Segal Consulting

Sonoma County Employees' Retirement Association

Actuarial Valuation and Review as of December 31, 2018

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April 24, 2019

Board of Retirement
Sonoma County Employees' Retirement Association
433 Aviation Boulevard, Suite 100
Santa Rosa, CA 95403

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

Andy Yeung

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

MAM/jl

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Section 1: Actuarial Valuation Summary

Purpose and Basis

This report was prepared by Segal Consulting ("Segal") to present a valuation of the Sonoma 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 Plan assets to cover the estimated cost of settling the Plan's 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 of Retirement;
- 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;
- Other actuarial assumptions regarding employee terminations, retirement, death, etc. and
- The funding policy adopted by the Board of Retirement.

One of the general goals of an actuarial valuation is to establish contributions which fully fund the 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 May 19, 2011 and last updated on February 28, 2019. Details of the funding policy are provided in *Section 4, Exhibit I* on page 75.

A schedule of current amortization balances and payments may be found in *Section 3, Exhibit H* on page 54. A graphical projection of the Unfunded Actuarial Accrued Liability (UAAL) amortization balances and payments has been included in *Section 3, Exhibit I* on page 60.

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. 66

1. The results of this valuation reflect changes in the economic and demographic 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 an increase in the average employer rate of 1.25% of payroll and an increase in the aggregate member rate of 0.45% of payroll. Out of the 1.25% of payroll increase in average employer rate, 0.68% is an increase in the Normal Cost rate and 0.57% is an increase in the UAAL rate.

2. Active members represented by some of the bargaining groups have agreed to pay additional employee Normal Cost contributions that are above those determined under the County Employees Retirement Law of 1937 (CERL), as permitted under the California Public Employees' Pension Reform Act of 2013 (CalPEPRA). As the specific amount of those higher contributions are dependent on the specific bargaining agreements, we have continued to include in this report only the minimum member contribution rates specified in the CERL. The final member rates adjusted to include the additional employee Normal Cost contributions will be provided in side letters based on the terms of the bargaining agreements.

Ref: Pg. 35
Ref: Pg. 27
Ref: Pgs. 54-59
Ref: Pgs. 60-61

3. The ratio of the Valuation Value of Assets to Actuarial Accrued Liabilities decreased from 87.7% to 86.8%. The funded ratio measured on a market value basis decreased from 94.2% to 83.9%. The Association's UAAL increased from $359.6 million as of December 31, 2017 to $404.7 million as of December 31, 2018. The increase in UAAL is primarily due to the assumption changes and the investment return (after "smoothing") lower than the 7.25% return assumption used in the December 31, 2017 valuation. A complete reconciliation of the Association's UAAL is provided in *Section 2, Subsection E*. A schedule of the current UAAL amortization amounts is provided in *Section 3, Exhibit H*. A graphical projection of the UAAL amortization bases and payments is provided in *Section 3, Exhibit I.*

Ref: Pg. 29

4. The average employer contribution rate calculated in this valuation increased from 18.77% of payroll to 20.58% of payroll. This change was due to: (i) the change in actuarial assumptions, (ii) investment return (after "smoothing") lower than the 7.25% return assumption used in the December 31, 2017 valuation, (iii) higher than expected individual salary increases, (iv) lower than expected increase in total payroll, and (v) other experience losses, offset to some degree by (vi) demographic changes and (vii) higher than expected contributions. A complete reconciliation of the Association's aggregate employer rate is provided in *Section 2, Subsection F*.

Ref: Pg. 30

5. The average member contribution rate calculated in this valuation increased from 11.57% of payroll to 12.01% of payroll. This change was due to the assumption changes and demographic changes. A complete reconciliation of the Association's average member rate is provided in *Section 2, Subsection F*.

Ref: Pg. 19

6. As indicated in *Section 2, Subsection B* of this report, the total unrecognized investment loss as of December 31, 2018 was $89.5 million (as compared to an unrecognized gain of $190.7 million in the December 31, 2017 valuation). This investment loss will be recognized in the determination of the Actuarial Value of Assets for funding purposes over the next few years, and will offset a portion of any investment gains that may occur after December 31, 2018. This implies that earning the assumed rate of investment return of 7.00% per year (net of expenses) on a market value basis will result in investment losses on the Actuarial Value of Assets in the next few years. Therefore, if the actual market return is equal to the assumed 7.00% rate and all other actuarial assumptions are met, the employer contribution requirements would generally increase over the next few years. The potential impact associated with the net deferred investment loss may be illustrated as follows:

    a. If the net deferred losses in this year's valuation were recognized immediately and entirely in the Valuation Value of Assets, the funded ratio would decrease from 86.8% to 83.9%.

       For comparison purposes, if all the net deferred gains in the December 31, 2017 valuation had been recognized immediately in the December 31, 2017 valuation, the funded ratio in last year's valuation would have increased from 87.7% to 94.2%.

    b. If the net deferred losses in this year's valuation were recognized immediately and entirely in the Valuation Value of Assets, the aggregate employer contribution rate would increase from 20.6% to 22.3%.

       For comparison purposes, if all the net deferred gains in the December 31, 2017 valuation had been recognized immediately in the December 31, 2017 valuation, the aggregate employer contribution rate in last year's valuation would have decreased from 19.0% to 15.3%.

7. The actuarial valuation report as of December 31, 2018 is based on financial information as of that date. Changes in the value of assets subsequent to that date are not reflected. Declines in asset values will increase the actuarial cost of the plan, while increases will decrease the actuarial cost of the plan.

8. General-County and General-Court members pay an additional UAAL contribution amount equal to 3.03% of payroll from July 1, 2004 to June 30, 2024. Effective July 1, 2024, the employer UAAL contribution rate will have to increase to offset for the expiration of the 3.03% rate paid by the General-County and General-Court members.

   Safety-County members pay an additional UAAL contribution amount equal to 3.00% of payroll from February 1, 2005 through the last pay period in June 2023. Effective with the first pay period in July 2023, the employer UAAL contribution rate will have to increase to offset for the expiration of the 3.00% rate paid by the Safety-County members.

Ref: Pg. 52

9. In this report, we have provided the amount of transfer that would be required to "true-up" the COLA and the Retired Member reserves so that the reserves after the "true-up" are equal to the present value of the COLA and retiree benefits for members currently receiving such benefits.

10. The Actuarial Standards Board approved a new Actuarial Standard of Practice No. 51 (ASOP 51) regarding risk assessment. ASOP 51 will be effective with SCERA's December 31, 2018 actuarial valuation. ASOP 51 requires actuaries to identify risks that "may reasonably be anticipated to significantly affect the plan's future financial condition". Investment risk, asset/liability mismatch risk, interest rate risk, longevity and other demographic risks and contribution risk are also cited as examples in ASOP 51. The standard does not require the actuary to evaluate the likelihood of contributing entities to make contributions when due, nor does it require the actuary to assess the likelihood or consequences of future changes in applicable law.

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

    A copy of the risk assessment report including the analysis recommended by Segal in consultation with SCERA staff will be available later in 2019.

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)
Employer Contribution Rates:	• General Plan A – County	19.75%	$35,567	18.26%	$32,884
	• General Plan A – Court	33.43%	2,940	31.16%	2,741
	• General Plan A – Valley of the Moon	17.74%	48	16.57%	45
	• General Plan B – County	14.52%	15,607	13.19%	14,177
	• General Plan B – Court	27.44%	1,148	25.21%	1,055
	• General Plan B – Valley of the Moon	11.62%	16	10.65%	15
	• Safety Plan A – County	30.94%	16,548	27.45%	14,681
	• Safety Plan A – Valley of the Moon	38.24%	1,478	35.45%	1,370
	• Safety Plan B – County	22.44%	4,253	20.08%	3,806
	• Safety Plan B – Valley of the Moon	23.89%	215	21.20%	191
	All Categories Combined	20.58%	$77,820	18.77%	$70,965
Average Member Contribution Rates:(2)	• General Plan A – County(3)	12.37%	$22,277	11.93%	$21,484
	• General Plan A – Court(3)	12.53%	1,102	12.08%	1,062
	• General Plan A – Valley of the Moon(3)	12.19%	33	12.13%	33
	• General Plan B – County	10.48%	11,264	10.37%	11,146
	• General Plan B – Court	10.48%	438	10.37%	434
	• General Plan B – Valley of the Moon	7.45%	10	7.34%	10
	• Safety Plan A – County(3)	12.77%	6,830	12.07%	6,455
	• Safety Plan A – Valley of the Moon(3)	10.99%	425	10.48%(4)	405
	• Safety Plan B – County	15.40%	2,919	13.98%	2,650
	• Safety Plan B – Valley of the Moon	11.99%	108	9.97%	90
	All Categories Combined	12.01%	$45,406	11.57%	$43,769

(1) Based on December 31, 2018 projected compensation.

(2) Includes an additional UAAL contribution rate of 3.03% and 3.00% of payroll for General (County and Court) and Safety-County members, respectively.

(3) The average entry age for each membership group is as follows:

Membership Group	Average Entry Age	Membership Group	Average Entry Age
General Plan A – County	36	Safety – County	30
General Plan A – Court	35	Safety – Valley of the Moon	35
General Plan A – Valley of the Moon	52		

(4) This is the contribution rate calculated in the December 31, 2017 valuation but using an average entry age of 35, reflecting the membership demographics as of December 31, 2018. In the December 31, 2017 valuation, the average entry age was 36 and the corresponding rate at that age was 10.67%.

Summary of Key Valuation Results (continued)

		December 31, 2018 ($ in '000s)	December 31, 2017 ($ in '000s)
Actuarial Accrued Liability as of December 31:	Retired members and beneficiaries	$1,882,466	$1,785,450
	Inactive vested members[1]	102,030	92,666
	Active members	1,087,581	1,038,740
	Total Actuarial Accrued Liability	3,072,077	2,916,856
	Normal Cost for plan year beginning December 31	79,841	75,927
Assets as of December 31:	Market Value of Assets (MVA)	$2,577,809	$2,748,040
	Actuarial Value of Assets (AVA)	2,667,345	2,557,299
	Actuarial Value of Assets as a percentage of Market Value of Assets	103.47%	93.06%
	Valuation Value of Assets (VVA)[2]	2,667,345	$2,557,299
Funded status as of December 31:	Unfunded Actuarial Accrued Liability on Market Value of Assets basis	$494,268	$168,816
	Funded percentage on MVA basis	83.91%	94.21%
	Unfunded Actuarial Accrued Liability on Valuation Value of Assets basis	$404,732	$359,557
	Funded percentage on VVA basis	86.83%	87.67%
Key assumptions:	Net investment return	7.00%	7.25%
	Price Inflation	2.75%	3.00%
	Payroll growth increase	3.25%	3.50%

(1) Includes inactive members due a refund of member contributions.

(2) Excludes non-valuation reserves.

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	4,021	4,110	-2.2%
	• Average age	45.5	45.5	0.0
	• Average service	9.7	9.6	0.1
	• Total projected compensation	$378,159,621	$369,750,901	2.3%
	• Average projected compensation	$94,046	$89,964	4.5%
	Retired Members and Beneficiaries:			
	• Number of members:			
	– Service retired	3,853	3,728	3.4%
	– Disability retired	640	637	0.5%
	– Beneficiaries	603	571	5.6%
	– Total	5,096	4,936	3.2%
	• Average age	68.7	68.5	0.2
	• Average monthly benefit	$2,855	$2,799	2.0%
	Inactive Vested Members:			
	• Number of members(1)	1,295	1,181	9.7%
	• Average Age	45.1	45.5	-0.4
	Total Members:	10,412	10,227	1.8%

(1) Includes inactive members due a refund of member contributions.

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 year-to-year changes in the Market Value of Assets in determining the contribution requirements.
Actuarial assumptions	In preparing an actuarial valuation, Segal projects the benefits to be paid to existing plan participants for the rest of their lives and the lives of their beneficiaries. This projection requires actuarial assumptions as to the probability of death, disability, withdrawal, 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.

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	3,984	881	3,570	4,451	1.12	0.90
2010	3,780	904	3,780	4,684	1.24	1.00
2011	3,587	919	4,021	4,940	1.38	1.12
2012	3,620	876	4,258	5,134	1.42	1.18
2013	3,833	918	4,394	5,312	1.39	1.15
2014	3,922	975	4,506	5,481	1.40	1.15
2015	4,071	1,047	4,653	5,700	1.40	1.14
2016	4,112	1,112	4,812	5,924	1.44	1.17
2017	4,110	1,181	4,936	6,117	1.49	1.20
2018	4,021	1,295	5,096	6,391	1.59	1.27

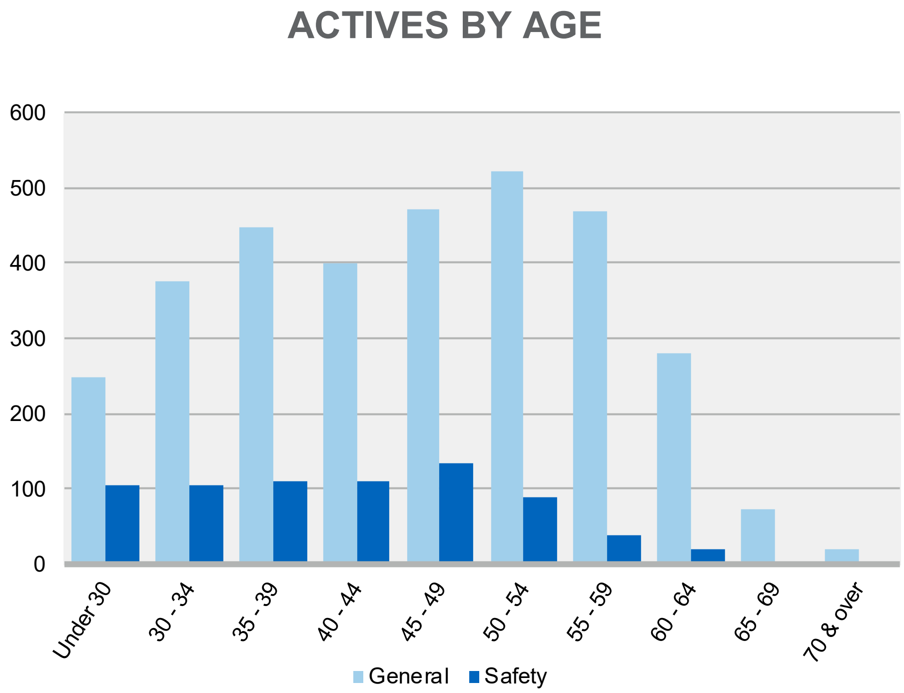
(1) Includes inactive members due a refund of member contributions.

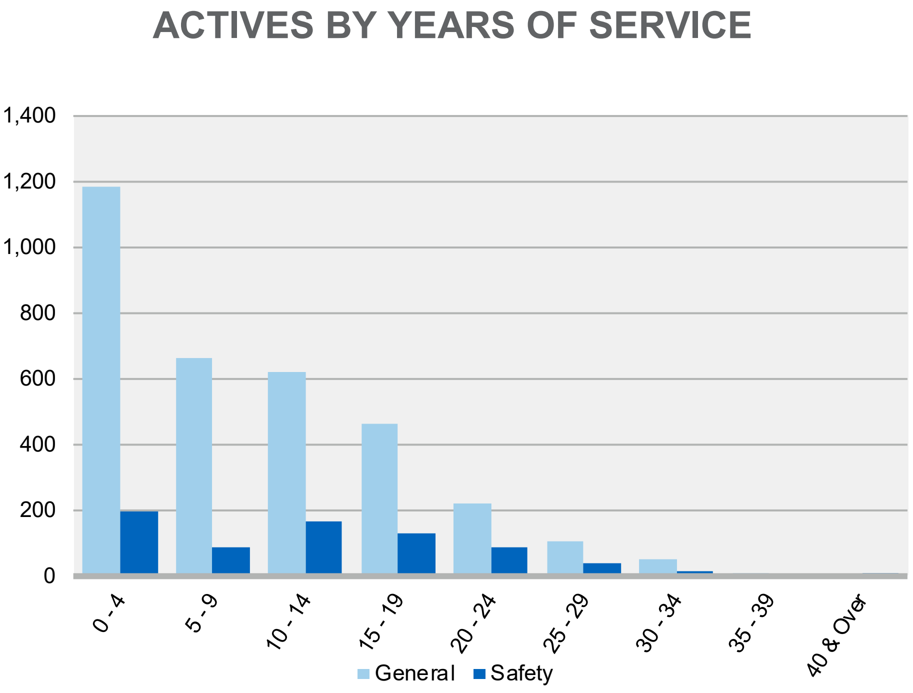
Active Members

Plan costs are affected by the age, years of service and compensation of active members. In this year’s valuation, there were 4,021 active members with an average age of 45.5, average years of service of 9.7 years and average compensation of $94,046. The 4,110 active members in the prior valuation had an average age of 45.5, average service of 9.6 years and average compensation of $89,964.

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

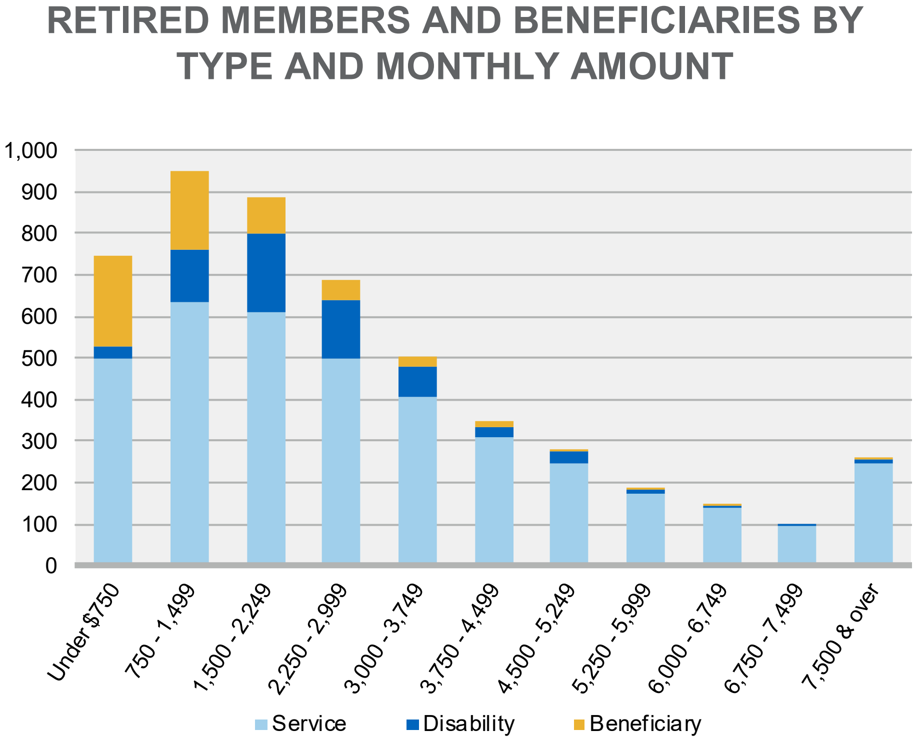
In this year’s valuation, there were 1,295 members with a vested right to a deferred or immediate vested benefit or entitled to a return of their member contributions versus 1,181 in the prior valuation.

Retired Members and Beneficiaries

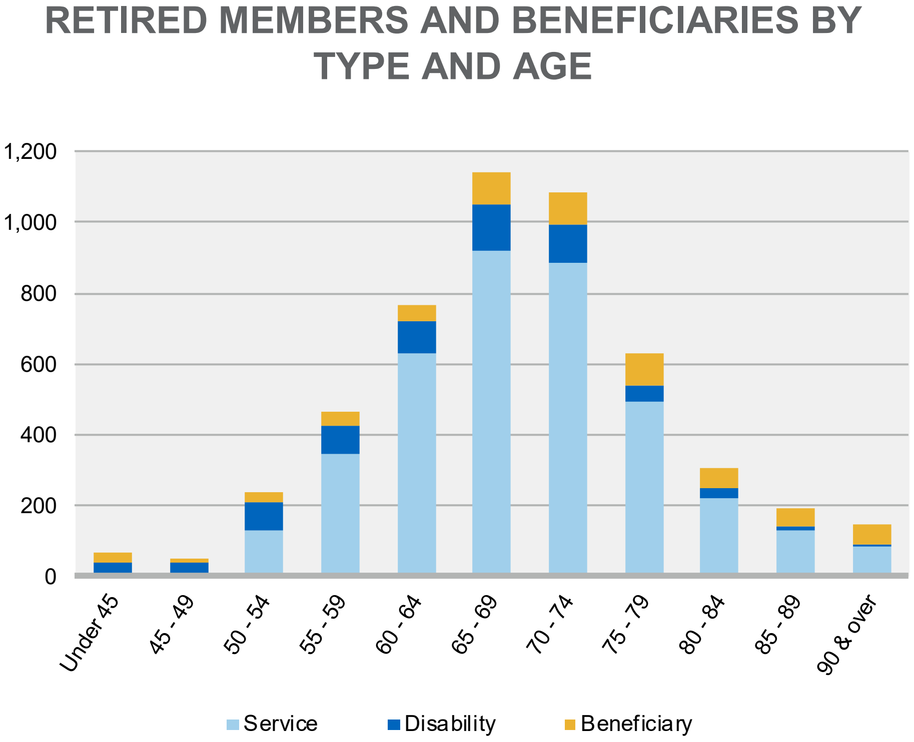
As of December 31, 2018, 4,493 retired members and 603 beneficiaries were receiving total monthly benefits of $14,547,731. For comparison, in the previous valuation, there were 4,365 retired members and 571 beneficiaries receiving monthly benefits of $13,817,223.

As of December 31, 2018, the average monthly benefit for retired members and beneficiaries is $2,855, compared to $2,799 in the previous valuation. The average age for retired members and beneficiaries is 68.7 in the current valuation, compared with 68.5 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 stability of the active population over the last ten years. The chart also shows the growth among the retired population over the same time period.

MEMBER STATISTICS: 2009 – 2018

	Active Participants			Retired Members and Beneficiaries		
Year Ended December 31	Count	Average Age	Average Service	Count	Average Age	Average Monthly Amount
2009	3,984	46.6	10.4	3,570	66.7	$2,228
2010	3,780	46.6	10.6	3,780	66.8	2,359
2011	3,587	46.5	10.7	4,021	66.9	2,461
2012	3,620	46.1	10.2	4,258	67.0	2,565
2013	3,833	46.0	9.9	4,394	67.5	2,601
2014	3,922	46.0	9.8	4,506	67.8	2,645
2015	4,071	45.7	9.6	4,653	68.0	2,691
2016	4,112	45.5	9.4	4,812	68.2	2,747
2017	4,110	45.5	9.6	4,936	68.5	2,799
2018	4,021	45.5	9.7	5,096	68.7	2,855

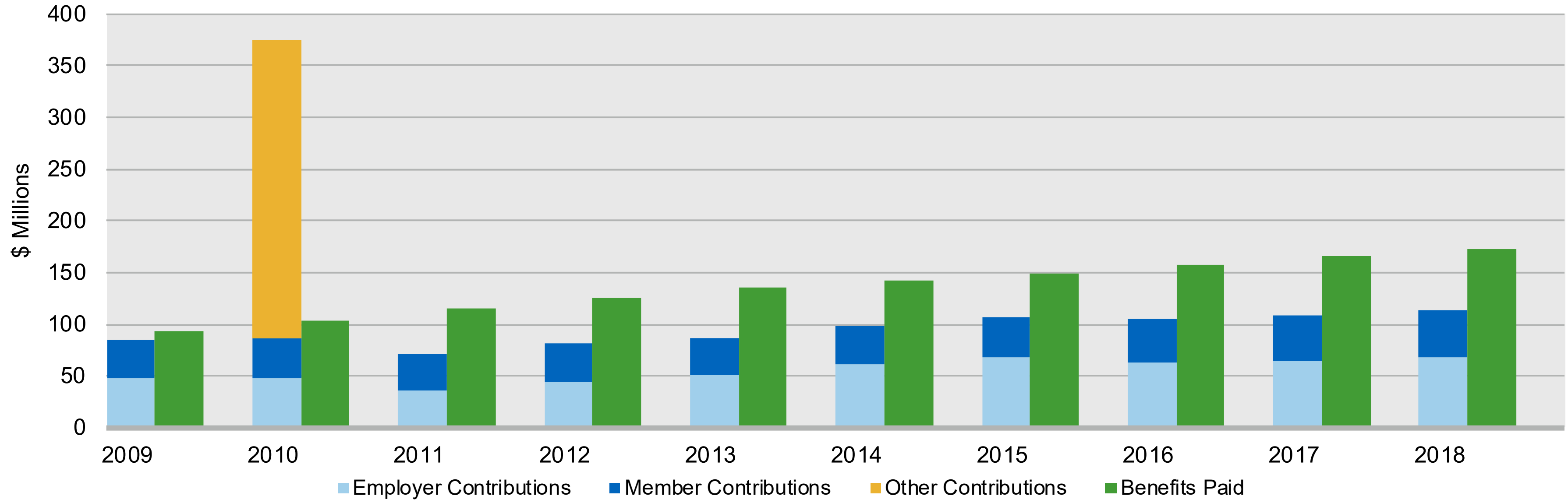
B. Financial Information

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

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

It is desirable to have level and predictable plan costs from one year to the next. For this reason, the Board has approved an asset valuation method that gradually adjusts to market value. Under this valuation method, the full value of market fluctuations is not recognized in a single year and, as a result, the valuation asset value and hence 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 ENDING DECEMBER 31, 2009 – 2018



DETERMINATION OF ACTUARIAL VALUE OF ASSETS

			Expected Return[1]	Actual Return[1]	Original Amount	Percent Deferred	Unrecognized Amount
1		Market Value of Assets					$2,577,808,991
2		Calculation of unrecognized return					
	a)	Combined Net Deferred Loss as of December 31, 2015			$(6,929,361)	25%	$(1,732,340)
	b)	Year ended December 31, 2016	$163,881,357	$189,948,848	26,067,491	40	10,426,996
	c)	Year ended December 31, 2017	171,703,340	394,910,340	223,207,000	60	133,924,200
	d)	Year ended December 31, 2018	183,114,885	(107,078,494)	(290,193,379)	80	(232,154,703)
	e)	Total unrecognized return[2]					$(89,535,847)
3		Actuarial Value of Assets **1 – 2e**					$2,667,344,838
4		Non-valuation reserves and other adjustments:					
	a)	Interest Fluctuation Reserve					$0
	b)	Undistributed Reserve					0
	c)	Negative Contingency Reserve (Before Any Transfers)					(572,543,879)
	d)	Transfer to True-Up Reserves					1,291,020
	e)	Negative Contingency Reserve (After Transfers) **4c + 4d**					(571,252,859)
	f)	Subtotal **4a + 4b + Max(4e, 0)**					$0
5		Valuation Value of Assets **3 – 4f**					$2,667,344,838

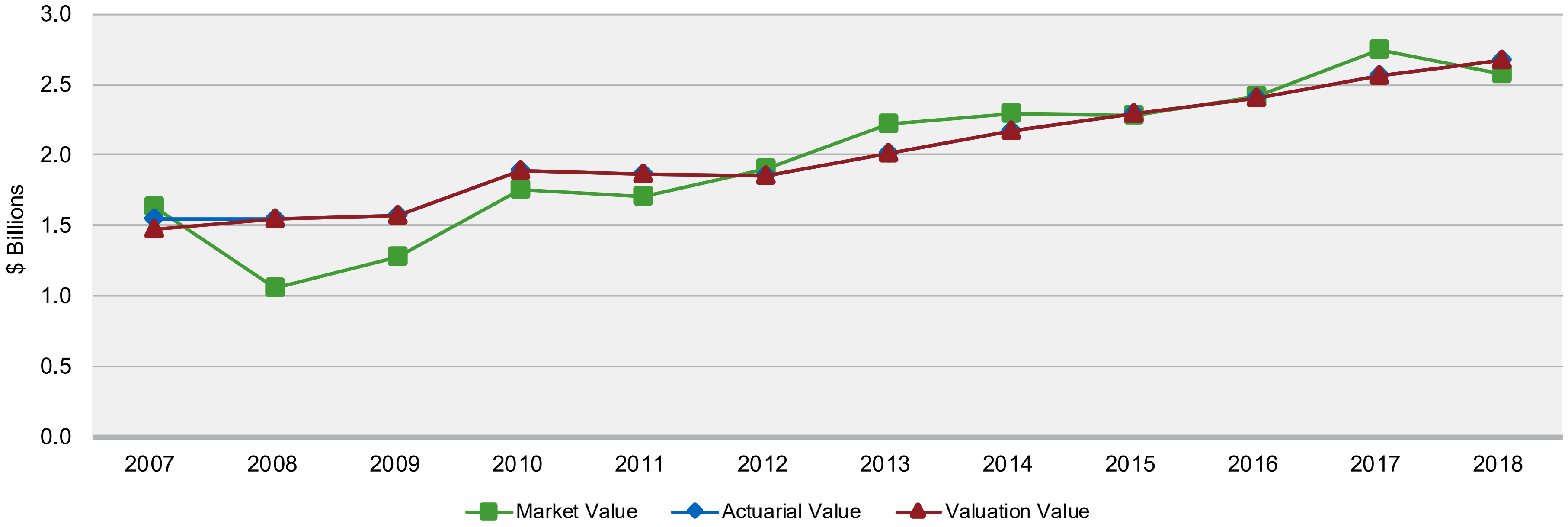
[1] The actual return on a market value basis is calculated by taking the difference between the end of year and beginning of year Market Value of Assets and adjusting that difference for the non-investment cash flows. Those cash flows include contributions received, benefit payments and administrative expenses made during the last calendar year. The amount subject to smoothing is determined as the actual market return earned during the last calendar year that was in excess/below the expected return on the Valuation Value of Assets.

[2] Deferred return as of December 31, 2018 recognized in each of the next four years:

(a) Amount recognized on December 31, 2019	$(9,916,118)
(b) Amount recognized on December 31, 2020	(8,183,778)
(c) Amount recognized on December 31, 2021	(13,397,276)
(f) Amount recognized on December 31, 2022	(58,038,675)
(g) Total unrecognized return as of December 31, 2018	$(89,535,847)

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

MARKET VALUE, ACTUARIAL VALUE, AND VALUATION VALUE OF ASSETS AS OF DECEMBER 31, 2007 – 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 $25.1 million, which includes $13.6 million from investment losses, a gain of $0.5 million from contribution experience and $12.0 million in losses from all other sources. The net experience variation from individual sources other than investments and contributions was 0.4% 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)	$(13,629,000)
2	Net gain from contribution experience	493,000
3	Net loss from other experience(2)	(11,954,000)
4	Net experience loss: **1 + 2 + 3**	$(25,090,000)

(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 (4.07%) for the year ended December 31, 2018.

For valuation purposes, the assumed rate of return on the Valuation Value of Assets is 7.25%. The actual rate of return on a valuation basis for the 2018 plan year was 6.71%. 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	$(110,661,410)	$169,615,851	$169,615,851
2	Average value of assets	$2,718,255,424	$2,527,514,010	$2,527,514,010
3	Rate of return: **1** ÷ **2**	(4.07%)	6.71%	6.71%
4	Assumed rate of return	7.25%	7.25%	7.25%
5	Expected investment income: **2 x 4**	197,073,518	183,244,766	183,244,766
6	Actuarial gain/(loss): **1 – 5**	$(307,734,928)	$(13,628,915)	$(13,628,915)

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

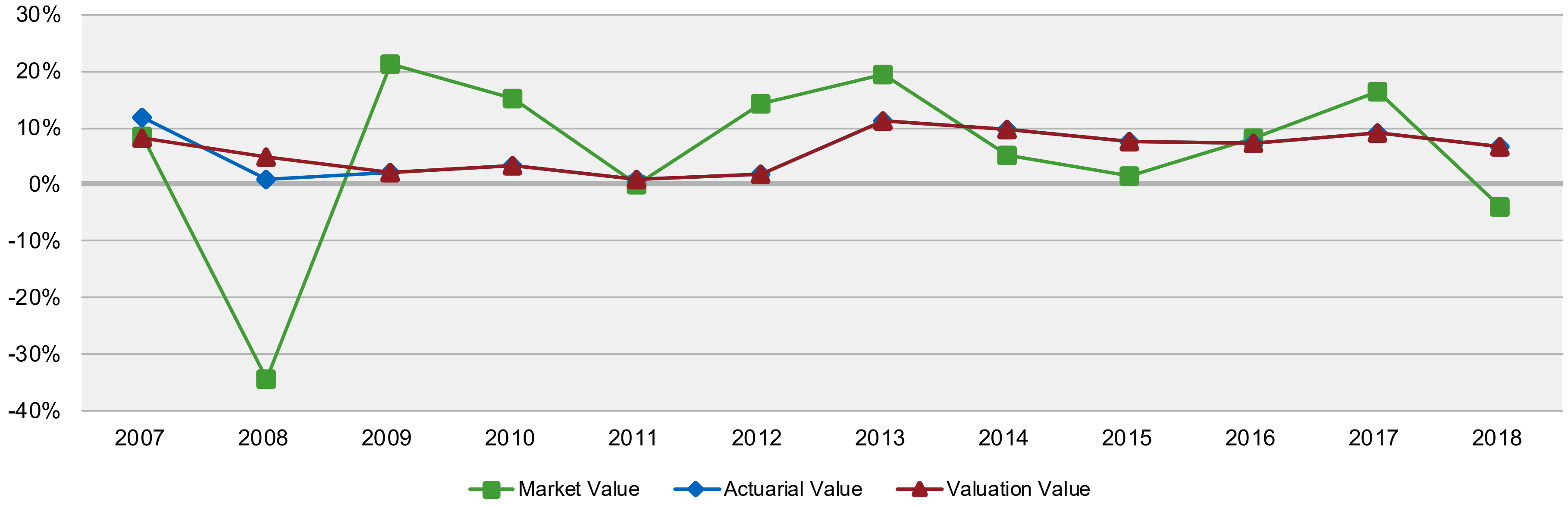
Year Ended December 31	Market Value Investment Return[1]		Actuarial Value Investment Return[1]		Valuation Value Investment Return[1]	
	Amount	Percent	Amount	Percent	Amount	Percent
2009	$224,056,000	21.28%	$32,771,000	2.13%	$32,771,000	2.13%
2010	207,173,000	15.23%	54,093,000	3.27%	54,093,000	3.27%
2011	1,179,000	0.07%	19,508,000	1.04%	19,508,000	1.04%
2012	239,065,000	14.16%	33,652,000	1.82%	33,652,000	1.82%
2013	366,462,000	19.49%	208,550,000	11.38%	208,550,000	11.38%
2014	114,072,000	5.18%	193,799,000	9.71%	193,799,000	9.71%
2015	31,063,000	1.37%	164,257,000	7.65%	164,257,000	7.65%
2016	185,730,000	8.23%	163,144,000	7.21%	163,144,000	7.21%
2017	391,179,000	16.40%	216,094,000	9.12%	216,094,000	9.12%
2018	(110,661,000)	(4.07%)	169,616,000	6.71%	169,616,000	6.71%
Most recent five-year geometric average return		5.20%		8.07%		8.07%
Most recent ten-year geometric average return		9.41%		5.95%		5.95%

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

(1) Net of administrative and investment expenses.

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 ENDING DECEMBER 31, 2007 – 2018



Contributions

Contributions for the year ended December 31, 2018 totaled $113.0 million, compared to the projected amount of $112.5 million. This resulted in a gain of $0.5 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), and
- salary increases (greater or smaller than projected).

The net loss from this other experience for the year ended December 31, 2018 amounted to $12.0 million, which is 0.4% of the Actuarial Accrued Liability. This loss was mainly due to 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 $3.1 billion, an increase of $0.2 billion, or 5.3%, 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 September 25, 2018.
  - These changes increased the Actuarial Accrued Liability by 1.0% and increased the Normal Cost by 5.6%.
  - The assumption changes include changes to inflation, investment return, individual salary increases, retirement, mortality, termination, disability, and cashout assumptions.
- 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		$359,557,000
2	Total Normal Cost at middle of year		75,927,000
3	Expected employer and member contributions		(112,516,000)
4	Interest		24,876,000
5	Expected Unfunded Actuarial Accrued Liability at end of year		$347,844,000
6	Changes due to:		
	a) Investment return less than expected	$13,629,000	
	b) Actual contributions greater than expected[1]	(493,000)	
	c) Individual salary increases higher than expected	11,293,000	
	d) Other experience loss	661,000	
	e) Change in actuarial assumptions	31,798,000	
	Total changes		$56,888,000
7	Unfunded Actuarial Accrued Liability at end of year		$404,732,000

Note: The sum of items 6c through 6d equals the “Net loss from other experience” shown in *Subsection C*.

(1) Includes impact of 18-month delay in rate implementation, phase-in of the impact of the changes in actuarial assumptions on the employer contribution rate (if any) and difference between Normal Cost and UAAL contributions due to actual payroll different than expected during 2018.

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 20.58% 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 ENDED DECEMBER 31

	All Tiers Combined	2018		2017	
		Amount ($ in '000s)	% of Projected Compensation	Amount ($ in '000s)	% of Projected Compensation
1	Total Normal Cost	$79,841	21.11%	$75,927	20.53%
2	Expected member Normal Cost contributions	(32,803)	(8.67%)	(31,406)	(8.49%)
3	Employer Normal Cost: **1 + 2**	$47,038	12.44%	$44,521	12.04%
4	Actuarial Accrued Liability	3,072,077		2,916,856	
5	Valuation Value of Assets	2,667,345		2,557,299	
6	Unfunded Actuarial Accrued Liability (UAAL): **4 – 5**	$404,732		$359,557	
7	Payment on UAAL	$41,887	11.08%	$36,589	9.89%
8	Expected member contributions on UAAL(1)	(11,105)	(2.94%)	(10,840)	(2.93%)
9	Employer Payment on UAAL: **7 + 8**	$30,782	8.14%	$25,749	6.96%
10	Total average recommended employer contribution: **3 + 9**	$77,820	20.58%	$70,270	19.00%
11	Projected compensation	$378,159		$369,751	

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

(1) Expected member contributions on the Unfunded Actuarial Accrued Liability have been adjusted for refundability.

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	Estimated Annual Dollar Amount(1) ($ in '000s)
Average Recommended Employer Contribution as of December 31, 2017	18.77%	$70,965
• Effect of investment return less than expected	0.26%	983
• Effect of actual contributions greater than expected(2)	(0.01%)	(38)
• Effect of individual salary increases higher than expected	0.21%	794
• Effect of amortizing prior year's UAAL over a smaller than expected projected total payroll	0.13%	492
• Effect of changes in member demographics on Normal Cost	(0.05%)	(189)
• Effect of other losses	0.02%	86
• Effect of change in assumptions	1.25%	4,727
Total change	1.81%	$6,855
Average Recommended Employer Contribution as of December 31, 2018	20.58%	$77,820

(1) Based on December 31, 2018 projected compensation.

(2) Includes impact of 18-month delay in rate implementation, phase-in of the impact of the changes in actuarial assumptions on the employer contribution rate (if any) and difference between Normal Cost and UAAL contributions due to actual payroll during 2018 different than expected.

Reconciliation of Average Recommended Member Contribution Rate

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 RATE FROM DECEMBER 31, 2017 TO DECEMBER 31, 2018

	General Plan A-County[1]	General Plan A-Court[1]	General Plan A-VOM	Safety Plan A-County[2]	Safety Plan A-VOM	
Average Recommended Member Contribution as of December 31, 2017[3]	11.93%	12.08%	12.13%	12.07%	10.48%[5]	
• Effect of changes in member demographics	0.00%	0.00%	0.00%	0.00%	0.00%	
• Effect of change in assumptions	0.44%	0.45%	0.06%	0.70%	0.51%	
Total change	0.44%	0.45%	0.06%	0.70%	0.51%	
Average Recommended Member Contribution as of December 31, 2018[4]	12.37%	12.53%	12.19%	12.77%	10.99%	
	General Plan B-County[1]	**General Plan B-Court[1]**	**General Plan B-VOM**	**Safety Plan B-County[2]**	**Safety Plan B-VOM**	**Total**
Average Recommended Member Contribution as of December 31, 2017	10.37%	10.37%	7.34%	13.98%	9.97%	11.57%
• Effect of changes in member demographics	(0.08%)	(0.08%)	(0.08%)	0.21%	0.51%	(0.01%)
• Effect of change in assumptions	0.19%	0.19%	0.19%	1.21%	1.51%	0.45%
Total change	0.11%	0.11%	0.11%	1.42%	2.02%	0.44%
Average Recommended Member Contribution as of December 31, 2018	10.48%	10.48%	7.45%	15.40%	11.99%	12.01%

(1) Rates include an additional UAAL contribution rate of 3.03% of payroll.

(2) Rates include an additional UAAL contribution rate of 3.00% of payroll.

(3) The above rates are based on average entry age. The weighted average member contribution rates as of December 31, 2017 are 11.76%, 11.92%, 10.61%, 11.57% and 9.17% for General-County, General-Court, General-Valley of the Moon, Safety-County and Safety-Valley of the Moon, respectively.

(4) The above rates are based on average entry age. The weighted average member contribution rates as of December 31, 2018 are 12.09%, 12.40%, 11.11%, 12.05% and 9.50% for General-County, General-Court, General-Valley of the Moon, Safety-County and Safety-Valley of the Moon, respectively.

(5) This is the contribution rate calculated in the December 31, 2017 valuation but reflecting the average entry age of 35 using the membership demographics as of December 31, 2018. In the December 31, 2017 valuation, the average entry age was 36 and the corresponding rate at that age was 10.67%.

Recommended Employer Contribution Rates

	December 31, 2018 Actuarial Valuation		December 31, 2017 Actuarial Valuation	
	Contribution Rate	Estimated Annual Dollar Amount[1] ($ in ‘000s)	Contribution Rate	Estimated Annual Dollar Amount[1] ($ in ‘000s)
General Plan A – County Members				
Normal Cost	12.68%	$22,835	12.41%	$22,349
UAAL	7.07%	12,732	5.85%	10,535
Total Contribution	19.75%	$35,567	18.26%	$32,884
General Plan A – Court Members				
Normal Cost	13.44%	$1,182	13.29%	$1,169
UAAL	19.99%	1,758	17.87%	1,572
Total Contribution	33.43%	$2,940	31.16%	$2,741
General Plan A – Valley of the Moon Members				
Normal Cost	13.57%	$37	13.26%	$36
UAAL	4.17%	11	3.31%	9
Total Contribution	17.74%	$48	16.57%	$45
General Plan B – County Members				
Normal Cost	7.45%	$8,008	7.34%	$7,889
UAAL	7.07%	7,599	5.85%	6,288
Total Contribution	14.52%	$15,607	13.19%	$14,177
General Plan B – Court Members				
Normal Cost	7.45%	$312	7.34%	$307
UAAL	19.99%	836	17.87%	748
Total Contribution	27.44%	$1,148	25.21%	$1,055
General Plan B – Valley of the Moon Members				
Normal Cost	7.45%	$10	7.34%	$10
UAAL	4.17%	6	3.31%	5
Total Contribution	11.62%	$16	10.65%	$15

(1) Amounts are based on December 31, 2018 projected compensation as shown on the next page.

Recommended Employer Contribution Rates (continued)

	December 31, 2018 Actuarial Valuation		December 31, 2017 Actuarial Valuation	
	Contribution Rate	Estimated Annual Dollar Amount(1) ($ in ‘000s)	Contribution Rate	Estimated Annual Dollar Amount(1) ($ in ‘000s)
Safety Plan A – County Members				
Normal Cost	20.90%	$11,178	18.35%	$9,814
UAAL	10.04%	5,370	9.10%	4,867
Total Contribution	30.94%	$16,548	27.45%	$14,681
Safety Plan A – Valley of the Moon Members				
Normal Cost	26.34%	$1,018	24.22%	$936
UAAL	11.90%	460	11.23%	434
Total Contribution	38.24%	$1,478	35.45%	$1,370
Safety Plan B – County Members				
Normal Cost	12.40%	$2,350	10.98%	$2,081
UAAL	10.04%	1,903	9.10%	1,725
Total Contribution	22.44%	$4,253	20.08%	$3,806
Safety Plan B – Valley of the Moon Members				
Normal Cost	11.99%	$108	9.97%	$90
UAAL	11.90%	107	11.23%	101
Total Contribution	23.89%	$215	21.20%	$191
All Categories Combined				
Normal Cost	12.44%	$47,038	11.82%	$44,681
UAAL	8.14%	30,782	6.95%	26,284
Total Contribution	20.58%	$77,820	18.77%	$70,965

(1) Amounts are based on December 31, 2018 projected compensation:

General Plan A – County	$180,088,000	Safety Plan A – County	$53,482,000
General Plan A – Court	8,795,000	Safety Plan A – VOM	3,865,000
General Plan A – VOM	270,000	Safety Plan B – County	18,953,000
General Plan B – County	107,485,000	Safety Plan B – VOM	899,000
General Plan B – Court	4,184,000		
General Plan B – VOM	138,000		
		Total	$378,159,000

Breakdown of the Total Normal Cost for Each Type of Benefit

	Elements of Normal Cost for Plan A Members			
Normal Cost	All General	Safety – County	Safety – VOM	Grand Total
Service Retirement	82%	56%	59%	75%
Vested Termination and Ordinary Withdrawal	11%	8%	5%	10%
Non-Service and Service Connected Disability	6%	35%	35%	14%
Non-Service and Service Connected Death	1%	1%	1%	1%
Total Employer Plus Employee Normal Cost	**100%**	**100%**	**100%**	**100%**

	Elements of Normal Cost for Plan B Members			
Normal Cost	All General	Safety – County	Safety – VOM	Grand Total
Service Retirement	79%	48%	49%	72%
Vested Termination and Ordinary Withdrawal	10%	8%	8%	10%
Non-Service and Service Connected Disability	9%	43%	42%	16%
Non-Service and Service Connected Death	2%	1%	1%	2%
Total Employer Plus Employee Normal Cost	**100%**	**100%**	**100%**	**100%**

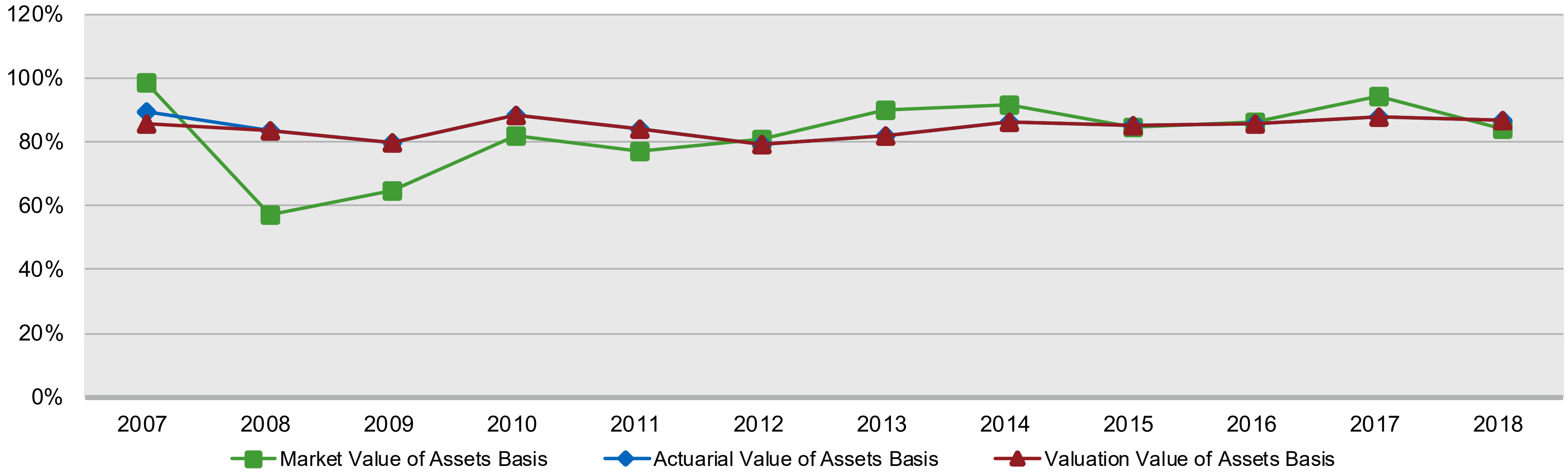
G. Funded Status

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 twelve 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 YEARS ENDING DECEMBER 31, 2007 – 2018



SCHEDULE OF FUNDING PROGRESS
FOR YEARS ENDING DECEMBER 31, 2009 - 2018

Actuarial Valuation Date as of December 31	Valuation Value of Assets (a)	Actuarial Accrued Liability (AAL) (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	$1,564,970,000	$1,967,058,000	$402,088,000	79.6%	$322,484,000	124.7%
2010	1,890,874,000	2,139,460,000	248,586,000	88.4%	323,601,000	76.8%
2011	1,867,117,000	2,220,520,000	353,403,000	84.1%	308,644,000	114.5%
2012	1,856,847,000	2,351,087,000	494,240,000	79.0%	302,764,000	163.2%
2013	2,016,781,000	2,466,224,000	449,443,000	81.8%	329,896,000	136.2%
2014	2,167,210,000	2,510,253,000	343,043,000	86.3%	324,418,000	105.7%
2015	2,289,057,000	2,694,979,000	405,922,000	84.9%	339,518,000	119.6%
2016	2,399,171,000	2,807,398,000	408,227,000	85.5%	356,129,000	114.6%
2017	2,557,299,000	2,916,856,000	359,557,000	87.7%	369,751,000	97.2%
2018	2,667,345,000	3,072,077,000	404,732,000	86.8%	378,159,000	107.0%

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 ($ in '000s)	COLA ($ in '000s)	Total ($ in '000s)
Actuarial Present Value of Future Benefits			
• Present value of benefits for retired members and beneficiaries	$1,847,309	$35,157	$1,882,466
• Present value of benefits for inactive vested members	102,030	0	102,030
• Present value of benefits for active members	1,634,159	0	1,634,159
Total Actuarial Present Value of Future Benefits	**$3,583,498**	**$35,157**	**$3,618,655**
Current and future assets			
• Total Valuation Value of Assets	$2,632,188	$35,157	$2,667,345
• Present value of future contributions by members(1)	243,446	0	243,446
• Present value of future employer contributions for:			
» Entry age Normal Cost	303,132	0	303,132
» Unfunded Actuarial Accrued Liability(1)	404,732	0	404,732
Total of current and future assets	**$3,583,498**	**$35,157**	**$3,618,655**

(1) Before reflecting supplemental contributions payable by certain members for the UAAL.

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 6.8. This means that a 1% asset gain or loss (relative to the assumed investment return) translates to about 6.8% of one year’s payroll. Since actuarial gains and losses are amortized over 20 years, there would be a 0.5% of payroll decrease/(increase) in the required contribution for each 1% asset gain/(loss).

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

The LVR also indicates how volatile contributions will be in response to changes in the Actuarial Accrued Liability due to actual experience or to changes in actuarial assumptions. The current LVR is about 8.1, but is 7.6 for General compared to 10.4 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 ENDING 2009 – 2018

Year Ended December 31	Asset Volatility Ratio			Liability Volatility Ratio		
	General	Safety	Total	General	Safety	Total
2009	3.8	4.4	3.9	5.9	6.8	6.1
2010	5.2	6.1	5.4	6.4	7.5	6.6
2011	5.3	6.3	5.5	6.9	8.2	7.2
2012	6.0	7.2	6.3	7.6	8.8	7.9
2013	6.4	7.8	6.7	7.2	8.6	7.5
2014	6.7	8.5	7.1	7.4	9.2	7.7
2015	6.3	8.5	6.7	7.4	10.1	7.9
2016	6.3	8.8	6.8	7.3	10.2	7.9
2017	6.9	9.5	7.4	7.3	10.1	7.9
2018	6.3	8.8	6.8	7.6	10.4	8.1

EXHIBIT A – TABLE OF PLAN COVERAGE
TOTAL PLAN

Category	Year Ended December 31		Change From Prior Year
	2018	2017	
Active members in valuation:			
• Number	4,021	4,110	-2.2%
• Average age	45.5	45.5	0.0
• Average years of service	9.7	9.6	0.1
• Total projected compensation	$378,159,621	$369,750,901	2.3%
• Average projected compensation	$94,046	$89,964	4.5%
• Account balances	$521,071,373	$502,326,499	3.7%
• Total active vested members	2,645	2,461	7.5%
Inactive vested members:			
• Number(1)	1,295	1,181	9.7%
• Average age	45.1	45.5	-0.4
Retired members:			
• Number in pay status	3,853	3,728	3.4%
• Average age	69.2	69.1	0.1
• Average monthly benefit	$3,145	$3,078	2.2%
Disabled members:			
• Number in pay status	640	637	0.5%
• Average age	63.4	63.0	0.4
• Average monthly benefit	$2,506	$2,444	2.5%
Beneficiaries:			
• Number in pay status	603	571	5.6%
• Average age	71.1	70.8	0.3
• Average monthly benefit	$1,370	$1,376	-0.4%

(1) Includes inactive members due a refund of member contributions.

EXHIBIT A – TABLE OF PLAN COVERAGE (CONTINUED)
GENERAL PLAN A

Category	Year Ended December 31		Change From Prior Year
	2018	2017	
Active members in valuation:			
• Number	1,937	2,122	-8.7%
• Average age	50.0	49.6	0.4
• Average years of service	14.0	13.3	0.7
• Total projected compensation	$189,152,321	$196,289,176	-3.6%
• Average projected compensation	$97,652	$92,502	5.6%
• Account balances	$358,770,056	$353,671,976	1.4%
• Total active vested members	1,896	1,942	-2.4%
Inactive vested members:			
• Number(1)	729	716	1.8%
• Average age	48.6	48.6	0.0
Retired members:			
• Number in pay status	3,337	3,251	2.6%
• Average age	69.9	69.7	0.2
• Average monthly benefit	$2,921	$2,855	2.3%
Disabled members:			
• Number in pay status	335	342	-2.0%
• Average age	67.0	66.4	0.6
• Average monthly benefit	$1,827	$1,804	1.3%
Beneficiaries:			
• Number in pay status	484	467	3.6%
• Average age	73.0	72.6	0.4
• Average monthly benefit	$1,273	$1,264	0.7%

(1) Includes inactive members due a refund of member contributions.

EXHIBIT A – TABLE OF PLAN COVERAGE (CONTINUED)
GENERAL PLAN B

Category	Year Ended December 31		Change From Prior Year
	2018	2017	
Active members in valuation:			
• Number	1,372	1,263	8.6%
• Average age	41.2	40.9	0.3
• Average years of service	3.0	2.5	0.5
• Total projected compensation	$111,807,438	$98,089,860	14.0%
• Average projected compensation	$81,492	$77,664	4.9%
• Account balances	$33,781,596	$24,416,818	38.4%
• Total active vested members	232	36	544.4%
Inactive vested members:			
• Number(1)	350	260	34.6%
• Average age	39.9	39.4	0.5
Retired members:			
• Number in pay status	8	1	700.0%
• Average age	66.0	70.8	-4.8
• Average monthly benefit	$894	$1,022	-12.5%
Disabled members:			
• Number in pay status	2	2	0.0%
• Average age	56.8	55.8	1.0
• Average monthly benefit	$1,901	$1,901	0.0%
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) Includes inactive members due a refund of member contributions.

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

Category	Year Ended December 31		Change From Prior Year
	2018	2017	
Active members in valuation:			
• Number	500	541	-7.6%
• Average age	44.9	44.5	0.4
• Average years of service	14.5	14.0	0.5
• Total projected compensation	$57,347,105	$59,402,499	-3.5%
• Average projected compensation	$114,694	$109,801	4.5%
• Account balances	$121,860,223	$119,985,250	1.6%
• Total active vested members	489	482	1.5%
Inactive vested members:			
• Number(1)	175	180	-2.8%
• Average age	44.2	43.7	0.5
Retired members:			
• Number in pay status	507	476	6.5%
• Average age	64.8	64.7	0.1
• Average monthly benefit	$4,658	$4,607	1.1%
Disabled members:			
• Number in pay status	301	291	3.4%
• Average age	59.6	59.2	0.4
• Average monthly benefit	$3,268	$3,201	2.1%
Beneficiaries:			
• Number in pay status	119	104	14.4%
• Average age	63.3	62.9	0.4
• Average monthly benefit	$1,766	$1,879	-6.0%

(1) Includes inactive members due a refund of member contributions.

EXHIBIT A – TABLE OF PLAN COVERAGE (CONTINUED)
SAFETY PLAN B

Category	Year Ended December 31		Change From Prior Year
	2018	2017	
Active members in valuation:			
• Number	212	184	15.2%
• Average age	33.8	32.5	1.3
• Average years of service	2.5	2.0	0.5
• Total projected compensation	$19,852,757	$15,969,366	24.3%
• Average projected compensation	$93,645	$86,790	7.9%
• Account balances	$6,659,498	$4,252,455	56.6%
• Total active vested members	28	1	2700.0%
Inactive vested members:			
• Number(1)	41	25	64.0%
• Average age	31.9	33.1	-1.2
Retired members:			
• Number in pay status	1	0	N/A
• Average age	63.7	N/A	N/A
• Average monthly benefit	$915	N/A	N/A
Disabled members:			
• Number in pay status	2	2	0.0%
• Average age	36.7	35.7	1.0
• Average monthly benefit	$2,243	$2,243	0.0%
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) Includes inactive members due a refund of member contributions.

EXHIBIT B – MEMBERS IN ACTIVE SERVICE AS OF DECEMBER 31, 2018
BY AGE, YEARS OF SERVICE, AND AVERAGE PROJECTED COMPENSATION
TOTAL PLAN

	Years of Service									
Age	**Total**	**0 - 4**	**5 - 9**	**10 - 14**	**15 - 19**	**20 - 24**	**25 - 29**	**30 - 34**	**35 - 39**	**40 & over**
Under 25	64	64	- -	- -	- -	- -	- -	- -	- -	- -
	$65,526	$65,526	- -	- -	- -	- -	- -	- -	- -	- -
25 - 29	290	261	29	- -	- -	- -	- -	- -	- -	- -
	79,600	77,548	$98,065	- -	- -	- -	- -	- -	- -	- -
30 - 34	481	287	154	40	- -	- -	- -	- -	- -	- -
	86,647	80,906	94,403	$97,971	- -	- -	- -	- -	- -	- -
35 - 39	560	220	138	169	33	- -	- -	- -	- -	- -
	91,391	82,012	93,971	99,584	$101,179	- -	- -	- -	- -	- -
40 - 44	508	135	98	149	114	12	- -	- -	- -	- -
	95,754	83,866	90,074	101,453	105,998	$107,774	- -	- -	- -	- -
45 - 49	607	102	88	149	131	111	24	2	- -	- -
	99,393	85,319	94,099	99,822	101,742	108,125	$122,738	$99,717	- -	- -
50 - 54	611	125	85	108	124	91	58	20	- -	- -
	100,334	91,188	96,110	93,188	98,574	116,482	117,753	100,963	- -	- -
55 - 59	507	97	74	101	111	61	35	26	2	- -
	98,261	88,853	97,422	95,611	98,919	98,637	113,536	122,368	$90,693	- -
60 - 64	299	66	63	56	57	23	21	9	3	1
	97,597	90,520	101,190	96,674	93,288	103,747	103,385	108,506	147,593	$124,442
65 - 69	75	19	11	15	16	9	1	4	- -	- -
	93,086	90,175	95,860	79,415	91,228	111,370	135,651	106,207	- -	- -
70 & over	19	2	8	- -	6	1	1	1	- -	- -
	92,933	88,914	104,673	- -	77,175	102,141	67,008	118,314	- -	- -
Total	**4,021**	**1,378**	**748**	**787**	**592**	**308**	**140**	**62**	**5**	**1**
	$94,046	**$82,441**	**$95,058**	**$97,922**	**$99,990**	**$108,450**	**$115,164**	**$111,612**	**$124,833**	**$124,442**

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

		Years of Service								
Age	**Total**	**0 - 4**	**5 - 9**	**10 - 14**	**15 - 19**	**20 - 24**	**25 - 29**	**30 - 34**	**35 - 39**	**40 & over**
Under 25	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
25 - 29	6	1	5	- -	- -	- -	- -	- -	- -	- -
	$103,906	$123,103	$100,067	- -	- -	- -	- -	- -	- -	- -
30 - 34	99	5	76	18	- -	- -	- -	- -	- -	- -
	89,934	78,347	92,008	$84,396	- -	- -	- -	- -	- -	- -
35 - 39	221	9	86	107	19	- -	- -	- -	- -	- -
	93,778	91,748	94,071	94,093	$91,635	- -	- -	- -	- -	- -
40 - 44	247	6	63	110	61	7	- -	- -	- -	- -
	95,519	87,907	89,877	99,907	94,603	$91,858	- -	- -	- -	- -
45 - 49	347	6	53	124	97	56	9	2	- -	- -
	97,500	100,333	96,395	97,793	99,597	94,770	$91,977	$99,717	- -	- -
50 - 54	395	4	59	99	101	69	45	18	- -	- -
	100,740	112,135	97,568	92,762	95,882	115,261	111,455	97,294	- -	- -
55 - 59	362	7	48	94	105	58	28	20	2	- -
	100,023	124,037	98,133	96,447	97,875	97,103	107,566	123,085	$90,693	- -
60 - 64	196	3	35	51	57	22	19	6	3	- -
	99,511	111,898	104,225	95,095	93,288	104,092	101,524	115,254	147,593	- -
65 - 69	51	- -	6	15	16	9	1	4	- -	- -
	93,558	- -	92,963	79,415	91,228	111,370	135,651	106,207	- -	- -
70 & over	13	- -	4	- -	6	1	1	1	- -	- -
	92,179	- -	111,954	- -	77,175	102,141	67,008	118,314	- -	- -
Total	**1,937**	**41**	**435**	**618**	**462**	**222**	**103**	**51**	**5**	**- -**
	$97,652	**$100,549**	**$95,344**	**$95,459**	**$96,047**	**$103,287**	**$106,668**	**$110,727**	**$124,833**	**- -**

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

	Years of Service									
Age	**Total**	**0 - 4**	**5 - 9**	**10 - 14**	**15 - 19**	**20 - 24**	**25 - 29**	**30 - 34**	**35 - 39**	**40 & over**
Under 25	47	47	- -	- -	- -	- -	- -	- -	- -	- -
	$60,399	$60,399	- -	- -	- -	- -	- -	- -	- -	- -
25 - 29	195	187	8	- -	- -	- -	- -	- -	- -	- -
	73,120	72,513	$87,321	- -	- -	- -	- -	- -	- -	- -
30 - 34	278	236	42	- -	- -	- -	- -	- -	- -	- -
	79,773	78,346	87,792	- -	- -	- -	- -	- -	- -	- -
35 - 39	228	192	35	1	- -	- -	- -	- -	- -	- -
	82,255	80,622	91,493	$72,489	- -	- -	- -	- -	- -	- -
40 - 44	152	121	31	- -	- -	- -	- -	- -	- -	- -
	84,436	83,112	89,604	- -	- -	- -	- -	- -	- -	- -
45 - 49	125	90	35	- -	- -	- -	- -	- -	- -	- -
	86,089	84,326	90,622	- -	- -	- -	- -	- -	- -	- -
50 - 54	128	104	24	- -	- -	- -	- -	- -	- -	- -
	86,262	85,716	88,625	- -	- -	- -	- -	- -	- -	- -
55 - 59	107	86	20	1	- -	- -	- -	- -	- -	- -
	85,909	85,179	90,246	61,976	- -	- -	- -	- -	- -	- -
60 - 64	84	59	24	1	- -	- -	- -	- -	- -	- -
	88,891	88,963	89,636	66,783	- -	- -	- -	- -	- -	- -
65 - 69	22	18	4	- -	- -	- -	- -	- -	- -	- -
	87,078	88,627	80,106	- -	- -	- -	- -	- -	- -	- -
70 & over	6	2	4	- -	- -	- -	- -	- -	- -	- -
	94,566	88,914	97,391	- -	- -	- -	- -	- -	- -	- -
Total	**1,372**	**1,142**	**227**	**3**	**- -**	**- -**	**- -**	**- -**	**- -**	**- -**
	$81,492	**$79,926**	**$89,563**	**$67,083**	**- -**	**- -**	**- -**	**- -**	**- -**	**- -**

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

	Years of Service									
Age	**Total**	**0 - 4**	**5 - 9**	**10 - 14**	**15 - 19**	**20 - 24**	**25 - 29**	**30 - 34**	**35 - 39**	**40 & over**
Under 25	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
25 - 29	10	2	8	- -	- -	- -	- -	- -	- -	- -
	$101,532	$86,855	$105,201	- -	- -	- -	- -	- -	- -	- -
30 - 34	47	1	24	22	- -	- -	- -	- -	- -	- -
	107,889	123,949	106,130	$109,077	- -	- -	- -	- -	- -	- -
35 - 39	89	2	12	61	14	- -	- -	- -	- -	- -
	109,196	134,145	96,924	109,660	$114,132	- -	- -	- -	- -	- -
40 - 44	102	2	3	39	53	5	- -	- -	- -	- -
	113,725	96,752	105,469	105,815	119,113	$130,055	- -	- -	- -	- -
45 - 49	129	- -	- -	25	34	55	15	- -	- -	- -
	118,039	- -	- -	109,886	107,860	121,722	$141,194	- -	- -	- -
50 - 54	74	3	2	9	23	22	13	2	- -	- -
	119,886	145,568	142,951	97,875	110,394	120,311	139,554	$133,986	- -	- -
55 - 59	33	1	4	6	6	3	7	6	- -	- -
	116,580	102,945	111,387	88,121	117,200	128,309	137,417	119,980	- -	- -
60 - 64	15	- -	4	4	- -	1	2	3	- -	1
	121,378	- -	143,954	124,279	- -	96,143	121,059	95,011	- -	$124,442
65 - 69	1	- -	1	- -	- -	- -	- -	- -	- -	- -
	176,261	- -	176,261	- -	- -	- -	- -	- -	- -	- -
70 & over	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Total	**500**	**11**	**58**	**166**	**130**	**86**	**37**	**11**	**- -**	**1**
	$114,694	**$118,100**	**$109,513**	**$107,648**	**$114,003**	**$121,778**	**$138,815**	**$115,717**	**- -**	**$124,442**

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

	Years of Service									
Age	Total	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 & over
Under 25	17	17	- -	- -	- -	- -	- -	- -	- -	- -
	$79,702	$79,702	- -	- -	- -	- -	- -	- -	- -	- -
25 - 29	79	71	8	- -	- -	- -	- -	- -	- -	- -
	90,971	89,906	$100,420	- -	- -	- -	- -	- -	- -	- -
30 - 34	57	45	12	- -	- -	- -	- -	- -	- -	- -
	96,944	93,662	109,252	- -	- -	- -	- -	- -	- -	- -
35 - 39	22	17	5	- -	- -	- -	- -	- -	- -	- -
	90,073	86,418	102,500	- -	- -	- -	- -	- -	- -	- -
40 - 44	7	6	1	- -	- -	- -	- -	- -	- -	- -
	87,903	90,742	70,870	- -	- -	- -	- -	- -	- -	- -
45 - 49	6	6	- -	- -	- -	- -	- -	- -	- -	- -
	85,193	85,193	- -	- -	- -	- -	- -	- -	- -	- -
50 - 54	14	14	- -	- -	- -	- -	- -	- -	- -	- -
	114,199	114,199	- -	- -	- -	- -	- -	- -	- -	- -
55 - 59	5	3	2	- -	- -	- -	- -	- -	- -	- -
	114,108	107,394	124,180	- -	- -	- -	- -	- -	- -	- -
60 - 64	4	4	- -	- -	- -	- -	- -	- -	- -	- -
	97,458	97,458	- -	- -	- -	- -	- -	- -	- -	- -
65 - 69	1	1	- -	- -	- -	- -	- -	- -	- -	- -
	118,046	118,046	- -	- -	- -	- -	- -	- -	- -	- -
70 & over	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Total	**212**	**184**	**28**	**- -**	**- -**	**- -**	**- -**	**- -**	**- -**	**- -**
	$93,645	**$91,884**	**$105,219**	**- -**	**- -**	**- -**	**- -**	**- -**	**- -**	**- -**

EXHIBIT C – RECONCILIATION OF MEMBER DATA

	Active Members	Inactive Vested Members(1)	Retired Members	Disabled Members	Beneficiaries	Total
Number as of December 31, 2017	**4,110**	**1,181**	**3,728**	**637**	**571**	**10,227**
• New members	304	26	N/A	N/A	55	385
• Terminations – with vested rights	(174)	174	N/A	N/A	N/A	0
• Contribution refunds	(43)	(33)	N/A	N/A	N/A	(76)
• Retirements	(170)	(41)	211	N/A	N/A	0
• New disabilities	(15)	(1)	(1)	17	N/A	0
• Return to work	10	(10)	0	0	N/A	0
• Died with or without beneficiary	(1)	(1)	(85)	(14)	(23)	(124)
• Data adjustments	0	0	0	0	0	0
Number as of December 31, 2018	**4,021**	**1,295**	**3,853**	**640**	**603**	**10,412**

(1) Includes inactive members due a refund of member contributions.

EXHIBIT D – 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		$2,748,040,446		$2,414,827,709
Contribution income:				
• Employer contributions	$67,425,348		$63,821,713	
• Member contributions	45,566,881		44,160,995	
Net contribution income		$112,992,230		$107,982,707
Investment income:				
• Interest, dividends and other income	$85,363,513		$54,211,347	
• Asset appreciation	(172,453,541)		360,896,054	
• Less investment and administrative fees	(23,571,381)		(23,928,824)	
Net investment income		$(110,661,409)		$391,178,578
Total income available for benefits		**$2,330,821**		**$499,161,285**
Less benefit payments:				
• Service retirement and disability benefits	$(170,370,383)		$(162,973,355)	
• Member refunds	(2,191,891)		(2,975,193)	
Net benefit payments		$(172,562,274)		$(165,948,548)
Change in net assets at market value		**$(170,231,454)**		**$333,212,737**
Net assets at market value at the end of the year		**$2,577,808,991**		**$2,748,040,446**

Note: Results may be slightly off due to rounding.

EXHIBIT E – SUMMARY STATEMENT OF PLAN ASSETS

	Year Ended December 31, 2018		Year Ended December 31, 2017	
Cash equivalents		$162,869,902		$169,820,129
Accounts receivable:				
• Securities sold	$4,413,925		$79,260,625	
• Accrued interest and dividends	6,413,921		5,510,027	
• Employer contributions	1,872,357		1,701,307	
• Other receivable	65,509		92,391	
Total accounts receivable		$12,765,713		$86,564,350
Investments:				
• Domestic and international stocks	$1,328,385,815		$1,552,900,954	
• Domestic and international bonds	558,598,762		550,608,507	
• Real assets	490,785,002		444,839,372	
• Securities lending collateral	9,739,900		24,316,052	
• Miscellaneous	133,294,310		127,644,683	
Total investments at market value		$2,520,803,789		$2,700,309,568
Other assets		2,459,939		2,805,699
Total assets		$2,698,899,343		$2,959,499,745
Accounts payable:				
• Accounts payable and other liabilities	$(111,350,451)		$(187,143,247)	
• Securities lending liability	(9,739,900)		(24,316,052)	
Total accounts payable		$(121,090,351)		$(211,459,299)
Net assets at market value		**$2,577,808,991**		**$2,748,040,446**
Net assets at actuarial value		**$2,667,344,838**		**$2,557,299,032**
Net assets at valuation value		**$2,667,344,838**		**$2,557,299,032**

Note: Results may be slightly off due to rounding.

EXHIBIT F – SUMMARY OF REPORTED RESERVE INFORMATION AS OF DECEMBER 31, 2018

	Before True-Up	After True-Up	Transfer Amount
Member reserves[1]			
• General	$457,084,281	$457,084,281	$0
• Safety	143,402,033	143,402,033	0
Employer reserves[1]			
• General	560,177,764	541,655,195	(18,522,569)
• Safety	217,988,362	213,990,190	(3,998,172)
Retired member reserve[1]			
• General	1,342,356,431	1,360,879,000	18,522,569
• Safety	482,431,828	486,430,000	3,998,172
• COLA	36,448,028	35,157,000	(1,291,028)
Negative contingency reserve[1]	$(572,543,879)	$(571,252,859)	$1,291,020
Total valuation reserve[1]	$2,667,344,846	$2,667,344,838	$(8)
Undistributed reserve[2]	$0	$0	$0
Interest fluctuation reserve[2]	0	0	0
Market stabilization reserve[2]	(89,535,855)	(89,535,847)	8
Net market value	**$2,577,808,991**	**$2,577,808,991**	**$0**

Note: Results may be slightly off due to rounding.

(1) Included in development of Valuation Value of Assets

(2) Not included in development of Valuation Value of Assets

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

Year Ended December 31	Employer Contributions	Member Contributions	Net Investment Return(1)	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	$47,576,576	$37,336,845	$224,055,873	$93,175,322	$1,272,886,153	$1,564,970,019	122.9%
2010	337,760,770(2)	37,321,820	207,173,056	103,271,467	1,751,870,332	1,890,873,742	107.9%
2011	35,710,655	35,943,823	1,179,111	114,919,128	1,709,784,793	1,867,117,386	109.2%
2012	45,078,748	36,963,228	239,064,594	125,964,399	1,904,926,964	1,856,847,434	97.5%
2013	51,852,499	35,491,526	366,462,205	135,960,456	2,222,772,738	2,016,780,822	90.7%
2014	61,179,319	37,126,072	114,071,949	141,675,383	2,293,474,695	2,167,210,096	94.5%
2015	68,239,981	38,713,777	31,063,205	149,364,229	2,282,127,429	2,289,056,790	100.3%
2016	63,639,564	40,782,605	185,729,857	157,451,746	2,414,827,709	2,399,170,737	99.4%
2017	63,821,713	44,160,995	391,178,577	165,948,548	2,748,040,446	2,557,299,032	93.1%
2018	67,425,348	45,566,881	(110,661,410)	172,562,274	2,577,808,991	2,667,344,838	103.5%

(1) On a market basis, net of investment fees and administrative expenses.

(2) Includes Pension Obligation Bonds issued by the County in the amount of $289,335,000.

EXHIBIT H – TABLE OF AMORTIZATION BASES

Type	Date Established	Initial Amount ($ in ‘000s)	Initial Period	Outstanding Balance[1] ($ in ‘000s)	Years Remaining	Annual Payment[2] ($ in ‘000s)
General						
Restart amortization - County	December 31, 2007	$123,396	21	$29,583	10	$3,584
Restart amortization - Court	December 31, 2007	8,599	21	7,327	10	888
Cash Allowance - County	December 31, 2007[3]	55,982	20	12,949	9	1,714
Actuarial loss - County	December 31, 2008	44,591	20	10,810	10	1,310
Actuarial loss - Court	December 31, 2008	3,107	20	2,676	10	324
Early Retirement Option - County	December 31, 2009[3]	1,448	20	365	11	41
Actuarial loss - County	December 31, 2009	45,691	20	11,496	11	1,288
Actuarial loss - Court	December 31, 2009	2,859	20	2,557	11	286
Actuarial loss - VOM	December 31, 2009	13	20	13	11	1
Assumption changes - County	December 31, 2009	10,990	20	2,765	11	310
Assumption changes - Court	December 31, 2009	688	20	615	11	69
Assumption changes - VOM	December 31, 2009	3	20	3	11	0
Actuarial loss - County	December 31, 2010	48,235	20	43,952	12	4,588
Actuarial loss - Court	December 31, 2010	3,044	20	2,802	12	292
Actuarial loss - VOM	December 31, 2010	14	20	14	12	1
Assumption changes - County	December 31, 2010	37,393	20	34,072	12	3,557
Assumption changes - Court	December 31, 2010	2,360	20	2,173	12	227
Assumption changes - VOM	December 31, 2010	11	20	11	12	1
Actuarial loss - County	December 31, 2011	74,087	20	69,077	13	6,767
Actuarial loss - Court	December 31, 2011	4,760	20	4,483	13	439
Actuarial loss - VOM	December 31, 2011	23	20	22	13	2

(1) The outstanding balance for all County bases established on or before December 31, 2009 have been adjusted to reflect $289.3 million in proceeds from issuance of Pension Obligation Bonds by the County. The outstanding balance for all County bases established on or before December 31, 2015 have been adjusted to reflect $3.7 million from an additional UAAL payment by the County.

(2) Before adjustments for supplemental contributions paid by certain employees to reduce the employer’s UAAL.

(3) Payment is only made by the County and not by the Court or Valley of the Moon because the programs were only available to County employees.

EXHIBIT H – TABLE OF AMORTIZATION BASES (CONTINUED)

Type	Date Established	Initial Amount ($ in ‘000s)	Initial Period	Outstanding Balance[1] ($ in ‘000s)	Years Remaining	Annual Payment[2] ($ in ‘000s)
General (continued)						
Actuarial loss - County	December 31, 2012	$71,616	20	$67,929	14	$6,281
Actuarial loss - Court	December 31, 2012	4,188	20	4,014	14	371
Actuarial loss - VOM	December 31, 2012	99	20	96	14	9
Assumption changes - County	December 31, 2012	64,345	20	61,032	14	5,644
Assumption changes - Court	December 31, 2012	3,763	20	3,605	14	333
Assumption changes - VOM	December 31, 2012	89	20	86	14	8
Compensation earnable change - County	December 31, 2012	(8,157)	20	(7,736)	14	(715)
Compensation earnable change - Court	December 31, 2012	(477)	20	(457)	14	(42)
Compensation earnable change - VOM	December 31, 2012	(11)	20	(11)	14	(1)
Cashout change - County	December 31, 2012	(20,626)	20	(19,565)	14	(1,809)
Actuarial gain - County	December 31, 2013	(35,260)	20	(33,934)	15	(2,977)
Actuarial gain - Court	December 31, 2013	(1,884)	20	(1,831)	15	(161)
Actuarial gain - VOM	December 31, 2013	(38)	20	(37)	15	(3)
Actuarial gain - County	December 31, 2014	(71,508)	20	(69,517)	16	(5,811)
Actuarial gain - Court	December 31, 2014	(3,657)	20	(3,591)	16	(300)
Actuarial gain - VOM	December 31, 2014	(84)	20	(82)	16	(7)
Actuarial gain - County	December 31, 2015	(15,879)	20	(15,534)	17	(1,242)
Actuarial gain - Court	December 31, 2015	(830)	20	(820)	17	(66)
Actuarial gain - VOM	December 31, 2015	(18)	20	(18)	17	(1)
Assumption changes - County	December 31, 2015	57,580	20	56,332	17	4,503
Assumption changes - Court	December 31, 2015	3,009	20	2,975	17	238
Assumption changes - VOM	December 31, 2015	64	20	64	17	5
Actuarial loss - County	December 31, 2016	7,303	20	7,267	18	558
Actuarial loss - Court	December 31, 2016	364	20	363	18	28
Actuarial loss - VOM	December 31, 2016	8	20	8	18	1

[1] The outstanding balance for all County bases established on or before December 31, 2015 have been adjusted to reflect $3.7 million from an additional UAAL payment by the County.

[2] Before adjustments for supplemental contributions paid by certain employees to reduce the employer’s UAAL.

EXHIBIT H – TABLE OF AMORTIZATION BASES (CONTINUED)

Type	Date Established	Initial Amount ($ in ‘000s)	Initial Period	Outstanding Balance ($ in ‘000s)	Years Remaining	Annual Payment[1] ($ in ‘000s)
General (continued)						
Actuarial gain - County	December 31, 2017	$(26,381)	20	$(26,351)	19	$(1,946)
Actuarial gain - Court	December 31, 2017	(1,236)	20	(1,235)	19	(91)
Actuarial gain - VOM	December 31, 2017	(37)	20	(37)	19	(3)
Actuarial loss - County	December 31, 2018	21,856	20	21,856	20	1,558
Actuarial loss - Court	December 31, 2018	987	20	987	20	70
Actuarial loss - VOM	December 31, 2018	31	20	31	20	2
Assumption changes - County	December 31, 2018	24,241	20	24,241	20	1,728
Assumption changes - Court	December 31, 2018	1,094	20	1,094	20	78
Assumption changes - VOM	December 31, 2018	34	20	34	20	2
Subtotal				**$309,023**		**$31,931**

(1) Before adjustments for supplemental contributions paid by certain employees to reduce the employer’s UAAL.

EXHIBIT H – TABLE OF AMORTIZATION BASES (CONTINUED)

Type	Date Established	Initial Amount ($ in '000s)	Initial Period	Outstanding Balance[1] ($ in '000s)	Years Remaining	Annual Payment[2] ($ in '000s)
Safety – County						
Restart amortization	December 31, 2007	$43,504	21	$10,445	10	$1,265
Cash Allowance	December 31, 2007[3]	14,693	20	3,404	9	451
Actuarial loss	December 31, 2008	7,603	20	1,846	10	224
Actuarial loss	December 31, 2009	28,643	20	7,216	11	808
Assumption changes	December 31, 2009	7,337	20	1,849	11	207
Actuarial loss	December 31, 2010	14,765	20	13,472	12	1,406
Assumption changes	December 31, 2010	14,376	20	13,117	12	1,369
Actuarial loss	December 31, 2011	24,746	20	23,105	13	2,263
Actuarial loss	December 31, 2012	26,012	20	24,705	14	2,284
Assumption changes	December 31, 2012	12,268	20	11,651	14	1,077
Compensation earnable change	December 31, 2012	(2,613)	20	(2,481)	14	(229)
Cashout change	December 31, 2012	(11,987)	20	(11,385)	14	(1,053)
Actuarial gain	December 31, 2013	(6,051)	20	(5,831)	15	(512)
Actuarial gain	December 31, 2014	(26,652)	20	(25,945)	16	(2,169)
Actuarial gain	December 31, 2015	(5,153)	20	(5,049)	17	(404)
Assumption changes	December 31, 2015	31,096	20	30,463	17	2,435
Actuarial loss	December 31, 2016	2,293	20	2,281	18	175
Actuarial gain	December 31, 2017	(10,655)	20	(10,643)	19	(786)
Actuarial loss	December 31, 2018	2,079	20	2,079	20	148
Assumption changes	December 31, 2018	6,032	20	6,032	20	430
Subtotal				**$90,331**		**$9,389**

(1) The outstanding balance for all bases established on or before December 31, 2009 have been adjusted to reflect $289.3 million in proceeds from issuance of Pension Obligation Bonds by the County. The outstanding balance for all bases established on or before December 31, 2015 have been adjusted to reflect $3.7 million from an additional UAAL payment by the County.

(2) Before adjustments for supplemental contributions paid by certain employees to reduce the employer's UAAL.

(3) Payment is only made by the County and not by Valley of the Moon because the program was only available to County employees.

EXHIBIT H – TABLE OF AMORTIZATION BASES (CONTINUED)

Type	Date Established	Initial Amount ($ in ‘000s)	Initial Period	Outstanding Balance ($ in ‘000s)	Years Remaining	Annual Payment ($ in ‘000s)
Safety – Valley of the Moon						
Restart amortization	December 31, 2007	$1,852	21	$1,578	10	$191
Actuarial loss	December 31, 2008	169	20	145	10	18
Actuarial loss	December 31, 2009	678	20	606	11	68
Assumption changes	December 31, 2009	174	20	155	11	17
Actuarial loss	December 31, 2010	344	20	318	12	33
Assumption changes	December 31, 2010	335	20	309	12	32
Actuarial loss	December 31, 2011	639	20	602	13	59
Actuarial loss	December 31, 2012	1,444	20	1,383	14	128
Assumption changes	December 31, 2012	681	20	653	14	60
Compensation earnable change	December 31, 2012	(145)	20	(139)	14	(13)
Actuarial gain	December 31, 2013	(333)	20	(324)	15	(28)
Actuarial gain	December 31, 2014	(1,524)	20	(1,497)	16	(125)
Actuarial gain	December 31, 2015	(321)	20	(318)	17	(25)
Assumption changes	December 31, 2015	1,937	20	1,915	17	153
Actuarial loss	December 31, 2016	141	20	140	18	11
Actuarial gain	December 31, 2017	(683)	20	(682)	19	(50)
Actuarial loss	December 31, 2018	137	20	137	20	10
Assumption changes	December 31, 2018	397	20	397	20	28
Subtotal				**$5,378**		**$567**

EXHIBIT H – TABLE OF AMORTIZATION BASES (CONTINUED)

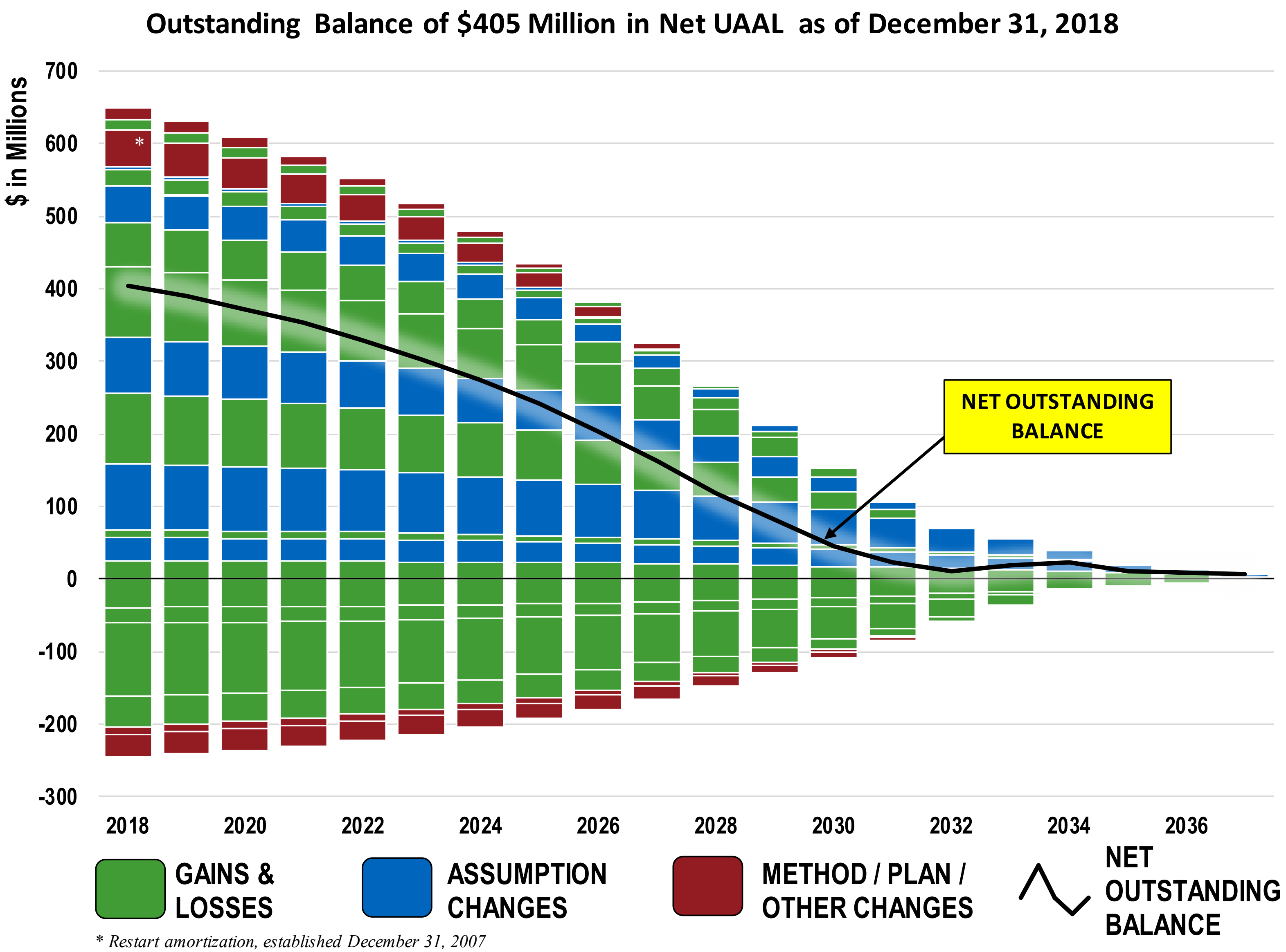
Type	Date Established	Initial Amount ($ in '000s)	Initial Period	Outstanding Balance[1] ($ in '000s)	Years Remaining	Annual Payment[2] ($ in '000s)
Total						
Restart amortization	December 31, 2007	$177,351	21	$48,933	10	$5,928
Cash Allowance	December 31, 2007	70,675	20	16,353	9	2,165
Actuarial loss	December 31, 2008	55,470	20	15,477	10	1,876
Early Retirement Option	December 31, 2009	1,448	20	365	11	41
Actuarial loss	December 31, 2009	77,884	20	21,888	11	2,451
Assumption changes	December 31, 2009	19,192	20	5,387	11	603
Actuarial loss	December 31, 2010	66,402	20	60,558	12	6,320
Assumption changes	December 31, 2010	54,475	20	49,682	12	5,186
Actuarial loss	December 31, 2011	104,255	20	97,289	13	9,530
Actuarial loss	December 31, 2012	103,359	20	98,127	14	9,073
Assumption changes	December 31, 2012	81,146	20	77,027	14	7,122
Compensation earnable change	December 31, 2012	(11,403)	20	(10,824)	14	(1,000)
Cashout change	December 31, 2012	(32,613)	20	(30,950)	14	(2,862)
Actuarial gain	December 31, 2013	(43,566)	20	(41,957)	15	(3,681)
Actuarial gain	December 31, 2014	(103,425)	20	(100,632)	16	(8,412)
Actuarial gain	December 31, 2015	(22,201)	20	(21,739)	17	(1,738)
Assumption changes	December 31, 2015	93,686	20	91,749	17	7,334
Actuarial loss	December 31, 2016	10,109	20	10,059	18	773
Actuarial gain	December 31, 2017	(38,992)	20	(38,948)	19	(2,876)
Actuarial loss	December 31, 2018	25,090	20	25,090	20	1,788
Assumption changes	December 31, 2018	31,798	20	31,798	20	2,266
Total				**$404,732**		**$41,887**

Note: The equivalent single amortization period is about 12 years.

[1] The outstanding balance for all County bases established on or before December 31, 2009 have been adjusted to reflect $289.3 million in proceeds from issuance of Pension Obligation Bonds by the County. The outstanding balance for all County bases established on or before December 31, 2015 have been adjusted to reflect $3.7 million from an additional UAAL payment by the County.

[2] Before adjustments for supplemental contributions paid by certain employees to reduce the employer's UAAL.

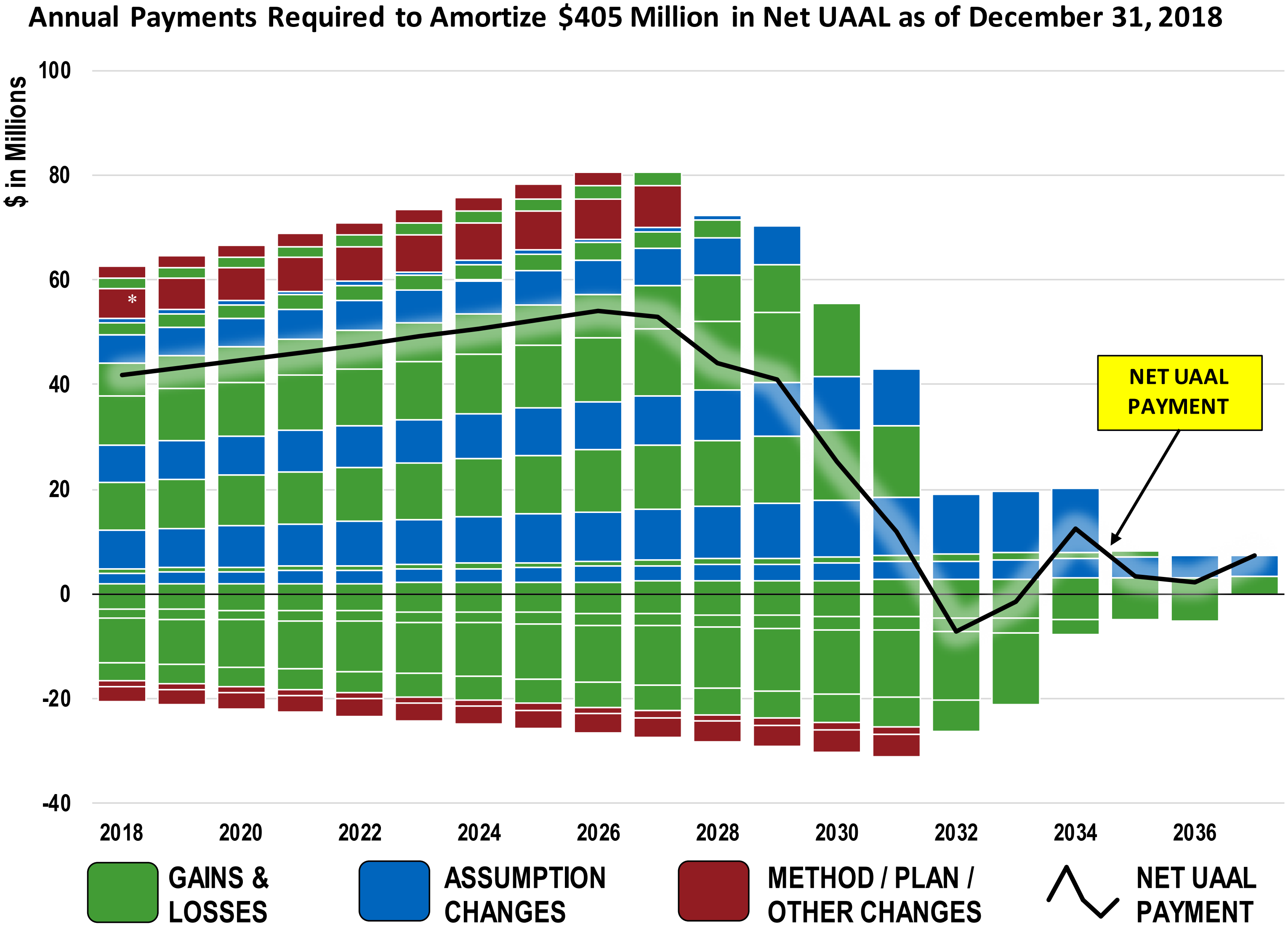
EXHIBIT I – PROJECTION OF UAAL BALANCES AND PAYMENTS



** Restart amortization, established December 31, 2007*

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

Annual Payments Required to Amortize $405 Million in Net UAAL as of December 31, 2018



** Restart amortization, established December 31, 2007*

EXHIBIT J – DEFINITION OF PENSION TERMS

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

Actuarial Accrued Liability for Actives:	The equivalent of the accumulated Normal Costs allocated to the years before the valuation date.
Actuarial Accrued Liability for Pensioners and Beneficiaries:	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):	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: 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, withdrawal, 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 pay off the Unfunded Actuarial Accrued Liability.

Assumptions or Actuarial Assumptions:	The estimates upon which the cost of the Plan is calculated, including: Investment return - the rate of investment yield that the Plan will earn over the long-term future; Mortality rates - the rate or probability of death at a given age for employees and pensioners; Retirement rates - the rate or probability of retirement at a given age or service; Disability rates – the rate or probability of disability retirement at a given age; Withdrawal rates - the rate or probability at which employees of various ages are expected to leave employment for reasons other than death, disability, or retirement; Salary increase rates - 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 withdrawal.
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 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.

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 dated September 25, 2018. Unless otherwise noted, all actuarial assumptions and methods shown below apply to all members. These assumptions were adopted by the Board.
<u>Economic Assumptions</u>	
Net Investment Return:	7.00%; net of administrative and investment expenses. Based on the Actuarial Experience Study referenced above, expected administrative and investment expenses represent about 0.75% of the Actuarial Value of Assets.
Employee Contribution Crediting Rate:	Assumed inflation rate of 2.75% as an estimate of the 10-Year Treasury rate; credited semi-annually.
Consumer Price Index:	Not applicable.
Payroll Growth:	Inflation of 2.75% per year plus “across the board” salary increases of 0.50% per year, used to amortize the Unfunded Actuarial Accrued Liability as a level percentage of payroll.
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” 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	5.50%	7.50%
1 – 2	5.00	7.00
2 – 3	4.50	5.00
3 – 4	3.50	4.00
4 – 5	2.50	3.50
5 – 6	1.50	1.50
6 – 7	1.25	1.25
7 – 8	1.00	1.25
8 – 9	0.95	1.25
9 – 10	0.90	1.25
10 – 11	0.85	1.25
11 – 12	0.80	1.25
12 – 13	0.75	1.25
13 – 14	0.75	1.00
14 – 15	0.75	1.00
15 & Over	0.50	0.75

Demographic Assumptions

Post-Retirement Mortality Rates:

Healthy

- **General and Safety Members and All Beneficiaries:** Headcount-Weighted RP-2014 Healthy Annuitant Table times 94% for males and 102% for females, projected generationally with the two-dimensional mortality improvement scale MP-2017.

Disabled

- **General and Safety Members:** Headcount-Weighted RP-2014 Disabled Retiree Table times 91% for males and 93% for females, projected generationally with the two-dimensional mortality improvement scale MP-2017.

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

Pre-Retirement Mortality Rates:	- **General and Safety Members:** Headcount-Weighted RP-2014 Employee Table times 93% for males and 95% for females, projected generationally with the two-dimensional mortality improvement scale MP-2017.

	Rate (%)			
	General[1]		Safety[1]	
Age	Male	Female	Male	Female
20	0.05%	0.02%	0.05%	0.02%
25	0.06	0.02	0.06	0.02
30	0.06	0.03	0.06	0.03
35	0.06	0.03	0.06	0.03
40	0.07	0.05	0.07	0.05
45	0.11	0.08	0.11	0.08
50	0.19	0.13	0.19	0.13
55	0.32	0.20	0.32	0.20
60	0.53	0.29	0.53	0.29
65	0.91	0.42	0.91	0.42

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

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

Mortality Rates for Member Contributions:	- **General Members:** Headcount-Weighted RP-2014 Healthy Annuitant Table times 94% for males and 102% for females, projected 20 years with the two-dimensional scale MP-2017, weighted 33.33% male and 66.67% female. - **Safety Members:** Headcount-Weighted RP-2014 Healthy Annuitant Table times 94% for males and 102% for females, projected 20 years with the two-dimensional scale MP-2017, weighted 75% male and 25% female.

Disability Incidence:

Disability Incidence		
	Rate (%)	
Age	General	Safety
20	0.05%	0.10%
25	0.05	0.16
30	0.05	0.68
35	0.05	1.30
40	0.14	1.50
45	0.23	2.10
50	0.31	2.50
55	0.38	2.80
60	0.43	3.00
65	0.60	0.00
70	0.00	0.00

55% of General disabilities are assumed to be service connected disabilities. The other 45% are assumed to be non-service connected disabilities.

95% of Safety disabilities are assumed to be service connected disabilities. The other 5% are assumed to be non-service connected disabilities.

Withdrawal:

Withdrawal (< 5 Years of Service)		
Years of Service	Rate (%)	
	General	Safety
Less than 1	6.00%	3.50%
1 – 2	3.00	2.40
2 – 3	2.50	1.60
3 – 4	2.50	1.60
4 – 5	2.00	1.60

Withdrawal (5+ Years of Service)		
	Rate (%)	
Age	General	Safety
20	1.50%	1.60%
25	1.50	1.60
30	1.38	1.24
35	0.97	0.64
40	0.54	0.25
45	0.37	0.09
50	0.32	0.02
55	0.24	0.00
60	0.14	0.00
65	0.04	0.00
70	0.00	0.00

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

Vested Termination:

Vested Termination (< 5 Years of Service)		
Years of Service	Rate (%)	
	General	Safety
Less than 1	7.00%	6.50%
1 – 2	6.00	5.00
2 – 3	4.50	4.00
3 – 4	3.50	4.00
4 – 5	3.50	4.00

Vested Termination (5+ Years of Service)		
	Rate (%)	
Age	General	Safety
20	3.50%	4.00%
25	3.50	4.00
30	3.50	3.40
35	3.20	2.40
40	2.70	1.40
45	2.20	0.85
50	2.00	0.30
55	2.00	0.00
60	2.00	0.00
65	1.40	0.00
70	0.00	0.00

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

Retirement Rates:

	Retirement Rates (%)					
	General			Safety		
Age	Plan A Less than 30 Years	Plan A 30 or More Years	Plan B	Plan A Less than 30 Years	Plan A 30 or More Years	Plan B
48	0.0%	0.0%	0.0%	5.0%	5.0%	0.0%
49	0.0	0.0	0.0	5.0	5.0	0.0
50	6.0	10.0	0.0	18.0	18.0	5.0
51	6.0	10.0	0.0	16.0	16.0	5.0
52	6.0	10.0	3.5	12.0	18.0	4.5
53	6.0	15.0	1.0	14.0	25.0	4.5
54	7.0	20.0	2.0	22.0	50.0	7.5
55	10.0	25.0	2.5	25.0	75.0	16.5
56	8.0	25.0	3.5	30.0	75.0	15.0
57	8.0	30.0	4.5	20.0	75.0	12.0
58	12.0	30.0	5.0	20.0	75.0	16.0
59	20.0	40.0	7.5	20.0	75.0	16.0
60	25.0	40.0	8.5	75.0	100.0	75.0
61	25.0	45.0	9.5	75.0	100.0	75.0
62	30.0	45.0	14.5	75.0	100.0	75.0
63	30.0	45.0	16.5	75.0	100.0	75.0
64	30.0	45.0	19.0	75.0	100.0	75.0
65	30.0	45.0	24.0	100.0	100.0	100.0
66	40.0	45.0	20.0	100.0	100.0	100.0
67	40.0	50.0	20.0	100.0	100.0	100.0
68	40.0	50.0	20.0	100.0	100.0	100.0
69	50.0	80.0	20.0	100.0	100.0	100.0
70	100.0	100.0	100.0	100.0	100.0	100.0

Retirement Age and Benefit for Deferred Vested Members:

General Retirement Age: 58

Safety Retirement Age: 53

General and Safety deferred vested members who terminate with less than five years of service and are not vested are assumed to retire at age 70 if they decide to leave their contributions on deposit.

25% of future General and 40% of future Safety deferred vested members are assumed to continue to work for a reciprocal employer. For reciprocals, 3.75% and 4.00% compensation increases per annum are assumed for General and Safety, respectively.

Future Benefit Accruals: 1.0 year of service per year of employment.

Unknown Data for Members:	Same as those exhibited by members with similar known characteristics. If not specified, members are assumed to be male.
Inclusion of Deferred Vested Members:	All deferred vested members are included in the valuation.
Definition of Active Members:	First day of employment.
Form of Payment:	All active and inactive members are assumed to elect the unmodified option at retirement.
Percent Married:	For all active and inactive members, 70% of male members and 55% 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 4 years younger than the member and female members are assumed to have a male spouse who is 2 years older than the member.
Cashouts:	The following assumptions for a one-time compensation increase at retirement from vacation, sick leave and holiday cashouts are used: *Plan A County Members terminated prior to June 1, 2014:* General Members 4.00% Safety Members 6.00% The following assumptions for a one-time compensation increase at retirement from vacation and holiday cashouts are used: *General Plan A Court Members:* General Members 3.75% *Plan A VOM Members:* General Members 2.00% Safety Members 3.00%
Actuarial Funding Policy	
Actuarial Cost Method:	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.
Actuarial Value of Assets:	Market Value of Assets less unrecognized returns in each of the last five years. Unrecognized returns are equal to the difference between the actual market return and the expected return on the valuation value and are recognized over a five-year period. Deferred gains and losses as of December 31, 2015 have been combined and will be recognized in equal amounts over a four-year period starting January 1, 2016.
Valuation Value of Assets:	The Actuarial Value of Assets reduced by the value of the non-valuation reserves.

Amortization Policy:	The outstanding balance of the December 31, 2007 UAAL as well as any new UAAL established on each subsequent valuation after December 31, 2007 is amortized over separate 20-year declining periods. The UAAL established as a result of including as pensionable salary a cash allowance of $3.45 per hour for General-County and Safety-County members is amortized over a 20-year declining period with 9 years remaining as of December 31, 2018.
Cost Sharing Method:	Effective with the December 31, 2007 valuation, a separate Normal Cost rate is calculated for Safety Plan A-County and Safety Plan A-VOM, based on their respective active member demographics. Likewise, a separate Normal Cost rate has been calculated for Safety Plan B for each of the two employers upon the implementation of that Plan effective January 1, 2013. Any new Safety UAAL for Plan A and Plan B is pooled and then allocated between Safety-County and Safety-VOM, based on the proportions of their payroll to the total Safety payroll. Effective with the restatement of the December 31, 2012 contribution rates to reflect the elimination of vacation, sick leave and holiday cashouts for General-County, a separate Normal Cost rate is calculated for General Plan A-County. The Normal Cost rate for General Plan A-Court and General Plan A-VOM is developed on a pooled basis. Effective with the December 31, 2015 valuation, the Normal Cost rate for General Plan A-VOM is further adjusted relative to the Normal Cost rate for General Plan A-Court to reflect the different cashouts at the two employers. However, a pooled Normal Cost rate has been calculated for General-Plan B for all three employers upon the implementation of that Plan effective January 1, 2013. Any new General UAAL for Plan A and Plan B is pooled and then allocated between General-County, General-Court and General-VOM based on the proportions of their payroll to the total General payroll.
<u>Other Actuarial Methods</u>	
Employer Contributions:	Employer contributions consist of two components: *Normal Cost* The annual contribution rate that, if paid annually from a member’s first year of membership through the year of retirement, would accumulate to the amount necessary to fully fund the member's retirement-related benefits. Accumulation includes annual crediting of interest at the assumed investment earning rate. The contribution rate is determined as a level percentage of the member’s compensation. *Contribution to the Unfunded Actuarial Accrued Liability (UAAL)* The annual contribution rate that, if paid annually over the UAAL amortization period, would accumulate to the amount necessary to fully fund the UAAL. Accumulation includes annual crediting of interest at the assumed investment earning rate. The contribution (or rate credit in the case of a negative UAAL) is calculated to remain as a level percentage of future active member payroll (including payroll for new members as they enter the 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 payroll growth rate assumption. The recommended employer contributions are provided in *Section 2, Subsection F*.

Member Contributions:

Normal Cost

Plan A Members

Articles 6 and 6.8 of the CERL define the methodology to be used in the calculation of member basic contribution rates for General Plan A members and Safety Plan A members, respectively. The basic contribution rate is determined so that the accumulation of a member's basic contributions made in a given year until a certain age will be sufficient to fund an annuity at that age that is equal to 1/100 of Final Average Compensation for General and Safety members. That age is 55 for General members and 50 for Safety members. It is assumed that contributions are made annually at the same rate, starting at entry age. Accumulation includes semi-annual crediting of interest at one-half of the assumed investment earning rate.

Active members represented by some of the bargaining groups have agreed to pay additional employee normal cost contributions that are above those determined under the CERL as permitted under CalPEPRA. As the specific amount of those higher contributions are dependent on the specific bargaining agreements, we have continued to include only the minimum member contribution rates in this report. The final member rates adjusted to include the additional employee normal cost contributions will be provided in side letters based on the terms of the bargaining agreements.

Plan B Members

Pursuant to Section 7522.30(a) of the Government Code, CalPEPRA 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 the CalPEPRA members. Also of note is that based on our recommendation, SCERA has decided to use the discretion made available by AB1380 to no longer round the member's contribution rate to the nearest ¼% as previously required by CalPEPRA.

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

Contribution to the Unfunded Actuarial Accrued Liability (UAAL)

General-County and General-Court members (excluding Valley of the Moon) pay an additional UAAL contribution amount equal to 3.03% of payroll for a 20-year period from July 1, 2004 to June 30, 2024. Safety-County members (excluding Valley of the Moon) pay an additional UAAL contribution amount equal to 3.00% of payroll from February 1, 2005 through the last pay period in June 2023. These rates are subtracted from the employer's UAAL rates, after adjustment for refundability.

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. Plan A 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. Plan A contribution rates determined in this valuation have not been reduced for the Section 415 limitations. Actual limitations will result in gains as they occur.
Justification for Change in Actuarial Assumptions:	The following assumptions have been changed since the prior valuation as a result of the January 1, 2015 through December 31, 2017 Actuarial Experience Study:
Net Investment Return:	7.25%; net of administrative and investment expenses.
Employee Contribution Crediting Rate:	Net investment return credited semi-annually.
Payroll Growth:	Inflation of 3.00% per year plus "across the board" salary increases of 0.50% per year, used to amortize the Unfunded Actuarial Accrued Liability as a level percentage of payroll.
Increase in Section 7522.10 Compensation Limit:	Increase of 3.00% per year from the valuation date.

Justification for Change in Actuarial Assumptions (continued):

The following assumptions have been changed since the prior valuation as a result of the January 1, 2015 through December 31, 2017 Actuarial Experience Study (continued):

Salary Increases:

The annual rate of compensation increase includes: inflation at 3.00%, plus “across the board” 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	6.00%	8.50%
1 – 2	5.00	4.75
2 – 3	3.75	3.75
3 – 4	2.50	2.75
4 – 5	1.50	1.75
5 & Over	0.50	0.50

Post-Retirement Mortality Rates:

Healthy

- **General Members and All Beneficiaries:** Headcount-Weighted RP-2014 Healthy Annuitant Table projected 20 years with the two-dimensional scale MP-2014 set back one year for males and set forward one year for females.
- **Safety Members:** Headcount-Weighted RP-2014 Healthy Annuitant Table projected 20 years with the two-dimensional scale MP-2014 set back one year.

Disabled

- **General Members:** Headcount-Weighted RP-2014 Healthy Annuitant Table projected 20 years with the two-dimensional scale MP-2014 set forward five years.
- **Safety Members:** Headcount-Weighted RP-2014 Healthy Annuitant Table projected 20 years with the two-dimensional scale MP-2014 set forward four years.

Justification for Change in Actuarial Assumptions (continued):

The following assumptions have been changed since the prior valuation as a result of the January 1, 2015 through December 31, 2017 Actuarial Experience Study (continued):

Pre-Retirement Mortality Rates:

- **General and Safety Members:** Headcount-Weighted RP-2014 Employee Table projected 20 years with the two-dimensional scale MP-2014 times ½.

	Rate (%)			
	General		Safety	
Age	Male	Female	Male	Female
30	0.02%	0.01%	0.02%	0.01%
35	0.03	0.01	0.03	0.01
40	0.03	0.02	0.03	0.02
45	0.05	0.03	0.05	0.03
50	0.08	0.06	0.08	0.06
55	0.14	0.09	0.14	0.09
60	0.23	0.12	0.23	0.12

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

Mortality Rates for Member Contributions:

- **General Members:** Headcount-Weighted RP-2014 Healthy Annuitant Table projected 20 years with the two-dimensional scale MP-2014 set back one year for males and set forward one year for females weighted 33.33% male and 66.67% female.
- **Safety Members:** Headcount-Weighted RP-2014 Healthy Annuitant Table projected 20 years with the two-dimensional scale MP-2014 set back one year weighted 75% male and 25% female.

Justification for Change in Actuarial Assumptions (continued):

The following assumptions have been changed since the prior valuation as a result of the January 1, 2015 through December 31, 2017 Actuarial Experience Study (continued):

Disability Incidence:

Disability Incidence

	Rate (%)	
Age	**General**	**Safety**
20	0.05%	0.06%
25	0.05	0.16
30	0.08	0.38
35	0.13	0.65
40	0.18	0.90
45	0.29	1.60
50	0.38	2.30
55	0.43	2.80
60	0.51	0.00

50% of General disabilities are assumed to be service connected disabilities. The other 50% are assumed to be non-service connected disabilities.

95% of Safety disabilities are assumed to be service connected disabilities. The other 5% are assumed to be non-service connected disabilities.

Justification for Change in Actuarial Assumptions (continued):

The following assumptions have been changed since the prior valuation as a result of the January 1, 2015 through December 31, 2017 Actuarial Experience Study (continued):

Withdrawal:

Withdrawal (< 5 Years of Service)

Years of Service	Rate (%) General	Rate (%) Safety
Less than 1	6.00%	4.00%
1 – 2	4.00	2.40
2 – 3	3.00	1.60
3 – 4	2.50	1.60
4 – 5	2.00	1.60

Withdrawal (5+ Years of Service)

Age	Rate (%) General	Rate (%) Safety
20	1.50%	1.60%
25	1.50	1.60
30	1.50	1.26
35	1.05	0.70
40	0.60	0.34
45	0.44	0.14
50	0.34	0.00
55	0.24	0.00
60	0.14	0.00

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

Justification for Change in Actuarial Assumptions (continued):

The following assumptions have been changed since the prior valuation as a result of the January 1, 2015 through December 31, 2017 Actuarial Experience Study (continued):

Vested Termination:

Vested Termination (< 5 Years of Service)

Years of Service	Rate (%) General	Rate (%) Safety
Less than 1	6.25%	6.00%
1 – 2	5.50	4.00
2 – 3	4.00	4.00
3 – 4	3.00	4.00
4 – 5	3.00	4.00

Vested Termination (5+ Years of Service)

Age	Rate (%) General	Rate (%) Safety
20	3.00%	4.00%
25	3.00	4.00
30	3.00	3.40
35	3.00	2.10
40	2.40	1.05
45	2.00	0.60
50	2.00	0.00
55	1.70	0.00
60	1.50	0.00
65	1.20	0.00
70	0.00	0.00

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

Justification for Change in Actuarial Assumptions (continued):

The following assumptions have been changed since the prior valuation as a result of the January 1, 2015 through December 31, 2017 Actuarial Experience Study (continued):

Retirement Rates:

	Retirement Rates (%)					
	General			Safety		
Age	Plan A Less than 30 Years	Plan A 30 or More Years	Plan B	Plan A Less than 30 Years	Plan A 30 or More Years	Plan B
50	7.0%	10.0%	0.0%	14.0%	10.0%	4.0%
51	7.0	10.0	0.0	16.0	12.0	5.0
52	7.0	12.0	4.0	16.0	18.0	6.0
53	8.0	16.0	1.5	18.0	25.0	6.0
54	9.0	20.0	2.5	24.0	50.0	8.0
55	10.0	25.0	2.5	30.0	100.0	20.0
56	10.0	30.0	4.5	30.0	100.0	15.0
57	10.0	30.0	5.5	25.0	100.0	15.0
58	15.0	30.0	6.5	25.0	100.0	20.0
59	20.0	40.0	7.5	25.0	100.0	20.0
60	25.0	40.0	8.5	100.0	100.0	100.0
61	25.0	45.0	9.5	100.0	100.0	100.0
62	30.0	45.0	14.5	100.0	100.0	100.0
63	30.0	45.0	16.5	100.0	100.0	100.0
64	30.0	45.0	19.0	100.0	100.0	100.0
65	30.0	45.0	24.0	100.0	100.0	100.0
66	40.0	45.0	20.0	100.0	100.0	100.0
67	40.0	50.0	20.0	100.0	100.0	100.0
68	50.0	50.0	20.0	100.0	100.0	100.0
69	80.0	80.0	20.0	100.0	100.0	100.0
70	100.0	100.0	100.0	100.0	100.0	100.0

Justification for Change in Actuarial Assumptions (continued):	The following assumptions have been changed since the prior valuation as a result of the January 1, 2015 through December 31, 2017 Actuarial Experience Study (continued):
Retirement Age and Benefit for Deferred Vested Members:	General Retirement Age: 58 Safety Retirement Age: 52 Deferred vested members who terminate with less than five years of service and are not vested are assumed to retire at age 70 for both General and Safety if they decide to leave their contributions on deposit. 30% of future General and 45% of future Safety deferred vested members are assumed to continue to work for a reciprocal employer. For reciprocals, 4.00% compensation increases are assumed per annum.
Cashouts:	The following assumptions for a one-time compensation increase at retirement from vacation, sick leave and holiday cashouts are used: *Plan A County Members terminated prior to June 1, 2014:* General Members 4.00% Safety Members 6.00% *General Plan A Court Members:* General Members 4.00% The following assumptions for a one-time compensation increase at retirement from vacation and holiday cashouts are used: *Plan A VOM Members:* General Members 4.00% Safety Members 6.00%

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:	All permanent employees of the County of Sonoma or contracting district, scheduled to work at least 50% of a full-time position are eligible to become a member of the Retirement Association.
Plan A	All General and Safety members with membership dates before January 1, 2013.
Plan B	All General and Safety members with membership dates on or after January 1, 2013, without reciprocity.
Final Compensation for Benefit Determination:	
Plan A	Highest consecutive one year of compensation earnable (§31462.1)(FAC1).
Plan B	Highest consecutive three years of pensionable compensation (§7522.10(c), §7522.32 and §7522.34)(FAC3).
Service:	Years of service (Yrs) are generally based on a member's employment during a period of time for which deductions are made from their compensation.
Service Retirement Eligibility:	
General	
Plan A	Age 50 with 10 years of service credit, or age 70 regardless of service credit, or after 30 years of service credit regardless of age (§31672).
Plan B	Age 52 with 5 years of service credit (§7522.20(a)) or age 70 regardless of service credit.
Safety	
Plan A	Age 50 with 10 years of service credit, or age 70 regardless of service credit, or after 20 years of service credit regardless of age (§31663.25).
Plan B	Age 50 with 5 years of service credit (§7522.25(d)) or age 70 regardless of service credit.

Benefit Formula:		
General Plan A – County (§31676.17)	**Retirement Age**	**Benefit Formula**
	50	2.00% x (FAC1 – $1,400) x Yrs
	55	2.50% x (FAC1 – $1,400) x Yrs
	60 and over	3.00% x (FAC1 – $1,400) x Yrs
General Plan A – Court (§31676.17)	**Retirement Age**	**Benefit Formula**
	50	2.00% x (FAC1 – $1,400) x Yrs
	55	2.50% x (FAC1 – $1,400) x Yrs
	60 and over	3.00% x (FAC1 – $1,400) x Yrs
General Plan A – Valley of the Moon (§31676.17)	**Retirement Age**	**Benefit Formula**
	50	2.00% x FAC1 x Yrs
	55	2.50% x FAC1 x Yrs
	60 and over	3.00% x FAC1 x Yrs
General Plan B (§7522.20(a))	**Retirement Age**	**Benefit Formula**
	52	1.00% x FAC3 x Yrs
	55	1.30% x FAC3 x Yrs
	60	1.80% x FAC3 x Yrs
	62	2.00% x FAC3 x Yrs
	65	2.30% x FAC3 x Yrs
	67 and over	2.50% x FAC3 x Yrs
Safety Plan A – County (§31664.1)	**Retirement Age**	**Benefit Formula**
	50 and over	3.00% x (FAC1 – $1,400) x Yrs
Safety Plan A – Valley of the Moon (§31664.1)	**Retirement Age**	**Benefit Formula**
	50 and over	3.00% x FAC1 x Yrs
Safety Plan B (§7522.25(d))	**Retirement Age**	**Benefit Formula**
	50	2.00% x FAC3 x Yrs
	55	2.50% x FAC3 x Yrs
	57 and over	2.70% x FAC3 x Yrs

Maximum Benefit:	
Plan A	100% of Final Average Compensation (§31676.17, §31664.1).
Plan B	None.
Non-Service Connected Disability:	
General Plan A Members	
Eligibility	Five years of service (§31720).
Benefit Formula	1.8% of Final Average Compensation per year of service. If the benefit does not exceed one-third of Final Average Compensation, the service is projected to 62, but the total projected benefit cannot be more than one-third of Final Average Compensation (§31727.1). The Service Retirement benefit is payable, if greater.
Safety Plan A Members	
Eligibility	Five years of service (§31720).
Benefit Formula	1.8% of Final Average Compensation per year of service. If the benefit does not exceed one-third of Final Average Compensation, the service is projected to 55, but the total projected benefit cannot be more than one-third of Final Average Compensation (§31727.2). The Service Retirement benefit is payable, if greater.
All Plan B Members	
Eligibility	Five years of service (§31720).
Benefit Formula	1.5% of Final Average Compensation per year of service. If the benefit does not exceed one-third of Final Average Compensation, the service is projected to 65, but the total projected benefit cannot be more than one-third of Final Average Compensation (§31727). The Service Retirement benefit is payable, if greater.
Service Connected Disability:	
All Members	
Eligibility	No age or service requirements (§31720).
Benefit Formula	50% of the Final Average Compensation or 100% of Service Retirement benefit, if larger (§31727.4).

Pre-Retirement Death:	
All Members	
Eligibility	None.
Basic lump sum benefit	Refund of employee contributions with interest, plus one month's compensation for each year of service, to a maximum of six months' compensation (§37181).
Service Connected Death	50% of Final Compensation or 100% of Service Retirement benefit, if greater, payable to spouse or registered domestic partner (§31787).
Vested Members	
Eligibility	Five years of service.
Basic benefit	60% of the greater of Service Retirement or Non-Service Connected Disability benefit payable to surviving eligible spouse or registered domestic partner (§31765.1, §31781.1), in lieu of the basic lump sum benefit above.
Service Connected Death	50% of Final Compensation or 100% of Service Retirement benefit, if greater, payable to spouse or registered domestic partner (§31787).
Death After Retirement:	
All Members	
Service Retirement or Non Service Connected Disability Retirement	Unless another option was selected at retirement, 60% of member's unmodified allowance continued to eligible spouse or registered domestic partner (§31760.1).
Service Connected Disability Retirement	Unless another option was selected at retirement, 100% of member's unmodified allowance continued to eligible spouse or registered domestic partner (§31786).
Withdrawal Benefits:	
Less than Five Years of Service	Refund of accumulated employee contributions with interest, or benefit at age 70 (§31628). A member may also elect to leave contributions on deposit in the retirement fund (§31629.5).
Five or More Years of Service	If contributions left on deposit, eligible for retirement benefits at any time after eligible to retire (§31700).

Member Contributions:	Please refer to *Section 4, Exhibit III* for specific rates.
General Plan A	Entry-age based rates that provide for an annuity at age 55 equal to 1/100 of FAC1. (§31621.8)
General Plan B	50% of the total Normal Cost rate.
Safety Plan A	Entry-age based rates that provide for an annuity at age 50 equal to 1/100 of FAC1. (§31639.25)
Safety Plan B	50% of the total Normal Cost rate.
Additional Contributions	
General – County & Courts	An additional UAAL contribution amount equal to 3.03% of payroll will be paid from July 1, 2004 to June 30, 2024.
Safety – County	An additional UAAL contribution amount equal to 3.00% of payroll will be paid from February 1, 2005 through the last pay period in June 2023.
Other Information:	Safety Plan A members with 30 or more years of service are exempt from paying member contributions. The same applies for General Plan A members hired on or before March 7, 1973.
Changes in Plan Provisions:	There have been no changes in plan provisions since the last valuation.

Note: The summary of major plan provisions is designed to outline principal plan benefits as interpreted for purposes of the actuarial valuation. If the 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

Comparison of Total Member Rate(1) from December 31, 2018 (New) and December 31, 2017 (Current) Valuations

General Plan A – County(2)

Entry Age	Current	New	Change
25	7.32%	7.61%	**0.29%**
35	8.75%	9.17%	**0.42%**
45	10.49%	11.02%	**0.53%**

Safety Plan A – County(4)

Entry Age	Current	New	Change
25	8.30%	8.96%	**0.66%**
35	9.92%	10.69%	**0.77%**
45	12.11%	12.59%	**0.48%**

General Plan A – Court(2)

Entry Age	Current	New	Change
25	7.58%	7.89%	**0.31%**
35	9.05%	9.50%	**0.45%**
45	10.84%	11.39%	**0.55%**

Safety Plan A – VOM

Entry Age	Current	New	Change
25	8.78%	9.22%	**0.44%**
35	10.48%	10.99%	**0.51%**
45	12.68%	12.89%	**0.21%**

General Plan A – VOM

Entry Age	Current	New	Change
25	7.60%	7.76%	**0.16%**
35	9.08%	9.34%	**0.26%**
45	10.87%	11.22%	**0.35%**

Safety Plan B – County(4)

Entry Age	Current	New	Change
Any(3)	10.98%	12.40%	**1.42%**

General Plan B(2)

Entry Age	Current	New	Change
Any(3)	7.34%	7.45%	**0.11%**

Safety Plan B – VOM

Entry Age	Current	New	Change
Any(3)	9.97%	11.99%	**2.02%**

(1) For Plan A integrated member’s, contributions for the first $350 of monthly payroll are based on 2/3 of the above rates.

(2) Rates exclude an additional UAAL contribution rate of 3.03% of payroll payable from July 1, 2004 to June 30, 2024 for County and Court members only.

(3) Plan B member rates are independent of entry age.

(4) Rates exclude an additional UAAL contribution rate of 3.00% of payroll payable from February 1, 2005 to the last pay period in June 2023 for County members only.

EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

General Members' Contribution Rates Based on the December 31, 2018 Actuarial Valuation (as a % of monthly payroll)

General – Plan A					
	County		Court		VOM
Entry Age	First $350(1)	Over $350	First $350(1)	Over $350	All Eligible Pay
16	4.29%	6.43%	4.45%	6.67%	6.56%
17	4.37%	6.56%	4.53%	6.80%	6.69%
18	4.45%	6.68%	4.62%	6.93%	6.81%
19	4.54%	6.81%	4.71%	7.06%	6.94%
20	4.62%	6.94%	4.79%	7.19%	7.07%
21	4.71%	7.07%	4.89%	7.33%	7.21%
22	4.80%	7.20%	4.98%	7.47%	7.34%
23	4.89%	7.34%	5.07%	7.61%	7.48%
24	4.98%	7.47%	5.17%	7.75%	7.62%
25	5.08%	7.61%	5.26%	7.89%	7.76%
26	5.17%	7.76%	5.36%	8.04%	7.91%
27	5.27%	7.90%	5.46%	8.19%	8.05%
28	5.37%	8.05%	5.56%	8.34%	8.21%
29	5.47%	8.20%	5.67%	8.50%	8.36%
30	5.57%	8.35%	5.77%	8.66%	8.51%
31	5.67%	8.51%	5.88%	8.82%	8.67%
32	5.78%	8.67%	5.99%	8.98%	8.84%
33	5.89%	8.83%	6.10%	9.15%	9.00%
34	6.00%	9.00%	6.22%	9.32%	9.17%
35	6.11%	9.17%	6.33%	9.50%	9.34%
36	6.23%	9.34%	6.45%	9.68%	9.52%
37	6.35%	9.52%	6.58%	9.86%	9.71%
38	6.47%	9.71%	6.70%	10.05%	9.89%
39	6.60%	9.90%	6.83%	10.25%	10.09%
40	6.72%	10.07%	6.95%	10.43%	10.26%

EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

General – Plan A (continued)					
	County		Court		VOM
Entry Age	First $350[(1)]	Over $350	First $350[(1)]	Over $350	All Eligible Pay
41	6.83%	10.25%	7.07%	10.61%	10.44%
42	6.96%	10.44%	7.20%	10.80%	10.63%
43	7.08%	10.63%	7.33%	10.99%	10.82%
44	7.21%	10.82%	7.46%	11.19%	11.02%
45	7.34%	11.02%	7.59%	11.39%	11.22%
46	7.48%	11.22%	7.73%	11.60%	11.42%
47	7.63%	11.44%	7.88%	11.81%	11.64%
48	7.77%	11.65%	8.02%	12.02%	11.85%
49	7.91%	11.86%	8.15%	12.23%	12.06%
50	8.00%	12.00%	8.24%	12.36%	12.19%
51	8.04%	12.06%	8.26%	12.39%	12.24%
52	8.02%	12.04%	8.22%	12.33%	12.19%
53	7.98%	11.98%	8.13%	12.19%	12.09%
54 & Over	7.92%	11.88%	7.92%	11.88%	11.88%

Interest:	7.00% per annum
COLA:	0.00%
Mortality:	See *Section 4, Exhibit I*
Salary Increase:	Inflation (2.75%) + Across-the-Board Increase (0.50%) + Merit (See *Section 4, Exhibit I*)

Note: The above rates exclude an additional UAAL contribution rate of 3.03% of payroll payable from July 1, 2004 to June 30, 2024 for County and Court members only.

(1) For integrated members only.

EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

General Members' Contribution Rates Based on the December 31, 2018 Actuarial Valuation (as a % of monthly payroll)

General – Plan B	
Entry Age	All Eligible Pay(1)
All Members	7.45%

Interest:	7.00% per annum
COLA:	0.00%
Mortality:	See *Section 4, Exhibit I*
Salary Increase:	Inflation (2.75%) + Across-the-Board Increase (0.50%) + Merit (See *Section 4, Exhibit I*)

Note: The above rates exclude an additional UAAL contribution rate of 3.03% of payroll payable from July 1, 2004 to June 30, 2024 for County and Court members only.

(1) It is our understanding that in the determination of pension benefits under the CalPEPRA 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 (reference: Section 7522.10). These amounts should be adjusted for changes to the Consumer Price Index for All Urban Consumers after 2019 (reference: Section 7522.10(d)).

EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

Safety Members' Contribution Rates Based on the December 31, 2018 Actuarial Valuation (as a % of monthly payroll)

Safety – Plan A			
	County		VOM
Entry Age	First $350[1]	Over $350	All Eligible Pay
16	5.12%	7.67%	7.90%
17	5.20%	7.81%	8.04%
18	5.29%	7.94%	8.17%
19	5.39%	8.08%	8.32%
20	5.48%	8.22%	8.46%
21	5.57%	8.36%	8.60%
22	5.67%	8.50%	8.75%
23	5.77%	8.65%	8.90%
24	5.87%	8.80%	9.06%
25	5.97%	8.96%	9.22%
26	6.07%	9.11%	9.38%
27	6.18%	9.27%	9.54%
28	6.29%	9.43%	9.71%
29	6.40%	9.60%	9.88%
30	6.51%	9.77%	10.05%
31	6.63%	9.95%	10.23%
32	6.75%	10.13%	10.42%
33	6.88%	10.32%	10.61%
34	7.01%	10.51%	10.81%
35	7.12%	10.69%	10.99%
36	7.25%	10.87%	11.17%
37	7.35%	11.03%	11.34%
38	7.47%	11.20%	11.51%
39	7.59%	11.38%	11.69%
40	7.71%	11.57%	11.88%

EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

Safety – Plan A (continued)			
	County		VOM
Entry Age	First \$350[1]	Over \$350	All Eligible Pay
41	7.85%	11.78%	12.09%
42	8.00%	12.00%	12.31%
43	8.17%	12.25%	12.56%
44	8.34%	12.51%	12.82%
45	8.40%	12.59%	12.89%
46	8.43%	12.65%	12.93%
47	8.43%	12.64%	12.89%
48	8.31%	12.47%	12.65%
49 & Over	8.17%	12.25%	12.25%

Interest:	7.00% per annum
COLA:	0.00%
Mortality:	See *Section 4, Exhibit I*
Salary Increase:	Inflation (2.75%) + Across-the-Board Increase (0.50%) + Merit (See *Section 4, Exhibit I*)

Note: The above rates exclude an additional UAAL contribution rate of 3.00% of payroll payable from February 1, 2005 to the last pay period in June 2023 for County members only.

(1) For integrated members only.

EXHIBIT III – MEMBER CONTRIBUTION RATES (CONTINUED)

Safety Members' Contribution Rates Based on the December 31, 2018 Actuarial Valuation (as a % of monthly payroll)

Safety – Plan B			
Plan B – County		Plan B – VOM	
Entry Age	All Eligible Pay(1)	Entry Age	All Eligible Pay(1)
All Members	12.40%	All Members	11.99%

Interest:	7.00% per annum
COLA:	0.00%
Mortality:	See *Section 4, Exhibit I*
Salary Increase:	Inflation (2.75%) + Across-the-Board Increase (0.50%) + Merit (See *Section 4, Exhibit I*)

Note: The above rates exclude an additional UAAL contribution rate of 3.00% of payroll payable from February 1, 2005 to the last pay period in June 2023 for County members only.

(1) It is our understanding that in the determination of pension benefits under the CalPEPRA 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 (reference: Section 7522.10). These amounts should be adjusted for changes to the Consumer Price Index for All Urban Consumers after 2019 (reference: Section 7522.10(d)).

EXHIBIT IV – AVERAGE EMPLOYER CONTRIBUTION RATES

The following chart displays the historical and future average employer contribution rates, broken down by normal cost and unfunded actuarial accrued liability. These rates have not been adjusted for any contribution rate phase-in (if applicable).

Weighted Average Employer Contribution Rate for All Groups

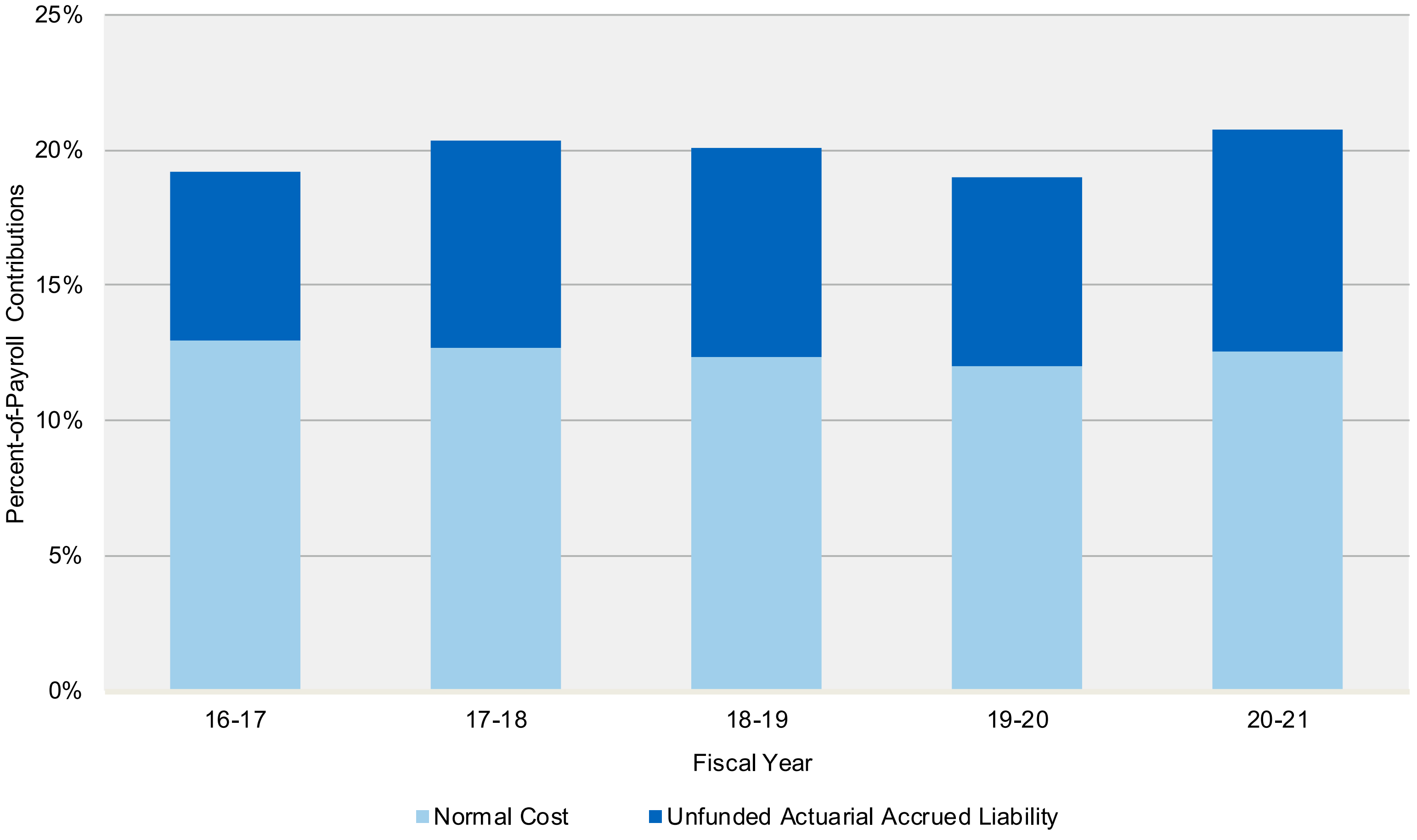


EXHIBIT V – RESERVES

The following chart displays the 5-year historical reserves balance after “true-up”.

Five Year Comparison of Reserves Submitted for the December 31, 2018 Valuation

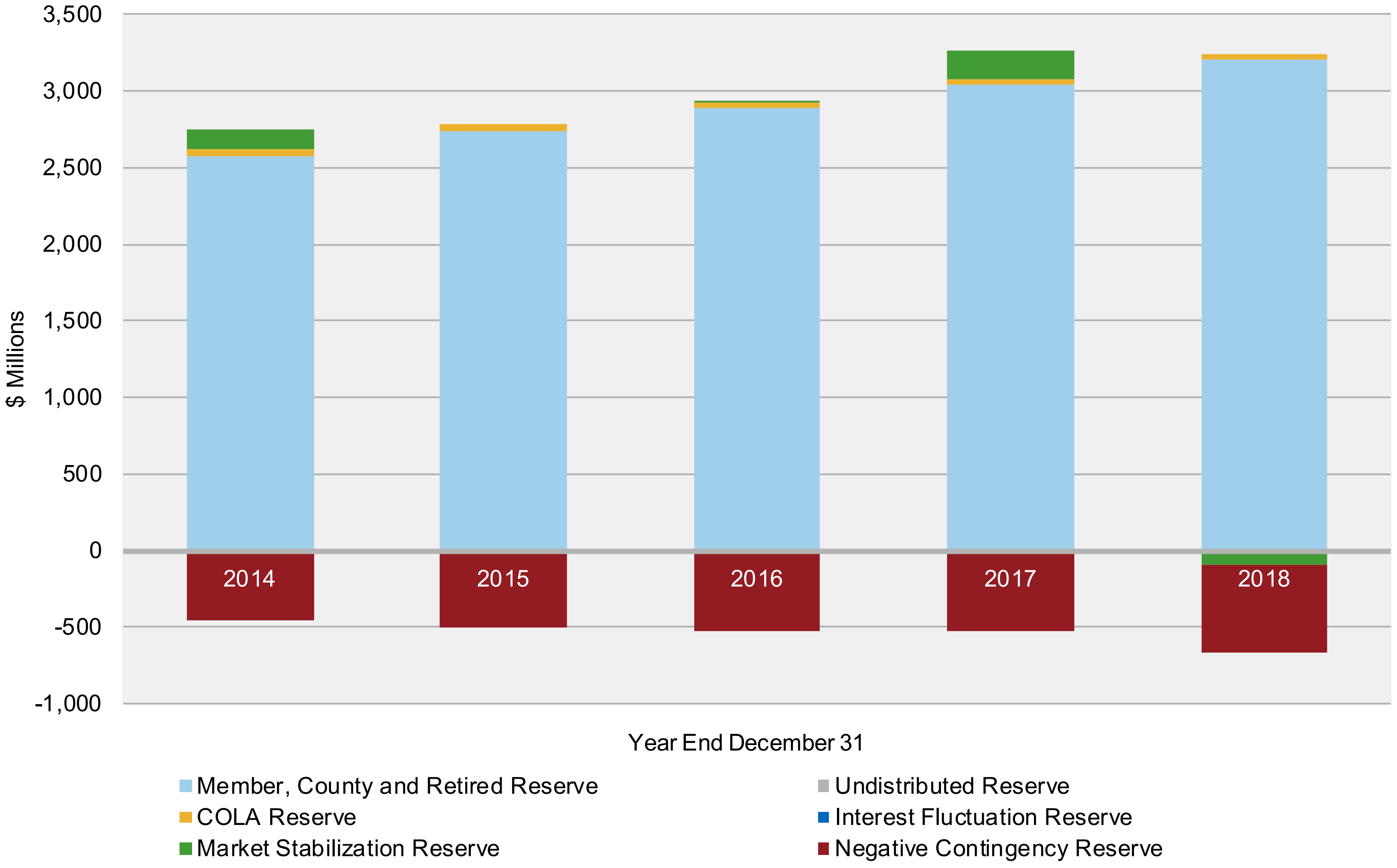


EXHIBIT VI – SCHEDULE OF EMPLOYER CONTRIBUTIONS

Plan Year Ended December 31	Annual Required Contributions	Actual Contributions	Percentage Contributed
2009	$47,577,000(1)	$47,577,000	100.0%(1)
2010	48,426,000(2)	48,426,000(3)	100.0%(2)
2011	35,711,000(4)	35,711,000	100.0%(4)
2012	45,079,000(2)	45,079,000	100.0%(2)
2013	51,852,000(5)	51,852,000	100.0%(5)
2014	61,179,000(6)	61,179,000	100.0%(6)
2015	64,687,000	68,240,000	105.5%
2016	63,640,000	63,640,000	100.0%
2017	63,822,000	63,822,000	100.0%
2018	67,425,000	67,425,000	100.0%

Note: Reference to GASB is under the old Statements 25 and 27.

(1) Determined using an amortization period of about 29 years (an amortization period of up to 30 years was allowed by GASB).

(2) Determined using an amortization period of about 26 years (an amortization period of up to 30 years was allowed by GASB).

(3) Excludes $289.3 million in proceeds from issuance of Pension Obligation Bonds.

(4) Determined using an amortization period of about 23 years (an amortization period of up to 30 years was allowed by GASB).

(5) Determined using an amortization period of about 27 years (an amortization period of up to 30 years was allowed by GASB).

(6) Determined using an amortization period of about 28 years (an amortization period of up to 30 years was allowed by GASB).