



AGENDA

RETIREMENT BOARD MEETING

REGULAR MEETING
August 9, 2017
9:00 a.m.

Retirement Board Conference Room
The Willows Office Park
1355 Willow Way, Suite 221
Concord, California

THE RETIREMENT BOARD MAY DISCUSS AND TAKE ACTION ON THE FOLLOWING:

1. Pledge of Allegiance.
2. Accept comments from the public.
3. Approve minutes from the June 14, 2017 meeting.
4. Routine items for August 9, 2017.
 - a. Approve certifications of membership.
 - b. Approve service and disability allowances.
 - c. Accept disability applications and authorize subpoenas as required.
 - d. Approve death benefits.
 - e. Accept Asset Allocation Report.

CLOSED SESSION

5. The Board will go into closed session to consider the Hearing Officer's recommendation regarding the disability application for Ramona Anguiano.
6. The Board will go into closed session pursuant to Govt. Code Section 54956.9(d)(2) to confer with legal counsel regarding potential litigation (one case).

OPEN SESSION

7. Presentation from Segal regarding the December 31, 2016 Valuation Report.
8. Consider and take possible action to adopt the December 31, 2016 Valuation Report and contribution rates for the period July 1, 2018 – June 30, 2019.
9. Update on audit committee composition by Board chair.
10. Consider authorizing the attendance of Board and/or staff:
 - a. Debt, Income and Real Estate Opportunities, Torchlight Investors, October 3-4, 2017, New York, NY.

The Retirement Board will provide reasonable accommodations for persons with disabilities planning to attend Board meetings who contact the Retirement Office at least 24 hours before a meeting.

- b. 63rd Annual Employee Benefits Conference, IFEBP, October 22-25, 2017, Las Vegas, NV. (Note: Conflict with meeting)
- c. 2017 Invesco Real Estate Global Client Conference, Invesco, November 7-9, 2017, La Jolla, CA. (Note: Conflict with meeting)

11. Miscellaneous

- a. Staff Report
- b. Outside Professionals' Report
- c. Trustees' comments

The Retirement Board will provide reasonable accommodations for persons with disabilities planning to attend Board meetings who contact the Retirement Office at least 24 hours before a meeting.



Meeting Date
08/09/17
Agenda Item
#3

MINUTES

RETIREMENT BOARD MEETING MINUTES

REGULAR MEETING
June 14, 2017
9:00 a.m.

Retirement Board Conference Room
The Willows Office Park
1355 Willow Way, Suite 221
Concord, California

Present: Debora Allen, Candace Andersen, Scott Gordon, Jerry Holcombe, David MacDonald, John Phillips, William Pigeon, Todd Smithey, Jerry Telles and Rusty Watts

Absent: Louie Kroll and Gabe Rodrigues

Staff: Gail Strohl, Chief Executive Officer; Christina Dunn, Deputy Chief Executive Officer; Karen Levy, General Counsel; Wrally Dutkiewicz, Compliance Officer; Henry Gudino, Accounting Manager; and Tim Hoppe, Retirement Services Manager

Outside Professional Support: Harvey Leiderman Representing: Reed Smith LLP

1. Pledge of Allegiance

Pigeon led all in the *Pledge of Allegiance*.

2. Accept comments from the public

No member of the public offered comment.

3. Approval of Minutes

It was M/S/C to approve the minutes of the April 26, 2017 meeting with the following corrections – On Staff Present add Retirement Services Manager after Tim Hoppe’s name and on page 2, fourth paragraph, third line, add a comma after the word managers. (Yes: Allen, Andersen, Gordon, MacDonald, Phillips, Pigeon, Smithey, Telles and Watts).

It was M/S/C to approve the minutes of the May 10, 2017 meeting. (Yes: Allen, Andersen, Gordon, MacDonald, Phillips, Pigeon, Smithey, Telles and Watts).

4. Routine Items

It was M/S/C to approve the routine items of the June 14, 2017 meeting. (Yes: Allen, Andersen, Gordon, MacDonald, Phillips, Pigeon, Smithey, Telles and Watts)

CLOSED SESSION

The Board moved into closed session pursuant to Govt. Code Section 54957.

The Board moved into open session.

5. It was **M/S/C** to accept the Medical Advisor's recommendation and grant the following disability benefits:
 - a. LeRhonda Birden – Service Connected (Yes: Allen, Andersen, MacDonald, Phillips, Pigeon, Smithey, Telles and Watts. No: Gordon)

6. **Consider and take possible action regarding non-service connected disability retirement allowance of deceased member Brenda Parker**

Hoppe reported this is an application for a Tier 3 employee, Brenda Parker, who passed away and had a Member Election Form for Non-Service Disability in the Event of Death During Active Membership on file. He stated the Board's Medical Advisor analyzed Ms. Parker's medical records and determined she is eligible for a non-service connected disability. Hoppe recommended a non-service connected disability retirement be granted and the member's beneficiary be granted Optional Settlement 2 allowance benefits pursuant to Government Code Section 31762.

After a discussion, it was **M/S/C** to: 1) Find that the member was permanently unable to engage in any substantial gainful employment and grant a non-service connected disability retirement, effective May 2, 2016; and 2) Grant the member's beneficiary (member's daughter) benefits pursuant to Government Code Section 31762 (Optional Settlement allowance for the life of the named beneficiary). (Yes: Allen, Andersen, Gordon, MacDonald, Phillips, Pigeon, Smithey, Telles and Watts)

7. **Presentation on communication to employers and members concerning the review of improper compensation enhancements and review results**

Strohl reported that at the March 8, 2017 meeting the Board requested information on verbal and written communications provided to the members regarding improper compensation enhancements. She reviewed the disclaimer language that has been added to the member communications that were included in the agenda packet. Hoppe reported a second slide with a disclaimer has been added to the group counseling presentation. Strohl noted there will be periodic summaries of the compensation enhancement reviews provided to the Board in the future.

There was discussion regarding the terms "improper" and "excess" in the written materials and also on employer/employee responsibilities in determining pay codes that are compensable. The Board recommended several changes to the communications.

Dutkiewicz reviewed the summary of the number of compensation enhancement reviews conducted between 2013-May 2017 and their outcomes.

8. **Consider and take possible action to:**

- a. Adopt Board of Retirement Resolution 2017-2 to increase the salary of the Chief Executive Officer by 4.5% effective July 1, 2017.
- b. Authorize the Board Chairperson to execute the amended and restated employment agreement for the Chief Executive Officer effective July 1, 2017.

Smithey reported the Ad Hoc Committee met regarding contract changes, evaluations were compiled and a review was held. Based on the information collected, the Committee recommended a 4.5% increase for merit and cost of living effective July 1, 2017 and to amend the current 3-month severance package to a 6-month termination for no-cause in exchange for a release of claims.

Trustee Watts reviewed grammatical changes that needed to be made to the contract.

It was M/S/C to adopt Board of Retirement Resolution 2017-2 to increase the salary of the Chief Executive Officer by 4.5% effective July 1, 2017 and to authorize the Board Chairperson to execute the amended and restated employment agreement for the Chief Executive Officer effective July 1, 2017. (Yes: Allen, Andersen, Gordon, MacDonald, Phillips, Pigeon, Smithey, Telles and Watts)

9. **Consider and take possible action to adopt Board of Retirement Resolution 2017-3 to increase the salary ranges by 3% for all unrepresented classifications effective July 1, 2017, with the exception of the Chief Executive Officer**

Strohl recommended increasing all unrepresented salary ranges by 3% and adopting Resolution 2017-3 effective July 1, 2017. Trustee Telles asked for clarification on the maximum amount allowed on a vacation buy back. Dunn stated it is 1/3 of their annual accrual and not the maximum cumulative hours.

It was M/S/C to adopt Board of Retirement Resolution 2017-3 to increase the salary ranges by 3% for all unrepresented classifications effective July 1, 2017, with the exception of the Chief Executive Officer. (Yes: Allen, Andersen, Gordon, MacDonald, Phillips, Pigeon, Smithey, Telles and Watts)

10. **Consider and take possible action to adopt CCCERA Position Pay Schedules effective July 1, 2017 which reflect the salary range changes in Board of Retirement Resolutions 2017-2 and 2017-3**

Strohl reported this is an updated pay schedule.

It was M/S/C to adopt CCCERA Position Pay Schedules effective July 1, 2017 which reflect the salary range changes in Board of Retirement Resolutions 2017-2 and 2017-3. (Yes: Allen, Andersen, Gordon, MacDonald, Phillips, Phillips, Smithey, Telles and Watts)

11. **Legislative updated**

Levy and Leiderman gave an update on pending legislation as detailed in the memorandum noting the bills on the last page do not apply to CCCERA.

12. **Miscellaneous**

(a) Staff Report –

Strohl reported Brown Armstrong will be at the next Board meeting to present the results of the 2016 audit; and, the current building owners will be doing exterior work on the building and will also be redoing the hallway and lobby.

Gudino reported there is an Audit Committee meeting following the Board meeting; he will be providing an update of the actual expenditures to the 2016 budget at the next meeting; staff is working on a plan to invoice employer districts for actuarial and audit fees related to the GASB 68 audit implementation; and, he provided an update on implementation of online banking in accounting.

(b) Outside Professionals' Report -

None

(c) Trustees' comments –

Andersen reported the Board of Supervisors held Trustee interviews noting Trustee Allen withdrew her application. She also reported Trustee Phillips and Trustee Holcombe were reappointed. Jay Kwon, an employee of the City of San Jose Retirement System, was appointed as the alternate Trustee.

Allen reported this will be her last meeting. She thanked everyone stating this truly was the best learning opportunity in her life and she enjoyed getting to know everyone. She encouraged the Board to continue to look at the future stability of pension plans for future generations.

She requested the meeting be adjourned in memory of the three UPS employees that died in San Francisco.

Gordon thanked Allen for her leadership and said he learned a lot from her.

It was **M/S/C** to adjourn the meeting in memory of Wayne Chan, Benson Louie, and Michael Lefiti. (Yes: Allen, Andersen, Gordon, MacDonald, Phillips, Pigeon, Smithey, Telles and Watts)

John Phillips, Chairman

Scott Gordon, Secretary

CONTRA COSTA COUNTY EMPLOYEES' RETIREMENT ASSOCIATION

BOARD OF RETIREMENT

Meeting Date
08/09/17
Agenda Item
#4

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August 9, 2017

Items requiring Board Action

A. Certifications of Membership – see list and classification forms.

B. Service and Disability Retirement Allowances:

<u>Name</u>	<u>Number</u>	<u>Effective Date</u>	<u>Option Type</u>	<u>Group</u>	<u>Selected</u>
Beasley, Debbi	D9500	04/01/17	SR	Tier III	Unmod
Chaney, Charlene	61506	03/31/17	SR	Tier II and III	Unmod
Colon, James	D7830	03/30/17	SR	Tier I and Safety A	Unmod
Deatherage, Michael	42369	05/06/17	SR	Tier II	Unmod
Dexter, Sean	47424	05/02/17	SR	Safety A	Unmod
Graner, Reed	66573	03/31/17	SR	Tier I	Unmod
Hanaway, Sharlene	63432 A/P	05/31/17	SR	Tier I	Unmod
Lee, Yong	50844	04/11/17	SR	Tier II and III	Unmod
Martinez, Azyadeth	72113	06/01/17	SR	Tier III	Unmod
Martinez, Christopher	54818	04/14/17	SR	Safety A	Unmod
McClure, Brian	55312	04/14/17	SR	Safety A	Option 2
Nelson, Mary	D7830	05/01/17	SR	Tier I	Unmod
Owyang, Robert	71955	05/01/17	SR	Tier III	Unmod
Pope, Gloria	62755	03/31/17	SR	Tier II and III	Unmod
Potts, Thomas	45745	03/31/17	SR	Tier II and III	Unmod
Puruganan, Mary	43986	03/31/17	SR	Tier III	Unmod
Quintero, Rosa	52445	03/31/17	SR	Tier II and III	Unmod
Russell-Sanders, Linda	66506	04/20/17	SR	Tier II and III	Option 1
Samm, Natalie	44580	05/08/17	SR	Tier II and III	Unmod
Shipe, Judith	37506	05/31/17	SR	Tier II and III	Unmod
Simmons, Mark	46851	02/28/17	SR	Tier II and III	Unmod
Thompson, James	72020	05/01/17	SR	Tier III	Unmod
Trilevsky, Mark	D7830	03/28/17	SR	Safety A	Unmod
Valdivia, Carmen	49314	06/01/17	SR	Tier III	Unmod
Weiss, Elizabeth	61202	04/30/17	SR	Tier II and III	Unmod
White, Sana	64574	04/12/17	SR	Tier II and III	Unmod

KEY:

Group
 I = Tier I
 II = Tier II
 III = Tier III
 S/A = Safety Tier A
 S/C = Safety Tier C

Option
 * = County Advance
 Selected w/option

Type
 NSP = Non-Specified
 SCD = Service Connected Disability
 SR = Service Retirement
 NSCD = Non-Service Connected Disability

CONTRA COSTA COUNTY EMPLOYEES' RETIREMENT ASSOCIATION

BOARD OF RETIREMENT

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August 9, 2017

C.

Disability Retirement Applications: The Board's Hearing Officer is hereby authorized to issue subpoenas in the f

<u>Name</u>	<u>Number</u>	<u>Filed</u>	<u>Type</u>
Probert-Kurtz, Natalie	D7830	07/10/17	SCD

D.

<i>Deaths:</i> <u>Name</u>	<u>Date of Death</u>	<u>Employer as of Date of Death</u>
Benner, James	04/28/17	Beneficiary
Benson, Harry	06/22/17	Contra Costa County
Briody, Madeline	03/03/17	Contra Costa County
Gery, Steven	07/05/17	San Ramon Valley Fire District
Guzman, Jerry	05/21/17	Contra Costa County
Hamilton, William	07/12/17	Contra Costa County
Hernandez, Margarita	06/20/17	Contra Costa County
Lopez, Tilo David	06/27/17	Housing Authority
Martinez, Deborah	06/29/17	Contra Costa County/Beneficiary
Sherwood, Frances	06/26/17	Contra Costa County
Thompson, Charles	07/01/17	Contra Costa County
Walden, Herman	07/18/17	Contra Costa County
Wheatley, Betty	07/23/17	Contra Costa County

KEY:

Group
 I = Tier I
 II = Tier II
 III = Tier III
 S/A = Safety Tier A
 S/C = Safety Tier C

Option
 * = County Advance
 Selected w/option

Type
 NSP = Non-Specified
 SCD = Service Connected Disability
 SR = Service Retirement
 NSCD = Non-Service Connected Disability

CERTIFICATION OF MEMBERSHIPS

<i>Name</i>	<i>Employee Number</i>	<i>Tier</i>	<i>Membership Date</i>	<i>Employer</i>
Abiyeva, Madina	84213	S/E	05/01/17	Contra Costa County
Anderson, Brenda A.	65147	III	05/01/17	Contra Costa County
Aquino, Elijah Yor R.	84636	P5.2	05/01/17	Contra Costa County
Arata, Brandon A.	84647	P5.2	05/01/17	Contra Costa County
Arsenault, Michelle E.	84678	P5.2	05/01/17	Contra Costa County
Ascanio, Rosana	84635	P5.2	05/01/17	Contra Costa County
Azam, Cassim H.	84561	P5.2	05/01/17	Contra Costa County
Balderston, Kevin D.	71323	P5.2	05/01/17	Contra Costa County
Becker, Therese M.	84583	P5.2	05/01/17	Contra Costa County
Bell, Tiffany J.	84562	P5.2	05/01/17	Contra Costa County
Beller, Michael A.	84643	P5.2	05/01/17	Contra Costa County
Brown, Michelle S.	D9500	P5.3	05/01/17	Superior Courts
Buonserio, Julie A.	D9500	P5.3	05/01/17	Superior Courts
Burell, Veronica F.	84642	P5.2	05/01/17	Contra Costa County
Burgess, Suzanne M.	84576	P5.2	05/01/17	Contra Costa County
Castro, Randy Z.	84580	P5.2	05/01/17	Contra Costa County
Clopton, Kristen N.	84563	P5.2	05/01/17	Contra Costa County
Dador, Clarissa Marie B.	84604	P5.2	05/01/17	Contra Costa County
Davis, Keiana L.	84652	P5.2	05/01/17	Contra Costa County
De Torres, Nova A.	79683	P5.2	05/01/17	Contra Costa County
Del Muro Serpa, Luis I	83409	P5.2	05/01/17	Contra Costa County
Drummond, Forrest E.	79284	P5.2	05/01/17	Contra Costa County
Duarte, Norman E.	84621	P5.2	05/01/17	Contra Costa County
Durocher, Stacey J.	84674	P5.2	05/01/17	Contra Costa County
Edens, Noelle M.	84578	P5.2	05/01/17	Contra Costa County
Espinosa, Leticia R.	84671	P5.2	05/01/17	Contra Costa County
Eusebio, Antonneth	81792	P5.2	05/01/17	Contra Costa County
Fernandez, Patricia I.	84028	P5.2	05/01/17	Contra Costa County
Forbes, Rachel C.	84641	P5.2	05/01/17	Contra Costa County
Fossa, Frida E.	81015	P5.2	05/01/17	Contra Costa County
Fullerton, Stephanie R.	84582	P5.2	05/01/17	Contra Costa County
George, Andrey G.	84676	P5.2	05/01/17	Contra Costa County
Gilbert, Paul C.	84648	P5.2	05/01/17	Contra Costa County
Goy, Coleen A.	84581	P5.2	05/01/17	Contra Costa County
Guzman, Jessica G.	84566	P5.2	05/01/17	Contra Costa County
Hernandez, Elizabeth A.	84619	P5.2	05/01/17	Contra Costa County
Hwang, Jean Y.	79434	P5.2	05/01/17	Contra Costa County
Hydeman, Laura B.	84720	P5.2	05/01/17	Contra Costa County
Joaquin, Katie U.	81016	P5.2	05/01/17	Contra Costa County
Johnson, Suzanne P.	84597	P5.2	05/01/17	Contra Costa County

Key:

I = Tier I	P4.2 = PEPR Tier 4 (2% COLA)	S/A = Safety Tier A
II = Tier II	P4.3 = PEPR Tier 4 (3% COLA)	S/C = Safety Tier C
III = Tier III	P5.2 = PEPR Tier 5 (2% COLA)	S/D = Safety Tier D
	P5.3 = PEPR Tier 5 (3% COLA)	S/E = Safety Tier E

CERTIFICATION OF MEMBERSHIPS

<i>Name</i>	<i>Employee Number</i>	<i>Tier</i>	<i>Membership Date</i>	<i>Employer</i>
Kaminski, Celia N.	84588	P5.2	05/01/17	Contra Costa County
Kaur, Amandeep	84625	P5.2	05/01/17	Contra Costa County
Kiesow, Judy K.	81627	P5.2	05/01/17	Contra Costa County
Kipp, Kerry M.	80910	P5.2	05/01/17	Contra Costa County
La Vanaway, Susan J.	84498	P5.2	05/01/17	Contra Costa County
Lacson, Louis N.	84603	P5.2	05/01/17	Contra Costa County
Lazar, Max M.	84649	P5.2	05/01/17	Contra Costa County
Lehman, Sophie B.	84640	P5.2	05/01/17	Contra Costa County
Lema, Bradley W.	84645	P5.2	05/01/17	Contra Costa County
Leung, Yat-Ming J.	84675	P5.2	05/01/17	Contra Costa County
Liang, Lishi	84622	P5.2	05/01/17	Contra Costa County
Luckenbach, Cynthia D.	84699	P5.2	05/01/17	Contra Costa County
Mae, Laura L.	56165	III	05/01/17	Contra Costa County
Manansala, Ivy Lynn M.	84598	P5.2	05/01/17	Contra Costa County
Manguira, Raquel A.	84623	P5.2	05/01/17	Contra Costa County
McCauley, Miaja L.	D3301	P5.3	05/01/17	Contra Costa Mosquito & Vector Control District
McFate, Patrick L.	84577	P5.2	05/01/17	Contra Costa County
Medrano, Jolicer G.	84634	P5.2	05/01/17	Contra Costa County
Morris, Peter C.	84599	P5.2	05/01/17	Contra Costa County
Mortensen, Aileen V.	71089	P5.2	05/01/17	Contra Costa County
Mueller, Nicholas R.	56297	P5.2	05/01/17	Contra Costa County
Mullen, Kimberly K.	84629	P5.2	05/01/17	Contra Costa County
Munoz-Maciel, Jazmin A.	84123	P5.2	05/01/17	Contra Costa County
Naca, Rebecca D.	33656	P5.2	05/01/17	Contra Costa County
Naghash Maheri, Maryam	82199	P5.2	05/01/17	Contra Costa County
Northcutt, Stephen M.	84651	P5.2	05/01/17	Contra Costa County
Nuval, Pepe	84584	P5.2	05/01/17	Contra Costa County
Ortiz, Caroline S.	84680	P5.2	05/01/17	Contra Costa County
Palu, Allison G.F.	84628	P5.2	05/01/17	Contra Costa County
Preciado Ramirez, Gladys E.	84197	P5.2	05/01/17	Contra Costa County
Price, Kally L.	84627	P5.2	05/01/17	Contra Costa County
Redman, Shaun C.	D3301	P5.3	05/01/17	Contra Costa Mosquito & Vector Control District
Rhames, Katherine A.	84589	P5.2	05/01/17	Contra Costa County
Santillan, Jaime	84232	S/E	05/01/17	Contra Costa County
Schickedanz, Katrina K.	79447	P5.2	05/01/17	Contra Costa County
Siliezar-Ramos, Patricia G.	78942	P5.2	05/01/17	Contra Costa County
Sirna, Josefina G.	81954	P5.2	05/01/17	Contra Costa County
Slauson, Ryan P.	84646	P5.2	05/01/17	Contra Costa County
Story, Ashley L.	84644	P5.2	05/01/17	Contra Costa County
Stovell, Paris V.	83694	P5.2	05/01/17	Contra Costa County

Key:

I = Tier I	P4.2 = PEPR Tier 4 (2% COLA)	S/A = Safety Tier A
II = Tier II	P4.3 = PEPR Tier 4 (3% COLA)	S/C = Safety Tier C
III = Tier III	P5.2 = PEPR Tier 5 (2% COLA)	S/D = Safety Tier D
	P5.3 = PEPR Tier 5 (3% COLA)	S/E = Safety Tier E

CERTIFICATION OF MEMBERSHIPS

<i>Name</i>	<i>Employee Number</i>	<i>Tier</i>	<i>Membership Date</i>	<i>Employer</i>
Tapia, Rosio V.	84480	P5.2	05/01/17	Contra Costa County
Thomas, Lisa S.	84477	P5.2	05/01/17	Contra Costa County
Torres III, Luis-Felipe	83440	P5.2	05/01/17	Contra Costa County
Umanzor, Ericka C.	84616	P5.2	05/01/17	Contra Costa County
Villalobos, Melissa A.	84677	P5.2	05/01/17	Contra Costa County
Wang, Caroline T.	84688	P5.2	05/01/17	Contra Costa County
Wolde-Michael, Tsegu	76837	III	05/01/17	Contra Costa County
Yauger Rodriguez, Jorge	84254	S/E	05/01/17	Contra Costa County

Key:

I = Tier I	P4.2 = PEPR A Tier 4 (2% COLA)	S/A = Safety Tier A
II = Tier II	P4.3 = PEPR A Tier 4 (3% COLA)	S/C = Safety Tier C
III = Tier III	P5.2 = PEPR A Tier 5 (2% COLA)	S/D = Safety Tier D
	P5.3 = PEPR A Tier 5 (3% COLA)	S/E = Safety Tier E

TIER CHANGES

<i>Name</i>	<i>Employee Number</i>	<i>Old Tier</i>	<i>New Tier</i>	<i>Effective Date</i>	<i>Employer</i>	<i>Reason for Change</i>
NONE						

Key:

I = Tier I	P4.2 = PEPPRA Tier 4 (2% COLA)	S/A = Safety Tier A
II = Tier II	P4.3 = PEPPRA Tier 4 (3% COLA)	S/C = Safety Tier C
III = Tier III	P5.2 = PEPPRA Tier 5 (2% COLA)	S/D = Safety Tier D
	P5.3 = PEPPRA Tier 5 (3% COLA)	S/E = Safety Tier E

Contra Costa County Employees' Retirement Association
Asset Allocation as of June 30, 2017

	Market Value	Percentage of Total Fund	Phase 2b Target Percentage	Phase 2b Over/(Under)	Long Term Target	Long Term Over/(Under)
Liquidity						
Insight	683,956,060	8.7%	12.6%	-3.9%		
Sit	431,232,890	5.5%	6.2%	-0.7%		
Dimensional Fund Advisors	331,963,392	4.2%	6.2%	-2.0%		
Goldman Sachs	54,007	0.0%	0.0%	0.0%		
Lazard	1,011,978	0.0%	0.0%	0.0%		
Total Liquidity	1,448,218,327	18.5%	25.0%	-6.5%	27.0%	-8.5%
		Range				
		16% - 28%				
Growth						
Domestic Equity						
Boston Partners	363,402,568	4.6%	4.5%	0.1%		
Jackson Square	357,175,126	4.6%	4.5%	0.1%		
BlackRock Index Fund	78,399,446	1.0%	1.3%	-0.3%		
Emerald Advisors	280,919,760	3.6%	3.0%	0.6%		
Intech (Core)	308,486,067	3.9%	0.0%	3.9%		
PIMCO Stocks+	167,100,864	2.1%	0.0%	2.1%		
Ceredex	239,265,458	3.1%	3.0%	0.1%		
Total Domestic Equity	1,794,749,289	22.9%	16.3%	6.6%	6.0%	16.9%
Global & International Equity						
Pyrford (BMO)	452,708,229	5.8%	5.2%	0.6%	6.0%	-0.2%
William Blair	464,668,483	5.9%	5.2%	0.7%	6.0%	-0.1%
JPMorgan Global Opportunities	207,066	0.0%	0.0%	0.0%		
First Eagle	345,080,488	4.4%	4.3%	0.1%		
Artisan Global Opportunities	384,458,075	4.9%	4.3%	0.6%		
Intech (Global Low Volatility)	24,711,724	0.3%	0.0%	0.3%		
PIMCO/RAE Emerging Markets	302,001,009	3.9%	4.2%	-0.3%	5.0%	-1.1%
TT Emerging Markets	0	0.0%	4.2%	-4.2%	5.0%	-5.0%
Total Global & International Equity	1,973,835,074	25.2%	27.4%	-2.2%	22.0%	3.2%
Private Equity						
	801,403,000	10.2%	9.6%	0.6%	12.0%	-1.8%
Private Credit						
	152,455,000	1.9%	2.4%	-0.5%	12.0%	-10.1%
Real Estate - Value Add						
	161,870,000	2.1%	4.0%	-1.9%	4.0%	-1.9%
Real Estate - Opportunistic & Distressed						
	466,867,000	6.0%	4.0%	2.0%	4.0%	2.0%
Real Estate - REIT (Adelante)						
	66,538,259	0.8%	1.0%	-0.2%	1.0%	-0.2%
High Yield (Allianz)						
	393,330,017	5.0%	4.3%	0.7%		
Total Growth Assets	5,811,047,639	74.2%	69.0%	5.2%	61.0%	13.2%
		Range				
		60% - 80%				
Risk Diversifying						
AFL-CIO	238,312,410	3.0%	3.5%	-0.5%	3.0%	0.0%
Diversifying Strategies (Wellington)	186,971,295	2.4%	2.5%	-0.1%	9.0%	-6.6%
Total Risk Diversifying	425,283,705	5.4%	6.0%	-0.6%	12.0%	-6.6%
		Range				
		0% - 10%				
Cash and Overlay						
Overlay (Parametric)	17,336,235	0.2%	0.0%	0.2%		
Cash	132,201,426	1.7%	0.0%	1.7%	0.0%	1.7%
Total Cash and Overlay	149,537,661	1.9%	0.0%	1.9%	0.0%	1.9%
Total Fund	7,834,087,332	100%	100%	0%	100%	0%

*Phase 2b targets and ranges reflect Phase 2b asset allocation targets accepted by the Board on July 12, 2017 (BOR Resolution 2017-6)

Private Market Investments
As of June 30, 2017

REAL ESTATE - Value Add	Inception Date	Target Termination	# of Extension	Discretion by GP/LP	New Target Termination	Funding Commitment	Market Value	% of Total Asset	Outstanding Commitment
Invesco IREF I	10/22/03	04/30/11	3rd 1 YR	GP	4/30/2014	50,000,000	91,000	0.00%	
Invesco IREF II	05/30/07	12/31/15				85,000,000	457,000	0.01%	
Invesco IREF III	08/01/13	08/01/20				35,000,000	15,438,000	0.20%	11,634,000
Invesco IREF IV	12/01/14	12/01/21				35,000,000	21,788,000	0.28%	3,190,000
Long Wharf FREG III	03/30/07	12/30/15				75,000,000	2,465,000	0.03%	
Long Wharf FREG IV	08/14/13	09/30/21				25,000,000	19,253,000	0.25%	
Long Wharf FREG V	10/31/16	09/30/24				50,000,000	15,331,000	0.20%	33,355,000
LaSalle Income & Growth Fund VI	01/31/12	01/31/19				75,000,000	44,216,000	0.56%	3,946,000
LaSalle Income & Growth Fund VII	10/31/16	09/30/24				75,000,000	42,831,000	0.55%	32,234,000
Outstanding Commitments						505,000,000	161,870,000	2.07%	84,359,000
Total							84,359,000		246,229,000

REAL ESTATE - Opportunistic & Distressed	Inception Date	Target Termination	# of Extension	Discretion by GP/LP	New Target Termination	Funding Commitment	Market Value	% of Total Asset	Outstanding Commitment
DLJ Real Estate Capital Partners, L.P. III	06/30/05	06/30/14	1st 2 YR	GP	6/30/2016	75,000,000	30,206,000	0.39%	
DLJ Real Estate Capital Partners, L.P. IV	12/31/07	09/30/16				100,000,000	87,039,000	1.11%	
DLJ Real Estate Capital Partners, L.P. V	07/31/13	12/31/22				75,000,000	33,017,000	0.42%	39,072,000
Oaktree Real Estate Opportunities Fund V	12/15/11	12/31/16				50,000,000	14,285,000	0.18%	
Oaktree Real Estate Opportunities Fund VI	09/30/13	09/30/20				80,000,000	66,531,000	0.85%	5,682,000
Oaktree Real Estate Opportunities Fund VII	02/28/15	02/28/23				65,000,000	4,416,000	0.06%	58,500,000
Siguler Guff Distressed Real Estate Opp. Fund	12/31/11	12/31/16				75,000,000	53,819,000	0.69%	11,993,000
Siguler Guff Distressed Real Estate Opp. Fund II	08/31/13	08/31/20				70,000,000	55,685,000	0.71%	24,867,000
Siguler Guff Distressed Real Estate Opp. II Co-Inv	01/31/16	01/31/23				25,000,000	15,123,000	0.19%	10,567,000
Paulson Real Estate Fund II	11/10/13	11/10/20				20,000,000	21,913,000	0.28%	1,874,000
Angelo Gordon Realty Fund VIII	12/31/11	12/31/18				80,000,000	46,807,000	0.60%	18,145,000
Angelo Gordon Realty Fund IX	10/10/14	10/10/22				65,000,000	35,026,000	0.49%	31,091,000
Outstanding Commitments						780,000,000	466,867,000	5.96%	201,791,000
Total							201,791,000		668,658,000

PRIVATE CREDIT	Inception Date	Target Termination	# of Extension	Discretion by GP/LP	New Target Termination	Funding Commitment	Market Value	% of Total Asset	Outstanding Commitment
Torchlight Debt Opportunity Fund II	09/28/06	09/30/16				128,000,000	44,245,000	0.56%	
Torchlight Debt Opportunity Fund III	09/30/08	09/30/16				75,000,000	8,499,000	0.11%	
Torchlight Debt Opportunity Fund IV	08/01/12	08/30/20				60,000,000	57,030,000	0.73%	
Torchlight Debt Opportunity Fund V	12/31/14	09/17/22				75,000,000	28,759,000	0.37%	56,250,000
Angelo Gordon Energy Credit Opportunities	09/10/15	09/10/20				16,500,000	13,922,000	0.18%	0
Outstanding Commitments						354,500,000	152,455,000	1.95%	56,250,000
Total							56,250,000		208,705,000

Private Market Investments
As of June 30, 2017

PRIVATE EQUITY	Inception Date	Target Termination	# of Extension	Discretion by GP/LP	New Target Termination	Funding Commitment	Market Value	% of Total Asset	Outstanding Commitment
Adams Street Partners	12/22/95	INDEFINITE				180,000,000	128,044,000	1.63%	82,492,000
Adams Street Secondary II	12/31/08	12/31/20				30,000,000	13,463,000	0.17%	12,637,000
Adams Street Secondary V	10/31/12	10/31/22				40,000,000	20,636,000	0.26%	17,340,000
Adams Street Venture Innovation Fund	03/09/16	03/09/28				75,000,000	3,413,000	0.04%	71,587,000
Bay Area Equity Fund	06/14/04	01/15/13	1st 2 YR	LP	1/15/2015	10,000,000	3,150,000	0.04%	
Bay Area Equity Fund II	2/29/09	12/31/17				10,000,000	8,667,000	0.11%	
Carpenter Community BancFund	01/31/08	01/31/16				30,000,000	23,512,000	0.30%	
EIF USPF I	11/08/02	11/08/12	3rd 1YR	LP	11/08/15	30,000,000	569,000	0.01%	
EIF USPF II	06/15/05	06/15/15				50,000,000	40,635,000	0.52%	
EIF USPF III	02/28/07	02/28/17				65,000,000	58,641,000	0.75%	
EIF USPF IV	06/28/10	06/28/20				50,000,000	49,775,000	0.64%	
Oaktree Private Investment Fund 2009	02/28/10	01/31/17				40,000,000	14,470,000	0.24%	
Ocean Avenue Fund II	06/11/14	05/31/24				30,000,000	21,926,000	0.28%	10,384,000
Ocean Avenue Fund III	06/11/14	05/31/24				50,000,000	10,000,000	0.07%	40,000,000
Paladin III	11/30/07	12/31/17				25,000,000	24,755,000	0.32%	
Pathway	11/09/98	05/31/21				125,000,000	30,042,000	0.38%	14,604,000
Pathway 2008	12/26/08	12/26/23				30,000,000	21,671,000	0.28%	6,776,000
Pathway 6	05/24/11	05/24/26				40,000,000	32,222,000	0.41%	12,721,000
Pathway 7	02/07/13	02/07/23				70,000,000	40,514,000	0.52%	29,410,000
Pathway 8	11/23/15	11/23/25				50,000,000	15,698,000	0.20%	38,078,000
Siguler Guff CCCERA Opportunities	06/03/14	05/31/25				200,000,000	111,080,000	1.42%	113,248,000
Siguler Guff Secondary Opportunities	12/31/16	12/31/26				50,000,000	9,396,000	0.12%	45,682,000
Real Assets									
Aether III & III Surplus	11/30/13	11/30/20				75,000,000	58,011,000	0.62%	20,958,000
Aether IV	01/01/16	01/01/28				50,000,000	7,505,000	0.08%	42,082,000
ARES EIF V	09/09/15	09/09/25				50,000,000	9,227,000	0.09%	38,561,000
Commonfund Capital Natural Resources IX	06/30/13	06/30/20				50,000,000	38,331,000	0.35%	16,625,000
Wastewater Opportunity Fund	12/31/15	11/30/22				25,000,000	6,050,000	0.05%	18,950,000
Outstanding Commitments						1,545,000,000	801,403,000	9.80%	632,135,000
Total							632,135,000		1,433,538,000

Market value column is the latest ending quarter plus any additional capital calls after the ending quarter.
The Target Termination column is the beginning of liquidation of the fund, however, some funds may be extended for an additional two or three years.

Contra Costa County Employees' Retirement Association

**Actuarial Valuation and Review
As of December 31, 2016**



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

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100 Montgomery Street Suite 500 San Francisco, CA 94104-4308
T 415.263.8257 www.segalco.com

July 28, 2017

*Board of Retirement
Contra Costa County Employees' Retirement Association
1335 Willow Way, Suite 221
Concord, CA 94520*

Dear Board Members:

We are pleased to submit this Actuarial Valuation and Review as of December 31, 2016. It summarizes the actuarial data used in the valuation, establishes the funding requirements for the fiscal year beginning July 1, 2018 and analyzes the preceding year's experience.

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


The measurements shown in this actuarial valuation may not be applicable for other purposes. 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 (such as the end of an amortization period); and changes in plan provisions or applicable law.

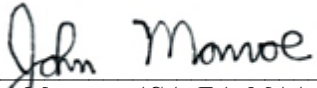
The actuarial calculations were completed under the supervision of John Monroe, ASA, MAAA, Enrolled Actuary. We are members of the American Academy of Actuaries and we meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion herein. To the best of our knowledge, the information supplied in the 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 Plan.

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

Sincerely,

SEGAL CONSULTING

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


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

JEM/bbf

SECTION 1

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SECTION 1: Valuation Summary for the Contra Costa County Employees' Retirement Association

PURPOSE

This report has been prepared by Segal Consulting to present a valuation of the Contra Costa County Employees' Retirement Association (CCCERA) as of December 31, 2016. The valuation was performed to determine whether the assets and contributions are sufficient to provide the prescribed benefits. The contribution rate requirements presented in this report are based on:

- The benefit provisions of the Retirement Association, as administered by the Board;
- The characteristics of covered active members, terminated members, and retired members and beneficiaries as of December 31, 2016, provided by the Association's staff;
- The assets of the Plan as of December 31, 2016, provided by the Association's staff;
- Economic assumptions regarding future salary increases and investment earnings; and
- Other actuarial assumptions, regarding employee terminations, retirement, death, etc.

One of the general goals of an actuarial valuation is to establish contributions that fully fund the system's liabilities, and that, 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 assets, 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 reasonably consistent, both internally and with prior years' information.

SECTION 1: Valuation Summary for the Contra Costa County Employees' Retirement Association

Ref: Pgs. 70 - 82

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 2008, the Board elected to amortize the remaining balance of the Association's unfunded actuarial accrued liability (UAAL) through December 31, 2007 over a decreasing 15 year period with 6 years remaining as of December 31, 2016. Any change in the UAAL that arises at each valuation after December 31, 2007 is amortized over its own separate declining 18-year period.

Effective with the December 31, 2013 valuation, any change in UAAL that arises due to plan amendments is amortized over its own declining 10-year period (with the exception of a change due to retirement incentives, which is to be funded in full upon adoption of the incentive).

We recommend that the rates calculated in this report be adopted by the Board for the fiscal year that extends from July 1, 2018 through June 30, 2019.

SIGNIFICANT ISSUES IN VALUATION YEAR

The following key findings were the result of this actuarial valuation:

Ref: Pg. 35
Ref: Pg. 69

➤ The ratio of the valuation value of assets to the actuarial accrued liability increased from 84.5% to 86.5% while the ratio of the market value of assets to the actuarial accrued liability also increased from 82.6% to 84.6%. The Association's UAAL (which is based on the valuation value of assets) has decreased from \$1.3 billion to \$1.2 billion. This decrease is due to an investment return on actuarial value (i.e. after smoothing) greater than the 7.00% assumed rate, actual contributions greater than expected, a mortality gain on retirees and beneficiaries and a retirement gain on actives all offset to some degree by higher than expected individual salary increases and higher than expected COLA increases for retirees and beneficiaries. A reconciliation of the Association's UAAL is provided in Section 3, Exhibit I.

Ref: Pg. 32

➤ The average employer rate calculated in this valuation (excluding any employer subvention of member rates or member subvention of employer rates) has decreased from 39.23% of payroll to 38.08% of payroll. This decrease is due to an investment return on actuarial value (i.e. after smoothing) greater than the 7.00% assumed rate, actual contributions greater than expected, a mortality gain on retirees and beneficiaries, amortizing the prior year's UAAL over a greater than expected projected total payroll and a retirement gain on actives all offset to some degree by higher than expected individual salary increases and a higher than expected COLA increases for retirees and beneficiaries. A complete reconciliation of the Association's aggregate employer rate is provided in Section 2, Subsection D (see Chart 15).

SECTION 1: Valuation Summary for the Contra Costa County Employees' Retirement Association

- Ref: Pgs. 21 - 31*
- Separate employer contribution rates are shown in Chart 14 for members with membership dates before January 1, 2013 (non-PEPRA members) and on or after January 1, 2013 (PEPRA members). However, the average employer contribution rates shown on page v are based on all members regardless of their membership date. A detailed schedule of the employer contribution rates is provided in Section 2, Subsection D, Chart 14.
- Ref: Pg. 33*
- The average member rate calculated in this valuation has decreased from 12.09% of payroll to 12.08% of payroll. A complete reconciliation of the Association's aggregate member rate is provided in Section 2, Subsection D (see Chart 16).

The detailed member rates are provided in Appendix A and B of this report. They are shown by cost group.
- Ref: Pg. 5*
- The total unrecognized net investment loss as of December 31, 2016 is about \$184 million as compared to an unrecognized net investment loss of \$175 million in the previous valuation. The net investment loss of \$184 million will be recognized in the determination of the actuarial value of assets for funding purposes in the next few years as shown in the footnote in Chart 7.
 - The net deferred losses of \$184 million represent about 2.5% of the market value of assets. Unless offset by future investment gains or other favorable experience, the recognition of the \$184 million market losses is expected to have an impact on the Association's future funded ratio and contribution rate requirements. This potential impact may be illustrated as follows:
 - If the net deferred losses were recognized immediately in the valuation value of assets, the funded percentage would decrease from 86.5% to 84.4%.

For comparison purposes, if all the deferred losses in the December 31, 2015 valuation had been recognized immediately in the December 31, 2015 valuation, the funded percentage would have decreased from 84.5% to 82.4%.
 - If the net deferred losses were recognized immediately in the valuation value of assets, the average employer contribution rate would increase from 38.1% to about 39.9% of payroll.

For comparison purposes, if all the deferred losses in the December 31, 2015 valuation had been recognized immediately in the December 31, 2015 valuation, the average employer contribution rate would have increased from 39.2% to 41.0% of payroll.
 - The actuarial valuation report as of December 31, 2016 is based on financial information as of that date. Changes in the assets subsequent to that date, to the extent that they exist, are not reflected. Declines in asset values will increase the actuarial cost of the plan, while increases will decrease the actuarial cost of the plan.

SECTION 1: Valuation Summary for the Contra Costa County Employees' Retirement Association

- Historically, the three terminated employers (Diablo Water District, Delta Diablo Sanitation District and City of Pittsburg) have been included in the cost groups that they were originally part of when they were active employers. Since the assets and liabilities of the terminated employers have been included in cost groups that have non-terminated employers, this means that the demographic experience of the terminated employers has impacted the contribution rates for the non-terminated employers in those cost groups. This is in contrast to the fact that the contributions for terminated employers are determined separately and so are not affected by the experience of the non-terminated employers.

Starting with this valuation, we have moved the assets and liabilities associated with the three terminated employers from Cost Groups #1, #2 and #7 to their own Terminated Employers Cost Group. This will provide consistency in that the experience of the terminated and non-terminated employers will not impact each other's contribution rates. Also note that the methodology used to calculate the contribution amounts for the terminated employers is unchanged.

Impact of Future Experience on Contribution Rates

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.

SECTION 1: Valuation Summary for the Contra Costa County Employees' Retirement Association

Summary of Key Valuation Results

	December 31, 2016		December 31, 2015	
		Estimated		Estimated
Average Employer Contribution Rates⁽¹⁾:				
General	Total Rate	Annual Amount	Total Rate	Annual Amount
Cost Group #1 – County and Small Districts (Tier 1 and 4)	32.24%	\$7,255,727	32.49%	\$7,512,572
Cost Group #2 – County and Small Districts (Tier 3 and 5)	27.79%	158,011,177	28.67%	154,482,818
Cost Group #3 – Central Contra Costa Sanitary District	51.06%	16,647,933	52.90%	16,024,427
Cost Group #4 – Contra Costa Housing Authority	41.39%	2,292,585	42.21%	2,206,611
Cost Group #5 – Contra Costa County Fire Protection District	32.30%	1,373,964	31.16%	1,162,968
Cost Group #6 – Small Districts (Non-Enhanced Tier 1 and 4)	28.88%	231,953	25.38%	210,590
Safety				
Cost Group #7 – County (Tier A and D)	75.62%	45,850,943	76.40%	47,859,008
Cost Group #8 – Contra Costa and East Fire Protection Districts	77.06%	26,794,496	81.96%	26,136,961
Cost Group #9 – County (Tier C and E)	67.42%	17,836,505	68.42%	15,800,464
Cost Group #10 – Moraga-Orinda Fire District	70.26%	4,947,214	70.17%	4,709,426
Cost Group #11 – San Ramon Valley Fire District	80.73%	15,490,933	83.14%	14,556,108
Cost Group #12 – Rodeo-Hercules Fire Protection District	96.93%	2,012,833	86.23%	2,120,310
All Employers combined	38.08%	\$298,746,263	39.23%	\$292,782,263
Average Member Contribution Rates⁽¹⁾:				
General	Total Rate	Annual Amount	Total Rate	Annual Amount
Cost Group #1 – County and Small Districts (Tier 1 and 4)	10.78%	\$2,425,734	10.77%	\$2,489,883
Cost Group #2 – County and Small Districts (Tier 3 and 5)	10.84%	61,630,010	10.84%	58,411,126
Cost Group #3 – Central Contra Costa Sanitary District	11.56%	3,769,197	11.65%	3,528,812
Cost Group #4 – Contra Costa Housing Authority	11.57%	640,888	11.40%	595,980
Cost Group #5 – Contra Costa County Fire Protection District	10.99%	467,521	10.99%	410,238
Cost Group #6 – Small Districts (Non-Enhanced Tier 1 and 4)	13.55%	108,839	13.03%	108,119
Safety				
Cost Group #7 – County (Tier A and D)	17.83%	10,810,732	17.74%	11,112,405
Cost Group #8 – Contra Costa and East Fire Protection Districts	17.12%	5,953,027	17.28%	5,511,118
Cost Group #9 – County (Tier C and E)	16.08%	4,253,979	15.34%	3,542,648
Cost Group #10 – Moraga-Orinda Fire District	17.14%	1,206,917	17.12%	1,148,954
Cost Group #11 – San Ramon Valley Fire District	16.63%	3,190,924	16.91%	2,960,537
Cost Group #12 – Rodeo-Hercules Fire Protection District	15.44%	320,617	16.28%	400,294
All Categories Combined	12.08%	\$94,778,385	12.09%	\$90,220,114

⁽¹⁾ Based on projected payroll as of each valuation date shown. These rates *do not* include any employer subvention of member contributions or any member subvention of employer contributions. The rates shown are averages based on all members regardless of their membership date.

Note: Pages 19 and 20 contain a summary that shows which employers are in each cost group.

SECTION 1: Valuation Summary for the Contra Costa County Employees' Retirement Association

Summary of Key Valuation Results (continued)

	December 31, 2016	December 31, 2015
Funded Status:		
Actuarial accrued liability (AAL)	\$8,794,434,139	\$8,448,624,096
Valuation value of assets (VVA)	\$7,606,997,530	\$7,136,801,380
Market value of assets (MVA)	\$7,438,519,504	\$6,976,582,428
Funded percentage on VVA basis (VVA/AAL)	86.5%	84.5%
Funded percentage on MVA basis (MVA/AAL)	84.6%	82.6%
Unfunded Actuarial Accrued Liability (UAAL) on VVA basis	\$1,187,436,609	\$1,311,822,716
Unfunded Actuarial Accrued Liability (UAAL) on MVA basis	\$1,355,914,635	\$1,472,041,668
Summary of Financial Data:		
Market value of assets	\$7,438,519,504	\$6,976,582,428
Return on market value of assets	7.10%	0.95%
Actuarial value of assets	\$7,622,351,103	\$7,151,936,096
Return on actuarial value of assets	7.04%	8.78%
Valuation value of assets	\$7,606,997,530	\$7,136,801,380
Return on valuation value of assets	7.04%	8.79%
Key Assumptions:		
Interest rate	7.00%	7.00%
Inflation rate	2.75%	2.75%
Across the board salary increase	0.50%	0.50%

SECTION 1: Valuation Summary for the Contra Costa County Employees' Retirement Association

Summary of Key Valuation Demographic Data

	December 31, 2016	December 31, 2015	Percentage Change
Active Members:			
Number of members	9,848	9,642	2.1%
Average age	45.9	45.9	N/A
Average service	9.9	9.9	N/A
Projected total payroll (compensation)	\$784,412,260	\$746,352,665	5.1%
Average projected payroll	\$79,652	\$77,406	2.9%
Retired Member and Beneficiaries:			
Number of members:			
Service retired	6,825	6,738	1.3%
Disability retired	905	925	-2.2%
Beneficiaries	1,370	1,405	-2.5%
Total	9,100	9,068	0.4%
Average age	70.0	69.9	N/A
Average Monthly Benefit	\$3,799	\$3,706	2.5%
Vested Terminated Members:			
Number of terminated vested members ⁽¹⁾	3,089	2,790	10.7%
Average age	46.6	46.5	N/A

⁽¹⁾ Includes 1,543 terminated members with member contributions on deposit as of December 31, 2016 and 1,244 as of December 31, 2015.

SECTION 1: Valuation Summary for the Contra Costa County Employees' Retirement Association

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 an actuarial 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. It is important to keep Segal informed with respect to plan provisions and administrative procedures, and to review the plan description in this report (as well as the plan summary included in our funding valuation 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** This valuation is based on the market value of assets as of the valuation date, as provided by the Association.
- **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 valuation is prepared at the request of the CCCERA. 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

SECTION 1: Valuation Summary for the Contra Costa County Employees' Retirement Association

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.

- If CCCERA 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 Board 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 CCCERA, it is not a fiduciary in its capacity as actuaries and consultants with respect to CCCERA.

SECTION 2: Valuation Results for the Contra Costa County Employees' Retirement Association

A. MEMBER DATA

The Actuarial Valuation and Review considers the number and demographics of covered members, including active members, vested terminated 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, C and D.

A historical perspective of how the member population has changed over the past ten valuations can be seen in this chart.

CHART 1
Member Population: 2007 – 2016

Year Ended December 31	Active Members	Vested Terminated Members ⁽¹⁾	Retired Members and Beneficiaries	Ratio of Non-Actives to Actives
2007	9,421	2,008	6,911	0.95
2008	9,385	2,153	7,012	0.98
2009	8,938	2,209	7,292	1.06
2010	8,811	2,231	7,559	1.11
2011	8,629	2,214	8,085	1.19
2012	8,640	2,288	8,517	1.25
2013	9,124	2,345	8,625	1.20
2014	9,159	2,647	8,871	1.26
2015	9,642	2,790	9,068	1.23
2016	9,848	3,089	9,100	1.24

⁽¹⁾ Includes members who terminate and leave accumulated contributions on deposit.

SECTION 2: Valuation Results for the Contra Costa County Employees' Retirement Association

Active Members

Plan costs are affected by the age, years of service and payroll of active members. In this year's valuation, there are 9,848 active members with an average age of 45.9, average years of service of 9.9 years and average payroll of \$79,652. The 9,642 active members in the prior valuation had an average age of 45.9, average service of 9.9 years and average payroll of \$77,406.

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

Inactive Members

In this year's valuation, there were 3,089 members with a vested right to a deferred or immediate vested benefit or entitled to a return of their employee contributions versus 2,790 in the prior valuation.

These graphs show a distribution of active members by age and by years of service.

CHART 2
Distribution of Active Members by Age as of December 31, 2016

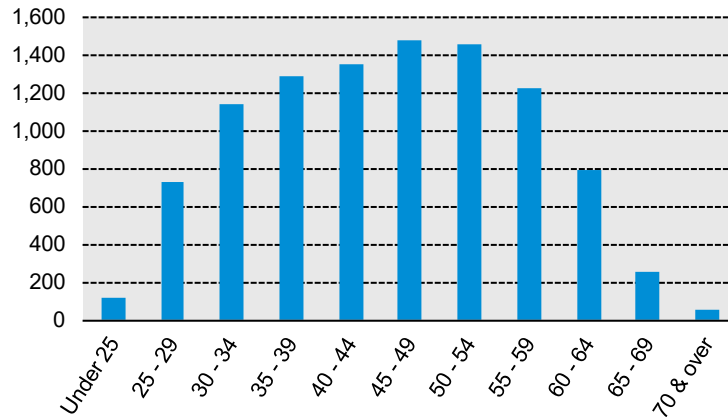
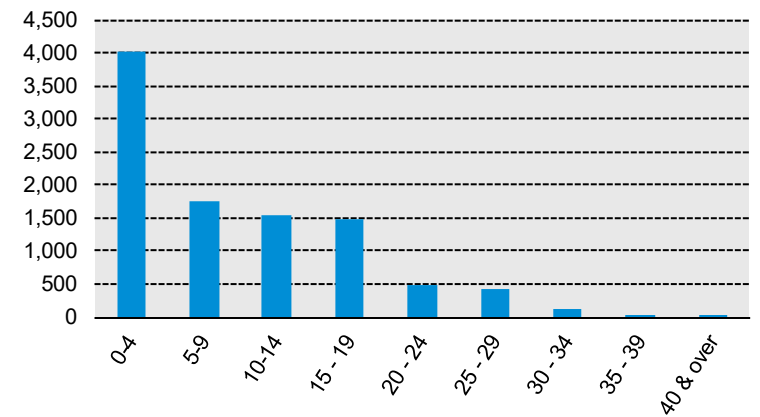


CHART 3
Distribution of Active Members by Years of Service as of December 31, 2016



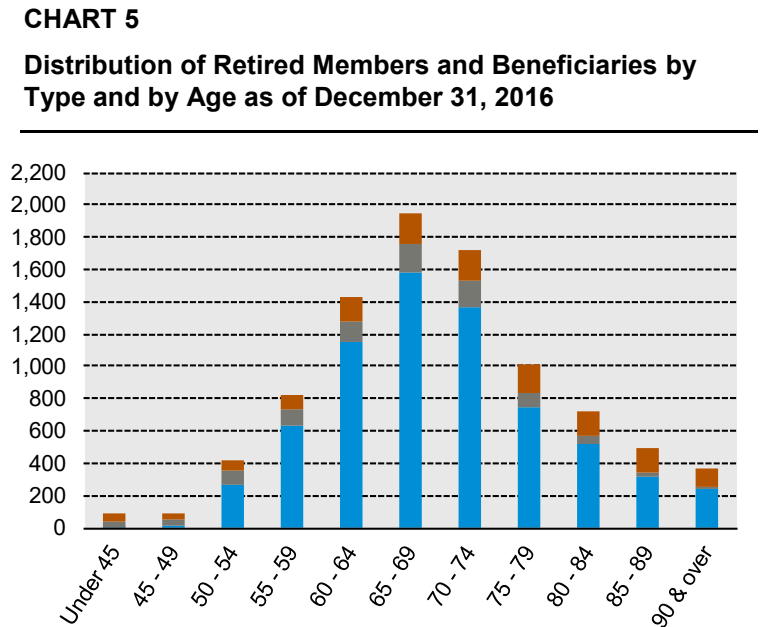
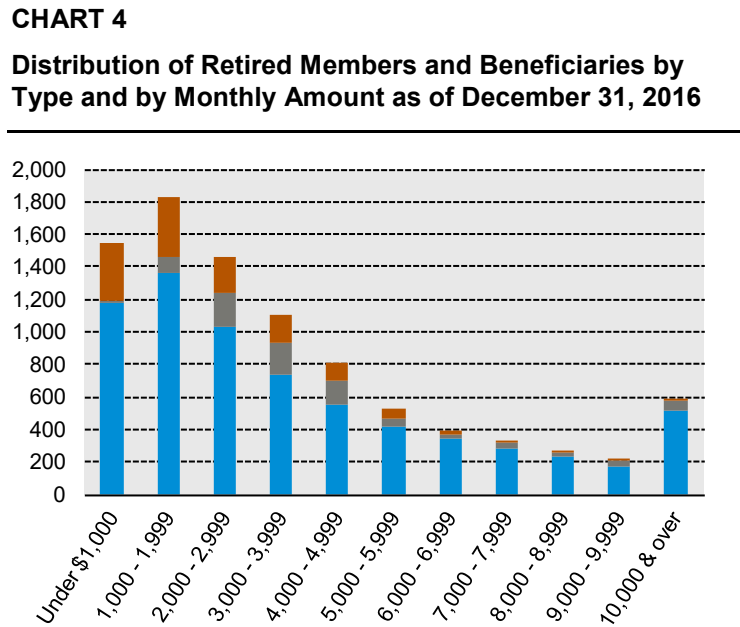
SECTION 2: Valuation Results for the Contra Costa County Employees' Retirement Association

Retired Members and Beneficiaries

As of December 31, 2016, 7,730 retired members and 1,370 beneficiaries were receiving total monthly benefits of \$34,574,919. For comparison, in the previous valuation, there were 7,663 retired members and 1,405 beneficiaries receiving monthly benefits of \$33,609,454.

These graphs show a distribution of the current retired members and beneficiaries based on their monthly amount and age, by type of pension.

- Beneficiary
- Disability
- Service



SECTION 2: Valuation Results for the Contra Costa County Employees' Retirement Association

B. FINANCIAL INFORMATION

Retirement plan funding anticipates that, over the long term, both contributions (net of administrative expenses starting in 2016) and net investment earnings (less investment fees) will be needed to cover benefit payments.

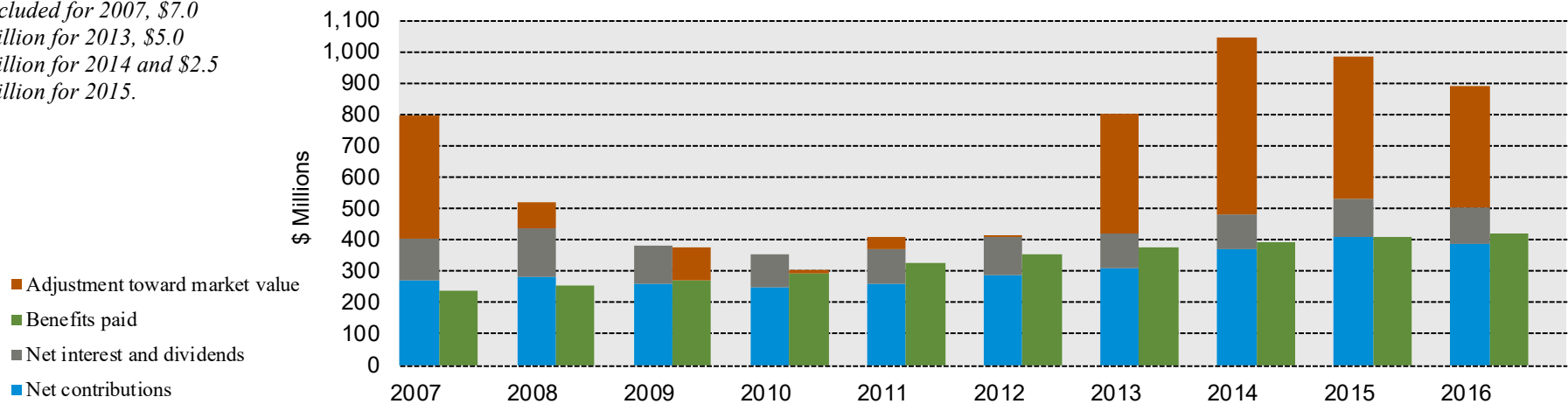
Retirement plan assets change as a result of the net impact of these income and expense components. The adjustment toward market value shown in the chart is the “non-cash” earnings on investment implicitly included in the Actuarial Value of Assets. Additional financial information, including a summary of these transactions for the valuation year, is presented in Section 3, Exhibits E and F.

It is desirable to have level and predictable plan costs from one year to the next. For this reason, the Board of Retirement has approved an asset valuation method that gradually adjusts to market value. Under this valuation method, the full value of market fluctuation is not recognized in a single year and, as a result, the asset value and the plan costs are more stable.

The amount of the adjustment to recognize market value is treated as income, which may be positive or negative. Realized and unrealized gains and losses are treated equally and, therefore, the sale of assets has no immediate effect on the actuarial value.

The chart depicts the components of changes in the actuarial value of assets over the last ten years. UAAL prepayments of \$3.0 million are included for 2007, \$7.0 million for 2013, \$5.0 million for 2014 and \$2.5 million for 2015.

CHART 6
Comparison of Increases and Decreases in the Actuarial Value of Assets for Years Ended December 31, 2007 - 2016



SECTION 2: Valuation Results for the Contra Costa County Employees' Retirement Association

CHART 7

Determination of Actuarial and Valuation Value of Assets for Year Ended December 31, 2016

The chart shows the determination of the actuarial and valuation value of assets as of the valuation date.

Six Month Period		Total Actual Market Return (net)	Expected Market Return (net)	Investment Gain (Loss)	Deferred Factor	Deferred Return
From	To					
7/2011	12/2011	\$(205,242,203)	\$204,284,793	\$(409,526,996)	0.0	\$0
1/2012	6/2012	296,675,568	195,294,521	101,381,047	0.0	0
7/2012	12/2012	371,057,645	205,350,894	165,706,751	0.1	16,570,675
1/2013	6/2013	281,608,945	218,386,047	63,222,898	0.2	12,644,580
7/2013	12/2013	588,758,958	227,909,702	360,849,256	0.3	108,254,777
1/2014	6/2014	347,257,106	249,636,410	97,620,696	0.4	39,048,278
7/2014	12/2014	125,727,585	241,361,743	(115,634,158)	0.5	(57,817,079)
1/2015	6/2015	207,439,920	246,283,585	(38,843,665)	0.6	(23,306,199)
7/2015	12/2015	(142,612,600)	253,672,471	(396,285,071)	0.7	(277,399,549)
1/2016	6/2016	297,615,324	239,907,822	57,707,502	0.8	46,166,001
7/2016	12/2016	196,258,919	249,584,567	(53,325,648)	0.9	(47,993,083)
1. Total Deferred Return ⁽¹⁾						\$(183,831,599)
2. Market Value of Assets						7,438,519,504
3. Actuarial Value of Assets (Item 2 – Item 1)						7,622,351,103
4. Actuarial Value as Percentage of Market Value (Item 3 / Item 2)						102.5%
5. Non-valuation Reserves and Designations:						
a. Post Retirement Death Benefit						\$15,353,573
b. Statutory Contingency						0
c. Additional One Percent Contingency						0
d. Unrestricted Designation						0
e. Total						\$15,353,573
6. Valuation Value of Assets (Item 3 – Item 5e)						\$7,606,997,530

⁽¹⁾ Deferred return recognized in each of the next 5 years:

(a) Amount recognized during 2017	\$11,633,037
(b) Amount recognized during 2018	(53,667,143)
(c) Amount recognized during 2019	(97,712,792)
(d) Amount recognized during 2020	(38,752,136)
(e) Amount recognized during 2021	(5,332,565)
(f) Subtotal	\$(183,831,599)

Note: Results may not add due to rounding.

SECTION 2: Valuation Results for the Contra Costa County Employees' Retirement Association

CHART 8

Allocation of Valuation Value of Assets as of December 31, 2016

The calculation of the valuation value of assets from December 31, 2015 to December 31, 2016 by cost groups is provided below.

	General					
	Cost Groups #1 and #2 General County and Small Districts	Cost Group #3 Central Contra Costa Sanitary District	Cost Group #4 Contra Costa Housing Authority	Cost Group #5 Contra Costa County Fire Protection District	Cost Group #6 Small Districts (General Non-Enhanced)	Terminated Employers
1 Allocated Valuation Value of Assets As of Beginning of Plan Year	\$4,014,614,015	\$269,066,926	\$46,536,785	\$44,072,777	\$5,912,204	
2 Contributions:						
a. Total Member Contributions	57,706,481	2,707,596	507,149	441,124	77,462	
b. Employer Contributions - Excludes POB and other Special Contributions	171,837,001	18,790,942	2,341,731	1,325,157	252,943	
c. Employer Contributions - Special (POB, Termination, etc.)	851,822	0	0	0	0	
d. Total Contributions	230,395,304	21,498,538	2,848,880	1,766,281	330,405	
3 Total Payments Excluding Post- Retirement Death	235,183,262	17,756,806	2,809,024	2,901,385	332,749	
4 Administrative Expenses ⁽¹⁾	6,389,887	344,418	59,444	42,445	9,435	
5 Subtotal (Item 1 + 2d - 3 - 4)	4,003,436,170	272,464,240	46,517,197	42,895,228	5,900,425	
6 Weighted Average Fund Balance	4,008,867,012	270,765,583	46,526,991	43,484,003	5,906,315	
7 Earnings Allocated in Proportion to Item 6	282,226,662	19,062,061	3,275,528	3,061,300	415,808	
8 Allocated Valuation Value of Assets As of End of Plan Year (Item 5 + 7)	\$4,285,662,832	\$291,526,301	\$49,792,725	\$45,956,528	\$6,316,233	
9 Allocated Valuation Value of Assets As of End of Plan Year After Transferring Terminated Employers	\$4,254,074,626	\$291,526,301	\$49,792,725	\$45,956,528	\$6,316,233	\$56,628,197

⁽¹⁾ Allocated based on expected administrative expenses from the prior valuation.

Note: Results may not add due to rounding.

SECTION 2: Valuation Results for the Contra Costa County Employees' Retirement Association

CHART 8 (continued)

Allocation of Valuation Value of Assets as of December 31, 2016

	Safety					
	Cost Groups #7 & 9 Safety County	Cost Group #8 Contra Costa & East Fire Protection Districts	Cost Group #10 Moraga-Orinda Fire District	Cost Group #11 San Ramon Valley Fire District	Cost Group #12 Rodeo-Hercules Fire Protection District	Total
1 Allocated Valuation Value of Assets As of Beginning of Plan Year	\$1,479,361,053	\$800,706,823	\$145,098,686	\$304,257,020	\$27,175,091	\$7,136,801,380
2 Contributions:						
a. Total Member Contributions	14,565,248	6,709,598	1,696,958	4,500,066	328,490	89,240,172
b. Employer Contributions - Excludes POB and other Special Contributions	64,547,397	25,907,233	4,201,042	14,608,848	2,022,036	305,834,330
c. Employer Contributions – Special (POB, Termination, etc.)	770,991	0	0	0	0	1,622,813
d. Total Contributions	79,883,636	32,616,831	5,898,000	19,108,914	2,350,526	396,697,315
3 Total Payments Excluding Post- Retirement Death	82,151,110	52,767,142	9,371,820	14,076,870	1,992,683	419,342,851
4 Administrative Expenses ⁽¹⁾	974,852	362,642	76,310	199,072	27,958	8,486,463
5 Subtotal (Item 1 + 2d – 3 – 4)	1,476,118,727	780,193,870	141,548,556	309,089,992	27,504,976	7,105,669,381
6 Weighted Average Fund Balance	1,477,739,890	790,450,347	143,323,621	306,673,506	27,340,034	7,121,077,302
7 Earnings Allocated in Proportion to Item 6	104,033,782	55,648,183	10,090,070	21,590,000	1,924,755	501,328,149
8 Allocated Valuation Value of Assets As of End of Plan Year (Item 5 + 7)	\$1,580,152,509	\$835,842,053	\$151,638,626	\$330,679,992	\$29,429,731	\$7,606,997,530
9 Allocated Valuation Value of Assets As of End of Plan Year After Transferring Terminated Employers	\$1,555,112,518	\$835,842,053	\$151,638,626	\$330,679,992	\$29,429,731	\$7,606,997,530

⁽¹⁾ Allocated based on expected administrative expenses from the prior valuation.

Note: Results may not add due to rounding.

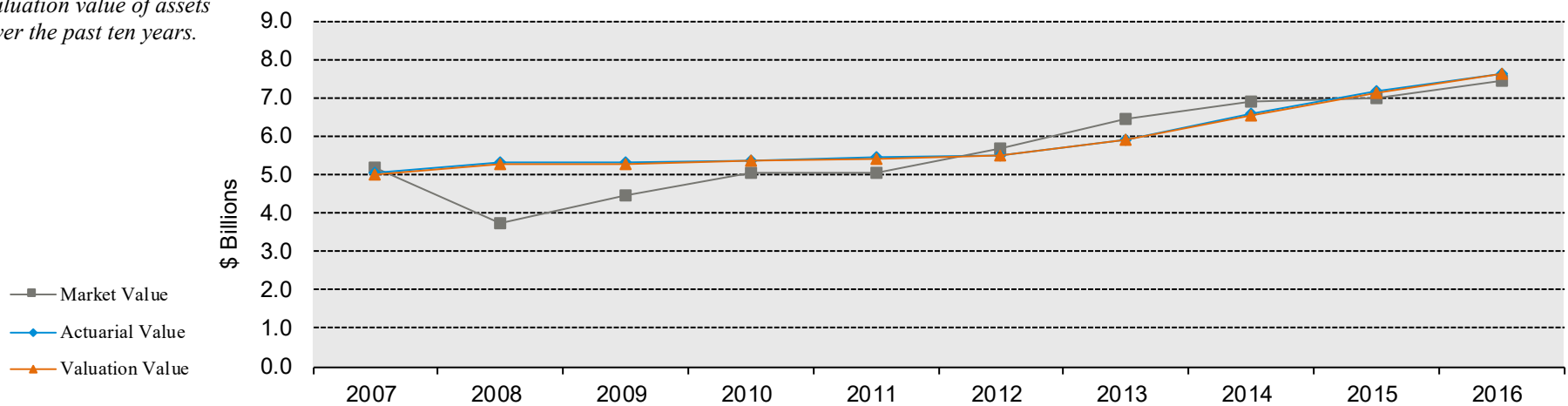
SECTION 2: Valuation Results for the Contra Costa County Employees' Retirement Association

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, but with less volatility. The valuation value of assets is the actuarial value, excluding any non-valuation reserves.

The valuation value of assets is significant because CCCERA's liabilities are compared to this measure of its assets to determine what portion, if any, remains unfunded. Amortization of the unfunded liability is an important element in determining the contribution requirement.

This chart shows the change in the relative values of market value, actuarial value and valuation value of assets over the past ten years.

CHART 9
Relative Values of Market Value, Actuarial Value and Valuation Value of Assets for Years Ended December 31, 2007 – 2016



SECTION 2: Valuation Results for the Contra Costa County Employees' Retirement Association

C. ACTUARIAL EXPERIENCE

To calculate the required 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 contribution requirement will decrease from the previous year. On the other hand, the contribution requirement 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.

The total experience gain was \$47.0 million, a gain of \$2.9 million from investments, a gain of \$12.5 million from contribution experience and a gain of \$31.6 million from all other sources. A discussion of the major components of the actuarial experience is on the following pages.

This chart provides a summary of the actuarial experience during the past year.

CHART 10
Actuarial Experience for Year Ended December 31, 2016

1. Net gain/(loss) from investments ⁽¹⁾	\$2,852,738
2. Net gain/(loss) from contribution experience	12,487,504
3. Net gain/(loss) from other experience ⁽²⁾	<u>31,634,399</u>
4. Net experience gain/(loss): (1) + (2) + (3)	<u>\$46,974,641</u>

⁽¹⁾ Details in Chart 11

⁽²⁾ See Section 3, Exhibit I. Does not include the effect of plan or assumption changes, if any.

SECTION 2: Valuation Results for the Contra Costa County Employees' Retirement Association

Investment Rate of Return

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 CCCERA's investment policy. For valuation purposes, the assumed rate of return on the actuarial value of assets during 2016 was 7.00% (based on the December 31, 2015 actuarial valuation). The actual rate of return on the actuarial value for the 2016 Plan Year was 7.04%.

The market value return reflects the entire impact of the investment performance during the current year and ignores returns from prior years.

The actuarial and valuation value returns reflect the fact that investment gains and losses are gradually taken into account. This is because these returns reflect only a portion of the investment gain or loss from the current year as well as portions of the gains and losses from prior years in accordance with the Board's asset valuation method.

Since the actual return for the year was greater than the assumed return, the Plan experienced an actuarial gain on the actuarial and valuation value of assets during the year ended December 31, 2016.

This chart shows the gain/(loss) due to investment experience.

CHART 11

Investment Experience for Year Ended December 31, 2016 – Market Value, Actuarial Value and Valuation Value of Assets

	Market Value	Actuarial Value	Valuation Value
1. Actual return	\$493,874,242	\$502,352,173	\$501,328,149
2. Average value of assets	6,960,455,767	7,135,809,435	7,121,077,302
3. Actual rate of return: (1) ÷ (2)	7.10%	7.04%	7.04%
4. Assumed rate of return	7.00%	7.00%	7.00%
5. Expected return: (2) x (4)	487,231,904	499,506,660	498,475,411
6. Actuarial gain/(loss): (1) – (5)	<u>\$6,642,338</u>	<u>\$2,845,513</u>	<u>\$2,852,738</u>

SECTION 2: Valuation Results for the Contra Costa County Employees' Retirement Association

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 rates of return on an actuarial, valuation and market value basis for the last ten years.

CHART 12

Investment Return – Valuation Value, Actuarial Value and Market Value: 2007 – 2016

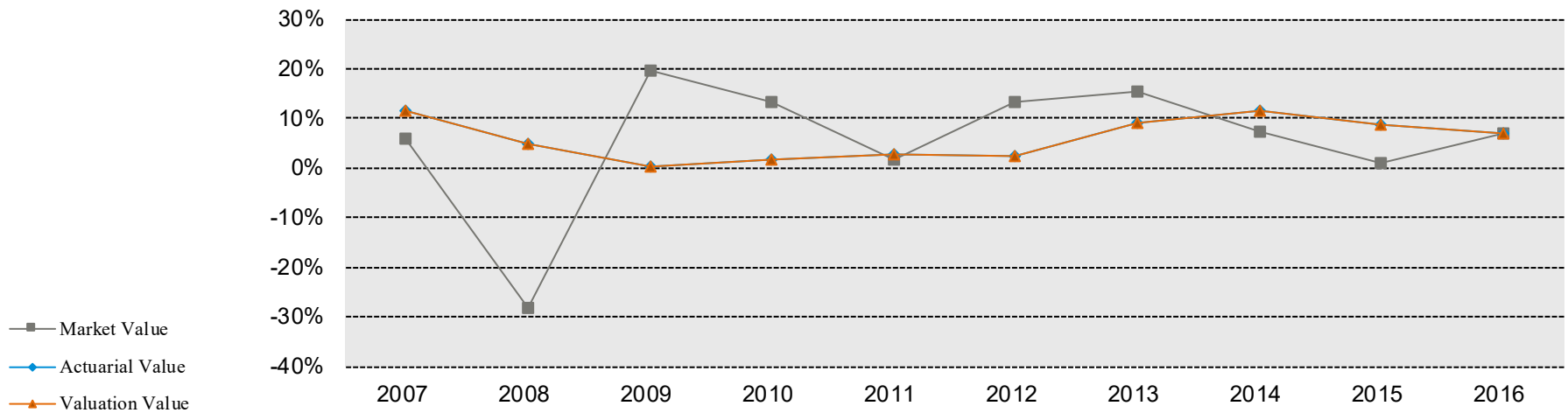
Year Ended December 31	Market Value Investment Return		Actuarial Value Investment Return		Valutaion Value Investment Return	
	Amount	Percent	Amount	Percent	Amount	Percent
2007	\$294,694,885	6.03%	\$522,206,583	11.63%	\$521,211,436	11.64%
2008	(1,477,705,765)	(28.35%)	238,397,117	4.73%	237,402,129	4.72%
2009	736,956,891	19.68%	18,226,933	0.34%	17,021,116	0.32%
2010	594,637,090	13.35%	95,918,913	1.82%	94,835,030	1.80%
2011	88,042,268	1.76%	148,058,548	2.78%	146,988,614	2.77%
2012	668,138,997	13.31%	121,921,302	2.25%	120,826,177	2.24%
2013	870,984,744	15.50%	492,503,802	9.01%	491,324,308	9.02%
2014	473,522,261	7.35%	673,040,867	11.39%	671,957,212	11.40%
2015	65,495,657	0.95%	577,199,123	8.78%	576,151,245	8.79%
2016	493,874,242	7.10%	502,352,173	7.04%	501,328,149	7.04%
Five-Year Average Return		8.32%		7.76%		7.77%
Ten-Year Average Return		5.18%		6.05%		6.05%

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

SECTION 2: Valuation Results for the Contra Costa County Employees' Retirement Association

Subsection B described the actuarial asset valuation method that gradually takes into account fluctuations in the market value rate of return. The effect of this is to stabilize the actuarial rate of return, which contributes to leveling pension plan costs.

CHART 13
Market, Actuarial and Valuation Value Rates of Return for Years Ended December 31, 2007 - 2016



SECTION 2: Valuation Results for the Contra Costa County Employees' Retirement Association

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 the participants,
- retirement experience (earlier or later than expected),
- mortality (more or fewer deaths than expected),
- the number of disability retirements,
- salary increases different than assumed, and
- COLA increases for retirees and beneficiaries different than assumed.

Please see Exhibit I in Section 3 for a detailed reconciliation of changes in the Unfunded Actuarial Accrued Liability.

SECTION 2: Valuation Results for the Contra Costa County Employees' Retirement Association

D. RECOMMENDED CONTRIBUTION

Employer contributions consist of two components:

Normal Cost

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

Contribution to the Unfunded Actuarial Accrued Liability (UAAL)

The annual contribution rate that, if paid annually over the UAAL amortization period, would accumulate to the amount necessary to fully fund the UAAL. Accumulation includes annual crediting of interest at the assumed investment earning rate. The contribution (or rate credit in the case of a negative UAAL) is calculated to remain as a level percentage of future active member payroll (including payroll for new members as they enter the Association) assuming a constant number of active members. In order to remain as a level percentage of payroll, amortization payments (credits) are scheduled to increase at the combined annual inflation and "across the board" salary increase rate of 3.25% along with expected payroll. The remaining balance of the December 31, 2007 UAAL is being amortized over a 6-year declining period as of December 31, 2016. Any change in the UAAL that arises at each valuation after December 31, 2007 is amortized over its own separate declining 18-year period. Effective with the December 31, 2013 valuation, any change in the UAAL that arises due to plan amendments is amortized over its own declining 10-year period (with the exception of a change due to retirement incentives, which is to be funded in full upon adoption of the incentive).

Employer Contribution Rates

The current and recommended employer contribution rates are shown in Chart 14. County contribution rates also include the Superior Court.

The PEPRA Tier 4 (2% COLA) in Cost Group #1 continues to not have any actual members as of December 31, 2016. The contribution rates for this cost group have been developed based on generally the same methodology used to estimate contribution rates for all of the PEPRA tiers in the December 31, 2012 valuation. We have assumed in this valuation that the demographic profiles (e.g., entry age, composition of male versus female, etc.) for this cost group can be approximated by

SECTION 2: Valuation Results for the Contra Costa County Employees' Retirement Association

the data profiles of current active members with membership dates on and after January 1, 2011.

The amortization cost for the UAAL has been expressed as a percentage of total future payroll, including members with membership dates on or after January 1, 2013. This has been done in order to continue the open group level percent of payroll amortization methodology for the UAAL associated with members with membership dates before January 1, 2013. It is also consistent with the methodology applied when Safety Tier C was implemented.

The employer contribution rates shown in Chart 14 are the aggregate rates before reflecting the under and over \$350 of monthly compensation contribution provisions for members integrated with Social Security. The detailed contribution rates reflecting these provisions will be provided in the contribution rate packet that goes to the Board of Supervisors.

Member Contributions Non-PEPRA Members

Articles 6 and 6.8 of the 1937 Act define the methodology to be used in the calculation of member basic contribution rates for non-PEPRA General and Safety members, respectively. The basic contribution rate is determined as that percentage of compensation which if paid annually from a member's first year of membership through the prescribed retirement age would accumulate to the amount necessary to fund a prescribed annuity.

The annuity is equal to:

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

SECTION 2: Valuation Results for the Contra Costa County Employees' Retirement Association

Member contributions are accumulated at an annual interest rate adopted annually by the Board. Note that recently negotiated MOU's for County General members no longer include the 50% employer subvention of the members' basic contributions. Districts pay varying portions, of the members' basic contributions on a nonrefundable basis. Members also pay 50% of the cost-of-living benefit. For most Safety Tier A employers, Safety members also subvent a portion of the employer rate, currently up to 9% of compensation (depending on their MOU). Chart 14 does not include any employer subvention of member contributions or any member subvention of employer contributions.

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

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

The age specific contribution rates are provided in Appendix A.

PEPRA Members

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

Member contribution rates are provided in Appendix B.

SECTION 2: Valuation Results for the Contra Costa County Employees' Retirement Association

Administrative Expense

The Board adopted an explicit administrative expense assumption effective with the December 31, 2015 actuarial valuation. The explicit administrative expense assumption is based on the prior year actual administration expenses, expressed as a percent of actual compensation for that year. For the 2016 calendar year the actual administrative expenses were \$8,486,463 and actual compensation was \$755,138,882. This results in an administrative expense load of 1.12% of compensation for the December 31, 2016 valuation. This is a decrease from the 1.14% assumption determined in the prior valuation.

The explicit assumption is allocated to both the employers and members based on the portions of the total Normal Cost rate (before expenses) for the employers and members. This results in an administrative expense load allocation as shown in the table below.

	<u>Average Normal Cost Rates Before Administrative Expense</u>	<u>Weighting</u>	<u>Total Loading</u>
Employer	16.50%	58.68%	0.66%
Member	11.62%	<u>41.32%</u>	<u>0.46%</u>
		100.00%	1.12%

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

<u>Allocation of Administrative Expense Load as % of Payroll</u>	
Addition to Employer Basic Normal Cost Rate	0.46%
Addition to Employer Basic UAAL Rate	0.20%
Addition to Member Basic Rate	<u>0.46%</u>
Total Addition to Contribution Rates	1.12%

The administrative expense load is added to the Basic rates for employers and members.

Cost Sharing Adjustments

Starting with the December 31, 2009 Actuarial Valuation, the Board took action to depool CCCERA's assets, liabilities and normal cost by employer when determining

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employer contribution rates. The Board action included a review of experience back to December 31, 2002. This did not involve recalculation of any employer rates prior to December 31, 2009. However, it did involve reflecting the separate experience of the employers in each individual cost group back from December 31, 2002 through December 31, 2009. The cost groups are detailed on pages 19 and 20. In addition, the Board action called for a discontinuation of certain cost sharing adjustments for both member and employer contribution rates for General Tier 1 and Safety Tier A. Even under the depooling structure, there are a few remaining cost sharing arrangements. Here is a summary of the cost sharing arrangements that were implemented in the December 31, 2009 Actuarial Valuation:

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

Other Adjustments

Other adjustments made in the determination of rates are as follows:

- Adjustments are made to some UAAL amounts for the County, the Contra Costa County Fire Protection District (CCCFPD), the Moraga-Orinda Fire District (Moraga) and First 5 – Children & Families Commission (First Five) to account for Pension Obligation Bonds (POBs) and any other special contributions that they previously made. These adjustments serve to reduce the UAAL contribution rate for these employers. The outstanding balances of these adjustments as of December 31, 2016 are as follows:

	<u>County General</u>	<u>Moraga General</u>	<u>First Five General</u>	<u>CCCFPD Safety</u>
Basic	\$165,598,272	\$291,624	\$652,884	\$47,532,691
COL	\$132,695,558	\$169,255	\$493,854	\$36,250,560

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Summary of Cost Groups and Employers

GENERAL

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

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Summary of Cost Groups and Employers (continued)

SAFETY

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

A special adjustment is made for employers that have a remaining balance of a Pension Obligation Bond or any other special contributions as described on page 18.

SECTION 2: Valuation Results for the Contra Costa County Employees' Retirement Association

**CHART 14
Components of Current and Recommended Employer Contribution Rates**

Cost Group #1	December 31, 2016 (Recommended Rates for FY 18-19) ⁽¹⁾				December 31, 2015 (Recommended Rates for FY 17-18) ⁽²⁾			
	Basic	COLA	Total	Estimated Annual Amount	Basic	COLA	Total	Estimated Annual Amount
County General Tier 1 w/Courts								
Normal Cost	12.35%	3.55%	15.90%	\$1,856,159	12.09%	3.47%	15.56%	\$2,039,140
UAAL	<u>11.44%</u>	<u>1.99%</u>	<u>13.43%</u>	<u>1,567,813</u>	<u>11.84%</u>	<u>2.35%</u>	<u>14.19%</u>	<u>1,859,601</u>
Total Contributions	23.79%	5.54%	29.33%	\$3,423,972	23.93%	5.82%	29.75%	\$3,898,741
	Payroll = \$11,673,958				Payroll = \$13,105,014			
Cost Group #1								
District General Tier 1 w/o POB								
Normal Cost	12.35%	3.55%	15.90%	\$1,060,297	12.09%	3.47%	15.56%	\$1,007,866
UAAL	<u>16.86%</u>	<u>6.33%</u>	<u>23.19%</u>	<u>1,546,433</u>	<u>17.36%</u>	<u>6.77%</u>	<u>24.13%</u>	<u>1,562,969</u>
Total Contributions	29.21%	9.88%	39.09%	\$2,606,730	29.45%	10.24%	39.69%	\$2,570,835
	Payroll = \$6,668,534				Payroll = \$6,477,285			
Cost Group #1								
District General Tier 1 w/ POB (Moraga)								
Normal Cost	12.35%	3.55%	15.90%	\$84,808	12.09%	3.47%	15.56%	\$75,963
UAAL	<u>7.73%</u>	<u>1.04%</u>	<u>8.77%</u>	<u>46,778</u>	<u>7.31%</u>	<u>0.94%</u>	<u>8.25%</u>	<u>40,276</u>
Total Contributions	20.08%	4.59%	24.67%	\$131,586	19.40%	4.41%	23.81%	\$116,239
	Payroll = \$533,382				Payroll = \$488,196			
Cost Group #1								
District General Tier 1 w/ UAAL Prepayment (First Five)								
Normal Cost	12.35%	3.55%	15.90%	\$277,000	12.09%	3.47%	15.56%	\$273,155
UAAL	<u>10.91%</u>	<u>1.82%</u>	<u>12.73%</u>	<u>221,775</u>	<u>11.25%</u>	<u>2.16%</u>	<u>13.41%</u>	<u>235,412</u>
Total Contributions	23.26%	5.37%	28.63%	\$498,775	23.34%	5.63%	28.97%	\$508,567
	Payroll = \$1,742,141				Payroll = \$1,755,494			

⁽¹⁾ The Basic Normal Cost and UAAL rates shown for each cost group include an explicit administrative expense load of 0.46% and 0.20% of payroll, respectively.

⁽²⁾ The Basic Normal Cost and UAAL rates shown for each cost group include an explicit administrative expense load of 0.47% and 0.20% of payroll, respectively.

SECTION 2: Valuation Results for the Contra Costa County Employees' Retirement Association

**CHART 14 (continued)
Components of Current and Recommended Employer Contribution Rates**

Cost Group #1	December 31, 2016 (Recommended Rates for FY 18-19) ⁽¹⁾				December 31, 2015 (Recommended Rates for FY 17-18) ⁽²⁾			
	Basic	COLA	Total	Estimated Annual Amount	Basic	COLA	Total	Estimated Annual Amount
County General Tier 4 (3% COLA) w/ Courts								
Normal Cost	8.67%	2.94%	11.61%	\$0	9.14%	3.07%	12.21%	\$0
UAAL	<u>11.44%</u>	<u>1.99%</u>	<u>13.43%</u>	<u>0</u>	<u>11.84%</u>	<u>2.35%</u>	<u>14.19%</u>	<u>0</u>
Total Contributions	20.11%	4.93%	25.04%	\$0	20.98%	5.42%	26.40%	\$0
	Payroll = \$0				Payroll = \$0			
Cost Group #1								
District General Tier 4 (3% COLA) w/o POB								
Normal Cost	8.67%	2.94%	11.61%	\$154,073	9.14%	3.07%	12.21%	\$101,563
UAAL	<u>16.86%</u>	<u>6.33%</u>	<u>23.19%</u>	<u>307,749</u>	<u>17.36%</u>	<u>6.77%</u>	<u>24.13%</u>	<u>200,714</u>
Total Contributions	25.53%	9.27%	34.80%	\$461,822	26.50%	9.84%	36.34%	\$302,277
	Payroll = \$1,327,075				Payroll = \$831,803			
Cost Group #1								
District General Tier 4 (3% COLA) w/ POB (Moraga)								
Normal Cost	8.67%	2.94%	11.61%	\$8,062	9.14%	3.07%	12.21%	\$5,132
UAAL	<u>7.73%</u>	<u>1.04%</u>	<u>8.77%</u>	<u>6,090</u>	<u>7.31%</u>	<u>0.94%</u>	<u>8.25%</u>	<u>3,468</u>
Total Contributions	16.40%	3.98%	20.38%	\$14,152	16.45%	4.01%	20.46%	\$8,600
	Payroll = \$69,443				Payroll = \$42,033			
Cost Group #1								
District General Tier 4 (3% COLA) with UAAL Prepayment (First Five)								
Normal Cost	8.67%	2.94%	11.61%	\$56,614	9.14%	3.07%	12.21%	\$51,143
UAAL	<u>10.91%</u>	<u>1.82%</u>	<u>12.73%</u>	<u>62,076</u>	<u>11.25%</u>	<u>2.16%</u>	<u>13.41%</u>	<u>56,170</u>
Total Contributions	19.58%	4.76%	24.34%	\$118,690	20.39%	5.23%	25.62%	\$107,313
	Payroll = \$487,635				Payroll = \$418,863			

⁽¹⁾ The Basic Normal Cost and UAAL rates shown for each cost group include an explicit administrative expense load of 0.46% and 0.20% of payroll, respectively.

⁽²⁾ The Basic Normal Cost and UAAL rates shown for each cost group include an explicit administrative expense load of 0.47% and 0.20% of payroll, respectively.

SECTION 2: Valuation Results for the Contra Costa County Employees' Retirement Association

**CHART 14 (continued)
Components of Current and Recommended Employer Contribution Rates**

Cost Group #1	December 31, 2016 (Recommended Rates for FY 18-19) ⁽¹⁾				December 31, 2015 (Recommended Rates for FY 17-18) ⁽²⁾			
	Basic	COLA	Total	Estimated Annual Amount	Basic	COLA	Total	Estimated Annual Amount
County General Tier 4 (2% COLA) w/ Courts								
Normal Cost	8.83%	2.04%	10.87%	\$0	8.84%	2.02%	10.86%	\$0
UAAL	<u>11.44%</u>	<u>1.99%</u>	<u>13.43%</u>	<u>0</u>	<u>11.84%</u>	<u>2.35%</u>	<u>14.19%</u>	<u>0</u>
Total Contributions	20.27%	4.03%	24.30%	\$0	20.68%	4.37%	25.05%	\$0
		Payroll = \$0				Payroll = \$0		
Cost Group #2								
County General Tier 3 w/ Courts								
Normal Cost	12.28%	3.42%	15.70%	\$64,625,796	12.08%	3.37%	15.45%	\$65,306,348
UAAL	<u>11.44%</u>	<u>1.99%</u>	<u>13.43%</u>	<u>55,281,811</u>	<u>11.84%</u>	<u>2.35%</u>	<u>14.19%</u>	<u>59,980,394</u>
Total Contributions	23.72%	5.41%	29.13%	\$119,907,607	23.92%	5.72%	29.64%	\$125,286,742
		Payroll = \$411,629,272				Payroll = \$422,694,810		
Cost Group #2								
District General Tier 3 w/o POB								
Normal Cost	12.28%	3.42%	15.70%	\$489,780	12.08%	3.37%	15.45%	\$480,631
UAAL	<u>16.86%</u>	<u>6.33%</u>	<u>23.19%</u>	<u>723,440</u>	<u>17.36%</u>	<u>6.77%</u>	<u>24.13%</u>	<u>750,655</u>
Total Contributions	29.14%	9.75%	38.89%	\$1,213,220	29.44%	10.14%	39.58%	\$1,231,286
		Payroll = \$3,119,619				Payroll = \$3,110,880		
Cost Group #2								
County General Tier 5 (3%/4% COLA) w/ Courts								
Normal Cost	8.39%	2.78%	11.17%	\$6,430,765	8.28%	2.77%	11.05%	\$6,394,827
UAAL	<u>11.44%</u>	<u>1.99%</u>	<u>13.43%</u>	<u>7,731,887</u>	<u>11.84%</u>	<u>2.35%</u>	<u>14.19%</u>	<u>8,212,000</u>
Total Contributions	19.83%	4.77%	24.60%	\$14,162,652	20.12%	5.12%	25.24%	\$14,606,827
		Payroll = \$57,571,759				Payroll = \$57,871,738		

⁽¹⁾ The Basic Normal Cost and UAAL rates shown for each cost group include an explicit administrative expense load of 0.46% and 0.20% of payroll, respectively.

⁽²⁾ The Basic Normal Cost and UAAL rates shown for each cost group include an explicit administrative expense load of 0.47% and 0.20% of payroll, respectively.

SECTION 2: Valuation Results for the Contra Costa County Employees' Retirement Association

**CHART 14 (continued)
Components of Current and Recommended Employer Contribution Rates**

Cost Group #2	December 31, 2016 (Recommended Rates for FY 18-19) ⁽¹⁾				December 31, 2015 (Recommended Rates for FY 17-18) ⁽²⁾			
	Basic	COLA	Total	Estimated Annual Amount	Basic	COLA	Total	Estimated Annual Amount
District General Tier 5 (3%/4% COLA) w/o POB								
Normal Cost	8.39%	2.78%	11.17%	\$27,371	8.28%	2.77%	11.05%	\$21,607
UAAL	<u>16.86%</u>	<u>6.33%</u>	<u>23.19%</u>	<u>56,826</u>	<u>17.36%</u>	<u>6.77%</u>	<u>24.13%</u>	<u>47,183</u>
Total Contributions	25.25%	9.11%	34.36%	\$84,197	25.64%	9.54%	35.18%	\$68,790
	Payroll = \$245,044				Payroll = \$195,536			
Cost Group #2								
County General Tier 5 (2% COLA) w/ Courts								
Normal Cost	8.25%	1.89%	10.14%	\$9,709,443	8.11%	1.85%	9.96%	\$5,462,794
UAAL	<u>11.44%</u>	<u>1.99%</u>	<u>13.43%</u>	<u>12,859,746</u>	<u>11.84%</u>	<u>2.35%</u>	<u>14.19%</u>	<u>7,782,836</u>
Total Contributions	19.69%	3.88%	23.57%	\$22,569,189	19.95%	4.20%	24.15%	\$13,245,630
	Payroll = \$95,753,877				Payroll = \$54,847,327			
Cost Group #2								
District General Tier 5 (2% COLA) w/o POB								
Normal Cost	8.25%	1.89%	10.14%	\$22,608	8.11%	1.85%	9.96%	\$12,722
UAAL	<u>16.86%</u>	<u>6.33%</u>	<u>23.19%</u>	<u>51,704</u>	<u>17.36%</u>	<u>6.77%</u>	<u>24.13%</u>	<u>30,821</u>
Total Contributions	25.11%	8.22%	33.33%	\$74,312	25.47%	8.62%	34.09%	\$43,543
	Payroll = \$222,957				Payroll = \$127,729			

⁽¹⁾ The Basic Normal Cost and UAAL rates shown for each cost group include an explicit administrative expense load of 0.46% and 0.20% of payroll, respectively.

⁽²⁾ The Basic Normal Cost and UAAL rates shown for each cost group include an explicit administrative expense load of 0.47% and 0.20% of payroll, respectively.

SECTION 2: Valuation Results for the Contra Costa County Employees' Retirement Association

**CHART 14 (continued)
Components of Current and Recommended Employer Contribution Rates**

Cost Group #3	December 31, 2016 (Recommended Rates for FY 18-19) ⁽¹⁾				December 31, 2015 (Recommended Rates for FY 17-18) ⁽²⁾			
	Basic	COLA	Total	Estimated Annual Amount	Basic	COLA	Total	Estimated Annual Amount
CCCSD General Tier 1								
Normal Cost	13.45%	3.91%	17.36%	\$4,951,527	13.24%	3.84%	17.08%	\$4,705,205
UAAL	<u>23.91%</u>	<u>10.56%</u>	<u>34.47%</u>	<u>9,831,747</u>	<u>25.42%</u>	<u>10.89%</u>	<u>36.31%</u>	<u>10,002,694</u>
Total Contributions	37.36%	14.47%	51.83%	\$14,783,274	38.66%	14.73%	53.39%	\$14,707,899
	Payroll = \$28,522,620				Payroll = \$27,548,041			
Cost Group #3								
CCCSD General Tier 4 (3% COLA)								
Normal Cost	8.32%	2.88%	11.20%	\$457,284	8.71%	2.99%	11.70%	\$320,837
UAAL	<u>23.91%</u>	<u>10.56%</u>	<u>34.47%</u>	<u>1,407,375</u>	<u>25.42%</u>	<u>10.89%</u>	<u>36.31%</u>	<u>995,691</u>
Total Contributions	32.23%	13.44%	45.67%	\$1,864,659	34.13%	13.88%	48.01%	\$1,316,528
	Payroll = \$4,082,897				Payroll = \$2,742,196			
Cost Group #4								
Contra Costa Housing Authority General Tier 1								
Normal Cost	13.38%	3.76%	17.14%	\$723,575	12.98%	3.65%	16.63%	\$708,240
UAAL	<u>16.10%</u>	<u>9.29%</u>	<u>25.39%</u>	<u>1,071,854</u>	<u>16.70%</u>	<u>9.77%</u>	<u>26.47%</u>	<u>1,127,308</u>
Total Contributions	29.48%	13.05%	42.53%	\$1,795,429	29.68%	13.42%	43.10%	\$1,835,548
	Payroll = \$4,221,560				Payroll = \$4,258,812			
Cost Group #4								
Contra Costa Housing Authority General Tier 4 (3% COLA)								
Normal Cost	9.21%	3.13%	12.34%	\$162,600	8.82%	3.00%	11.82%	\$114,546
UAAL	<u>16.10%</u>	<u>9.29%</u>	<u>25.39%</u>	<u>334,556</u>	<u>16.70%</u>	<u>9.77%</u>	<u>26.47%</u>	<u>256,517</u>
Total Contributions	25.31%	12.42%	37.73%	\$497,156	25.52%	12.77%	38.29%	\$371,063
	Payroll = \$1,317,669				Payroll = \$969,086			

⁽¹⁾ The Basic Normal Cost and UAAL rates shown for each cost group include an explicit administrative expense load of 0.46% and 0.20% of payroll, respectively.

⁽²⁾ The Basic Normal Cost and UAAL rates shown for each cost group include an explicit administrative expense load of 0.47% and 0.20% of payroll, respectively.

SECTION 2: Valuation Results for the Contra Costa County Employees' Retirement Association

**CHART 14 (continued)
Components of Current and Recommended Employer Contribution Rates**

Cost Group #5	December 31, 2016 (Recommended Rates for FY 18-19) ⁽¹⁾				December 31, 2015 (Recommended Rates for FY 17-18) ⁽²⁾			
	Basic	COLA	Total	Estimated Annual Amount	Basic	COLA	Total	Estimated Annual Amount
CCCYPD General Tier 1								
Normal Cost	12.25%	3.53%	15.78%	\$543,052	12.08%	3.47%	15.55%	\$529,826
UAAL	<u>10.77%</u>	<u>6.49%</u>	<u>17.26%</u>	<u>593,984</u>	<u>10.32%</u>	<u>5.54%</u>	<u>15.86%</u>	<u>540,388</u>
Total Contributions	23.02%	10.02%	33.04%	\$1,137,036	22.40%	9.01%	31.41%	\$1,070,214
	Payroll = \$3,441,393				Payroll = \$3,407,238			
Cost Group #5								
CCCYPD General Tier 4 (3% COLA)								
Normal Cost	11.24%	3.86%	15.10%	\$16,406	10.97%	3.78%	14.75%	\$14,045
UAAL	<u>10.77%</u>	<u>6.49%</u>	<u>17.26%</u>	<u>18,753</u>	<u>10.32%</u>	<u>5.54%</u>	<u>15.86%</u>	<u>15,102</u>
Total Contributions	22.01%	10.35%	32.36%	\$35,159	21.29%	9.32%	30.61%	\$29,147
	Payroll = \$108,649				Payroll = \$95,223			
Cost Group #5								
CCCYPD General Tier 4 (2% COLA)								
Normal Cost	9.25%	2.15%	11.40%	\$80,257	9.54%	2.21%	11.75%	\$27,069
UAAL	<u>10.77%</u>	<u>6.49%</u>	<u>17.26%</u>	<u>121,512</u>	<u>10.32%</u>	<u>5.54%</u>	<u>15.86%</u>	<u>36,538</u>
Total Contributions	20.02%	8.64%	28.66%	\$201,769	19.86%	7.75%	27.61%	\$63,607
	Payroll = \$704,009				Payroll = \$230,376			

⁽¹⁾ The Basic Normal Cost and UAAL rates shown for each cost group include an explicit administrative expense load of 0.46% and 0.20% of payroll, respectively.

⁽²⁾ The Basic Normal Cost and UAAL rates shown for each cost group include an explicit administrative expense load of 0.47% and 0.20% of payroll, respectively.

SECTION 2: Valuation Results for the Contra Costa County Employees' Retirement Association

**CHART 14 (continued)
Components of Current and Recommended Employer Contribution Rates**

Cost Group #6	December 31, 2016 (Recommended Rates for FY 18-19) ⁽¹⁾				December 31, 2015 (Recommended Rates for FY 17-18) ⁽²⁾			
	Basic	COLA	Total	Estimated Annual Amount	Basic	COLA	Total	Estimated Annual Amount
Non-Enhanced District General Tier 1								
Normal Cost	12.82%	3.84%	16.66%	\$109,747	13.08%	3.84%	16.92%	\$116,077
UAAL	<u>12.43%</u>	<u>-0.06%</u>	<u>12.37%</u>	<u>81,487</u>	<u>9.73%</u>	<u>-0.55%</u>	<u>9.18%</u>	<u>62,978</u>
Total Contributions	25.25%	3.78%	29.03%	\$191,234	22.81%	3.29%	26.10%	\$179,055
	Payroll = \$658,747				Payroll = \$686,034			
Cost Group #6								
Non-Enhanced District General Tier 4 (3% COLA)								
Normal Cost	11.96%	3.85%	15.81%	\$22,845	9.46%	3.30%	12.76%	\$18,340
UAAL	<u>12.43%</u>	<u>-0.06%</u>	<u>12.37%</u>	<u>17,874</u>	<u>9.73%</u>	<u>-0.55%</u>	<u>9.18%</u>	<u>13,195</u>
Total Contributions	24.39%	3.79%	28.18%	\$40,719	19.19%	2.75%	21.94%	\$31,535
	Payroll = \$144,494				Payroll = \$143,734			
Cost Group #7								
County Safety Tier A								
Normal Cost	22.91%	7.31%	30.22%	\$17,367,909	22.71%	7.20%	29.91%	\$17,847,901
UAAL	<u>25.44%</u>	<u>20.43%</u>	<u>45.87%</u>	<u>26,362,210</u>	<u>26.43%</u>	<u>20.44%</u>	<u>46.87%</u>	<u>27,968,275</u>
Total Contributions	48.35%	27.74%	76.09%	\$43,730,119	49.14%	27.64%	76.78%	\$45,816,176
	Payroll = \$57,471,572				Payroll = \$59,672,019			
Cost Group #7								
County Safety Tier D								
Normal Cost	15.04%	6.19%	21.23%	\$671,015	15.61%	6.34%	21.95%	\$651,557
UAAL	<u>25.44%</u>	<u>20.43%</u>	<u>45.87%</u>	<u>1,449,809</u>	<u>26.43%</u>	<u>20.44%</u>	<u>46.87%</u>	<u>1,391,275</u>
Total Contributions	40.48%	26.62%	67.10%	\$2,120,824	42.04%	26.78%	68.82%	\$2,042,832
	Payroll = \$3,160,691				Payroll = \$2,968,370			

⁽¹⁾ The Basic Normal Cost and UAAL rates shown for each cost group include an explicit administrative expense load of 0.46% and 0.20% of payroll, respectively.

⁽²⁾ The Basic Normal Cost and UAAL rates shown for each cost group include an explicit administrative expense load of 0.47% and 0.20% of payroll, respectively.

SECTION 2: Valuation Results for the Contra Costa County Employees' Retirement Association

**CHART 14 (continued)
Components of Current and Recommended Employer Contribution Rates**

Cost Group #8	December 31, 2016 (Recommended Rates for FY 18-19) ⁽¹⁾				December 31, 2015 (Recommended Rates for FY 17-18) ⁽²⁾			
	Basic	COLA	Total	Estimated Annual Amount	Basic	COLA	Total	Estimated Annual Amount
CCCYPD Safety Tier A								
Normal Cost	22.01%	7.12%	29.13%	\$8,289,271	21.66%	7.04%	28.70%	\$7,887,405
UAAL	<u>17.31%</u>	<u>27.22%</u>	<u>44.53%</u>	<u>12,671,515</u>	<u>21.27%</u>	<u>27.91%</u>	<u>49.18%</u>	<u>13,515,769</u>
Total Contributions	39.32%	34.34%	73.66%	\$20,960,786	42.93%	34.95%	77.88%	\$21,403,174
	Payroll = \$28,456,131				Payroll = \$27,482,247			
Cost Group #8 East CCCYPD Safety Tier A								
Normal Cost	22.01%	7.12%	29.13%	\$825,079	21.66%	7.04%	28.70%	\$782,496
UAAL	<u>45.64%</u>	<u>48.83%</u>	<u>94.47%</u>	<u>2,675,770</u>	<u>51.05%</u>	<u>50.63%</u>	<u>101.68%</u>	<u>2,772,271</u>
Total Contributions	67.65%	55.95%	123.60%	\$3,500,849	72.71%	57.67%	130.38%	\$3,554,767
	Payroll = \$2,832,402				Payroll = \$2,726,466			
Cost Group #8 CCCYPD Safety Tier D								
Normal Cost	13.67%	5.77%	19.44%	\$329,369	14.57%	6.10%	20.67%	\$309,996
UAAL	<u>17.31%</u>	<u>27.22%</u>	<u>44.53%</u>	<u>754,465</u>	<u>21.27%</u>	<u>27.91%</u>	<u>49.18%</u>	<u>737,573</u>
Total Contributions	30.98%	32.99%	63.97%	\$1,083,834	35.84%	34.01%	69.85%	\$1,047,569
	Payroll = \$1,694,284				Payroll = \$1,499,741			
Cost Group #8 East CCCYPD Safety Tier D								
Normal Cost	13.67%	5.77%	19.44%	\$56,679	14.57%	6.10%	20.67%	\$1,061
UAAL	<u>45.64%</u>	<u>48.83%</u>	<u>94.47%</u>	<u>275,438</u>	<u>51.05%</u>	<u>50.63%</u>	<u>101.68%</u>	<u>5,219</u>
Total Contributions	59.31%	54.60%	113.91%	\$332,117	65.62%	56.73%	122.35%	\$6,280
	Payroll = \$291,561				Payroll = \$5,133			

⁽¹⁾ The Basic Normal Cost and UAAL rates shown for each cost group include an explicit administrative expense load of 0.46% and 0.20% of payroll, respectively.

⁽²⁾ The Basic Normal Cost and UAAL rates shown for each cost group include an explicit administrative expense load of 0.47% and 0.20% of payroll, respectively.

SECTION 2: Valuation Results for the Contra Costa County Employees' Retirement Association

**CHART 14 (continued)
Components of Current and Recommended Employer Contribution Rates**

	December 31, 2016 (Recommended Rates for FY 18-19) ⁽¹⁾				December 31, 2015 (Recommended Rates for FY 17-18) ⁽²⁾			
	Basic	COLA	Total	Estimated Annual Amount	Basic	COLA	Total	Estimated Annual Amount
Cost Group #8								
CCCFPD Safety Tier E								
Normal Cost	13.01%	3.67%	16.68%	\$249,862	16.17%	4.40%	20.57%	\$36,914
UAAL	<u>17.31%</u>	<u>27.22%</u>	<u>44.53%</u>	<u>667,048</u>	<u>21.27%</u>	<u>27.91%</u>	<u>49.18%</u>	<u>88,257</u>
Total Contributions	30.32%	30.89%	61.21%	\$916,910	37.44%	32.31%	69.75%	\$125,171
	Payroll = \$1,497,974				Payroll = \$179,457			
Cost Group #9								
County Safety Tier C								
Normal Cost	21.29%	4.55%	25.84%	\$3,308,435	20.42%	4.37%	24.79%	\$3,317,342
UAAL	<u>25.44%</u>	<u>20.43%</u>	<u>45.87%</u>	<u>5,872,984</u>	<u>26.43%</u>	<u>20.44%</u>	<u>46.87%</u>	<u>6,272,037</u>
Total Contributions	46.73%	24.98%	71.71%	\$9,181,419	46.85%	24.81%	71.66%	\$9,589,379
	Payroll = \$12,803,541				Payroll = \$13,381,773			
Cost Group #9								
County Safety Tier E								
Normal Cost	13.72%	3.81%	17.53%	\$2,393,118	13.37%	3.71%	17.08%	\$1,658,879
UAAL	<u>25.44%</u>	<u>20.43%</u>	<u>45.87%</u>	<u>6,261,968</u>	<u>26.43%</u>	<u>20.44%</u>	<u>46.87%</u>	<u>4,552,206</u>
Total Contributions	39.16%	24.24%	63.40%	\$8,655,086	39.80%	24.15%	63.95%	\$6,211,085
	Payroll = \$13,651,555				Payroll = \$9,712,409			

⁽¹⁾ The Basic Normal Cost and UAAL rates shown for each cost group include an explicit administrative expense load of 0.46% and 0.20% of payroll, respectively.

⁽²⁾ The Basic Normal Cost and UAAL rates shown for each cost group include an explicit administrative expense load of 0.47% and 0.20% of payroll, respectively.

SECTION 2: Valuation Results for the Contra Costa County Employees' Retirement Association

**CHART 14 (continued)
Components of Current and Recommended Employer Contribution Rates**

	December 31, 2016 (Recommended Rates for FY 18-19) ⁽¹⁾				December 31, 2015 (Recommended Rates for FY 17-18) ⁽²⁾			
	Basic	COLA	Total	Estimated Annual Amount	Basic	COLA	Total	Estimated Annual Amount
Cost Group #10								
Moraga-Orinda FD Safety Tier A								
Normal Cost	20.96%	6.96%	27.92%	\$1,725,213	21.02%	6.92%	27.94%	\$1,709,761
UAAL	<u>15.98%</u>	<u>27.46%</u>	<u>43.44%</u>	<u>2,684,215</u>	<u>17.83%</u>	<u>25.17%</u>	<u>43.00%</u>	<u>2,631,343</u>
Total Contributions	36.94%	34.42%	71.36%	\$4,409,428	38.85%	32.09%	70.94%	\$4,341,104
	Payroll = \$6,179,131				Payroll = \$6,119,403			
Cost Group #10								
Moraga-Orinda FD Safety Tier D								
Normal Cost	13.29%	5.63%	18.92%	\$163,164	13.53%	5.71%	19.24%	\$113,858
UAAL	<u>15.98%</u>	<u>27.46%</u>	<u>43.44%</u>	<u>374,622</u>	<u>17.83%</u>	<u>25.17%</u>	<u>43.00%</u>	<u>254,464</u>
Total Contributions	29.27%	33.09%	62.36%	\$537,786	31.36%	30.88%	62.24%	\$368,322
	Payroll = \$862,390				Payroll = \$591,777			
Cost Group #11								
San Ramon FD Safety Tier A								
Normal Cost	21.86%	7.01%	28.87%	\$5,179,535	21.54%	6.97%	28.51%	\$4,859,497
UAAL	<u>32.19%</u>	<u>20.32%</u>	<u>52.51%</u>	<u>9,420,761</u>	<u>34.10%</u>	<u>20.77%</u>	<u>54.87%</u>	<u>9,352,529</u>
Total Contributions	54.05%	27.33%	81.38%	\$14,600,296	55.64%	27.74%	83.38%	\$14,212,026
	Payroll = \$17,940,890				Payroll = \$17,044,886			
Cost Group #11								
San Ramon FD Safety Tier D								
Normal Cost	13.28%	5.64%	18.92%	\$235,907	13.70%	5.79%	19.49%	\$90,185
UAAL	<u>32.19%</u>	<u>20.32%</u>	<u>52.51%</u>	<u>654,730</u>	<u>34.10%</u>	<u>20.77%</u>	<u>54.87%</u>	<u>253,897</u>
Total Contributions	45.47%	25.96%	71.43%	\$890,637	47.80%	26.56%	74.36%	\$344,082
	Payroll = \$1,246,868				Payroll = \$462,724			

⁽¹⁾ The Basic Normal Cost and UAAL rates shown for each cost group include an explicit administrative expense load of 0.46% and 0.20% of payroll, respectively.

⁽²⁾ The Basic Normal Cost and UAAL rates shown for each cost group include an explicit administrative expense load of 0.47% and 0.20% of payroll, respectively.

SECTION 2: Valuation Results for the Contra Costa County Employees' Retirement Association

**CHART 14 (continued)
Components of Current and Recommended Employer Contribution Rates**

Cost Group #12	December 31, 2016 (Recommended Rates for FY 18-19) ⁽¹⁾				December 31, 2015 (Recommended Rates for FY 17-18) ⁽²⁾			
	Basic	COLA	Total	Estimated Annual Amount	Basic	COLA	Total	Estimated Annual Amount
Non-Enhanced Rodeo-Hercules FPD Safety Tier A								
Normal Cost	14.82%	5.20%	20.02%	\$363,887	17.68%	5.70%	23.38%	\$464,184
UAAL	<u>46.06%</u>	<u>31.23%</u>	<u>77.29%</u> ⁽³⁾	<u>1,404,835</u>	<u>39.26%</u>	<u>24.81%</u>	<u>64.07%</u> ⁽⁴⁾	<u>1,272,039</u>
Total Contributions	60.88%	36.43%	97.31%	\$1,768,722	56.94%	30.51%	87.45%	\$1,736,223
	Payroll = \$1,817,615				Payroll = \$1,985,389			
Cost Group #12								
Non-Enhanced Rodeo-Hercules FPD Safety Tier D								
Normal Cost	11.92%	5.07%	16.99%	\$43,991	11.96%	5.10%	17.06%	\$80,766
UAAL	<u>46.06%</u>	<u>31.23%</u>	<u>77.29%</u> ⁽³⁾	<u>200,120</u>	<u>39.26%</u>	<u>24.81%</u>	<u>64.07%</u> ⁽⁴⁾	<u>303,321</u>
Total Contributions	57.98%	36.30%	94.28%	\$244,111	51.22%	29.91%	81.13%	\$384,087
	Payroll = \$258,921				Payroll = \$473,421			
Total All Employers Combined (Aggregate)								
Normal Cost	13.16%	3.80%	16.96%	\$133,072,503	13.25%	3.85%	17.10%	\$127,598,878
UAAL	<u>14.63%</u>	<u>6.49%</u>	<u>21.12%</u>	<u>165,673,760</u>	<u>15.34%</u>	<u>6.79%</u>	<u>22.13%</u>	<u>165,183,385</u>
Total Contributions	27.79%	10.29%	38.08%	\$298,746,263	28.59%	10.64%	39.23%	\$292,782,263
	Payroll = \$784,412,260				Payroll = \$746,352,663			

⁽¹⁾ The Basic Normal Cost and UAAL rates shown for each cost group include an explicit administrative expense load of 0.46% and 0.20% of payroll, respectively.

⁽²⁾ The Basic Normal Cost and UAAL rates shown for each cost group include an explicit administrative expense load of 0.47% and 0.20% of payroll, respectively.

⁽³⁾ Total UAAL dollar contribution for Rodeo-Hercules FPD is \$1,683,829 for FY 18-19. It is based on the UAAL rate shown above multiplied by estimated payroll for FY 18-19. The estimated payroll for FY 18-19 was determined by increasing payroll amounts shown above for 2017 by 18-months of assumed wage inflation.

⁽⁴⁾ Total UAAL dollar contribution for Rodeo-Hercules FPD is \$1,652,779 for FY 17-18. It is based on the UAAL rate shown above multiplied by estimated payroll for FY 17-18. The estimated payroll for FY 17-18 was determined by increasing payroll amounts shown above for 2016 by 18-months of assumed wage inflation.

SECTION 2: Valuation Results for the Contra Costa County Employees' Retirement Association

The employer contribution rates as of December 31, 2016 are based on all of the data described in the previous sections, the actuarial assumptions described in Section 4, and the Plan provisions adopted at the time of preparation of the Actuarial Valuation. They include all changes affecting future costs, adopted benefit changes, actuarial gains and losses and changes in the actuarial assumptions.

Reconciliation of Recommended Employer Contribution Rate

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

CHART 15
Reconciliation of Recommended Average Employer Contribution from December 31, 2015 to December 31, 2016 Valuation

	Contribution Rate ⁽¹⁾	Estimated Annual Dollar Cost ⁽²⁾
Recommended Average Employer Contribution Rate in December 31, 2015 Valuation	39.23%	\$292,782,263
Effect of investment (gain)/loss ⁽³⁾	(0.03%)	(235,324)
Effect of difference in actual versus expected contributions due to delay in implementation of contribution rates calculated in 12/31/2015 valuation	(0.12%)	(941,295)
Effect of higher than expected individual salary increases	0.11%	862,853
Effect of amortizing prior year's UAAL over a greater than expected projected total payroll	(0.39%)	5,319,442 ⁽⁴⁾
Effect of higher than expected COLA increases for retirees and beneficiaries	0.34%	2,667,002
Effect of changes in member demographics on Normal Cost	(0.13%)	(1,019,736)
Effect of mortality gain on retirees and beneficiaries	(0.56%)	(4,392,709)
Effect of retirement experience gain on actives	(0.28%)	(2,196,354)
Effect of net other experience (gains)/losses ⁽⁵⁾	(0.08%)	5,978,562
Effect of change in administrative expense load	(0.01%)	(78,441)
Total change	(1.15%)	5,964,000
Recommended Average Employer Contribution Rate in December 31, 2016 Valuation	38.08%	\$298,746,263

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

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

(3) Return on the valuation value of assets of 7.04% was greater than the 7.00% assumed in the December 31, 2015 valuation.

(4) Represents the dollar increase in UAAL amortization payments for amortization bases established prior to the December 31, 2016 valuation.

(5) Other differences in actual versus expected experience including (but not limited to) disability, withdrawal and leave cashout experience. Also includes impact of -0.17% associated with moving terminated employers to their own cost group. Estimated annual dollar cost also reflects change in payroll from prior valuation.

SECTION 2: Valuation Results for the Contra Costa County Employees' Retirement Association

The member contribution rates as of December 31, 2016 are based on all of the data described in the previous sections, the actuarial assumptions described in Section 4, and the Plan provisions adopted at the time of preparation of the Actuarial Valuation. They include all changes affecting future costs, adopted benefit changes, actuarial gains and losses and changes in the actuarial assumptions.

Reconciliation of Recommended Member Contribution Rate

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

The chart reconciles the member contribution from the prior valuation to the amount determined in this valuation.

**CHART 16
Reconciliation of Recommended Average Member Contribution from December 31, 2015 to December 31, 2016 Valuation**

	Contribution Rate ⁽¹⁾	Estimated Annual Dollar Cost ⁽²⁾
Recommended Average Member Contribution Rate in December 31, 2015 Valuation	12.09%	\$90,220,114
Effect of change in administrative expense load	(0.01%)	(78,441)
Effect of changes in member demographics ⁽³⁾	<u>0.00%</u>	<u>4,636,712</u>
Total change	<u>(0.01%)</u>	<u>\$4,558,271</u>
Recommended Average Member Contribution Rate in December 31, 2016 Valuation	12.08%	\$94,778,385

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

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

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

SECTION 2: Valuation Results for the Contra Costa County Employees' Retirement Association

E. FUNDED RATIO

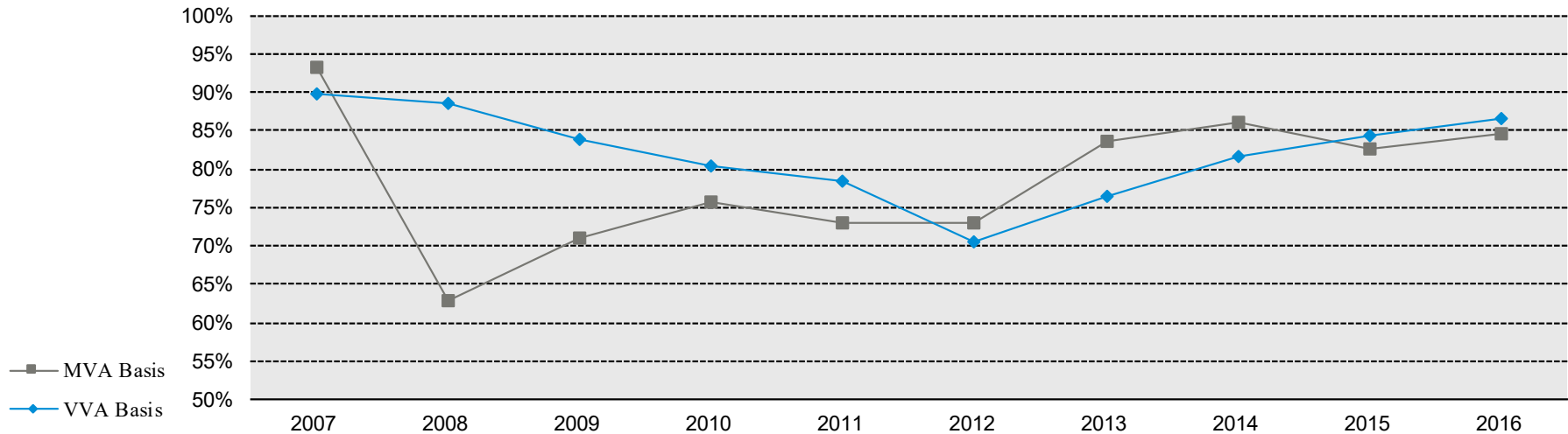
A critical piece of information regarding the Plan's financial status is the funded ratio. The ratios compare the valuation value of assets and market value of assets to the actuarial accrued liabilities of the Plan as calculated. High ratios indicate a well-funded plan with assets sufficient to cover the plan's actuarial accrued liabilities. Lower ratios may indicate recent changes to benefit structures, funding of the plan below actuarial requirements, poor asset performance, or a variety of other factors. The chart below depicts a history of the funded ratio for this plan.

Chart 18 on the next page shows the Plan's schedule of funding progress for the last ten years.

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

CHART 17

Funded Ratio for Plan Years Ending December 31, 2007 – 2016



SECTION 2: Valuation Results for the Contra Costa County Employees' Retirement Association

CHART 18
Schedule of Funding Progress

Actuarial Valuation Date	Valuation Value of Assets⁽¹⁾ (a)	Actuarial Accrued Liability (AAL)⁽²⁾ (b)	Unfunded/ (Overfunded) AAL (UAAL) (b) – (a)	Funded Ratio (a) / (b)	Projected Covered Payroll (c)	UAAL as a Percentage of Covered Payroll [(b) – (a)] / (c)
12/31/2007	\$5,016,136,535	\$5,581,048,225	\$564,911,690	89.88%	\$671,617,932	84.11%
12/31/2008	5,282,505,159	5,972,471,074	689,965,915	88.45%	704,947,668	97.87%
12/31/2009	5,290,114,102	6,314,787,187	1,024,673,085	83.77%	694,443,999	147.55%
12/31/2010	5,341,821,711	6,654,036,801	1,312,215,090	80.28%	687,443,206	190.88%
12/31/2011	5,426,719,066	6,915,311,649	1,488,592,583	78.47%	666,394,146	223.38%
12/31/2012	5,482,257,062	7,761,315,535	2,279,058,473	70.64%	652,312,180	349.38%
12/31/2013	5,907,416,432	7,731,097,407	1,823,680,975	76.41%	679,428,911	268.41%
12/31/2014	6,557,496,101	8,027,438,213	1,469,942,112	81.69%	697,831,837	210.64%
12/31/2015	7,136,801,380	8,448,624,096	1,311,822,716	84.47%	746,352,663	175.76%
12/31/2016	7,606,997,530	8,794,434,139	1,187,436,609	86.50%	784,412,260	151.38%

⁽¹⁾ Excludes assets for non-valuation reserves.

⁽²⁾ Excludes liabilities for non-valuation reserves.

SECTION 2: Valuation Results for the Contra Costa County Employees' Retirement Association

F. 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 measure since it is based on the current level of assets.

For CCCERA, the current AVR is about 9.5. This means that a 1% asset gain/(loss) (relative to the assumed investment return) translates to about 9.5% of one-year's payroll. Since CCCERA amortizes actuarial gains and losses over a 18-year period, there would be a 0.7% of payroll decrease/(increase) in the required contribution for each 1% asset gain/(loss).

The Liability Volatility Ratio (LVR), which is equal to the Actuarial Accrued Liability divided by payroll, provides an indication of the longer-term potential for contribution volatility for any given level of investment volatility. This is because, over an extended period of time, the plan's assets should track the plan's liabilities. For example, if a plan is 50% funded on a market value basis, the liability volatility ratio would be double the asset volatility ratio and the plan sponsor should expect contribution volatility to increase over time as the plan becomes better funded.

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.

For CCCERA, the current LVR is about 11.1. This is about 17% higher than the AVR. Therefore, we would expect that contribution volatility will increase over the long-term.

This chart shows how the asset and liability volatility ratios have varied over time, both for the plan in total and separately for General and Safety.

CHART 19
Volatility Ratios for Years Ended December 31, 2009 – 2016

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

SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association

EXHIBIT A

Table of Plan Coverage

i. General Tier 1

Category	Year Ended December 31		Change From Prior Year
	2016	2015	
Active members in valuation			
Number	559	590	-5.3%
Average age	49.9	49.9	N/A
Average service	15.8	15.2	N/A
Projected total payroll ⁽¹⁾	\$57,462,335	\$57,604,252	-0.2%
Projected average payroll	\$102,795	\$97,634	5.3%
Account balances	\$61,775,547	\$56,845,843	8.7%
Total active members with at least five years of service	500	518	-3.5%
Vested terminated members⁽²⁾	234	238	-1.7%
Retired members⁽²⁾			
Number in pay status	2,503	2,574	-2.8%
Average age	74.6	74.4	N/A
Average monthly benefit	\$4,087	\$3,958	3.3%
Disabled members⁽²⁾			
Number in pay status ⁽³⁾	265	275	-3.6%
Average age	71.6	71.0	N/A
Average monthly benefit	\$2,802	\$2,744	2.1%
Beneficiaries⁽²⁾			
Number in pay status	682	738	-7.6%
Average age	77.4	78.0	N/A
Average monthly benefit	\$2,243	\$2,129	5.4%

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

⁽²⁾ Includes members from terminated employers.

⁽³⁾ For 2016, includes 192 members receiving a service-connected disability and 73 members receiving an ordinary disability.

SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association

EXHIBIT A (continued)

Table of Plan Coverage

ii. General Tier 2

Category	Year Ended December 31		Change From Prior Year
	2016	2015	
Active members in valuation			
Number ⁽¹⁾	0	0	N/A
Average age	N/A	N/A	N/A
Average service	N/A	N/A	N/A
Projected total payroll	N/A	N/A	N/A
Projected average payroll	N/A	N/A	N/A
Account balances	N/A	N/A	N/A
Total active members with at least five years of service	0	0	N/A
Vested terminated members⁽²⁾	214	220	-2.7%
Retired members⁽²⁾			
Number in pay status	419	428	-2.1%
Average age	74.6	74.1	N/A
Average monthly benefit	\$849	\$845	0.5%
Disabled members⁽²⁾			
Number in pay status ⁽³⁾	45	46	-2.2%
Average age	70.7	69.8	N/A
Average monthly benefit	\$2,309	\$2,237	3.2%
Beneficiaries⁽²⁾			
Number in pay status	106	101	5.0%
Average age	68.4	67.1	N/A
Average monthly benefit	\$836	\$828	1.0%

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

⁽²⁾ Includes members from terminated employers.

⁽³⁾ For 2016, includes 24 members receiving a service-connected disability and 21 members receiving an ordinary disability.

SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association

EXHIBIT A (continued)

Table of Plan Coverage

iii. General Tier 3

Category	Year Ended December 31		Change From Prior Year
	2016	2015	
Active members in valuation			
Number	5,053	5,441	-7.1%
Average age	50.0	49.3	N/A
Average service	13.3	12.3	N/A
Projected total payroll ⁽¹⁾	\$414,748,891	\$425,927,553	-2.6%
Projected average payroll	\$82,080	\$78,281	4.9%
Account balances	\$487,288,911	\$452,009,665	7.8%
Total active members with at least five years of service	4,411	4,420	-0.2%
Vested terminated members	1,687	1,590	6.1%
Retired members			
Number in pay status	2,695	2,525	6.7%
Average age	67.2	66.7	N/A
Average monthly benefit	\$2,716	\$2,656	2.3%
Disabled members			
Number in pay status ⁽²⁾	84	86	-2.3%
Average age	62.0	61.3	N/A
Average monthly benefit	\$2,341	\$2,250	4.0%
Beneficiaries			
Number in pay status	187	170	10.0%
Average age	62.0	61.2	N/A
Average monthly benefit	\$1,612	\$1,582	1.9%

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

⁽²⁾ For 2016, include 28 members receiving a service-connected disability and 56 members receiving an ordinary disability.

SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association

EXHIBIT A (continued)

Table of Plan Coverage

iv. General Tier 4 – 2% COLA

Category	Year Ended December 31		Change From Prior Year
	2016	2015	
Active members in valuation			
Number	14	5	180.0%
Average age	42.6	40.4	N/A
Average service	1.2	0.9	N/A
Projected total payroll ⁽¹⁾	\$704,009	\$230,376	205.6%
Projected average payroll	\$50,286	\$46,075	9.1%
Account balances	\$98,401	\$15,146	549.7%
Total active members with at least five years of service	0	0	N/A
Vested terminated members	1	0	N/A
Retired members			
Number in pay status	0	0	N/A
Average age	N/A	N/A	N/A
Average monthly benefit	N/A	N/A	N/A
Disabled members			
Number in pay status	0	0	N/A
Average age	N/A	N/A	N/A
Average monthly benefit	N/A	N/A	N/A
Beneficiaries			
Number in pay status	0	0	N/A
Average age	N/A	N/A	N/A
Average monthly benefit	N/A	N/A	N/A

⁽¹⁾ Calculated by increasing actual calendar year salaries by the assumed salary scale. Projected compensation for 2017 has been limited. It is our understanding that in the determination of pension benefits under the PEPRA formulas, the compensation that can be taken into account for 2016 is equal to \$118,775. (For an employer that is not enrolled in Social Security, the maximum amount is 120% of \$118,775, or \$142,530). (reference: Section 7522.10). These amounts should be adjusted for changes to the Consumer Price Index for All Urban Consumers after 2017. (reference: Section 7522.10(d))

SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association

EXHIBIT A (continued)

Table of Plan Coverage

v. General Tier 4 – 3% COLA

Category	Year Ended December 31		Change From Prior Year
	2016	2015	
Active members in valuation			
Number	103	78	32.1%
Average age	40.8	41.3	N/A
Average service	1.9	1.0	N/A
Projected total payroll ⁽¹⁾	\$7,537,862	\$5,242,937	43.8%
Projected average payroll	\$73,183	\$67,217	8.9%
Account balances	\$1,038,597	\$473,152	119.5%
Total active members with at least five years of service	1	0	N/A
Vested terminated members	11	4	175.0%
Retired members			
Number in pay status	0	0	N/A
Average age	N/A	N/A	N/A
Average monthly benefit	N/A	N/A	N/A
Disabled members			
Number in pay status	0	0	N/A
Average age	N/A	N/A	N/A
Average monthly benefit	N/A	N/A	N/A
Beneficiaries			
Number in pay status	0	0	N/A
Average age	N/A	N/A	N/A
Average monthly benefit	N/A	N/A	N/A

⁽¹⁾ Calculated by increasing actual calendar year salaries by the assumed salary scale. Projected compensation for 2017 has been limited. It is our understanding that in the determination of pension benefits under the PEPRA formulas, the compensation that can be taken into account for 2016 is equal to \$118,775. (For an employer that is not enrolled in Social Security, the maximum amount is 120% of \$118,775, or \$142,530). (reference: Section 7522.10). These amounts should be adjusted for changes to the Consumer Price Index for All Urban Consumers after 2017. (reference: Section 7522.10(d))

SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association

EXHIBIT A (continued)

Table of Plan Coverage

vi. General Tier 5 – 2% COLA

Category	Year Ended December 31		Change From Prior Year
	2016	2015	
Active members in valuation			
Number	1,784	1,151	55.0%
Average age	39.2	38.5	N/A
Average service	1.1	0.6	N/A
Projected total payroll ⁽¹⁾	\$95,976,834	\$54,975,056	74.6%
Projected average payroll	\$53,799	\$47,763	12.6%
Account balances	\$9,678,004	\$3,677,402	163.2%
Total active members with at least five years of service	17	7	142.9%
Vested terminated members	256	132	93.9%
Retired members			
Number in pay status	0	0	N/A
Average age	N/A	N/A	N/A
Average monthly benefit	N/A	N/A	N/A
Disabled members			
Number in pay status	0	0	N/A
Average age	N/A	N/A	N/A
Average monthly benefit	N/A	N/A	N/A
Beneficiaries			
Number in pay status	0	0	N/A
Average age	N/A	N/A	N/A
Average monthly benefit	N/A	N/A	N/A

⁽¹⁾ Calculated by increasing actual calendar year salaries by the assumed salary scale. Projected compensation for 2017 has been limited. It is our understanding that in the determination of pension benefits under the PEPRA formulas, the compensation that can be taken into account for 2016 is equal to \$118,775. (For an employer that is not enrolled in Social Security, the maximum amount is 120% of \$118,775, or \$142,530). (reference: Section 7522.10). These amounts should be adjusted for changes to the Consumer Price Index for All Urban Consumers after 2017. (reference: Section 7522.10(d))

SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association

EXHIBIT A (continued)

Table of Plan Coverage

vii. General Tier 5 – 3% COLA

Category	Year Ended December 31		Change From Prior Year
	2016	2015	
Active members in valuation			
Number	865	948	-8.8%
Average age	42.0	40.8	N/A
Average service	2.8	1.9	N/A
Projected total payroll ⁽¹⁾	\$57,816,803	\$58,067,274	-0.4%
Projected average payroll	\$66,840	\$61,252	9.1%
Account balances	\$14,800,751	\$9,632,112	53.7%
Total active members with at least five years of service	12	5	140.0%
Vested terminated members	243	209	16.3%
Retired members			
Number in pay status	0	0	N/A
Average age	N/A	N/A	N/A
Average monthly benefit	N/A	N/A	N/A
Disabled members			
Number in pay status	0	0	N/A
Average age	N/A	N/A	N/A
Average monthly benefit	N/A	N/A	N/A
Beneficiaries			
Number in pay status	0	0	N/A
Average age	N/A	N/A	N/A
Average monthly benefit	N/A	N/A	N/A

⁽¹⁾ Calculated by increasing actual calendar year salaries by the assumed salary scale. Projected compensation for 2017 has been limited. It is our understanding that in the determination of pension benefits under the PEPRA formulas, the compensation that can be taken into account for 2016 is equal to \$118,775. (For an employer that is not enrolled in Social Security, the maximum amount is 120% of \$118,775, or \$142,530). (reference: Section 7522.10). These amounts should be adjusted for changes to the Consumer Price Index for All Urban Consumers after 2017. (reference: Section 7522.10(d))

SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association

EXHIBIT A (continued)

Table of Plan Coverage

viii. Safety Tier A

Category	Year Ended December 31		Change From Prior Year
	2016	2015	
Active members in valuation			
Number	991	1,048	-5.4%
Average age	44.6	43.9	N/A
Average service	15.5	14.5	N/A
Projected total payroll ⁽¹⁾	\$114,697,741	\$115,030,411	-0.3%
Projected average payroll	\$115,739	\$109,762	5.4%
Account balances	\$358,633,855	\$333,257,056	7.6%
Total active members with at least five years of service	953	987	-3.4%
Vested terminated members⁽²⁾	331	307	7.8%
Retired members⁽²⁾			
Number in pay status	1,208	1,211	-0.2%
Average age	65.9	65.7	N/A
Average monthly benefit	\$7,653	\$7,455	2.7%
Disabled members⁽²⁾			
Number in pay status ⁽³⁾	506	514	-1.6%
Average age	63.5	62.8	N/A
Average monthly benefit	\$5,877	\$5,710	2.9%
Beneficiaries⁽²⁾			
Number in pay status	395	396	-0.3%
Average age	68.3	68.4	N/A
Average monthly benefit	\$3,723	\$3,540	5.2%

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

⁽²⁾ Includes members from terminated employers.

⁽³⁾ For 2016, include 484 members receiving a service-connected disability and 22 members receiving an ordinary disability.

SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association

EXHIBIT A (continued)

Table of Plan Coverage

ix. Safety Tier C

Category	Year Ended December 31		Change From Prior Year
	2016	2015	
Active members in valuation			
Number	136	147	-7.5%
Average age	36.6	35.1	N/A
Average service	6.7	5.9	N/A
Projected total payroll ⁽¹⁾	\$12,803,541	\$13,381,773	-4.3%
Projected average payroll	\$94,144	\$91,032	3.4%
Account balances	\$10,676,664	\$9,277,790	15.1%
Total active members with at least five years of service	88	77	14.3%
Vested terminated members	72	61	18.0%
Retired members			
Number in pay status	0	0	N/A
Average age	N/A	N/A	N/A
Average monthly benefit	N/A	N/A	N/A
Disabled members			
Number in pay status ⁽²⁾	5	4	25.0%
Average age	43.8	40.5	N/A
Average monthly benefit	\$3,704	\$3,624	2.2%
Beneficiaries			
Number in pay status	0	0	N/A
Average age	N/A	N/A	N/A
Average monthly benefit	N/A	N/A	N/A

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

⁽²⁾ For 2016, include 5 members receiving a service-connected disability.

SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association

EXHIBIT A (continued)

Table of Plan Coverage

x. Safety Tier D

Category	Year Ended December 31		Change From Prior Year
	2016	2015	
Active members in valuation			
Number	106	92	15.2%
Average age	33.0	33.4	N/A
Average service	2.0	1.5	N/A
Projected total payroll ⁽¹⁾	\$7,514,715	\$6,001,166	25.2%
Projected average payroll	\$70,894	\$65,230	8.7%
Account balances	\$2,916,657	\$1,626,968	79.3%
Total active members with at least five years of service	0	0	N/A
Vested terminated members	17	13	30.8%
Retired members			
Number in pay status	0	0	N/A
Average age	N/A	N/A	N/A
Average monthly benefit	N/A	N/A	N/A
Disabled members			
Number in pay status	0	0	N/A
Average age	N/A	N/A	N/A
Average monthly benefit	N/A	N/A	N/A
Beneficiaries			
Number in pay status	0	0	N/A
Average age	N/A	N/A	N/A
Average monthly benefit	N/A	N/A	N/A

⁽¹⁾ Calculated by increasing actual calendar year salaries by the assumed salary scale. Projected compensation for 2017 has been limited. It is our understanding that in the determination of pension benefits under the PEPRAs formulas, the compensation that can be taken into account for 2016 is equal to \$118,775. (For an employer that is not enrolled in Social Security, the maximum amount is 120% of \$118,775, or \$142,530). (reference: Section 7522.10). These amounts should be adjusted for changes to the Consumer Price Index for All Urban Consumers after 2017. (reference: Section 7522.10(d))

SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association

EXHIBIT A (continued)

Table of Plan Coverage

xi. Safety Tier E

Category	Year Ended December 31		Change From Prior Year
	2016	2015	
Active members in valuation			
Number	237	142	66.9%
Average age	31.4	31.2	N/A
Average service	1.6	1.3	N/A
Projected total payroll ⁽¹⁾	\$15,149,530	\$9,891,867	53.2%
Projected average payroll	\$63,922	\$69,661	-8.2%
Account balances	\$3,886,353	\$1,675,580	131.9%
Total active members with at least five years of service	0	0	N/A
Vested terminated members	23	16	43.8%
Retired members			
Number in pay status	0	0	N/A
Average age	N/A	N/A	N/A
Average monthly benefit	N/A	N/A	N/A
Disabled members			
Number in pay status	0	0	N/A
Average age	N/A	N/A	N/A
Average monthly benefit	N/A	N/A	N/A
Beneficiaries			
Number in pay status	0	0	N/A
Average age	N/A	N/A	N/A
Average monthly benefit	N/A	N/A	N/A

⁽¹⁾ Calculated by increasing actual calendar year salaries by the assumed salary scale. Projected compensation for 2017 has been limited. It is our understanding that in the determination of pension benefits under the PEPRAs formulas, the compensation that can be taken into account for 2016 is equal to \$118,775. (For an employer that is not enrolled in Social Security, the maximum amount is 120% of \$118,775, or \$142,530). (reference: Section 7522.10). These amounts should be adjusted for changes to the Consumer Price Index for All Urban Consumers after 2017. (reference: Section 7522.10(d))

SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association

EXHIBIT B

**Members in Active Service and Projected Payroll as of December 31, 2016
By Age and Years of Service**

i. General Tier 1 Non-Enhanced

Age	Total	Years of Service								
		0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 & over
Under 25	--	--	--	--	--	--	--	--	--	--
25 - 29	--	--	--	--	--	--	--	--	--	--
30 - 34	1	1	--	--	--	--	--	--	--	--
35 - 39	\$43,591	\$43,591	--	--	--	--	--	--	--	--
40 - 44	--	--	--	--	--	--	--	--	--	--
45 - 49	3	--	--	2	1	--	--	--	--	--
50 - 54	107,380	--	--	\$123,681	\$74,778	--	--	--	--	--
55 - 59	1	--	1	--	--	--	--	--	--	--
60 - 64	46,537	--	46,537	--	--	--	--	--	--	--
65 - 69	3	1	2	--	--	--	--	--	--	--
70 & over	82,160	63,829	91,326	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
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	--	--	--	--	--	--	--	--	--	--
Total	8	2	3	2	1	--	--	--	--	--
	\$82,343	\$53,710	\$76,396	\$123,681	\$74,778	--	--	--	--	--

SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association

EXHIBIT B (continued)

**Members in Active Service and Projected Payroll as of December 31, 2016
By Age and Years of Service**

ii. General Tier 1 Enhanced

Age	Total	Years of Service									
		0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 & over	
Under 25	--	--	--	--	--	--	--	--	--	--	--
25 - 29	11	8	3	--	--	--	--	--	--	--	--
30 - 34	27	9	15	3	--	--	--	--	--	--	--
35 - 39	58	21	15	19	3	--	--	--	--	--	--
40 - 44	69	7	17	23	22	--	--	--	--	--	--
45 - 49	83	9	15	17	28	9	4	1	--	--	--
50 - 54	125	7	16	30	39	13	17	3	--	--	--
55 - 59	105	8	21	9	23	17	16	2	9	--	--
60 - 64	58	2	11	12	17	5	7	--	4	--	--
65 - 69	14	--	4	5	3	--	1	--	--	--	1
70 & over	1	--	--	--	1	--	--	--	--	--	--
	87,910	--	--	--	87,910	--	--	--	--	--	--
Total	551	71	117	118	136	44	45	6	13	1	
	\$103,092	\$103,411	\$101,135	\$99,870	\$107,718	\$95,980	\$110,547	\$116,463	\$82,668	\$223,121	

SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association

EXHIBIT B (continued)

**Members in Active Service and Projected Payroll as of December 31, 2016
By Age and Years of Service**

iii. General Tier 3 Enhanced

Age	Years of Service									
	Total	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 & over
Under 25	--	--	--	--	--	--	--	--	--	--
25 - 29	58	37	21	--	--	--	--	--	--	--
	\$60,798	\$58,807	\$64,307	--	--	--	--	--	--	--
30 - 34	314	118	156	39	1	--	--	--	--	--
	71,846	72,552	71,982	\$69,131	\$73,066	--	--	--	--	--
35 - 39	563	118	244	158	43	--	--	--	--	--
	83,047	80,124	85,573	84,379	71,834	--	--	--	--	--
40 - 44	660	106	212	200	136	6	--	--	--	--
	84,516	82,760	83,142	87,617	83,873	\$75,342	--	--	--	--
45 - 49	833	101	204	198	237	60	32	1	--	--
	84,451	78,207	83,240	83,791	90,492	83,871	\$72,122	\$90,488	--	--
50 - 54	939	84	170	194	247	114	99	28	3	--
	84,181	76,315	74,743	79,429	84,212	94,116	104,563	84,735	\$88,467	--
55 - 59	838	74	165	163	184	84	112	39	17	--
	82,087	72,822	76,795	81,241	80,937	90,831	91,593	84,609	82,738	--
60 - 64	591	59	123	120	140	56	54	32	7	--
	81,854	79,800	76,194	76,392	86,704	87,690	85,108	91,223	80,649	--
65 - 69	210	17	60	50	37	23	16	7	--	--
	77,794	72,242	71,808	77,669	86,901	88,308	72,313	73,314	--	--
70 & over	47	4	10	15	12	2	3	--	1	--
	68,771	64,855	86,995	61,815	71,440	70,337	44,782	--	43,321	--
Total	5,053	718	1,365	1,137	1,037	345	316	107	28	--
	\$82,080	\$76,404	\$79,117	\$81,593	\$84,782	\$89,640	\$91,156	\$85,936	\$81,422	--

SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association

EXHIBIT B (continued)

Members in Active Service and Projected Payroll as of December 31, 2016

By Age and Years of Service

iv. General Tier 4 – 2% COLA

Age	Total	Years of Service								
		0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 & over
Under 25	--	--	--	--	--	--	--	--	--	--
25 - 29	1	1	--	--	--	--	--	--	--	--
	\$15,402	\$15,402	--	--	--	--	--	--	--	--
30 - 34	4	4	--	--	--	--	--	--	--	--
	59,110	59,111	--	--	--	--	--	--	--	--
35 - 39	1	1	--	--	--	--	--	--	--	--
	41,462	41,462	--	--	--	--	--	--	--	--
40 - 44	1	1	--	--	--	--	--	--	--	--
	65,092	65,092	--	--	--	--	--	--	--	--
45 - 49	3	3	--	--	--	--	--	--	--	--
	62,994	62,994	--	--	--	--	--	--	--	--
50 - 54	3	3	--	--	--	--	--	--	--	--
	45,901	45,901	--	--	--	--	--	--	--	--
55 - 59	1	1	--	--	--	--	--	--	--	--
	18,925	18,925	--	--	--	--	--	--	--	--
60 - 64	--	--	--	--	--	--	--	--	--	--
65 - 69	--	--	--	--	--	--	--	--	--	--
70 & over	--	--	--	--	--	--	--	--	--	--
Total	14	14	--	--	--	--	--	--	--	--
	\$50,286	\$50,286	--	--	--	--	--	--	--	--

SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association

EXHIBIT B (continued)

Members in Active Service and Projected Payroll as of December 31, 2016

By Age and Years of Service

v. General Tier 4 – 3% COLA

Age	Total	Years of Service								
		0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 & over
Under 25	2	2	--	--	--	--	--	--	--	--
	\$47,162	\$47,162	--	--	--	--	--	--	--	--
25 - 29	17	17	--	--	--	--	--	--	--	--
	66,491	66,491	--	--	--	--	--	--	--	--
30 - 34	17	17	--	--	--	--	--	--	--	--
	85,029	85,029	--	--	--	--	--	--	--	--
35 - 39	19	19	--	--	--	--	--	--	--	--
	75,021	75,021	--	--	--	--	--	--	--	--
40 - 44	16	16	--	--	--	--	--	--	--	--
	67,097	67,097	--	--	--	--	--	--	--	--
45 - 49	6	6	--	--	--	--	--	--	--	--
	97,848	97,849	--	--	--	--	--	--	--	--
50 - 54	12	12	--	--	--	--	--	--	--	--
	64,489	64,489	--	--	--	--	--	--	--	--
55 - 59	11	10	--	--	1	--	--	--	--	--
	72,034	73,770	--	--	\$54,680	--	--	--	--	--
60 - 64	2	2	--	--	--	--	--	--	--	--
	85,740	85,740	--	--	--	--	--	--	--	--
65 - 69	1	1	--	--	--	--	--	--	--	--
	43,927	43,927	--	--	--	--	--	--	--	--
70 & over	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
Total	103	102	--	--	1	--	--	--	--	--
	\$73,183	\$73,365	--	--	\$54,680	--	--	--	--	--

SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association

EXHIBIT B (continued)

**Members in Active Service and Projected Payroll as of December 31, 2016
By Age and Years of Service**

vi. General Tier 5 – 2% COLA

Age	Total	Years of Service								
		0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 & over
Under 25	74	74	--	--	--	--	--	--	--	--
	\$38,785	\$38,785	--	--	--	--	--	--	--	--
25 - 29	350	350	--	--	--	--	--	--	--	--
	49,793	49,793	--	--	--	--	--	--	--	--
30 - 34	373	372	1	--	--	--	--	--	--	--
	56,783	56,616	\$118,775	--	--	--	--	--	--	--
35 - 39	258	258	--	--	--	--	--	--	--	--
	57,532	57,532	--	--	--	--	--	--	--	--
40 - 44	221	221	--	--	--	--	--	--	--	--
	54,146	54,146	--	--	--	--	--	--	--	--
45 - 49	165	165	--	--	--	--	--	--	--	--
	52,873	52,873	--	--	--	--	--	--	--	--
50 - 54	131	131	--	--	--	--	--	--	--	--
	58,250	58,250	--	--	--	--	--	--	--	--
55 - 59	135	135	--	--	--	--	--	--	--	--
	54,015	54,015	--	--	--	--	--	--	--	--
60 - 64	61	58	3	--	--	--	--	--	--	--
	53,166	53,263	51,288	--	--	--	--	--	--	--
65 - 69	12	12	--	--	--	--	--	--	--	--
	53,051	53,051	--	--	--	--	--	--	--	--
70 & over	4	4	--	--	--	--	--	--	--	--
	40,766	40,766	--	--	--	--	--	--	--	--
Total	1,784	1,780	4	--	--	--	--	--	--	--
	\$53,799	\$53,766	\$68,159	--	--	--	--	--	--	--

SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association

EXHIBIT B (continued)

Members in Active Service and Projected Payroll as of December 31, 2016

By Age and Years of Service

vii. General Tier 5 – 3% COLA

Age	Total	Years of Service								
		0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 & over
Under 25	6	6	--	--	--	--	--	--	--	--
	\$50,091	\$50,091	--	--	--	--	--	--	--	--
25 - 29	99	99	--	--	--	--	--	--	--	--
	56,533	56,533	--	--	--	--	--	--	--	--
30 - 34	170	170	--	--	--	--	--	--	--	--
	68,381	68,381	--	--	--	--	--	--	--	--
35 - 39	170	170	--	--	--	--	--	--	--	--
	67,385	67,385	--	--	--	--	--	--	--	--
40 - 44	117	117	--	--	--	--	--	--	--	--
	74,111	74,111	--	--	--	--	--	--	--	--
45 - 49	83	83	--	--	--	--	--	--	--	--
	67,815	67,815	--	--	--	--	--	--	--	--
50 - 54	80	80	--	--	--	--	--	--	--	--
	68,228	68,228	--	--	--	--	--	--	--	--
55 - 59	72	71	1	--	--	--	--	--	--	--
	63,374	63,496	\$54,726	--	--	--	--	--	--	--
60 - 64	52	49	3	--	--	--	--	--	--	--
	64,954	65,926	49,085	--	--	--	--	--	--	--
65 - 69	13	13	--	--	--	--	--	--	--	--
	75,967	75,967	--	--	--	--	--	--	--	--
70 & over	3	3	--	--	--	--	--	--	--	--
	51,056	51,056	--	--	--	--	--	--	--	--
Total	865	861	4	--	--	--	--	--	--	--
	\$66,840	\$66,916	\$50,495	--	--	--	--	--	--	--

SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association

EXHIBIT B (continued)

Members in Active Service and Projected Payroll as of December 31, 2016

By Age and Years of Service

viii. Safety Tier A Non-Enhanced

Age	Total	Years of Service								
		0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 & over
Under 25	--	--	--	--	--	--	--	--	--	--
25 - 29	--	--	--	--	--	--	--	--	--	--
30 - 34	--	--	--	--	--	--	--	--	--	--
35 - 39	2	2	--	--	--	--	--	--	--	--
40 - 44	\$125,867	\$125,867	--	--	--	--	--	--	--	--
45 - 49	3	--	--	1	2	--	--	--	--	--
50 - 54	140,609	--	--	\$145,479	\$138,173	--	--	--	--	--
55 - 59	4	1	--	--	1	--	2	--	--	--
60 - 64	133,436	125,108	--	--	135,416	--	\$136,610	--	--	--
65 - 69	2	--	--	--	--	--	2	--	--	--
70 & over	147,572	--	--	--	--	--	147,572	--	--	--
	2	--	--	--	--	1	--	1	--	--
	157,584	--	--	--	--	\$177,989	--	\$137,179	--	--
	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
Total	13	3	--	1	3	1	4	1	--	--
	\$139,817	\$125,614	--	\$145,479	\$137,254	\$177,989	\$142,091	\$137,179	--	--

SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association

EXHIBIT B (continued)

**Members in Active Service and Projected Payroll as of December 31, 2016
By Age and Years of Service**

ix. Safety Tier A Enhanced

Age	Total	Years of Service								
		0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 & over
Under 25	--	--	--	--	--	--	--	--	--	--
25 - 29	13	9	4	--	--	--	--	--	--	--
	\$96,784	\$87,030	\$118,731	--	--	--	--	--	--	--
30 - 34	94	24	53	17	--	--	--	--	--	--
	108,360	88,828	113,970	\$118,444	--	--	--	--	--	--
35 - 39	155	11	57	72	15	--	--	--	--	--
	110,861	83,840	109,951	115,320	\$112,739	--	--	--	--	--
40 - 44	227	5	19	103	97	3	--	--	--	--
	110,741	91,921	112,778	111,306	110,592	\$114,589	--	--	--	--
45 - 49	273	4	22	60	115	47	25	--	--	--
	120,528	147,541	110,723	119,143	116,885	121,896	\$142,342	--	--	--
50 - 54	143	4	6	24	50	20	34	5	--	--
	126,802	91,274	117,126	111,275	120,009	125,548	152,675	\$138,372	--	--
55 - 59	48	5	4	13	10	11	3	2	--	--
	109,492	103,771	112,394	92,851	95,662	134,585	127,287	130,590	--	--
60 - 64	20	--	6	5	5	2	2	--	--	--
	112,823	--	86,509	115,459	103,985	140,419	179,672	--	--	--
65 - 69	5	--	2	2	1	--	--	--	--	--
	113,111	--	110,112	109,135	127,061	--	--	--	--	--
70 & over	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
Total	978	62	173	296	293	83	64	7	--	--
	\$115,419	\$93,082	\$111,288	\$113,523	\$114,213	\$124,640	\$148,292	\$136,149	--	--

SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association

EXHIBIT B (continued)

Members in Active Service and Projected Payroll as of December 31, 2016

By Age and Years of Service

x. Safety Tier C

Age	Total	Years of Service								
		0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 & over
Under 25	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
25 - 29	22	14	8	--	--	--	--	--	--	--
	\$96,795	\$94,581	\$100,670	--	--	--	--	--	--	--
30 - 34	50	21	29	--	--	--	--	--	--	--
	91,822	86,642	95,573	--	--	--	--	--	--	--
35 - 39	28	11	16	--	1	--	--	--	--	--
	88,795	82,161	92,598	--	\$100,911	--	--	--	--	--
40 - 44	15	1	14	--	--	--	--	--	--	--
	98,188	92,379	98,602	--	--	--	--	--	--	--
45 - 49	13	3	10	--	--	--	--	--	--	--
	94,521	101,101	92,547	--	--	--	--	--	--	--
50 - 54	4	2	2	--	--	--	--	--	--	--
	135,156	94,562	175,750	--	--	--	--	--	--	--
55 - 59	2	1	1	--	--	--	--	--	--	--
	78,649	58,935	98,363	--	--	--	--	--	--	--
60 - 64	2	--	2	--	--	--	--	--	--	--
	98,586	--	98,586	--	--	--	--	--	--	--
65 & over	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
Total	136	53	82	--	1	--	--	--	--	--
	\$94,144	\$88,512	\$97,701	--	\$100,911	--	--	--	--	--

SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association

EXHIBIT B (continued)

Members in Active Service and Projected Payroll as of December 31, 2016

By Age and Years of Service

xi. Safety Tier D

Age	Total	Years of Service								
		0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 & over
Under 25	5	5	--	--	--	--	--	--	--	--
	\$41,418	\$41,417	--	--	--	--	--	--	--	--
25 - 29	37	37	--	--	--	--	--	--	--	--
	62,958	62,958	--	--	--	--	--	--	--	--
30 - 34	38	38	--	--	--	--	--	--	--	--
	75,506	75,506	--	--	--	--	--	--	--	--
35 - 39	10	10	--	--	--	--	--	--	--	--
	71,630	71,630	--	--	--	--	--	--	--	--
40 - 44	7	7	--	--	--	--	--	--	--	--
	79,331	79,331	--	--	--	--	--	--	--	--
45 - 49	4	4	--	--	--	--	--	--	--	--
	89,029	89,029	--	--	--	--	--	--	--	--
50 - 54	3	3	--	--	--	--	--	--	--	--
	93,856	93,856	--	--	--	--	--	--	--	--
55 - 59	2	2	--	--	--	--	--	--	--	--
	99,815	99,815	--	--	--	--	--	--	--	--
60 - 64	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
65 & over	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
Total	106	106	--	--	--	--	--	--	--	--
	\$70,894	\$70,894	--	--	--	--	--	--	--	--

SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association

EXHIBIT B (continued)

Members in Active Service and Projected Payroll as of December 31, 2016

By Age and Years of Service

xii. Safety Tier E

Age	Total	Years of Service								
		0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 & over
Under 25	28	28	--	--	--	--	--	--	--	--
	\$50,907	\$50,907	--	--	--	--	--	--	--	--
25 - 29	118	118	--	--	--	--	--	--	--	--
	63,073	63,073	--	--	--	--	--	--	--	--
30 - 34	46	46	--	--	--	--	--	--	--	--
	63,132	63,132	--	--	--	--	--	--	--	--
35 - 39	15	15	--	--	--	--	--	--	--	--
	73,604	73,604	--	--	--	--	--	--	--	--
40 - 44	10	10	--	--	--	--	--	--	--	--
	69,466	69,466	--	--	--	--	--	--	--	--
45 - 49	8	8	--	--	--	--	--	--	--	--
	61,608	61,609	--	--	--	--	--	--	--	--
50 - 54	5	5	--	--	--	--	--	--	--	--
	82,399	82,399	--	--	--	--	--	--	--	--
55 - 59	7	7	--	--	--	--	--	--	--	--
	96,259	96,259	--	--	--	--	--	--	--	--
60 - 64	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
65 & over	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
Total	237	237	--	--	--	--	--	--	--	--
	\$63,922	\$63,922	--	--	--	--	--	--	--	--

SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association

EXHIBIT C

Average Monthly Benefit and Membership Distribution of Retired Members and Beneficiaries

i. General Tier 1 as of December 31, 2016

Age	Total	Years of Retirement								
		0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 & over
Under 25	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
25 - 29	2	--	1	--	--	1	--	--	--	--
	\$710	--	\$997	--	--	\$422	--	--	--	--
30 - 34	5	--	2	--	1	2	--	--	--	--
	833	--	997	--	\$1,326	422	--	--	--	--
35 - 39	2	--	--	--	--	2	--	--	--	--
	613	--	--	--	--	613	--	--	--	--
40 - 44	6	2	--	1	--	1	1	1	--	--
	1,348	\$1,575	--	\$2,375	--	579	\$993	\$990	--	--
45 - 49	8	1	1	--	1	4	1	--	--	--
	1,714	2,670	3,294	--	2,261	1,123	999	--	--	--
50 - 54	33	22	1	2	3	3	1	1	--	--
	1,542	1,604	2,121	1,070	1,334	1,934	700	854	--	--
55 - 59	145	76	45	8	6	6	2	2	--	--
	2,765	2,941	2,735	2,391	3,431	1,130	2,938	972	--	--
60 - 64	383	106	179	55	14	13	5	6	2	3
	3,887	3,694	4,975	2,140	1,831	3,094	1,722	1,770	\$1,255	\$446
65 - 69	617	57	206	201	96	24	15	7	6	5
	4,201	4,351	5,540	4,247	2,346	2,339	2,380	1,976	2,176	1,087
70 - 74	659	15	90	261	168	77	20	14	11	3
	4,243	2,856	5,369	5,378	3,577	1,912	2,405	3,070	2,175	1,030
75 - 80	477	2	8	81	181	100	72	19	10	4
	3,815	687	2,937	5,560	4,718	2,722	1,949	2,293	2,801	1,616
80 - 84	439	1	1	11	97	152	85	74	12	6
	3,363	331	5,969	3,524	4,890	3,865	2,273	1,738	2,618	2,694
85 - 89	365	--	--	1	14	81	112	89	46	22
	2,889	--	--	3,002	2,796	4,105	3,332	2,031	1,684	2,202
90 & over	309	--	--	1	5	12	63	90	100	38
	2,569	--	--	1,229	2,120	2,824	3,301	2,652	2,194	2,157
Total	3,450	282	534	622	586	478	377	303	187	81
	\$3,624	\$3,364	\$5,011	\$4,649	\$3,853	\$3,116	\$2,694	\$2,188	\$2,117	\$2,011

Note: Includes members from terminated employers.

Note: Total retired benefit \$12,501,560, average age 75.0 and average years retired 18.6.

SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association

EXHIBIT C (continued)

Average Monthly Benefit and Membership Distribution of Retired Members and Beneficiaries

ii. General Tier 2 as of December 31, 2016

Age	Total	Years of Retirement								
		0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 & over
Under 25	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
25 - 29	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
30 - 34	2	--	--	--	2	--	--	--	--	--
	\$799	--	--	--	\$799	--	--	--	--	--
35 - 39	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
40 - 44	8	--	--	1	5	1	1	--	--	--
	830	--	--	\$1,308	624	\$1,756	\$457	--	--	--
45 - 49	11	--	--	--	5	3	3	--	--	--
	1,058	--	--	--	1,282	999	742	--	--	--
50 - 54	8	4	--	1	--	2	1	--	--	--
	829	\$154	--	622	--	1,739	1,919	--	--	--
55 - 59	28	13	8	2	3	2	--	--	--	--
	545	289	\$246	1,397	1,919	489	--	--	--	--
60 - 64	56	9	13	22	4	7	1	--	--	--
	846	471	748	634	1,843	1,405	2,268	--	--	--
65 - 69	95	7	20	27	32	5	4	--	--	--
	921	239	863	953	909	1,579	1,465	--	--	--
70 - 74	111	1	20	13	49	22	4	2	--	--
	858	19	617	774	987	734	1,533	\$1,110	--	--
75 - 80	88	--	3	24	34	24	3	--	--	--
	1,200	--	385	1,131	1,374	1,007	2,122	--	--	--
80 - 84	98	--	2	3	49	32	9	3	--	--
	1,131	--	1,825	1,127	1,213	789	1,567	1,684	--	--
85 - 89	46	--	--	1	13	24	5	3	--	--
	913	--	--	58	828	1,045	1,024	322	--	--
90 & over	19	--	--	--	1	7	11	--	--	--
	935	--	--	--	997	608	1,137	--	--	--
Total	570	34	66	94	197	129	42	8	--	--
	\$962	\$303	\$698	\$905	\$1,115	\$945	\$1,356	\$1,030	--	--

Note: Includes members from terminated employers.

Note: Total retired benefit \$548,102, average age 73.1 and average years retired 16.7.

SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association

EXHIBIT C (continued)

Average Monthly Benefit and Membership Distribution of Retired Members and Beneficiaries

iii. General Tier 3 as of December 31, 2016

Age	Total	Years of Retirement								
		0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 & over
Under 25	3	2	1	--	--	--	--	--	--	--
	\$1,178	\$891	\$1,751	--	--	--	--	--	--	--
25 - 29	1	--	--	1	--	--	--	--	--	--
	1,856	--	--	\$1,856	--	--	--	--	--	--
30 - 34	5	1	--	2	1	1	--	--	--	--
	1,353	1,885	--	1,125	\$1,878	\$751	--	--	--	--
35 - 39	7	2	1	4	--	--	--	--	--	--
	1,110	1,193	1,855	883	--	--	--	--	--	--
40 - 44	8	5	1	1	1	--	--	--	--	--
	1,774	2,203	816	1,535	826	--	--	--	--	--
45 - 49	16	7	2	4	3	--	--	--	--	--
	1,299	1,512	1,219	1,044	1,196	--	--	--	--	--
50 - 54	115	94	13	5	3	--	--	--	--	--
	1,789	1,718	2,688	1,237	1,051	--	--	--	--	--
55 - 59	323	221	94	6	2	--	--	--	--	--
	2,104	2,254	1,763	2,362	913	--	--	--	--	--
60 - 64	660	350	235	72	3	--	--	--	--	--
	2,913	2,998	3,204	1,566	2,457	--	--	--	--	--
65 - 69	865	334	379	129	23	--	--	--	--	--
	2,928	2,700	3,320	2,684	1,138	--	--	--	--	--
70 - 74	617	116	274	194	32	1	--	--	--	--
	2,749	2,221	3,277	2,539	1,442	2,046	--	--	--	--
75 - 80	255	15	81	109	49	--	1	--	--	--
	2,213	1,948	2,455	2,402	1,490	--	\$1,466	--	--	--
80 - 84	82	2	19	38	23	--	--	--	--	--
	1,764	2,427	2,096	1,443	1,963	--	--	--	--	--
85 - 89	6	1	3	2	--	--	--	--	--	--
	1,216	738	1,393	1,188	--	--	--	--	--	--
90 & over	3	--	2	1	--	--	--	--	--	--
	3,331	--	1,856	6,280	--	--	--	--	--	--
Total	2,966	1,150	1,105	568	140	2	1	--	--	--
	\$2,636	\$2,549	\$3,043	\$2,307	\$1,494	\$1,398	\$1,466	--	--	--

Note: Total retired benefit \$7,817,765, average age 66.7 and average years retired 6.7.

SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association

EXHIBIT C (continued)

**Average Monthly Benefit and Membership Distribution of Retired Members and Beneficiaries
iv. Safety Tier A and Tier C as of December 31, 2016**

Age	Total	Years of Retirement								
		0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 & over
Under 25	6	--	--	3	--	2	--	--	1	--
	\$1,833	--	--	\$1,383	--	\$1,424	--	--	\$4,001	--
25 - 29	1	--	--	1	--	--	--	--	--	--
	865	--	--	865	--	--	--	--	--	--
30 - 34	2	2	--	--	--	--	--	--	--	--
	3,237	\$3,237	--	--	--	--	--	--	--	--
35 - 39	12	6	4	--	--	2	--	--	--	--
	3,483	4,114	\$3,681	--	--	1,197	--	--	--	--
40 - 44	23	4	11	7	--	--	1	--	--	--
	3,647	3,893	3,531	4,083	--	--	\$869	--	--	--
45 - 49	56	24	14	11	5	1	1	--	--	--
	4,389	4,906	4,657	3,958	\$3,514	843	869	--	--	--
50 - 54	255	169	47	15	16	6	2	--	--	--
	5,982	6,424	6,297	3,885	4,074	3,061	995	--	--	--
55 - 59	328	82	185	27	19	10	4	1	--	--
	7,113	6,704	8,250	4,288	4,583	3,541	3,830	\$3,418	--	--
60 - 64	324	35	104	133	24	16	6	4	2	--
	7,391	5,786	8,882	8,108	3,740	3,296	4,701	3,200	3,344	--
65 - 69	371	13	60	180	53	36	14	9	6	--
	7,126	3,636	7,967	9,091	4,366	4,277	3,698	2,580	3,648	--
70 - 74	333	5	23	87	131	34	18	25	9	1
	6,377	3,734	4,353	8,168	7,316	4,414	3,940	3,126	3,671	\$3,481
75 - 80	190	1	10	6	43	66	33	15	7	9
	6,081	1,336	3,294	5,341	7,763	7,162	4,875	3,976	3,877	3,883
80 - 84	106	--	1	--	6	32	32	21	10	4
	5,913	--	4,112	--	6,996	7,087	6,495	4,379	4,265	2,855
85 - 89	73	--	--	--	1	3	11	27	20	11
	4,652	--	--	--	525	2,983	5,002	5,180	4,506	4,099
90 & over	34	--	--	--	--	--	1	6	9	18
	5,162	--	--	--	--	--	3,776	7,002	6,648	3,882
Total	2,114	341	459	470	298	208	123	108	64	43
	\$6,484	\$6,069	\$7,582	\$7,890	\$6,126	\$5,409	\$4,857	\$4,176	\$4,459	\$3,833

Note: Includes members from terminated employers.

Note: Total retired benefit \$13,707,493, average age 65.7 and average years retired 14.8.

SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association

EXHIBIT D

Reconciliation of Member Data – December 31, 2015 to December 31, 2016

	Active Participants	Vested Terminated Members	Pensioners	Disableds	Beneficiaries	Total
Number as of December 31, 2015	9,642	2,790	6,738	925	1,405	21,500
New participants	1,057	104	0	0	104	1,265
Terminations – with vested rights	-388	388	0	0	0	0
Contribution refunds	-184	-110	0	0	0	-294
Retirements	-236	-63	299	0	0	0
New disabilities	-8	0	-5	13	0	0
Return to work	24	-24	0	0	0	0
Died with or without beneficiary	-31	-2	-206	-34	-132	-405
Data adjustments	<u>-28</u>	<u>6</u>	<u>-1</u>	<u>1</u>	<u>-7</u>	<u>-29</u>
Number as of December 31, 2016	9,848	3,089	6,825	905	1,370	22,037

SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association

EXHIBIT E

Summary Statement of Income and Expenses on an Actuarial Value Basis

	Year Ended December 31, 2016	Year Ended December 31, 2015
Contribution income:		
Employer contributions	\$307,457,143	\$323,720,270
Employee contributions	89,240,172	85,360,637
Administrative expenses ⁽¹⁾	<u>(8,486,463)</u>	<u>N/A</u>
Net contribution income	\$388,210,852	\$409,080,907
Investment income:		
Interest, dividends and other income	\$163,255,934	\$173,789,634
Adjustment toward market value ⁽²⁾	385,424,070	454,583,447
Less investment expenses ⁽¹⁾	<u>(46,327,831)</u>	<u>(51,173,958)</u>
Net investment income	<u>502,352,173</u>	<u>577,199,123</u>
Total income available for benefits	\$890,563,025	\$986,280,030
Less benefit payments:		
Benefits paid	\$(411,779,400)	\$(399,843,820)
Refunds of contributions	(7,448,304)	(5,348,722)
Adjustments/transfers/other expenses	<u>(920,314)</u>	<u>(1,711,824)</u>
Net benefit payments	\$(420,148,018)	\$(406,904,366)
Change in reserve for future benefits	\$470,415,007	\$579,375,664

⁽¹⁾ Prior to 2016, administrative expenses were shown as an offset to investment income in this exhibit.

⁽²⁾ Equals the "non-cash" earnings on investments implicitly included in the Actuarial Value of Assets.

SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association

EXHIBIT F

Summary Statement of Assets

	Year Ended December 31, 2016	Year Ended December 31, 2015
Cash equivalents	\$644,324,488	\$583,481,915
Other Assets	266,092	484,248
Accounts receivable:		
Investment trades	\$232,983,556	\$494,428,756
Investment income	18,879,074	22,027,298
Employee and employer contributions	8,834,817	8,497,351
Additional contributions ⁽¹⁾	<u>15,965,773</u>	<u>17,229,968</u>
Total accounts receivable	276,663,220	542,183,373
Investments:		
Stocks	\$2,948,533,927	\$2,843,799,249
Bonds	2,563,716,770	2,269,753,558
Real estate	701,599,169	859,795,614
Alternative investments and real assets	<u>977,913,714</u>	<u>949,514,478</u>
Total investments at market value	<u>7,191,763,580</u>	<u>6,922,862,899</u>
Total assets	<u>\$8,113,017,380</u>	<u>\$8,049,012,435</u>
Less accounts payable:		
Investment trades	\$(302,095,514)	\$(618,461,974)
Security lending	(204,196,090)	(285,450,987)
Employer contributions unearned	(149,089,010)	(150,471,546)
Other	<u>(19,117,262)</u>	<u>(18,045,500)</u>
Total accounts payable	\$(674,497,876)	\$(1,072,430,007)
Net assets at market value	<u>\$7,438,519,504</u>	<u>\$6,976,582,428</u>
Net assets at actuarial value	<u>\$7,622,351,103</u>	<u>\$7,151,936,096</u>
Net assets at valuation value	<u>\$7,606,997,530</u>	<u>\$7,136,801,380</u>

⁽¹⁾ Equals the sum of additional contribution receivables for the final Paulson Settlement.

SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association

EXHIBIT G

Actuarial Balance Sheet

An overview of the Plan's funding is given by an Actuarial Balance Sheet. In this approach, we first determine the amount and timing of all future payments that are projected/anticipated to be made by the Plan for current participants. We then discount these payments at the valuation interest rate to the date of the valuation, thereby determining their present value. We refer to this present value as the "liability" of the Plan.

Second, we determine how this liability will be met. These actuarial "assets" 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.

Assets⁽¹⁾	Basic	COLA	Total
1. Total valuation value of assets	\$4,713,877,023	\$2,893,120,507	\$7,606,997,530
2. Present value of future contributions by members	473,903,623	217,110,631	691,014,254
3. Present value of future employer contributions for:			
(a) entry age normal cost	697,484,164	208,399,227	905,883,391
(b) unfunded actuarial accrued liability	856,705,671	330,730,938	1,187,436,609
4. Total actuarial assets	\$6,741,970,481	\$3,649,361,303	\$10,391,331,784
Liabilities⁽¹⁾			
5. Present value of benefits for retirees and beneficiaries	\$3,298,859,298	\$2,371,951,605	\$5,670,810,903
6. Present value of benefits for vested terminated members ⁽²⁾	202,626,860	68,626,680	271,253,540
7. Present value of benefits for active members	3,240,484,323	1,208,783,018	4,449,267,341
8. Total present value of benefits	\$6,741,970,481	\$3,649,361,303	\$10,391,331,784

⁽¹⁾ *Assets and liabilities exclude administrative expenses.*

⁽²⁾ *Includes nonvested terminated members.*

SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association

EXHIBIT H

Summary of Total Allocated Reserves

Reserves	December 31, 2016	December 31, 2015
Member Deposits ⁽¹⁾	\$729,442,554	\$659,742,501
Member Cost of Living ⁽¹⁾	387,381,328	351,691,660
Employer Advance ⁽¹⁾⁽²⁾	1,834,547,821	1,718,271,792
Employer Cost of Living ⁽¹⁾⁽²⁾	824,863,184	696,900,677
Retired Members ⁽¹⁾⁽²⁾	3,292,924,578	3,145,208,662
Retired Cost of Living ⁽¹⁾⁽²⁾	2,333,427,992	2,260,503,858
Dollar Power Cost of Living Supplement Pre-Funding ⁽¹⁾	5,348,040	6,867,388
Post Retirement Death Benefit ⁽³⁾	15,353,573	15,134,716
Statutory Contingency (one percent) ⁽³⁾	0	0
Additional One Percent Contingency Designation ⁽³⁾	0	0
Contra Tracking Account ⁽¹⁾	(1,800,937,967)	(1,702,385,158)
Total Allocated Reserves	7,622,351,103	7,151,936,096
Total Deferred Return	(183,831,599)	(175,353,668)
Net Market Value	\$7,438,519,504	\$6,976,582,428

Note: Results may not add due to rounding.

⁽¹⁾ *Included in valuation value of assets.*

⁽²⁾ *Both December 31, 2016 and December 31, 2015 information reflect a "true-up" of retired reserves.*

⁽³⁾ *Not included in valuation value of assets.*

SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association

EXHIBIT I

Development of Unfunded Actuarial Accrued Liability

	Year Ended December 31, 2016
1. Unfunded actuarial accrued liability at beginning of year	\$1,311,822,716
2. Total Normal Cost at middle of year ⁽¹⁾	210,803,280
3. Expected administrative expenses	8,508,420
4. Expected employer and member contributions	(384,625,190)
5. Interest (whole year on (1) plus half year on (2) + (3) + (4))	<u>87,902,024</u>
6. Expected unfunded actuarial accrued liability at end of year	<u>\$1,234,411,250</u>
7. Actuarial (gain)/loss due to all changes:	
(a) Investment return more than expected	\$(2,852,738)
(b) Actual contributions greater than expected	(12,487,504)
(c) Higher than expected individual salary increases	11,445,085
(d) Higher than expected COLA increases for retirees and beneficiaries	35,042,530
(e) Mortality gain on retirees and beneficiaries	(54,838,445)
(f) Retirement experience gain on actives	(30,008,431)
(g) Other experience (gain)/loss ⁽²⁾	<u>6,724,862</u>
(h) Total changes	<u>\$(46,974,641)</u>
8. Unfunded actuarial accrued liability at end of year	<u>\$1,187,436,609</u>

Note: The "net gain from other experience" of \$31,634,399 shown in Section 2, Chart 10 is equal to the sum of items 7(c) through 7(g).

⁽¹⁾ Excludes administrative expense load.

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

SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association

EXHIBIT J

Table of Amortization Bases

	Date Established	Source	Initial Amount	Outstanding Balance	Years Remaining	Annual Payment⁽¹⁾
Cost Groups #1 and #2	December 31, 2007	Restart of Amortization	\$785,069,153	\$515,849,872	6	\$97,318,171
General County and	December 31, 2008	Actuarial (Gain)/Loss	80,033,199	68,797,136	10	8,335,042
Small Districts	December 31, 2009	Actuarial (Gain)/Loss	165,041,323	147,360,077	11	16,503,988
	December 31, 2009	Assumption Change ⁽²⁾	39,563,826	35,325,265	11	3,956,348
	December 31, 2009	Depooling Implementation	(74,701,913)	(66,698,930)	11	(7,470,126)
	December 31, 2010	Actuarial (Gain)/Loss	153,070,543	140,825,790	12	14,700,135
	December 31, 2011	Actuarial (Gain)/Loss	94,750,078	89,204,397	13	8,738,488
	December 31, 2012	Actuarial (Gain)/Loss	117,029,116	112,092,968	14	10,365,043
	December 31, 2012	Assumption Change ⁽²⁾	288,802,882	276,621,522	14	25,578,714
	December 31, 2013	Actuarial (Gain)/Loss	(134,810,112)	(131,141,026)	15	(11,504,030)
	December 31, 2013	Assumption Change ⁽³⁾	(107,553,289)	(104,626,044)	15	(9,178,067)
	December 31, 2014	Actuarial (Gain)/Loss	(171,898,812)	(169,090,843)	16	(14,133,161)
	December 31, 2015	Actuarial (Gain)/Loss	(105,003,533)	(104,043,835)	17	(8,317,596)
	December 31, 2015	Assumption Change ⁽²⁾	39,814,884	39,450,989	17	3,153,838
	December 31, 2016	Actuarial (Gain)/Loss	(28,579,026)	<u>(28,579,026)</u>	18	<u>(2,192,559)</u>
Total for Cost Groups #1 and #2				\$821,348,312		\$135,854,228

Note: Results may not add due to rounding.

SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association

EXHIBIT J (continued)

Table of Amortization Bases

	Date Established	Source	Initial Amount	Outstanding Balance	Years Remaining	Annual Payment⁽¹⁾
Cost Group #3	December 31, 2007	Restart of Amortization	\$36,185,000	\$23,776,285	6	\$4,485,539
Central Contra Costa	December 31, 2008	Actuarial (Gain)/Loss	3,709,835	3,189,002	10	386,360
Sanitary District	December 31, 2009	Actuarial (Gain)/Loss	10,118,261	9,034,269	11	1,011,817
	December 31, 2009	Assumption Change ⁽²⁾	2,003,000	1,788,414	11	200,298
	December 31, 2009	Depooling Implementation	20,037,235	17,890,601	11	2,003,706
	December 31, 2010	Actuarial (Gain)/Loss	18,178,489	16,724,316	12	1,745,772
	December 31, 2010	Assumption Change ⁽³⁾	11,479,648	10,561,343	12	1,102,448
	December 31, 2011	Actuarial (Gain)/Loss	10,514,535	9,899,124	13	969,721
	December 31, 2012	Actuarial (Gain)/Loss	12,564,241	12,034,297	14	1,112,791
	December 31, 2012	Assumption Change ⁽²⁾	22,455,342	21,508,203	14	1,988,826
	December 31, 2012	UAAL Prepayment	(4,666,477)	(4,469,651)	14	(413,301)
	December 31, 2013	Actuarial (Gain)/Loss	582,962	567,096	15	49,747
	December 31, 2013	Assumption Change ⁽³⁾	(14,950,866)	(14,543,953)	15	(1,275,833)
	December 31, 2013	UAAL Prepayment	(4,662,899)	(4,535,990)	15	(397,909)
	December 31, 2014	Actuarial (Gain)/Loss	(11,848,823)	(11,655,273)	16	(974,186)
	December 31, 2014	UAAL Prepayment	(2,331,896)	(2,293,804)	16	(191,724)
	December 31, 2015	Actuarial (Gain)/Loss	(6,504,510)	(6,445,061)	17	(515,239)
	December 31, 2015	Assumption Change ⁽²⁾	44,220	43,816	17	3,503
	December 31, 2016	Actuarial (Gain)/Loss	(1,522,932)	<u>(1,522,932)</u>	18	<u>(116,838)</u>
Total for Cost Group #3				\$81,550,100		\$11,175,498

Note: Results may not add due to rounding.

SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association

EXHIBIT J (continued)

Table of Amortization Bases

	Date Established	Source	Initial Amount	Outstanding Balance	Years Remaining	Annual Payment⁽¹⁾
Cost Group #4	December 31, 2007	Restart of Amortization	\$7,770,000	\$5,105,478	6	\$963,179
Contra Costa Housing Authority	December 31, 2008	Actuarial (Gain)/Loss	1,573,513	1,352,604	10	163,873
	December 31, 2009	Actuarial (Gain)/Loss	1,277,079	1,140,263	11	127,707
	December 31, 2009	Assumption Change ⁽²⁾	425,000	379,469	11	42,500
	December 31, 2009	Depooling Implementation	(189,275)	(168,998)	11	(18,927)
	December 31, 2010	Actuarial (Gain)/Loss	619,697	570,125	12	59,513
	December 31, 2010	Assumption Change ⁽³⁾	(920,656)	(847,009)	12	(88,415)
	December 31, 2011	Actuarial (Gain)/Loss	1,059,328	997,326	13	97,698
	December 31, 2012	Actuarial (Gain)/Loss	1,912,999	1,832,311	14	169,431
	December 31, 2012	Assumption Change ⁽²⁾	3,722,862	3,565,836	14	329,727
	December 31, 2013	Actuarial (Gain)/Loss	(2,220,704)	(2,160,264)	15	(189,504)
	December 31, 2013	Assumption Change ⁽³⁾	(1,077,289)	(1,047,969)	15	(91,931)
	December 31, 2014	Actuarial (Gain)/Loss	(1,360,021)	(1,337,805)	16	(111,818)
	December 31, 2015	Actuarial (Gain)/Loss	(875,294)	(867,294)	17	(69,334)
	December 31, 2015	Assumption Change ⁽²⁾	432,801	428,845	17	34,283
	December 31, 2016	Actuarial (Gain)/Loss	(297,092)	<u>(297,092)</u>	18	<u>(22,793)</u>
Total for Cost Group #4				\$8,645,827		\$1,395,189

Note: Results may not add due to rounding.

SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association

EXHIBIT J (continued)

Table of Amortization Bases

	Date Established	Source	Initial Amount	Outstanding Balance	Years Remaining	Annual Payment⁽¹⁾
Cost Group #5	December 31, 2007	Restart of Amortization	\$(1,011,000)	\$(664,304)	6	\$(125,325)
Contra Costa County Fire Protection District	December 31, 2008	Actuarial (Gain)/Loss	45,963	39,510	10	4,787
	December 31, 2009	Actuarial (Gain)/Loss	1,614,180	1,441,249	11	161,417
	December 31, 2009	Assumption Change ⁽²⁾	336,000	300,004	11	33,600
	December 31, 2009	Depooling Implementation	2,142,538	1,913,003	11	214,252
	December 31, 2010	Actuarial (Gain)/Loss	2,722,306	2,504,537	12	261,437
	December 31, 2011	Actuarial (Gain)/Loss	1,350,620	1,271,569	13	124,563
	December 31, 2012	Actuarial (Gain)/Loss	1,787,426	1,712,034	14	158,309
	December 31, 2012	Assumption Change ⁽²⁾	3,184,172	3,049,867	14	282,016
	December 31, 2013	Actuarial (Gain)/Loss	(2,500,665)	(2,432,605)	15	(213,394)
	December 31, 2013	Assumption Change ⁽³⁾	(985,653)	(958,827)	15	(84,111)
	December 31, 2014	Actuarial (Gain)/Loss	(2,215,758)	(2,179,563)	16	(182,175)
	December 31, 2015	Actuarial (Gain)/Loss	(756,551)	(749,636)	17	(59,928)
	December 31, 2015	Assumption Change ⁽²⁾	355,946	352,693	17	28,195
	December 31, 2016	Actuarial (Gain)/Loss	1,591,375	<u>1,591,375</u>	18	<u>122,089</u>
Total for Cost Group #5				\$7,190,906		\$725,732

Note: Results may not add due to rounding.

SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association

EXHIBIT J (continued)

Table of Amortization Bases

	Date Established	Source	Initial Amount	Outstanding Balance	Years Remaining	Annual Payment⁽¹⁾
Cost Group #6	December 31, 2007	Restart of Amortization	\$1,028,000	\$675,474	6	\$127,432
Small Districts	December 31, 2008	Actuarial (Gain)/Loss	61,240	52,642	10	6,378
(General Non-enhanced)	December 31, 2009	Actuarial (Gain)/Loss	385,148	343,886	11	38,514
	December 31, 2009	Assumption Change ⁽²⁾	126,000	112,501	11	12,600
	December 31, 2009	Depooling Implementation	(1,028,581)	(918,387)	11	(102,857)
	December 31, 2010	Actuarial (Gain)/Loss	194,488	178,930	12	18,678
	December 31, 2011	Actuarial (Gain)/Loss	(137,086)	(129,063)	13	(12,643)
	December 31, 2012	Actuarial (Gain)/Loss	177,439	169,955	14	15,715
	December 31, 2012	Assumption Change ⁽²⁾	225,958	216,427	14	20,013
	December 31, 2013	Actuarial (Gain)/Loss	59,503	57,884	15	5,078
	December 31, 2013	Assumption Change ⁽³⁾	(152,973)	(148,810)	15	(13,054)
	December 31, 2014	Actuarial (Gain)/Loss	(190,513)	(187,401)	16	(15,663)
	December 31, 2015	Actuarial (Gain)/Loss	(327,285)	(324,293)	17	(25,925)
	December 31, 2015	Assumption Change ⁽²⁾	33,272	32,968	17	2,636
	December 31, 2016	Actuarial (Gain)/Loss	272,161	<u>272,161</u>	18	<u>20,880</u>
Total for Cost Group #6				\$404,875		\$97,782

Note: Results may not add due to rounding.

SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association

EXHIBIT J (continued)

Table of Amortization Bases

	Date Established	Source	Initial Amount	Outstanding Balance	Years Remaining	Annual Payment⁽¹⁾
Cost Groups #7 and #9	December 31, 2007	Restart of Amortization	\$127,662,439	\$83,883,888	6	\$15,825,198
County Safety	December 31, 2008	Actuarial (Gain)/Loss	25,619,265	22,022,511	10	2,668,113
	December 31, 2009	Actuarial (Gain)/Loss	55,134,940	49,228,210	11	5,513,446
	December 31, 2009	Assumption Change ⁽²⁾	11,076,665	9,889,997	11	1,107,657
	December 31, 2009	Depooling Implementation	23,852,078	21,296,751	11	2,385,187
	December 31, 2010	Actuarial (Gain)/Loss	57,287,975	52,705,271	12	5,501,653
	December 31, 2011	Actuarial (Gain)/Loss	45,209,350	42,563,266	13	4,169,509
	December 31, 2012	Actuarial (Gain)/Loss	53,258,503	51,012,124	14	4,717,003
	December 31, 2012	Assumption Change ⁽²⁾	138,353,562	132,517,974	14	12,253,708
	December 31, 2013	Actuarial (Gain)/Loss	(35,024,912)	(34,071,650)	15	(2,988,853)
	December 31, 2013	Assumption Change ⁽³⁾	(43,771,706)	(42,580,385)	15	(3,735,262)
	December 31, 2014	Actuarial (Gain)/Loss	(61,809,002)	(60,799,351)	16	(5,081,807)
	December 31, 2014	Assumption Change ⁽⁴⁾	(58,092)	(57,142)	16	(4,776)
	December 31, 2015	Actuarial (Gain)/Loss	(58,489,966)	(57,955,386)	17	(4,633,138)
	December 31, 2015	Assumption Change ⁽²⁾	39,291,409	38,932,298	17	3,112,372
	December 31, 2016	Actuarial (Gain)/Loss	(13,557,811)	<u>(13,557,811)</u>	18	<u>(1,040,144)</u>
Total for Cost Groups #7 and #9				\$295,030,565		\$39,769,866

Note: Results may not add due to rounding.

SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association

EXHIBIT J (continued)

Table of Amortization Bases

	Date Established	Source	Initial Amount	Outstanding Balance	Years Remaining	Annual Payment⁽¹⁾
Cost Group #8	December 31, 2007	Restart of Amortization	\$124,138,710	\$81,568,531	6	\$15,388,392
Contra Costa and East Fire	December 31, 2008	Actuarial (Gain)/Loss	6,780,436	5,828,514	10	706,147
Protection Districts	December 31, 2009	Actuarial (Gain)/Loss	27,018,706	24,124,132	11	2,701,847
	December 31, 2009	Assumption Change ⁽²⁾	4,945,000	4,415,231	11	494,496
	December 31, 2009	Depooling Implementation	47,818,666	42,695,745	11	4,781,825
	December 31, 2010	Actuarial (Gain)/Loss	38,165,445	35,112,431	12	3,665,220
	December 31, 2010	Assumption Change ⁽³⁾	(1,599,051)	(1,471,136)	12	(153,565)
	December 31, 2011	Actuarial (Gain)/Loss	26,533,166	24,980,192	13	2,447,067
	December 31, 2012	Actuarial (Gain)/Loss	31,501,440	30,172,747	14	2,790,022
	December 31, 2012	Assumption Change ⁽²⁾	68,193,356	65,317,042	14	6,039,754
	December 31, 2013	Actuarial (Gain)/Loss	(22,661,640)	(22,044,865)	15	(1,933,833)
	December 31, 2013	Assumption Change ⁽³⁾	(17,910,676)	(17,423,206)	15	(1,528,409)
	December 31, 2014	Actuarial (Gain)/Loss	(29,217,962)	(28,740,686)	16	(2,402,240)
	December 31, 2015	Actuarial (Gain)/Loss	(19,005,510)	(18,831,806)	17	(1,505,475)
	December 31, 2015	Assumption Change ⁽²⁾	24,296,846	24,074,781	17	1,924,615
	December 31, 2016	Actuarial (Gain)/Loss	(8,297,685)	<u>(8,297,685)</u>	18	<u>(636,591)</u>
Total for Cost Group #8				\$241,479,960		\$32,779,272

Note: Results may not add due to rounding.

SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association

EXHIBIT J (continued)

Table of Amortization Bases

	Date Established	Source	Initial Amount	Outstanding Balance	Years Remaining	Annual Payment⁽¹⁾
Cost Group #10	December 31, 2007	Restart of Amortization	\$(2,591,000)	\$(1,702,483)	6	\$(321,184)
Moraga-Orinda	December 31, 2008	Actuarial (Gain)/Loss	2,002,150	1,721,063	10	208,514
Fire District	December 31, 2009	Actuarial (Gain)/Loss	5,671,684	5,064,064	11	567,163
	December 31, 2009	Assumption Change ⁽²⁾	1,012,000	903,582	11	101,199
	December 31, 2009	Depooling Implementation	4,873,631	4,351,508	11	487,359
	December 31, 2010	Actuarial (Gain)/Loss	5,334,964	4,908,198	12	512,343
	December 31, 2010	Assumption Change ⁽³⁾	806,018	741,541	12	77,406
	December 31, 2011	Actuarial (Gain)/Loss	6,791,005	6,393,530	13	626,312
	December 31, 2012	Actuarial (Gain)/Loss	8,924,598	8,548,169	14	790,434
	December 31, 2012	Assumption Change ⁽²⁾	12,149,892	11,637,424	14	1,076,092
	December 31, 2013	Actuarial (Gain)/Loss	(1,027,440)	(999,476)	15	(87,677)
	December 31, 2013	Assumption Change ⁽³⁾	(3,613,981)	(3,515,620)	15	(308,399)
	December 31, 2014	Actuarial (Gain)/Loss	(4,813,045)	(4,734,423)	16	(395,719)
	December 31, 2015	Actuarial (Gain)/Loss	(8,490,806)	(8,413,203)	17	(672,578)
	December 31, 2015	Assumption Change ⁽²⁾	3,844,347	3,809,211	17	304,520
	December 31, 2016	Actuarial (Gain)/Loss	1,028,690	<u>1,028,690</u>	18	<u>78,920</u>
	Total for Cost Group #10				\$29,741,775	

Note: Results may not add due to rounding.

SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association

EXHIBIT J (continued)

Table of Amortization Bases

	Date Established	Source	Initial Amount	Outstanding Balance	Years Remaining	Annual Payment⁽¹⁾
Cost Group #11	December 31, 2007	Restart of Amortization	\$58,766,000	\$38,613,711	6	\$7,284,708
San Ramon Valley	December 31, 2008	Actuarial (Gain)/Loss	10,216,694	8,782,347	10	1,064,016
Fire District	December 31, 2009	Actuarial (Gain)/Loss	9,262,105	8,269,835	11	926,202
	December 31, 2009	Assumption Change ⁽²⁾	2,453,000	2,190,205	11	245,298
	December 31, 2009	Depooling Implementation	(20,174,500)	(18,013,161)	11	(2,017,432)
	December 31, 2010	Actuarial (Gain)/Loss	6,585,812	6,058,985	12	632,469
	December 31, 2010	Assumption Change ⁽³⁾	5,093,420	4,685,976	12	489,147
	December 31, 2011	Actuarial (Gain)/Loss	5,513,071	5,190,393	13	508,452
	December 31, 2012	Actuarial (Gain)/Loss	14,600,741	13,984,900	14	1,293,159
	December 31, 2012	Assumption Change ⁽²⁾	26,672,143	25,547,144	14	2,362,300
	December 31, 2013	Actuarial (Gain)/Loss	(4,492,900)	(4,370,618)	15	(383,402)
	December 31, 2013	Assumption Change ⁽³⁾	(12,984,002)	(12,630,620)	15	(1,107,991)
	December 31, 2014	Actuarial (Gain)/Loss	(13,850,852)	(13,624,598)	16	(1,138,788)
	December 31, 2015	Actuarial (Gain)/Loss	(9,008,582)	(8,926,247)	17	(713,593)
	December 31, 2015	Assumption Change ⁽²⁾	5,533,144	5,482,573	17	438,294
	December 31, 2016	Actuarial (Gain)/Loss	2,020,042	<u>2,020,042</u>	18	<u>154,976</u>
Total for Cost Group #11				\$63,260,867		\$10,037,815

Note: Results may not add due to rounding.

SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association

EXHIBIT J (continued)

Table of Amortization Bases

	Date Established	Source	Initial Amount	Outstanding Balance	Years Remaining	Annual Payment⁽¹⁾
Cost Group #12	December 31, 2007	Restart of Amortization	\$3,960,000	\$2,602,020	6	\$490,887
Rodeo-Hercules Fire	December 31, 2008	Actuarial (Gain)/Loss	957,150	822,773	10	99,682
Protection District	December 31, 2009	Actuarial (Gain)/Loss	2,872,360	2,564,638	11	287,234
	December 31, 2009	Assumption Change ⁽²⁾	1,154,000	1,030,369	11	115,399
	December 31, 2009	Depooling Implementation	(1,809,374)	(1,615,532)	11	(180,936)
	December 31, 2010	Actuarial (Gain)/Loss	1,502,503	1,382,312	12	144,293
	December 31, 2010	Assumption Change ⁽³⁾	662,085	609,122	12	63,583
	December 31, 2011	Actuarial (Gain)/Loss	2,067,217	1,946,224	13	190,653
	December 31, 2012	Actuarial (Gain)/Loss	2,246,131	2,151,391	14	198,935
	December 31, 2012	Assumption Change ⁽²⁾	3,018,796	2,891,467	14	267,369
	December 31, 2013	Actuarial (Gain)/Loss	413,088	401,845	15	35,251
	December 31, 2013	Assumption Change ⁽³⁾	(1,169,821)	(1,137,982)	15	(99,827)
	December 31, 2014	Actuarial (Gain)/Loss	315,937	310,776	16	25,976
	December 31, 2015	Actuarial (Gain)/Loss	(990,379)	(981,328)	17	(78,450)
	December 31, 2015	Assumption Change ⁽²⁾	775,874	768,783	17	61,459
	December 31, 2016	Actuarial (Gain)/Loss	(270,731)	<u>(270,731)</u>	18	<u>(20,770)</u>
Total for Cost Group #12				\$13,476,147		\$1,600,738

Note: Results may not add due to rounding.

SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association

EXHIBIT J (continued)

Table of Amortization Bases

	Date Established	Source	Initial Amount	Outstanding Balance	Years Remaining	Annual Payment⁽¹⁾
Special Adjustments⁽⁵⁾	December 31, 2007	County General POBs	\$(453,973,319)	\$(298,293,830)	6	\$(56,274,919)
	December 31, 2007	Moraga General POBs	(701,412)	(460,879)	6	(86,948)
	December 31, 2007	CCCFPD Safety POBs	(127,509,711)	(83,783,251)	6	(15,806,213)
	December 31, 2011	First Five UAAL Prepayment	(1,794,205)	<u>(1,146,738)</u>	6	<u>(233,191)</u>
Total for Special Adjustments				\$(383,684,697)		\$(72,401,271)
Terminated Employers⁽⁶⁾				\$8,991,972		

Note: Results may not add due to rounding.

SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association

EXHIBIT J (continued)

Table of Amortization Bases

	Date Established	Source	Initial Amount	Outstanding Balance	Years Remaining	Annual Payment⁽¹⁾
All Cost Groups Combined	December 31, 2007	Restart of Amortization	\$1,140,977,302	\$749,708,471	6	\$141,436,997
	December 31, 2007	County General POBs ⁽⁵⁾	(453,973,319)	(298,293,830)	6	(56,274,919)
	December 31, 2007	Moraga General POBs ⁽⁵⁾	(701,412)	(460,879)	6	(86,948)
	December 31, 2007	CCCFPD Safety POBs ⁽⁵⁾	(127,509,711)	(83,783,251)	6	(15,806,213)
	December 31, 2008	Actuarial (Gain)/Loss	130,999,446	112,608,102	10	13,642,912
	December 31, 2009	Actuarial (Gain)/Loss	278,395,785	248,570,622	11	27,839,335
	December 31, 2009	Assumption Change ⁽²⁾	63,094,491	56,335,037	11	6,309,395
	December 31, 2009	Depooling Implementation	820,505	732,602	11	82,051
	December 31, 2010	Actuarial (Gain)/Loss	283,662,222	260,970,896	12	27,241,513
	December 31, 2010	Assumption Change ⁽³⁾	15,521,464	14,279,837	12	1,490,604
	December 31, 2011	Actuarial (Gain)/Loss	193,651,285	182,316,958	13	17,859,820
	December 31, 2011	First Five UAAL Prepayment ⁽⁵⁾	(1,794,205)	(1,146,738)	6	(233,191)
	December 31, 2012	Actuarial (Gain)/Loss	244,002,634	233,710,895	14	21,610,842
	December 31, 2012	Assumption Change ⁽²⁾	566,778,965	542,872,907	14	50,198,519
	December 31, 2012	Sanitary UAAL Prepayment	(4,666,477)	(4,469,651)	14	(413,301)
	December 31, 2013	Actuarial (Gain)/Loss	(201,682,820)	(196,193,680)	15	(17,210,617)
	December 31, 2013	Assumption Change ⁽³⁾	(204,170,256)	(198,613,415)	15	(17,422,884)
	December 31, 2013	Sanitary UAAL Prepayment	(4,662,899)	(4,535,990)	15	(397,909)
	December 31, 2014	Actuarial (Gain)/Loss	(296,895,242)	(292,045,455)	16	(24,410,106)
	December 31, 2014	Assumption Change ⁽⁴⁾	(51,701)	(50,856)	16	(4,251)
	December 31, 2014	Sanitary UAAL Prepayment	(2,331,896)	(2,293,804)	16	(191,724)
	December 31, 2015	Actuarial (Gain)/Loss	(209,452,416)	(207,538,088)	17	(16,591,256)
	December 31, 2015	Assumption Change ⁽²⁾	114,422,743	113,376,956	17	9,063,715
	December 31, 2016	Actuarial (Gain)/Loss	(47,613,010)	<u>(47,613,010)</u>	18	<u>(3,652,830)</u>
Total for All Cost Groups Terminated Employers⁽⁶⁾				\$1,178,444,637		\$164,079,554
Total CCCERA				<u>8,991,972</u>		
				\$1,187,436,609		

SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association

EXHIBIT J (continued)

Table of Amortization Bases

Note: Results may not add due to rounding.

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

SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association

EXHIBIT K

Section 415 Limitations

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 \$215,000 for 2017. Normal Retirement Age for these purposes is age 62. These are the limits in simplified terms. They must generally be adjusted based on each participant's circumstances, for such things as age at

retirement, form of benefits chosen and after tax contributions. Limits are also affected by the "grandfather" election under Section 415(b)(10).

For non-PEPRA members, benefits in excess of the limits may be paid through a qualified governmental excess plan that meets the requirements of Section 415(m).

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

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

SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association

EXHIBIT L

Definitions of Pension Terms

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

Assumptions or Actuarial Assumptions:

The estimates on which the cost of the Plan is calculated including:

- (a) Investment return — the rate of investment yield that the Plan will earn over the long-term future;
- (b) Mortality rates — the death rates of employees and pensioners; life expectancy is based on these rates;
- (c) Retirement rates — the rate or probability of retirement at a given age; and
- (d) Turnover rates — the rates at which employees of various ages are expected to leave employment for reasons other than death, disability, or retirement.

Normal Cost:

The amount of contributions required to fund the level cost allocated to the current year of service.

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:

The single sum value of lifetime benefits to existing pensioners. This sum takes account of life expectancies appropriate to the ages of the pensioners and of the interest that the sum is expected to earn before it is entirely paid out in benefits.

Unfunded Actuarial Accrued Liability:

The extent to which the actuarial accrued liability of the Plan exceeds the assets of the Plan.

SECTION 3: Supplemental Information for the Contra Costa County Employees' Retirement Association

Amortization of the Unfunded

Actuarial Accrued Liability: Payments made over a period of years equal in value to the Plan's unfunded actuarial accrued liability.

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 market gains and losses to avoid significant swings in the value of assets from one year to the next.

Payroll or Compensation:

Payroll for pension purposes expected to be paid to active members during the twelve months following the valuation date. Only pay that would possibly go into the determination of retirement benefits is included.

Asset Volatility Ratio:

Equal to the market value of assets divided by total projected payroll. This provides an indication of the potential contribution volatility for any given level of investment volatility.

Liability Volatility Ratio:

Equal to the Actuarial Accrued Liability divided by total projected payroll. This provides an indication of the longer-term potential for contribution volatility for any given level of investment volatility. It 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.

SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association

EXHIBIT I

Summary of Actuarial Valuation Results

The valuation was made with respect to the following data supplied to us:

1. Retired members as of the valuation date (including 1,370 beneficiaries in pay status)	9,100
2. Members inactive during year ended December 31, 2016 with vested rights	3,089
3. Members active during the year ended December 31, 2016	9,848

The actuarial factors as of the valuation date are as follows (amounts in 000s):

1. Normal cost*	\$227,851
2. Present value of future benefits	10,391,332
3. Present value of future normal costs	1,596,897
4. Actuarial accrued liability**	8,794,435
Retired members and beneficiaries	\$5,670,811
Inactive members with vested rights	271,254
Active members	2,852,370
5. Valuation value of assets*** (\$7,438,520 at market value as reported by CCCERA)	7,606,998
6. Unfunded actuarial accrued liability	\$1,187,437

* *Includes administrative expense load.*

** *Excludes liabilities for non-valuation reserves*

*** *Excludes assets for non-valuation reserves*

SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association

EXHIBIT I (continued)

Summary of Actuarial Valuation Results

The determination of the recommended average employer contribution is as follows
(amounts in 000s):

	Dollar Amount	% of Payroll
1. Total normal cost	\$227,851	29.04%
2. Expected employee contributions	<u>(94,778)</u>	<u>(12.08%)</u>
3. Employer normal cost: (1) + (2)	\$133,073	16.96%
4. Amortization of unfunded actuarial accrued liability	<u>165,674</u>	<u>21.12%</u>
5. Total recommended average employer contribution: (3) + (4)	\$298,746	38.08%
6. Projected payroll	\$784,412	

SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association

EXHIBIT II

Actuarial Assumptions and Methods

Rationale for Assumptions:

The information and analysis used in selecting each demographic (non-economic) assumption that has a significant effect on this actuarial valuation is shown in the January 1, 2012 through December 31, 2014 Actuarial Experience Study dated June 1, 2016. The information and analysis used in selecting each economic assumption is shown in our Review of Economic Actuarial Assumptions dated April 19, 2016.

Economic Assumptions

Net Investment Return:

7.00%, net of investment expenses

Administrative Expenses:

1.12% of payroll allocated to both the employer and the member based on normal cost (before expenses) for the employer and member. This assumption changes each year based on the actual administrative expenses as a percent of actual compensation during the calendar year leading up to the valuation date.

**Employee Contribution
Crediting Rate:**

7.00%, compounded semi-annually

Consumer Price Index:

Increase of 2.75% per year; retiree COLA increases due to CPI subject to a 3.00% maximum change per year (valued as a 2.75% increase) except for Tier 3 and PEPRA Tier 5 disability benefits and Tier 2 benefits which are subject to a 4.00% maximum change per year (valued as a 2.75% increase). Safety Tier C benefits, Safety PEPRA Tier E benefits and benefits for PEPRA Tier 4 and Tier 5 members covered under certain memoranda of understanding are subject to a 2.00% maximum change per year. For members that have COLA banks, they are reflected in projected future COLA's.

Payroll Growth:

Inflation of 2.75% per year plus "across the board" real salary increases of 0.50% per year.

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**Increase in Internal Revenue
Code Section 401(a)(17)**

Compensation Limit:

Increase of 2.75% per year from the valuation date.

Increase in Section 7522.10

Compensation Limit:

Increase of 2.75% per year from the valuation date.

Demographic Assumptions

Post – Retirement Mortality Rates:

Healthy:

For General Members: Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table, projected generationally with the two-dimensional MP-2015 projection scale.

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

Disabled:

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

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

Beneficiaries:

Beneficiaries are assumed to have the same mortality as a General Member of the opposite sex who has taken a service (non-disability) retirement.

The RP-2014 mortality tables and adjustments as shown above reflect the mortality experience as of the measurement date. The generational projection is a provision for future mortality improvement.

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Member Contribution Rates: For General Members: Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table, projected to 2034 with the two-dimensional MP-2015 projection scale, weighted 30% male and 70% female.

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

Pre – Retirement Mortality Rates: Headcount-Weighted RP-2014 Employee Mortality Table times 75%, projected generationally with the two-dimensional MP-2015 projection scale.

Termination Rates Before Retirement:

Age	Rate (%)	
	Male	Female
25	0.05	0.02
30	0.05	0.02
35	0.05	0.03
40	0.06	0.04
45	0.09	0.06
50	0.16	0.10
55	0.26	0.16
60	0.42	0.23
65	0.73	0.33

All pre-retirement deaths are assumed to be non-service connected. Note that generational projections beyond the base year (2014) are not reflected in the above mortality rates.

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Termination Rates Before Retirement (continued):

Age	Rate (%) Disability		
	General Tier 1 and Tier 4 ⁽¹⁾	General Tier 3 and Tier 5 ⁽²⁾	Safety ⁽³⁾
20	0.01	0.01	0.02
25	0.02	0.02	0.22
30	0.04	0.03	0.42
35	0.08	0.05	0.56
40	0.22	0.08	0.66
45	0.36	0.13	1.00
50	0.52	0.16	2.88
55	0.60	0.20	4.60
60	0.60	0.28	5.00
65	0.60	0.32	5.00
70	0.60	0.32	5.00

⁽¹⁾ 65% of General Tier 1 and Tier 4 disabilities are assumed to be duty disabilities. The other 35% are assumed to be ordinary disabilities.

⁽²⁾ 30% of General Tier 3 and Tier 5 disabilities are assumed to be duty disabilities. The other 70% are assumed to be ordinary disabilities.

⁽³⁾ 100% of Safety disabilities are assumed to be duty disabilities.

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Termination Rates Before Retirement (continued):

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

* *The member is assumed to receive the greater of the member's contribution balance or a deferred retirement benefit. No withdrawal is assumed after a member is first assumed to retire.*

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Retirement Rates (General):

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

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Retirement Rates (Safety):

Rates (%)				
Age	Safety Tier A (Enhanced)	Safety Tier C (Enhanced)	Safety Tier A (Non-enhanced)	PEPRA Safety Tiers D and E
45	4.00	2.00	0.00	0.00
46	3.00	1.00	0.00	0.00
47	10.00	4.00	0.00	0.00
48	10.00	4.00	0.00	0.00
49	25.00	12.00	0.00	0.00
50	30.00	18.00	5.00	5.00
51	30.00	18.00	4.00	4.00
52	25.00	15.00	4.00	4.00
53	25.00	15.00	5.00	5.00
54	25.00	15.00	8.00	6.00
55	28.00	18.00	10.00	10.00
56	25.00	15.00	10.00	10.00
57	25.00	15.00	12.00	18.00
58	35.00	25.00	18.00	18.00
59	35.00	25.00	20.00	18.00
60	35.00	30.00	20.00	18.00
61	35.00	30.00	20.00	20.00
62	35.00	30.00	20.00	20.00
63	35.00	30.00	20.00	20.00
64	50.00	40.00	100.00	30.00
65	100.00	100.00	100.00	30.00
66	100.00	100.00	100.00	100.00

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Retirement Age and Benefit for Deferred Vested Members:

For deferred vested benefits, we make the following retirement assumption:

General: Age 59

Safety: Age 54

We assume that 40% and 65% of future General and Safety deferred vested members, respectively, will continue to work for a reciprocal employer. For reciprocals, we assume 4.75% compensation increases per annum.

Future Benefit Accruals:

1.0 year of service per year for the full-time employees. Continuation of current partial service accrual for part-time employees.

Unknown Data for Members:

Same as those exhibited by members with similar known characteristics. If not specified, members are assumed to be male.

Percent Married:

75% of male members and 50% of female members are assumed to be married at pre-retirement death or retirement. There is no explicit assumption for children's benefits.

Age of Spouse:

Males are 3 years older than their spouses, and females are 2 years younger than their spouses.

Offsets by Other Plans of the Employer for Disability Benefits:

The Plan requires members who retire because of disability from General Tier 3 and PEPRA General Tier 5 to offset the Plan's disability benefits with other Plans of the employer. We have not assumed any offsets in this valuation.

SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association

Leave Cashout Assumptions:

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

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

	Membership Date before January 1, 2013
Cost Group 1:	1.25%
Cost Group 2:	0.50% for Tier 2 1.00% for Tier 3
Cost Group 3:	5.50%
Cost Group 4:	0.50%
Cost Group 5:	1.00%
Cost Group 6:	0.75%
Cost Group 7:	1.00%
Cost Group 8:	0.75%
Cost Group 9:	0.00%
Cost Group 10:	1.00%
Cost Group 11:	2.50%
Cost Group 12:	2.50%

The cost of this pay element is recognized in the valuation as an employer and member cost in both basic and COLA components.

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

None

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Service From Accumulated Sick Leave Conversion:

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

Service Retirements:

General:	1.20%
Safety:	1.90%

Disability Retirements:

General:	0.08%
Safety:	1.30%

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

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Salary Increases:

Annual Rate of Compensation Increase		
Inflation: 2.75% per year, plus “across the board” salary increases of 0.50% per year, plus the following merit and promotional increases:		
Years of Service	General	Safety
Less than 1	10.00%	10.50%
1	7.25	7.25
2	5.25	5.75
3	3.75	4.50
4	2.75	3.00
5	2.25	1.75
6	1.75	1.25
7	1.50	1.20
8	1.25	1.15
9	1.20	1.10
10	1.15	1.05
11	1.10	1.00
12	1.00	0.95
13	0.90	0.85
14	0.80	0.80
15	0.75	0.75
16	0.75	0.75
17	0.75	0.75
18	0.75	0.75
19	0.75	0.75
20 or more	0.75	0.75

The average total assumed salary increase for active members in the December 31, 2016 actuarial valuation is 5.4%

SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association

Actuarial Methods

- Actuarial Cost Method:** Entry Age Actuarial Cost Method. Entry Age is calculated as 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 percent of compensation, as if the current benefit formulas have always been in effect (i.e., “replacement life”).
- Actuarial Value of Assets:** Market value of assets less unrecognized returns in each of the last nine semi-annual accounting periods. Unrecognized return is equal to the difference between the actual market return and the expected return on the market value, and is recognized semi-annually over a five-year period.
- Valuation Value of Assets:** Actuarial Value of Assets reduced by the value of the non-valuation reserves and designations.
- Amortization Policy:** The UAAL (i.e., the difference between the AAL and the Valuation Value of Assets) as of December 31, 2014 will continue to be amortized over separate amortization layers based on the valuations during which each separate layer was previously established.
- Any new UAAL as a result of actuarial gains or losses identified in the annual valuation as of December 31 will be amortized over a period of 18 years.
- Any new UAAL as a result of change in actuarial assumptions or methods will be amortized over a period of 18 years.
- Unless the Board adopts an alternative amortization period after receiving an actuarial analysis:
- i. With the exception noted in ii., below, the increase in UAAL as a result of any plan amendments will be amortized over a period of 10 years;
 - ii. The entire increase in UAAL resulting from a temporary retirement incentive will be funded in full upon adoption of the incentive. If the increase in UAAL is due to the impact of benefits resulting from additional service permitted in Section 31641.04 of the 1937 CERL (Golden Handshake), the entire increase in UAAL will be funded in full upon adoption of the Golden Handshake.

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

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

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

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

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

Changes in Actuarial Assumptions and Methods:

The following assumption was changed. Previously, this assumption was as follows:

Administrative Expenses:

1.14% of payroll allocated to both the employer and the member based on normal cost (before expenses) for the employer and member. This assumption changes each year based on the actual administrative expenses as a percent of actual compensation during the calendar year leading up to the valuation date.

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EXHIBIT III

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.

Membership Eligibility:

<i>General Tier 1</i>	General members hired before July 1, 1980 and electing not to transfer to Tier 2 Plan. Certain General members with membership dates before January 1, 2013 hired by specific employers who did not adopt Tier 2 are placed in Tier 1.
<i>General Tier 2</i>	Most General members hired on or after August 1, 1980 and all General members hired before July 1, 1980 electing to transfer to the Tier 2 Plan. Effective October 1, 2002, for the County, Tier 2 was eliminated and all County employees (excluding CNA employees) in Tier 2 were placed in Tier 3. Effective January 1, 2005, all CNA employees in Tier 2 were placed in Tier 3.
<i>General Tier 3</i>	General members with membership dates before January 1, 2013 who are not placed in Tier 1 are placed in Tier 3.
<i>PEPRA General Tier 4</i>	General members with membership dates on or after January 1, 2013 hired by specific employers who did not adopt Tier 2 are placed in Tier 4.
<i>PEPRA General Tier 5</i>	General members with membership dates on or after January 1, 2013 who are not placed in Tier 4 are placed in Tier 5.
<i>Safety Tiers A and C</i>	Safety members with membership dates before January 1, 2013. County Sheriff's Department Safety members hired on or after January 1, 2007, but before January 1, 2013 are placed in Safety Tier C Enhanced.
<i>PEPRA Safety Tiers D and E</i>	Safety members with membership dates on or after January 1, 2013. Safety members from certain bargaining units are placed in Safety Tier E.

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Final Compensation for Benefit Determination:

<i>General Tier 1, Tier 3 (non-disability), and Safety Tier A</i>	Highest consecutive twelve months of compensation earnable. (FAS1) (§31462.1)
<i>General Tier 2, Tier 3 (disability), and Safety Tier C</i>	Highest consecutive thirty-six months of compensation earnable. (FAS3) (§31462)
<i>PEPRA General Tiers 4 and 5 PEPRA Safety Tiers D and E</i>	Highest consecutive thirty-six months of pensionable compensation. (FAS3) (§7522.10(c), §7522.32 and §7522.34)

Compensation Limit:

<i>Non-PEPRA Tiers</i>	For members with membership dates on or after January 1, 1996, Compensation Earnable is limited to Internal Revenue Code Section 401(a)(17). The limit is \$270,000 for calendar year 2017. The limit is indexed for inflation on an annual basis.
<i>PEPRA Tiers</i>	Pensionable Compensation is limited to \$118,775 for 2017 (\$142,530, if not enrolled in Social Security). The limit is indexed for inflation on an annual basis.

Social Security Primary Insurance Amount:

<i>General Tier 2</i>	Estimated Social Security award at age 62 assuming level future earnings. (PIA)
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Service:

<i>All tiers</i>	Years of service*. (Yrs)
<i>General Tier 2</i>	Years of service up to a maximum of 30 years*. (Yrs30) * Includes accumulated sick leave as of the date of retirement (§31641.01).

Service Retirement Eligibility:

<i>General Tiers 1, 2 and 3</i>	Age 50 with 10 years of service, or age 70 regardless of service, or after 30 years of service, regardless of age. (§31672)
<i>PEPRA General Tiers 4 and 5</i>	Age 52 with 5 years of service, or age 70 regardless of service. (§7522.20(a)) and §31672.3)
<i>Safety Tiers A and C</i>	Age 50 with 10 years of service, or age 70 regardless of service, or after 20 years of service, regardless of age. (§31663.25)

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PEPRA Safety Tiers D and E Age 50 with 5 years of service, or age 70 regardless of service. (§7522.25(a) and §31672.3)

Benefit Formula:

General Tiers 1 and 3 (Non-enhanced)(§31676.11)

Retirement Age	Benefit Formula
50	$(1.24\% \times \text{FAS1} - 1/3 \times 1.24\% \times \$350 \times 12) \times \text{Yrs}$
55	$(1.67\% \times \text{FAS1} - 1/3 \times 1.67\% \times \$350 \times 12) \times \text{Yrs}$
60	$(2.18\% \times \text{FAS1} - 1/3 \times 2.18\% \times \$350 \times 12) \times \text{Yrs}$
62	$(2.35\% \times \text{FAS1} - 1/3 \times 2.35\% \times \$350 \times 12) \times \text{Yrs}$
65 or later	$(2.61\% \times \text{FAS1} - 1/3 \times 2.61\% \times \$350 \times 12) \times \text{Yrs}$

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

50	$(1.43\% \times \text{FAS1} - 1/3 \times 1.43\% \times \$350 \times 12) \times \text{Yrs}$
55	$(2.00\% \times \text{FAS1} - 1/3 \times 2.00\% \times \$350 \times 12) \times \text{Yrs}$
60	$(2.26\% \times \text{FAS1} - 1/3 \times 2.26\% \times \$350 \times 12) \times \text{Yrs}$
62	$(2.37\% \times \text{FAS1} - 1/3 \times 2.37\% \times \$350 \times 12) \times \text{Yrs}$
65 or later	$(2.42\% \times \text{FAS1} - 1/3 \times 2.42\% \times \$350 \times 12) \times \text{Yrs}$

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

General Tier 2 (§31752)

50	$0.83\% \times \text{FAS3} \times \text{Yrs} - 0.57\% \times \text{Yrs} \times 30 \times \text{PIA}$
55	$1.13\% \times \text{FAS3} \times \text{Yrs} - 0.87\% \times \text{Yrs} \times 30 \times \text{PIA}$
60	$1.43\% \times \text{FAS3} \times \text{Yrs} - 1.37\% \times \text{Yrs} \times 30 \times \text{PIA}$
62	$1.55\% \times \text{FAS3} \times \text{Yrs} - 1.67\% \times \text{Yrs} \times 30 \times \text{PIA}$
65 or later	$1.73\% \times \text{FAS3} \times \text{Yrs} - 1.67\% \times \text{Yrs} \times 30 \times \text{PIA}$

The offsets shown in all of the above formulas only apply to members integrated with Social Security.

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Benefit Formula:

<i>PEPRA General Tiers 4 and 5</i> (§7522.20(a))	Retirement Age	Benefit Formula
	52	1.00%xFAS3xYrs
	55	1.30%xFAS3xYrs
	60	1.80%xFAS3xYrs
	62	2.00%xFAS3xYrs
	65	2.30%xFAS3xYrs
	67 or later	2.50%xFAS3xYrs
<i>Safety Tier A (Non-enhanced)(§31664)</i>	50	2.00%xFAS1xYrs
	55 or later	2.62%xFAS1xYrs
<i>Safety Tier A (Enhanced)(§31664.1)</i>	50 or later	3.00%xFAS1xYrs
<i>Safety Tier C (Enhanced)(§31664.1)</i>	50 or later	3.00%xFAS3xYrs
<i>PEPRA Safety Tiers D and E</i> (§7522.25(d))	50	2.00%xFAS3xYrs
	55	2.50%xFAS3xYrs
	57 or later	2.70%xFAS3xYrs

Maximum Benefit:

<i>General Tiers 1 and 3</i> <i>Safety Tiers A and C</i>	100% of Final Compensation (§31676.11, §31676.16, §31664, §31664.1)
<i>General Tier 2</i> <i>PEPRA General Tiers 4 and 5</i> <i>PEPRA Safety Tiers D and E</i>	None

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Ordinary Disability:

General Tiers 1 and 4

Eligibility

Five years of service (§31720).

Benefit Formula

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

General Tiers 2, 3 and 5

Eligibility

Ten years of service (definition of disability is more strict than Tier 1 Plan) (§31720.1).

Benefit Formula

40% of Final Compensation plus 10% of Final Compensation used in the benefit determination for each minor child (maximum of three) (§31727.01).

Offset

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

Safety

Eligibility

Five years of service (§31720).

Benefit Formula

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

Line-of-Duty Disability:

General Tiers 1 and 4, and Safety

Eligibility

No age or service requirements (§31720).

Benefit Formula

50% of the Final Compensation (§31727.4).

General Tiers 2, 3 and 5

Eligibility

No age or service requirements (§31720).

Benefit Formula

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

Offset

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

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Pre-Retirement Death:

Non-General Tier 2

Eligibility - A

None

Benefit - A

Refund of employee contributions with interest plus one month's compensation for each year of service to a maximum of six month's compensation (§31781); 50% of Final Compensation payable to spouse if Line of Duty death (§31787).

OR

Eligibility - B

Five years of service (Ten years for Tiers 3 and 5).

Benefit - B

Option 2 (100% continuation) of Service Retirement or Ordinary Disability benefit payable to designated beneficiary.

Death in line of duty

50% of Final compensation.

General Tier 2

Eligibility - A

None

Benefit - A

Refund of employee contributions with interest plus \$2,000 lump sum benefit offset by any Social Security payment. (§31781.01); If a Line of Duty death, then 60% of Service or Disability Retirement Benefit (minimum benefit is 24% of Final Compensation) plus, for each minor child, 10% of the allowance otherwise paid to the member. Minimum family benefit is 60% of the member's allowance. Maximum family benefit is 100% of member's allowance.

OR

Eligibility - B

Ten years of service.

Benefit - B

Option 2 (100% continuation) of Service Retirement or Ordinary Disability benefit payable to designated beneficiary.

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Death After Retirement:

Non-General Tier 2

Service or

Ordinary Disability Retirement

60% of member's unmodified allowance continued to eligible spouse. An eligible spouse is a surviving spouse who was married to the member one year prior to member's retirement or at least two years prior to the date of death and has attained age 55 on or prior to the date of death (§31760.2). An additional lump sum benefit of \$5,000 is payable to the member's beneficiary (§31789.5).

Line-of-Duty Disability

100% of members allowance continued to eligible spouse (§31786). An additional lump sum benefit of \$5,000 is payable to the member's beneficiary (§31789.5).

General Tier 2

Service or

Disability Retirement

60% of member's unmodified allowance continued to eligible spouse plus 20% of allowance to each minor child (§31789.11). Minimum benefit is 60% of allowance. Maximum benefit is 100% of allowance. \$5,000 lump sum death benefit (§31789.5) plus \$2,000 less any Social Security Lump sum payment (§31789.01) are payable to member's beneficiary.

Withdrawal Benefits:

Less than Five Years of Service

Refund of accumulated employee contributions with interest, or earned benefit at age 70 (§31628).

Five or More Years of Service

If contributions left on deposit, entitled to earned benefits commencing at any time after eligible to retire (§31700).

SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association

Post-Retirement

Cost-of-Living Benefits:

General Tiers 1, 3, 4 and 5

Safety Tiers A and D

Future changes based on Consumer Price Index to a maximum of 3% per year, excess “banked.” Tier 3 and PEPPRA Tier 5 disability benefits have a maximum of 4% per year, excess “banked.” Benefits for PEPPRA Tier 4 and Tier 5 members covered under certain memoranda of understanding have a maximum of 2% per year, excess “banked”.

General Tier 2

Future changes based on Consumer Price Index to a maximum of 4% per year, excess “banked.”

Safety Tiers C and E

Future changes based on Consumer Price Index to a maximum of 2% per year, excess “banked.”

Member Contributions:

Please refer to Appendices A and B for the specific rates.

General Tiers 1 and 3 (Non-enhanced)

Basic

Provide for one-half of the \$31676.11 benefit payable at age 55.

Cost-of-Living

Provide for one-half of future Cost-of-Living costs.

General Tiers 1 and 3 (Enhanced)

Basic

Provide for an average annuity at age 60 equal to 1/120 of FAS1.

Cost-of-Living

Provide for one-half of future Cost-of-Living costs.

PEPPRA General Tiers 4 and 5

50% of the total Normal Cost rate.

Safety Tier A (Non-enhanced)

Basic

Provide for one-half of the \$31664 benefit payable at age 50.

Cost-of-Living

Provide for one-half of future Cost-of-Living costs.

SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association

Member Contributions (continued):

Safety Tier A (Enhanced)

Basic

Provide for an average annuity at age 50 equal to 1/100 of FAS1.

Cost-of-Living

Provide for one-half of future Cost-of-Living costs.

Safety Tier C (Enhanced)

Basic

Provide for an average annuity at age 50 equal to 1/100 of FAS3.

Cost-of-Living

Provide for one-half of future Cost-of-Living costs.

PEPRA Safety Tiers D and E

50% of the total Normal Cost rate.

Other Information:

Transfers from the Tier 1 Plan to the Tier 2 Plan were made on an individual voluntary irrevocable basis. Credit is given under the Tier 2 Plan for future service only. The Cost-of-Living maximum is 4% only for the credit under the Tier 2 Plan. Transferred Tier 2 Plan members keep the five-year requirement for nonservice-connected disability. Those who were members on or before March 7, 1973 and Safety members under the enhanced benefit formula with membership dates on or before January 1, 2013 will be exempt from paying member contributions after 30 years of service.

Plan Provisions Not Valued:

Additional \$5,000 lump sum post-retirement death benefit (except for \$2,000 for General Tier 2 members paid out of the Valuation Value of Assets) payable to a member's beneficiary. This benefit is paid from a reserve that is not included in the Valuation Value of Assets and is subject at all times to the availability of funds.

Plan Changes:

There have been no changes in plan provisions since the previous actuarial 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 that both can be sure the proper provisions are valued.

SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association

Appendix A

Member Contribution Rates for Members with Membership Dates before January 1, 2013

**General Cost Group #1 Members' Contribution Rates (Expressed as a Percentage of Monthly Payroll)
For Members with Membership Dates before January 1, 2013**

Calculated Under Recommended Assumptions

Entry Age	Basic		COLA		Total	
	First \$350	Over \$350	First \$350	Over \$350	First \$350	Over \$350
15	3.75%	5.40%	1.79%	2.69%	5.54%	8.09%
16	3.81%	5.49%	1.83%	2.74%	5.64%	8.23%
17	3.87%	5.58%	1.85%	2.78%	5.72%	8.36%
18	3.93%	5.67%	1.89%	2.83%	5.82%	8.50%
19	3.99%	5.76%	1.92%	2.88%	5.91%	8.64%
20	4.05%	5.85%	1.95%	2.93%	6.00%	8.78%
21	4.12%	5.95%	1.99%	2.99%	6.11%	8.94%
22	4.18%	6.04%	2.02%	3.03%	6.20%	9.07%
23	4.25%	6.14%	2.06%	3.09%	6.31%	9.23%
24	4.31%	6.24%	2.09%	3.14%	6.40%	9.38%
25	4.38%	6.34%	2.13%	3.20%	6.51%	9.54%
26	4.45%	6.44%	2.17%	3.25%	6.62%	9.69%
27	4.52%	6.55%	2.21%	3.31%	6.73%	9.86%
28	4.59%	6.65%	2.25%	3.37%	6.84%	10.02%
29	4.66%	6.76%	2.29%	3.43%	6.95%	10.19%
30	4.73%	6.87%	2.33%	3.49%	7.06%	10.36%
31	4.81%	6.98%	2.37%	3.55%	7.18%	10.53%
32	4.88%	7.09%	2.41%	3.61%	7.29%	10.70%
33	4.95%	7.20%	2.45%	3.67%	7.40%	10.87%
34	5.03%	7.32%	2.49%	3.73%	7.52%	11.05%
35	5.11%	7.44%	2.53%	3.80%	7.64%	11.24%
36	5.19%	7.56%	2.57%	3.86%	7.76%	11.42%
37	5.27%	7.68%	2.62%	3.93%	7.89%	11.61%
38	5.36%	7.81%	2.67%	4.00%	8.03%	11.81%
39	5.45%	7.94%	2.71%	4.07%	8.16%	12.01%

SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association

**General Cost Group #1 Members' Contribution Rates (Expressed as a Percentage of Monthly Payroll)
For Members with Membership Dates before January 1, 2013**

Calculated Under Recommended Assumptions

Entry Age	Basic		COLA		Total	
	First \$350	Over \$350	First \$350	Over \$350	First \$350	Over \$350
40	5.53%	8.07%	2.76%	4.14%	8.29%	12.21%
41	5.63%	8.21%	2.81%	4.22%	8.44%	12.43%
42	5.72%	8.35%	2.86%	4.29%	8.58%	12.64%
43	5.81%	8.49%	2.91%	4.37%	8.72%	12.86%
44	5.91%	8.64%	2.97%	4.45%	8.88%	13.09%
45	6.02%	8.80%	3.03%	4.54%	9.05%	13.34%
46	6.11%	8.94%	3.07%	4.61%	9.18%	13.55%
47	6.21%	9.09%	3.13%	4.69%	9.34%	13.78%
48	6.31%	9.24%	3.19%	4.78%	9.50%	14.02%
49	6.42%	9.40%	3.24%	4.86%	9.66%	14.26%
50	6.53%	9.56%	3.30%	4.95%	9.83%	14.51%
51	6.63%	9.72%	3.36%	5.04%	9.99%	14.76%
52	6.75%	9.89%	3.42%	5.13%	10.17%	15.02%
53	6.85%	10.05%	3.48%	5.22%	10.33%	15.27%
54	6.93%	10.17%	3.52%	5.28%	10.45%	15.45%
55	7.03%	10.31%	3.57%	5.36%	10.60%	15.67%
56	7.08%	10.39%	3.60%	5.40%	10.68%	15.79%
57	7.07%	10.38%	3.60%	5.40%	10.67%	15.78%
58	7.01%	10.28%	3.56%	5.34%	10.57%	15.62%
59	6.83%	10.01%	3.46%	5.19%	10.29%	15.20%
60	6.83%	10.01%	3.46%	5.19%	10.29%	15.20%

Interest: 7.00%

Salary Increase: See Exhibit II.

Administrative Expense: 0.46% of payroll added to Basic rates

Leave Cashout: 1.25%

COLA Loading: 54.39% applied to Basic rates prior to adjustment for administrative expenses.

Mortality: Headcount-Weighted RP 2014 Healthy Annuitant Mortality Table, projected to 2034 with the two-dimensional MP-2015 projection scale, weighted 30% male and 70% female.

SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association

**General Cost Group #2 Members' Contribution Rates (Expressed as a Percentage of Monthly Payroll)
For Members with Membership Dates before January 1, 2013**

Calculated Under Recommended Assumptions

Entry Age	Basic		COLA		Total	
	First \$350	Over \$350	First \$350	Over \$350	First \$350	Over \$350
15	3.75%	5.39%	1.64%	2.46%	5.39%	7.85%
16	3.81%	5.48%	1.67%	2.50%	5.48%	7.98%
17	3.87%	5.57%	1.70%	2.55%	5.57%	8.12%
18	3.93%	5.66%	1.73%	2.59%	5.66%	8.25%
19	3.99%	5.75%	1.76%	2.64%	5.75%	8.39%
20	4.05%	5.84%	1.79%	2.68%	5.84%	8.52%
21	4.11%	5.93%	1.82%	2.73%	5.93%	8.66%
22	4.17%	6.03%	1.85%	2.78%	6.02%	8.81%
23	4.24%	6.13%	1.89%	2.83%	6.13%	8.96%
24	4.31%	6.23%	1.92%	2.88%	6.23%	9.11%
25	4.37%	6.33%	1.95%	2.93%	6.32%	9.26%
26	4.44%	6.43%	1.99%	2.98%	6.43%	9.41%
27	4.51%	6.53%	2.02%	3.03%	6.53%	9.56%
28	4.57%	6.63%	2.05%	3.08%	6.62%	9.71%
29	4.65%	6.74%	2.09%	3.13%	6.74%	9.87%
30	4.72%	6.85%	2.13%	3.19%	6.85%	10.04%
31	4.79%	6.96%	2.16%	3.24%	6.95%	10.20%
32	4.87%	7.07%	2.20%	3.30%	7.07%	10.37%
33	4.95%	7.19%	2.24%	3.36%	7.19%	10.55%
34	5.02%	7.30%	2.27%	3.41%	7.29%	10.71%
35	5.10%	7.42%	2.31%	3.47%	7.41%	10.89%
36	5.18%	7.54%	2.35%	3.53%	7.53%	11.07%
37	5.27%	7.67%	2.39%	3.59%	7.66%	11.26%
38	5.35%	7.79%	2.43%	3.65%	7.78%	11.44%
39	5.43%	7.92%	2.48%	3.72%	7.91%	11.64%
40	5.53%	8.06%	2.53%	3.79%	8.06%	11.85%
41	5.61%	8.19%	2.57%	3.85%	8.18%	12.04%
42	5.71%	8.33%	2.61%	3.92%	8.32%	12.25%
43	5.81%	8.48%	2.67%	4.00%	8.48%	12.48%

SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association

**General Cost Group #2 Members' Contribution Rates (Expressed as a Percentage of Monthly Payroll)
For Members with Membership Dates before January 1, 2013**

Calculated Under Recommended Assumptions

Entry Age	Basic		COLA		Total	
	First \$350	Over \$350	First \$350	Over \$350	First \$350	Over \$350
44	5.90%	8.62%	2.71%	4.07%	8.61%	12.69%
45	6.00%	8.77%	2.76%	4.14%	8.76%	12.91%
46	6.11%	8.93%	2.81%	4.22%	8.92%	13.15%
47	6.21%	9.08%	2.87%	4.30%	9.08%	13.38%
48	6.30%	9.22%	2.91%	4.37%	9.21%	13.59%
49	6.40%	9.37%	2.96%	4.44%	9.36%	13.81%
50	6.51%	9.53%	3.01%	4.52%	9.52%	14.05%
51	6.63%	9.71%	3.07%	4.61%	9.70%	14.32%
52	6.73%	9.87%	3.13%	4.69%	9.86%	14.56%
53	6.83%	10.02%	3.18%	4.77%	10.01%	14.79%
54	6.93%	10.17%	3.23%	4.84%	10.16%	15.01%
55	7.00%	10.27%	3.26%	4.89%	10.26%	15.16%
56	7.05%	10.34%	3.29%	4.93%	10.34%	15.27%
57	7.03%	10.31%	3.27%	4.91%	10.30%	15.22%
58	6.92%	10.15%	3.22%	4.83%	10.14%	14.98%
59	6.84%	10.03%	3.18%	4.77%	10.02%	14.80%
60	6.84%	10.03%	3.18%	4.77%	10.02%	14.80%

Interest: 7.00%
 Salary Increase: See Exhibit II.
 Administrative Expense: 0.46% of payroll added to Basic rates
 Leave Cashout: 0.50% for Tier 2 and 1.00% for Tier 3
 COLA Loading: 49.86% applied to Basic rates prior to adjustment for administrative expenses.
 Mortality: Headcount-Weighted RP 2014 Healthy Annuitant Mortality Table, projected to 2034 with the two-dimensional MP-2015 projection scale, weighted 30% male and 70% female.

SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association

**General Cost Group #3 Members' Contribution Rates (Expressed as a Percentage of Monthly Payroll)
For Members with Membership Dates before January 1, 2013**

Calculated Under Recommended Assumptions

Entry Age	Basic		COLA		Total	
	First \$350	Over \$350	First \$350	Over \$350	First \$350	Over \$350
15	3.89%	5.61%	1.91%	2.86%	5.80%	8.47%
16	3.95%	5.70%	1.94%	2.91%	5.89%	8.61%
17	4.01%	5.79%	1.97%	2.96%	5.98%	8.75%
18	4.08%	5.89%	2.01%	3.02%	6.09%	8.91%
19	4.14%	5.98%	2.05%	3.07%	6.19%	9.05%
20	4.21%	6.08%	2.08%	3.12%	6.29%	9.20%
21	4.27%	6.17%	2.11%	3.17%	6.38%	9.34%
22	4.33%	6.27%	2.15%	3.23%	6.48%	9.50%
23	4.41%	6.38%	2.19%	3.29%	6.60%	9.67%
24	4.47%	6.48%	2.23%	3.34%	6.70%	9.82%
25	4.54%	6.58%	2.27%	3.40%	6.81%	9.98%
26	4.61%	6.69%	2.31%	3.46%	6.92%	10.15%
27	4.69%	6.80%	2.35%	3.52%	7.04%	10.32%
28	4.75%	6.90%	2.39%	3.58%	7.14%	10.48%
29	4.83%	7.02%	2.43%	3.64%	7.26%	10.66%
30	4.91%	7.13%	2.47%	3.71%	7.38%	10.84%
31	4.98%	7.24%	2.51%	3.77%	7.49%	11.01%
32	5.06%	7.36%	2.55%	3.83%	7.61%	11.19%
33	5.14%	7.48%	2.60%	3.90%	7.74%	11.38%
34	5.22%	7.60%	2.65%	3.97%	7.87%	11.57%
35	5.30%	7.72%	2.69%	4.03%	7.99%	11.75%
36	5.39%	7.85%	2.74%	4.11%	8.13%	11.96%
37	5.47%	7.98%	2.79%	4.18%	8.26%	12.16%
38	5.56%	8.11%	2.83%	4.25%	8.39%	12.36%
39	5.65%	8.24%	2.88%	4.32%	8.53%	12.56%
40	5.74%	8.38%	2.93%	4.40%	8.67%	12.78%
41	5.83%	8.52%	2.99%	4.48%	8.82%	13.00%
42	5.93%	8.67%	3.04%	4.56%	8.97%	13.23%
43	6.03%	8.81%	3.09%	4.64%	9.12%	13.45%

SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association

**General Cost Group #3 Members' Contribution Rates (Expressed as a Percentage of Monthly Payroll)
For Members with Membership Dates before January 1, 2013**

Calculated Under Recommended Assumptions

Entry Age	Basic		COLA		Total	
	First \$350	Over \$350	First \$350	Over \$350	First \$350	Over \$350
44	6.13%	8.97%	3.15%	4.73%	9.28%	13.70%
45	6.23%	9.12%	3.21%	4.81%	9.44%	13.93%
46	6.33%	9.27%	3.26%	4.89%	9.59%	14.16%
47	6.44%	9.43%	3.32%	4.98%	9.76%	14.41%
48	6.55%	9.59%	3.38%	5.07%	9.93%	14.66%
49	6.64%	9.73%	3.43%	5.15%	10.07%	14.88%
50	6.75%	9.90%	3.49%	5.24%	10.24%	15.14%
51	6.86%	10.06%	3.55%	5.33%	10.41%	15.39%
52	6.97%	10.23%	3.62%	5.43%	10.59%	15.66%
53	7.08%	10.39%	3.68%	5.52%	10.76%	15.91%
54	7.17%	10.53%	3.73%	5.59%	10.90%	16.12%
55	7.23%	10.61%	3.76%	5.64%	10.99%	16.25%
56	7.27%	10.68%	3.79%	5.68%	11.06%	16.36%
57	7.25%	10.65%	3.77%	5.66%	11.02%	16.31%
58	7.13%	10.47%	3.71%	5.56%	10.84%	16.03%
59	6.76%	9.91%	3.50%	5.25%	10.26%	15.16%
60	6.76%	9.91%	3.50%	5.25%	10.26%	15.16%

Interest: 7.00%

Salary Increase: See Exhibit II.

Administrative Expense: 0.46% of payroll added to Basic rates

Leave Cashout: 5.50%

COLA Loading: 55.56% applied to Basic rates prior to adjustment for administrative expenses.

Mortality: Headcount-Weighted RP 2014 Healthy Annuitant Mortality Table, projected to 2034 with the two-dimensional MP-2015 projection scale, weighted 30% male and 70% female.

SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association

**General Cost Group #4 Members' Contribution Rates (Expressed as a Percentage of Monthly Payroll)
For Members with Membership Dates before January 1, 2013**

Calculated Under Recommended Assumptions

Entry Age	Basic		COLA		Total	
	First \$350	Over \$350	First \$350	Over \$350	First \$350	Over \$350
15	3.73%	5.37%	1.79%	2.69%	5.52%	8.06%
16	3.79%	5.45%	1.82%	2.73%	5.61%	8.18%
17	3.85%	5.54%	1.85%	2.78%	5.70%	8.32%
18	3.91%	5.63%	1.89%	2.83%	5.80%	8.46%
19	3.97%	5.72%	1.92%	2.88%	5.89%	8.60%
20	4.03%	5.81%	1.95%	2.93%	5.98%	8.74%
21	4.09%	5.91%	1.99%	2.98%	6.08%	8.89%
22	4.15%	6.00%	2.02%	3.03%	6.17%	9.03%
23	4.22%	6.10%	2.05%	3.08%	6.27%	9.18%
24	4.29%	6.20%	2.09%	3.14%	6.38%	9.34%
25	4.35%	6.30%	2.13%	3.19%	6.48%	9.49%
26	4.42%	6.40%	2.17%	3.25%	6.59%	9.65%
27	4.49%	6.50%	2.20%	3.30%	6.69%	9.80%
28	4.56%	6.61%	2.24%	3.36%	6.80%	9.97%
29	4.63%	6.71%	2.28%	3.42%	6.91%	10.13%
30	4.70%	6.82%	2.32%	3.48%	7.02%	10.30%
31	4.77%	6.93%	2.36%	3.54%	7.13%	10.47%
32	4.85%	7.04%	2.40%	3.60%	7.25%	10.64%
33	4.93%	7.16%	2.44%	3.66%	7.37%	10.82%
34	5.00%	7.27%	2.48%	3.72%	7.48%	10.99%
35	5.08%	7.39%	2.53%	3.79%	7.61%	11.18%
36	5.16%	7.51%	2.57%	3.86%	7.73%	11.37%
37	5.24%	7.63%	2.61%	3.92%	7.85%	11.55%
38	5.33%	7.76%	2.66%	3.99%	7.99%	11.75%
39	5.41%	7.89%	2.71%	4.06%	8.12%	11.95%
40	5.50%	8.02%	2.75%	4.13%	8.25%	12.15%
41	5.59%	8.15%	2.81%	4.21%	8.40%	12.36%
42	5.68%	8.29%	2.85%	4.28%	8.53%	12.57%
43	5.78%	8.44%	2.91%	4.36%	8.69%	12.80%

SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association

**General Cost Group #4 Members' Contribution Rates (Expressed as a Percentage of Monthly Payroll)
For Members with Membership Dates before January 1, 2013**

Calculated Under Recommended Assumptions

Entry Age	Basic		COLA		Total	
	First \$350	Over \$350	First \$350	Over \$350	First \$350	Over \$350
44	5.87%	8.58%	2.96%	4.44%	8.83%	13.02%
45	5.98%	8.74%	3.02%	4.53%	9.00%	13.27%
46	6.08%	8.89%	3.07%	4.61%	9.15%	13.50%
47	6.18%	9.04%	3.13%	4.69%	9.31%	13.73%
48	6.27%	9.18%	3.18%	4.77%	9.45%	13.95%
49	6.38%	9.34%	3.24%	4.86%	9.62%	14.20%
50	6.48%	9.49%	3.29%	4.94%	9.77%	14.43%
51	6.59%	9.66%	3.35%	5.03%	9.94%	14.69%
52	6.71%	9.83%	3.41%	5.12%	10.12%	14.95%
53	6.81%	9.98%	3.47%	5.21%	10.28%	15.19%
54	6.90%	10.12%	3.52%	5.28%	10.42%	15.40%
55	6.98%	10.24%	3.57%	5.35%	10.55%	15.59%
56	7.05%	10.35%	3.61%	5.41%	10.66%	15.76%
57	7.04%	10.33%	3.60%	5.40%	10.64%	15.73%
58	6.94%	10.18%	3.55%	5.32%	10.49%	15.50%
59	6.67%	9.78%	3.40%	5.10%	10.07%	14.88%
60	6.67%	9.78%	3.40%	5.10%	10.07%	14.88%

Interest: 7.00%

Salary Increase: See Exhibit II.

Administrative Expense: 0.46% of payroll added to Basic rates

Leave Cashout: 0.50%

COLA Loading: 54.69% applied to Basic rates prior to adjustment for administrative expenses.

Mortality: Headcount-Weighted RP 2014 Healthy Annuitant Mortality Table, projected to 2034 with the two-dimensional MP-2015 projection scale, weighted 30% male and 70% female.

SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association

**General Cost Group #5 Members' Contribution Rates (Expressed as a Percentage of Monthly Payroll)
For Members with Membership Dates before January 1, 2013**

Calculated Under Recommended Assumptions

Entry Age	Basic		COLA		Total	
	First \$350	Over \$350	First \$350	Over \$350	First \$350	Over \$350
15	3.75%	5.39%	1.76%	2.64%	5.51%	8.03%
16	3.81%	5.48%	1.79%	2.69%	5.60%	8.17%
17	3.87%	5.57%	1.83%	2.74%	5.70%	8.31%
18	3.93%	5.66%	1.86%	2.79%	5.79%	8.45%
19	3.99%	5.75%	1.89%	2.84%	5.88%	8.59%
20	4.05%	5.84%	1.92%	2.88%	5.97%	8.72%
21	4.11%	5.93%	1.95%	2.93%	6.06%	8.86%
22	4.17%	6.03%	1.99%	2.99%	6.16%	9.02%
23	4.24%	6.13%	2.03%	3.04%	6.27%	9.17%
24	4.31%	6.23%	2.06%	3.09%	6.37%	9.32%
25	4.37%	6.33%	2.10%	3.15%	6.47%	9.48%
26	4.44%	6.43%	2.13%	3.20%	6.57%	9.63%
27	4.51%	6.53%	2.17%	3.25%	6.68%	9.78%
28	4.57%	6.63%	2.21%	3.31%	6.78%	9.94%
29	4.65%	6.74%	2.25%	3.37%	6.90%	10.11%
30	4.72%	6.85%	2.29%	3.43%	7.01%	10.28%
31	4.79%	6.96%	2.33%	3.49%	7.12%	10.45%
32	4.87%	7.07%	2.36%	3.54%	7.23%	10.61%
33	4.95%	7.19%	2.41%	3.61%	7.36%	10.80%
34	5.02%	7.30%	2.45%	3.67%	7.47%	10.97%
35	5.10%	7.42%	2.49%	3.73%	7.59%	11.15%
36	5.18%	7.54%	2.53%	3.80%	7.71%	11.34%
37	5.27%	7.67%	2.58%	3.87%	7.85%	11.54%
38	5.35%	7.79%	2.62%	3.93%	7.97%	11.72%
39	5.43%	7.92%	2.67%	4.00%	8.10%	11.92%
40	5.53%	8.06%	2.72%	4.08%	8.25%	12.14%
41	5.61%	8.19%	2.76%	4.14%	8.37%	12.33%
42	5.71%	8.33%	2.81%	4.22%	8.52%	12.55%
43	5.81%	8.48%	2.87%	4.30%	8.68%	12.78%

SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association

**General Cost Group #5 Members' Contribution Rates (Expressed as a Percentage of Monthly Payroll)
For Members with Membership Dates before January 1, 2013**

Calculated Under Recommended Assumptions

Entry Age	Basic		COLA		Total	
	First \$350	Over \$350	First \$350	Over \$350	First \$350	Over \$350
44	5.90%	8.62%	2.92%	4.38%	8.82%	13.00%
45	6.00%	8.77%	2.97%	4.46%	8.97%	13.23%
46	6.11%	8.93%	3.03%	4.54%	9.14%	13.47%
47	6.21%	9.08%	3.08%	4.62%	9.29%	13.70%
48	6.30%	9.22%	3.13%	4.70%	9.43%	13.92%
49	6.40%	9.37%	3.19%	4.78%	9.59%	14.15%
50	6.51%	9.53%	3.24%	4.86%	9.75%	14.39%
51	6.63%	9.71%	3.31%	4.96%	9.94%	14.67%
52	6.73%	9.87%	3.37%	5.05%	10.10%	14.92%
53	6.83%	10.02%	3.42%	5.13%	10.25%	15.15%
54	6.93%	10.17%	3.47%	5.21%	10.40%	15.38%
55	7.00%	10.27%	3.51%	5.26%	10.51%	15.53%
56	7.05%	10.34%	3.53%	5.30%	10.58%	15.64%
57	7.03%	10.31%	3.52%	5.28%	10.55%	15.59%
58	6.92%	10.15%	3.47%	5.20%	10.39%	15.35%
59	6.84%	10.03%	3.42%	5.13%	10.26%	15.16%
60	6.84%	10.03%	3.42%	5.13%	10.26%	15.16%

Interest: 7.00%
 Salary Increase: See Exhibit II.
 Administrative Expense: 0.46% of payroll added to Basic rates
 Leave Cashout: 1.00%
 COLA Loading: 53.62% applied to Basic rates prior to adjustment for administrative expenses.
 Mortality: Headcount-Weighted RP 2014 Healthy Annuitant Mortality Table, projected to 2034 with the two-dimensional MP-2015 projection scale, weighted 30% male and 70% female.

SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association

**General Cost Group #6 Members' Contribution Rates (Expressed as a Percentage of Monthly Payroll)
For Members with Membership Dates before January 1, 2013**

Calculated Under Recommended Assumptions

Entry Age	Basic		COLA		Total	
	First \$350	Over \$350	First \$350	Over \$350	First \$350	Over \$350
15	4.23%	6.12%	1.71%	2.57%	5.94%	8.69%
16	4.30%	6.22%	1.74%	2.61%	6.04%	8.83%
17	4.37%	6.32%	1.77%	2.66%	6.14%	8.98%
18	4.43%	6.42%	1.80%	2.70%	6.23%	9.12%
19	4.51%	6.53%	1.83%	2.75%	6.34%	9.28%
20	4.57%	6.63%	1.87%	2.80%	6.44%	9.43%
21	4.65%	6.74%	1.90%	2.85%	6.55%	9.59%
22	4.72%	6.85%	1.93%	2.90%	6.65%	9.75%
23	4.79%	6.96%	1.97%	2.95%	6.76%	9.91%
24	4.87%	7.07%	2.00%	3.00%	6.87%	10.07%
25	4.95%	7.19%	2.03%	3.05%	6.98%	10.24%
26	5.02%	7.30%	2.07%	3.10%	7.09%	10.40%
27	5.10%	7.42%	2.10%	3.15%	7.20%	10.57%
28	5.18%	7.54%	2.14%	3.21%	7.32%	10.75%
29	5.26%	7.66%	2.17%	3.26%	7.43%	10.92%
30	5.35%	7.79%	2.21%	3.32%	7.56%	11.11%
31	5.43%	7.92%	2.25%	3.38%	7.68%	11.30%
32	5.52%	8.05%	2.29%	3.44%	7.81%	11.49%
33	5.61%	8.18%	2.33%	3.50%	7.94%	11.68%
34	5.69%	8.31%	2.37%	3.56%	8.06%	11.87%
35	5.79%	8.45%	2.41%	3.62%	8.20%	12.07%
36	5.89%	8.60%	2.46%	3.69%	8.35%	12.29%
37	5.98%	8.74%	2.50%	3.75%	8.48%	12.49%
38	6.08%	8.89%	2.55%	3.82%	8.63%	12.71%
39	6.19%	9.05%	2.59%	3.89%	8.78%	12.94%
40	6.30%	9.22%	2.65%	3.97%	8.95%	13.19%
41	6.40%	9.37%	2.69%	4.04%	9.09%	13.41%
42	6.51%	9.53%	2.74%	4.11%	9.25%	13.64%

SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association

**General Cost Group #6 Members' Contribution Rates (Expressed as a Percentage of Monthly Payroll)
For Members with Membership Dates before January 1, 2013**

Calculated Under Recommended Assumptions

Entry Age	Basic		COLA		Total	
	First \$350	Over \$350	First \$350	Over \$350	First \$350	Over \$350
43	6.61%	9.68%	2.79%	4.18%	9.40%	13.86%
44	6.72%	9.85%	2.84%	4.26%	9.56%	14.11%
45	6.83%	10.01%	2.89%	4.33%	9.72%	14.34%
46	6.94%	10.18%	2.94%	4.41%	9.88%	14.59%
47	7.07%	10.37%	2.99%	4.49%	10.06%	14.86%
48	7.17%	10.52%	3.04%	4.56%	10.21%	15.08%
49	7.27%	10.68%	3.09%	4.63%	10.36%	15.31%
50	7.37%	10.82%	3.13%	4.70%	10.50%	15.52%
51	7.41%	10.89%	3.15%	4.73%	10.56%	15.62%
52	7.39%	10.86%	3.14%	4.71%	10.53%	15.57%
53	7.29%	10.70%	3.09%	4.64%	10.38%	15.34%
54	7.00%	10.27%	2.97%	4.45%	9.97%	14.72%
55	7.00%	10.27%	2.97%	4.45%	9.97%	14.72%
56	7.00%	10.27%	2.97%	4.45%	9.97%	14.72%
57	7.00%	10.27%	2.97%	4.45%	9.97%	14.72%
58	7.00%	10.27%	2.97%	4.45%	9.97%	14.72%
59	7.00%	10.27%	2.97%	4.45%	9.97%	14.72%
60	7.00%	10.27%	2.97%	4.45%	9.97%	14.72%

Interest: 7.00%
 Salary Increase: See Exhibit II.
 Administrative Expense: 0.46% of payroll added to Basic rates
 Leave Cashout: 0.75%
 COLA Loading: 45.33% applied to Basic rates prior to adjustment for administrative expenses.
 Mortality: Headcount-Weighted RP 2014 Healthy Annuitant Mortality Table, projected to 2034 with the two-dimensional MP-2015 projection scale, weighted 30% male and 70% female.

SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association

**Safety Cost Group #7 Members' Contribution Rates (Expressed as a Percentage of Monthly Payroll)
For Members with Membership Dates before January 1, 2013**

Calculated Under Recommended Assumptions

Entry Age	Basic	COLA	Total
15	9.04%	6.41%	15.45%
16	9.04%	6.41%	15.45%
17	9.04%	6.41%	15.45%
18	9.04%	6.41%	15.45%
19	9.04%	6.41%	15.45%
20	9.04%	6.41%	15.45%
21	9.04%	6.41%	15.45%
22	9.18%	6.52%	15.70%
23	9.33%	6.63%	15.96%
24	9.49%	6.75%	16.24%
25	9.64%	6.86%	16.50%
26	9.80%	6.98%	16.78%
27	9.96%	7.10%	17.06%
28	10.13%	7.23%	17.36%
29	10.30%	7.35%	17.65%
30	10.47%	7.48%	17.95%
31	10.64%	7.61%	18.25%
32	10.83%	7.75%	18.58%
33	11.02%	7.89%	18.91%
34	11.21%	8.03%	19.24%
35	11.41%	8.18%	19.59%
36	11.61%	8.33%	19.94%
37	11.80%	8.47%	20.27%
38	12.00%	8.62%	20.62%
39	12.21%	8.78%	20.99%
40	12.43%	8.94%	21.37%
41	12.66%	9.12%	21.78%
42	12.89%	9.29%	22.18%
43	13.18%	9.50%	22.68%
44	13.41%	9.68%	23.09%

SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association

**Safety Cost Group #7 Members' Contribution Rates (Expressed as a Percentage of Monthly Payroll)
For Members with Membership Dates before January 1, 2013**

Calculated Under Recommended Assumptions

Entry Age	Basic	COLA	Total
45	13.61%	9.83%	23.44%
46	13.65%	9.86%	23.51%
47	13.59%	9.81%	23.40%
48	13.38%	9.65%	23.03%
49	13.00%	9.37%	22.37%
50	13.00%	9.37%	22.37%
51	13.00%	9.37%	22.37%
52	13.00%	9.37%	22.37%
53	13.00%	9.37%	22.37%
54	13.00%	9.37%	22.37%
55	13.00%	9.37%	22.37%
56	13.00%	9.37%	22.37%
57	13.00%	9.37%	22.37%
58	13.00%	9.37%	22.37%
59	13.00%	9.37%	22.37%
60	13.00%	9.37%	22.37%

Interest: 7.00%

Salary Increase: See Exhibit II.

Administrative Expense: 0.46% of payroll added to Basic rates

Leave Cashout: 1.00%

COLA Loading: 74.72% applied to Basic rates prior to adjustment for administrative expenses.

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

SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association

**Safety Cost Group #8 Members' Contribution Rates (Expressed as a Percentage of Monthly Payroll)
For Members with Membership Dates before January 1, 2013**

Calculated Under Recommended Assumptions

Entry Age	Basic	COLA	Total
15	9.02%	6.51%	15.53%
16	9.02%	6.51%	15.53%
17	9.02%	6.51%	15.53%
18	9.02%	6.51%	15.53%
19	9.02%	6.51%	15.53%
20	9.02%	6.51%	15.53%
21	9.02%	6.51%	15.53%
22	9.16%	6.61%	15.77%
23	9.31%	6.73%	16.04%
24	9.47%	6.85%	16.32%
25	9.62%	6.96%	16.58%
26	9.78%	7.09%	16.87%
27	9.94%	7.21%	17.15%
28	10.11%	7.34%	17.45%
29	10.27%	7.46%	17.73%
30	10.45%	7.59%	18.04%
31	10.63%	7.73%	18.36%
32	10.81%	7.87%	18.68%
33	10.99%	8.00%	18.99%
34	11.19%	8.16%	19.35%
35	11.38%	8.30%	19.68%
36	11.58%	8.45%	20.03%
37	11.78%	8.61%	20.39%
38	11.98%	8.76%	20.74%
39	12.19%	8.92%	21.11%
40	12.40%	9.08%	21.48%
41	12.62%	9.24%	21.86%
42	12.87%	9.43%	22.30%
43	13.15%	9.65%	22.80%
44	13.41%	9.84%	23.25%

SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association

**Safety Cost Group #8 Members' Contribution Rates (Expressed as a Percentage of Monthly Payroll)
For Members with Membership Dates before January 1, 2013**

Calculated Under Recommended Assumptions

Entry Age	Basic	COLA	Total
45	13.57%	9.97%	23.54%
46	13.60%	9.99%	23.59%
47	13.51%	9.92%	23.43%
48	13.40%	9.84%	23.24%
49	13.03%	9.56%	22.59%
50	13.03%	9.56%	22.59%
51	13.03%	9.56%	22.59%
52	13.03%	9.56%	22.59%
53	13.03%	9.56%	22.59%
54	13.03%	9.56%	22.59%
55	13.03%	9.56%	22.59%
56	13.03%	9.56%	22.59%
57	13.03%	9.56%	22.59%
58	13.03%	9.56%	22.59%
59	13.03%	9.56%	22.59%
60	13.03%	9.56%	22.59%

Interest: 7.00%

Salary Increase: See Exhibit II.

Administrative Expense: 0.46% of payroll added to Basic rates

Leave Cashout: 0.75%

COLA Loading: 76.02% applied to Basic rates prior to adjustment for administrative expenses.

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

SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association

**Safety Cost Group #9 Members' Contribution Rates (Expressed as a Percentage of Monthly Payroll)
For Members with Membership Dates before January 1, 2013**

Calculated Under Recommended Assumptions

Entry Age	Basic	COLA	Total
15	8.63%	3.92%	12.55%
16	8.63%	3.92%	12.55%
17	8.63%	3.92%	12.55%
18	8.63%	3.92%	12.55%
19	8.63%	3.92%	12.55%
20	8.63%	3.92%	12.55%
21	8.63%	3.92%	12.55%
22	8.77%	3.99%	12.76%
23	8.91%	4.06%	12.97%
24	9.06%	4.13%	13.19%
25	9.21%	4.20%	13.41%
26	9.36%	4.27%	13.63%
27	9.51%	4.35%	13.86%
28	9.67%	4.42%	14.09%
29	9.83%	4.50%	14.33%
30	10.00%	4.58%	14.58%
31	10.17%	4.66%	14.83%
32	10.34%	4.75%	15.09%
33	10.52%	4.83%	15.35%
34	10.70%	4.92%	15.62%
35	10.88%	5.00%	15.88%
36	11.06%	5.09%	16.15%
37	11.24%	5.18%	16.42%
38	11.44%	5.27%	16.71%
39	11.63%	5.36%	16.99%
40	11.82%	5.46%	17.28%
41	12.04%	5.56%	17.60%
42	12.26%	5.67%	17.93%
43	12.44%	5.75%	18.19%
44	12.52%	5.79%	18.31%

SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association

**Safety Cost Group #9 Members' Contribution Rates (Expressed as a Percentage of Monthly Payroll)
For Members with Membership Dates before January 1, 2013**

Calculated Under Recommended Assumptions

Entry Age	Basic	COLA	Total
45	12.50%	5.78%	18.28%
46	12.42%	5.74%	18.16%
47	12.16%	5.62%	17.78%
48	12.54%	5.80%	18.34%
49	13.13%	6.09%	19.22%
50	13.13%	6.09%	19.22%
51	13.13%	6.09%	19.22%
52	13.13%	6.09%	19.22%
53	13.13%	6.09%	19.22%
54	13.13%	6.09%	19.22%
55	13.13%	6.09%	19.22%
56	13.13%	6.09%	19.22%
57	13.13%	6.09%	19.22%
58	13.13%	6.09%	19.22%
59	13.13%	6.09%	19.22%
60	13.13%	6.09%	19.22%

Interest: 7.00%
 Salary Increase: See Exhibit II.
 Administrative Expense: 0.46% of payroll added to Basic rates
 Leave Cashout: 0.00%
 COLA Loading: 48.03% applied to Basic rates prior to adjustment for administrative expenses.
 Mortality: Headcount-Weighted RP 2014 Healthy Annuitant Mortality Table set back three years, projected to 2034 with the two-dimensional MP-2015 projection scale, weighted 85% male and 15% female.

SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association

**Safety Cost Group #10 Members' Contribution Rates (Expressed as a Percentage of Monthly Payroll)
For Members with Membership Dates before January 1, 2013**

Calculated Under Recommended Assumptions

Entry Age	Basic	COLA	Total
15	9.04%	6.31%	15.35%
16	9.04%	6.31%	15.35%
17	9.04%	6.31%	15.35%
18	9.04%	6.31%	15.35%
19	9.04%	6.31%	15.35%
20	9.04%	6.31%	15.35%
21	9.04%	6.31%	15.35%
22	9.18%	6.41%	15.59%
23	9.33%	6.52%	15.85%
24	9.49%	6.64%	16.13%
25	9.64%	6.75%	16.39%
26	9.80%	6.87%	16.67%
27	9.96%	6.98%	16.94%
28	10.13%	7.11%	17.24%
29	10.30%	7.23%	17.53%
30	10.47%	7.36%	17.83%
31	10.64%	7.48%	18.12%
32	10.83%	7.62%	18.45%
33	11.02%	7.76%	18.78%
34	11.21%	7.90%	19.11%
35	11.41%	8.05%	19.46%
36	11.61%	8.20%	19.81%
37	11.80%	8.34%	20.14%
38	12.00%	8.48%	20.48%
39	12.21%	8.64%	20.85%
40	12.43%	8.80%	21.23%
41	12.66%	8.97%	21.63%
42	12.89%	9.14%	22.03%
43	13.18%	9.35%	22.53%
44	13.41%	9.52%	22.93%

SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association

**Safety Cost Group #10 Members' Contribution Rates (Expressed as a Percentage of Monthly Payroll)
For Members with Membership Dates before January 1, 2013**

Calculated Under Recommended Assumptions

Entry Age	Basic	COLA	Total
45	13.61%	9.67%	23.28%
46	13.65%	9.70%	23.35%
47	13.59%	9.65%	23.24%
48	13.38%	9.50%	22.88%
49	13.00%	9.22%	22.22%
50	13.00%	9.22%	22.22%
51	13.00%	9.22%	22.22%
52	13.00%	9.22%	22.22%
53	13.00%	9.22%	22.22%
54	13.00%	9.22%	22.22%
55	13.00%	9.22%	22.22%
56	13.00%	9.22%	22.22%
57	13.00%	9.22%	22.22%
58	13.00%	9.22%	22.22%
59	13.00%	9.22%	22.22%
60	13.00%	9.22%	22.22%

Interest: 7.00%

Salary Increase: See Exhibit II.

Administrative Expense: 0.46% of payroll added to Basic rates

Leave Cashout: 1.00%

COLA Loading: 73.51% applied to Basic rates prior to adjustment for administrative expenses.

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

SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association

**Safety Cost Group #11 Members' Contribution Rates (Expressed as a Percentage of Monthly Payroll)
For Members with Membership Dates before January 1, 2013**

Calculated Under Recommended Assumptions

Entry Age	Basic	COLA	Total
15	9.16%	6.79%	15.95%
16	9.16%	6.79%	15.95%
17	9.16%	6.79%	15.95%
18	9.16%	6.79%	15.95%
19	9.16%	6.79%	15.95%
20	9.16%	6.79%	15.95%
21	9.16%	6.79%	15.95%
22	9.31%	6.91%	16.22%
23	9.46%	7.02%	16.48%
24	9.62%	7.15%	16.77%
25	9.77%	7.27%	17.04%
26	9.93%	7.39%	17.32%
27	10.10%	7.52%	17.62%
28	10.27%	7.66%	17.93%
29	10.44%	7.79%	18.23%
30	10.61%	7.92%	18.53%
31	10.79%	8.06%	18.85%
32	10.98%	8.21%	19.19%
33	11.16%	8.35%	19.51%
34	11.36%	8.51%	19.87%
35	11.56%	8.66%	20.22%
36	11.76%	8.82%	20.58%
37	11.96%	8.97%	20.93%
38	12.16%	9.13%	21.29%
39	12.37%	9.29%	21.66%
40	12.58%	9.46%	22.04%
41	12.82%	9.65%	22.47%
42	13.06%	9.83%	22.89%
43	13.33%	10.04%	23.37%
44	13.59%	10.25%	23.84%

SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association

**Safety Cost Group #11 Members' Contribution Rates (Expressed as a Percentage of Monthly Payroll)
For Members with Membership Dates before January 1, 2013**

Calculated Under Recommended Assumptions

Entry Age	Basic	COLA	Total
45	13.75%	10.37%	24.12%
46	13.79%	10.40%	24.19%
47	13.70%	10.33%	24.03%
48	13.43%	10.12%	23.55%
49	12.82%	9.65%	22.47%
50	12.82%	9.65%	22.47%
51	12.82%	9.65%	22.47%
52	12.82%	9.65%	22.47%
53	12.82%	9.65%	22.47%
54	12.82%	9.65%	22.47%
55	12.82%	9.65%	22.47%
56	12.82%	9.65%	22.47%
57	12.82%	9.65%	22.47%
58	12.82%	9.65%	22.47%
59	12.82%	9.65%	22.47%
60	12.82%	9.65%	22.47%

Interest: 7.00%

Salary Increase: See Exhibit II.

Administrative Expense: 0.46% of payroll added to Basic rates

Leave Cashout: 2.50%

COLA Loading: 78.04% applied to Basic rates prior to adjustment for administrative expenses.

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

SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association

**Safety Cost Group #12 Members' Contribution Rates (Expressed as a Percentage of Monthly Payroll)
For Members with Membership Dates before January 1, 2013**

Calculated Under Recommended Assumptions

Entry Age	Basic	COLA	Total
15	9.16%	4.74%	13.90%
16	9.16%	4.74%	13.90%
17	9.16%	4.74%	13.90%
18	9.16%	4.74%	13.90%
19	9.16%	4.74%	13.90%
20	9.16%	4.74%	13.90%
21	9.16%	4.74%	13.90%
22	9.31%	4.82%	14.13%
23	9.46%	4.90%	14.36%
24	9.62%	4.99%	14.61%
25	9.77%	5.07%	14.84%
26	9.93%	5.16%	15.09%
27	10.10%	5.25%	15.35%
28	10.27%	5.34%	15.61%
29	10.44%	5.43%	15.87%
30	10.61%	5.53%	16.14%
31	10.79%	5.62%	16.41%
32	10.98%	5.73%	16.71%
33	11.16%	5.83%	16.99%
34	11.36%	5.93%	17.29%
35	11.56%	6.04%	17.60%
36	11.76%	6.15%	17.91%
37	11.96%	6.26%	18.22%
38	12.16%	6.37%	18.53%
39	12.37%	6.48%	18.85%
40	12.58%	6.60%	19.18%
41	12.82%	6.73%	19.55%
42	13.06%	6.86%	19.92%
43	13.33%	7.01%	20.34%
44	13.59%	7.15%	20.74%

SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association

**Safety Cost Group #12 Members' Contribution Rates (Expressed as a Percentage of Monthly Payroll)
For Members with Membership Dates before January 1, 2013**

Calculated Under Recommended Assumptions

Entry Age	Basic	COLA	Total
45	13.75%	7.24%	20.99%
46	13.79%	7.26%	21.05%
47	13.70%	7.21%	20.91%
48	13.43%	7.06%	20.49%
49	12.82%	6.73%	19.55%
50	12.82%	6.73%	19.55%
51	12.82%	6.73%	19.55%
52	12.82%	6.73%	19.55%
53	12.82%	6.73%	19.55%
54	12.82%	6.73%	19.55%
55	12.82%	6.73%	19.55%
56	12.82%	6.73%	19.55%
57	12.82%	6.73%	19.55%
58	12.82%	6.73%	19.55%
59	12.82%	6.73%	19.55%
60	12.82%	6.73%	19.55%

Interest: 7.00%

Salary Increase: See Exhibit II.

Administrative Expense: 0.46% of payroll added to Basic rates

Leave Cashout: 2.50%

COLA Loading: 54.44% applied to Basic rates prior to adjustment for administrative expenses.

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

SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association

Appendix B

Member Contribution Rates for Members with Membership Dates on or after January 1, 2013

**General Members' Contribution Rates for Members with Membership Dates on or after January 1, 2013
(Expressed as a Percentage of Monthly Payroll)**

Calculated Under Recommended Assumptions

	Basic	COLA	Total
Cost Group #1 – PEPRA Tier 4 (2% COLA)	8.83%	2.04%	10.87%
Cost Group #1 – PEPRA Tier 4 (3% COLA)	8.67%	2.94%	11.61%
Cost Group #2 - PEPRA Tier 5 (2% COLA)	8.25%	1.89%	10.14%
Cost Group #2 - PEPRA Tier 5 (3%/4% COLA)	8.39%	2.78%	11.17%
Cost Group #3 - PEPRA Tier 4 (3% COLA)	8.32%	2.88%	11.20%
Cost Group #4 - PEPRA Tier 4 (3% COLA)	9.21%	3.13%	12.34%
Cost Group #5 - PEPRA Tier 4 (2% COLA)	9.25%	2.15%	11.40%
Cost Group #5 - PEPRA Tier 4 (3% COLA)	11.24%	3.86%	15.10%
Cost Group #6 - PEPRA Tier 4 (3% COLA)	11.96%	3.85%	15.81%

The PEPRA member contribution rates are 50% of the Normal Cost rate. The Basic rates shown above also include an administrative expense load of 0.46% of payroll.

Note: It is our understanding that in the determination of pension benefits under the PEPRA formulas, the compensation that can be taken into account for 2017 is equal to the Social Security Taxable Wage Base or \$118,775. (For an employer that is not enrolled in Social Security, the maximum amount is \$142,530 or 120% of the Social Security Taxable Wage Base). (reference: Section 7522.10). These amounts should be adjusted for changes to the Consumer Price Index for All Urban Consumers after 2017. (reference: Section 7522.10(d))

SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association

**Safety Members' Contribution Rates for Members with Membership Dates on or after January 1, 2013
(Expressed as a Percentage of Monthly Payroll)**

Calculated Under Recommended Assumptions

	Basic	COLA	Total
Cost Group #7 - PEPRA Tier D	15.04%	6.19%	21.23%
Cost Group #8 - PEPRA Tier D	13.67%	5.77%	19.44%
Cost Group #8 - PEPRA Tier E	13.01%	3.67%	16.68%
Cost Group #9 - PEPRA Tier E	13.72%	3.81%	17.53%
Cost Group #10 - PEPRA Tier D	13.29%	5.63%	18.92%
Cost Group #11 - PEPRA Tier D	13.28%	5.64%	18.92%
Cost Group #12 - PEPRA Tier D	11.92%	5.07%	16.99%

The PEPRA member contribution rates are 50% of the Normal Cost rate. The Basic rates shown above also include an administrative expense load of 0.46% of payroll.

Note: It is our understanding that in the determination of pension benefits under the PEPRA formulas, the compensation that can be taken into account for 2017 is equal to the Social Security Taxable Wage Base or \$118,775. (For an employer that is not enrolled in Social Security, the maximum amount is \$142,530 or 120% of the Social Security Taxable Wage Base). (reference: Section 7522.10). These amounts should be adjusted for changes to the Consumer Price Index for All Urban Consumers after 2017. (reference: Section 7522.10(d))

SECTION 4: Reporting Information for the Contra Costa County Employees' Retirement Association

Appendix C

Refundability Factors

	December 31, 2016		December 31, 2015	
	Legacy Tiers	PEPRA Tiers	Legacy Tiers	PEPRA Tiers
General				
Cost Group #1 – County and Small Districts (Tier 1)	0.9599		0.9598	
PEPRA Tier 4 (2% COLA)		0.9605		0.9599
PEPRA Tier 4 (3% COLA)		0.9625		0.9594
Cost Group #2 – County and Small Districts (Tier 3)	0.9576		0.9570	
PEPRA Tier 5 (2% COLA)		0.9621		0.9623
PEPRA Tier 5 (3%/4% COLA)		0.9630		0.9642
Cost Group #3 – Central Contra Costa Sanitary District	0.9588	0.9661	0.9580	0.9640
Cost Group #4 – Contra Costa Housing Authority	0.9563	0.9667	0.9562	0.9680
Cost Group #5 – Contra Costa County Fire Protection District	0.9590		0.9586	
PEPRA Tier 4 (2% COLA)		0.9635		0.9643
PEPRA Tier 4 (3% COLA)		0.9637		0.9657
Cost Group #6 – Small Districts (Non-Enhanced Tier 1 and 4)	0.9535	0.9511	0.9509	0.9672
Safety				
Cost Group #7 – County (Tier A and D)	0.9657	0.9755	0.9654	0.9739
Cost Group #8 – Contra Costa and East Fire Protection Districts	0.9665		0.9668	
PEPRA Tier D (3% COLA)		0.9779		0.9768
PEPRA Tier E (2% COLA)		0.9757		0.9693
Cost Group #9 – County (Tier C and E)	0.9668	0.9747	0.9670	0.9748
Cost Group #10 – Moraga-Orinda Fire District	0.9693	0.9786	0.9680	0.9783
Cost Group #11 – San Ramon Valley Fire District	0.9670	0.9784	0.9676	0.9784
Cost Group #12 – Rodeo-Hercules Fire Protection District	0.9718	0.9807	0.9679	0.9806

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Meeting Date
08/09/17
Agenda Item
#10a.



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Torchlight Investment Summit

The poster features the Torchlight Investors logo at the top left. The main title "Debt, Income and Real Estate Opportunities" is centered in a large, white, sans-serif font. Below the title, it says "Torchlight Investors Annual Investment Summit". The date "October 3-4, 2017" is listed, along with the location "Grand Hyatt Hotel, 400 Lexington Ave, New York, NY 10174". A paragraph of text states: "Torchlight Investors is delighted to host Pulitzer Prize-winning political columnist George Will during its 2017 Annual Investment Summit." Another paragraph says: "Torchlight is also pleased to welcome Bloomberg Markets analyst Scarlet Fu, Bloomberg News bureau chief Jason Kelly, and Bloomberg Fixed Income specialist Tim Chen to its 2017 Summit reception." At the bottom, there is a registration link "rsvp | rsvp@torchlightinvestors.com", a phone number "1-888-281-2772", and "Event information".

Agenda

Keynote Speaker

Register

Accommodation

2017 Annual Investment Summit Agenda

October 3

- 5pm:** Reception at Le Cirque's Stella Room
151 East 58th Street, New York, NY, 10022
- 5:15pm-6pm:** Tours of the Bloomberg News Headquarters
- 6:15pm:** Bloomberg Markets anchor Scarlet Fu, Bloomberg News New York bureau chief Jason Kelly and fixed income specialist Ting Chen talk about the news and financial organization's vision and where the industry is heading in the next decade
- 7pm:** Dinner at Le Cirque
- 9pm:** Networking and Post-Dinner Drinks

October 4

Annual Investment Summit
Andaz Hotel, 485 5th Avenue
(at 41st Street and 5th Avenue)

- 8am:** Breakfast and Registration
- 9am:** Debt, Income and Real Estate Opportunities
Dan Heflin, Partner, Chief Executive Officer and Co-Chief Investment Officer, Torchlight Investors
- 9:45am:** Torchlight Strategies
Marc Young, Partner, Co-Chief Investment Officer, Torchlight Investors
Luca Montalti, Partner, Asset Management, Torchlight Investors
- 10:45am:** Keynote Conversation
Pulitzer Prize-winning political columnist George Will talks with Dan Heflin about politics, economics and the U.S' new role on the global stage
- 11:45am:** Lunch
- 2pm:** A New Beginning? State of the CRE Markets in 2017 and 2018
Industry panel discussion
- 3pm:** Closing Remarks
Dan Heflin, Partner, Chief Executive Officer and Co-Chief Investment Officer, Torchlight Investors

2017 Annual Investment Summit

Accommodation

Venue

Andaz 5th Avenue Hotel

485 5th Avenue, New York, NY 10017
at 41st Street and 5th Avenue

A room block is available at a conference rate.

To reserve a room, please contact Jennifer Yuen
+1-212-883-2773 or jyuen@torchlightinvestors.com

Nearby Hotels

Bryant Park Hotel

40 West 40th Street
(between 5th and 6th Avenues)
+1-212-869-0100
<http://bryantparkhotel.com>

Dylan Hotel

52 East 41st Street
(between Park and Madison Avenues)
+1-212-338-0500
<http://www.dylanhotel.com/>

The Library Hotel

299 Madison Avenue (on 41st Street)
+1-212-983-4500
<http://www.libraryhotel.com/>

Courtyard Marriott New York Manhattan

3 East 40th Street (on 5th Avenue)
+1-212-477-1500
<http://www.marriott.com>

Grand Hyatt New York

109 East 42nd Street (at Grand Central Terminal)
+1-212-833-1234
<http://grandnewyork.hyatt.com>


Meeting Date
08/09/17
Agenda Item
#10b.

COMPLETE PROGRAM AGENDA

63rd Annual Employee Benefits Conference

October 22-25, 2017 | Preconference: October 21-22, 2017
Mandalay Bay Convention Center | Las Vegas, Nevada



 #IFAnnual | @IFAnnual

63rd Annual

October 22-25, 2017 | Mandalay Bay Convention Center | Las Vegas, Nevada

Employee Benefits Conference

In a year when significant changes to our health care system and retirement structures are on the horizon, the 63rd Annual Employee Benefits Conference is here to help you navigate your plans through what may lie ahead.

Your chosen source for education, the Annual Conference offers not only more than 100 educational sessions but also a variety of preconference programs and workshops designed to enrich your learning and provide greater detail on specific knowledge areas that will help you sustain your funds. Take advantage of this comprehensive learning opportunity by registering today!

At the Annual Conference, you will:

- Learn how the actions of the new administration will impact your benefit plans
- Discover new insights to enhance your pension strategy
- Learn about potential changes to the Affordable Care Act
- Secure exclusive insights from experts who are on the forefront of what is happening in the industry now!
- Identify risks that could impact the long-term security of your plans and plan participants
- Engage with speakers and have your specific questions answered.

The Annual Conference provides the best, most current and most applicable information on benefits and pensions in the country.

Christine Burke
MEA Benefits Trust

Exclusive Networking

Only at the Annual Conference will you have opportunity to network with nearly 5,000 peers representing funds from across the country, including:

- Multiemployer fund trustees, administrators, business managers and association leaders
- Public sector plan trustees and staff
- Fund administrators and managers
- Third-party administrators (TPA)
- Benefit consultants
- Attorneys/accountants/actuaries
- Investment managers and consultants
- Others who are involved in the overall management of benefit trust funds.

For more information visit
www.ifebp.org/usannual.

Join the Conversation



/IFAnnual

#IFAnnual

@IFAnnual

Conference Schedule

Friday, October 20

Registration 12:00 noon-5:00 p.m.
(Registration opens for the 64th Annual Employee Benefits Conference in New Orleans, Louisiana.)

Saturday, October 21

Registration 7:00 a.m.-5:00 p.m.
 Preconference Programs 8:00 a.m.-5:00 p.m.

Sunday, October 22

Registration 7:00 a.m.-5:00 p.m.
 Preconference Programs 8:00 a.m.-4:00 p.m.
 Exhibit Hall* 12:00 noon-4:30 p.m.
 Opening Session* 4:30-6:00 p.m.
 Welcome Reception* (in Exhibit Hall) . . . 6:00-7:00 p.m.

Monday, October 23

Registration 6:30 a.m.-4:30 p.m.
 Keynote Session 7:30-8:45 a.m.
 Breakout Sessions 9:15 a.m.-4:15 p.m.
 Exhibit Hall 10:30 a.m.-2:30 p.m.
 Lunch (in Exhibit Hall) 11:45 a.m.-1:15 p.m.

Tuesday, October 24

Registration 6:30 a.m.-4:15 p.m.
 Breakout Sessions 7:30 a.m.-4:00 p.m.
 Exhibit Hall 10:30 a.m.-2:30 p.m.
 Lunch (in Exhibit Hall) 11:45 a.m.-1:15 p.m.

Wednesday, October 25

Registration 6:30 a.m.-12:00 noon
 Breakout Sessions 7:30-10:15 a.m.
 Finale Session* 10:30-11:45 a.m.

**Guests are welcome to attend.*

The Venue

All conference sessions and activities will take place at the Mandalay Bay Convention Center in the heart of the Las Vegas Strip. Featuring thousands of well-appointed guest rooms, more than 20 restaurants, numerous pools and entertainment options, Mandalay Bay offers a little something for everyone. Looking to explore more of Las Vegas at the end of each conference day? Hundreds of sights and attractions are located a short walking distance or cab ride away.



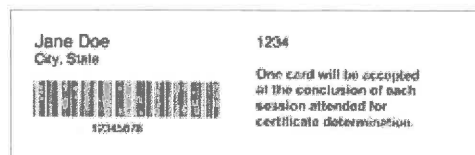
Earning a Certificate of Attendance

A certificate of attendance will be issued to registrants whose attendance can be verified at 11 or more time frames beginning with the opening keynote session on Sunday and ending with the finale keynote session on Wednesday.



Verifying Attendance

Attendance cards will be provided in your registration packet on site. To verify your attendance, submit one (1) attendance card at the conclusion of each session. Attendance cards will not be accepted at any other location, and only one (1) card will be accepted and credited for each time period.



Conference Schedule: Sunday/Monday

Administration

Fiduciary
Responsibility

General Topics

Health and
Welfare

Investments

Pensions

SUNDAY, OCTOBER 22

4:30-6:00 p.m.

OPENING SESSION: Crossing the Generational Divide

MONDAY, OCTOBER 23

7:30-8:45 a.m.

KEYNOTE SESSION: The Hacker's Blacklist: Top Cyber Threats and Countermeasures

9:15-10:30 a.m.

A01-AC1
An Administrator's
Compliance Checklist

F01
Fiduciary Responsibility
Refresher

G04-1
Audits That Can Save
Your Plan Money

H01
FEATURED SESSION—The
Future of Health Care in America

I01
FEATURED SESSION—A
Global Economic Outlook

P01-1
Managing Pension Risk
and Plan Maturity

P04-1
Understanding the
Actuary's Math

P11-1
DC Plan/Annuity Fund
Trends and Challenges

H13-1
Alternatives to Traditional
Health Care Delivery

H20-1
Nuts and Bolts of Merging
Health Funds

H21
Aligning Benefit Design and
Incentives (Value-Based Benefit
Design)

10:45 a.m.-
12:00 noon

A02
Administration in the
Small Fund Office

F02-1
Legal and Regulatory
Update

G06-1
Approaches to Effective
Collection Practices

H02-1
Health Care Reform—
The Details

I08-1
Fundamentals of
Private Equity

P06-1
Pension Funding
Refresher—Valuation
Basics

A04
The Future of
Administrative
Technology

F09-1
Understanding Your
Defined Contribution
Plan Fees

G07-1
Employee Benefit Plan
Financial Statements—
From A to Z

H04-1
Mental Health Issues and
Dealing With the Opioid Crisis

I10-1
Concepts in Advanced
Asset Allocation

P10-1
Alternative Plan Designs
in the Multiemployer
Community—The Risk
Spectrum

G12-1
Working Effectively
With Your A-Team

H15-1
Health Care Price and Quality
Transparency

I14
So You Think You Know
Investments—An
Investment Terminology
Game

P12-1
Refresher on Withdrawal
Liability

H17
How to Assess the Financial
Status of Your Health Fund

P15-1
How Do Actuaries Set
Assumptions?

11:45 a.m.-1:15 p.m.—Lunch

1:30-2:45 p.m.

A03
Best Practices in
Internal Claims
Appeals

F05-1
Hidden Fiduciary Risks
in Your Investment
Program

G09-1
Surviving a DOL
Investigation (Beginning
to End)

H03-1
Bargaining in an Uncertain
Health Care Environment

I04-1
Alternatives Now and in
the Future

P02-1
PBGC Solvency and
Solutions

F06-1
Dealing With Conflicting
Loyalties—Which Hat
Are You Wearing?

G10-1
Best Practices in
Processing Requests
for Proposals (RFPs) or
Requests for Information
(RFIs)

H05-1
WORKSHOP—Followup to
Mental Health and Opioid Issues

I05-1
Fixed Income Investing—
Past, Present and Future

P07-1
Suspension of Benefits
Under Multiemployer
Pension Reform Act
(MPRA)

H09-1
A Closer Look at Your PBM
Contract

I09-1
Components of Asset
Allocation

P13-1
Advanced Withdrawal
Liability (Selection of
Methods)

H16
Communicating Your Health Plan
Value to Participants

I13-1
Real Estate—Revisited

H24-1
High-Touch Case Management
and Wearables

3:00-4:15 p.m.

A05-AC2
Hot Topics in
Health and Welfare
Administration

F03-1
Trustee Ethics

G05-1
Understanding Your
Cyber-Risk

H07-1
Detecting Fraud and Abuse in
Benefit Claims and Delivery

I03-1
Investment Best Practices

P08-1
Mergers, Spin-Offs and
Partitions in a PPA and
MPRA Environment

F04-1
Trustee Expenses—
In Depth

G08-1
Best Practices in Payroll
Audits and Why They
Are Important

H10-1
Ways to Control Your
Prescription Drug Costs

I06-1
Advanced Concepts in
Fixed Income Investing

P09-1
Funding Policies for
Multiemployer Plans

G13-1
Stop Leaving Money on
the Table

H18
WORKSHOP—The Role of
Coalitions Today

I16-1
Active vs. Passive
Investing

P14-1
Advanced Withdrawal
Liability (Selection of
Assumptions)

H22-1
Member Choice Design
in Health Plans

I18-1
Investment Strategy
Debates

H25-1
Emerging Trends in Health Care

Conference Schedule: Sunday/Monday

Public Plans	Retirement Security/Financial Education	Apprenticeship, Training and Education	Fund Professionals—Accountants	Fund Advisors—Attorneys	Open Forums	TMP/AMP/ New Trustees Institute—Level I
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SUNDAY, OCTOBER 22

OPENING SESSION: Crossing the Generational Divide

MONDAY, OCTOBER 23

KEYNOTE SESSION: The Hacker's Blacklist: Top Cyber Threats and Countermeasures

PE2 Overview of Public Pension Plan Developments	R03-1 Retirement Readiness—Considerations Before Retirement	T07 Professional Development of Instructors	P-ACCT3 Compliance Reporting	P-ATTY3 Advanced Withdrawal Liability for Attorneys	A01-AC1 An Administrator's Compliance Checklist NT05 Governance (9:15 a.m.-12:15 p.m.)
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		T02 Grant Availability and How to Obtain Them	P-ACCT4 Accountant Professional Development	P-ATTY1 Ethical Issues for Employee Benefit Attorneys	
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11:45 a.m.-1:15 p.m.—Lunch

PE1 Legislative and Regulatory Update			P-ACCT2 Accounting and Auditing Update	P-ATTY2 Negotiating Cybersecurity Contracts	TC1 TMP Candidate Class: Governance—Part I
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		T01 Regulatory and Legislative Update		P-ATTY5 MPRA Applications: Lessons From the Trenches	A05-AC2 Hot Topics in Health and Welfare Administration TC2 TMP Candidate Class: Governance—Part II
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Conference Schedule: Tuesday

	Administration	Fiduciary Responsibility	General Topics	Health and Welfare	Investments	Pensions
TUESDAY, OCTOBER 24						
7:30-8:45 a.m.	A06 Tried and True Employment Practices in the Fund Office	F02-2 Legal and Regulatory Update F10-1 Trust Funds as Employers	G01 FEATURED SESSION—Employee Benefits in the New Administration G03-1 Alleviating Fraud in Your Plans G07-2 Employee Benefit Plan Financial Statements—From A to Z	H02-2 Health Care Reform—The Details H04-2 Mental Health Issues and Dealing With the Opioid Crisis H12-1 Are You Prepared for a HIPAA Audit? H19-1 How New Drugs Come to Market	I09-2 Components of Asset Allocation I10-2 Concepts in Advanced Asset Allocation I15-1 Investments in Participant-Directed Defined Contribution Plans I18-2 Investment Strategy Debates	P04-2 Understanding the Actuary's Math P05-1 Pension Valuation Forecasts P10-2 Alternative Plan Designs in the Multiemployer Community—The Risk Spectrum P11-2 DC Plan/Annuity Fund Trends and Challenges
9:00-10:15 a.m.		F04-2 Trustee Expenses—In Depth F08-1 Best Practices in Defined Contribution Plans	G08-2 Best Practices in Payroll Audits and Why They Are Important G13-TG1 Stop Leaving Money on the Table G14-1 The Rise of Mobile Devices	H05-2 WORKSHOP—Followup to Mental Health and Opioid Issues H15-2 Health Care Price and Quality Transparency H23-1 Health Reimbursement Accounts—Revisited H24-2 High-Touch Case Management and Wearables	I03-2 Investment Best Practices I05-2 Fixed Income Investing—Past, Present and Future I11-1 Emerging Markets and Frontier Markets—Shifting Sands?	P01-2 Managing Pension Risk and Plan Maturity P06-2 Pension Funding Refresher—Valuation Basics P15-2 How Do Actuaries Set Assumptions?
10:30-11:45 a.m.	A07 Data Privacy and Security—Be Prepared	F07-1 What Does a Good Custodian Do for Your Fund? F09-2 Understanding Your Defined Contribution Plan Fees	G05-2 Understanding Your Cyber-Risk G11-1 Managing the Fund Office Real Estate	H07-2 Detecting Fraud and Abuse in Benefit Claims and Delivery H08 A Cost/Benefit Look at Wellness Programs H09-2 A Closer Look at Your PBM Contract H11-1 Specialty Drug Management—Is It Possible? H20-2 Nuts and Bolts of Merging Health Funds	I04-2 Alternatives Now and in the Future I08-2 Fundamentals of Private Equity I17-1 Questions to Ask Your Investment Professional	P07-2 Suspension of Benefits Under Multiemployer Pension Reform Act (MPRA) P08-2 Mergers, Spin-Offs and Partitions in a PPA and MPRA Environment P12-2 Refresher on Withdrawal Liability P16-1 Confronting Insolvency
11:45 a.m.-1:15 p.m.—Lunch						
1:15-2:30 p.m.	A08 Building an Effective Online Strategy	F05-2 Hidden Fiduciary Risks in Your Investment Program F06-2 Dealing With Conflicting Loyalties—Which Hat Are You Wearing? F11-1 Best Practices in Trustee Governance	G10-2 Best Practices in Processing Requests for Proposals (RFPs) or Requests for Information (RFIs) G12-2 Working Effectively With Your A-Team	H03-2 Bargaining in an Uncertain Health Care Environment H10-2 Ways to Control Your Prescription Drug Costs H25-2 Emerging Trends in Health Care	I06-2 Advanced Concepts in Fixed Income Investing I07-1 Equity Investing in Today's World I11-2 Emerging Markets and Frontier Markets—Shifting Sands? I13-2 Real Estate—Revisited	P03-1 Addressing Funding Shortfalls P09-2 Funding Policies for Multiemployer Plans P13-2 Advanced Withdrawal Liability (Selection of Methods)

Conference Schedule: Tuesday

Public Plans	Retirement Security/Financial Education	Apprenticeship, Training and Education	Fund Professionals—Accountants	Fund Advisors—Attorneys	Open Forums	TMP/AMP
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TUESDAY, OCTOBER 24

<p>PE3 The Sonoma County Experience—Eliminating Retiree Health Liability While Preserving Benefits</p>		<p>T03 Mentoring—A 360-Degree Approach</p>	<p>P-ACCT1 DOL Update</p>			<p>AG1 AMP Graduate Class: Strategic Planning for Employee Benefit Plans—Part I</p>
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<p>PE4 Achieving Health and Financial Well-Being in the Public Sector</p>	<p>R01 FEATURED SESSION—Behavioral Finance</p>	<p>T04 Managing Opioids, Legalized Drugs and Mental Health for Apprentices</p>	<p>P-ACCT5 Auditing and Accounting for Employer Contributions</p>	<p>P-ATTY4 Pension Compliance Reviews</p>	<p>OF1 Ask the Professionals (Part I)</p>	<p>AG2 AMP Graduate Class: Strategic Planning for Employee Benefit Plans—Part II G13-TG1 Stop Leaving Money on the Table</p>
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<p>PE5 Achieving Health and Wellness With On-Site Opportunities</p>	<p>R02 The Retirement Income Challenge</p>	<p>T05 Training Fund Expenses—In Depth</p>			<p>OF2 Ask the Professionals (Part II)</p>	
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11:45 a.m.-1:15 p.m.—Lunch

<p>PE6 Retirement Plan Fees in Public Sector Plans</p>	<p>R03.2 Retirement Readiness—Considerations Before Retirement</p>	<p>T06 Apprenticeships During Transition to a Total Right-to-Work Environment</p>	<p>P-ACCT6 Best Practices in Employee Benefit Auditing</p>	<p>P-ATTY6 Implementation of Alternative Investments</p>		
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Conference Schedule: Tuesday/Wednesday

	Administration	Fiduciary Responsibility	General Topics	Health and Welfare	Investments	Pensions
TUESDAY, OCTOBER 24						
2:45-4:00 p.m.	A09 Plugging Leaks in Pension Plan Administration	F03-2 Trustee Ethics F08-2 Best Practices in Defined Contribution Plans F51 ROUNDTABLE—Running a More Efficient Meeting	G02 A Case Study in an Alternative Fund Administration Model G04-AC3-TG2 Audits That Can Save Your Plan Money G09-2 Surviving a DOL Investigation (Beginning to End) G15 The Multiemployer Plan Landscape—A Survey of 5500 Data	H06 Medicare and Your Retiree Health Plans H13-2 Alternatives to Traditional Health Care Delivery H14-1 Curbing Medical Trend	I02 Discretionary vs. Nondiscretionary Investing I12-1 Essential Knowledge for Infrastructure Investing I16-2 Active vs. Passive Investing I17-2 Questions to Ask Your Investment Professional	P02-2 PBGC Solvency and Solutions P05-2 Pension Valuation Forecasts P14-2 Advanced Withdrawal Liability (Selection of Assumptions)
WEDNESDAY, OCTOBER 25						
7:30-8:45 a.m.		F10-2 Trust Funds as Employers F11-2 Best Practices in Trustee Governance	G06-2 Approaches to Effective Collection Practices G11-2 Managing the Fund Office Real Estate	H19-2 How New Drugs Come to Market H22-2 Member Choice Design in Health Plans H23-2 Health Reimbursement Accounts—Revisited	I07-2 Equity Investing in Today's World	P03-2 Addressing Funding Shortfalls
9:00-10:15 a.m.		F07-2 What Does a Good Custodian Do for Your Fund?	G03-2 Alleviating Fraud in Your Plans G14-2 The Rise of Mobile Devices G51 ROUNDTABLE—Out-of-the-Box Thinking	H11-2 Specialty Drug Management—Is It Possible? H12-2 Are You Prepared for a HIPAA Audit? H14-2 Curbing Medical Trend	I12-2 Essential Knowledge for Infrastructure Investing I15-2 Investments in Participant-Directed Defined Contribution Plans	P16-2 Confronting Insolvency
10:30-11:45 a.m.	FINALE SESSION: ADAPT: Overcoming Adversity					

Session topics, speakers and times are subject to change. For the most current program, visit: www.ifebp.org/usannual-session-planner.

Conference Schedule: Tuesday/Wednesday

Public Plans	Retirement Security/Financial Education	Apprenticeship, Training and Education	Fund Professionals—Accountants	Fund Advisors—Attorneys	Open Forums	TMP/AMP
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TUESDAY, OCTOBER 24

PE7
WORKSHOP—Disclosures and Solvency

R05
Qualifying for Medicare and Social Security

P-ATTY7
Trending Legal Issues in Health Plan Design

G04-AC3-TG2
Audits That Can Save Your Plan Money

WEDNESDAY, OCTOBER 25

R04
Building Financial Wellness Programs

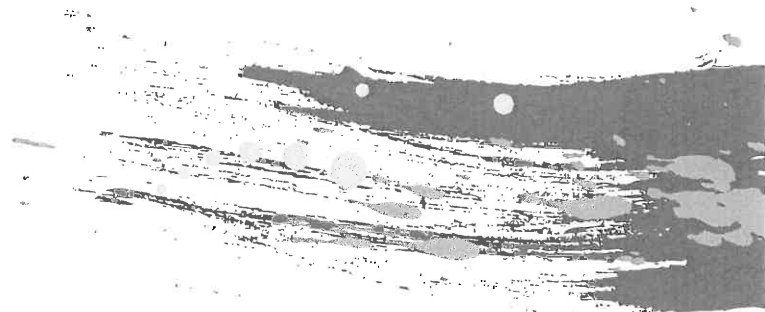
FINALE SESSION: ADAPT: Overcoming Adversity

Build your personalized agenda online by August 25, 2017 and be entered for a chance to win! One grand prize winner will receive their choice of:

- Apple® Watch Sport
- Bose® Solo Soundbar
- Amazon Echo.

Two additional winners will receive a Fitbit Flex! You must be registered for the conference in order to submit your session selections.

www.ifebp.org/usannual-session-planner



Shuttle Bus Service

Days of Operation

Complimentary shuttle bus service will be provided to all conference registrants, exhibitors and guests from Saturday, October 21 through Wednesday, October 25.

Locations Served

Shuttle service will be provided between the Mandalay Bay Convention Center and official conference hotels listed at www.ifebp.org/achotels. Shuttle service will not be provided to the Delano, since this property is within the Mandalay Bay complex.

Prior to the Conference

If you have special transportation needs or questions regarding the shuttle system, please contact Bridget Mergen, coordinator of shuttle service, at (262) 373-7655 or bridgetm@ifebp.org.

During the Conference

A shuttle bus information desk will be staffed during shuttle operation hours at the convention center. A phone number will be provided closer to the conference dates for those who require special transportation or who have any questions regarding the shuttle system while on site.



Special Accommodations— Scooters Available

ScooterBug Mobility Rentals is proud to be the exclusive scooter and wheelchair rental service for the 63rd Annual Employee Benefits Conference. Enjoy beautiful Las Vegas and maneuver through the Mandalay Bay Convention Center with confidence. Reservations must be made in advance for all rentals. Available equipment includes:

- Electric Convenience Vehicles (ECVs)
- Wheelchairs.

To make a reservation, contact ScooterBug at 1-800-877-6106 or (702) 736-4399.

Hold Your Meeting in Conjunction With the Annual Employee Benefits Conference

Save travel expenses by holding your meeting immediately before or after the Annual Conference. Let us leverage our relationships with the conference center, hotels and vendors to put together a seamless event for your organization. Our qualified staff of certified meeting professionals (CMPs) will assist you with planning your meeting by connecting you to the services needed to execute a successful event. Let us take the pressure and tedious tasks off your hands.

How we can help you:

- Secure desirable space for receptions, meetings and special events
- Contract negotiations for venues, hotels and vendors
- Coordinate meeting requirements with suppliers and facilities
- Assist in food-and-beverage planning
- Arrange hotel rooms and manage your room block for your participants
- Speaker sourcing and contracting
- Registration processing and badge/ticket production
- Provide audiovisual and multimedia support, equipment and expertise
- Marketing, attendee communication and program materials
- Ground transportation and transfers
- On-site logistical management and technical support.

Put the power of experienced International Foundation meeting and event management services team to work for you.

To learn more about our full line of services, please contact:

Kathryn Gleesing, CMP

kathryng@ifebp.org | (262) 373-7660

18700 W. Bluemound Rd. | Brookfield, WI 53045 | www.ifebp.org/EventManagement

Hotel Information

The International Foundation has negotiated discounted rates for conference attendees at the Las Vegas hotels noted below. Reservations must be booked through the International Foundation to receive these discounted rates.

1 The Mirage*

Room Block: 475

3,044 guest rooms, maximum of four guests per room.

\$35 charge for third and fourth guest 18+.

\$109 s/d (Thursday, October 19)

\$159 s/d (Friday, October 20-Tuesday, October 24)

\$109 s/d (Wednesday, October 25-Thursday, October 26)

A daily resort fee of \$22 plus the current Clark County room tax of 13.8% (subject to change) will be charged in addition to the room rates set forth above. See website for resort fee inclusions.

Smartly redesigned rooms feature stylish comfort complemented by ultramodern amenities and chic upgrades. Reflecting today's lifestyle, rooms are outfitted with a 42" LCD TV, iHome MP3 docks, cordless phones and luxurious robes for lounging in. Take advantage of the worldly selection of fine and casual dining venues as you enjoy your own private oasis at the Mirage.

2 The Cosmopolitan of Las Vegas*

Room Block: 850

2,995 guest rooms, maximum of four adults per room.

\$30 charge for third and fourth guest 18+.

\$229 s/d (Thursday, October 19)

\$279 s/d (Friday, October 20-Saturday, October 21)

\$229 s/d (Sunday, October 22-Thursday, October 26)

A daily resort fee of \$15 plus the current Clark County room tax of 13.8% (subject to change) will be charged in addition to the room rates set forth above. See website for resort fee inclusions.

Guest rooms at the Cosmopolitan are spacious, warm and welcoming, with artful, hand-crafted touches that give each space the intimate feel of a private, urban residence. Many rooms have large sliding glass doors that open onto oversized, private terraces. Marble-floored bathrooms invite guests to luxuriate in deep soaking tubs and exhilarating rain showers, and each room is outfitted with the latest technology for maximum in-room enjoyment, including sophisticated entertainment systems, Samsung plasma-screen televisions, high-speed wireless Internet access and state-of-the-art control panels.

*Union properties

13.8% tax (subject to change without notice)

*Please see our website at www.ifebp.org/achotels for availability updates and the latest information.

3 Delano Las Vegas*

Room Block: 480

1,117 guest rooms, maximum of four adults per room.

\$35 charge for third and fourth guest 15+.

\$179 s/d (Thursday, October 19-Friday, October 20)

\$259 s/d (Saturday, October 21-Tuesday, October 24)

\$179 s/d (Wednesday, October 25-Thursday, October 26)

Delano Las Vegas offers an all-suite, smoke-free, luxury hotel experience located steps from Mandalay Bay, blending signature elements of Delano South Beach with the distinct energy only found on the Las Vegas Strip. Boasting one of the highest standards for square footage of any hotel in the city (725 square feet per standard room), each suite features a private bedroom with spacious spa-style bath and adjoining living room with 46" flat-screen TV, a wet bar, a desk and a powder room for a plush retreat.

4 Mandalay Bay Resort & Casino*

Room Block: 1,785

3,309 guest rooms, maximum of four adults in a room.

\$35 charge for third and fourth guest 15+.

\$145 s/d (Thursday, October 19-Friday, October 20)

\$235 s/d (Saturday, October 21-Tuesday, October 24)

\$145 s/d (Wednesday, October 25-Thursday, October 26)

More than 3,000 guest rooms and suites at Mandalay Bay have been redesigned as part of a \$100 million remodel. Radiating casual elegance and comfort, each room features a 42"-plus LED TV, Wi-Fi access and a minibar. Lofty pillow-top beds and warm textiles allow for effortless relaxation. From the real sand beach complete with a wave pool and lazy river to the Shark Reef Aquarium and award-winning restaurants, many adventures await Mandalay Bay guests.



REGISTRATION/2017

63rd Annual Employee Benefits Conference (01-1701)

Customer Information (Please print clearly)

Source code 1701 AS AT AV AW AX AY AZ

Individual ID# or CEBS® ID# _____ Last 4/3 digits of SSN/SIN _____ Date of birth (mm/dd/yyyy) _____
 Full first name _____ M.I. _____ Last name _____
 Employer _____ Title _____
 Address _____ Business Home
 City _____ State/Province _____ Country _____ ZIP/Postal code _____
 Phone _____ Fax _____
 E-mail _____


See our policies regarding your registration/cancellation/refund/record retention/photo release and privacy at www.ifebp.org/policies.

Not a Member? Join Now to Attend.

Individual \$325* Organizational \$995* Members-only conference—Join now to be eligible to attend. *Membership dues are reduced quarterly. Visit www.ifebp.org/join for current rates.

Registration Information

Organization representing _____ Organization # _____
 Badge name _____ Badge title _____
 Special dietary requirements—specify _____
 Form completed by _____ Phone _____

 Special assistance?
 Yes No


63rd Annual Employee Benefits Conference | October 22-25, 2017 | Mandalay Bay Convention Center | Las Vegas, Nevada (01-1701)

Conference Registration Fee—Sunday-Wednesday, October 22-25	Until Sept. 10		After Sept. 10	
Member (includes welcome reception, Monday and Tuesday lunch).....	<input type="checkbox"/> \$1,525		<input type="checkbox"/> \$1,825	
Preconference Registration—One-Day Workshop—Saturday OR Sunday, October 21 or 22	Member	Nonmember	Member	Nonmember
Saturday Workshop Session # PC.....	<input type="checkbox"/> \$ 435	<input type="checkbox"/> \$ 545	<input type="checkbox"/> \$ 585	<input type="checkbox"/> \$ 695
Sunday Workshop Session # PC.....	<input type="checkbox"/> \$ 435	<input type="checkbox"/> \$ 545	<input type="checkbox"/> \$ 585	<input type="checkbox"/> \$ 695
PC30 Sunday Lifetime Financial Planning (attendees under 50).....	<input type="checkbox"/> \$ 435	<input type="checkbox"/> \$ 545	<input type="checkbox"/> \$ 585	<input type="checkbox"/> \$ 695
PC36 Spouse Registration: Lifetime Financial Planning (personal check/credit card) Name.....		<input type="checkbox"/> \$ 30		<input type="checkbox"/> \$ 30
Preconference Registration—Two-Day Workshops—Saturday AND Sunday, October 21 and 22				
PC53/54 Lifetime Retirement Planning (attendees over 50).....	<input type="checkbox"/> \$ 870	<input type="checkbox"/> \$1,090	<input type="checkbox"/> \$1,170	<input type="checkbox"/> \$1,390
PC55/56 Spouse/Guest: Lifetime Retirement Planning (personal check/credit card) Name.....		<input type="checkbox"/> \$ 60		<input type="checkbox"/> \$ 60
New Trustees Institutes—Saturday-Monday, October 21-23				
New Trustees Institute—Level I: Core Concepts Saturday-Monday (01-17N8).....	<input type="checkbox"/> \$1,345	<input type="checkbox"/> \$1,675	<input type="checkbox"/> \$1,645	<input type="checkbox"/> \$1,975
New Trustees Institute—Level II: Concepts in Practice Saturday-Sunday (01-17N9).....	<input type="checkbox"/> \$1,345	<input type="checkbox"/> \$1,675	<input type="checkbox"/> \$1,645	<input type="checkbox"/> \$1,975
Masters Programs—Saturday AND Sunday, October 21 and 22				
Each class is limited to 75. Must meet eligibility requirements below.				
Administrators Masters Program (AMP®) (01-17E2)	<input type="checkbox"/> \$1,445	<input type="checkbox"/> \$1,775	<input type="checkbox"/> \$1,745	<input type="checkbox"/> \$2,075
<input type="checkbox"/> I have at least five years of professional administrative experience. (Includes one lunch)				
Trustees Masters Program (TMP) (01-17D2)	<input type="checkbox"/> \$1,445	<input type="checkbox"/> \$1,775	<input type="checkbox"/> \$1,745	<input type="checkbox"/> \$2,075
<input type="checkbox"/> I have been a trustee for at least five years and attended two International Foundation programs.				
TMP Advanced Leadership Summit—Sunday ONLY (01-17D3)	<input type="checkbox"/> \$ 725	<input type="checkbox"/> \$ 890	<input type="checkbox"/> \$ 875	<input type="checkbox"/> \$1,040
<input type="checkbox"/> I have earned my TMP pin.				
CAPPP®—Certificate of Achievement in Public Plan Policy—Saturday AND Sunday, October 21 and 22				
<input type="checkbox"/> Employee Health Part II (01-1718H) <input type="checkbox"/> Employee Pensions Part II (01-1718P).....	<input type="checkbox"/> \$1,095	<input type="checkbox"/> \$1,315	<input type="checkbox"/> \$1,395	<input type="checkbox"/> \$1,615

CANCEL POLICY: Early cancel fee is \$50/meeting day. Within 30 days of meeting, cancel fee is 50% of registration fee.

Hotel

Reservation deadline: September 8, 2017 Include \$400 hotel deposit Visit www.ifebp.org/achotels for hotel options.

Reservations confirmed on a first-come, first-served basis. Best available will be assigned.  Smoke-free? Yes No
 # of Adults _____ # of Children _____ Arrival date _____ Departure date _____ King bed Two beds
 1st choice _____ 2nd choice _____ 3rd choice _____ 4th choice _____
 Special requests _____

Continuing Education Credit

\$25 continuing education fee due at time of registration (if applicable). The International Foundation will apply for CE credit based on requests. You must indicate the profession for which credit is requested.

Actuary Attorney CFP CIMA CPA Insurance producer* PHR/SPHR/GPHR
 SHRM-CP/SHRM-SCP Other, specify _____
 Licensed in the state of _____ License/NPN/BAR/CPA # _____

*Preapproval of programs/seminars is required in ALL insurance states. This process can take up to 90 days. Late requests could preclude insurance producers from earning credit. Note: Requests made for CE credit on this form do not guarantee administration of credit.

CEBS CPE Continuing education forms are not required to earn CEBS CPE credit. By checking this box you will be provided with continuing education forms in your registration packet. These forms can be turned in at the program for a CPE certificate for documentation and to assist you with self-reporting your CEBS CPE credits. **\$25 CE fee does not apply.** Visit www.cebscpe.org for additional information on reporting CEBS CPE credit hours.

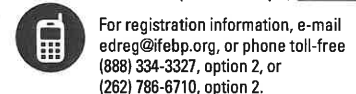
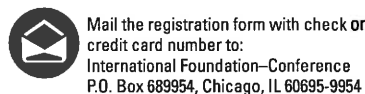
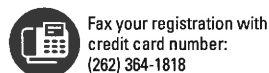
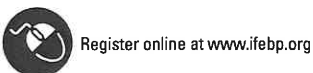
Payment Information

Full payment in U.S. funds must accompany order. Make check payable to International Foundation.

Check # _____ \$ _____
 VISA MasterCard Discover American Express
 Credit card # _____ Exp. date _____
 Cardholder's name (print) _____

Registration/Order Summary

Membership fee	\$ _____
Registration fee	\$ _____
Preconference/New Trustee fee	\$ _____
AMP®/TMP/CAPPP® fee	\$ _____
Hotel deposit (\$400)	\$ _____
Continuing education fee (\$25)	\$ _____
Total (U.S. funds)	\$ _____





2017 Invesco Real Estate Global Client Conference

The Lodge at Torrey Pines
La Jolla, California

November 7-9, 2017

Meeting Date
08/09/17
Agenda Item
#10c.

Tuesday, November 7, 2017

- | | |
|------------------------|--|
| 11:30 a.m. – 1:00 p.m. | Buffet Lunch <i>(Optional)</i> |
| 12:00 p.m. – 1:00 p.m. | Invesco Asia Core Fund Update Meeting** |
| 1:00 p.m. – 2:00 p.m. | Invesco U.S. Income Fund Annual Meeting** |
| 2:00 p.m. – 2:30 p.m. | Invesco U.S. Income Fund Advisory Committee Meeting* |
| 2:30 p.m. – 3:30 p.m. | Invesco Mortgage Recovery Fund II Annual Meeting** |
| 3:30 p.m. – 4:00 p.m. | Invesco Mortgage Recovery Fund II Advisory Committee* |
| 6:00 p.m. | Cocktail Reception |
| 7:00 p.m. | Welcome Dinner |
| 9:00 p.m. – 12:00 a.m. | Hospitality Suite <i>(Optional)</i> |

Wednesday, November 8, 2017

- | | |
|-----------------------|---|
| 7:00 a.m. – 8:30 a.m. | Buffet Breakfast and Discussion: Income – Equity & Debt
7:30 a.m. – 8:15 a.m. |
| | Darin Turner
Invesco Real Estate
Managing Director – Portfolio Manager |
| | Dan Kubiak
Invesco Real Estate
Senior Director – Portfolio Manager |
| | Charlie Rose
Invesco Real Estate
Senior Director – Investment Officer |
| 8:30 a.m. – 8:45 a.m. | Welcome and Invesco Real Estate Update |
| | Scott Dennis
Invesco Real Estate
Managing Director – Chief Executive Officer |

**For Advisory Committee members only.*

***For fund investors and their consultants only.*

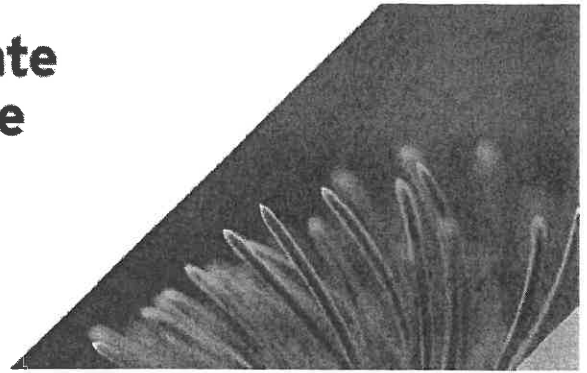
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2017 Invesco Real Estate Global Client Conference

The Lodge at Torrey Pines
La Jolla, California

November 7-9, 2017



Wednesday, November 8, 2017

8:45 a.m. – 9:30 a.m.

Economic & Financial Market Outlook

9:30 a.m. – 10:15 a.m.

Driverless Cars: Reshaping the Urban Environment and Creating Real Estate Investment Opportunity

Brad Greiwe
Fifth Wall
Co-Founder & Managing Partner

10:15 a.m. – 10:45 a.m.

Break

10:45 a.m. – 11:45 a.m.

Placemaking and Mixed Use Real Estate

Fehmi Karahan
The Karahan Companies
President and CEO

Dene Oliver
OliverMcMillan LLC
CEO

11:45 a.m. – 1:00 p.m.

Buffet Lunch

1:00 p.m. – 1:30 p.m.

House View Summary

Tim Bellman
Invesco Real Estate
Managing Director – Head of Global Research

Mike Sobolik
Invesco Real Estate
Managing Director – Regional Director of Research, North America

1:30 p.m. – 2:15 p.m.

Listed Real Assets

Joe Rodriguez
Invesco Real Estate
Managing Director – Head of Global Securities

Darin Turner
Invesco Real Estate
Managing Director – Portfolio Manager

2:15 p.m. – 2:30 p.m.

Break

**For Advisory Committee members only.*

***For fund investors and their consultants only.*

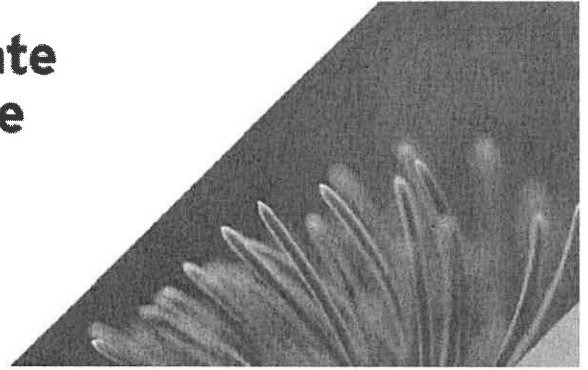
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The Lodge at Torrey Pines
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November 7-9, 2017



Wednesday, November 8, 2017

2:30 p.m. – 3:15 p.m.

Expectations for Core Investments - US, Europe and Asia

Tracey Luke

Invesco Real Estate
Senior Director – Portfolio Manager

Michelle Foss

Invesco Real Estate
Senior Director – Portfolio Manager, US

Paddy Bingham

Invesco Real Estate
Managing Director – Director of Fund Management, Europe

Ian Schilling

Invesco Real Estate
Managing Director – Head of Core Funds and Private Accounts,
Asia Pacific

3:15 p.m. – 4:00 p.m.

Global High Return Opportunities

Tim Bellman

Invesco Real Estate
Managing Director – Head of Global Research

Bert Crouch

Invesco Real Estate
Managing Director – Portfolio Manager, Structured
Investments

Jay Hurley

Invesco Real Estate
Managing Director – Portfolio Manager, US

Kevin Grundy

Invesco Real Estate
Managing Director, Structured Investments – Europe

Calvin Chou

Invesco Real Estate
Managing Director – Portfolio Manager and Head of
Opportunistic Funds, Asia Pacific

**For Advisory Committee members only.*

***For fund investors and their consultants only.*

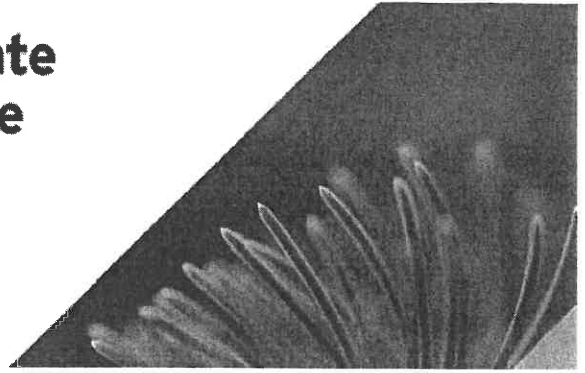
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2017 Invesco Real Estate Global Client Conference

The Lodge at Torrey Pines
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November 7-9, 2017



Wednesday, November 8, 2017

5:00 p.m. – 6:30 p.m.	Group Networking Activity and Cocktail Reception – Top Golf Challenge
7:00 p.m.	Dinner
9:00 p.m. – 12:00 a.m.	Hospitality Suite (Optional)

Thursday, November 9, 2017

7:00 a.m. – 9:00 a.m.	Buffet Breakfast and Discussion: Round Table Q&A with Invesco
	7:15 a.m. – 8:00 a.m.
8:15 a.m. – 9:15 a.m.	Breakout Sessions <ul style="list-style-type: none">• Invesco Core Real Estate – U.S.A. Annual Meeting**• Invesco Real Estate Europe Market Update• Invesco Real Estate Asia Market Update
9:15 a.m. – 9:30 a.m.	Break
9:30 a.m. – 10:30 a.m.	Breakout Sessions <ul style="list-style-type: none">• Invesco Real Estate U.S. Value-Add Funds Annual Meeting**• Invesco Real Estate Europe Market Update• Invesco Real Estate Asia Market Update
10:30 a.m. – 12:00 p.m.	Invesco U.S. Value-Add Fund IV Advisory Committee Meeting*
10:30 a.m. – 12:30 p.m.	Invesco Core Real Estate – U.S.A. Advisory Committee Meeting*
11:30 a.m. – 1:00 p.m.	Buffet Lunch (Optional)
1:00 p.m.	Conference Concludes

**For Advisory Committee members only.*

***For fund investors and their consultants only.*

*Please Note: Agenda is subject to change. Final version will be distributed closer to event date.
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