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January 3, 2017

February 8, 2017
Agenda Item 10

Ms. Gail Strohl
Chief Executive Officer
Contra Costa County Employees' Retirement Association
1355 Willow Way, Suite 221
Concord, CA 94520

Re: Contra Costa County Employees' Retirement Association Reconciliations of Employer Contribution Rate and Unfunded Actuarial Accrued Liability Reconciliation by Cost Group & Unfunded Actuarial Accrued Liability by Employers Based on the December 31, 2015 Actuarial Valuation

Dear Gail:

As requested, we are providing the following information regarding the December 31, 2015 valuation.

Exhibit A – A reconciliation of employer contribution rate changes separately for each of CCCERA's cost groups.

Exhibit B – A reconciliation of the Unfunded Actuarial Accrued Liability (UAAL) separately for each of CCCERA's cost groups.

Exhibit C – Allocation of the UAAL for each participating employer.

Reconciliation of Employer Contribution Rate Changes for Each Cost Group

Exhibit A details the changes in the recommended employer contribution rates for each cost group from the December 31, 2014 valuation to the December 31, 2015 valuation.

Observations

- The average employer rate decreased from 40.06% of payroll as of December 31, 2014 to 39.23% of payroll as of December 31, 2015. As discussed in our December 31, 2015 actuarial valuation report, this decrease is due to an investment return on actuarial value (i.e. after smoothing) greater than the 7.25% assumed rate, lower than expected COLA increases for retirees and beneficiaries and other experience gains all offset to some degree by the changes in actuarial assumptions (including the explicit administrative expense load). Lower than expected COLA increases for retirees and beneficiaries decreased the average employer contribution rate by 0.29%. The investment gain decreased the average employer contribution rate by 0.99% of payroll. The investment gain was allocated to each cost group in proportion to the assets for each cost group. The estimated impact of the investment gain varies by cost group with the Safety cost groups experiencing larger rate decreases.

- The changes in actuarial assumptions increased the average employer contribution rate by a total of 2.56% of payroll (including the impact of the explicit administrative expense load).

- Note that there were also other various changes shown in Exhibit A including the 18-month delay in implementation of the contribution rates calculated in the December 31, 2015 valuation, the effect of actual versus expected total payroll growth and the net effect of other experience.

RECONCILIATION OF UAAL FOR EACH COST GROUP

Exhibit B presents the changes in the UAAL by cost group from the December 31, 2014 valuation to the December 31, 2015 valuation. Note that we have combined the results for Cost Group #1 and #2 and Cost Group #7 and #9 as the UAAL for these cost groups is still pooled.

Exhibit B shows that the decrease in UAAL is primarily due to an investment return on actuarial value (i.e. after smoothing) greater than the 7.25% assumed rate, actual contributions greater than expected and lower than expected COLA increases for retirees and beneficiaries all offset to some degree by the changes in actuarial assumptions. The investment gain was again generally allocated amongst the cost groups based on the valuation value of assets for each cost group. All other elements of the changes in UAAL were determined based on the data specific to each separate cost group.

ALLOCATION OF UAAL BY EMPLOYER

Exhibit C provides an allocation of the UAAL as of December 31, 2015 by employer.

Since the depooling action taken by the Board effective December 31, 2009, employers that are now in their own cost group have their UAAL determined separately in the valuation. For employers that do not have their own cost group, there is no UAAL maintained on an employer-by-employer basis in the valuation. In those cases, we develop contributions to fund the UAAL strictly according to projected payroll for each employer. We then use those UAAL contributions to develop a UAAL for each participating employer. Note that the UAAL we calculate for each employer is not necessarily the liability that would be allocated to that employer in the event of a plan termination or withdrawal by that employer.

Based on the above method, we have prepared the breakdown of the UAAL for each participating employer as shown in the enclosed Exhibit C. We also show the projected payroll for each participating employer that was used in the determination of the UAAL.

All results shown in this letter are based on the December 31, 2015 actuarial valuation including the participant data and actuarial assumptions on which that valuation was based. That valuation and these calculations were completed under the supervision of John Monroe, ASA, MAAA, Enrolled Actuary.

The undersigned is a member of the American Academy of Actuaries and meets the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion herein.

Please let us know if you have any questions.

Sincerely,

John Monroe

John Monroe

JEM/bbf
Enclosures

EXHIBIT A

Reconciliation of Recommended Employer Contribution from December 31, 2014 to December 31, 2015 Valuation	Cost Group #1 General County and Small Districts	Cost Group #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 Non-enhanced
Recommended Employer Contribution Rate in December 31, 2014 Valuation	33.14%	29.36%	55.71%	41.76%	31.59%	26.62%
Effect of investment gain[1]	-0.74%	-0.74%	-0.92%	-0.93%	-1.23%	-0.74%
Effect of additional UAAL contributions from Sanitary District	0.00%	0.00%	-0.57%	0.00%	0.00%	0.00%
Effect of actual contributions smaller/(larger) than expected contributions due to delay in implementation of contribution rates calculated in 12/31/2014 valuation	-0.40%	-0.40%	-0.85%	-0.01%	-0.49%	-0.07%
Effect of higher/(lower) than expected individual salary increases	-0.13%	-0.13%	-0.12%	-0.68%	-0.69%	-0.76%
Effect of amortizing prior year's UAAL over a smaller/(larger) than expected projected total payroll	-0.51%	-0.51%	-1.53%	0.38%	-0.21%	0.41%
Effect of lower than expected COLA increases for retirees and beneficiaries	-0.20%	-0.20%	-0.27%	-0.21%	-0.32%	-0.09%
Effect of changes in member demographics on Normal Cost	-0.43%	-0.54%	-0.42%	-0.68%	-0.66%	0.20%
Effect of mortality (gain)/loss for retirees and beneficiaries	0.12%	0.12%	0.09%	-0.01%	-0.31%	-0.42%
Effect of other experience (gains)/losses[2]	0.00%	-0.03%	0.47%	0.60%	1.55%	-0.83%
Effect of changes in actuarial assumptions	0.97%	1.07%	0.64%	1.32%	1.26%	0.39%
Effect of administrative expense load	0.67%	0.67%	0.67%	0.67%	0.67%	0.67%
Total Change	-0.65%	-0.69%	-2.81%	0.45%	-0.43%	-1.24%
Recommended Employer Contribution Rate in December 31, 2015 Valuation	32.49%	28.67%	52.90%	42.21%	31.16%	25.38%

Note: *These rates do not include any employer subvention of member contributions, or member subvention of employer contributions.*

(1) *Return on the valuation value of assets of 8.79% was greater than the 7.25% assumed in the 2014 valuation.*

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

EXHIBIT A

Reconciliation of Recommended Employer Contribution from December 31, 2014 to December 31, 2015 Valuation	Cost Group #7 Safety County	Cost Group #8 Contra Costa and East Fire Protection Districts	Cost Group #9 Safety County	Cost Group #10 Moraga-Orinda Fire District	Cost Group #11 San Ramon Valley Fire District	Cost Group #12 Rodeo-Hercules Fire Protection District Non-enhanced	Total Average Recommended Rate
Recommended Employer Contribution Rate in December 31, 2014 Valuation	77.77%	78.93%	70.63%	69.66%	83.79%	89.27%	40.06%
Effect of investment gain[1]	-1.79%	-2.61%	-1.79%	-2.25%	-1.80%	-1.15%	-0.99%
Effect of additional UAAL contributions from Sanitary District	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.02%
Effect of actual contributions smaller/(larger) than expected contributions due to delay in implementation of contribution rates calculated in 12/31/2014 valuation	-0.68%	-0.64%	-0.68%	0.29%	-0.57%	-0.63%	-0.45%
Effect of higher/(lower) than expected individual salary increases	0.00%	0.13%	0.00%	-1.62%	1.18%	0.44%	-0.09%
Effect of amortizing prior year's UAAL over a smaller/(larger) than expected projected total payroll	-1.70%	-0.36%	-1.70%	3.58%	-0.88%	-4.56%	-0.72%
Effect of lower than expected COLA increases for retirees and beneficiaries	-0.53%	-0.93%	-0.53%	-0.66%	-0.43%	-0.39%	-0.29%
Effect of changes in member demographics on Normal Cost	-0.27%	-0.24%	-1.58%	-0.04%	0.16%	-0.62%	-0.57%
Effect of mortality (gain)/loss for retirees and beneficiaries	-1.65%	-1.39%	-1.65%	-0.75%	-0.99%	0.28%	-0.18%
Effect of other experience (gains)/losses[2]	-0.45%	1.05%	-0.45%	-4.34%	-1.17%	-1.52%	-0.08%
Effect of changes in actuarial assumptions	5.03%	7.35%	5.50%	5.63%	3.18%	4.44%	1.89%
Effect of administrative expense load	0.67%	0.67%	0.67%	0.67%	0.67%	0.67%	0.67%
Total Change	-1.37%	3.03%	-2.21%	0.51%	-0.65%	-3.04%	-0.83%
Recommended Employer Contribution Rate in December 31, 2015 Valuation	76.40%	81.96%	68.42%	70.17%	83.14%	86.23%	39.23%

Note: *These rates do not include any employer subvention of member contributions, or member subvention of employer contributions.*

(1) *Return on the valuation value of assets of 8.79% was greater than the 7.25% assumed in the 2013 valuation.*

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

EXHIBIT B

Reconciliation of Unfunded Actuarial Accrued Liability from December 31, 2014 to December 31, 2015 Valuation

	Cost Group #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 Non-enhanced
1. Unfunded actuarial accrued liability at beginning of year	$693,303,150	$100,955,188	$10,721,870	$6,334,081	$545,720
2. Gross Normal cost at middle of year	130,311,169	7,995,426	1,371,348	936,482	231,712
3. Expected employer and member contributions	(209,887,008)	(18,926,801)	(2,699,261)	(1,511,005)	(323,528)
4. Interest (whole year on (1) plus half year on (2) + (3))	47,379,854	6,922,989	729,199	438,394	36,236
5. Expected unfunded actuarial accrued liability at end of year	$661,107,165	$96,946,802	$10,123,156	$6,197,952	$490,140
6. Actuarial (gain)/loss due to all changes:					
(a) Gain from investment return	$(56,661,014)	$(3,797,527)	$(656,806)	$(622,029)	$(83,443)
(b) Gain from additional UAAL contributions by Sanitary District	0	(2,322,759)	0	0	0
(c) Actual contributions less/(more) than expected	(30,214,447)	(3,495,589)	(7,542)	(247,186)	(7,958)
(d) Higher/(lower) than expected individual salary increases	(9,659,616)	(490,740)	(480,527)	(352,098)	(85,917)
(e) Lower than expected COLA increases for retirees and beneficiaries	(15,608,956)	(1,115,203)	(149,992)	(164,663)	(10,611)
(f) Mortality (gain)/loss for retirees and beneficiaries	9,346,104	389,554	(9,523)	(155,262)	(47,313)
(g) Other experience (gain)/loss[1]	(2,918,096)	2,023,470	430,298	784,179	(92,335)
(h) Changes in actuarial assumptions	40,045,512	44,220	432,801	355,946	33,272
(i) Total changes	$(65,670,513)	$(8,764,574)	$(441,291)	$(401,113)	$(294,305)
7. Unfunded actuarial accrued liability at end of year	$595,436,652	$88,182,228	$9,681,865	$5,796,839	$195,835

***Note**: Results may not add due to rounding.*

[1] *Other differences in actual versus expected experience including (but not limited to) disability, withdrawal, retirement and leave cashout experience.*

EXHIBIT B

Reconciliation of Unfunded Actuarial Accrued Liability from December 31, 2014 to December 31, 2015 Valuation	Cost Group #7 and #9 Safety County	Cost Group #8 Contra Costa and 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 Non-enhanced	Total
1. Unfunded actuarial accrued liability at beginning of year	$363,959,212	$170,077,640	$34,844,301	$74,173,976	$15,026,974	$1,469,942,112
2. Gross Normal cost at middle of year	35,170,509	13,831,595	3,073,278	7,556,844	845,638	201,324,001
3. Expected employer and member contributions	(74,191,363)	(29,408,622)	(6,086,727)	(16,846,158)	(2,335,070)	(362,215,543)
4. Interest (whole year on (1) plus half year on (2) + (3))	24,972,537	11,765,962	2,416,974	5,040,876	1,035,464	100,738,485
5. Expected unfunded actuarial accrued liability at end of year	`$349,910,895	$166,266,575	$34,247,826	$69,925,538	$14,573,006	$1,409,789,055
6. Actuarial (gain)/loss due to all changes:						
(a) Gain from Investment return	$(20,879,242)	$(11,300,927)	$(2,047,878)	$(4,294,189)	$(383,541)	$(100,726,596)
(b) Gain from additional UAAL contributions by Sanitary District	0	0	0	0	0	(2,322,759)
(c) Actual contributions less/(more) than expected	(7,897,578)	(2,780,192)	261,628	(1,345,897)	(210,711)	(45,945,472)
(d) Higher/(lower) than expected individual salary increases	(17,276)	571,875	(1,477,942)	2,807,941	147,841	(9,036,459)
(e) Lower than expected COLA increases for retirees and beneficiaries	(6,115,665)	(4,010,678)	(599,265)	(1,018,436)	(129,634)	(28,923,103)
(f) Mortality (gain)/loss for retirees and beneficiaries	(21,237,170)	(4,329,289)	(679,881)	(2,352,865)	94,118	(18,981,527)
(g) Other experience (gain)/loss(1)	(3,014,792)	2,863,219	(3,944,961)	(2,793,016)	(505,370)	(7,167,404)
(h) Changes in actuarial assumptions	39,775,019	24,296,846	3,844,347	5,533,144	775,874	115,136,981
(i) Total changes	$(19,386,704)	$5,310,854	$(4,643,952)	$(3,463,318)	$(211,423)	$(97,966,339)
7. Unfunded actuarial accrued liability at end of year	$330,524,191	$171,577,429	$29,603,874	$66,462,220	$14,361,583	$1,311,822,716

***Note**: Results may not add due to rounding.*

(1) *Other differences in actual versus expected experience including (but not limited to) disability, withdrawal, retirement and leave cashout experience.*

EXHIBIT C

Contra Costa County Employees' Retirement Association
UAAL Breakdown

Employer	Unfunded Actuarial Accrued Liability (UAAL)	Projected Payroll
County	$879,610,000	$609,508,552
Superior Court	25,941,000	24,744,906
Districts:		
Bethel Island Municipal Improvement District	99,000	60,165
Byron, Brentwood, Knightsen Union Cemetery District	53,000	226,019
Central Contra Costa Sanitary District	88,182,000	30,290,237
First Five - Contra Costa Children & Families Commission	2,296,000	2,174,357
Contra Costa County Employees' Retirement Association	6,285,000	3,803,561
Contra Costa Fire Protection District	154,708,000	32,894,282
Contra Costa Housing Authority	9,682,000	5,227,898
Contra Costa Mosquito and Vector Control District	5,093,000	3,082,507
East Contra Costa Fire Protection District	22,759,000	2,788,091
In-Home Supportive Services Authority	1,177,000	712,038
Local Agency Formation Commission	358,000	216,358
Moraga-Orinda Fire Protection District	29,968,000	7,241,409
Rodeo Sanitary District	142,000	603,750
Rodeo-Hercules Fire Protection District	14,397,000	2,480,217
San Ramon Valley Fire Protection District	71,073,000	20,298,316
Total:	$1,311,823,000	$746,352,663

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Vice President & Actuary
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January 3, 2017

Ms. Gail Strohl
Chief Executive Officer
Contra Costa County Employees' Retirement Association
1355 Willow Way, Suite 221
Concord, CA 94520

**Re: Contra Costa County Employees' Retirement Association
Five-Year Projection of Employer Contribution Rate Changes**

Dear Gail:

As requested, we have updated our five-year projection of estimated employer contribution rate changes for CCCERA. This projection is derived from the December 31, 2015 actuarial valuation results. Key assumptions and methods are detailed below. **It is important to understand that these results are entirely dependent on those assumptions. Actual results as determined in future actuarial valuations will differ from these results. In particular, actual investment returns and actual salary levels different than assumed can have a significant impact on future contribution rates.**

Results

The estimated contribution rate changes shown on the next page apply to the recommended average employer contribution rate. For purposes of this projection, the rate changes that are included reflect the asset gains and losses that are funded as a level percentage of the Association's total active payroll base.

The changes in contribution rate are due to: (1) deferred gains and losses from the actuarial asset smoothing methodology; (2) losses due to investment income not earned on the excess of the Actuarial Value of Assets (AVA) over the Market Value of Assets (MVA) (and gains when the opposite occurs); and (3) contribution gains and losses which occur from delaying the implementation of new rates until 18 months after the actuarial valuation date.

The following table provides the year-to-year rate changes from each of the above components and the cumulative rate change over the five-year projection period. To obtain the estimated average employer contribution rate at each successive valuation date, these cumulative rate changes should be added to the rates developed from the December 31, 2015 valuation. These rate changes become effective 18 months following the actuarial valuation date shown in the table.

The rate changes shown below represent the average rate for the aggregate plan.

Rate Change Component	Valuation Date (12/31)				
	2016	2017	2018	2019	2020
(1) Deferred (Gains)/Losses	-0.07%	-0.10%	0.51%	0.89%	0.35%
(2) (Gain)/Loss of Investment Income on Difference Between MVA and AVA	0.12%	0.12%	0.13%	0.09%	0.02%
(3) 18-Month Rate Delay	-0.18%	-0.03%	-0.01%	0.05%	0.10%
Incremental Rate Change	-0.13%	-0.01%	0.63%	1.03%	0.47%
Cumulative Rate Change	-0.13%	-0.14%	0.49%	1.52%	1.99%

The difference between these cumulative rate changes and those shown in our May 19, 2016 letter (i.e., previous five-year projection) are as follows:

	Valuation Date (12/31)				
	2015	2016	2017	2018	2019
Cumulative Rate Change From May 19, 2016 Letter	-2.69%	-3.17%	-3.47%	-3.02%	-2.14%
Reflecting Actual Experience through 12/31/2015 and Changes in Demographic Actuarial Assumptions	-0.83%[1]	-0.96%	-0.97%	-0.34%	0.69%
Difference	1.86%	2.21%	2.50%	2.68%	2.83%

These differences are mainly due to changes in demographic assumptions in the December 31, 2015 valuation that were not reflected in the previous projection.

The average employer contribution rate as of the December 31, 2015 Actuarial Valuation is 39.23%, and based on the cumulative rate changes above is projected to progress as shown below.

	Valuation Date (12/31)				
	2016	2017	2018	2019	2020
Average Employer Contribution Rate	39.10%	39.09%	39.72%	40.75%	41.22%

[1] Actual change in the average employer contribution rate as shown on page 32 of the December 31, 2015 valuation.

The rate change for an individual cost group or employer will vary depending primarily on the size of that group's assets and liabilities relative to its payroll. The ratio of the group's assets to payroll is sometimes referred to as the asset volatility index (AVI). A higher AVI results in more volatile contributions and can result from the following factors:

- More generous benefits
- More retirees
- Older workforce
- Shorter careers
- Issuance of Pension Obligation Bonds (POBs)

The attached exhibit shows the AVI for CCCERA's cost groups along with the "relative AVI" which is the AVI for that specific cost group divided by the average AVI for the aggregate plan. Using these ratios we have estimated the rate change due to these generally investment related net losses for each individual cost group by multiplying the rate changes shown above for the aggregate plan by the relative AVI for each cost group. These estimated rate changes for each cost group are shown in the attached exhibit.

Note that because we have estimated the allocation of the rate changes across the cost groups, the actual rate changes by group may differ from those shown in the exhibit, even if the plan-wide average rate changes are close to those shown above.

Key Assumptions and Methods

The projection is based upon the following assumptions and methods:

- December 31, 2015 non-economic assumptions remain unchanged.
- December 31, 2015 retirement benefit formulas remain unchanged.
- December 31, 2015 1937 Act statutes remain unchanged.
- UAAL amortization method remains unchanged.
- December 31, 2015 economic assumptions remain unchanged, including the 7.00% investment earnings assumption.
- We have assumed that returns of 7.00% are actually earned on a market value basis for each of the next four years after 2015.
- Active payroll grows at 3.25% per annum.
- Deferred investment gains and losses are recognized per the asset smoothing schedule prepared by the Association as of December 31, 2015. They are funded as a level percentage of the Association's total active payroll base.

- Deferred investment gains are all applied directly to reduce the UAAL. Note that this assumption may not be entirely consistent with the details of the Board's Interest Crediting and Excess Earnings Policy.
- The AVI used for these projections is based on the December 31, 2015 Actuarial Valuation and is assumed to stay constant during the projection period.
- All other actuarial assumptions used in the December 31, 2015 actuarial valuation are realized.
- No changes are made to actuarial methodologies, such as adjusting for the contribution rate delay in advance.
- The projections do not reflect any changes in the employer contribution rates that could result due to future changes in the demographics of CCCERA's active members or decreases in the employer contribution rates that might result from new hires going into the PEPRA tiers.

Finally, we emphasize that projections, by their nature, are not a guarantee of future results. The modeling projections are intended to serve as illustrations of future financial outcomes that are based on the information available to us at the time the modeling is undertaken and completed, and the agreed-upon assumptions and methodologies described herein. Emerging results may differ significantly if the actual experience proves to be different from these assumptions or if alternative methodologies are used. Actual experience may differ due to such variables as demographic experience, the economy, stock market performance and the regulatory environment.

Unless otherwise noted, all of the above calculations are based on the December 31, 2015 actuarial valuation results including the participant data and actuarial assumptions on which that valuation was based. That valuation and these projections were completed under the supervision of John Monroe, ASA, MAAA, Enrolled Actuary.

The undersigned is a member of the American Academy of Actuaries and meets the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion herein.

Please let us know if you have any questions.

Sincerely,

John Monroe

John Monroe

JEM/bbf
Enclosure

Exhibit

Contra Costa County Employees' Retirement Association

Estimated Employer Rate Change by Cost Group (CG) Based on December 31, 2015 Valuation

	CG#1 & CG#2 Combined Enhanced General	CG#3 Enhanced CCC Sanitary District	CG#4 Enhanced Housing Authority	CG#5 Enhanced CCCFPD	CG#6 Non-Enhanced District
Market Value of Assets (MVA)*	$3,915,973,566	$262,455,859	$45,393,360	$42,989,894	$5,766,939
Projected Payroll for 2016	$561,966,708	$30,290,236	$5,227,898	$3,732,837	$829,769
Asset Volatility Index (AVI) = MVA/Payroll	6.97	8.66	8.68	11.52	6.95
Relative Volatility Index (AVI) = CG AVI / Total Plan AVI	0.75	0.93	0.93	1.23	0.75
Estimated Incremental Rate Change as of 12/31/2016	-0.10%	-0.12%	-0.12%	-0.16%	-0.10%
Estimated Incremental Rate Change as of 12/31/2017	-0.01%	-0.01%	-0.01%	-0.01%	-0.01%
Estimated Incremental Rate Change as of 12/31/2018	0.47%	0.59%	0.59%	0.78%	0.47%
Estimated Incremental Rate Change as of 12/31/2019	0.77%	0.96%	0.96%	1.27%	0.77%
Estimated Incremental Rate Change as of 12/31/2020	0.35%	0.44%	0.44%	0.58%	0.35%
Cumulative Rate Change as of 12/31/2016	-0.10%	-0.12%	-0.12%	-0.16%	-0.10%
Cumulative Rate Change as of 12/31/2017	-0.11%	-0.13%	-0.13%	-0.17%	-0.11%
Cumulative Rate Change as of 12/31/2018	0.36%	0.46%	0.46%	0.61%	0.36%
Cumulative Rate Change as of 12/31/2019	1.13%	1.42%	1.42%	1.88%	1.13%
Cumulative Rate Change as of 12/31/2020	1.48%	1.86%	1.86%	2.46%	1.48%

	CG#7 & CG#9 Combined Enhanced County	CG#8 Enhanced CCCFPD/East CCCFPD	CG#10 Enhanced Moraga-Orinda FD	CG#11 Enhanced San Ramon Valley FD	CG#12 Non-Enhanced Rodeo-Hercules FPD	Total Plan
Market Value of Assets (MVA)*	$1,443,012,642	$781,033,181	$141,533,561	$296,781,320	$26,507,390	$6,961,447,712
Projected Payroll for 2016	$85,734,572	$31,893,044	$6,711,180	$17,507,611	$2,458,810	$746,352,665
Asset Volatility Index (AVI) = MVA/Payroll	16.83	24.49	21.09	16.95	10.78	9.33
Relative Volatility Index (AVI) = CG AVI / Total Plan AVI	1.80	2.63	2.26	1.82	1.16	1.00
Estimated Incremental Rate Change as of 12/31/2016	-0.23%	-0.34%	-0.29%	-0.24%	-0.15%	-0.13%
Estimated Incremental Rate Change as of 12/31/2017	-0.02%	-0.03%	-0.02%	-0.02%	-0.01%	-0.01%
Estimated Incremental Rate Change as of 12/31/2018	1.14%	1.65%	1.42%	1.14%	0.73%	0.63%
Estimated Incremental Rate Change as of 12/31/2019	1.86%	2.70%	2.33%	1.87%	1.19%	1.03%
Estimated Incremental Rate Change as of 12/31/2020	0.85%	1.23%	1.06%	0.85%	0.54%	0.47%
Cumulative Rate Change as of 12/31/2016	-0.23%	-0.34%	-0.29%	-0.24%	-0.15%	-0.13%
Cumulative Rate Change as of 12/31/2017	-0.25%	-0.37%	-0.31%	-0.26%	-0.16%	-0.14%
Cumulative Rate Change as of 12/31/2018	0.89%	1.28%	1.11%	0.88%	0.57%	0.49%
Cumulative Rate Change as of 12/31/2019	2.75%	3.98%	3.44%	2.75%	1.76%	1.52%
Cumulative Rate Change as of 12/31/2020	3.60%	5.21%	4.50%	3.60%	2.30%	1.99%

*** Excludes Post Retirement Death Benefit reserve.**

These rates do not include any employer subvention of member contributions or any member subvention of employer contributions.