – 18	2.00	1.50
18 – 19	2.00	1.25
19 – 20	1.75	1.00
20 & Over	1.25	0.75

The member is assumed to receive the greater of the member's contribution balance or a deferred retirement benefit.

No termination is assumed after a member is first assumed to retire.

Retirement Rates (General):	Retirement Rates (%)					
	Tier 1 Enhanced		Tier 3 Enhanced		Tier 1 Non-Enhanced	PEPRA Tier 4 and Tier 5
	Less than 30 Years of Service	Over 30 Years of Service	Less than 30 Years of Service	Over 30 Years of Service		
Age						
50	5.00	9.00	4.00	7.20	3.00	0.00
51	4.00	7.20	3.00	5.40	3.00	0.00
52	4.00	7.20	3.00	5.40	3.00	2.00
53	4.00	7.20	4.00	7.20	3.00	3.00
54	12.00	21.60	6.00	10.80	3.00	3.00
55	15.00	27.00	8.00	14.40	10.00	5.00
56	17.00	30.60	8.00	9.60	10.00	5.00
57	17.00	30.60	9.00	10.80	10.00	6.00
58	17.00	30.60	10.00	12.00	10.00	6.00
59	22.00	26.40	12.00	14.40	10.00	8.00
60	25.00	30.00	13.00	15.60	25.00	8.00
61	30.00	36.00	18.00	21.60	15.00	12.00
62	30.00	36.00	22.00	26.40	40.00	18.00
63	25.00	30.00	22.00	26.40	35.00	18.00
64	25.00	30.00	25.00	30.00	30.00	20.00
65	35.00	35.00	32.00	32.00	40.00	25.00
66	40.00	40.00	32.00	32.00	35.00	25.00
67	40.00	40.00	30.00	30.00	35.00	25.00
68	40.00	40.00	30.00	30.00	35.00	25.00
69	40.00	40.00	30.00	30.00	35.00	25.00
70	35.00	35.00	35.00	35.00	40.00	40.00
71	35.00	35.00	35.00	35.00	40.00	40.00
72	35.00	35.00	35.00	35.00	40.00	40.00
73	35.00	35.00	35.00	35.00	50.00	40.00
74	35.00	35.00	35.00	35.00	50.00	40.00
75 & Over	100.00	100.00	100.00	100.00	100.00	100.00

Retirement Rates (Safety):	Retirement Rates (%)				
	Tier A Enhanced			Tier C Enhanced	Tier A Non-Enhanced and PEPRA Tier D and Tier E
	Age	Less than 30 Years of Service	Over 30 Years of Service		
	45	7.00	8.75	2.00	0.00
	46	3.00	3.75	1.00	0.00
	47	10.00	12.50	4.00	0.00
	48	10.00	12.50	4.00	0.00
	49	25.00	31.25	12.00	0.00
	50	25.00	31.25	18.00	5.00
	51	25.00	31.25	18.00	4.00
	52	18.00	22.50	15.00	4.00
	53	18.00	22.50	15.00	5.00
	54	18.00	22.50	15.00	6.00
	55	20.00	30.00	18.00	10.00
	56	20.00	30.00	15.00	10.00
	57	22.00	33.00	15.00	18.00
	58	22.00	33.00	25.00	18.00
	59	22.00	33.00	25.00	18.00
	60	25.00	37.50	25.00	18.00
	61	25.00	37.50	25.00	20.00
	62	25.00	37.50	25.00	20.00
	63	30.00	45.00	30.00	20.00
	64	40.00	60.00	35.00	25.00
	65 & Over	100.00	100.00	100.00	100.00
Retirement Age and Benefit for Deferred Vested Members:	General:	59			
	Safety with Reciprocity:	53			
	Safety without Reciprocity:	50			
	40% of future General and 70% of future Safety deferred vested members are assumed to continue to work for a reciprocal employer. For reciprocals, 3.75% and 4.25% compensation increases are assumed per annum for General and Safety, respectively.				
Future Benefit Accruals:	1.0 year of service per year for full-time employees. Continuation of current partial service accrual for part-time employees.				

Unknown Data for Members:	Same as those exhibited by members with similar known characteristics. If not specified, members are assumed to be male.																										
Definition of Active Members:	All active members of CCCERA as of the valuation date.																										
Form of Payment:	All active and inactive members are assumed to elect the unmodified option at retirement. There is no explicit assumption for children's benefits.																										
Percent Married:	For all active and inactive members, 65% of male members and 50% of female members are assumed to be married at pre-retirement death or retirement.																										
Age and Gender of Spouse:	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 2 years older than the member.																										
Offsets by Other Plans of the Employer for Disability Benefits:	The Plan requires members who retire because of disability from General Tier 3 and General PEPRA Tier 5 to offset the Plan's disability benefits with other Plans of the employer. We have not assumed any offsets in this valuation.																										
Leave Cashout Assumptions:	<p>The following assumptions for leave cashouts as a percentage of final average pay are used:</p> <p><i>General Tiers 1, 2 and 3 Safety Tiers A and C</i></p> <table> <tr> <td>Cost Group 1</td> <td>1.00%</td> </tr> <tr> <td>Cost Group 2</td> <td>0.50% for Tier 2 0.75% for Tier 3</td> </tr> <tr> <td>Cost Group 3</td> <td>4.75%</td> </tr> <tr> <td>Cost Group 4</td> <td>0.50%</td> </tr> <tr> <td>Cost Group 5</td> <td>1.25%</td> </tr> <tr> <td>Cost Group 6</td> <td>0.25%</td> </tr> <tr> <td>Cost Group 7</td> <td>0.75%</td> </tr> <tr> <td>Cost Group 8</td> <td>0.50%</td> </tr> <tr> <td>Cost Group 9</td> <td>0.00%</td> </tr> <tr> <td>Cost Group 10</td> <td>0.50%</td> </tr> <tr> <td>Cost Group 11</td> <td>2.50%</td> </tr> <tr> <td>Cost Group 12</td> <td>2.00%</td> </tr> <tr> <td>Terminated Employers</td> <td>0.00%</td> </tr> </table> <p><i>General PEPRA Tiers 4 and 5 Safety PEPRA Tiers D and E</i></p> <p>None</p>	Cost Group 1	1.00%	Cost Group 2	0.50% for Tier 2 0.75% for Tier 3	Cost Group 3	4.75%	Cost Group 4	0.50%	Cost Group 5	1.25%	Cost Group 6	0.25%	Cost Group 7	0.75%	Cost Group 8	0.50%	Cost Group 9	0.00%	Cost Group 10	0.50%	Cost Group 11	2.50%	Cost Group 12	2.00%	Terminated Employers	0.00%
Cost Group 1	1.00%																										
Cost Group 2	0.50% for Tier 2 0.75% for Tier 3																										
Cost Group 3	4.75%																										
Cost Group 4	0.50%																										
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Cost Group 10	0.50%																										
Cost Group 11	2.50%																										
Cost Group 12	2.00%																										
Terminated Employers	0.00%																										

<p>Service from Accumulated Sick Leave Conversion:</p>	<p>The following assumptions for additional service converted from accumulated sick leave as a percentage of service at retirement are used:</p> <p><i>Service Retirements:</i></p> <p>General: 1.10%</p> <p>Safety: 1.80%</p> <p><i>Disability Retirements:</i></p> <p>General: 0.06%</p> <p>Safety: 1.20%</p> <p>Pursuant to Section 31641.01, the cost of this benefit for the non-PEPRA tiers will be charged only to employers and will not affect member contribution rates.</p>
<p><u>Actuarial Funding Policy</u></p>	
<p>Actuarial Cost Method:</p>	<p>Entry Age Actuarial Cost Method. Entry Age is the age on the valuation date minus years of service. 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 tier”).</p>
<p>Actuarial Value of Assets:</p>	<p>Market value of assets (MVA) less unrecognized returns in each of the last nine semi-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 semi-annually over a five-year period.</p>
<p>Valuation Value of Assets:</p>	<p>The Actuarial Value of Assets reduced by the value of the non-valuation reserves and designations.</p>
<p>Amortization Policy:</p>	<p>The UAAL as of December 31, 2014 will continue to be amortized over separate amortization layers based on the valuations during which each separate layer was previously established.</p> <p>Any new UAAL as a result of actuarial gains or losses identified in the annual valuation as of December 31 will be amortized over a period of 18 years.</p> <p>Any new UAAL as a result of change in actuarial assumptions or methods will be amortized over a period of 18 years.</p> <p>Unless the Board adopts an alternative amortization period after receiving an actuarial analysis:</p> <ol style="list-style-type: none"> i. With the exception noted in ii., below, the increase in UAAL as a result of any plan amendments will be amortized over a period of 10 years; ii. The entire increase in UAAL resulting from a temporary retirement incentive will be funded in full upon adoption of the incentive. If the increase in UAAL is due to the impact of benefits resulting from additional service permitted in Section 31641.04 of the 1937 CERL (Golden Handshake), the entire increase in UAAL will be funded in full upon adoption of the Golden Handshake.

The UAAL will be amortized over “closed” amortization periods so that the amortization period for each layer decreases by one year with each actuarial valuation.

The UAAL will be amortized as a level percentage of payroll so that the amortization amount in each year during the amortization period shall be expected to be a level percentage of covered payroll, taking into consideration the current assumption for general payroll increase (i.e., wage inflation).

If an overfunding or “surplus” exists (i.e., the VVA exceeds the AAL, so that the total of all UAAL amortization layers becomes negative), any prior UAAL amortization layers will be considered fully amortized, and any subsequent UAAL will be amortized as the first of a new series of amortization layers, using the above amortization periods.

If the surplus exceeds 20% of the AAL per Section 7522.52 of the Government Code, then the amount of surplus in excess of 20% of the AAL (and any subsequent surpluses in excess of that amount) will be amortized over an “open” amortization period of 30 years, but only if the other conditions of Section 7522.52 have also been met. If those conditions are not met, then the surplus will not be amortized and the full Normal Cost will be contributed.

These amortization policy components will generally apply separately to each of CCCERA’s UAAL cost groups with the exception that the conditions of Section 7522.52 apply to the total plan.

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 expressed 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 Association) 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 rate of 3.25% (i.e., 2.75% inflation plus 0.50% “across the board” salary increase).

The amortization policy is described on the previous page.

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

General Tier 4 (2% COLA)

The General Tier 4 (2% COLA) in Cost Group #1 continues to not have any actual members as of December 31, 2018. The contribution rates for this cost group have been developed based on generally the same methodology used to estimate contribution rates for all of the PEPRA tiers in the December 31, 2012 valuation. We have assumed in this valuation that the demographic profiles (e.g., entry age, composition of male versus female, etc.) for this cost group can be approximated by the data profiles of current active members with membership dates on and after January 1, 2011.

Member Contributions:

Non-PEPRA 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 non-PEPRA General and Safety members, respectively. The member's basic contribution rate is determined so that, if paid annually from a member's first year of membership through the prescribed retirement age, would accumulate to the amount necessary to fund an annuity that is equal to:

- 1/120 of one year Final Average Salary per year of service at age 55 for General Tier 1 and Tier 3 Non-Enhanced members
- 1/100 of one year Final Average Salary per year of service at age 50 for Safety Tier A Non-Enhanced members
- 1/120 of one year Final Average Salary per year of service at age 60 for General Tier 1 and Tier 3 Enhanced members
- 1/100 of one year Final Average Salary per year of service at age 50 for Safety Tier A Enhanced members
- 1/100 of three year Final Average Salary per year of service at age 50 for Safety Tier C Enhanced members

Member contributions are accumulated at an annual interest rate adopted annually by the Board. Note that recently negotiated MOU's for County General members no longer include the 50% employer subvention of the members' basic contributions. Districts pay varying portions of the members' basic contributions on a nonrefundable basis. Members also pay 50% of the cost-of-living benefit. For most Safety Tier A employers, Safety members also subvent a portion of the employer rate, currently up to 9% of compensation (depending on their MOU).

Effective with the December 31, 2014 valuation, for determining the cost of the total benefit (i.e., basic and COLA components), the leave cashout assumptions are recognized in the valuation as an employer and member cost. Prior to the December 31, 2014 valuation, for determining the cost of the basic benefit (i.e., non-COLA component), the leave cashout assumptions were recognized in the valuation only as an employer cost and did not affect member contribution rates. In other words, the leave cashout assumptions were only used in establishing COLA member contribution rates.

As a result of including the leave cashout assumptions in the basic member rates for the members of each specific cost group, the COLA member rates are no longer pooled across all members of the same tier. This results in twelve different sets of member contribution rates for each specific cost group.

PEPRA Members

Pursuant to Section 7522.30(a) of the Government Code, PEPRA members 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 PEPRA members. In addition, we have calculated the total Normal Cost rate for the PEPRA tiers to the nearest one-fiftieth of one percent (i.e., the nearest even one-hundredth) as that will allow the Normal Cost rate to be shared exactly 50:50 without going beyond two decimal places.

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

Cost Sharing Adjustments:

Starting with the December 31, 2009 Actuarial Valuation, the Board took action to depool CCCERA's assets, liabilities and normal cost by employer when determining employer contribution rates. The Board action included a review of experience back to December 31, 2002. This did not involve recalculation of any employer rates prior to December 31, 2009. However, it did involve reflecting the separate experience of the employers in each individual cost group back from December 31, 2002 through December 31, 2009. The cost groups are detailed in *Section 4, Exhibit V*. In addition, the Board action called for a discontinuation of certain cost sharing adjustments for both member and employer contribution rates for General Tier 1 and Safety Tier A. Even under the depooling structure, there are a few remaining cost sharing arrangements. Here is a summary of the cost sharing arrangements that were implemented in the December 31, 2009 Actuarial Valuation:

- Smaller employers (less than 50 active members as of December 31, 2009) were pooled with the applicable County tier. Safety members from the East Contra Costa Fire Protection District were pooled with Safety members of the Contra Costa County Fire Protection District.
- Due to a statutory requirement, the Superior Court was pooled with the County regardless of how many members the Court has.
- UAAL costs are pooled between Cost Group #1 and Cost Group #2 which represent General County and Small Districts. UAAL costs are also pooled for Cost Groups #7 and #9 which are Safety County tiers.

Additional Contribution Rate Adjustments:

Adjustments are made to some UAAL amounts for the County, the Contra Costa County Fire Protection District (CCCFPD), the Moraga-Orinda Fire District (Moraga), First 5 – Children & Families Commission (First Five) and Local Agency Formation Commission (LAFCO) to account for Pension Obligation Bonds (POBs) and any other special contributions that they previously made. These adjustments serve to reduce the UAAL contribution rate for these employers. The outstanding balances of these adjustments as of December 31, 2018 are as follows:

	<u>County General</u>	<u>Moraga General</u>	<u>First Five General</u>	<u>LAFCO General</u>	<u>CCCFPD Safety</u>
Basic	\$121,836,665	\$214,558	\$463,954	\$22,200	\$34,971,530
COL	\$97,628,947	\$124,527	\$350,944	\$8,335	\$26,670,852

**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 \$225,000 for 2019. 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-PEPRA 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.

Contribution rates determined in this valuation have not been reduced for the Section 415 limitations. However, it is anticipated that PEPRA members will not be limited in the future due to the PEPRA compensation limit applied in the determination of their benefit. Actual limitations will result in actuarial gains as they occur.

Changed Actuarial Assumptions:

The following assumptions have been changed since the prior valuation. Rationale for these changes are presented in the January 1, 2015 through December 31, 2017 Actuarial Experience Study.

Administrative Expenses:

1.13% of payroll allocated to both the employer and the member based on normal cost (before expenses) for the employer and member. This assumption changes each year based on the actual administrative expenses as a percent of actual compensation during the calendar year leading up to the valuation date.

Changed Actuarial Assumptions (continued):

The following assumptions have been changed since the prior valuation. Rationale for these changes are presented in the January 1, 2015 through December 31, 2017 Actuarial Experience Study.

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	Merit and Promotion Increases	
	Rate (%)	
	General	Safety
Less than 1	10.00	10.50
1 – 2	7.25	7.25
2 – 3	5.25	5.75
3 – 4	3.75	4.50
4 – 5	2.75	3.00
5 – 6	2.25	1.75
6 – 7	1.75	1.25
7 – 8	1.50	1.20
8 – 9	1.25	1.15
9 – 10	1.20	1.10
10 – 11	1.15	1.05
11 – 12	1.10	1.00
12 – 13	1.00	0.95
13 – 14	0.90	0.85
14 – 15	0.80	0.80
15 – 16	0.75	0.75
16 – 17	0.75	0.75
17 – 18	0.75	0.75
18 – 19	0.75	0.75
19 – 20	0.75	0.75
20 & Over	0.75	0.75

Changed Actuarial Assumptions (continued):

The following assumptions have been changed since the prior valuation. Rationale for these changes are presented in the January 1, 2015 through December 31, 2017 Actuarial Experience Study.

Post-Retirement Mortality Rates:

Healthy

- **General Members:** Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table, projected generationally with the two-dimensional scale MP-2015.
- **Safety Members:** Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table set back three years, projected generationally with the two-dimensional scale MP-2015.
- **All Beneficiaries:** Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table, projected generationally with the two-dimensional scale MP-2015.

Disabled

- **General Members:** Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table set forward eight years, projected generationally with the two-dimensional scale MP-2015.
- **Safety Members:** Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table set forward three years, projected generationally with the two-dimensional scale MP-2015.

Pre-Retirement Mortality Rates:

- **General and Safety Members:** Headcount-Weighted RP-2014 Employee Mortality Table multiplied by 75%, projected generationally with the two-dimensional scale MP-2015.

Age	Rate (%)			
	General ⁽¹⁾		Safety ⁽¹⁾	
	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	0.09	0.06	0.09	0.06
50	0.16	0.10	0.16	0.10
55	0.26	0.16	0.26	0.16
60	0.42	0.23	0.42	0.23
65	0.73	0.33	0.73	0.33

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

All pre-retirement deaths are assumed to be non-service connected.

Changed Actuarial Assumptions (continued):

The following assumptions have been changed since the prior valuation. Rationale for these changes are presented in the January 1, 2015 through December 31, 2017 Actuarial Experience Study.

Mortality Rates for Member Contributions:

- **General Members:** Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table, projected to 2034 with the two-dimensional scale MP-2015, weighted 30% male and 70% female.
- **Safety Members:** Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table set back three years, projected to 2034 with the two-dimensional scale MP-2015, weighted 85% male and 15% female.

Disability Incidence:

Disability Incidence			
Rate (%)			
Age	General Tier 1 and Tier 4	General Tier 3 and Tier 5	Safety
20	0.01	0.01	0.02
25	0.02	0.02	0.22
30	0.04	0.03	0.42
35	0.08	0.05	0.56
40	0.22	0.08	0.66
45	0.36	0.13	1.00
50	0.52	0.16	2.88
55	0.60	0.20	4.60
60	0.60	0.28	5.00
65	0.60	0.32	5.00
70	0.60	0.32	5.00

65% of General Tier 1 and Tier 4 disabilities are assumed to be service connected disabilities. The other 35% are assumed to be non-service connected disabilities.

30% of General Tier 3 and Tier 5 disabilities are assumed to be service connected disabilities. The other 70% are assumed to be non-service connected disabilities.

100% of Safety disabilities are assumed to be service connected disabilities.

**Changed Actuarial Assumptions
(continued):**

The following assumptions have been changed since the prior valuation. Rationale for these changes are presented in the January 1, 2015 through December 31, 2017 Actuarial Experience Study.

Termination:

Years of Service	Termination	
	Rate (%)	
	General	Safety
Less than 1	13.50	13.00
1 – 2	9.25	8.00
2 – 3	9.00	7.00
3 – 4	6.00	5.50
4 – 5	4.50	3.75
5 – 6	4.25	3.25
6 – 7	3.75	3.00
7 – 8	3.50	2.75
8 – 9	3.25	2.50
9 – 10	3.00	2.25
10 – 11	2.75	2.00
11 – 12	2.50	1.90
12 – 13	2.40	1.80
13 – 14	2.30	1.70
14 – 15	2.20	1.60
15 – 16	2.10	1.50
16 – 17	2.00	1.40
17 – 18	2.00	1.30
18 – 19	2.00	1.20
19 – 20	1.75	1.10
20 & Over	1.50	1.00

The member is assumed to receive the greater of the member's contribution balance or a deferred retirement benefit.

No termination is assumed after a member is first assumed to retire.

Changed Actuarial Assumptions (continued):

The following assumptions have been changed since the prior valuation. Rationale for these changes are presented in the January 1, 2015 through December 31, 2017 Actuarial Experience Study.

Retirement Rates (General):

Age	Retirement Rates (%)			
	Tier 1 Enhanced	Tier 3 Enhanced	Tier 1 Non-Enhanced	PEPRA Tier 4 and Tier 5
50	5.00	4.00	3.00	0.00
51	4.00	3.00	3.00	0.00
52	5.00	3.00	3.00	2.00
53	5.00	5.00	3.00	3.00
54	14.00	6.00	3.00	3.00
55	20.00	10.00	10.00	5.00
56	20.00	10.00	10.00	5.00
57	20.00	10.00	10.00	6.00
58	20.00	12.00	10.00	8.00
59	25.00	13.00	10.00	9.00
60	28.00	15.00	25.00	10.00
61	35.00	20.00	15.00	14.00
62	35.00	25.00	40.00	20.00
63	30.00	25.00	35.00	20.00
64	30.00	30.00	30.00	20.00
65	35.00	35.00	40.00	25.00
66	40.00	35.00	35.00	30.00
67	40.00	35.00	35.00	30.00
68	40.00	35.00	35.00	30.00
69	40.00	35.00	35.00	30.00
70	50.00	40.00	50.00	50.00
71	50.00	40.00	50.00	50.00
72	50.00	40.00	50.00	50.00
73	50.00	40.00	50.00	50.00
74	50.00	40.00	50.00	50.00
75 & Over	100.00	100.00	100.00	100.00

Changed Actuarial Assumptions (continued):

The following assumptions have been changed since the prior valuation. Rationale for these changes are presented in the January 1, 2015 through December 31, 2017 Actuarial Experience Study.

<i>Retirement Rates (Safety):</i>	Retirement Rates (%)				
	Age	Tier A Enhanced	Tier C Enhanced	Tier A Non-Enhanced	PEPRA Tier D and Tier E
	45	4.00	2.00	0.00	0.00
	46	3.00	1.00	0.00	0.00
	47	10.00	4.00	0.00	0.00
	48	10.00	4.00	0.00	0.00
	49	25.00	12.00	0.00	0.00
	50	30.00	18.00	5.00	5.00
	51	30.00	18.00	4.00	4.00
	52	25.00	15.00	4.00	4.00
	53	25.00	15.00	5.00	5.00
	54	25.00	15.00	8.00	6.00
	55	28.00	18.00	10.00	10.00
	56	25.00	15.00	10.00	10.00
	57	25.00	15.00	12.00	18.00
	58	35.00	25.00	18.00	18.00
	59	35.00	25.00	20.00	18.00
	60	35.00	30.00	20.00	18.00
	61	35.00	30.00	20.00	20.00
	62	35.00	30.00	20.00	20.00
	63	35.00	30.00	20.00	20.00
	64	50.00	40.00	100.00	30.00
	65	100.00	100.00	100.00	30.00
	66 & Over	100.00	100.00	100.00	100.00
<i>Retirement Age and Benefit for Deferred Vested Members:</i>	General:	59			
	Safety:	54			
	40% of future General and 65% of future Safety deferred vested members are assumed to continue to work for a reciprocal employer. For reciprocals, 4.75% compensation increases are assumed per annum for both General and Safety.				
<i>Percent Married:</i>	For all active and inactive members, 75% of male members and 50% of female members are assumed to be married at pre-retirement death or retirement.				

Changed Actuarial Assumptions (continued):

The following assumptions have been changed since the prior valuation. Rationale for these changes are presented in the January 1, 2015 through December 31, 2017 Actuarial Experience Study.

Leave Cashout Assumptions:

The following assumptions for leave cashouts as a percentage of final average pay are used:

General Tiers 1, 2 and 3 Safety Tiers A and C

Cost Group 1	1.25%
Cost Group 2	0.50% for Tier 2 1.00% for Tier 3
Cost Group 3	5.50%
Cost Group 4	0.50%
Cost Group 5	1.00%
Cost Group 6	0.75%
Cost Group 7	1.00%
Cost Group 8	0.75%
Cost Group 9	0.00%
Cost Group 10	1.00%
Cost Group 11	2.50%
Cost Group 12	2.50%
Terminated Employers	0.00%

General PEPRA Tiers 4 and 5 Safety PEPRA Tiers D and E

None

Service from Accumulated Sick Leave Conversion:

The following assumptions for additional service converted from accumulated sick leave as a percentage of service at retirement are used:

Service Retirements:

General:	1.20%
Safety:	1.90%

Disability Retirements:

General:	0.08%
Safety:	1.30%

Pursuant to Section 31641.01, the cost of this benefit for the non-PEPRA tiers will be charged only to employers and will not affect member contribution rates.

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:	
<i>General Tier 1</i>	General members hired before July 1, 1980 and electing not to transfer to Tier 2 Plan. Certain General members with membership dates before January 1, 2013 hired by specific employers who did not adopt Tier 2 are placed in Tier 1.
<i>General Tier 2</i>	Most General members hired on or after August 1, 1980 and all General members hired before July 1, 1980 electing to transfer to the Tier 2 Plan. Effective October 1, 2002, for the County, Tier 2 was eliminated and all County employees (excluding CNA employees) in Tier 2 were placed in Tier 3. Effective January 1, 2005, all CNA employees in Tier 2 were placed in Tier 3.
<i>General Tier 3</i>	General members with membership dates before January 1, 2013 who are not placed in Tier 1 are placed in Tier 3.
<i>General PEPRA Tier 4</i>	General members with membership dates on or after January 1, 2013 hired by specific employers who did not adopt Tier 2 are placed in Tier 4.
<i>General PEPRA Tier 5</i>	General members with membership dates on or after January 1, 2013 who are not placed in Tier 4 are placed in Tier 5.
<i>Safety Tier A and Tier C</i>	Safety members with membership dates before January 1, 2013. County Sheriff's Department Safety members hired on or after January 1, 2007, but before January 1, 2013 are placed in Safety Tier C Enhanced.
<i>Safety PEPRA Tier D and Tier E</i>	Safety members with membership dates on or after January 1, 2013. Safety members from certain bargaining units are placed in Safety Tier E.
Final Compensation for Benefit Determination:	
<i>General Tier 1 and Tier 3 (non-disability), Safety Tier A</i>	Highest consecutive 12 months of compensation earnable. (§31462.1) (FAS1)
<i>General Tier 2 and Tier 3 (disability), Safety Tier C</i>	Highest consecutive 36 months of compensation earnable. (§31462) (FAS3)
<i>General Tier 4 and Tier 5, Safety Tier D and Tier E</i>	Highest consecutive 36 months of pensionable compensation. (§7522.10(c), §7522.32 and §7522.34) (FAS3)

Compensation Limit:													
<i>General Tier 1, Tier 2 and Tier 3, Safety Tier A and Tier C</i>	For members with membership dates on or after January 1, 1996, Compensation Earnable is limited to Internal Revenue Code Section 401(a)(17). The limit is \$280,000 for calendar year 2019. The limit is indexed for inflation on an annual basis.												
<i>General Tier 4 and Tier 5, Safety Tier D and Tier E</i>	Pensionable Compensation is limited to \$124,180 for 2019 (\$149,016, if not enrolled in Social Security). The limit is indexed for inflation on an annual basis.												
Social Security Primary Insurance Amount:													
<i>General Tier 2</i>	Estimated Social Security award at age 62 assuming level future earnings. (PIA)												
Service:													
<i>All Tiers</i>	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. Includes accumulated sick leave as of the date of retirement. (§31641.01)												
<i>General Tier 2</i>	Maximum of 30 years (Yrs30).												
Service Retirement Eligibility:													
<i>General Tier 1, Tier 2, and Tier 3</i>	Age 50 with 10 years of service, or age 70 regardless of service, or after 30 years of service regardless of age. (§31672)												
<i>General Tier 4 and Tier 5</i>	Age 52 with 5 years of service or age 70 regardless of service. (§7522.20(a) and §31672.3)												
<i>Safety Tier A and Tier C</i>	Age 50 with 10 years of service, or age 70 regardless of service, or after 20 years of service regardless of age. (§31663.25)												
<i>Safety Tier D and Tier E</i>	Age 50 with 5 years of service or age 70 regardless of service. (§7522.25(a)) and §31672.3)												
Benefit Formula:													
<i>General Tier 1 and Tier 3 (Non-Enhanced) (§31676.11)</i>	<p>The offsets shown in all benefit formulas only apply to members integrated with Social Security.</p> <table border="1"> <thead> <tr> <th>Retirement Age</th> <th>Benefit Formula</th> </tr> </thead> <tbody> <tr> <td>50</td> <td>1.24% x (FAS1 – \$1,400) x Yrs</td> </tr> <tr> <td>55</td> <td>1.67% x (FAS1 – \$1,400) x Yrs</td> </tr> <tr> <td>60</td> <td>2.18% x (FAS1 – \$1,400) x Yrs</td> </tr> <tr> <td>62</td> <td>2.35% x (FAS1 – \$1,400) x Yrs</td> </tr> <tr> <td>65 & Over</td> <td>2.61% x (FAS1 – \$1,400) x Yrs</td> </tr> </tbody> </table>	Retirement Age	Benefit Formula	50	1.24% x (FAS1 – \$1,400) x Yrs	55	1.67% x (FAS1 – \$1,400) x Yrs	60	2.18% x (FAS1 – \$1,400) x Yrs	62	2.35% x (FAS1 – \$1,400) x Yrs	65 & Over	2.61% x (FAS1 – \$1,400) x Yrs
Retirement Age	Benefit Formula												
50	1.24% x (FAS1 – \$1,400) x Yrs												
55	1.67% x (FAS1 – \$1,400) x Yrs												
60	2.18% x (FAS1 – \$1,400) x Yrs												
62	2.35% x (FAS1 – \$1,400) x Yrs												
65 & Over	2.61% x (FAS1 – \$1,400) x Yrs												

*General Tier 1 and Tier 3
(Enhanced) (§31676.16)*

Retirement Age	Benefit Formula
50	1.43% x (FAS1 – \$1,400) x Yrs
55	2.00% x (FAS1 – \$1,400) x Yrs
60	2.26% x (FAS1 – \$1,400) x Yrs
62	2.37% x (FAS1 – \$1,400) x Yrs
65 & Over	2.42% x (FAS1 – \$1,400) x Yrs

For members previously covered under the non-enhanced §31676.11 formula, they are entitled to at least the benefits they could have received under §31676.11.

General Tier 2 (§31752)

Retirement Age	Benefit Formula
50	0.83% x FAS3 x Yrs – 0.57% x Yrs30 x PIA
55	1.13% x FAS3 x Yrs – 0.87% x Yrs30 x PIA
60	1.43% x FAS3 x Yrs – 1.37% x Yrs30 x PIA
62	1.55% x FAS3 x Yrs – 1.67% x Yrs30 x PIA
65 & Over	1.73% x FAS3 x Yrs – 1.67% x Yrs30 x PIA

*General Tier 4 and Tier 5
(§7522.20(a))*

Retirement Age	Benefit Formula
52	1.00% x FAS3 x Yrs
55	1.30% x FAS3 x Yrs
60	1.80% x FAS3 x Yrs
62	2.00% x FAS3 x Yrs
65	2.30% x FAS3 x Yrs
67 & Over	2.50% x FAS3 x Yrs

*Safety Tier A (Non-Enhanced)
(§31664)*

Retirement Age	Benefit Formula
50	2.00% x FAS1 x Yrs
55 & Over	2.62% x FAS1 x Yrs

*Safety Tier A (Enhanced)
(§31664.1)*

Retirement Age	Benefit Formula
50 & Over	3.00% x FAS1 x Yrs

<i>Safety Tier C (Enhanced)</i> (§31664.1)	Retirement Age 50 & Over	Benefit Formula 3.00% x FAS3 x Yrs
<i>Safety Tier D and Tier E</i> (§7522.25(d))	Retirement Age 50 55 57 & Over	Benefit Formula 2.00% x FAS3 x Yrs 2.50% x FAS3 x Yrs 2.70% x FAS3 x Yrs
Maximum Benefit:		
<i>General Tier 1 and Tier 3, Safety Tier 1 and Tier C</i>		100% of Final Compensation. (§31676.11, §31676.16, §31664, §31664.1)
<i>General Tier 2, Tier 4 and Tier 5, Safety Tier D and Tier E</i>		None.
Non-Service Connected Disability:		
<i>General Tier 1 and Tier 4</i>		
<i>Eligibility</i>		Five years of service. (§31720)
<i>Benefit Formula</i>		1.5% per year of service. If the benefit does not exceed one-third of Final Compensation, the service is projected to age 65, but the total projected benefit cannot be more than one-third of Final Compensation. (§31727)
<i>General Tier 2, Tier 3 and Tier 5</i>		
<i>Eligibility</i>		Ten years of service. (§31720.1)
<i>Benefit Formula</i>		40% of Final Compensation plus 10% of Final Compensation used in the benefit determination for each minor child (maximum of three). (§31727.01)
<i>Offset</i>		Disability benefits are offset by other plans of the employer except Workers Compensation and Social Security.
<i>Safety</i>		
<i>Eligibility</i>		Five years of service (§31720).
<i>Benefit Formula</i>		1.8% per year of service. If the benefit does not exceed one-third of Final Compensation, the service is projected to age 55, but the total projected benefit cannot be more than one-third of Final Compensation. (§31727.2)

Service Connected Disability:*General Tier 1 and Tier 4,
Safety*

Eligibility No age or service requirements. (§31720)

Benefit Formula 50% of the Final Compensation. (§31727.4)

General Tier 2, Tier 3, and Tier 5

Eligibility No age or service requirements. (§31720)

Benefit Formula 40% of Final Compensation plus 10% of Final Compensation for each minor child (maximum of three). (§31727.01)

Offset Disability benefits are offset by other plans of the Employer except Workers Compensation and Social Security.

Pre-Retirement Death:*General Tier 1, Tier 3, Tier 4,
and Tier 5,
Safety*

Eligibility – A None.

Benefit – A Refund of employee contributions with interest, plus one month's compensation for each year of service, to a maximum of six month's compensation (§31781).

Eligibility – B Five years of service (Ten years for General Tier 3 and Tier 5).

Benefit – B Option 2 (100% continuation) of Service Retirement or Non-Service Connected Disability benefit payable to designated beneficiary.

Death in line of duty 50% of Final Compensation payable to spouse. (§31787)

General Tier 2

Eligibility – A None.

Benefit – A Refund of employee contributions with interest, plus \$2,000 lump sum benefit offset by any Social Security payment. (§31781.01);

Eligibility – B Ten years of service.

Benefit – B Option 2 (100% continuation) of Service Retirement or Non-Service Connected Disability benefit payable to designated beneficiary.

<i>Death in line of duty</i>	60% of Service or Disability Retirement Benefit (minimum benefit is 24% of Final Compensation) plus, for each minor child, 10% of the allowance otherwise paid to the member. Minimum family benefit is 60% of the member's allowance. Maximum family benefit is 100% of member's allowance.
Death After Retirement:	
<i>General Tier 1, Tier 3, Tier 4, and Tier 5, Safety</i>	
<i>Service Retirement or Non-Service Connected Disability Retirement</i>	Unless another option was selected at retirement, 60% of member's unmodified allowance continues to eligible spouse. An eligible spouse is a surviving spouse who was married to the member at least one year prior to the member's retirement or at least two years prior to the date of death and has attained age 55 on or prior to the date of death. (§31760.2) An additional lump sum benefit of \$5,000 is payable to the member's beneficiary. (§31789.5)
<i>Service Connected Disability</i>	Unless another option was selected at retirement, 100% of member's allowance continued to eligible spouse. (§31786) An additional lump sum benefit of \$5,000 is payable to the member's beneficiary. (§31789.5)
<i>General Tier 2</i>	
<i>Service Retirement or Non-Service Connected Disability Retirement</i>	Unless another option was selected at retirement, 60% of member's unmodified allowance continues to eligible spouse plus 20% of allowance to each minor child. (§31789.11) Maximum benefit is 100% of allowance. An additional lump sum benefit of \$5,000 (§31789.5) plus \$2,000 less any Social Security lump sum payment (§31789.01) are payable to the member's beneficiary.
Withdrawal Benefits:	
<i>Less than Five Years of Service</i>	Refund of accumulated employee contributions with interest, or earned benefit at age 70. (§31628)
<i>Five or More Years of Service</i>	If contributions left on deposit, entitled to earned benefits commencing at any time after eligible to retire. (§31700)
Post-Retirement Cost-of-Living Benefits:	
<i>General Tier 1, Tier 3 (non-disability), Tier 4, and Tier 5, Safety Tier A and Tier D</i>	Future changes based on Consumer Price Index to a maximum of 3% per year, excess "banked."
<i>General Tier 2, Tier 3 (disability) and Tier 5 (disability)</i>	Future changes based on Consumer Price Index to a maximum of 4% per year, excess "banked."
<i>General Tier 4 and Tier 5 (under certain MOUs), Safety Tier C and Tier E</i>	Future changes based on Consumer Price Index to a maximum of 2% per year, excess "banked."

Member Contributions:	Please refer to <i>Section 4, Exhibit III</i> for specific rates.
<i>General Tier 1 and Tier 3 (Non-Enhanced)</i>	
<i>Basic</i>	Entry-age based rates that provide for one-half of the \$31676.11 benefit payable at age 55.
<i>Cost-of-Living</i>	Entry-age based rates that provide for one-half of future Cost-of-Living costs.
<i>General Tier 1 and Tier 3 (Enhanced)</i>	
<i>Basic</i>	Entry-age based rates that provide for an annuity at age 60 equal to 1/120 of FAS1.
<i>Cost-of-Living</i>	Entry-age based rates that provide for one-half of future Cost-of-Living costs.
<i>General Tier 4 and Tier 5</i>	50% of the total Normal Cost rate.
<i>Safety Tier A (Non-Enhanced)</i>	
<i>Basic</i>	Entry-age based rates that provide for one-half of the \$31664 benefit payable at age 50.
<i>Cost-of-Living</i>	Entry-age based rates that provide for one-half of future Cost-of-Living costs.
<i>Safety Tier A (Enhanced)</i>	
<i>Basic</i>	Entry-age based rates that provide for an annuity at age 50 equal to 1/100 of FAS1.
<i>Cost-of-Living</i>	Entry-age based rates that provide for one-half of future Cost-of-Living costs.
<i>Safety Tier C (Enhanced)</i>	
<i>Basic</i>	Entry-age based rates that provide for an annuity at age 50 equal to 1/100 of FAS3.
<i>Cost-of-Living</i>	Entry-age based rates that provide for one-half of future Cost-of-Living costs.
<i>Safety Tier D and Tier E</i>	50% of the total Normal Cost rate.
Other Information:	Transfers from Tier 1 to Tier 2 were made on an individual voluntary irrevocable basis. Credit is given under Tier 2 for future service only. The Cost-of-Living maximum is 4% only for the credit under Tier 2. Transferred Tier 2 members keep the five-year requirement for nonservice-connected disability. Those who were members on or before March 7, 1973 and Safety members with membership dates on or before January 1, 2013 will be exempt from paying member contributions after 30 years of service.
Plan Provisions Not Valued:	Additional \$5,000 lump sum post-retirement death benefit (except for \$2,000 for General Tier 2 members paid out of the Valuation Value of Assets) payable to a member's beneficiary. This benefit is paid from a reserve that is not included in the Valuation Value of Assets and is subject at all times to the availability of funds.
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 Association should find the plan summary not in accordance with the actual provisions, the Association should alert the actuary so they can both be sure the proper provisions are valued.

EXHIBIT III – MEMBER CONTRIBUTION RATES

General Cost Group #1 Members' Contribution Rates (as a % of Monthly Payroll) Members with Membership Dates before January 1, 2013						
Entry Age	Basic		COLA		Total	
	First \$350	Over \$350	First \$350	Over \$350	First \$350	Over \$350
15	3.69%	5.30%	1.67%	2.51%	5.36%	7.81%
16	3.75%	5.39%	1.71%	2.56%	5.46%	7.95%
17	3.82%	5.49%	1.74%	2.61%	5.56%	8.10%
18	3.88%	5.59%	1.78%	2.67%	5.66%	8.26%
19	3.95%	5.69%	1.81%	2.72%	5.76%	8.41%
20	4.02%	5.79%	1.85%	2.77%	5.87%	8.56%
21	4.08%	5.89%	1.88%	2.82%	5.96%	8.71%
22	4.15%	5.99%	1.91%	2.87%	6.06%	8.86%
23	4.22%	6.10%	1.95%	2.93%	6.17%	9.03%
24	4.30%	6.21%	1.99%	2.99%	6.29%	9.20%
25	4.37%	6.32%	2.03%	3.05%	6.40%	9.37%
26	4.44%	6.43%	2.07%	3.10%	6.51%	9.53%
27	4.52%	6.55%	2.11%	3.17%	6.63%	9.72%
28	4.60%	6.66%	2.15%	3.22%	6.75%	9.88%
29	4.68%	6.78%	2.19%	3.29%	6.87%	10.07%
30	4.76%	6.90%	2.23%	3.35%	6.99%	10.25%
31	4.84%	7.03%	2.28%	3.42%	7.12%	10.45%
32	4.92%	7.15%	2.32%	3.48%	7.24%	10.63%
33	5.01%	7.28%	2.37%	3.55%	7.38%	10.83%
34	5.10%	7.42%	2.41%	3.62%	7.51%	11.04%
35	5.19%	7.55%	2.46%	3.69%	7.65%	11.24%
36	5.28%	7.69%	2.51%	3.76%	7.79%	11.45%
37	5.38%	7.83%	2.55%	3.83%	7.93%	11.66%
38	5.47%	7.97%	2.61%	3.91%	8.08%	11.88%
39	5.57%	8.12%	2.65%	3.98%	8.22%	12.10%

EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

General Cost Group #1 Members' Contribution Rates (as a % of Monthly Payroll) Members with Membership Dates before January 1, 2013 (continued)						
Entry Age	Basic		COLA		Total	
	First \$350	Over \$350	First \$350	Over \$350	First \$350	Over \$350
40	5.67%	8.27%	2.71%	4.06%	8.38%	12.33%
41	5.78%	8.43%	2.76%	4.14%	8.54%	12.57%
42	5.88%	8.58%	2.81%	4.22%	8.69%	12.80%
43	5.98%	8.73%	2.87%	4.30%	8.85%	13.03%
44	6.08%	8.88%	2.92%	4.38%	9.00%	13.26%
45	6.18%	9.04%	2.97%	4.46%	9.15%	13.50%
46	6.29%	9.20%	3.03%	4.55%	9.32%	13.75%
47	6.40%	9.36%	3.09%	4.63%	9.49%	13.99%
48	6.50%	9.51%	3.14%	4.71%	9.64%	14.22%
49	6.60%	9.66%	3.19%	4.79%	9.79%	14.45%
50	6.70%	9.82%	3.25%	4.87%	9.95%	14.69%
51	6.81%	9.98%	3.30%	4.95%	10.11%	14.93%
52	6.92%	10.14%	3.36%	5.04%	10.28%	15.18%
53	7.02%	10.30%	3.41%	5.12%	10.43%	15.42%
54	7.13%	10.46%	3.47%	5.20%	10.60%	15.66%
55	7.23%	10.61%	3.52%	5.28%	10.75%	15.89%
56	7.28%	10.68%	3.55%	5.32%	10.83%	16.00%
57	7.26%	10.65%	3.53%	5.30%	10.79%	15.95%
58	7.24%	10.62%	3.53%	5.29%	10.77%	15.91%
59 & Over	7.03%	10.31%	3.41%	5.12%	10.44%	15.43%

Interest: 7.00% per annum
Mortality: See Section 4, Exhibit I
Salary Increase: Inflation (2.75%) + Across-the-Board Increase (0.50%) + Merit (See Section 4, Exhibit I)
Administrative Expense: 0.47% of payroll added to Basic rates
Leave Cashout: 1.00%
COLA Loading Factor: 52.07%, applied to Basic rates prior to adjustment for administrative expenses.

EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

General Cost Group #2 Members' Contribution Rates (as a % of Monthly Payroll) Members with Membership Dates before January 1, 2013						
Entry Age	Basic		COLA		Total	
	First \$350	Over \$350	First \$350	Over \$350	First \$350	Over \$350
15	3.68%	5.29%	1.56%	2.34%	5.24%	7.63%
16	3.74%	5.38%	1.59%	2.38%	5.33%	7.76%
17	3.81%	5.48%	1.62%	2.43%	5.43%	7.91%
18	3.87%	5.57%	1.65%	2.47%	5.52%	8.04%
19	3.94%	5.67%	1.68%	2.52%	5.62%	8.19%
20	4.00%	5.77%	1.71%	2.57%	5.71%	8.34%
21	4.08%	5.88%	1.75%	2.62%	5.83%	8.50%
22	4.14%	5.98%	1.78%	2.67%	5.92%	8.65%
23	4.22%	6.09%	1.81%	2.72%	6.03%	8.81%
24	4.29%	6.20%	1.85%	2.78%	6.14%	8.98%
25	4.36%	6.31%	1.89%	2.83%	6.25%	9.14%
26	4.44%	6.42%	1.92%	2.88%	6.36%	9.30%
27	4.51%	6.53%	1.96%	2.94%	6.47%	9.47%
28	4.59%	6.65%	2.00%	3.00%	6.59%	9.65%
29	4.67%	6.77%	2.03%	3.05%	6.70%	9.82%
30	4.75%	6.89%	2.07%	3.11%	6.82%	10.00%
31	4.83%	7.01%	2.11%	3.17%	6.94%	10.18%
32	4.92%	7.14%	2.15%	3.23%	7.07%	10.37%
33	5.00%	7.27%	2.20%	3.30%	7.20%	10.57%
34	5.09%	7.40%	2.24%	3.36%	7.33%	10.76%
35	5.18%	7.53%	2.28%	3.42%	7.46%	10.95%
36	5.27%	7.67%	2.33%	3.49%	7.60%	11.16%
37	5.36%	7.81%	2.37%	3.56%	7.73%	11.37%
38	5.46%	7.96%	2.42%	3.63%	7.88%	11.59%
39	5.56%	8.11%	2.47%	3.70%	8.03%	11.81%

EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

General Cost Group #2 Members' Contribution Rates (as a % of Monthly Payroll) Members with Membership Dates before January 1, 2013 (continued)						
Entry Age	Basic		COLA		Total	
	First \$350	Over \$350	First \$350	Over \$350	First \$350	Over \$350
40	5.66%	8.25%	2.51%	3.77%	8.17%	12.02%
41	5.76%	8.40%	2.56%	3.84%	8.32%	12.24%
42	5.86%	8.56%	2.61%	3.92%	8.47%	12.48%
43	5.96%	8.71%	2.66%	3.99%	8.62%	12.70%
44	6.06%	8.86%	2.71%	4.07%	8.77%	12.93%
45	6.17%	9.02%	2.77%	4.15%	8.94%	13.17%
46	6.28%	9.18%	2.81%	4.22%	9.09%	13.40%
47	6.38%	9.34%	2.87%	4.30%	9.25%	13.64%
48	6.48%	9.48%	2.91%	4.37%	9.39%	13.85%
49	6.59%	9.65%	2.97%	4.45%	9.56%	14.10%
50	6.69%	9.80%	3.01%	4.52%	9.70%	14.32%
51	6.80%	9.96%	3.07%	4.60%	9.87%	14.56%
52	6.90%	10.12%	3.12%	4.68%	10.02%	14.80%
53	7.03%	10.31%	3.18%	4.77%	10.21%	15.08%
54	7.11%	10.43%	3.22%	4.83%	10.33%	15.26%
55	7.20%	10.57%	3.27%	4.90%	10.47%	15.47%
56	7.28%	10.68%	3.30%	4.95%	10.58%	15.63%
57	7.26%	10.66%	3.29%	4.94%	10.55%	15.60%
58	7.25%	10.64%	3.29%	4.93%	10.54%	15.57%
59 & Over	6.84%	10.03%	3.09%	4.63%	9.93%	14.66%

Interest: 7.00% per annum
Mortality: See Section 4, Exhibit I
Salary Increase: Inflation (2.75%) + Across-the-Board Increase (0.50%) + Merit (See Section 4, Exhibit I)
Administrative Expense: 0.47% of payroll added to Basic rates
Leave Cashout: 0.75%
COLA Loading Factor: 48.48%, applied to Basic rates prior to adjustment for administrative expenses.

EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

General Cost Group #3 Members' Contribution Rates (as a % of Monthly Payroll) Members with Membership Dates before January 1, 2013			
Entry Age	Basic	COLA	Total
15	5.48%	2.64%	8.12%
16	5.57%	2.69%	8.26%
17	5.67%	2.74%	8.41%
18	5.77%	2.79%	8.56%
19	5.88%	2.85%	8.73%
20	5.98%	2.90%	8.88%
21	6.09%	2.96%	9.05%
22	6.20%	3.02%	9.22%
23	6.31%	3.08%	9.39%
24	6.42%	3.14%	9.56%
25	6.53%	3.19%	9.72%
26	6.65%	3.26%	9.91%
27	6.77%	3.32%	10.09%
28	6.89%	3.38%	10.27%
29	7.01%	3.45%	10.46%
30	7.14%	3.52%	10.66%
31	7.27%	3.58%	10.85%
32	7.40%	3.65%	11.05%
33	7.53%	3.72%	11.25%
34	7.66%	3.79%	11.45%
35	7.80%	3.86%	11.66%
36	7.95%	3.94%	11.89%
37	8.09%	4.02%	12.11%
38	8.24%	4.09%	12.33%
39	8.40%	4.18%	12.58%

EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

General Cost Group #3 Members' Contribution Rates (as a % of Monthly Payroll) Members with Membership Dates before January 1, 2013 (continued)			
Entry Age	Basic	COLA	Total
40	8.55%	4.26%	12.81%
41	8.71%	4.34%	13.05%
42	8.86%	4.42%	13.28%
43	9.02%	4.51%	13.53%
44	9.18%	4.59%	13.77%
45	9.35%	4.68%	14.03%
46	9.50%	4.76%	14.26%
47	9.66%	4.84%	14.50%
48	9.82%	4.93%	14.75%
49	9.98%	5.01%	14.99%
50	10.14%	5.10%	15.24%
51	10.30%	5.18%	15.48%
52	10.47%	5.27%	15.74%
53	10.63%	5.35%	15.98%
54	10.77%	5.43%	16.20%
55	10.87%	5.48%	16.35%
56	10.98%	5.54%	16.52%
57	10.94%	5.52%	16.46%
58	10.70%	5.39%	16.09%
59 & Over	10.26%	5.16%	15.42%

Interest: 7.00% per annum
Mortality: See Section 4, Exhibit I
Salary Increase: Inflation (2.75%) + Across-the-Board Increase (0.50%) + Merit (See Section 4, Exhibit I)
Administrative Expense: 0.47% of payroll added to Basic rates
Leave Cashout: 4.75%
COLA Loading Factor: 52.70%, applied to Basic rates prior to adjustment for administrative expenses.

EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

General Cost Group #4 Members' Contribution Rates (as a % of Monthly Payroll) Members with Membership Dates before January 1, 2013						
Entry Age	Basic		COLA		Total	
	First \$350	Over \$350	First \$350	Over \$350	First \$350	Over \$350
15	3.67%	5.27%	1.67%	2.51%	5.34%	7.78%
16	3.74%	5.37%	1.71%	2.56%	5.45%	7.93%
17	3.80%	5.46%	1.74%	2.61%	5.54%	8.07%
18	3.86%	5.56%	1.77%	2.66%	5.63%	8.22%
19	3.93%	5.66%	1.81%	2.71%	5.74%	8.37%
20	4.00%	5.76%	1.85%	2.77%	5.85%	8.53%
21	4.06%	5.86%	1.88%	2.82%	5.94%	8.68%
22	4.14%	5.97%	1.91%	2.87%	6.05%	8.84%
23	4.20%	6.07%	1.95%	2.93%	6.15%	9.00%
24	4.28%	6.18%	1.99%	2.98%	6.27%	9.16%
25	4.35%	6.29%	2.03%	3.04%	6.38%	9.33%
26	4.42%	6.40%	2.07%	3.10%	6.49%	9.50%
27	4.50%	6.52%	2.11%	3.16%	6.61%	9.68%
28	4.58%	6.63%	2.15%	3.22%	6.73%	9.85%
29	4.66%	6.75%	2.19%	3.28%	6.85%	10.03%
30	4.74%	6.87%	2.23%	3.35%	6.97%	10.22%
31	4.82%	7.00%	2.27%	3.41%	7.09%	10.41%
32	4.90%	7.12%	2.32%	3.48%	7.22%	10.60%
33	4.99%	7.25%	2.36%	3.54%	7.35%	10.79%
34	5.08%	7.38%	2.41%	3.61%	7.49%	10.99%
35	5.17%	7.52%	2.46%	3.69%	7.63%	11.21%
36	5.26%	7.65%	2.50%	3.75%	7.76%	11.40%
37	5.35%	7.79%	2.55%	3.83%	7.90%	11.62%
38	5.45%	7.94%	2.60%	3.90%	8.05%	11.84%
39	5.55%	8.09%	2.65%	3.98%	8.20%	12.07%

EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

General Cost Group #4 Members' Contribution Rates (as a % of Monthly Payroll) Members with Membership Dates before January 1, 2013 (continued)						
Entry Age	Basic		COLA		Total	
	First \$350	Over \$350	First \$350	Over \$350	First \$350	Over \$350
40	5.65%	8.24%	2.71%	4.06%	8.36%	12.30%
41	5.75%	8.39%	2.76%	4.14%	8.51%	12.53%
42	5.85%	8.54%	2.81%	4.22%	8.66%	12.76%
43	5.95%	8.69%	2.87%	4.30%	8.82%	12.99%
44	6.05%	8.84%	2.91%	4.37%	8.96%	13.21%
45	6.16%	9.01%	2.97%	4.46%	9.13%	13.47%
46	6.26%	9.16%	3.03%	4.54%	9.29%	13.70%
47	6.36%	9.31%	3.08%	4.62%	9.44%	13.93%
48	6.46%	9.46%	3.13%	4.70%	9.59%	14.16%
49	6.58%	9.63%	3.19%	4.79%	9.77%	14.42%
50	6.67%	9.77%	3.24%	4.86%	9.91%	14.63%
51	6.78%	9.94%	3.30%	4.95%	10.08%	14.89%
52	6.89%	10.10%	3.35%	5.03%	10.24%	15.13%
53	7.01%	10.28%	3.42%	5.13%	10.43%	15.41%
54	7.11%	10.43%	3.47%	5.21%	10.58%	15.64%
55	7.20%	10.57%	3.52%	5.28%	10.72%	15.85%
56	7.24%	10.63%	3.54%	5.31%	10.78%	15.94%
57	7.27%	10.67%	3.55%	5.33%	10.82%	16.00%
58	7.16%	10.51%	3.50%	5.25%	10.66%	15.76%
59 & Over	6.86%	10.05%	3.34%	5.01%	10.20%	15.06%

Interest: 7.00% per annum
Mortality: See Section 4, Exhibit I
Salary Increase: Inflation (2.75%) + Across-the-Board Increase (0.50%) + Merit (See Section 4, Exhibit I)
Administrative Expense: 0.47% of payroll added to Basic rates
Leave Cashout: 0.50%
COLA Loading Factor: 52.27%, applied to Basic rates prior to adjustment for administrative expenses.

EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

General Cost Group #5 Members' Contribution Rates (as a % of Monthly Payroll) Members with Membership Dates before January 1, 2013			
Entry Age	Basic	COLA	Total
15	5.31%	2.55%	7.86%
16	5.40%	2.60%	8.00%
17	5.50%	2.65%	8.15%
18	5.60%	2.70%	8.30%
19	5.70%	2.76%	8.46%
20	5.80%	2.81%	8.61%
21	5.90%	2.86%	8.76%
22	6.01%	2.92%	8.93%
23	6.11%	2.97%	9.08%
24	6.22%	3.03%	9.25%
25	6.33%	3.09%	9.42%
26	6.45%	3.15%	9.60%
27	6.56%	3.21%	9.77%
28	6.68%	3.27%	9.95%
29	6.80%	3.34%	10.14%
30	6.92%	3.40%	10.32%
31	7.04%	3.46%	10.50%
32	7.17%	3.53%	10.70%
33	7.30%	3.60%	10.90%
34	7.43%	3.67%	11.10%
35	7.57%	3.74%	11.31%
36	7.70%	3.81%	11.51%
37	7.85%	3.89%	11.74%
38	7.99%	3.96%	11.95%
39	8.14%	4.04%	12.18%

EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

General Cost Group #5 Members' Contribution Rates (as a % of Monthly Payroll) Members with Membership Dates before January 1, 2013 (continued)			
Entry Age	Basic	COLA	Total
40	8.29%	4.12%	12.41%
41	8.45%	4.20%	12.65%
42	8.60%	4.28%	12.88%
43	8.75%	4.36%	13.11%
44	8.90%	4.44%	13.34%
45	9.06%	4.53%	13.59%
46	9.22%	4.61%	13.83%
47	9.38%	4.69%	14.07%
48	9.53%	4.77%	14.30%
49	9.69%	4.86%	14.55%
50	9.85%	4.94%	14.79%
51	10.01%	5.03%	15.04%
52	10.16%	5.11%	15.27%
53	10.33%	5.20%	15.53%
54	10.49%	5.28%	15.77%
55	10.60%	5.34%	15.94%
56	10.67%	5.37%	16.04%
57	10.73%	5.41%	16.14%
58	10.61%	5.34%	15.95%
59 & Over	10.29%	5.17%	15.46%

Interest: 7.00% per annum
Mortality: See Section 4, Exhibit I
Salary Increase: Inflation (2.75%) + Across-the-Board Increase (0.50%) + Merit (See Section 4, Exhibit I)
Administrative Expense: 0.47% of payroll added to Basic rates
Leave Cashout: 1.25%
COLA Loading Factor: 52.69%, applied to Basic rates prior to adjustment for administrative expenses.

EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

General Cost Group #6 Members' Contribution Rates (as a % of Monthly Payroll) Members with Membership Dates before January 1, 2013						
Entry Age	Basic		COLA		Total	
	First \$350	Over \$350	First \$350	Over \$350	First \$350	Over \$350
15	4.18%	6.03%	1.62%	2.43%	5.80%	8.46%
16	4.25%	6.14%	1.65%	2.48%	5.90%	8.62%
17	4.32%	6.24%	1.69%	2.53%	6.01%	8.77%
18	4.40%	6.36%	1.72%	2.58%	6.12%	8.94%
19	4.47%	6.47%	1.75%	2.63%	6.22%	9.10%
20	4.55%	6.59%	1.79%	2.68%	6.34%	9.27%
21	4.62%	6.70%	1.82%	2.73%	6.44%	9.43%
22	4.70%	6.82%	1.85%	2.78%	6.55%	9.60%
23	4.78%	6.94%	1.89%	2.83%	6.67%	9.77%
24	4.87%	7.07%	1.93%	2.89%	6.80%	9.96%
25	4.96%	7.20%	1.97%	2.95%	6.93%	10.15%
26	5.04%	7.33%	2.00%	3.00%	7.04%	10.33%
27	5.13%	7.46%	2.04%	3.06%	7.17%	10.52%
28	5.22%	7.59%	2.08%	3.12%	7.30%	10.71%
29	5.31%	7.73%	2.12%	3.18%	7.43%	10.91%
30	5.40%	7.87%	2.16%	3.24%	7.56%	11.11%
31	5.50%	8.01%	2.20%	3.30%	7.70%	11.31%
32	5.60%	8.17%	2.25%	3.37%	7.85%	11.54%
33	5.70%	8.31%	2.29%	3.43%	7.99%	11.74%
34	5.80%	8.47%	2.33%	3.50%	8.13%	11.97%
35	5.91%	8.63%	2.38%	3.57%	8.29%	12.20%
36	6.02%	8.79%	2.43%	3.64%	8.45%	12.43%
37	6.12%	8.95%	2.47%	3.71%	8.59%	12.66%
38	6.23%	9.11%	2.52%	3.78%	8.75%	12.89%
39	6.34%	9.27%	2.57%	3.85%	8.91%	13.12%

EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

General Cost Group #6 Members' Contribution Rates (as a % of Monthly Payroll) Members with Membership Dates before January 1, 2013 (continued)						
Entry Age	Basic		COLA		Total	
	First \$350	Over \$350	First \$350	Over \$350	First \$350	Over \$350
40	6.45%	9.44%	2.62%	3.93%	9.07%	13.37%
41	6.56%	9.60%	2.67%	4.00%	9.23%	13.60%
42	6.66%	9.76%	2.71%	4.07%	9.37%	13.83%
43	6.78%	9.93%	2.76%	4.14%	9.54%	14.07%
44	6.88%	10.09%	2.81%	4.21%	9.69%	14.30%
45	6.99%	10.25%	2.85%	4.28%	9.84%	14.53%
46	7.11%	10.43%	2.91%	4.36%	10.02%	14.79%
47	7.22%	10.59%	2.95%	4.43%	10.17%	15.02%
48	7.34%	10.78%	3.01%	4.51%	10.35%	15.29%
49	7.44%	10.93%	3.05%	4.58%	10.49%	15.51%
50	7.54%	11.07%	3.09%	4.64%	10.63%	15.71%
51	7.61%	11.18%	3.13%	4.69%	10.74%	15.87%
52	7.58%	11.13%	3.11%	4.67%	10.69%	15.80%
53	7.52%	11.05%	3.09%	4.63%	10.61%	15.68%
54 & Over	7.22%	10.59%	2.95%	4.43%	10.17%	15.02%

Interest: 7.00% per annum
Mortality: See Section 4, Exhibit I
Salary Increase: Inflation (2.75%) + Across-the-Board Increase (0.50%) + Merit (See Section 4, Exhibit I)
Administrative Expense: 0.47% of payroll added to Basic rates
Leave Cashout: 0.25%
COLA Loading Factor: 43.77%, applied to Basic rates prior to adjustment for administrative expenses.

EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

Safety Cost Group #7 Members' Contribution Rates (as a % of Monthly Payroll) Members with Membership Dates before January 1, 2013			
Entry Age	Basic	COLA	Total
15	9.46%	6.27%	15.73%
16	9.46%	6.27%	15.73%
17	9.46%	6.27%	15.73%
18	9.46%	6.27%	15.73%
19	9.46%	6.27%	15.73%
20	9.46%	6.27%	15.73%
21	9.46%	6.27%	15.73%
22	9.60%	6.37%	15.97%
23	9.74%	6.47%	16.21%
24	9.89%	6.57%	16.46%
25	10.04%	6.68%	16.72%
26	10.19%	6.78%	16.97%
27	10.35%	6.89%	17.24%
28	10.50%	7.00%	17.50%
29	10.66%	7.11%	17.77%
30	10.83%	7.23%	18.06%
31	11.00%	7.34%	18.34%
32	11.17%	7.46%	18.63%
33	11.35%	7.59%	18.94%
34	11.53%	7.71%	19.24%
35	11.72%	7.85%	19.57%
36	11.91%	7.98%	19.89%
37	12.10%	8.11%	20.21%
38	12.29%	8.24%	20.53%
39	12.50%	8.39%	20.89%

EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

Safety Cost Group #7 Members' Contribution Rates (as a % of Monthly Payroll) Members with Membership Dates before January 1, 2013 (continued)			
Entry Age	Basic	COLA	Total
40	12.72%	8.54%	21.26%
41	12.93%	8.69%	21.62%
42	13.16%	8.85%	22.01%
43	13.39%	9.01%	22.40%
44	13.65%	9.19%	22.84%
45	13.87%	9.35%	23.22%
46	13.89%	9.36%	23.25%
47	13.92%	9.38%	23.30%
48	13.73%	9.25%	22.98%
49 & Over	13.21%	8.89%	22.10%

Interest: 7.00% per annum
Mortality: See Section 4, Exhibit I
Salary Increase: Inflation (2.75%) + Across-the-Board Increase (0.50%) + Merit (See Section 4, Exhibit I)
Administrative Expense: 0.47% of payroll added to Basic rates
Leave Cashout: 0.75%
COLA Loading Factor: 69.75%, applied to Basic rates prior to adjustment for administrative expenses.

EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

Safety Cost Group #8 Members' Contribution Rates (as a % of Monthly Payroll) Members with Membership Dates before January 1, 2013			
Entry Age	Basic	COLA	Total
15	9.44%	6.41%	15.85%
16	9.44%	6.41%	15.85%
17	9.44%	6.41%	15.85%
18	9.44%	6.41%	15.85%
19	9.44%	6.41%	15.85%
20	9.44%	6.41%	15.85%
21	9.44%	6.41%	15.85%
22	9.58%	6.51%	16.09%
23	9.72%	6.61%	16.33%
24	9.87%	6.72%	16.59%
25	10.02%	6.83%	16.85%
26	10.17%	6.94%	17.11%
27	10.32%	7.04%	17.36%
28	10.48%	7.16%	17.64%
29	10.64%	7.27%	17.91%
30	10.80%	7.39%	18.19%
31	10.97%	7.51%	18.48%
32	11.15%	7.64%	18.79%
33	11.32%	7.76%	19.08%
34	11.51%	7.89%	19.40%
35	11.70%	8.03%	19.73%
36	11.88%	8.16%	20.04%
37	12.08%	8.30%	20.38%
38	12.27%	8.44%	20.71%
39	12.47%	8.58%	21.05%

EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

Safety Cost Group #8 Members' Contribution Rates (as a % of Monthly Payroll) Members with Membership Dates before January 1, 2013 (continued)			
Entry Age	Basic	COLA	Total
40	12.69%	8.74%	21.43%
41	12.91%	8.90%	21.81%
42	13.14%	9.06%	22.20%
43	13.37%	9.22%	22.59%
44	13.62%	9.40%	23.02%
45	13.83%	9.55%	23.38%
46	13.90%	9.60%	23.50%
47	13.84%	9.56%	23.40%
48	13.75%	9.50%	23.25%
49 & Over	13.24%	9.13%	22.37%

Interest: 7.00% per annum
Mortality: See Section 4, Exhibit I
Salary Increase: Inflation (2.75%) + Across-the-Board Increase (0.50%) + Merit (See Section 4, Exhibit I)
Administrative Expense: 0.47% of payroll added to Basic rates
Leave Cashout: 0.50%
COLA Loading Factor: 71.51%, applied to Basic rates prior to adjustment for administrative expenses.

EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

Safety Cost Group #9 Members' Contribution Rates (as a % of Monthly Payroll) Members with Membership Dates before January 1, 2013			
Entry Age	Basic	COLA	Total
15	9.04%	3.86%	12.90%
16	9.04%	3.86%	12.90%
17	9.04%	3.86%	12.90%
18	9.04%	3.86%	12.90%
19	9.04%	3.86%	12.90%
20	9.04%	3.86%	12.90%
21	9.04%	3.86%	12.90%
22	9.17%	3.92%	13.09%
23	9.31%	3.99%	13.30%
24	9.45%	4.05%	13.50%
25	9.59%	4.11%	13.70%
26	9.73%	4.18%	13.91%
27	9.88%	4.24%	14.12%
28	10.03%	4.31%	14.34%
29	10.18%	4.38%	14.56%
30	10.34%	4.45%	14.79%
31	10.50%	4.52%	15.02%
32	10.67%	4.60%	15.27%
33	10.84%	4.68%	15.52%
34	11.01%	4.75%	15.76%
35	11.18%	4.83%	16.01%
36	11.36%	4.91%	16.27%
37	11.54%	4.99%	16.53%
38	11.71%	5.07%	16.78%
39	11.91%	5.16%	17.07%

EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

Safety Cost Group #9 Members' Contribution Rates (as a % of Monthly Payroll) Members with Membership Dates before January 1, 2013 (continued)			
Entry Age	Basic	COLA	Total
40	12.10%	5.24%	17.34%
41	12.29%	5.33%	17.62%
42	12.49%	5.42%	17.91%
43	12.66%	5.50%	18.16%
44	12.76%	5.54%	18.30%
45	12.77%	5.55%	18.32%
46	12.65%	5.49%	18.14%
47	12.39%	5.37%	17.76%
48	12.72%	5.52%	18.24%
49 & Over	13.30%	5.79%	19.09%

Interest: 7.00% per annum
Mortality: See Section 4, Exhibit I
Salary Increase: Inflation (2.75%) + Across-the-Board Increase (0.50%) + Merit (See Section 4, Exhibit I)
Administrative Expense: 0.47% of payroll added to Basic rates
Leave Cashout: 0.00%
COLA Loading Factor: 45.09%, applied to Basic rates prior to adjustment for administrative expenses.

EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

Safety Cost Group #10 Members' Contribution Rates (as a % of Monthly Payroll) Members with Membership Dates before January 1, 2013			
Entry Age	Basic	COLA	Total
15	9.44%	6.15%	15.59%
16	9.44%	6.15%	15.59%
17	9.44%	6.15%	15.59%
18	9.44%	6.15%	15.59%
19	9.44%	6.15%	15.59%
20	9.44%	6.15%	15.59%
21	9.44%	6.15%	15.59%
22	9.58%	6.24%	15.82%
23	9.72%	6.34%	16.06%
24	9.87%	6.44%	16.31%
25	10.02%	6.54%	16.56%
26	10.17%	6.65%	16.82%
27	10.32%	6.75%	17.07%
28	10.48%	6.86%	17.34%
29	10.64%	6.97%	17.61%
30	10.80%	7.08%	17.88%
31	10.97%	7.19%	18.16%
32	11.15%	7.32%	18.47%
33	11.32%	7.43%	18.75%
34	11.51%	7.56%	19.07%
35	11.70%	7.69%	19.39%
36	11.88%	7.82%	19.70%
37	12.08%	7.96%	20.04%
38	12.27%	8.09%	20.36%
39	12.47%	8.22%	20.69%

EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

Safety Cost Group #10 Members' Contribution Rates (as a % of Monthly Payroll) Members with Membership Dates before January 1, 2013 (continued)			
Entry Age	Basic	COLA	Total
40	12.69%	8.37%	21.06%
41	12.91%	8.52%	21.43%
42	13.14%	8.68%	21.82%
43	13.37%	8.84%	22.21%
44	13.62%	9.01%	22.63%
45	13.83%	9.15%	22.98%
46	13.90%	9.20%	23.10%
47	13.84%	9.16%	23.00%
48	13.75%	9.10%	22.85%
49 & Over	13.24%	8.75%	21.99%

Interest: 7.00% per annum
Mortality: See Section 4, Exhibit I
Salary Increase: Inflation (2.75%) + Across-the-Board Increase (0.50%) + Merit (See Section 4, Exhibit I)
Administrative Expense: 0.47% of payroll added to Basic rates
Leave Cashout: 0.50%
COLA Loading Factor: 68.52%, applied to Basic rates prior to adjustment for administrative expenses.

EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

Safety Cost Group #11 Members' Contribution Rates (as a % of Monthly Payroll) Members with Membership Dates before January 1, 2013			
Entry Age	Basic	COLA	Total
15	9.61%	6.55%	16.16%
16	9.61%	6.55%	16.16%
17	9.61%	6.55%	16.16%
18	9.61%	6.55%	16.16%
19	9.61%	6.55%	16.16%
20	9.61%	6.55%	16.16%
21	9.61%	6.55%	16.16%
22	9.76%	6.66%	16.42%
23	9.90%	6.76%	16.66%
24	10.05%	6.86%	16.91%
25	10.20%	6.97%	17.17%
26	10.36%	7.09%	17.45%
27	10.51%	7.19%	17.70%
28	10.67%	7.31%	17.98%
29	10.83%	7.42%	18.25%
30	11.00%	7.54%	18.54%
31	11.17%	7.67%	18.84%
32	11.35%	7.80%	19.15%
33	11.53%	7.92%	19.45%
34	11.72%	8.06%	19.78%
35	11.90%	8.19%	20.09%
36	12.09%	8.33%	20.42%
37	12.29%	8.47%	20.76%
38	12.49%	8.61%	21.10%
39	12.69%	8.76%	21.45%

EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

Safety Cost Group #11 Members' Contribution Rates (as a % of Monthly Payroll) Members with Membership Dates before January 1, 2013 (continued)			
Entry Age	Basic	COLA	Total
40	12.90%	8.91%	21.81%
41	13.12%	9.06%	22.18%
42	13.35%	9.23%	22.58%
43	13.59%	9.40%	22.99%
44	13.82%	9.57%	23.39%
45	14.05%	9.73%	23.78%
46	14.08%	9.75%	23.83%
47	14.02%	9.71%	23.73%
48	13.76%	9.52%	23.28%
49 & Over	12.99%	8.97%	21.96%

Interest: 7.00% per annum
Mortality: See Section 4, Exhibit I
Salary Increase: Inflation (2.75%) + Across-the-Board Increase (0.50%) + Merit (See Section 4, Exhibit I)
Administrative Expense: 0.47% of payroll added to Basic rates
Leave Cashout: 2.50%
COLA Loading Factor: 71.65%, applied to Basic rates prior to adjustment for administrative expenses.

EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

Safety Cost Group #12 Members' Contribution Rates (as a % of Monthly Payroll) Members with Membership Dates before January 1, 2013			
Entry Age	Basic	COLA	Total
15	9.57%	6.70%	16.27%
16	9.57%	6.70%	16.27%
17	9.57%	6.70%	16.27%
18	9.57%	6.70%	16.27%
19	9.57%	6.70%	16.27%
20	9.57%	6.70%	16.27%
21	9.57%	6.70%	16.27%
22	9.71%	6.80%	16.51%
23	9.86%	6.91%	16.77%
24	10.00%	7.02%	17.02%
25	10.16%	7.13%	17.29%
26	10.31%	7.24%	17.55%
27	10.46%	7.35%	17.81%
28	10.62%	7.47%	18.09%
29	10.78%	7.59%	18.37%
30	10.95%	7.71%	18.66%
31	11.12%	7.84%	18.96%
32	11.30%	7.97%	19.27%
33	11.47%	8.10%	19.57%
34	11.66%	8.24%	19.90%
35	11.86%	8.38%	20.24%
36	12.04%	8.52%	20.56%
37	12.23%	8.66%	20.89%
38	12.43%	8.80%	21.23%
39	12.64%	8.96%	21.60%

EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

Safety Cost Group #12 Members' Contribution Rates (as a % of Monthly Payroll) Members with Membership Dates before January 1, 2013 (continued)			
Entry Age	Basic	COLA	Total
40	12.86%	9.12%	21.98%
41	13.07%	9.27%	22.34%
42	13.31%	9.45%	22.76%
43	13.54%	9.62%	23.16%
44	13.76%	9.78%	23.54%
45	13.97%	9.94%	23.91%
46	14.03%	9.98%	24.01%
47	13.95%	9.92%	23.87%
48	13.79%	9.80%	23.59%
49 & Over	13.05%	9.26%	22.31%

Interest: 7.00% per annum
Mortality: See Section 4, Exhibit I
Salary Increase: Inflation (2.75%) + Across-the-Board Increase (0.50%) + Merit (See Section 4, Exhibit I)
Administrative Expense: 0.47% of payroll added to Basic rates
Leave Cashout: 2.00%
COLA Loading Factor: 73.61%, applied to Basic rates prior to adjustment for administrative expenses.

EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

General Members' Contribution Rates (as a % of Monthly Payroll) Members with Membership Dates On or After January 1, 2013			
	Basic	COLA	Total
Cost Group #1 – PEPRA Tier 4 (2% COLA)	8.68%	1.99%	10.67%
Cost Group #1 – PEPRA Tier 4 (3% COLA)	8.80%	2.96%	11.76%
Cost Group #2 - PEPRA Tier 5 (2% COLA)	8.16%	1.84%	10.00%
Cost Group #2 - PEPRA Tier 5 (3%/4% COLA)	8.39%	2.76%	11.15%
Cost Group #3 - PEPRA Tier 4 (3% COLA)	8.23%	2.83%	11.06%
Cost Group #4 - PEPRA Tier 4 (3% COLA)	8.96%	3.02%	11.98%
Cost Group #5 - PEPRA Tier 4 (2% COLA)	10.07%	2.27%	12.34%
Cost Group #5 - PEPRA Tier 4 (3% COLA)	11.38%	3.79%	15.17%
Cost Group #6 - PEPRA Tier 4 (3% COLA)	9.39%	3.21%	12.60%

The PEPRA member contribution rates are 50% of the Normal Cost rate. The Basic rates shown above also include an administrative expense load of 0.47% of payroll.

Note: It is our understanding that in the determination of pension benefits under the PEPRA formulas, the maximum compensation that can be taken into account for 2019 is equal to \$124,180; for an employer that is not enrolled in Social Security, the maximum amount is \$149,016. (§7522.10) These amounts should be adjusted for changes to the Consumer Price Index for All Urban Consumers after 2019. (§7522.10(d))

EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

Safety Members' Contribution Rates (as a % of Monthly Payroll) Members with Membership Dates On or After January 1, 2013			
	Basic	COLA	Total
Cost Group #7 - PEPRA Tier D	14.31%	5.73%	20.04%
Cost Group #8 - PEPRA Tier D	13.05%	5.35%	18.40%
Cost Group #8 - PEPRA Tier E	12.09%	3.32%	15.41%
Cost Group #9 - PEPRA Tier E	13.17%	3.57%	16.74%
Cost Group #10 - PEPRA Tier D	12.70%	5.23%	17.93%
Cost Group #11 - PEPRA Tier D	11.44%	4.71%	16.15%
Cost Group #12 - PEPRA Tier D	11.65%	4.82%	16.47%

The PEPRA member contribution rates are 50% of the Normal Cost rate. The Basic rates shown above also include an administrative expense load of 0.47% of payroll.

Note: It is our understanding that in the determination of pension benefits under the PEPRA formulas, the maximum compensation that can be taken into account for 2019 is equal to \$124,180; for an employer that is not enrolled in Social Security, the maximum amount is \$149,016. (§7522.10) These amounts should be adjusted for changes to the Consumer Price Index for All Urban Consumers after 2019. (§7522.10(d))

EXHIBIT IV – REFUNDABILITY FACTORS

		December 31, 2018		December 31, 2017	
		Legacy Tiers	PEPRA Tiers	Legacy Tiers	PEPRA Tiers
General					
Cost Group #1 –	County and Small Districts (Tier 1)	0.9577		0.9602	
	PEPRA Tier 4 (2% COLA)		0.9574		0.9605
	PEPRA Tier 4 (3% COLA)		0.9582		0.9613
Cost Group #2 –	County and Small Districts (Tier 3)	0.9540		0.9576	
	PEPRA Tier 5 (2% COLA)		0.9580		0.9611
	PEPRA Tier 5 (3%/4% COLA)		0.9604		0.9631
Cost Group #3 –	Central Contra Costa Sanitary District	0.9560	0.9661	0.9588	0.9670
Cost Group #4 –	Contra Costa Housing Authority	0.9536	0.9643	0.9571	0.9654
Cost Group #5 –	Contra Costa County Fire Protection District	0.9563		0.9591	
	PEPRA Tier 4 (2% COLA)		0.9568		0.9630
	PEPRA Tier 4 (3% COLA)		0.9585		0.9606
Cost Group #6 –	Small Districts (Non-Enhanced Tier 1 and 4)	0.9512	0.9647	0.9556	0.9643
Safety					
Cost Group #7 –	County (Tier A and D)	0.9599	0.9716	0.9657	0.9758
Cost Group #8 –	Contra Costa and East Fire Protection Districts	0.9606		0.9666	
	PEPRA Tier D (3% COLA)		0.9732		0.9770
	PEPRA Tier E (2% COLA)		0.9719		0.9748
Cost Group #9 –	County (Tier C and E)	0.9613	0.9703	0.9670	0.9752
Cost Group #10 –	Moraga-Orinda Fire District	0.9639	0.9733	0.9688	0.9787
Cost Group #11 –	San Ramon Valley Fire District	0.9618	0.9735	0.9665	0.9794
Cost Group #12 –	Rodeo-Hercules Fire Protection District	0.9533	0.9769	0.9718	0.9803

EXHIBIT V – SUMMARY OF COST GROUPS AND EMPLOYERS

General			
Cost Group	Employer Name	Benefit Structure	Special Adjustment
1	County General	Tier 1 Enhanced/PEPRA Tier 4	Yes
	Local Agency Formation Commission	Tier 1 Enhanced/PEPRA Tier 4	Yes
	Contra Costa Mosquito and Vector Control District	Tier 1 Enhanced/PEPRA Tier 4	
	Bethel Island Municipal District (Non-Integrated)	Tier 1 Enhanced/PEPRA Tier 4	
	First 5-Children & Families Commission	Tier 1 Enhanced/PEPRA Tier 4	Yes
	Contra Costa County Employees' Retirement Association	Tier 1 Enhanced/PEPRA Tier 4	
	Superior Court	Tier 1 Enhanced/PEPRA Tier 4	Yes
	East Contra Costa Fire Protection District (Non-Integrated)	Tier 1 Enhanced/PEPRA Tier 4	
	Moraga-Orinda Fire District (Non-Integrated)	Tier 1 Enhanced/PEPRA Tier 4	Yes
	Rodeo-Hercules Fire Protection District (Non-Integrated)	Tier 1 Enhanced/PEPRA Tier 4	
	San Ramon Valley Fire District (Non-Integrated)	Tier 1 Enhanced/PEPRA Tier 4	
2	County General	Tier 3 Enhanced/PEPRA Tier 5	Yes
	In-Home Supportive Services Authority	Tier 3 Enhanced/PEPRA Tier 5	
	Contra Costa Mosquito and Vector Control District	Tier 3 Enhanced/PEPRA Tier 5	
	Superior Court	Tier 3 Enhanced/PEPRA Tier 5	Yes
3	Central Contra Costa Sanitary District (Non-Integrated)	Tier 1 Enhanced/PEPRA Tier 4	
4	Contra Costa Housing Authority	Tier 1 Enhanced/PEPRA Tier 4	
5	Contra Costa County Fire Protection District (Non-Integrated)	Tier 1 Enhanced/PEPRA Tier 4	
6	Rodeo Sanitary District	Tier 1 Non-Enhanced/PEPRA Tier 4	
	Byron Brentwood Cemetery	Tier 1 Non-Enhanced/PEPRA Tier 4	

EXHIBIT V – SUMMARY OF COST GROUPS AND EMPLOYERS (CONTINUED)

Safety			
Cost Group	Employer Name	Benefit Structure	Special Adjustment
7	County Safety	Tier A Enhanced/PEPRA Tier D	
8	Contra Costa County Fire Protection District East Contra Costa Fire Protection District	Tier A Enhanced/PEPRA Tier D/E Tier A Enhanced/PEPRA Tier D	Yes
9	County Safety	Tier C Enhanced/PEPRA Tier E (Members hired on or after January 1, 2007)	
10	Moraga-Orinda Fire District	Tier A Enhanced/PEPRA Tier D	
11	San Ramon Valley Fire District	Tier A Enhanced/PEPRA Tier D	
12	Rodeo-Hercules Fire Protection District	Tier A Non-Enhanced/PEPRA Tier D	

Note: A special adjustment is made for employers that have a remaining balance of a Pension Obligation Bond or any other special contributions as described on page 119.

EXHIBIT VI – ALLOCATION OF VALUATION VALUE OF ASSETS AS OF DECEMBER 31, 2018

	Cost Groups #1 and #2 General County and Small Districts	Cost Group #3 Central Contra Costa Sanitary District	Cost Group #4 Contra Costa Housing Authority	Cost Group #5 Contra Costa County Fire Protection District	Cost Group #6 Small Districts (General Non- Enhanced)	Terminated Employers	
1	Allocated Valuation Value of Assets as of Beginning of Year	\$4,583,679,028	\$317,188,761	\$53,424,568	\$48,484,690	\$6,780,593	\$56,542,068
2	Contributions: ⁽¹⁾						
a.	Total Member Contributions	\$69,698,402	\$3,876,989	\$610,154	\$610,915	\$118,751	\$0
b.	Employer Contributions - Excludes POB and other Special Contributions	177,742,805	17,520,615	2,254,454	1,693,621	241,046	0
c.	Employer Contributions - Special (POB, Termination, etc.)	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>1,089,680</u>
d.	Total Contributions	\$247,441,207	\$21,397,604	\$2,864,608	\$2,304,536	\$359,797	\$1,089,680
3	Total Payments Excluding Post-Retirement Death	255,207,702	20,041,187	3,141,084	3,233,923	366,995	5,347,734
4	Administrative Expenses ⁽²⁾	<u>7,068,136</u>	<u>372,658</u>	<u>60,569</u>	<u>55,815</u>	<u>9,229</u>	<u>0</u>
5	Subtotal (1 + 2d – 3 – 4)	\$4,568,844,397	\$318,172,520	\$53,087,523	\$47,499,488	\$6,764,166	\$52,284,014
6	Weighted Average Fund Balance	4,576,261,710	317,680,641	53,256,046	47,992,089	6,772,380	54,254,963
7	Earnings Allocated in Proportion to (6)	<u>289,341,885</u>	<u>20,085,896</u>	<u>3,367,204</u>	<u>3,034,381</u>	<u>428,195</u>	<u>3,430,362</u>
8	Allocated Valuation Value of Assets As of End of Year (5 + 7)	\$4,858,186,282	\$338,258,416	\$56,454,727	\$50,533,869	\$7,192,361	\$55,714,376
9	Adjustment for Pre-Paid Contributions	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
10	Final Valuation Value of Assets As of End of Year (8 + 9)	\$4,858,186,282	\$338,258,416	\$56,454,727	\$50,533,869	\$7,192,361	\$55,714,376

Note: Results may be slightly off due to rounding.

⁽¹⁾ Employer contributions include “member subvention of employer contributions” and exclude “employer subvention of member contributions”.

⁽²⁾ Allocated based on expected administrative expenses from the prior valuation.

EXHIBIT VI – ALLOCATION OF VALUATION VALUE OF ASSETS AS OF DECEMBER 31, 2018

	Cost Groups #7 & 9 Safety County	Cost Group #8 Contra Costa & East Fire Protection Districts	Cost Group #10 Moraga-Orinda Fire District	Cost Group #11 San Ramon Valley Fire District	Cost Group #12 Rodeo- Hercules Fire Protection District	Total
1 Allocated Valuation Value of Assets as of Beginning of Year	\$1,678,768,488	\$879,830,504	\$160,248,990	\$362,597,496	\$32,346,005	\$8,179,891,191
2 Contributions: ⁽¹⁾						
a. Total Member Contributions	\$17,149,125	\$6,563,206	\$1,346,450	\$3,264,050	\$303,487	\$103,541,529
b. Employer Contributions - Excludes POB and other Special Contributions	69,392,785	29,841,817	5,164,011	16,936,767	2,985,502	323,773,423
c. Employer Contributions - Special (POB, Termination, etc.)	<u>0</u>	<u>0</u>	<u>0</u>	<u>254,000</u>	<u>0</u>	<u>1,343,680</u>
d. Total Contributions	\$86,541,910	\$36,405,023	\$6,510,461	\$20,454,817	\$3,288,989	\$428,658,632
3 Total Payments Excluding Post-Retirement Death	90,478,168	56,930,942	10,320,442	17,018,641	1,872,129	463,958,947
4 Administrative Expenses ⁽²⁾	<u>1,046,093</u>	<u>387,293</u>	<u>79,770</u>	<u>233,712</u>	<u>23,778</u>	<u>9,337,053</u>
5 Subtotal (1 + 2d – 3 – 4)	\$1,673,786,137	\$858,917,292	\$156,359,239	\$365,799,960	\$33,739,087	\$8,135,253,823
6 Weighted Average Fund Balance	1,676,277,313	869,373,898	158,304,115	364,198,728	33,042,546	8,157,414,429
7 Earnings Allocated in Proportion to (6)	105,985,468	54,967,635	10,009,045	23,027,081	2,089,171	515,766,323
8 Allocated Valuation Value of Assets As of End of Year (5 + 7)	\$1,779,771,605	\$913,884,927	\$166,368,284	\$388,827,041	\$35,828,258	\$8,651,020,146
9 Adjustment for Pre-Paid Contributions ⁽³⁾	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>(841,920)</u>	<u>(841,920)</u>
10 Final Valuation Value of Assets As of End of Year (8 + 9)	\$1,779,771,605	\$913,884,927	\$166,368,284	\$388,827,041	\$34,986,338	\$8,650,178,226

Note: Results may be slightly off due to rounding.

⁽¹⁾ Employer contributions include “member subvention of employer contributions” and exclude “employer subvention of member contributions”.

⁽²⁾ Allocated based on expected administrative expenses from the prior valuation.

⁽³⁾ This adjustment is to exclude 6 months of contributions made by Rodeo-Hercules Fire Protection District during the 2018 calendar year that were pre-paid for the 2019 calendar year. These contributions will be reflected in the next valuation.

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