2018 COMPREHENSIVE ANNUAL FINANCIAL REPORT

FOR THE YEAR ENDED DECEMBER 31, 2018

Concord, California

CONTRA COSTA COUNTY EMPLOYEES' RETIREMENT ASSOCIATION

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2018 COMPREHENSIVE ANNUAL FINANCIAL REPORT

FOR THE YEAR ENDED DECEMBER 31, 2018

Issued by:

Gail Strohl
Chief Executive Officer

Henry J. Gudino, CPA
Accounting Manager

Contra Costa County Employees' Retirement Association
1355 Willow Way, Suite 221
Concord, California 94520-5728
cccera.org

CCCERA's mission is to administer pension benefits earned by our members and to be prudent stewards of plan assets.

CONTRA COSTA COUNTY CCCERA Employees' Retirement Association

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INTRODUCTORY

LETTER OF TRANSMITTAL

June 19, 2019

Board of Retirement
Contra Costa County Employees' Retirement Association
1355 Willow Way, Suite 221
Concord, CA 94520-5728

Dear Board Members:

I am pleased to present the Contra Costa County Employees' Retirement Association's (CCCERA) Comprehensive Annual Financial Report (CAFR) for the year ended December 31, 2018, the 73rd year of operation.

CCCERA is a public employee retirement system that was established by the County of Contra Costa (the County) on July 1, 1945, and is administered by the Board of Retirement (Board) to provide service retirement, disability, death, and survivor benefits for County employees and 16 other participating agencies under the California State Government Code, Section 31450 et seq. (County Employees Retirement Law of 1937) and Section 7522 et seq. (California Public Employees' Pension Reform Act of 2013).

REPORT CONTENTS

CCCERA management is responsible for both the accuracy of the data and the completeness and fairness of the presentation of financial information within this CAFR, including all disclosures. The CAFR is divided into five sections:

The INTRODUCTORY SECTION includes a description of CCCERA's management and organizational structure, a letter of transmittal, a listing of the members of the Board, and a listing of professional consultants.

The FINANCIAL SECTION presents the financial condition and funding status of CCCERA. This section contains the opinion of the independent certified public accountants, Brown Armstrong Accountancy Corporation, Management's Discussion and Analysis of CCCERA's financial activities, the financial statements, and the related supplementary financial information.

The INVESTMENT SECTION provides an overview of CCCERA's investment program. This section contains reports on investment activity, investment policies, investment results, and various investment schedules, charts, and graphs.

The ACTUARIAL SECTION communicates CCCERA's funding status and presents other actuarial related information. This section contains the certification of the consulting actuary, Segal Consulting, actuarial statistics, and general plan provisions.

The STATISTICAL SECTION presents information on CCCERA's operations on a multi-year basis.

CCCERA AND ITS SERVICES

CCCERA was established on July 1, 1945, to provide retirement allowances and other benefits to the safety and general members employed by the County. Currently, Contra Costa County and 16 other participating agencies are members of CCCERA. The participating agencies include:

- Bethel Island Municipal Improvement District
- Byron-Brentwood-Knightsen Union Cemetery
- Central Contra Costa Sanitary District
- Contra Costa County Employees' Retirement Association
- Contra Costa Housing Authority
- Contra Costa Mosquito and Vector Control District
- First 5 – Children & Families Commission
- In-Home Supportive Services Authority (IHSS)
- Local Agency Formation Commission (LAFCO)
- Rodeo Sanitary District
- Superior Court of California, Contra Costa County
- Contra Costa Fire Protection District
- East Contra Costa Fire Protection District
- Moraga-Orinda Fire Protection District
- Rodeo-Hercules Fire Protection District
- San Ramon Valley Fire Protection District

In addition, CCCERA administers retirement, disability, or survivor benefits to retirees or beneficiaries of the following former participating agencies:

- Alamo-Lafayette Cemetery District
- City of Pittsburg
- Delta Diablo Sanitation District
- Diablo Water District
- Ironhouse Sanitary District
- Kensington Fire Protection District
- Superintendent of Schools - Contra Costa County Office of Education
- Stege Sanitary District

CCCERA is governed by the California Constitution, the County Employees Retirement Law of 1937 (CERL), the California Public Employees' Pension Reform Act of 2013 (PEPRA), and the regulations, procedures, and policies adopted by CCCERA's Board of Retirement. The Contra Costa County Board of Supervisors may also adopt resolutions, as permitted by CERL, which may affect benefits of CCCERA members.

The 12 member Board of Retirement is responsible for the general management of CCCERA. Of the 12 members, three are alternates, one for the appointed members, one for safety, and one for retirees. Five board members are appointed by the Contra Costa County Board of Supervisors, one as an alternate. Four board members, including the safety alternate, are elected by CCCERA's active membership. Two board members are elected by the retirees, one as an alternate. The County treasurer serves as an ex-officio member. Board members, with the exception of the County treasurer, serve three-year terms in office, with no term limits.

FINANCIAL INFORMATION

This report has been prepared in accordance with generally accepted accounting principles (GAAP) in the United States of America as promulgated by the Governmental Accounting Standards Board (GASB). GAAP requires that management provide a narrative introduction, overview, and analysis to accompany the basic financial statements in the form of management's discussion and analysis ("MD&A"). This letter of transmittal is designed to complement the MD&A and should be read in conjunction with it. CCCERA's MD&A can be found immediately following the independent auditor's report.

Management of CCCERA is responsible for establishing and maintaining an internal control structure designed to ensure CCCERA's assets are protected from loss, theft, or misuse. The internal controls are designed to provide reasonable, but not absolute, assurance that these objectives are met. Reasonable assurance recognizes the cost of a control relative to the benefits likely to be derived and that these judgments by management are based on estimates. Responsibility for the accuracy, completeness, fair representation of information and all disclosures rests with CCCERA's management. The accounting firm of Brown Armstrong Accountancy Corporation, a certified public accounting firm, provides financial statement independent audit services to CCCERA. The financial audit provides reasonable assurance that CCCERA's financial statements are presented in conformity with GAAP and are free from material misstatement.

ACTUARIAL FUNDING STATUS

CCCERA contracts with an independent actuarial consulting firm, Segal Consulting, to act as the Pension (Plan's) actuary and conduct annual actuarial valuations, which are presented to the Board annually. On a triennial basis, the actuary also conducts an experience study of the members of CCCERA and makes recommendations to the Board on all economic and non-economic assumptions. The most recent triennial experience study is as of December 31, 2017.

CCCERA's funding objective is to meet long-term defined benefit obligations through contributions and investment income. Funds are derived from the excess of additions, which include contributions and investment earnings, over deductions which are comprised of benefits and administrative expenses. Funds are accumulated to meet future benefit obligations to retirees and beneficiaries. This accumulated balance is referred to as the "net-position restricted for benefits" in the Statement of Fiduciary Net Position in the Financial Section of the report. Due to GASB Statement No. 67, the total pension liability is not reported in the basic financial statements, but is disclosed in Note 6 to the basic financial statements and in the required supplementary information. The total pension liability is determined by the Plan's actuary and is a measure of the present value of actuarial accrued liabilities estimated to be payable in the future to current retirees, beneficiaries, and active members for service earned to date. The net pension liability is measured as the total pension liability less the amount of the Plan's fiduciary net position. The net pension liability is an accounting measurement for financial statement purposes.

Segal Consulting's actuarial valuation as of December 31, 2017, determined the funding ratio to be 88.5%, an increase of 2.0% over the prior year, using approved assumptions. This ratio compares the actuarial value of assets of the Plan to the actuarial accrued liabilities of the Plan. For a more in-depth review of the funding of the Plan, see the actuarial section of this report on page 83.

In 2018, CCCERA, as an employer for its staff, contracted with Milliman Inc. to prepare an actuarial valuation of Other Post-Employment Benefits (OPEB) liabilities in accordance with GASB Statement Nos. 74 and 75, including the creation of an IRS Section 115 Trust for pre-funding purposes. More information about OPEB liabilities and funding of the trust may be found in Note 7, OPEB Liability and Trust and in the actuarial section of this report.

INVESTMENTS

The Board maintains exclusive control of all retirement system investments and is responsible for establishing investment objectives, strategies, and policies. The California Constitution and Government Code Sections 31594 and 31595 authorize the Board to invest in any investment deemed prudent in the Board's opinion.

The Board has adopted an Investment Policy, which provides the framework for the management of CCCERA's investments. This policy establishes CCCERA's investment objectives and defines the principal duties of the Board, custodian bank, and investment managers. The asset allocation is an integral part of the Investment Policy and is designed to provide an optimum mix of asset classes with return expectations that reflect expected liabilities. Within the Investment Section of this report, a summary of the asset allocation can be found on page 75, along with a schedule of investment management fees and brokerage commissions on pages 80 and 81.

On a fair value basis, the total net position restricted for benefits decreased from $8.4 billion at December 31, 2017, to $8.1 billion at December 31, 2018. For the year ended December 31, 2018, CCCERA's investment portfolio returned -2.7%, net of investment management fees, reflecting market conditions throughout the year. CCCERA's annualized rate of return was 5.8% over the last three years, 5.4% over the last five years, and 9.1% over the last 10 years, net of investment expenses.

STRATEGIC PLAN 2018-2020

In 2018, CCCERA completed its first year of its first strategic plan, which incorporates the core values of trust, innovation and accountability. These core values are supported with the following strategic initiatives:

- Improve communication within the organization and with external stakeholders.
- Expand use of technology across the organization to achieve goals in the most efficient manner.
- Implement measures to improve customer services to external and internal customers.
- Data integrity and security are of paramount importance. New projects will be implemented to ensure data is accurate and secured appropriately.
- Institute effective training and recognition programs to foster continued employee development.

This year, a number of activities were completed to further these initiatives. At the plan's implementation, a strategic plan reference card was distributed to staff to provide a visual, living document, in an effort to make the strategic direction of CCCERA at the forefront of all activities.

SERVICE EFFORTS

During the last year, the Retirement and Member Services teams handled 17,481 phone inquiries. The Administrative Services team scanned and indexed 71,327 member documents. Retirement counselors provided 21 group pre-retirement workshops at various locations in Contra Costa County including employer offices. In 2018, 933 new members were enrolled; 326 service and disability applications were processed and added to payroll; and 622 member withdrawal requests were handled.

ACCOMPLISHMENTS

Investment Portfolio Management:

As an integral part of the investment policy, CCCERA has an internally developed portfolio construction methodology, known as the Functionally Focused Portfolio (FFP), to assign portfolio allocations according to strategic priorities as defined by the Board. The FFP was approved by the Board in September 2016 to be rolled out in phases over approximately three years. The FFP consists of three sub-portfolios, Liquidity, Growth, and Risk Diversifying, and is designed to allocate a higher percentage of assets into the short-term, highly liquid fixed income instruments that will be used to accomplish CCCERA's primary function, paying for 3-4 years of pension benefits. CCCERA will continue to allocate the bulk of the remaining assets into a globally diversified growth sub-portfolio of stocks, real estate, and alternative asset strategies and the remaining into risk diversified investments.

The Liquidity portfolio was implemented in October 2016 and is invested with three fixed income managers all of whom pursue a high credit quality, low duration investment approach designed to produce monthly cash flows that fund the benefit payments. The Growth portfolio was implemented in July 2017 with the selection of a private markets advisor and is designed to take advantage of capital appreciation and income opportunities globally. To achieve this, the Growth portfolio includes a variety of assets, from stocks and growth oriented bonds, to private equity, real estate, and private credit. The risk diversifying phase was implemented in June 2018 to hold assets that are expected to diversify the growth's sub-portfolio volatility while offering moderate growth.

Master Custodian Bank:

CCCERA issued a Request For Proposal (RFP) in April 2018 and was pleased to select Northern Trust as its new custodian effective March 1, 2019. The purpose was to assess and confirm that the custodial services were the most effective, cost efficient, best use of technology, and continued to be in the best interests of CCCERA, its members, and beneficiaries. This accomplishment involved on-boarding and transitioning of over 70 investment manager and fund accounts holding a portfolio of $8.6 billion in assets.

Actuarial Services:

CCCERA issued an RFP in September 2018 for actuarial and actuarial audit services and was pleased to select Segal Consulting as its continuing actuary and Cheiron, Inc. for actuarial and triennial study audit services.

AWARDS

The Government Finance Officers Association of the United States and Canada (GFOA) awarded a Certificate of Achievement for Excellence in Financial Reporting to CCCERA for its CAFR for the year ended December 31, 2017. This was the 18th consecutive year that CCCERA has received this award. The Certificate of Achievement is a prestigious national award recognizing conformance with the highest standards for preparation of state and local government financial reports.

In order to be awarded a Certificate of Achievement, a government unit must publish an easily readable and efficiently organized CAFR, the contents of which meet or exceed program standards. The CAFR must satisfy both accounting principles generally accepted in the United States of America and applicable legal requirements.

A Certificate of Achievement is valid for a period of one year only. We believe that our current CAFR continues to meet the Certificate of Achievement program requirements, and it is being submitted to the GFOA to determine its eligibility for another certificate.

CCCERA is a recipient also of the GFOA Award for Outstanding Achievement in Popular Annual Financial Reporting (PAFR) for the year ended December 31, 2017. This marks the 9th consecutive year to receive this honor.

CCCERA was awarded the Public Pension Coordinating Council's (PPCC) Public Pension Standards Award in 2018. The Public Pension Standards are intended to reflect minimum expectations for public retirement system management and administration, and to serve as a benchmark by which all defined benefit public plans should be measured.

ACKNOWLEDGMENTS

The compilation of this report reflects the combined and dedicated effort of many individuals at CCCERA. It is intended to provide complete and reliable information as the basis for making management decisions, as a means of determining compliance with legal provisions, and as a means of determining responsible stewardship of the funds of CCCERA.

Thank you to the Board, the consultants, and staff for their commitment to CCCERA.

Respectfully submitted,

Gail Strohl

Gail Strohl
Chief Executive Officer

RETIREMENT BOARD (As of December 31, 2018)

Chairperson
Todd Smithey
Term Expires June 30, 2020
Elected by General Members

Vice-Chairperson
Scott W. Gordon
Term Expires June 30, 2019
Appointed by Board of Supervisors

Secretary
David J. MacDonald
Term Expires June 30, 2019
Elected by General Members

Jerry Telles
Term Expires June 30, 2019
Elected by Retirees

John B. Phillips
Term Expires June 30, 2020
Appointed by Board of Supervisors

Jerry R. Holcombe
Term Expires June 30, 2020
Appointed by Board of Supervisors

Candace Andersen
Term Expires June 30, 2020
Appointed by Board of Supervisors

William Pigeon
Term Expires June 30, 2020
Elected by Safety Members

County Treasurer
Russell V. Watts
Ex Officio by Statute

(Alternate)
Louie Kroll
Term Expires June 30, 2019
Elected by Retirees

(Alternate)
Jay Kwon
Term Expires June 30, 2020
Appointed by Board of Supervisors

(Alternate)
Vacant
Term Expires June 30, 2020
Elected by Safety Members

PROFESSIONAL CONSULTANTS (As of December 31, 2018)

Actuarial Services
Segal Consulting
Cheiron, Inc.
Milliman Inc.

Independent Auditor
Brown Armstrong Accountancy Corporation

Fiduciary & Investment Counsel
Reed Smith, LLP
DLA Piper, LLP
Foley & Lardner, LLP
K&L Gates, LLP

General & Tax Counsel
Ice Miller, LLP

Disability Counsel
Laughlin, Falbo, Levy & Moresi, LLP

Labor Relations Counsel
Wiley Price & Radulovich, LLP

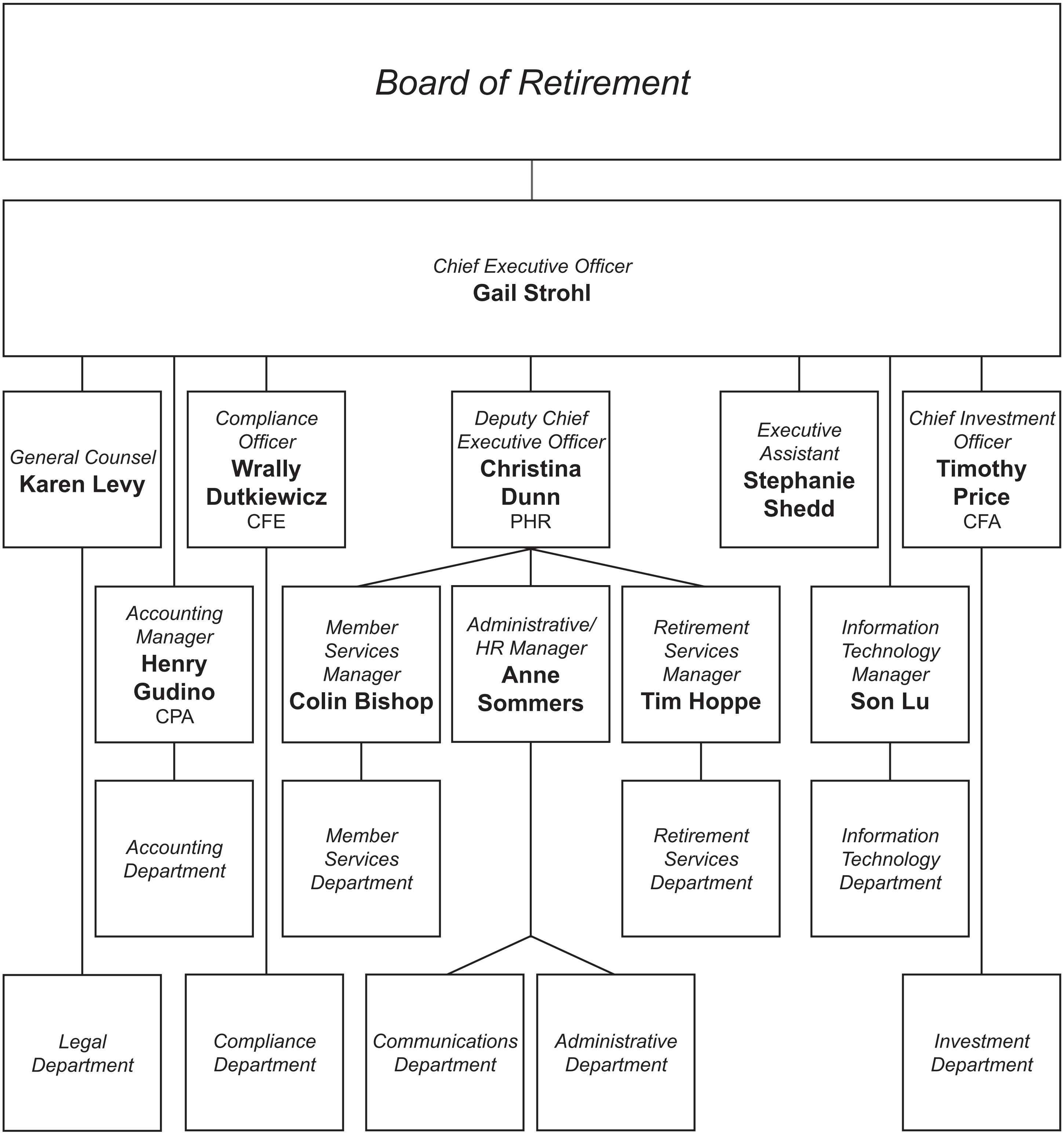
Investment Consultants
Verus Investments
Stepstone Investments

Master Custodian
State Street Bank & Trust Company

Fiscal Agent
Mechanics Bank

Note: List of Investment Managers is located on page 78 of this report.

ADMINISTRATIVE ORGANIZATION CHART (As of December 31, 2018)



GFOA CERTIFICATE OF ACHIEVEMENT AWARD

Government Finance Officers Association

Certificate of
Achievement
for Excellence
in Financial
Reporting

Presented to

Contra Costa County

Employees' Retirement Association

California

For its Comprehensive Annual
Financial Report
for the Fiscal Year Ended

December 31, 2017

Christopher P. Morrill

Executive Director/CEO

PPCC PUBLIC PENSION STANDARDS AWARD

PPC

Public Pension Coordinating Council

Public Pension Standards Award
For Funding and Administration
2018

Presented to

Contra Costa County Employees' Retirement Association

In recognition of meeting professional standards for
plan funding and administration as
set forth in the Public Pension Standards.

Presented by the Public Pension Coordinating Council, a confederation of

National Association of State Retirement Administrators (NASRA)
National Conference on Public Employee Retirement Systems (NCPERS)
National Council on Teacher Retirement (NCTR)

Alan H. Winkle
Program Administrator

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FINANCIAL

INDEPENDENT AUDITOR'S REPORT

BROWN ARMSTRONG
CERTIFIED PUBLIC ACCOUNTANTS

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SUITE 208
FRESNO, CA 93720
TEL 559.476.3592

LAGUNA HILLS OFFICE
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SUITE 255
LAGUNA HILLS, CA 92653
TEL 949.652.5422

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TEL 888.565.1040

WWW.BACPAS.COM

REGISTERED with the Public Company Accounting Oversight Board and MEMBER of the American Institute of Certified Public Accountants

BROWN ARMSTRONG
Certified Public Accountants

INDEPENDENT AUDITOR'S REPORT

To the Board of Retirement and Audit Committee of
Contra Costa County Employees' Retirement Association
Concord, California

Report on the Financial Statements

We have audited the accompanying Retirement Plan and Postemployment Health Care Plan Statement of Fiduciary Net Position of the Contra Costa County Employees' Retirement Association (CCCERA), a pension trust fund of the County of Contra Costa, California, as of December 31, 2018; the related Retirement Plan and Postemployment Health Care Plan Statement of Changes in Fiduciary Net Position for the year then ended; and the related notes to the financial statements, which collectively comprise CCCERA's basic financial statements as listed in the table of contents.

Management's Responsibility for the Financial Statements

Management is responsible for the preparation and fair presentation of these financial statements in accordance with accounting principles generally accepted in the United States of America; this includes the design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of financial statements that are free from material misstatement, whether due to fraud or error.

Auditor's Responsibility

Our responsibility is to express an opinion on these financial statements based on our audit. We conducted our audit in accordance with auditing standards generally accepted in the United States of America and the standards applicable to financial audits contained in *Government Auditing Standards*, issued by the Comptroller General of the United States. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to CCCERA's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of CCCERA's internal control. Accordingly, we express no such opinion. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluating the overall financial statement presentation of the financial statements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Opinion

In our opinion, the financial statements referred to above present fairly, in all material respects, the Fiduciary Net Position and Postemployment Health Care Plan of CCCERA as of December 31, 2018, and the Changes in Fiduciary Net Position for the year then ended, in accordance with accounting principles generally accepted in the United States of America.

Other Matters

Required Supplementary Information

Accounting principles generally accepted in the United States of America require that the management's discussion and analysis and required supplementary information, as listed in the table of contents, be presented to supplement the basic financial statements. Such information, although not a part of the basic financial statements, is required by the Governmental Accounting Standards Board (GASB), who considers it to be an essential part of financial reporting for placing the basic financial statements in an appropriate operational, economic, or historical context. We have applied certain limited procedures to the required supplementary information in accordance with auditing standards generally accepted in the United States of America, which consisted of inquiries of management about the methods of preparing the information and comparing the information for consistency with management's responses to our inquiries, the basic financial statements, and other knowledge we obtained during our audit of the basic financial statements. We do not express an opinion or provide any assurance on the information because the limited procedures do not provide us with sufficient evidence to express an opinion or provide any assurance.

Other Information

Our audit was conducted for the purpose of forming an opinion on the financial statements that collectively comprise CCCERA's basic financial statements. The other supplementary information and the introductory, investment, actuarial, and statistical sections, as listed in the table of contents, are presented for purposes of additional analysis and are not a required part of the basic financial statements.

The other supplementary information is the responsibility of management and was derived from and relates directly to the underlying accounting and other records used to prepare the basic financial statements. Such information has been subjected to the auditing procedures applied in the audit of the basic financial statements and certain additional procedures, including comparing and reconciling such information directly to the underlying accounting and other records used to prepare the basic financial statements or to the basic financial statements themselves, and other additional procedures in accordance with auditing standards generally accepted in the United States of America. In our opinion, the other supplementary information is fairly stated in all material respects in relation to the basic financial statements as a whole.

The introductory, investment, actuarial, and statistical sections have not been subjected to the auditing procedures applied in the audit of the basic financial statements and, accordingly, we do not express an opinion or provide any assurance on them.

Report on Summarized Comparative Information

We have previously audited CCCERA's December 31, 2017 financial statements, and our report dated June 22, 2018, expressed an unmodified opinion on those audited financial statements. In our opinion, the summarized comparative information presented herein as of December 31, 2017, is consistent, in all material respects, with the audited financial statements from which it has been derived.

Emphasis of Matter

As discussed in Note 2 to the basic financial statements, in 2018 CCCERA adopted GASB Statements No. 74, *Financial Reporting for Postemployment Benefit Plans Other Than Pension Plans,* and No. 75, *Accounting and Financial Reporting for Postemployment Benefits Other Than Pensions*. As noted in Note 7, the total Other Postemployment Benefits (OPEB) liability is $4,710,000. The Fiduciary Net Position as a Percentage of Total OPEB Liability as of December 31, 2018, was 54%.

Other Reporting Required by *Government Auditing Standards*

In accordance with *Government Auditing Standards*, we have also issued our report dated June 19, 2019, on our consideration of CCCERA's internal control over financial reporting and on our tests of its compliance with certain provisions of laws, regulations, contracts, agreements, and other matters. The purpose of that report is to describe the scope of our testing of internal control over financial reporting and compliance and the results of that testing, and not to provide an opinion on the internal control over financial reporting or on compliance. That report is an integral part of an audit performed in accordance with *Government Auditing Standards* in considering CCCERA's internal control over financial reporting and compliance.

BROWN ARMSTRONG
ACCOUNTANCY CORPORATION

Brown Armstrong
Accountancy Corporation

Bakersfield, California
June 19, 2019

MANAGEMENT'S DISCUSSION AND ANALYSIS December 31, 2018 and 2017

As management of the Contra Costa County Employees' Retirement Association (CCCERA), we offer readers of CCCERA's financial statements this discussion and analysis (MD&A) of the financial position and results of operation for the years ended December 31, 2018 and 2017. The information presented here, in conjunction with the Notes to the Financial Statements beginning on page 34, provide a clear picture of CCCERA's overall financial status and activities.

FINANCIAL HIGHLIGHTS

Pension Plan

- The Net Position – Restricted for Benefits, as reported in the Statement of Fiduciary Net Position, totaled $8.1 billion and $8.4 billion at the close of December 31, 2018 and 2017, respectively. All of the net position is available to meet CCCERA's ongoing obligations to plan participants and their beneficiaries.

- CCCERA's total Net Position – Restricted for Benefits decreased by $240.6 million, or 2.9%, and increased $952.1 million, or 12.8%, as of December 31, 2018 and 2017, respectively. Although there were increases in employer and member contributions in both years, and investment income in 2017, the overall decrease in 2018 over prior year is primarily the result of negative investment earnings.

- Total Additions, as reflected in the Statement of Changes in Fiduciary Net Position, for the years ended December 31, 2018 and 2017 were $242.9 million and $1,407.9 million, respectively. This includes employer and plan member contributions of $428.6 million, investment loss of $187.3 million, and net securities lending income of $1.6 million for 2018, along with employer and plan member contributions of $411.3 million, investment income of $995.7 million and net securities lending income of $0.9 million for 2017. The 82.7% decrease in additions to net position over the prior year is attributed to net investment loss for the year.

- Total Deductions, as reflected in the Statement of Changes in Fiduciary Net Position, totaled $483.5 million for the year ended December 31, 2018, an increase of $27.7 million over the year ended December 31, 2017, or approximately 6.1%, mainly attributed to the increase in retiree payroll. Benefits paid to retirees and beneficiaries increased from $430.0 million in 2017 to $452.5 million in 2018, or approximately 5.2%. This increase can be attributed to an increase in the number of new retirees and an annual cost-of-living (COLA) increase.

- CCCERA's funding objective is to meet long-term benefit obligations through contributions and investment income. As of December 31, 2017, the date of CCCERA's last actuarial pension plan valuation prepared by Segal Consulting, the funded status for CCCERA (the ratio of the valuation of assets to the actuarial liabilities) was 88.5%, compared to 86.5% in the previous year. The increase in the funding ratio is due to contributions in excess of the value of benefits earned as well as investment earnings in excess of the assumed rate.

- The total investment portfolio finished 2018 with a negative return after investment fees of -2.7%, compared to 13.9% in 2017.

- Based on the Governmental Accounting Standards Board (GASB) Statement No. 67, CCCERA has a net pension liability (NPL) of $1.43 billion and $0.81 billion as of December 31, 2018 and 2017, respectively. The plan fiduciary net position as a percentage of the total pension liability is 85.09% and 91.18% as of December 31, 2018 and 2017, respectively. The net pension liability as a percentage of covered payroll is 167.82% and 100.18% as of December 31, 2018 and 2017, respectively. Refer to Note 6, *Net Pension Liability*, and the *Schedule of Changes in Net Pension Liability and Related Ratios* in the Required Supplementary Information section on page 49 of this report for more information.

Other Post-Employment Benefits (OPEB) Trust

- The OPEB Trust Net Position – Restricted for Benefits, as reported in the Statement of Fiduciary Position and in the Statement of Changes in Fiduciary Net Position, was implemented in 2018 as a result of newly implemented GASB Statement Nos. 74 and 75 reporting requirements. The OPEB Trust net position of $2.5 million was an employer contribution transfer from a liability previously established in CCCERA's Pension Plan.

- The total OPEB liability, as calculated by CCCERA's OPEB actuary Milliman Inc., was $4.7 million as of December 31, 2018. The OPEB Trust net position of $2.5 million offsets the OPEB total liability resulting in a net OPEB liability of $2.2 million which is reported as part of CCCERA's Pension Plan other liabilities. Refer to Note 7, *Other Post-Employment Benefits (OPEB) Liability and Section 115 Trust* on page 51 for more information.

Overview of the Financial Statements

This Management's Discussion and Analysis is intended to serve as an introduction to CCCERA's financial statements, which are comprised of these components:

1. Statement of Fiduciary Net Position
2. Statement of Changes in Fiduciary Net Position
3. Notes to the Financial Statements
4. Required Supplementary Information and related Notes
5. Other Supplementary Information
6. Other Information

Please note, however, that this report also contains clarifying information to supplement the basic financial statements listed above.

The implementation of GASB Statement No. 67 (GASB 67) in 2014 increased the number of schedules in the Required Supplementary Information section. These new schedules provide a spectrum of financial information, including a pension liability measurement and changes to the liability, historical contributions, money-weighted investment return and additional actuarial related disclosures.

In the current year, CCCERA implemented GASB Statement No. 74 (GASB 74), *Financial Reporting for Postemployment Benefit Plans Other Than Pension Plans*, and GASB Statement No. 75 (GASB 75) *Accounting and Financial Reporting for Postemployment Benefits Other Than Pensions*.

GASB 74 revises existing guidance for OPEB plans and benefits provided to employees subsequent to their retirement. GASB 74 addresses the financial report of defined benefit OPEB plans administered through trusts that meet specified criteria. The rule requires a statement of fiduciary net position, as well as a statement of changes in fiduciary net position.

GASB 75 requires plan sponsors to report a liability on the face of the financial statements for the OPEB that they provide. In addition, plan sponsors that are responsible only for OPEB liabilities related to their own employees and that provide OPEB through a defined benefit OPEB plan administered through a trust that meets specified criteria will report a net OPEB liability, the difference between the total OPEB liability and assets accumulated and held in trust restricted to making benefit payments.

Similar to GASB 67, the implementation of GASB 74 and GASB 75 also requires additional note disclosures and RSI related to the measurement of the OPEB liabilities for which assets have been accumulated, changes in the liability, contributions, investment return and additional actuarial related disclosures.

The Statement of Fiduciary Net Position is a snapshot of account balances at year-end. It discloses the assets and deferred outflows of resources available for future payments to retirees and their beneficiaries and any current liabilities and deferred inflows of resources that are owed as of year-end. The net position, which is the assets and deferred outflows of resources less liabilities and deferred inflows of resources, reflects the funds available for future use. CCCERA established an irrevocable Other Post-Employment Benefit Trust in 2018. The purpose of this fund is for CCCERA, as an employer, to set aside assets to offset the OPEB retiree health care liability. The OPEB Trust is presented separately in the OPEB Trust's column on the Statement of Fiduciary Net Position.

The Statement of Changes in Fiduciary Net Position provides a view of all the activities that occurred during the fiscal year and shows the impact of those activities as additions and deductions to the pension plan and the OPEB Trust.

Both financial statements and the required disclosures are in compliance with the accounting principles and reporting guidelines as set forth by the Governmental Accounting Standards Board (GASB), using the accrual basis of accounting. CCCERA complies with all material requirements of these principles and guidelines.

The Statement of Fiduciary Net Position and the Statement of Changes in Fiduciary Net Position report information about CCCERA's activities. These statements include all assets and liabilities, using the accrual basis of accounting, which is similar to the accounting used by most private-sector companies. All of the current year's revenues and expenses are recognized when they are earned and incurred, regardless of when cash is received or paid. All investment purchases and sales are reported as of the trade date, not the settlement date. Investments are reported at current fair value. Both realized and unrealized investment gains and losses are recognized. Each component of capital assets is depreciated over its useful life.

These two statements report CCCERA's net position restricted for benefits and is one way to measure the pension plan's financial position. Over time, increases and decreases in CCCERA's net position are indicators of whether its financial position is improving or deteriorating. Other factors, such as market conditions, should be considered in measuring CCCERA's overall financial position. The decrease in CCCERA's fiduciary net position for the year ended December 31, 2018, was 2.9%. This decrease is due primarily to negative investment returns, although employer and member contributions received were higher than last year. CCCERA's total portfolio return was -2.7%, net of investment manager fees, for the year ending December 31, 2018. CCCERA's Statement of Fiduciary Net Position and Statement of Changes in Fiduciary Net Position appear on pages 32 and 33.

Notes to the Financial Statements provide additional information that is essential to a full understanding of the data provided in the financial statements. The notes provide detailed discussion of key policies, programs, and activities that occurred during the year. Asset allocation, the long-term expected rate of return, discount rate, key actuarial assumptions, and the Schedule of Net Pension Liability based on GASB 67 and GASB 74 for OPEB are also included in this section. Notes to the Financial Statements appear on pages 34 through 61.

Required Supplementary Information follows the notes and includes several additional GASB 67 schedules. The Schedule of Net Pension Liability in the notes section, together with the Schedule of Changes in Net Pension Liability and Related Ratios, provides an up-to-date financial indication of the extent to which the total pension liability is covered by the fiduciary net position of the pension plan. This information will improve the financial statements users' ability to compare the total pension liability for similar types of pension plans. Please note that liabilities on these schedules are calculated solely for financial reporting purposes and are not intended to provide information about the funding of CCCERA's benefits.

Another additional schedule, the Schedule of Employer Contributions, helps the reader determine if plan sponsors are meeting the actuarially determined contributions over a period of time.

The Schedule of Investment Returns includes a money-weighted return performance calculation which is net of investment expenses. These schedules, as well as Notes to the Required Supplementary Information, appear on pages 65 and 66.

The Schedule of Funding Progress for funding purposes is presented in the Actuarial section on page 87.

Other Supplementary Information includes the Schedule of Administrative Expenses, Schedule of Investment Expenses, and Schedule of Payments to Consultants. It appears on pages 67 through 69.

Financial Analysis

As of December 31, 2018, CCCERA has $8.1 billion in net position restricted for benefits, which means that assets of $8.6 billion exceed liabilities of $0.5 billion. As of December 31, 2017, CCCERA's net position restricted for benefits totaled $8.4 billion. The net position restricted for benefits is available to meet CCCERA's ongoing obligation to plan participants and their beneficiaries.

As of December 31, 2018, the net position restricted for benefits decreased by 2.9% over 2017, primarily due to a decrease in the fair value of investments. Current assets and current liabilities also changed by offsetting amounts due to recording of securities lending cash collateral.

Despite recent market volatility and competitive retirement benefits, CCCERA remains in a good financial position to meet its obligations to plan participants and beneficiaries.

CAPITAL ASSETS — Capital assets with an initial cost of more than $10,000 and an estimated useful life in excess of three years may be capitalized and depreciated/amortized. Depreciation/amortization is calculated using the straight-line method over the estimated useful lives of the assets. CCCERA's capital assets increased from $224 thousand as of December 31, 2017 to $283 thousand (net of accumulated depreciation and amortization) as of December 31, 2018. The investment in capital assets includes servers, equipment, furniture, and leasehold improvements. The total increase in CCCERA's investment in capital assets from 2017 to 2018 was 26% primarily due to additions of new computer hardware and software assets offset by the normal amortization and depreciation of assets taken by CCCERA annually.

Starting in 2008, CCCERA follows Government Code Section 31580.3, which allows expensing of software, hardware, and computer technology consulting services in support of the software or hardware used in the administration of the retirement system. During 2018 and 2017, CCCERA expensed $433 thousand and $399 thousand of software, hardware, and computer technology consulting services, respectively.

FIDUCIARY NET POSITION
(Dollars in Thousands)

Assets	2018	2017	Amount Increase/ (Decrease)	Percent Increase/ (Decrease)
Current and Other Assets	$713,010	$758,014	($45,004)	(5.9%)
Investments at Fair Value	7,900,085	8,153,588	(253,503)	(3.1%)
Capital Assets	283	224	59	26.3%
Total Assets	**8,613,378**	**8,911,826**	**(298,448)**	**(3.3%)**
Liabilities				
Current Liabilities	463,392	521,245	(57,853)	(11.1%)
Total Liabilities	**463,392**	**521,245**	**(57,853)**	**(11.1%)**
NET POSITION - RESTRICTED FOR BENEFITS	**$8,149,986**	**$8,390,581**	**($240,595)**	**(2.9%)**

CCCERA has annual pension plan valuations completed by its independent actuary, Segal Consulting. The purpose of the valuation is to determine the future contributions by the members and employers needed to provide for the prescribed benefits. The valuation takes into account CCCERA's policy to smooth the impact of market volatility by spreading each year's investment gains or losses over five years. Despite variations in the stock market, CCCERA's management and actuary concur that CCCERA remains in a financial position that will enable the plan to meet its obligations to participants and beneficiaries. CCCERA remains focused on the long-term performance of the fund, dependent on a strong and successful investment program, risk management, and strategic planning. CCCERA's latest Actuarial Valuation is as of December 31, 2017.

RESERVES — Pension plans establish reserves for various anticipated liabilities. CCCERA's reserves have been established to account for the accumulation of employer and employee contributions, the amounts available to meet the obligation of retired members as well as other items. A complete listing of CCCERA's reserves and corresponding balances for December 31, 2018 are presented in Note 10, *Reserves and Designations*.

CCCERA's Activities

CHANGES IN FIDUCIARY NET POSITION
(Dollars in Thousands)

Additions:	2018	2017	Amount Increase/ (Decrease)	Percent Increase/ (Decrease)
Employer Contributions	$325,117	$314,836	$10,281	3.3%
Plan Member Contributions	103,542	96,467	7,075	7.3%
Net Investment Income (Loss)	(187,339)	995,678	(1,183,017)	(118.8%)
Net Securities Lending Income	1,582	878	704	80.2%
Total Additions	**242,902**	**1,407,859**	**(1,164,957)**	**(82.7%)**
Deductions:				
Pension Benefits	452,512	430,037	22,475	5.2%
Contribution Prepayment Discount	9,274	9,140	134	1.5%
Administrative	9,337	9,146	191	2.1%
Refunds	8,093	5,518	2,575	46.7%
Other Expenses	4,281	1,957	2,324	118.8%
Total Deductions	**483,497**	**455,798**	**27,699**	**6.1%**
INCREASE (DECREASE) IN NET POSITION - RESTRICTED FOR BENEFITS	**($240,595)**	**$952,061**	**($1,192,656)**	**(125.3%)**

ADDITIONS TO FIDUCIARY NET POSITION — The primary sources of funding for CCCERA member benefits are employer contributions, plan member contributions, and net investment income. Total additions to the pension plan fiduciary net position for the years ended December 31, 2018 and 2017, were $242.9 million and $1,407.9 million, respectively. The decrease in the current year is primarily due to investment losses compared to gains in the previous year. The net investment income (loss), before securities lending, for the years ended December 31, 2018 and 2017 totaled $(187.3) million and $995.7 million, respectively. The investment section of this report reviews the results of investment activity for the year ended December 31, 2018. Employer Contributions were $325.1 million as of December 31, 2018, an increase of $10.3 million, or 3.3%, over 2017. Plan Member Contributions were $103.5 million as of December 31, 2018, an increase of $7.1 million, or 7.3%, from prior year. The increase is mostly due to higher employer and employee contribution rates.

DEDUCTIONS FROM FIDUCIARY NET POSITION — CCCERA was created to provide lifetime retirement annuities, survivor benefits, and permanent disability benefits to qualified members and their beneficiaries. The cost of such programs includes recurring benefit payments as designated by the plan, refund of contributions to terminated employees, and the cost of administering the system. Total deductions from the pension plan fiduciary net position for the years ended December 31, 2018 and 2017, were $483.5 million and $455.8 million, respectively. Retirement allowances, survivor benefits, and permanent disability benefits were $452.5 million as of December 31, 2018, an increase of $22.5 million, or 5.2%, over 2017. The growth in benefit payments was due to the combined effects of the following: (1) the net increase in the number of retirees and beneficiaries for the year and (2) the increase in the average retirement allowance of those who were added to the retirement payroll.

Administrative expense was $9.3 million for 2018. Administrative expense covers the basic costs of operating the retirement system, including information technology systems. Operating costs include personnel, professional services, insurance, office supplies and materials, software, hardware, depreciation and amortization, and miscellaneous expenses. The system's administrative expenses increased by $191 thousand, or 2.1%, in 2018. The increase was mainly due to personnel additions and employee retirement cost.

Member refunds were $8.1 million in 2018, an increase of $2.6 million, or 46.6% greater than 2017. Member refunds were greater in the current year due to a higher amount of terminated members requesting withdrawals.

Other expenses increased by $2.3 million over last year, or 119%, to $4.3 million in 2018. The primary reason for the increase is a one-time expense to recognize the net OPEB liability on the CCCERA pension plan Statement of Fiduciary Net Position.

The Board of Retirement approves the annual budget for CCCERA. The California Government Code Section 31580.2(a) limits the annual administrative expense to not exceed the greater of either of the following: (1) twenty-one hundredths of one percent (0.21%) of the accrued actuarial liability of the retirement system; or (2) two million dollars ($2,000,000), as adjusted annually by the amount of the annual cost-of-living adjustment computed in accordance with Article 16.5. CCCERA has consistently met its administrative expense budget for the current year and prior years.

STATUTORY LIMITATION FOR ADMINISTRATIVE EXPENSES
As of December 31, 2018 and 2017
(Dollars in Thousands)

		2018	2017
Actuarial Accrued Liability (AAL)	a	$8,794,434	$8,448,624
Statutory Limit For Administrative Expenses (AAL x 0.21%)		18,468	17,742
Actual Administrative Expenses Subject To Statutory Limit	b	9,337	9,146
Excess Statutory Limit Over Actual Administrative Expenses		$9,131	$8,596
Actual Administrative Expenses as a Percentage of AAL	b/a	0.11%	0.11%

Deductions of $483.5 million are more than additions of $242.9 million, resulting in a decrease of $240.6 million in fiduciary net position for the year ended December 31, 2018.

CHANGE IN FIDUCIARY NET POSITION — The change in fiduciary net position consists of total additions reduced by total deductions. The change in fiduciary net position, as compared to the prior year, decreased by $1,192.7 million for the year ended December 31, 2018. This decrease is due to investment losses in 2018 compared to gains in the previous year.

NET PENSION LIABILITY— CCCERA is subject to the provisions of GASB Statement No. 67, *Financial Reporting for Pension Plans*, beginning with the year ended December 31, 2014, and CCCERA's participating employers are subject to the provisions of GASB Statement No. 68, *Accounting and Financial Reporting for Pensions*, beginning with the fiscal year ended June 30, 2015. These standards require governments to recognize their long-term obligation for pension benefits as a liability on their balance sheets, to recognize their annual pension expense as a comprehensive measurement of the annual cost of pension benefits, and expands note disclosures and Required Supplementary Information for pension plans and their participating employers.

Pursuant to GASB Statement No. 67, the funded status and unfunded actuarial accrued liability (UAAL) of the plan are no longer presented in the notes or required supplementary information. The UAAL was determined by subtracting the excess of the actuarial accrued liability (discounted at the plan's assumed rate of return) from the actuarial value of assets (determined by smoothing values over a certain number of years to reduce volatility) and represented the costs allocated to date for current plan members that are not covered by the actuarial value of assets. The UAAL has now been replaced by the net pension liability (NPL), which represents the excess of the total pension liability (using an entry age cost method, discounted at a discount rate that reflects the expected return on assets) over fiduciary net position (valued at fair value). NPL is similar to UAAL but uses market assets, not smoothed assets. This is a conceptual shift by the GASB in the measurement of pension liabilities to provide a consistent, standardized methodology that allows comparability of data and increased transparency of the pension liability across all plans. CCCERA has complied with GASB Statement No. 67 for the years ended December 31, 2018 and December 31, 2017.

Based on Segal Consulting's Governmental Accounting Standards Board (GASB) 67 Actuarial Valuation as of December 31, 2018, the Net Pension Liability (NPL) of participating employers on a market basis is $1.43 billion as of December 31, 2018 and $0.81 billion as of December 31, 2017. The increase is primarily due to the -2.3% return on the market value of assets during 2018 (that was lower than the assumed return of 7.00%) and to changes in actuarial assumptions. Refer to Note 6, *Net Pension Liability*, and the Required Supplementary Information section of this report for further information.

Changes in Net Pension Liability
As of December 31, 2018 and 2017
(Dollars in Thousands)

	2018 (a)	2017 (b)	Amount Increase/ (Decrease) (c) = (a) - (b)	Percent Increase/ (Decrease) (c) / (b)
Total Pension Liability	$9,578,030	$9,202,018	$376,012	4.1%
Less Plan Fiduciary Net Position	8,149,986	8,390,581	(240,595)	(2.9%)
Net Pension Liability	**$1,428,044**	**$811,437**	**$616,607**	**76.0%**

OPEB NET LIABILITY— GASB 74 and GASB 75, require CCCERA to report the total OPEB liability of $4.7 million and net OPEB liability of $2.2 million as of December 31, 2018 as calculated by its actuary. GASB 74 and GASB 75 also require the OPEB fiduciary net position to be presented as a percentage of the total OPEB liability which is 54% as of December 31, 2018. The OPEB liability, which is the responsibility of CCCERA as an employer, is calculated separately from the Pension Plan liabilities and is presented solely for financial statement purposes. More information is found in Note 7, *Other Post-Employment Benefits (OPEB) Liability and Section 115 Trust*.

Net OPEB Liability
As of December 31, 2018
(Dollars in Thousands)

	2018
Total OPEB Liability	$4,710
Less OPEB Trust Fiduciary Net Position	2,542
Net OPEB Liability	**$2,168**

PENSION REFORM — Governor Jerry Brown signed the California Public Employees' Pension Reform Act of 2013 (PEPRA), which became effective January 1, 2013. While it has been called one of the largest pieces of pension reform legislation on record, it had minimal impact on current and retired CCCERA members hired prior to January 1, 2013. Most changes and provisions affected new public employees hired on or after January 1, 2013. Some new provisions that did impact current or retired CCCERA members were changes in what can be included in compensation for retirement purposes, new restrictions on the ability of a retiree to return to work with a CCCERA employer without reinstatement as an active member unless certain conditions are met, and elimination of employers' ability to adopt an enhanced benefit formula and apply it to past service. In addition, for new public employees, the legislation reduces benefit formulas, limits pensionable income, expands the final compensation period from one year to three years, and requires the new employee to pay a larger share of normal costs.

OVERALL ANALYSIS — For the year ended December 31, 2018, CCCERA's financial position and results from operations have experienced a decrease over the prior year. For 2018, CCCERA's net position decreased to $8.1 billion from $8.4 billion in 2017. The overall decrease in net position for December 31, 2018 is primarily attributable to depreciation in the fair value of the plan's broadly diversified portfolio. Despite fluctuations in the financial markets, CCCERA remains in a sound financial position to meet its obligations to plan participants and beneficiaries. The current financial position results from a strong and successful investment program, risk management and strategic planning meeting expectations. As a long-term investor, CCCERA can take advantage of price volatility along with a diversified exposure to domestic, global and international equities, fixed income investments, real estate, private equity, private credit, and liquidity programs. The plan has recovered well from the general market downturn which occurred in 2009 and 2008 and more recently from fourth quarter 2018. CCCERA is well positioned with value-focused assets to face market fluctuations.

CCCERA's Fiduciary Responsibilities

CCCERA's Board of Retirement and management are fiduciaries of the pension trust fund. Under the California Constitution and other applicable law, the assets can only be used for the exclusive benefit of plan participants and their beneficiaries and to defray the administrative and investment expenses of the plan.

Requests for Information

The Comprehensive Annual Financial Report is designed to provide the Board of Retirement, our membership, taxpayers, investment managers, and interested parties with a general overview of CCCERA's finances and to show accountability for the funds it receives.

Questions concerning any of the information provided in this report or requests for additional financial information should be addressed to:

Contra Costa County Employees' Retirement Association
Attn: Accounting Division
1355 Willow Way, Suite 221
Concord, CA 94520-5728
cccera.org
Telephone: (925) 521-3960
Facsimile: (925) 521-3969

Respectfully submitted,

Henry J. Gudino

Henry J. Gudino, CPA
Accounting Manager
June 19, 2019

BASIC FINANCIAL STATEMENTS
STATEMENT OF FIDUCIARY NET POSITION

Statement of Fiduciary Net Position
As of December 31, 2018 (With Comparative Totals)
(Dollars in Thousands)

	2018		2017
ASSETS	**Pension Plan**	**OPEB Trust**	**Pension Plan**
Cash & Cash Equivalents:			
Cash equivalents	$409,922	$2,542	$396,788
Cash collateral - securities lending	243,358		294,005
TOTAL CASH & CASH EQUIVALENTS	**653,280**	**2,542**	**690,793**
Receivables:			
Contributions	9,982		9,805
Investment trades	16,983		22,462
Investment income	20,230		20,294
Installment contract (see Note 12)	12,303		14,032
Other	15		335
TOTAL RECEIVABLES	**59,513**	**0**	**66,928**
Investments at fair value:			
Stocks	3,202,523		3,899,074
Bonds	2,611,980		2,385,461
Real assets	177,200		189,761
Real estate	644,588		652,386
Alternative investments	1,263,794		1,026,906
TOTAL INVESTMENTS AT FAIR VALUE	**7,900,085**	**0**	**8,153,588**
Other assets:			
Prepaid expenses/deposits	217		293
Capital assets, net of accumulated depreciation/amortization of $2,940 and $2,863, respectively	283		224
TOTAL ASSETS	**$8,613,378**	**$2,542**	**$8,911,826**
LIABILITIES			
Investment Trades	**20,577**		**25,353**
Securities Lending Collateral	**243,358**		**294,005**
Employer Contributions Unearned	**151,748**		**155,492**
Retirement Allowance Payable	**36,717**		**34,875**
Accounts Payable	**5,643**		**6,965**
Contributions Refundable	**2,972**		**2,094**
Other Liabilities	**2,377**		**2,461**
TOTAL LIABILITIES	**463,392**	**0**	**521,245**
NET POSITION - RESTRICTED FOR BENEFITS	**$8,149,986**	**$2,542**	**$8,390,581**

See accompanying notes to the financial statements.

STATEMENT OF CHANGES IN FIDUCIARY NET POSITION

Statement of Changes in Fiduciary Net Position
For the year ended December 31, 2018 (With Comparative Totals)
(Dollars in Thousands)

	2018		2017
ADDITIONS	**Pension Plan**	**OBEB Trust**	**Pension Plan**
Contributions:			
Employer contributions	$325,117	$2,542	$314,836
Plan member contributions	103,542		96,467
TOTAL CONTRIBUTIONS	**428,659**	**2,542**	**411,303**
Investment income:			
Net appreciation (depreciation) in fair value of investments	(323,946)		754,329
Net appreciation in fair value of real estate	52,035		59,216
Interest	112,096		102,614
Dividends	47,689		51,833
Real estate income, net	13,605		19,309
Alternative income	(30,488)		64,732
Investment expense	(45,149)		(42,865)
Other income/(expense), net	(13,181)		(13,490)
NET INVESTMENT INCOME (LOSS), BEFORE SECURITIES LENDING	**(187,339)**	**0**	**995,678**
Securities lending income (expense):			
Earnings	6,600		2,576
Rebates	(4,512)		(1,419)
Fees	(506)		(279)
NET SECURITIES LENDING INCOME	**1,582**	**0**	**878**
NET INVESTMENT INCOME (LOSS)	**(185,757)**	**0**	**996,556**
TOTAL ADDITIONS	**242,902**	**2,542**	**1,407,859**
DEDUCTIONS			
Benefits paid	**452,512**		**430,037**
Contribution prepayment discount	**9,274**		**9,140**
Administrative	**9,337**		**9,146**
Refunds of contributions	**8,093**		**5,518**
Other	**4,281**		**1,957**
TOTAL DEDUCTIONS	**483,497**	**0**	**455,798**
NET INCREASE (DECREASE) IN NET POSITION	**(240,595)**	**2,542**	**952,061**
NET POSITION - RESTRICTED FOR BENEFITS			
Beginning of year	**8,390,581**	**0**	**7,438,520**
End of year	**$8,149,986**	**$2,542**	**$8,390,581**

See accompanying notes to the financial statements.

NOTES TO THE FINANCIAL STATEMENTS (For the Year Ended December 31, 2018)

Note 1.
Plan Description

The Contra Costa County Employees' Retirement Association (CCCERA) is governed by the Board of Retirement (Board) under the County Employees Retirement Law of 1937 (CERL) and the California Public Employees' Pension Reform Act of 2013 (PEPRA). Members should refer to CERL and PEPRA for more complete information.

General

CCCERA is a contributory defined benefit plan (the Plan) initially organized under the provisions of CERL on July 1, 1945. It provides benefits upon retirement, death or disability of members. CCCERA operates as a cost-sharing, multiple employer defined benefit pension plan that covers substantially all of the employees of the County of Contra Costa (the County) and 16 other member agencies.

In October 2009, the Board de-pooled CCCERA's assets, actuarial accrued liability (AAL), and normal cost both by tier and employer for determining employer contribution rates. This Board action yielded 12 separate cost groups by employer, with the exception of smaller employers (those with less than 50 active members at that time) who continue to be pooled with the applicable County tier. The December 31, 2009 valuation was the first to incorporate the new "de-pooled" employer contribution rates, and those rates were effective July 1, 2011.

CCCERA's membership as of December 31, 2018 and 2017 is presented in the following table.

CCCERA Membership
As of December 31, 2018 and 2017

	2018	2017	Amount Increase/ (Decrease)	Percent Increase/ (Decrease)
Active members	10,037	10,038	(1)	0%
Retired members or beneficiaries	9,479	9,267	212	2%
Terminated members entitled to, but not yet receiving benefits*	3,574	3,327	247	7%
TOTAL MEMBERSHIP	**23,090**	**22,632**	**458**	**2%**

*Includes members who terminate with less than 5 years of service and leave accumulated contributions on deposit.

CCCERA, with its own governing board, is an independent governmental entity, separate and distinct from the County of Contra Costa. Costs of administering the Plan are financed through contributions and investment earnings.

Effective January 1, 2015, California Senate Bill 673 (SB 673) makes the CCCERA retirement system an independent "district" and the employer for its entire staff, subject to terms and conditions of employment established by the Board.

Benefit Provisions

The Plan is currently divided into thirteen benefit levels in accordance with CERL and PEPRA. These levels are known as General Tier 1 (Enhanced and Non-enhanced); General Tier 2, General Tier 3 Enhanced, General Tier 4 (2% and 3% maximum Cost-of-Living Adjustments (COLAs)), General Tier 5 (2% and 3%/4% maximum COLAs), Safety Tier A (Enhanced and Non-enhanced), Safety Tier C Enhanced, Safety Tier D, and Safety Tier E.

On October 1, 2002, the Contra Costa County Board of Supervisors adopted Resolution No. 2002/608, which provides enhanced benefit changes commonly known as 3% at 50 for safety members and 2% at 55 for general members, effective on July 1, 2002 and January 1, 2003, respectively. Effective January 1, 2005, the enhanced benefits were applied to the bargaining units represented by the California Nurses Association and the nonrepresented employees within similar classifications as employees in bargaining units represented by the California Nurses Association, as well as the supervisors and managers of those employees. Effective July 1, 2005, East Contra Costa Fire Protection District adopted the enhanced benefit structure for its employees. In addition, each Special District that is a participant of CCCERA, and whose staff are not County employees covered by Resolution No. 2002/608, may elect to participate in the enhanced benefits. As of December 31, 2012, nine (9) general member agencies and four (4) safety member agencies have adopted enhanced benefits for their employees. A fifth safety member agency adopted enhanced benefits for its general members in 2003, but not for safety members. Under PEPRA, which became effective January 1, 2013, Districts that have not adopted enhanced benefits will no longer be allowed to do so.

Legislation was signed by the Governor in 2002 which allowed the County, effective October 1, 2002, to provide Tier 3 to all new employees, to move those previously in Tier 2 to Tier 3 as of that date, and to apply all future service as Tier 3. Tier 3 was originally created on October 1, 1998, and made available to all members with five or more years of Tier 2 service who elected to transfer to Tier 3 coverage.

All members who moved to Tier 3 with five or more years of service prior to October 1, 2002, or were moved to Tier 3 effective October 1, 2002, January 1, 2005, or February 1, 2006, continue to have Tier 2 benefits for service prior to that date unless the service is converted to Tier 3. As of December 31, 2006, there are no active Tier 2 member accounts. Tier 1 includes members not mandated to be in Tier 2 or Tier 3 and reciprocal members who were placed in Tier 1 membership.

Safety includes members in active law enforcement, active fire suppression work, or certain other "Safety" classifications as defined in sections of CERL made operative by the Board of Supervisors.

Effective January 1, 2007, Contra Costa County and the Deputy Sheriffs' Association agreed to adopt a new Safety Tier C for sworn employees hired by the County after December 31, 2006. A Deputy Sheriff hired on or after January 1, 2007 through November 30, 2012, had a 3% at 50 benefit formula with a 2% maximum COLA and a 36 month final average salary period. Due to PEPRA, a Deputy Sheriff hired on or after January 1, 2013, has a 2.7% at 57 benefit formula with a 36 month final average salary period with compensation limited as noted below. The 2% maximum annual COLA is unchanged.

Effective January 1, 2012, members employed by the County and within certain bargaining units are responsible for the payment of 100% of the employees' basic retirement benefit contributions, determined annually by the Board, without the County paying any part of the employees' contributions. See Note 9, *Contributions*, for further description.

California Public Employees' Pension Reform Act (PEPRA)

In September 2012, the California Public Employees' Pension Reform Act of 2013 (PEPRA) was signed into law by the Governor of California, establishing new tiers for General and Safety members entering CCCERA membership on or after January 1, 2013. The benefit formula for General members is 2.5% at age 67 and the Safety formula is 2.7% at age 57. Benefits under the new PEPRA tiers are based on a three-year final average compensation period. Additionally, PEPRA limits the amount of compensation CCCERA can use to calculate a retirement benefit. The 2018 compensation limits are $121,388 for members covered by Social Security and $145,666 for members not covered by Social Security and these limits increase to $124,180 and $149,016, respectively, in 2019. The PEPRA annual compensation limits will be adjusted in future years based on changes in the Consumer Price Index. The majority of CCCERA General members are covered by Social Security, while CCCERA Safety members are not covered by Social Security.

In September 2013, the Governor approved Assembly Bill 1380 (AB 1380), which makes various technical corrections and conforming changes that align the CERL with the provisions of PEPRA. In particular, the bill clarifies that Tier 4, Tier 5, Safety Tier D and Safety Tier E members are eligible to retire at age 70, regardless of years of service, that the Board may, but is not required to, round these members' contribution rates to the nearest quarter of one percent, and those rates may be adjusted for any change in the normal cost rate. AB 1380 was effective January 1, 2014. On January 22, 2014, CCCERA's Board exercised the discretion made available by AB 1380 to no longer round the members' contribution rates for PEPRA members to the nearest quarter of one percent as previously required by PEPRA. This allows for exactly one-half of the Normal Cost to be paid by the employees and by the employers covered under the PEPRA tiers.

In November 2012, the County Board of Supervisors approved two memoranda of understanding (Deputy District Attorneys' Association and Contra Costa County Defenders' Association) that stipulated new CCCERA members who become members after December 31, 2012 within these bargaining units will earn retirement benefits that will be subject to a maximum annual COLA of 2%. As a result, CCCERA created a second Tier 5 for general members subject to this COLA provision. Other bargaining units (including units covering Tier 4 members) have since agreed to this COLA provision for those who become members after a certain date. Members in bargaining units subject to this COLA provision will be placed in General Tiers 4 or 5 (2% max COLA) or Safety Tier E.

In September 2013, the Board approved using base pay only for purposes of pensionable compensation for PEPRA members and to exclude all other special compensation beyond base pay. In addition, the Board clarified that separate pay items for premium pay to comply with the Fair Labor Standards Act (FLSA) and the Fire Retirement Allotment for the Moraga-Orinda Fire Protection District are to be excluded from pensionable compensation. In September 2014, the Board adopted a written policy to this effect, "Policy On Determining Pensionable Compensation Under PEPRA For Purposes Of Calculating Retirement Benefits."

Benefits are administered by the Board under the provisions of CERL and PEPRA. Annual COLAs to retirement benefits are provided for under CERL. Service retirements are based on age, length of service, and final compensation. Members may withdraw contributions plus interest credited or leave them on deposit for a deferred retirement when they terminate or transfer to a reciprocal retirement system.

Pertinent provisions for each section follow:

General – Tier 1
Members may elect service retirement at age 70 regardless of service, at age 50 with 10 years of service, or with 30 years of service regardless of age. Disability retirements may be granted as service connected with no minimum service credit required or non-service connected with five years of service credit required. The retirement benefit is based on Government Code Section 31676.11 for the Non-enhanced tier and Section 31676.16 for the Enhanced tier. The final compensation is based on a one-year average.

General – Tier 2
Members may elect service retirement at age 70 regardless of service, at age 50 with 10 years of service, or with 30 years of service regardless of age. Previously, disability retirements were granted as service connected with no minimum service credit required or non-service connected with ten years of service credit required. Those members who elected in 1980 to transfer from Tier 1 to Tier 2 were eligible for non-service connected disability retirement with five years of service. The definition of a disability is stricter under Tier 2 than under Tier 1. The retirement benefit is based on Government Code Section 31752. The final compensation is based on a three-year average.

General – Tier 3
Members may elect service retirement at age 70 regardless of service, at age 50 with 10 years of service, or with 30 years of service regardless of age. Disability retirements may be granted as service connected with no minimum service credit or non-service connected with ten years of service credit required. The definition of a disability is the same as Tier 2. The retirement benefit is based on Government

Code Section 31676.16. The final compensation is based on a one-year average.

General – Tier 4

Members may elect service retirement at age 70 regardless of service, or at age 52 with 5 years of service. Disability retirements may be granted as service connected with no minimum service credit or non-service connected with five years of service credit required. The definition of a disability is the same as Tier 1. The retirement benefit is based on Government Code Section 7522.20. The final compensation is based on a three-year average.

General – Tier 5

Members may elect service retirement at age 70 regardless of service, or at age 52 with 5 years of service. Disability retirements may be granted as service connected with no minimum service credit or non-service connected with ten years of service credit required. The definition of a disability is the same as Tier 3. The retirement benefit is based on Government Code Section 7522.20. The final compensation is based on a three-year average.

Safety – Tier A

Members may elect service retirement at age 70 regardless of service, or at age 50 with 10 years of service, or with 20 years of service regardless of age. Disability retirements may be granted as service connected with no minimum service credit required or non-service connected with five years of service credit required. The retirement benefit is based on Government Code Section 31664 for the Non-enhanced tier and Section 31664.1 for the Enhanced tier. The final compensation is based on a one-year average.

Safety – Tier C

Members may elect service retirement at age 70 regardless of service, or at age 50 with 10 years of service, or with 20 years of service regardless of age. Disability requirements may be granted as service connected with no minimum service credit required or non-service connected with five years of service credit required. The retirement benefit is based on Government Code Section 31664.1. The final compensation is based on a three-year average.

Safety – Tier D and Tier E

Members may elect service retirement at age 70 regardless of service, or at 50 with 5 years of service. Disability retirements may be granted as service connected with no minimum service credit required or non-service connected with five years of service credit required. The retirement benefit is based on Government Code Section 7522.25(d). The final compensation is based on a three-year average. Safety Tiers D and E differ only in the COLA provision.

Additional information regarding CCCERA's benefits is included in the Benefit Handbook, available at *cccera.org*.

Cost-of-Living Adjustments (COLA)

The CERL authorizes the Board to grant annual automatic and ad hoc cost-of-living increases to all eligible retired members. Article 16.5 requires the Board to apply a COLA effective April 1st of each year. This adjustment is based on the change in the San Francisco-Oakland-San Jose area Consumer Price Index and is limited to the maximum of two percent for certain Tier 4 and Tier 5 members, depending on Memoranda of Understanding (MOU), and all Safety Tier C and Safety Tier E members; a maximum of three percent for Tier 1, Tier 3 (service retirement), certain Tier 4 and Tier 5 (service retirement), Safety Tier A and Safety Tier D members; and a maximum of four percent for Tier 2, Tier 3 (disability retirement), and Tier 5 (disability retirement) members. Government Code Section 31874.3 allows the granting of a supplemental cost-of-living benefit, on a prefunded basis, to eligible retirees whose unused Consumer Price Index increase accumulations equal or exceed 20 percent. This supplemental increase is a permanent part of the retirees' monthly benefit and is known as "New Dollar Power".

Terminations

Effective January 1, 2003, a member with less than five years of service may elect to leave accumulated contributions on deposit in the retirement fund regardless of years of service as a result of the enactment of AB 2766, which amends Section 31629.5 of CERL. A member who continues membership under this ruling is granted a deferred status and is subject to the same age, service, and disability requirements that apply to other members for service or disability retirement.

Other Post-Employment Benefits (OPEB) Trust

On January 1, 2015, CCCERA became an independent employer. As an employer, CCCERA is responsible for the cost of retiree health benefits for CCCERA employees who retired on or after January 1, 2015. CCCERA contracts with the California Public Employees' Retirement System (CalPERS) and Delta Dental, as health and dental insurance providers for those retired employees. For the retiree health benefits provided to employees that retire from CCCERA on or after January 1, 2015, Milliman Inc., CCCERA's OPEB actuary, prepared an actuarial valuation report of OPEB for those benefits in accordance with the Governmental Accounting Standards Board (GASB) Statements Nos. 74 / 75 to determine the liability, annual required contribution, and other required financial disclosures.

Staff employees who retire directly from CCCERA may receive certain retiree benefits if they meet the eligibility requirements. CCCERA will contribute an amount toward the cost of retiree health benefits for staff retirees consistent with the bargaining agreements between CCCERA and its bargaining units.

As to the cost of retiree health benefits for Contra Costa County employees who worked at CCCERA and retired prior to January 1, 2015, before CCCERA became an independent employer, those liabilities are included with Contra Costa County's OPEB Trust for funding purposes. CCCERA currently provides payments to Contra Costa County for those retired County employees benefits and expenses on a "pay as you go" basis.

Note 2. Summary of Significant Accounting Policies

Basis of Accounting

CCCERA follows the accounting principles and reporting guidelines set forth by the Governmental Accounting Standards Board (GASB). The financial statements are prepared using the accrual basis of accounting in accordance with generally accepted accounting principles (GAAP) in the United States of America, under which revenues are recognized when earned and deductions are recorded when the liability is incurred. Employee and employer contributions are recognized in the period in which the contributions are due, pursuant to formal commitments, as well as statutory or contractual requirements. Investment income is recognized as revenue when earned. Retirement benefits and refunds of prior contributions are recognized when due and payable in accordance with the terms of the Plan. Other expenses are recognized when the corresponding liabilities are incurred. All investment purchases and sales are recorded on the trade date. The net appreciation and/or depreciation in fair value of investments held by CCCERA is recorded as an increase or decrease to investment income based on the valuation of investments at June 30th and December 31st.

Cash Equivalents

Cash equivalents include deposits in the Plan's custodian bank, investment managers, and County Treasurer's commingled cash pool. Cash equivalents are highly liquid investments with maturities of three months or less when purchased. Short-term investments with the custodian bank include foreign currencies, cash held in short-term investment funds and other short-term, highly liquid investments. Short-term investments considered cash equivalents are recorded at cost, which approximates fair value.

Methods Used to Value Investments

Investments are carried at fair value. Fair values for investments are derived by various methods, as indicated in the following chart:

Investment Fair Value Sources

Investments	Source
Publicly Traded Securities, such as stocks and bonds. Bonds includes obligations of the U.S. Treasury, U.S. agencies, non-U.S. governments, and both U.S. and non-U.S. corporations. Also included are mortgage backed securities and asset backed securities.	Valuations are provided by CCCERA's custodian bank based on end-of-day prices from external pricing vendors. Non-U.S. securities reflect currency exchange rates in effect at December 31, 2018 and 2017.
Private Real Estate	Fair value as provided by real estate fund managers, based on review of cash flow, exit capitalization rates, and market trends; fund managers commonly subject each property to independent third-party appraisal annually. Investments under development are carried at cumulative cost until developed.
Alternatives (Private Equity and Private Credit)	Fair value provided by investment managers as follows: Private investments - valued by the General Partner giving consideration to financial condition and operating results of the portfolio companies, nature of investment, marketability, and other factors deemed relevant. Public investments - valued based on quoted market prices, less a discount, if appropriate, for restricted securities.
Public Market Equity and Fixed Income Investments held in Institutional Commingled Fund/ Partnership	Fair value is typically provided by third-party fund administrator, who performs this service for the fund manager.

Investment Asset Allocation Policy

The allocation of investment assets within CCCERA's portfolio is approved by the Board as outlined in the Investment Policy. The asset allocation is an integral part of the Investment Policy. Plan assets are managed on a total return basis with a long-term objective of achieving and maintaining a fully funded status for the benefits provided through the Plan. In September 2016, the Board adopted a revised Investment Policy Statement, referred to as Functionally Focused Portfolio (FFP), that implemented long-term asset allocation targets in phases over a three year roll out period. As of 2018 the long-term asset allocation targets determined by the Board are as follows:

- Liquidity 23%
- Growth 67%
- Diversifying 10%

The first phase, liquidity sub-portfolio, was implemented in October 2016. The growth sub-portfolio phase was implemented in July 2017. The diversifying sub-portfolio phase was implemented in June 2018. Refer to the Investment Section of this report for more information. The following table provides the Board's adopted long-term asset allocation policy as of December 31, 2018.

Long-Term Asset Allocation Policy
As of December 31, 2018

LONG-TERM	
Asset Class	Target Allocation
Liquidity	**23%**
Growth:	
Domestic Equity	5%
Global & International Equity	24%
Private Equity	11%
Private Credit	12%
Real Estate - Value Add	5%
Real Estate - Opportunistic & Distressed	4%
Real Estate - REIT	1%
Risk Parity	5%
Total Growth	**67%**
Risk Diversifying	**10%**
TOTAL	**100%**

Receivables

Receivables consist primarily of interest, dividends, installment contracts, investments in transition (i.e., traded not settled) and contributions owed by plan sponsor employers as of December 31, 2018 and 2017.

Capital Assets

Capital assets, consisting of computer hardware, software, leasehold improvements, furniture and office equipment, are presented at historical cost, less accumulated depreciation and amortization. Capital assets with an initial cost of more than $10,000 and an estimated useful life in excess of three years are capitalized and depreciated/amortized. Depreciation/amortization is calculated using the straight-line method, with estimated lives ranging from three years for software, five to ten years for all hardware, leasehold improvements, and pension administration system assets, and five years for office equipment.

Income Taxes

The Internal Revenue Service has ruled that plans such as CCCERA qualify under Section 401(a) of the Internal Revenue Code and are not subject to tax under present tax laws. In December 2014, CCCERA received a favorable letter of determination from the Internal Revenue Service (IRS). Accordingly, no provision for income taxes has been made in the accompanying basic financial statements, as the Plan is exempt from federal and state income taxes under provisions of the Internal Revenue Code, Section 401, and California Revenue and Taxation Code, Section 23701, respectively.

Use of Estimates

The preparation of CCCERA's financial statements in conformity with accounting principles generally accepted in the United States of America (i.e., GAAP) requires management to make estimates and assumptions that affect the amounts reported in the financial statements and accompanying notes to the financial statements. Actual results could differ from those estimates.

Reclassifications

Comparative data for the prior year have been presented in the selected sections of the accompanying Statement of Fiduciary Net Position and Statement of Changes in Fiduciary Net Position. Also, certain accounts presented in the prior year's data may have been reclassified to be consistent with the current year's presentation.

Implementation of New GASB Pronouncements

In the current year, CCCERA implemented GASB Statement No. 74 (GASB 74), *Financial Reporting for Postemployment Benefit Plans Other Than Pension Plans* and GASB Statement No. 75 (GASB 75) *Accounting and Financial Reporting for Postemployment Benefits Other Than Pensions*.

In June 2015, the GASB issued Statement No. 74 to replace GASB Statement No. 43, *Financial Reporting for Postemployment Benefit Plans Other than Pension Plans*, as amended, and GASB Statements No. 45, *Accounting and Financial Reporting by Employers for Postemployment Benefits Other Than Pensions*, and No. 50, *Pension Disclosures-An Amendment of GASB Statements No. 25 and No. 27*, for plans which provide defined benefit OPEB administered through a trust. GASB 74 was established to improve financial reporting of OPEB through enhanced note disclosures and schedules of required supplementary information that were presented by OPEB plans that are administered through trusts that meet the specific criteria. The new information enhances decision-usefulness of the financial reports of those OPEB plans, their value for assessing accountability, and their transparency by providing information about measures of the net OPEB liabilities and explanations of how and why those liabilities changed from year to year. The provisions of GASB 74 are effective for financial reporting periods beginning after June 15, 2016. CCCERA's fiduciary net position is affected by the implementation of GASB 74 in the current fiscal year because an OPEB irrevocable trust was created.

GASB 75 was also issued in June 2015 and required to be effective for financial periods beginning after June 15, 2017. This statement was established to improve the decision–usefulness of information in employer and governmental non-employer contributing entity financial reports and enhance its value for assessing accountability and inter-period equity by requiring recognition of the entire OPEB liability and a more comprehensive measure of OPEB expense. The consistency, comparability, and transparency of the information reported by employers and governmental non-employer contributing entities about OPEB transactions will be improved with this statement. CCCERA's fiduciary net position is affected by the implementation of GASB 75 in the current year due to recording an expense for the Net OPEB liability on the financial statements for fiscal year ending December 31, 2018.

Note 3.
Deposits and Investment Risk Disclosures

Investment Stewardship

Except as otherwise expressly restricted by the California Constitution and by law, the Board may, at its discretion, invest, or delegate CCCERA to invest the assets of CCCERA through the purchase, holding, or sale of any form or type of instrument, or financial transaction when prudent in the informed opinion of the Board. In addition, the Board has established an Investment Policy, which places limits on the compositional mix of cash, fixed income and equity securities, real assets, alternative investments, and real estate investments. CCCERA currently employs external investment managers to manage its assets subject to the guidelines of the investment policy.

Investment Risk

Investments are subject to certain types of risks, including interest rate risk, credit risk (including custodial credit risk and concentrations of credit risk), and foreign currency risk. The Board recognizes that the assumption of investment risk is necessary to meet the Plan's objectives. The goal in managing investment risk is to ensure than an acceptable level of risk is being taken at the total Plan portfolio level. CCCERA has no formal policy relating to interest rate risk. The following describes those risks:

Interest Rate Risk

Interest rate risk is the risk that the changes in interest rates will adversely affect the fair value of an investment. The fair value of fixed maturity investments fluctuates in response to changes in market interest rates. Increases in prevailing interest rates generally translate into decreases in fair value of those investments. The fair value of interest sensitive instruments may also be affected by the creditworthiness of the issuer, prepayment options, relative values of alternative investments, and other general market conditions. Certain fixed maturity investments may have call provisions that could result in shorter maturity periods.

Holdings of Fixed Income Futures are allowed, on an unleveraged basis, such that the market notional value of long contracts shall be covered by cash, cash receivables, or cash equivalents with one year or less in duration.

The following schedule is a list of fixed income and short-term investments and the related maturity schedule for CCCERA as of December 31, 2018:

Investment Maturities (In Years)
As of December 31, 2018
(Dollars in Thousands)

Investment Type	Less than 1 year	1-5 years	6-10 years	More than 10 years	Fair Value
Collateralized Mortgage Backed Securities (CMBS)	$13,403	$160,757	$111,695	$231,448	$517,303
Collateralized Mortgage Obligations (CMO)	0	0	1,504	225,576	227,080
Corporate Bonds	245,608	961,315	221,707	0	1,428,630
Short-Term Investment Fund (STIF) Instruments	0	0	0	372,766	372,766
US Treasury Notes & Bonds	192,457	39,164	3,051	0	234,672
US Agencies (GNMA, FNMA, FHLMC)	21,371	23,446	1,974	284,559	331,350
TOTALS:	**$472,839**	**$1,184,682**	**$339,931**	**$1,114,349**	**$3,111,801**

Custodial Credit Risk

Custodial credit risk for deposits is the risk that, in the event of a financial institution's failure, CCCERA would not be able to recover its deposits. Deposits are exposed to custodial credit risk if they are not insured or not collateralized. Under California Government Code, a financial institution is required to secure deposits in excess of $250,000 made by state or local governmental units by pledging securities held in the form of an undivided collateral pool. The fair value of the pledged securities in the collateral pool must equal at least 110% of the total amount deposited by the public agencies. California law also allows financial institutions to secure governmental deposits by pledging first deed mortgage notes having a value of 150% of the secured public deposits. Such collateral is held by the pledging financial institution's trust department or agent in CCCERA's name.

At year-end, the carrying amount of CCCERA's cash deposits in non-interest bearing accounts was $43,090,776 (which are included in cash equivalents) and the bank balance was $43,025,664. The difference between the bank balance and the carrying amount represents outstanding checks and deposits in transit. Effective January 1, 2013, funds deposited in a non-interest bearing account no longer receive unlimited deposit insurance coverage by the Federal Deposit Insurance Corporation (FDIC). Non-interest bearing bank account balances in excess of the FDIC insurance coverage of $250,000 are collateralized with qualifying securities held in pooled pledged custodial accounts earmarked as collateral against public fund deposits.

Custodial credit risk for investments is the risk that, in the event of the failure of the counterparty to a transaction, CCCERA would not be able to recover the value of the investment or collateral securities that are in the possession of an outside party. Investment securities are exposed to custodial credit risk if the securities are uninsured, not registered in CCCERA's name, and held by the counterparty. CCCERA's investment securities are not exposed to custodial credit risk because all securities held by CCCERA's custodial bank are in CCCERA's name.

CCCERA has no general policy on custodial credit risk for deposits.

Money-Weighted Rate of Return

For the years ended December 31, 2018 and 2017, the annual money-weighted rate of return on the assets of the Plan, net of investment expense, was -2.18% and 13.23%, respectively. The money-weighted rate of return expresses investment performance, net of investment expense, adjusted for the timing of cash flows and the changing amounts actually invested.

At the June 8, 2016 Board meeting, the Board adopted an investment return assumption for financial reporting purposes that is net of investment expenses and not net of administrative expenses equal to 7.00% per year.

Investment Concentrations

The Board's investment policies and guidelines permit investments in numerous specified asset classes to take advantage of professional investment management advice and a well-diversified portfolio. At December 31, 2018, CCCERA has no individual securities that represent five percent (5%) or more of the Plan's fiduciary net position. Investments issued or explicitly guaranteed by the U.S. government and pooled investments are excluded from this requirement. However, there are four portfolio positions that exceed the 5% threshold, but each of these positions represents a diversified portfolio. As of December 31, 2018 the portfolios that exceed 5% of the Plan's fiduciary net position are:

- Insight Short-Duration Fixed Income 10.6%
- SIT Short-Duration Fixed Income 6.4%
- Pyrford International Equity 5.1%
- William Blair International Equity 5.1%

As of December 31, 2017, CCCERA held the same four portfolio positions that represented more than 5% of the Plan's fiduciary net position.

Credit Risk

Credit risk is the risk that an issuer, or other counterparty to an investment, will not fulfill its obligations. CCCERA's general investment policy is to apply the prudent-person rule. Investments are made as a prudent person would be expected to act, with discretion and for the exclusive purpose of providing benefits, minimizing contributions, and defraying reasonable expenses of administering the Plan. Investments should be diversified so as to minimize the risk of loss and to maximize the rate of return unless, under the circumstances, it is clearly prudent not to do so.

Nationally recognized statistical rating organizations provide ratings of debt securities' quality based on a variety of factors. For example, the financial condition of the issuer provides investors with some idea of the issuer's ability to meet its obligations. Fixed-maturity investments may consist of rated or non-rated securities. Ratings can range from AAA (highest quality) to D (default). An investment grade is a rating that indicates that a bond has a relatively low risk of default. Debt securities with ratings of BBB or higher are considered investment grade issues, and debt securities with ratings of BB or lower are non-investment grade issues. Debt securities in the non-investment grade category are more speculative and are often referred to as "high-yield". This is due to the fact that lower rated debt securities generally carry a higher interest rate to compensate the buyer for taking on additional risk.

The following is a schedule of the credit risk ratings of CCCERA's fixed income and short-term investments as of December 31, 2018 as rated by Standard & Poor's (Dollars in Thousands):

Credit Risk Ratings
As of December 31, 2018

Quality Ratings	Fair Value
AAA	$449,563
AA+	63,983
AA	45,486
AA-	113,668
A+	147,010
A	159,257
A-	146,906
BBB+	202,344
BBB	159,154
BBB-	22,085
BB+	32,093
BB	56,684
BB-	53,254
B+	47,448
B	37,699
B-	48,707
CCC+	18,692
CCC	0
CCC-	3,707
NR	1,304,061
TOTAL CREDIT RISK FIXED INCOME SECURITIES	**$3,111,801**

Investment Type	Quality Rating Range
Asset-backed securities*	AAA to CCC
Convertible bonds	Not rated
CMBS	AAA to CCC
CMO*	AAA to D
Corporate bonds*	AAA to CCC-
Municipals	AAA to BBB+
Private placements	AAA to BBB+
Real estate investment trust*	A- to B+
Short-term	AA to A+
U.S. & foreign agencies*	AAA to CCC+
Mutual funds	Not rated

*Investment type contained one or more investments that were not rated.

Foreign Currency Risk

Foreign currency risk is the risk that changes in exchange rates may adversely affect the fair value of an investment. CCCERA has no formal policy related to foreign currency risk. CCCERA's external investment managers may invest in international securities and must follow CCCERA's investment guidelines pertaining to these types of investments.

CCCERA's exposure to foreign currency risk in U.S. dollars as of December 31, 2018 is as follows:

Foreign Currency Risk
As of December 31, 2018
(Dollars in Thousands)

Currency	Fixed Income	Equity	Total
Australian Dollar	$1,668	$69,091	$70,759
Brazilian Real	1,085	40,415	41,500
British Pound Sterling	16,268	155,495	171,763
Canadian Dollar	5,885	19,662	25,547
Chinese Yuan - China	46	-	46
Colombian Peso	-	1,645	1,645
Czech Koruna	(3)	-	(3)
Danish Krone	506	21,896	22,402
Euro Currency	23,266	244,663	267,929
Hong Kong Dollar	4,314	202,361	206,675
Indian Rupee	-	70,067	70,067
Indonesian Rupiah	455	12,446	12,901
Israeli Shekel	316	4,695	5,011
Japanese Yen	37,800	120,456	158,256
Malaysian Ringgit	82	24,482	24,564
Mexican Peso	1,619	4,979	6,598
Norwegian Krone	423	8,881	9,304
Philippines Peso	-	1,481	1,481
Polish Zioty	527	4,738	5,265
Republic of Korea Won	6,510	102,226	108,736
Russian Federation Ruble	-	4,251	4,251
Singapore Dollar	1,246	21,076	22,322
South Africa Rand	-	43,439	43,439
Swedish Krona	2,849	25,810	28,659
Swiss Franc	6,729	92,008	98,737
Taiwan New Dollar	-	56,608	56,608
Thailand Bait	2,043	11,391	13,434
Turkish Lira	-	8,484	8,484
United Arab Emirates Dirham	-	1,108	1,108
Yuan Renminbi - China	(46)	-	(46)
TOTAL SECURITIES SUBJECT TO FOREIGN CURRENCY RISK	**$113,588**	**$1,373,854**	**$1,487,442**

Note 4.
Fair Value Measurements

CCCERA implemented GASB Statement No. 72 (GASB 72), *Fair Value Measurements and Application*, in the year ending December 31, 2016. GASB 72 was issued to address accounting and financial reporting issues related to fair value measurements and disclosures. The Plan's investments are measured and reported within the fair value hierarchy established by generally accepted accounting principles. The fair value hierarchy, which has three levels, is based on the valuation inputs used to measure an asset's fair value and gives the highest priority to unadjusted quoted prices in active markets for identical assets or liabilities (level 1 measurements) and the lowest priority to unobservable inputs (level 3 measurements). The three levels of the fair value hierarchy are as follows:

- *Level 1* inputs are quoted prices (unadjusted) for identical assets or liabilities in active markets.
- *Level 2* inputs are inputs other than quoted prices included in Level 1 that are observable for an asset or liability, either directly or indirectly. Inputs to the valuation include: 1) quoted prices for similar assets or liabilities in active markets; 2) quoted prices for identical or similar assets or liabilities in markets that are not active; 3) Inputs other than quoted prices that are observable for the asset or liability; and 4) market-corroborated inputs.
- *Level 3* inputs are unobservable inputs for an asset or liability where there are little market activities. The inputs into the determination of fair value are based upon the best information in the circumstances and may require management judgment or estimation.

Schedule of Investments by Fair Value Hierarchy

Equity securities and real estate investment trusts classified in Level 1 of the fair value hierarchy are valued using prices quoted in active markets for those securities.

The exchange traded Foreign Exchange Contracts classified in Level 1 of the fair value hierarchy are valued using a daily settlement when available or as a daily mark to market.

Debt and equity securities classified in Levels 1 or 2 of the fair value hierarchy are valued using a matrix pricing technique based on the availability of the market price, the pricing source and type, and the country of incorporation of the securities. The hierarchy levels are determined based on the level of corroborative information obtained from other market sources to assert that the prices provided represent observable data.

Equity mutual funds and real assets classified in Level 2 of the fair value hierarchy are valued based on the availability of market price of the underlying assets, and using either a discounted cash flow or Comparable Company Analysis with internal assumptions.

Certain investments which do not have a readily determinable fair value have been valued at Net Asset Value (NAV) per share (or its equivalent) provided that the NAV is calculated and used as a practical expedient to estimate fair value in accordance with GAAP requirements. These investments are not categorized within the fair value hierarchy but disclosed in the Schedule of Investments Measured at the NAV.

CCCERA has the following recurring fair value measurements as of December 31, 2018 (in thousands):

Schedule of Investments by Fair Value Hierarchy
The Plan has the following recurring fair value measurements as of December 31, 2018
(Dollars in Thousands)

		Fair Value Measurements Using		
	Total	Quoted Prices in Active Markets for Identical Assets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Other Unobservable Inputs (Level 3)
Investments by Fair Value Level:				
Stocks:				
Domestic Equity	$937,342	$914,576	$22,766	$-
Global & International Equity	268,775	216,784	51,991	-
Real Estate - REIT	66,689	66,234	455	-
Total Stock Securities	**1,272,806**	**1,197,594**	**75,212**	**-**
Bonds:				
Liquidity Program	1,786,770	-	1,786,770	-
Held in Equity Portfolios	3,517	-	3,517	-
High Yield	305,035	-	305,035	-
Risk Diversifying	201,154	-	201,154	
Total Bond Securities	**2,296,476**	**-**	**2,296,476**	**-**
Real Assets:				
Risk Diversifying	177,200	-	177,200	-
Cash Overlay	33,016	-	33,016	-
Total Investments By Fair Value Level	**3,779,498**	**1,197,594**	**2,581,904**	**-**
Investments Measured at the Net Asset Value (NAV):				
Public Market Commingled Funds	2,215,194			
Real Estate:				
Value Added, Opportunistic & Distressed Funds	644,588			
Alternatives:				
Private Equity & Private Credit Funds	1,263,794			
Total Investments Measured at the NAV	**4,123,576**			
TOTAL INVESTMENTS MEASURED AT FAIR VALUE	**$7,903,074**			
Investment Derivative Instruments:				
Futures Contracts	**(2,998)**	**(2,998)**	**-**	**-**
Foreign Exchange Contracts	**9**	**9**	**-**	**-**
Total Investment Derivative Instruments	**(2,989)**	**(2,989)**	**-**	**-**

Investments Measured at the Net Asset Value (NAV)
(Dollars in Thousands)

	Fair Value	Unfunded Commitments	Redemption Frequency	Redemption Notice Period
Public Market Commingled Funds (1)	$2,215,194	$-	1-90 days	1-30 days
Real Estate:				
Value Added, Opportunistic & Distressed Funds (2)	644,588	254,966	N/A	N/A
Alternatives:				
Private Equity & Private Credit Funds (3)	1,263,794	890,250	N/A	N/A
Total Investments Measured at the NAV	**$4,123,576**	**$1,145,216**		

1. *Public Market Commingled Funds:* This investment type consists of eight public market commingled funds that primarily invest in publicly traded stocks and bonds. The fair value of these investments has been determined using a practical expedient based on the investments' NAV per share (or its equivalent). These investments typically have monthly liquidity with ten days notice.

2. *Value Added, Opportunistic & Distressed Real Estate Funds:* This investment type consists of twenty-one real estate funds that invest primarily in commercial real estate. The fair value of these investments has been determined using a practical expedient based on the investments' NAV. All of the funds are in closed-end fund vehicles and are not redeemable. It is expected that these investments will be held for the entire lives of the funds and will not be sold in the secondary market. Distributions from each fund will be received as underlying assets are liquidated by the fund managers. It is expected that the underlying assets of these funds will be liquidated over the next one to 12 years, depending on the vintage year of each fund.

3. *Private Equity & Private Credit Funds:* This investment type consists of twenty-five private equity and five private credit funds. The private equity funds invest primarily in other private equity funds, privately held U.S., and non-U.S. companies. The five private credit funds invest primarily in other private credit funds, commercial real estate debt and debt instruments of upstream energy firms. The fair value of these investments has been determined using a practical expedient based on the investments' NAV. It is expected that these investments will be held for the entire lives of the funds and will not be sold in the secondary market. Distributions from each fund will be received as the underlying assets are liquidated by the fund managers. It is expected that the underlying assets of these funds will be liquidated over the next one to 15 years, depending on the vintage year of each fund.

Note 5. Securities Lending Transactions

The investment policy, adopted by the Board, permits the use of a securities lending program with its principal custodian bank. Securities lending is an investment management activity that mirrors the fundamentals of a loan transaction. Securities are lent to brokers and dealers (borrower), and in turn CCCERA receives cash as collateral and invests the collateral with the goal of earning a higher yield than the interest rate paid to the borrower. Earnings generated above and beyond the interest paid to the borrower represent the net income to CCCERA from the transaction. The custodian bank provides loss indemnification to CCCERA if the borrower fails to return the securities.

The custodian bank manages the securities lending program and receives cash and/or securities as collateral. The collateral cash can be invested and is automatically rolled into a Short-Term Investment Fund (STIF). The collateral securities cannot be pledged or sold by CCCERA without borrower default. The collateral is marked-to-market daily, and if the market value of the securities rises, CCCERA receives additional collateral.

Securities on loan must be collateralized at 102 percent and 105 percent of the fair value of domestic securities and international equity securities, respectively, plus accrued interest (in the case of debt securities).

There are no restrictions on the amount of the securities that can be loaned at one time. CCCERA has the right to terminate any loan in whole or in part by providing the custodian bank with written notice (a "Recall Notice"). Because the loans are terminable at will, the term to maturity of the security loans is generally not matched with the term to maturity of the cash collateral. At year-end, CCCERA had no credit risk exposure to borrowers, because the amount of collateral received exceeded the value of securities on loan. As of December 31, 2018, there were no violations of legal or contractual provisions. CCCERA had no losses on securities lending transactions resulting from the default of a borrower for the years ended December 31, 2018 and 2017.

At year-end, additional funds of $777 thousand are owed to borrowers for CCCERA's collateral overpayments on CCCERA's securities on loan. This is known as the "calculated mark" and will settle on the first business day of January 2019. CCCERA has no credit risk exposure to borrowers because the collateral exceeds the amount borrowed. The fair value of investments on loan at December 31, 2018 is $280.5 million which was collateralized by cash and securities in the amount of $286.0 million. The fair value of the cash collateral in the amount of $243.4 million has been reported both as an asset and liability in the accompanying Statement of Fiduciary Net Position.

Securities Lending
The following securities were on loan and collateral received as of December 31, 2018
(Dollars in Thousands)

Securities on Loan	Fair Value of Securities on Loan	Cash Collateral	Non-Cash Collateral	Calculated Mark*	Collateral Percentage
U.S. Corporate Fixed and Equity	$230,714	$192,560	$42,614	$740	102.3%
U.S. Government	45,848	46,749	-	31	102.0%
Non-U.S. Equity	392	419	-	(6)	105.2%
Non-U.S. Fixed Income	3,571	3,630	-	12	102.0%
TOTAL	**$280,525**	**$243,358**	**$42,614**	**$777**	**102.2%**

*Additional funds known as the "calculated mark" are due from/to the borrower to bring collateral to 102% for domestic and non-U.S. debt securities.

Note 6.
Net Pension Liability

Statement No. 67 of the Governmental Accounting Standards Board (GASB) requires public pension plans to provide a net pension liability. The net pension liability is measured as the total pension liability less the amount of the pension plan's fiduciary net position. The net pension liability is an accounting measurement for financial statement reporting purposes. The components of CCCERA's (the Plan's) net pension liability as of December 31, 2018 and 2017 are as follows:

Net Pension Liability
(Dollars in Thousands)

	December 31, 2018	December 31, 2017
Total Pension Liability (a)	$9,578,030	$9,202,018
Plan Fiduciary Net Position (b)	8,149,986	8,390,581
Net Pension Liability (a-b)	**$1,428,044**	**$811,437**
Plan Fiduciary Net Position as a Percentage of the Total Pension Liability (b/a)	**85.1%**	**91.2%**

Actuarial Assumptions

In preparing an actuarial valuation, the actuary employs generally accepted actuarial methods and assumptions to evaluate the Plan's assets, liabilities, and future contributions requirements. The actuary utilizes member data and financial information provided by the Plan with economic and demographic assumptions made about the future to estimate the Plan's financial status as of a specified point in time. Examples of estimates include assumptions about future employment, mortality, future investment returns, future salary increases, expected retirements and other relevant factors. Actuarially determined amounts are subject to continual review or modification. The Board reviews the economic and demographic assumptions of the Plan every three years.

The actuarial assumptions used to determine the total pension liability as of December 31, 2018 were based on the results of the most recent Actuarial Experience Study which covered the period from January 1, 2015 through December 31, 2017. Key methods and assumptions used in the latest actuarial valuation and the total pension liability are presented in the following table.

Key Methods and Assumptions Used In Annual Actuarial Valuation and Total Pension Liability

Valuation Date	December 31, 2018
Actuarial Experience Study	3 Year Period Ending December 31, 2017
Actuarial Cost Method	Entry Age
Amortization Method	Level percent of payroll
Remaining Amortization Period	Remaining balance of December 31, 2007 UAAL is amortized over a fixed (decreasing or closed) period with 5 years remaining as of December 31, 2017. Any changes in UAAL after December 31, 2007 is separately amortized over a fixed 18-year period effective with that valuation. Effective December 31, 2013, any changes in UAAL due to plan amendments (with the exception of a change due to retirement incentives) will be amortized over a 10-year fixed period effective with that valuation. The entire increase in UAAL resulting from a temporary retirement incentive will be funded in full upon adoption of the incentive.
Asset Valuation Method	Fair 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 fair value, and is recognized semi-annually over a five-year period. The Actuarial Value of Assets is reduced by the value of the non-valuation reserves and designations.
Investment Rate of Return	7.00%, net of pension plan investment expenses, including inflation
Inflation Rate	2.75%
Administrative Expenses	1.10% of payroll allocated to both the employer and member based on the components of the normal cost rates for the employer and member.
Real Across-the-Board Salary Increase	0.50%
Projected Salary Increases(1)	General: 3.75% to 15.25% Safety: 4.25% to 16.25%, varying by service, including inflation.
Cost-of-Living Adjustments	2.75% per year except for Safety Tier C, PEPRA Tier E benefits and PEPRA Tier 4 (2% COLA) and Tier 5 (2% COLA) benefits for members covered under certain memoranda of understanding are assumed to increase at 2% per year. All increases are contingent upon actual increases in Consumer Price Index (CPI).
Other Assumptions:	Same as those that will be used in the December 31, 2018 funding actuarial valuation.

(1)Includes inflation at 2.75% plus real across-the-board salary increase of 0.50% plus promotional and merit increases for December 31, 2018.

Long-Term Expected Real Rate of Return

The long-term expected rate of return on Plan investments was determined in 2018 using a building-block method in which expected future real rates of return (expected returns, net of inflation) are developed for each major asset class. This information is combined to produce the long-term expected rate of return by weighting the expected future real rates of return by the target asset allocation percentage, adding expected inflation, and subtracting expected investment expenses and a risk margin. The target allocations (approved by the Board) and projected arithmetic real rates of return for each major asset class, after deducting inflation, but before investment expenses, used in the derivation of the long-term expected investment rate of return assumption for each major asset class are summarized in the following table.

Long-Term Expected Real Rate of Return

Asset Class	Target Allocation	Weighted Average Long-Term Expected Real Rate of Return (Arithmetic)
Large Cap U.S. Equity	5.00%	5.44%
Developed International Equity	13.00%	6.54%
Emerging Markets Equity	11.00%	8.73%
Short-Term Govt/Credit	23.00%	0.84%
U.S. Treasury	3.00%	1.05%
Value Add Real Estate	5.00%	8.80%
Opportunistic Real Estate	4.00%	12.00%
Risk Parity	5.00%	5.80%
REIT	1.00%	6.80%
Risk Diversifying Strategies	7.00%	3.53%
Global Intrastructure	3.00%	7.90%
Private Credit	12.00%	5.80%
Private Equity	8.00%	9.27%
TOTAL	100.00%	

Mortality Rates

Mortality rates used in the latest actuarial valuation are based on the Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table, projected generationally with the two-dimensional MP-2015 projection scale for General Members and set back three years, projected generationally with the two dimensional MP-2015 projection scale for Safety Members. The rates used in evaluating disability allowances were based on the Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table set forward eight years, projected generationally with the two-dimensional MP-2015 projection scale for General Members and set forward three years for Safety Members.

Discount Rate

The discount rate used to measure the total pension liability as of December 31, 2018 and December 31, 2017 was 7.00%. The projection of cash flows used to determine the discount rate assumed Plan member contributions will be made at the current contribution rate and that employer contributions will be made at rates equal to the actuarially determined contribution rates. For this purpose, only employee and employer contributions that are intended to fund benefits for current Plan members and their beneficiaries are included. Projected employer contributions that are intended to fund the service costs for future Plan members and their beneficiaries, as well as projected contributions from future Plan members, are not included. Based on those assumptions, the Plan's fiduciary net position was projected to be available to make all projected future benefit payments for current Plan members. Therefore, the long-term expected rate of return on pension plan investments of 7.00% was applied to all periods of projected benefit payments to determine the total pension liability as of December 31, 2018 and December 31, 2017, respectively.

The following table presents the net pension liability of participating employers calculated using the discount rate of 7.00% as of December 31, 2018 as well as what the net pension liability would be if it were calculated using a discount rate that is 1-percentage-point lower (6.00%) or 1-percentage-point higher (8.00%) than the current rate.

Sensitivity of Net Pension Liability to Changes in the Discount Rate
As of December 31, 2018
(Dollars in Thousands)

	1% Decrease (6.00%)	Current Discount Rate (7.00%)	1% Increase (8.00%)
Net Pension Liability	$2,712,157	$1,428,044	$376,027

Note 7.
Other Post-Employment Benefits (OPEB) Liability and Section 115 Trust

GASB 74 and GASB 75 requires CCCERA to report the total OPEB liability and net OPEB liability as calculated by its actuary, Milliman Inc. GASB 74 and GASB 75 also require the OPEB fiduciary net position to be presented as a percentage of the total OPEB liability, which is 54% as of December 31, 2018. The total OPEB liability, which is the responsibility of CCCERA as an employer, is calculated separately from the Pension Plan liabilities and is presented solely for financial statement purposes.

On February 14, 2018, the Board adopted the OPEB Actuarial Valuation Report by Milliman Inc., directed the Chief Executive Officer (CEO) to establish an Irrevocable Trust agreement per IRS Code Section 115 for the purpose of pre-funding OPEB obligations for CCCERA employees, and to issue a Request For Proposal for OPEB Trust fund management services.

On November 28, 2018, the Board authorized the CEO to execute a contract with Public Agency Retirement Services (PARS) for OPEB Trust fund management services, appointed the CEO as CCCERA's plan administrator for the program, whose authority includes the selection of an appropriate investment option offered by PARS, and approved an initial employer contribution transfer of $2.5 million from the previously set-aside liability to pre-fund the OPEB Trust.

On January 23, 2019, the Board adopted a funding policy to contribute to the OPEB Trust equal to the Actuarially Determined Contribution (ADC) each year. For this valuation, the ADC is defined as the annual service cost, plus an amount to amortize the net OPEB liability over 30 years from 2018 on a level dollar basis, plus interest to account for the timing of contributions during the year.

The net OPEB liability is measured as the total OPEB liability less the amount of the OPEB Trust fiduciary net position. The net OPEB liability is an accounting measurement for financial statement reporting purposes which as of December 31, 2018 is as follows:

Net OPEB Liability
As of December 31, 2018
(Dollars in Thousands)

	2018
Total OPEB Liability	$4,710
Less OPEB Trust Fiduciary Net Position	2,542
Net OPEB Liability	**$2,168**
Fiduciary Net Position as a Percentage of Total OPEB Liability	**54.0%**

Key Methods and Assumptions Used In Actuarial Valuation of Total OPEB Liability	
Valuation Date	December 31, 2018
Actuarial Cost Method	Entry Age
Amortization Method	Level percent of payroll
Amortization Period	30 years
Asset Valuation Method	Fair value of assets
Investment Rate of Return	6.75%
Inflation Rate	2.75%
Assumed Salary Increases	4.00% to 13.25% varying by years of service
Other Assumptions:	Consistent with those used in the December 31, 2017 CCCERA Actuarial Valuation

Investment Rate of Return

The assumed investment rate of return used was 6.75%, net of expenses. This is based on the investment policy set by CCCERA for the OPEB Trust managed by PARS.

Discount Rate

Under GASB 74 / 75, the discount rate should be the single rate that reflects the long-term rate of return on OPEB plan investments that are expected to be used to finance the payment of benefits. To the extent that OPEB plan assets, along with expected future investment returns and expected future contributions are sufficient to finance all OPEB benefits, the discount rate should be based on the assumed investment on assets. CCCERA's current policy is to fund the Actuarial Determined Contribution each year. Based on CCCERA's funding policy, plan assets are projected to be sufficient to fund OPEB liabilities. Therefore, a discount rate of 6.75% and a 2.75% rate of long-term inflation was assumed. Based on the OPEB Trust portfolio's target allocation table below, the expected annual return of Trust assets over the next 50 years is expected to be 6.82%.

OPEB Trust Long-Term Expected Real Rate of Return

Asset Class	Target Asset Allocation	Expected 1 -Year Nominal Return
Domestic Equity Large Cap	20.0%	7.48%
Domestic Equity Small Cap	5.0%	8.75%
International Developed Equity	20.0%	8.99%
International Emerging Market Equity	15.0%	11.11%
Real Estate	2.0%	8.12%
U.S. Treasuries	8.0%	4.59%
Intermediate-Term Fixed Income	15.0%	4.94%
Short-Term Fixed Income	15.0%	4.28%
TOTAL	**100.00%**	
Expected annual return of OPEB Trust assets over 50 years		6.82%

Demographic Assumptions

Since CCCERA became in independent employer on January 1, 2015, there is insufficient experience data on mortality, turnover, disability and retirement rates for CCCERA staff employees. Therefore, the assumed demographic rates used for the OPEB valuation are the same used in the CCCERA pension plan valuation. These assumptions can be reviewed and modified in the future as experience emerges for CCCERA staff employees.

Sensitivity of Net OPEB Liabilities

GASB 74/ 75 requires disclosure of the sensitivity of the Net OPEB Liability (NOL) to changes in the discount rate and health care cost trend rates. The liabilities shown in the following table are as of December 31, 2018. The following tables show what CCCERA's net OPEB liability would be if it were calculated using a discount rate that is 1 percentage point lower or 1 percentage point higher than the current discount rate and the current healthcare cost trend rate.

Sensitivity of Net OPEB Liability to Changes in the Discount Rate
As of December 31, 2018
(Dollars in Thousands)

	1% Decrease (5.75%)	Current Discount Rate (6.75%)	1% Increase (7.75%)
Net OPEB Liability	$2,851	$2,168	$1,611

Sensitivity of Net OPEB Liability to Changes in the Healthcare Cost Trend Rate
As of December 31, 2018
(Dollars in Thousands)

	1% Decrease (5.75%)	Current Discount Rate (6.75%)	1% Increase (7.75%)
Net OPEB Liability	$1,538	$2,168	$2,962

Note 8.
Derivative Financial Instruments

A derivative is a security with a price that is dependent upon or derived from one or more underlying assets. As of December 31, 2018, the derivative instruments held by CCCERA are considered investments and not hedges for accounting purposes. The term hedging, as it is used elsewhere in the notes to these financial statements, denotes an economic activity and not an accounting method. The gains and losses from this activity are recognized as incurred in the Statement of Changes in Fiduciary Net Position.

CCCERA currently employs external investment managers to manage its assets as permitted by the California Government Code and CCCERA's investment policy and specific managers hold investments in swaps, options, futures, forward settlement contracts, and warrants and enter into forward foreign currency exchange security contracts within fixed income financial instruments. The fair value of options, futures, and warrants is determined based upon quoted market prices. The fair value of derivative investments that are not exchange traded, such as swaps, and TBAs (To Be Announced) is determined by an external pricing service using various proprietary methods, based upon the type of derivative instrument. Futures contracts are marked to market at the end of each trading day, and the settlement of gains or losses occur on the following business day through variation margins. The fair value of international currency forwards represents the unrealized gain or loss on the related contracts, which is calculated as the difference between the specified contract exchange rate and the exchange rate at the end of the reporting period.

Forward foreign currency exchange contracts are used primarily to hedge against changes in exchange rates related to foreign securities. Due to the level of risk associated with certain derivative investment securities, it is conceivable that changes in the values of investment securities will occur in the near term, and such changes could affect the amounts reported in the financial statements.

CCCERA could be exposed to risk if the counterparties to the contracts are unable to meet the terms of the contracts. CCCERA's investment managers seek to control this risk through counterparty credit evaluations and approvals, counterparty credit limits, and exposure monitoring procedures. CCCERA anticipates that the counterparties will be able to satisfy their obligations under the contracts. The following is a summary of derivative instruments at December 31, 2018 with the net appreciation/ (depreciation) that has occurred during the year:

Fair Value
As of December 31, 2018
(Dollars in Thousands)

Investment Derivatives by Type	Net Appreciation/ (Depreciation) in Fair Value Amount	Classifications	Fair Value	Notional Amount
Fixed Income Futures Long	$(578)	Futures	$-	$41,400
FX Forwards	823	Long Term Instruments	9	16,053
Index Futures Long	(38,996)	Futures	-	178
Index Options Written	(4,235)	Options	(2,998)	(159)
Warrants	-	Common Stock	-	224
TOTAL	**($42,986)**		**($2,989)**	

Valuation methods are more fully described in Note 2, *Summary of Significant Accounting Policies*, to the basic financial statements. CCCERA's derivative instruments that are not exchange traded, including the swaps disclosed above, are valued using methods employed for debt securities. CCCERA's investment policy does not require collateral to be held for derivative investments.

Futures contracts are instruments that derive their value from underlying indices or reference rates and are marked to market daily. Settlement of gains or losses occur the following business day. As a result, those instruments and other similar instruments do not have a fair value at December 31, 2018, or any other trading day. Daily settlement of gains and losses enhances internal controls as it limits counterparty credit risk. Futures variation margin accounts are also settled daily and recognized in the financial statements under net appreciation/(depreciation) in fair value as they are incurred.

Foreign currency contracts are obligations to buy or sell a currency at a contractual exchange rate and quantity on a specific date in the future. The fair value of the foreign currency forwards is the unrealized gain or loss calculated as the difference between the contractual exchange rate and the closing exchange rate as of December 31, 2018.

Counterparty Credit Risk

Counterparty credit ratings of CCCERA's non-exchange traded investment derivative instruments (approximately $142.8 thousand) and subject to loss as of December 31, 2018, ranged from AA- to A- per Standard & Poor's rating with similar ratings from Moody's and Fitch Ratings (Fitch). No instruments that were non-exchange traded lacked ratings. In a case where a wholly owned broker–dealer does not engage the rating companies for a standalone rating, the subsidiary is assigned the parent company rating as the broker-dealer is an integral part of their business model(s). With the exception of forward trade commitments, CCCERA has a policy of requiring collateral posting provisions in non-exchange traded derivative instruments where it is market practice. As of December 31, 2018, CCCERA does not hold any collateral related to its non-exchange traded derivative instruments.

The approximate $142.8 thousand represents the maximum loss that would be recognized at December 31, 2018 should the counterparties fail to perform. While no netting arrangements are used by CCCERA, the amount represents a net position of exposure for similar instruments.

Derivative Instruments Subject to Credit Risk

As of December 31, 2018, the following is a table of investment providers that are subject to credit risk, percentage of net exposure, and ratings:

Investment Provider Exposure to Credit Risk
At December 31, 2018

Counterparty	Percentage of Net Exposure	Standard & Poor's
HSBC BANK USA	31%	AA-
GOLDMAN SACHS BANK USA	26%	BBB+
BANK OF NEW YORK	25%	A
UBS AG	17%	A+
JPMORGAN CHASE BANK N.A	1%	A+

Custodial Credit Risk

The custodial credit risk for exchange traded derivative instruments is made in accordance with custodial credit risk disclosure requirements outlined in Generally Accepted Accounting Principles (GAAP). As of December 31, 2018, all of CCCERA's investments are held in CCCERA's name and are not subject to custodial credit risk.

Interest Rate Risk

As of December 31 2018, CCCERA is not exposed to interest rate risk on its swaps and options. Since CCCERA's investment managers can buy and sell the swaps and options on a daily basis, the investment managers actively manage the portfolio to minimize interest rate risk and it is unlikely that the swaps and options will be held to maturity. The total fair value subject to interest rate risk as of December 31, 2018 is zero.

The interest rate swaps and options are highly sensitive to interest rate changes. As of December 31, 2018, they had a fair value of zero and an approximate notional value of $41.4 million.

FOREIGN CURRENCY RISK IN INTERNATIONAL INVESTMENT SECURITIES

CCCERA is exposed to foreign currency risk on its various investments denominated in foreign currencies. As of December 31, 2018, there were no currencies in a receivable position (purchased). As of December 31, 2018, the following currencies were in a payable position (sold) with net exposure, denominated in United States Dollars:

Foreign Currency Risk in International Investment
(Dollars in Thousands)

Currency Name	Options	Net Receivable (Purchased)	Net Payable (Sold)	Swaps	Exposure
EURO CURRENCY	$-	$-	$90	$-	$90
POUND STERLING	-	-	52	-	52
JAPANESE YEN	-	-	(133)	-	(133)
SUBTOTAL	**$0**	**$0**	**$9**	**-**	**$9**
US DOLLAR	(2,998)	-	-	-	(2,998)
TOTAL	**($2,998)**	**$0**	**$9**	**$0**	**($2,989)**

Contingent Features

As of December 31, 2018, CCCERA held no investments with contingent features.

Note 9.
Contributions

Participating employers and active Plan members are required to contribute a percentage of covered salary to the Plan. This requirement is pursuant to Government Code Sections 31453.5, 31454 and 7522.52, for participating employers, and Government Code Sections 31621.6, 31639.25 and 7522.30 for active Plan members. The contribution requirements are established and may be amended by the Board pursuant to Article 1 of CERL, which is consistent with the Plan's Actuarial Funding Policy. The contribution rates are adopted yearly, based on an annual actuarial valuation, conducted by an independent actuary, that considers the mortality, service (including age at entry into the Plan, if applicable, and tier), and compensation experience of the members and beneficiaries, and also includes an evaluation of the Plan's assets and liabilities. Participating employers may pay a portion of the active Plan members' contributions through negotiations and bargaining agreements subject to restrictions in CERL and PEPRA.

Employers are required to contribute at an actuarially determined rate calculated on the alternate funding method permitted by Government Code Section 31453.5. Pursuant to provisions of CERL, the Retirement Board recommends annual contribution rates for approval by the Board of Supervisors. These contribution rates are determined in accordance with the Plan's Actuarial Funding Policy, which has the following goals:

1. To determine future contributions that, together with current plan assets, are expected to be sufficient to provide for all benefits provided by CCCERA;

2. To seek reasonable and equitable allocation of the cost of benefits over time including the goal that annual contributions should, to the extent reasonably possible, maintain a close relationship to both the expected cost of each year of service and to variations around that expected cost;

3. To manage and control future contribution volatility to the extent reasonably possible, consistent with other policy goals; and,

4. To support the general public policy goals of accountability and transparency by being clear as to both intent and effect, allowing for an assessment of whether, how and when the plan sponsors will meet the funding requirements of the Plan.

The "Entry Age" method is used to determine the normal cost and the Actuarial Accrued Liability (AAL). Under this method, the employer contribution rate provides for current cost (normal cost) plus a level percentage of payroll to amortize the Unfunded Actuarial Accrued Liability (UAAL). Normal cost under the Entry Age method is 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 benefit if all underlying assumptions are met. The UAAL is the difference between the Actuarial Accrued Liability and the Actuarial Value of Assets.

The rates for Legacy members (those subject to a benefit formula in CERL) are set to provide a retirement benefit equal to a fractional portion of the highest year(s) salary, based on membership and tier. The rates for PEPRA members (new members on or after January 1, 2013) are equal to one-half the normal cost of their defined benefit plan.

The recommended average member contribution rate for CCCERA members is 12.03% of annual covered salary, based on the most recent valuation. Certain Safety members, including Legacy members with Contra Costa Fire Protection District and Moraga-Orinda Fire District, contribute an additional percent of base pay towards the employer's increase in cost of the enhanced (3% at 50) safety benefit. Contra Costa Fire Protection District members pay 3% of base pay and Moraga-Orinda members contribute 9% of base pay. Member contributions are refundable upon termination of employment.

As of December 31, 2018, Contra Costa County and eight other CCCERA employers subsidize some portion of the employee basic retirement contribution for at least some employees.

During the year ended December 31, 2018, contributions totaled approximately $428.6 million which included $325.1 million in employer contributions and $103.5 million in employee contributions. The contribution figures also include employee and employer purchase, redeposit, and conversion amounts.

Government Code Section 31582(b) allows the Board of Supervisors to authorize the County auditor to make an advance payment of all or part of the County's estimated annual contribution to the retirement fund, provided that the payment is made no later than 30 days after the beginning of the County's fiscal year. If the advance is only a partial payment of the County's estimated annual contribution, remaining transfers will be done monthly or at the end of each pay period until the total amount required for the year is contributed.

Government Code Section 31582(b) was amended on July 17, 2017 with Senate Bill 671 approved by the Governor, to also allow the Board of Supervisors to authorize the County auditor to make a second advance payment for an additional year or partial year of contributions, provided that the payment is made no later than 30 days after the beginning of the County's fiscal year.

Government Code Section 31585(c) allows governing bodies of employer districts authorization for the same appropriations and transfers for all, part, or second additional annual advance payments. Contra Costa County and nine other participating employer districts "prepay" or make advance payments of all of the employer's estimated annual contributions discounted by the assumed interest rate in effect on July 1. At the end of the fiscal year, a "true-up" is completed and employers are either billed for an underpayment or apply their overpayment towards the following year contributions.

Ten-year historical trend information, designed to provide information about CCCERA's progress in accumulating sufficient assets to pay benefits when due, is presented in the Actuarial Section of this report on page 87.

As noted in Note 1, *Plan Description*, the Governor approved Assembly Bill 1380 (AB 1380) in September 2013, which makes various technical corrections and conforming changes that align CERL with the provisions of PEPRA. In particular, the bill stipulates that the Board may, but is not required to, round the member contribution rates for PEPRA members to the nearest quarter of one percent, and those rates may be adjusted for any change in the normal cost rate. AB 1380 was effective January 1, 2014. On January 22, 2014, CCCERA's Board exercised the discretion made available by AB 1380 to no longer round the members' contribution rates for PEPRA members to the nearest quarter of one percent as previously required. This should allow for exactly one-half of the Normal Cost to be paid by the employees and by the employers covered under the PEPRA plan.

The CERL requires an actuarial valuation be performed at least every three years for the purpose of measuring the Plan's funding progress and setting contribution rates. CCCERA exceeds this requirement by engaging an independent actuarial consulting firm to perform an actuarial valuation for the pension plan annually. The purpose of the valuation is to evaluate the assets and liabilities of the Plan and determine necessary changes in member and employer contribution rates. The actuarial assumptions and methods have been selected in order to help ensure the systematic funding of future benefit payments for CCCERA members, and to maintain equity among generations of participants and taxpayers.

Actuarial standards guide the frequency to which an investigation of experience (experience study) is performed. CCCERA engages an independent actuarial consulting firm to perform the experience study at least every three years. The economic and demographic assumptions are reviewed and updated as required each time an experience study is performed. If assumptions are modified as a result of the experience study, member and employer contribution requirements are adjusted to take into account the change in the projected experience of the Plan. The most recent complete review of economic and demographic assumptions was for the period January 1, 2015 through December 31, 2017.

The latest valuation as of December 31, 2017 discloses the actuarial value of assets at $8.2 billion with an actuarial accrued liability of $9.2 billion for a funded ratio of 88.5%. The UAAL is $1.1 billion, which is 123.09% of the $860.6 million projected covered payroll. A schedule of CCCERA's funding progress may be found in the Actuarial Section on page 87. The schedule of funding progress presents multi-year trend information about whether the actuarial value of plan assets is increasing or decreasing relative to the actuarial accrued liability for benefits over time. Additional information regarding the actuarial methods and significant assumptions used as of the latest actuarial valuation of plan assets and liabilities is shown in the following table.

Methods and Assumptions Used to Establish Actuarially Determined Contribution Rates	
Valuation Date	Actuarially determined contribution rates are calculated as of December 31, two and a half years prior to the end of the fiscal year in which contributions are reported.
Actuarial Cost Method	Entry Age Actuarial Cost Method
Amortization Method	Level Percent of payroll for total unfunded liability (3.25% payroll growth assumed)
Amortization Period	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.
Remaining Amortization Period	Remaining balance of December 31, 2007 UAAL is amortized over a fixed (decreasing or closed) period with 5 years remaining as of December 31, 2017. Any changes in UAAL after December 31, 2007 will be separately amortized over a fixed 18-year period effective with that valuation. Effective December 31, 2013, any changes in UAAL due to plan amendments (with the exception of a change due to retirement incentives) will be amortized over a 10-year fixed period effective with that valuation. The entire increase in UAAL resulting from a temporary retirement incentive will be funded in full upon adoption of the incentive.
Asset Valuation Method	Fair 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 fair value, and is recognized semi-annually over a five-year period. The Actuarial Value of Assets is reduced by the value of the non-valuation reserves and designations.
Actuarial Assumptions:	
Investment Rate of Return	7.00%, net of pension plan investment expenses, including inflation
Inflation Rate	2.75%
Administrative Expenses for December 31, 2018 Valuation	1.13% of payroll allocated to both the employer and member based on the components of the normal cost rates for the employer and member
Real Across-the-Board Salary Increases	0.50%
Projected Salary Increases - General	4.00% to 13.25%(1)
Projected Salary Increases - Safety	4.00% to 13.75%(1)
Cost-of-Living Adjustments	2.75% per year except for Safety Tier C, PEPRA Tier E benefits and PEPRA Tier 4 (2% COLA) and Tier 5 (2% COLA) benefits for members covered under certain memoranda of understanding are assumed to increase at 2% per year. All increases are contingent upon actual increases in CPI.
Other Assumptions	Same as those used in the December 31, 2017 funding actuarial valuation.

(1) Includes inflation at 2.75%, plus "across-the-board" salary increases of 0.50%, plus promotional and merit increases that vary by service for December 31, 2017.

OPEB Contributions

On January 23, 2019, the Board adopted a funding policy to contribute to the OPEB Trust equal to the Actuarially Determined Contribution (ADC) each year. The latest OPEB valuation as of December 31, 2018 defined the ADC as the annual service cost, plus an amount to amortize the net OPEB liability over 30 years from 2018 on a level dollar basis, plus interest to account for the timing of contributions during the year.

The following table details the ADC as of December 31, 2018:

OPEB Actuarially Determined Contribution (ADC)
As of December 31, 2018
(Dollars in Thousands)

	2018
Service Cost as of January 1, 2018	180
Amortization of net OPEB liability	322
Interest to December 31, 2018	34
ADC as of December 31, 2018	**536**

Note 10.
Reserves and Designations

All employer and Plan member contributions are allocated to various reserve accounts based on the recommendation of the Plan's actuary, as approved by the Board and, where applicable, as required by CERL. CCCERA currently does not set aside a separate reserve for purposes of benefit increases or reduced employer contributions. Reserves are established from employer and Plan member contributions and the accumulations of investment income after satisfying investment and administrative expenses. The reserves do not represent the present value of assets needed, as determined by actuarial valuation, to satisfy retirements and other benefits as they become due. Following are brief explanations of the major classes of reserves and designations used by CCCERA:

Member Deposits Reserve represents the balance of members' accumulated contributions. Additions include member contributions and credited interest; deductions include refunds of member contributions and transfers to Retired Member Reserve upon retirement.

Employer Advance Reserve represents the balance of employer contributions for future retirement payments to current active members. Additions include contributions from the employer and related earnings; deductions include transfers to Retired Member Reserve, lump sum death benefits, and supplemental disability payments under legislated rehabilitation programs.

Retired Member Reserve represents transfers of accumulated contributions of members who have retired, employer contributions needed to fund retired member benefits as determined by the actuary and credited interest less payments to retired members.

Contra Tracking Account represents the amount of interest credited to the reserve accounts that has not been paid for out of current or excess earnings. A balance in this account is the result of applying the full interest crediting policy of the Board and will be reduced to zero before replenishing the Contingency Reserve or allocating earnings to any discretionary uses.

Post Retirement Death Benefit Reserve represents the balance of transfers from excess earnings and related earnings, less lump sum death benefit payments to the beneficiaries of retirees.

Contingency Reserve represents reserves accumulated for future earnings deficiencies, investment losses and other contingencies. Additions include investment income and other revenues. Deductions include investment expenses, administrative expenses, interest allocated to other reserves, funding of Supplemental COLA, and transfers of excess earnings to other Reserves and other Designations. The Contingency Reserve is used to satisfy the California Government Code requirement that CCCERA reserve one percent of its assets against deficiencies in interest earnings in other years, losses on investments, and other contingencies. As of December 31, 2003, the Contingency Reserve was completely used to pay interest to the reserve accounts. This account will be replenished in subsequent periods when there are sufficient earnings according to the interest crediting policy for CCCERA.

Total Deferred Return represents the unrecognized return after smoothing of investment gains and losses based on a five-year smoothing method. This method smoothes only the semi-annual deviation of total market return (net of expenses) from the actuarial assumption, currently 7.00 percent per annum.

OPEB Trust represents the funded portion of the OPEB actuarial liability for staff employees who retire directly from CCCERA, the employer, and may receive certain retiree health benefits if they meet certain eligibility requirements.

Reserves and designated fiduciary net position as of December 31, 2018 and 2017 are as follows:

Reserved and Designated Fiduciary Net Position
As of December 31, 2018 and 2017
(Dollars in Thousands)

	2018 Pension Plan	2018 OPEB Trust	2017 Pension Plan
Valuation Reserves:			
Member Deposits Reserve			
Basic	$852,465		$793,242
Cost-of-Living	449,162		420,389
Employer Advance Reserve			
Basic	2,295,153		2,065,487
Cost-of-Living	1,032,587		928,965
Retired Member Reserve			
Basic	3,468,067		3,363,344
Cost-of-Living	2,565,742		2,444,582
New Dollar Power Cost-of-Living Supplement	2,649		3,947
Contra Tracking Account	(2,015,517)		(1,840,065)
TOTAL VALUATION RESERVES	**8,650,308**		**8,179,891**
Supplemental Reserves:			
Post Retirement Death Benefit Reserve	**15,758**		**15,625**
Other Reserves/Designations			
Contingency Reserve (one percent)	**0**		**0**
TOTAL ALLOCATED RESERVES/DESIGNATIONS	**8,666,066**	**-**	**8,195,516**
TOTAL DEFERRED RETURN	**(516,080)**		**195,065**
OPEB TRUST		**2,542**	
NET POSITION - RESTRICTED FOR BENEFITS	**$8,149,986**	**$2,542**	**$8,390,581**

Note 11.
Lease Obligation

CCCERA was owner of the Willows Office Park headquarters building located at 1355 Willow Way, Concord, California and had held this property as a real estate investment since 1984. The property was sold on March 24, 2016 and CCCERA entered into a fair market lease agreement with the new property manager, Paramount Company, to remain and occupy a portion of the building. A commitment under an operating lease agreement for office facilities provides for minimum future rental payments through September 30, 2019.

The CCCERA headquarters will be moving effective September 1, 2019 to 1200 Concord Avenue, 3rd Floor, Concord, California. In March 2019, CCCERA entered into a 10 year operating lease agreement with 1200 Concord, LLC to occupy approximately 20,000 square feet of office space.

The future minimum rental payment as of December 31, 2018 for our current lease is as follows:

Lease Obligation

Year Ending December 31	Amount
2019*	$331,558

* Lease expires September 30, 2019.

Note 12.
Paulson Lawsuit Settlement

During the year ended December 31, 1999, CCCERA settled its litigation, entitled *Vernon D. Paulson, et al. vs. Board of Retirement of the Contra Costa County Employees' Retirement Association, et al*. The lawsuit was brought on behalf of a class of retired members of CCCERA regarding the inclusions and the exclusions from "final" compensation that are used in calculating members' retirement benefits. A settlement agreement was entered into with all parties and each employer invoiced for their share of the $34.2 million additional liability plus interest up to the date of the payment. All employers except Contra Costa County have paid off their liability. Contra Costa County chose to pay its share of the liability due over 19.5 years and entered into an agreement with CCCERA. The following summary lists the pertinent details of the County's agreement plus the amounts due at December 31, 2018.

Installment Payments Due from Paulson Final Liability
(Dollars in Thousands)

	Contra Costa County
Agreement Details:	
Effective Date of Agreement	December 16, 2003
First Payment Due	August 1, 2004
Last Payment Due	February 1, 2024
Rate of Interest	8%
Annual Principal and Interest Payment	$2,760
Original Principal	$28,065
Receivable at December 31, 2018:	
Future Principal Payments	$11,906
Interest Accrued for 2018	$397
	$12,303

Note 13.
Litigation, Commitments, and Contingencies

CCCERA is subject to legal proceedings and claims arising in the ordinary course of its operations. CCCERA's management and legal counsel estimate that the ultimate outcome of such litigation will not have a material effect on CCCERA's financial statements.

On November 28, 2012, the Contra Costa County Deputy Sheriffs Association (DSA) and other employee groups filed a petition for a writ of mandate with the Contra Costa County Superior Court, seeking to prevent CCCERA from implementing AB 197. AB 197 added Subdivision 31461(b) to the CERL, mandating certain exclusions from compensation for retirement purposes. Final judgment was entered on May 12, 2014, and the matter has been appealed. Final resolution of this lawsuit in the courts could take several years.

On August 21, 2014, the DSA and other employee groups filed a petition for a writ of mandate with the Contra Costa County Superior Court, seeking a permanent injunction requiring CCCERA to include multiple in-service leave cash outs in pensionable pay so long as the cash outs were paid or payable during the final average salary period. The lawsuit is related to the 2012 lawsuit referenced above, in that it involves questions regarding whether certain leave payments are "earned and payable" in the final average salary period and therefore pensionable. Final resolution in the court could take several years.

A CCCERA retired member, Peter Nowicki, filed a claim challenging the Board's decision to reduce his retirement allowance after the exclusion of excess compensation determined to have been improperly increased by the member.

A CCCERA retired member, Jon Wilmot, filed a claim challenging the Board's decision to reduce his retirement allowance as mandated by applicable felony forfeiture law following the member's conviction for a job-related felony.

As of December 31, 2018, CCCERA was committed to future investments in real estate of $255 million and $890 million in alternative investments.

Note 14.
Administrative Expenses

The Board of Retirement annually adopts the operating budget for the administration of CCCERA. The administrative expenses are charged against the earnings of the Plan.

California Government Code Section 31580.2(a) states that the annual budget for administrative expenses of a CERL retirement system may not exceed the greater of either of the following:

1. Twenty-one hundredths of one percent (0.21 percent) of the actuarial accrued liability of the retirement system or,
2. Two million dollars ($2,000,000), as adjusted annually by the amount of the annual cost-of-living adjustment computed in accordance with Article 16.5 (commencing with Section 31870).

CCCERA has adopted the provisions of CERL which allows CCCERA to exclude actuarial, investment, legal, and disaster recovery costs from administrative expenses subject to the budget limits described above. Therefore, actuarial and investment costs are offset against investment income, and legal and disaster recovery costs are all reported on the Statement of Changes in Fiduciary Net Position as other expense.

The Board approved the administrative budgets for fiscal years ended December 31, 2018 and December 31, 2017, which were prepared based upon the twenty-one hundredths of one percent (0.21 percent) CERL limit.

The following budget-to-actual analysis of administrative expenses schedule is based upon the budget as approved by the CCCERA Board in comparison to actual administrative expenses:

Budget-to-Actual Analysis of Administrative Expense
As of December 31, 2018 and 2017
(Dollars in Thousands)

	2018	2017
Basis for Budget Limitation, Actuarial Accrual Liability (AAL)(1)	$8,794,434	$8,448,624
Maximum Allowable For Administrative Expenses (AAL x 0.21%)	18,468	17,742
Approved Administrative Budget	10,106	9,946
Actual Administrative Expenses	(9,337)	(9,146)
Actual Expenses (over) under Administrative Budget	$769	$800
Actual Administrative Expenses	$9,337	$9,146
Actuarial Accrued Liability (AAL)	8,794,434	8,448,624
Actual Administrative Expenses as a Percentage of AAL	0.11%	0.11%
Statutory Limit Allowable For Administrative Expenses per CERL	0.21%	0.21%

(1) The AAL, as determined by CCCERA's actuary each year, is used to calculate the statutory limit for administrative expenses for the year after next. For example, the AAL as of December 31, 2016 was approved by the Board in September 2017, and was used to establish the statutory limit for administrative expenses for the year ended December 31, 2018.

Note 15.
Subsequent Events

Subsequent events were evaluated through June 19, 2019, which is the date the financial statements were available to be issued.

On November 7, 2018, CCCERA Board of Trustees approved staff Request for Proposal (RFP) recommendation to enter into an agreement with The Northern Trust Company for Master Custodian Bank services. The transition of assets from State Street Bank, plus the onboarding of all other CCCERA alternative investments to Northern Trust was effective as of March 1, 2019.

Effective September 1, 2019, the CCCERA headquarters will be moving to 1200 Concord Avenue, 3rd Floor, Concord, California. In March 2019, CCCERA entered into a 10 year operating lease agreement with 1200 Concord, LLC to occupy approximately 20,000 square feet of office space.

CCCERA did not have any other events requiring recording or disclosure in the financial statements for the year ended December 31, 2018.

REQUIRED SUPPLEMENTARY INFORMATION
SCHEDULE OF CHANGES IN NET PENSION LIABILITY & RELATED RATIOS

The schedule of changes in net pension liability and related ratios displays the components of the total pension liability and plan fiduciary net position for the pension plan, calculated in conformity with the requirements of GASB 67. Covered payroll represents payroll on which contributions to the pension plan are based.

Schedule of Changes in Net Pension Liability and Related Ratios
For the years ended December 31, 2013 through 2018*
(Dollars in Thousands)

Year Ended December 31	2018	2017	2016	2015	2014	2013
Total Pension Liability						
Service cost	$229,098	$212,257	$202,697	$192,923	$192,257	$196,464
Interest	647,734	616,273	591,972	582,343	561,216	564,441
Changes of benefit terms	-	-	-	-	-	-
Differences between expected and actual experience	52,853	(29,192)	(19,957)	(62,118)	(183,605)	(77,223)
Changes of assumptions	(92,419)	-	-	72,186	(76)	(232,887)
Actual benefit payments, including refunds of employee contributions	(461,254)	(436,295)	(419,446)	(406,236)	(394,948)	(374,639)
Net Change in Total Pension Liability	**376,012**	**363,043**	**355,266**	**379,098**	**174,844**	**76,156**
Total Pension Liability - Beginning	**9,202,018**	**8,838,975**	**8,483,709**	**8,104,611**	**7,929,767**	**7,853,611**
Total Pension Liability - Ending (a)	**$9,578,030**	**$9,202,018**	**$8,838,975**	**$8,483,709**	**$8,104,611**	**$7,929,767**
Plan Fiduciary Net Position						
Contributions - employer (1)	$325,117	$314,836	$307,909	$323,720	$293,760	$235,018
Contributions - employee (1)	103,541	96,467	88,788	85,360	78,258	72,373
Net investment income (loss), including prepayment discount	(195,031)	987,416	493,874	73,611	480,502	877,761
Benefit payments, including refunds of employee contributions	(461,254)	(436,295)	(419,446)	(406,236)	(394,948)	(374,639)
Administrative expense	(9,337)	(9,146)	(8,486)	(8,115)	(6,980)	(6,776)
Other	(3,631)	(1,217)	(701)	(668)	-	-
Net Changes in Plan Fiduciary Net Position	**(240,595)**	**952,061**	**461,938**	**67,672**	**450,592**	**803,737**
Plan Fiduciary Net Position - Beginning	**8,390,581**	**7,438,520**	**6,976,582**	**6,908,910**	**6,458,318**	**5,654,581**
Plan Fiduciary Net Position - Ending (b)	**$8,149,986**	**$8,390,581**	**$7,438,520**	**$6,976,582**	**$6,908,910**	**$6,458,318**
Net Pension Liability (a) - (b) = (c)	**$1,428,044**	**$811,437**	**$1,400,455**	**$1,507,127**	**$1,195,701**	**$1,471,449**
PLAN FIDUCIARY NET POSITION AS A PERCENTAGE OF THE TOTAL PENSION LIABILITY (b) / (a)	**85.1%**	**91.2%**	**84.2%**	**82.2%**	**85.3%**	**81.4%**
COVERED PAYROLL (d)	**$850,929**	**$809,960**	**$755,139**	**$709,819**	**$671,486**	**$638,636**
NET PENSION LIABILITY AS PERCENTAGE OF COVERED PAYROLL (c) / (d)	**167.8%**	**100.2%**	**185.5%**	**212.3%**	**178.1%**	**230.4%**

*Schedule is intended to show information for 10 years. Additional years will be displayed as they become available.
(1) In accordance with GASB Statement No. 82, starting with the year ended December 31, 2016, employer-paid member contributions (employer subvention) are classified as Plan Member Contributions. Vice versa, plan member-paid employer contributions (reverse subvention) are classified as Employer Contributions.

SCHEDULE OF EMPLOYER CONTRIBUTIONS

Schedule of Employer Contributions
For the years 2009 through 2018
(Dollars in Thousands)

Year Ended December 31	Actuarially Determined Contributions (a)	Contributions in Relation to the Actuarially Determined Contributions (b)[1]		Contribution Deficiency/ (Excess) (b) - (a)	Covered Payroll (c)[2]	Contributions as a Percentage of Covered Payroll (b) / (c)
2009	$195,632	$195,632		$-	$704,948	27.75%
2010	183,951	183,951		-	694,444	26.49%
2011	200,389	200,389		-	687,443	29.15%
2012	212,321	212,321		-	666,394	31.86%
2013	228,017	228,017	(3)	-	638,636	35.70%
2014	288,760	288,760	(4)	-	671,486	43.00%
2015	321,220	321,220	(5)	-	709,819	45.25%
2016	307,909	307,909		-	755,139	40.78%
2017	314,512	314,512	(6)	-	809,960	38.83%
2018	324,863	324,863	(7)	-	850,929	38.18%

(1) Starting with the year ended December 31, 2016, includes "member subvention of employer contributions" and excludes "employer subvention of member contributions". Prior to that year, the contributions excluded "member subvention of employer contributions" and included "employer subvention of member contributions"; (2) Covered payroll represents payroll on which contributions to the pension plan are based; (3) Excludes additional contributions towards UAAL of $7,000,000; (4) Excludes additional contributions towards UAAL of $5,000,000; (5) Excludes additional contributions towards UAAL of $2,500,000; (6) Excludes additional contributions towards UAAL of $324,000; (7) Excludes additional contributions towards UAAL of $254,000.

Please refer to accompanying Notes to Required Supplementary Information on page 65.

SCHEDULE OF INVESTMENT RETURNS

The money-weighted rate of return expresses investment performance, net of investment expense, adjusted for the timing of cash flows and the changing amounts actually invested.

Schedule of Investment Returns
For the years 2013 through 2018*

For Years	2018	2017	2016	2015	2014	2013
Annual Money-Weighted Rate of Return, Net of Investment Expense	-2.18%	13.23%	7.10%	1.19%	7.51%	15.62%

*Schedule is intended to show information for 10 years. Additional years will be displayed as they become available.

SCHEDULE OF CHANGES IN THE NET OPEB LIABILITY AND RELATED RATIOS

The schedule of changes in net OPEB liability and related ratios displays the components of the total OPEB liability and OPEB Trust fiduciary net position, calculated in conformity with the requirements of GASB 74. Covered payroll is informational only and does not represent how employer contributions to the OPEB Trust are based.

Schedule of Changes in the Net OPEB Liability and related ratios
As of December 31, 2018
(Dollars in Thousands)

	2018
Total OPEB Liability	
Service cost	$180
Interest	299
Benefit payments [1]	(50)
Net Change in Total OPEB Liability	**429**
Total OPEB Liability - Beginning [2]	**4,281**
Total OPEB Liability - Ending (a)	**$4,710**
OPEB Trust Fiduciary Net Position	
Contributions - employer [1]	2,542
Net Change in OPEB Trust Fiduciary Net Position	**2,542**
OPEB Trust Fiduciary Net Position - Beginning	**-**
OPEB Trust Fiduciary Net Position - Ending (b)	**$2,542**
Net OPEB Liability (a) - (b) = (c)	**$2,168**
OPEB TRUST FIDUCIARY NET POSITION AS A PERCENTAGE OF THE TOTAL OPEB LIABILITY (b) / (a)	**54.0%**
COVERED PAYROLL (d)	**$4,997**
NET POSITION LIABILITY AS A PERCENTAGE OF COVERED PAYROLL (c) / (d)	**43.4%**

(1) Per the GASB 74 actuarial report, the benefit payment is an actuarial estimate of the cost to the CCCERA pension plan using census data information increased to reflect an estimated implicit subsidy. That amount was included in the overall GASB 74 and 75 implementation expense to CCCERA pension plan as of December 31, 2018.

(2) Per the GASB 74 actuarial report, the beginning balance of Total OPEB liability was included in the GASB 74 and 75 implementation expense to CCCERA pension plan as of December 31, 2018.

NOTES TO THE REQUIRED SUPPLEMENTARY INFORMATION

Note 1.
Schedule of Changes in Net Pension Liability and Related Ratios

The total pension liability contained in this schedule was provided by the Plan's actuary, Segal Consulting. The net pension liability is measured as the total pension liability less the amount of the fiduciary net position of the Plan.

Note 2
Schedule of Employer Contributions

The required employer contributions and percent of those contributions actually made are presented in this schedule. Actuarial assumptions used for this schedule are presented in the following table.

Additional Actuarial Information for 2018 Methods and assumptions used to establish "actuarially determined contribution" rates:	
Valuation Date	Actuarially determined contribution rates are calculated as of December 31, two and a half years prior to the end of the fiscal year in which contributions are reported.
Actuarial Experience Study	3 Year Period Ending December 31, 2017
Actuarial Cost Method	Entry Age
Amortization Method	Level Percent of Payroll
Amortization Policy	The UAAL (i.e., the difference between the AAL and the Valuation Value of Assets) as of December 31, 2017 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.
Remaining Amortization Period	Remaining balance of December 31, 2007 UAAL is amortized over a fixed (decreasing or closed) period with 5 years remaining as of December 31, 2017. Any changes in UAAL after December 31, 2007 is separately amortized over a fixed 18-year period effective with that valuation. Effective December 31, 2013, any changes in UAAL due to plan amendments (with the exception of a change due to retirement incentives) will be amortized over a 10-year fixed period effective with that valuation. The entire increase in UAAL resulting from a temporary retirement incentive will be funded in full upon adoption of the incentive.
Asset Valuation Method	Fair 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 fair value, and is recognized semi-annually over a five-year period. The Actuarial Value of Assets is reduced by the value of the non-valuation reserves and designations.
Actuarial Assumptions:	
Investment Rate of Return	7.00%, net of pension plan investment expenses, including inflation.
Inflation Rate	2.75%

Additional Actuarial Information for 2018 (Continued)	
Administrative Expenses	1.10% of payroll allocated to both the employer and member based on the components of the normal cost rates for the employer and member.
Real Across-the-Board Salary Increases	0.50%
Projected Salary Increases*	General: 3.75% to 15.25% Safety: 4.25% to 16.25%, varying by service, including inflation.
Cost-of-Living Adjustments	2.75% per year except for Safety Tier C, PEPRA Tier E benefits and PEPRA Tier 4 (2% COLA) and Tier 5 (2% COLA). Benefits for members covered under certain memoranda of understanding are assumed to increase at 2% per year. All increases are contingent upon actual increases in Consumer Price Index (CPI).

*Includes inflation at 2.75% plus real across-the-board salary increase of 0.50% plus and merit and promotional increases.

The information presented in the required supplementary schedules was determined as part of the Governmental Accounting Standards Board (GASB) 67 actuarial valuation as of December 31, 2018 provided by the Plan's actuary. Additional information as of the actuarial valuation as of December 31, 2017 is in the Actuarial Section.

CCCERA implemented GASB Statement No. 82, *Pension Issues, an amendment of GASB No. 67, No. 68, and No. 73* during the fiscal year ended December 31, 2017. GASB 82 was issued to address definition of payroll-related measures such as using covered payroll instead of covered-employee payroll; the selection of assumptions used to determine total pension liability and related measures; and classification of payments made by employers to satisfy employee contribution requirements.

OTHER SUPPLEMENTARY INFORMATION
SCHEDULE OF ADMINISTRATIVE EXPENSES

Schedule of Administrative Expenses
For the year ended December 31, 2018 (with Comparative Totals)
(Dollars in Thousands)

	2018	2017
Personnel Services:		
Salaries and Wages	$4,389	$4,029
Employee Benefits and Retirement	3,227	3,045
TOTAL PERSONNEL SERVICES	7,616	7,074
Operational Expenses:		
Professional Services:		
Audit Services	128	222
Actuary - Benefit Statements	71	75
Disability Hearing/ Medical Reviews	55	143
Other Professional Services	1	50
Total Professional Services	255	490
Office Expenses:		
Office Lease	417	421
Telephone & Internet Services	31	58
Equipment Lease & Maintenance	30	20
Furniture & Equipment	5	19
Office Supplies & Maintenance	57	80
Printing & Postage	118	147
Training & Education	108	111
Travel & Transportation	120	121
Insurance	215	267
Total Office Expenses	1,101	1,244
Information Technology (IT) Systems:		
Support Service & Software Contracts	258	268
Hardware & Equipment Maintenance	30	8
Project Consulting	25	-
Total IT Systems	313	276
ASSETS DEPRECIATION	52	62
TOTAL ADMINISTRATIVE EXPENSES	**$9,337**	**$9,146**

SCHEDULE OF INVESTMENT EXPENSES

Schedule of Investment Expenses
For the year ended December 31, 2018 (with Comparative Totals)
(Dollars in Thousands)

	2018	2017
Investment Management Fees, by portfolio:		
Stocks:		
Domestic Equity	$5,723	$7,050
Global & International Equity	8,270	7,853
Real Estate - REIT	382	387
Total Stock Securities	14,375	15,290
Bonds:		
Liquidity	1,610	1,681
Domestic Equity	35	419
High Yield	1,293	1,407
Risk Diversifying	1,347	1,023
Total Bond Securities	4,285	4,530
Real Assets:		
Risk Diversifying	649	661
Real Estate:		
Value Added	2,672	1,187
Opportunistic & Distressed	5,632	5,203
Total Real Estate Funds	8,304	6,390
Alternatives:		
Private Equity	10,630	11,451
Private Credit	4,278	1,914
Total Alternative Funds	14,908	13,365
TOTAL INVESTMENT MANAGEMENT FEES	**42,521**	**40,236**
Investment Consulting Fees:		
Consulting Services	582	492
Legal Services	167	157
Actuarial Services	163	228
TOTAL INVESTMENT CONSULTING FEES	**912**	**877**
INVESTMENT CUSTODIAN & FISCAL AGENT FEES	**334**	**435**
OTHER INVESTMENT RELATED EXPENSES	**1,382**	**1,317**
TOTAL INVESTMENT EXPENSES	**$45,149**	**$42,865**

SCHEDULE OF PAYMENTS TO CONSULTANTS

Schedule of Payments to Consultants
For the year ended December 31, 2018 (with Comparative Totals)
(Dollars in Thousands)

Type of Service	2018	2017
Actuarial Services & Consulting	**$163**	**$228**
Benefit Statement Services	**71**	**75**
Information Technology Consulting	**40**	**47**
Audit Services	**128**	**222**
Other Professional Services	**1**	**33**
Legal Services:		
Investment Legal Counsel	167	157
Disabilities	76	80
Outside Legal - Fiduciary & Tax	279	357
Other Legal Services	44	40
TOTAL LEGAL SERVICES	**566**	**634**
Investment Consultant Services	**563**	**468**
Investment Custodian & Fiscal Agent Fees	**334**	**435**
Proxy Guideline Voting Agent Service	**19**	**24**
TOTAL PAYMENTS TO CONSULTANTS	**$1,885**	**$2,166**

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INVESTMENT

CHIEF INVESTMENT OFFICER'S REPORT

May 24, 2019

Trustees, Board of Retirement
Contra Costa County Employees' Retirement Association

Re: Chief Investment Officer Review of 2018 Investment Activity

Members of the Board:

Markets experienced several headwinds in 2018, led by global trade conflicts and uncertainty over central bank actions. This led to a decline in overall equity markets globally, particularly in the fourth quarter, with a corresponding increase in the volatility levels to historical norms after several years of relative calm. The Russell 3000 Index of domestic stocks returned -5.2% for the year while the MSCI ACWI returned -9.4%. Emerging market securities experienced an even sharper downturn, with the MSCI Emerging Market index returning -14.6%. The debt markets also experienced a poor year, with the Barclays Bloomberg Aggregate returning 0.0% and the 1-3 Year Government/Credit Index up 1.6%. Real estate was a bright spot with healthy fundamentals leading to a 6.7% return on the NCREIF Property Index. All return figures in this review are presented net of fees and time-weighted, and are calculated by CCCERA's investment consultant, Verus Investments.

Total Fund Performance

CCCERA's Total Fund returned -2.7 (net of investment management fees) for the year ending December 31, 2018. This return was lower than the policy index return of -0.9%. Relative to the peer universe, CCCERA's conservative positioning resulted in a better return than the median public fund return of -4.0% and ranked in the 27th percentile of public funds. Over the past 10 years ending December 31, 2018, CCCERA has returned 9.1%.

Importantly, CCCERA has achieved these returns while assuming a lower risk posture than our peers, resulting in superior risk adjusted returns as measured by our Sharpe ratio. Over the trailing five years ending December 31, 2018, the fund achieved a Sharpe Ratio of 1.0 relative to the median public fund at 0.7, ranking in the 9th percentile of public funds.

Strategic Review of Asset Allocation and Portfolio Construction

CCCERA's primary function is to deliver timely and accurate pension benefits to Association members. Pension benefits represent the total of employer and member contributions, and market returns on the investment of those contributions over time. Pension fund trustees have a fiduciary responsibility to carefully invest plan assets to generate market returns while being mindful of the safety of the hard earned contributions. Pension funds typically accomplish that balance between investment returns and safety by allocating plan assets among several different types of investments, each with its own prospects for growth and safety.

Most pension funds, including CCCERA, have historically attempted to strike the right balance by allocating plan investments into three broad areas:

1. Bonds issued by governments and corporations, intended to provide income and reduce overall portfolio volatility.

2. Equities (stocks) intended to provide long-term growth.

3. Diversified alternative investments including real estate and private equity.

In 2016, after considerable study and careful deliberation, the CCCERA Board of Trustees approved a significant change to CCCERA's investment allocation. The new allocation has been dubbed a Functionally Focused Portfolio (FFP). It will be rolled out over approximately three years. The FFP is designed to allocate a higher percentage of assets into the short-term, highly liquid fixed income instruments that will be used to accomplish CCCERA's primary function, paying for the next 3-4 years of pension benefits. CCCERA will continue to allocate the bulk of the remaining assets into a globally diversified growth sub-portfolio of stocks, real estate and alternative asset strategies and the remaining into risk diversified investments.

The Board believes that in addition to focusing more investable resources into short-term instruments intended to achieve the plan's primary function of paying near-term pension benefits, the new Functionally Focused Portfolio allocation strategy will reduce the inherently higher volatility of the returns generated by our historical allocation. The Trustees recognize that by reducing the volatility of investment returns, some higher returns may not necessarily be achieved during the up markets. Conversely, CCCERA returns will be less likely to be as negatively impacted during the inevitable down years. The Board realizes that with this new strategy, CCCERA may not necessarily capture all the market highs, nor have to endure all the market lows either.

Asset Allocation

As of December 31, 2018, CCCERA's market value of assets was \$8.6 billion, a decrease of approximately \$0.2 billion from the December 31, 2017 market value of \$8.8 billion. This was the result of investment losses experienced in 2018. All asset classes as of December 31, 2018 were within their respective target allocations.

Sincerely,

Timothy Price, CFA
Chief Investment Officer

GENERAL INFORMATION

Contra Costa County Employees' Retirement Association's (CCCERA) funding objective is to meet long-term benefit obligations through contributions and investment income. The plan's main investment objective is for the total fund return to exceed the Consumer Price Index (CPI) plus 400 basis points over a market cycle. This is accomplished by the implementation of a carefully planned and executed long-term investment program.

The California Constitution and Government Code Sections 31594 and 31595 authorize the Board of Retirement (Board) to invest in any investment deemed prudent in the Board's opinion. Investment decisions are to be made in the sole interest and for the exclusive purpose of providing benefits, minimizing employer contributions, and defraying reasonable expenses for administering the system. Investments are to be diversified to minimize the risk of loss and to maximize the rate of return, unless under the circumstances it is clearly prudent to not do so. The Board has adopted an Investment Policy, which provides the framework for the management of CCCERA's investments. This policy establishes CCCERA's investment policies and objectives and defines the principal duties of the Board and staff, the Custodian bank and investment managers. For the year ended December 31, 2018, the total fund returned -2.7%; lower than the policy index return of -0.9% but more than the median public fund return of -4.0%.

SUMMARY OF PROXY VOTING GUIDELINES AND PROCEDURES

Voting of proxy ballots shall be in accordance with CCCERA's Proxy Voting Guidelines. CCCERA utilizes the services of Institutional Shareholder Services to research and vote CCCERA's U.S. proxy ballots in order to protect and enhance returns.

ASSET ALLOCATION

The asset allocation is an integral part of the Investment Policy. When a new asset class is implemented or a current asset class is expanded, the plan's policy is modified to reflect the change or revision. The Board implements the asset allocation plan by hiring investment managers to invest assets on CCCERA's behalf, subject to specific guidelines incorporated into each firm's contract.

The Board adopted an Investment Policy Statement in September 2016 in which the Board is to periodically set, review, and revise its asset allocation targets.

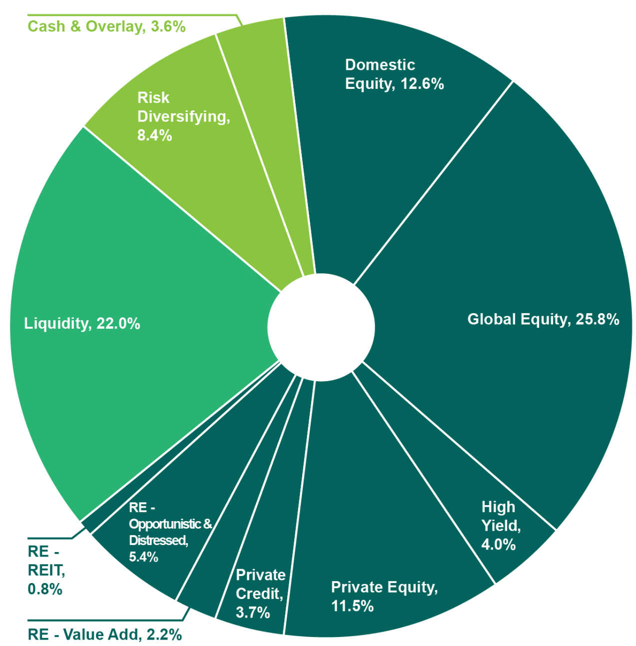
As of 2018 the long-term asset allocation targets determined by the Board are as follows:

- Liquidity 23%
- Growth 67%
- Diversifying 10%

The first phase, liquidity sub-portfolio, was implemented in October 2016. The growth sub-portfolio phase was implemented in July 2017. The diversifying sub-portfolio phase was implemented in June 2018. CCCERA's Chief Investment Officer and the outside investment consultant (Verus) assist the Board with the design and implementation of the new asset allocation as depicted in the following chart:

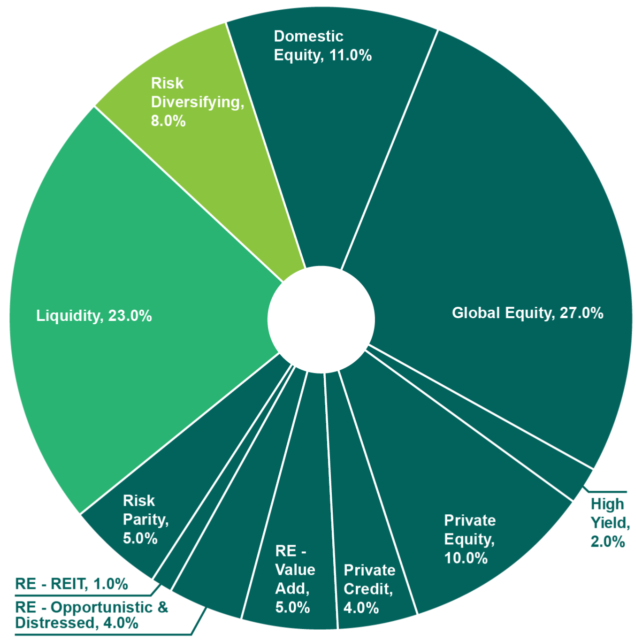
ACTUALS

Asset Class	Target Allocation
Liquidity	22.0%
Growth:	
Domestic Equity	12.6%
Global & International Equity	25.8%
High Yield	4.0%
Private Equity	11.5%
Private Credit	3.7%
Real Estate - Value Add	2.2%
Real Estate - Opportunistic & Distressed	5.4%
Real Estate - REIT	0.8%
Risk Parity	0.0%
Total Growth	66.0%
Risk Diversifying	8.4%
Cash & Overlay	3.6%
Total	**100%**



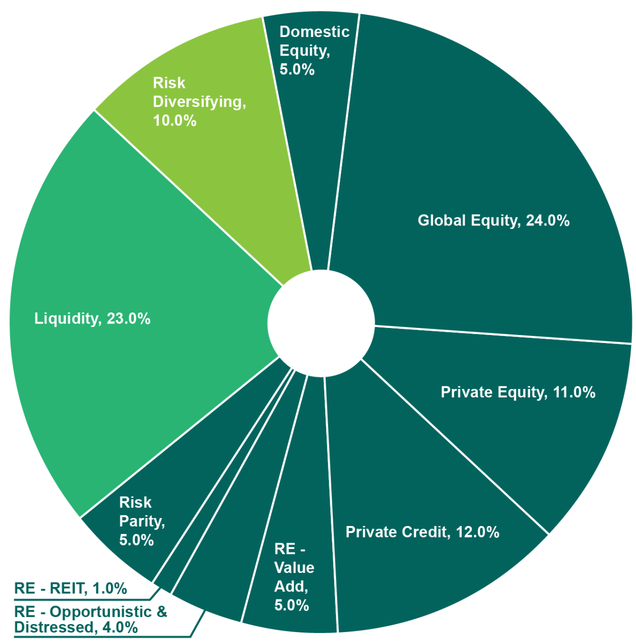
PHASE 3

Asset Class	Target Allocation
Liquidity	23.0%
Growth:	
Domestic Equity	11.0%
Global & International Equity	27.0%
High Yield	2.0%
Private Equity	10.0%
Private Credit	4.0%
Real Estate - Value Add	5.0%
Real Estate - Opportunistic & Distressed	4.0%
Real Estate - REIT	1.0%
Risk Parity	5.0%
Total Growth	69.0%
Risk Diversifying	8.0%
Cash & Overlay	0.0%
Total	**100%**



LONG-TERM

Asset Class	Target Allocation
Liquidity	23.0%
Growth:	
Domestic Equity	5.0%
Global & International Equity	24.0%
High Yield	0.0%
Private Equity	11.0%
Private Credit	12.0%
Real Estate - Value Add	5.0%
Real Estate - Opportunistic & Distressed	4.0%
Real Estate - REIT	1.0%
Risk Parity	5.0%
Total Growth	67.0%
Risk Diversifying	10.0%
Cash & Overlay	0.0%
Total	**100%**



INVESTMENT RESULTS BASED ON FAIR VALUE*

Investment Results Based on Fair Value*
As of December 31, 2018

		Annualized (net of fees)		
	Current Year	3 Year	5 Year	10 Year
Total Fund	-2.7%	5.8%	5.4%	9.1%
Benchmark:				
Policy Index	-0.9%	7.1%	6.1%	-
Total Fund excl. Overlay & Cash	-2.4%	5.9%	5.5%	9.2%
Benchmark:				
Policy Index	-0.9%	7.1%	6.1%	-
Total Domestic Equity	-7.6%	8.2%	7.2%	13.3%
Benchmark:				
Russell 3000	-5.2%	9.0%	7.9%	13.2%
Total International Equity	-14.7%	2.4%	1.1%	5.5%
Benchmarks:				
MSCI ACWI ex-USA Gross	-13.8%	5.0%	1.1%	7.1%
MSCI EAFE Gross	-13.4%	3.4%	1.0%	6.8%
Total Global Equity	-8.5%	6.3%	5.0%	7.3%
Benchmark:				
MSCI ACWI	-9.4%	6.6%	4.3%	9.5%
Private Credit	8.3%	8.5%	9.9%	13.0%
Benchmarks:				
ICE BofA ML High Yield Master II+2%	-0.3%	9.4%	5.9%	13.2%
Total High Yield	-3.6%	5.2%	2.5%	9.6%
Benchmark:				
ICE BofA ML High Yield Master II	-2.3%	7.3%	3.8%	11.0%
Total Real Estate	7.4%	7.7%	10.8%	10.5%
Benchmarks:				
Real Estate Benchmark	6.7%	6.8%	9.4%	9.3%
NCREIF - ODCE Index	8.3%	8.2%	10.4%	7.0%
NCREIF Property Index	6.7%	7.2%	9.3%	7.5%
Private Equity	12.1%	10.9%	11.6%	9.1%
Benchmark:				
S&P 500 + 4% Lagged	22.6%	21.9%	18.5%	16.4%
Diversifying	-2.3%	0.3%	0.2%	2.3%
Benchmark:				
Custom Diversifying Benchmark	1.5%	3.4%	3.6%	4.1%
Liquidity	1.7%	-	-	-
Benchmark:				
BBgBarc US Govt/Credit 1-3 Yr TR	1.6%	-	-	-
Total Cash	1.7%	1.2%	0.1%	-
Benchmark:				
91 Day T-Bills	1.9%	1.1%	0.6%	-

*Using time-weighted rate of return based on the market rate of return.

INVESTMENT MANAGERS (As of December 31, 2018)

GROWTH

Domestic Equity
BlackRock Institutional Trust
Ceredex Value Advisors
Emerald Advisors
Jackson Square Partners
Boston Partners Global Investors

Global & International Equity
Artisan Global Opportunities
First Eagle Investment Management
Pimco/RAE
Pyrford International
TT Emerging Markets
William Blair & Company

Real Estate Investment Trust (REIT)
Adelante Capital Management

High Yield Fixed Income
Allianz Global Investors

Private Equity
Adams Street Partners
Aether Investment Partners
Ares Energy Investors Funds
Carpenter Bancfund
Commonfund
DBL Investors (Bay Area Equity)
Equilibrium Capital (Wastewater)
Oaktree Capital
Ocean Avenue Capital Partners
Paladin Capital Management
Pathway Capital Management
Siguler Guff

Private Credit
Angelo Gordon Energy
Torchlight Investors
StepStone Group

Real Estate
Angelo Gordon
DLJ Real Estate Capital Partners LP
Invesco Real Estate
LaSalle Investment Management
Long Wharf Real Estate Partners
Oaktree Capital
Paulson & Co.
Siguler Guff

RISK DIVERSIFYING

AFL-CIO Housing Investment Trust
Parametric Defensive Equity
Wellington Management

LIQUIDITY

Dimensional Fund Advisors
Insight Investment
Sit Investments

CASH OVERLAY

Parametric Portfolio Associates
State Street Bank & Trust

SECURITIES LENDING PROGRAM

State Street Corporation

INVESTMENT SUMMARY

Investment Summary
For the year ended December 31, 2018
(Dollars in Thousands)

Type of Investment	Fair Value	Percent of Total Fair Value
Short-Term		
Cash equivalents	$409,922	4.8%
Cash collateral - securities lending	243,358	2.8%
TOTAL SHORT-TERM INVESTMENTS	**653,280**	**7.6%**
Long-Term		
Investments By Fair Value Level		
Stock Securities		
Domestic Equity	937,342	11.0%
Global & International Equity	268,784	3.1%
Real Estate - REIT	66,689	0.8%
Public Market Commingled Funds	1,896,692	22.2%
Cash Overlay	33,016	0.4%
Total Stock Securities	3,202,523	37.5%
Bond Securities		
Liquidity Program	1,786,770	20.9%
Held In Equity Portfolios	3,517	0.0%
High Yield	305,035	3.6%
Risk Diversifying	198,155	2.3%
Public Market Commingled Funds	318,503	3.7%
Total Bond Securities	2,611,980	30.5%
Real Assets		
Risk Diversifying	177,200	2.1%
Real Estate		
Value Added, Opportunistic & Distressed Funds	644,588	7.5%
Alternatives		
Private Equity & Private Credit Funds	1,263,794	14.8%
TOTAL LONG-TERM INVESTMENTS AT FAIR VALUE	**7,900,085**	**92.4%**
TOTAL SHORT AND LONG-TERM INVESTMENTS	**$8,553,365**	**100.0%**

SCHEDULE OF INVESTMENT MANAGEMENT FEES

Investment Management Fees
For the year ended December 31, 2018
(Dollars in Thousands)

Investment Activity	Assets Managed	Fees
Stock Managers		
Domestic Equity	$1,076,358	$5,723
Global & International Equity	2,062,994	8,270
Real Estate - REIT	66,689	382
TOTAL STOCK MANAGERS	3,206,041	14,375
Bond Managers		
Liquidity	1,786,770	1,610
Global & International Equity	0	35
High Yield	305,035	1,293
Risk Diversifying	516,658	1,347
TOTAL BOND MANAGERS	2,608,463	4,285
Real Asset Managers		
Risk Diversifying	177,199	649
Real Estate Managers		
Value Added	183,121	2,672
Opportunistic & Distressed	461,467	5,632
TOTAL REAL ESTATE MANAGERS	644,588	8,304
Alternative Investment Managers		
Private Equity	956,892	10,630
Private Credit	306,902	4,278
TOTAL ALTERNATIVE INVESTMENT MANAGERS	1,263,794	14,908
TOTAL FEES FROM INVESTMENT ACTIVITY	**7,900,085**	**42,521**
Custodian Cash and Cash Equivalents	653,280	334
Securities Lending Activity		
Management Fee	-	506
Borrower Rebate	-	4,512
TOTAL FEES FROM SECURITIES LENDING ACTIVITY	**N/A**	**5,018**
TOTAL INVESTMENT MANAGEMENT FEES	**$8,553,365**	**$47,873**

SCHEDULE OF BROKERAGE COMMISSIONS

Schedule of Brokerage Commissions
For the year ended December 31, 2018
(Dollars and Shares in Thousands)

Brokerage Firm	Commissions	Shares/Par Value Traded	Commission Per Share
COWEN AND COMPANY, LLC	$101	2,691	$0.038
MERRILL LYNCH,PIERCE,FENNER & SMITH INC.	64	5,350	0.012
GOLDMAN SACHS + CO LLC	64	4,125	0.015
JEFFERIES + COMPANY INC	39	1,638	0.024
RAYMOND JAMES AND ASSOCIATES	38	1,196	0.032
SANFORD C BERNSTEIN CO LLC	36	2,299	0.016
MORGAN STANLEY CO INCORPORATED	34	1,307	0.026
J.P. MORGAN SECURITIES LLC	33	1,394	0.024
LIQUIDNET EUROPE LIMITED	30	996	0.030
RBC CAPITAL MARKETS, LLC	26	1,669	0.016
ISI GROUP INC	24	1,095	0.022
CREDIT SUISSE SECURITIES (USA) LLC	22	1,167	0.019
LOOP CAPITAL MARKETS	19	505	0.038
BLOOMBERG TRADEBOOK LLC	19	621	0.030
J P MORGAN SECURITIES INC	18	586	0.031
WEEDEN + CO.	17	443	0.039
BARCLAYS CAPITAL LE	16	854	0.019
CITIGROUP GLOBAL MARKETS INC	15	451	0.032
ROBERT W. BAIRD CO.INCORPORATED	13	409	0.033
PENSERRA SECURITIES	12	309	0.040
Top 20 Firms by Commission Dollars	**$640**	**29,105**	**$0.022**
All Other Brokerage Firms	**$244**	**11,374**	**$0.021**
TOTAL BROKERAGE COMMISSIONS	**$884**	**40,479**	**$0.022**

SCHEDULE OF TOP TEN EQUITIES AND FIXED INCOME SECURITIES

Top 10 Equity Securities
As of December 31, 2018
(Dollars and Shares in Thousands)

CUSIP	Shares	Security Name	Fair Value
ACI00DVB8	38,991	PYRFORD INTERNATIONAL TRUST	$415,506
12999N909	14,954	CIF II REAL TOTAL RETURN	177,200
594918104	321	MICROSOFT CORP	32,625
989TGM908	24	GOLD COMMODITY IN OUNCES	30,204
46266C105	135	IQVIA HOLDINGS INC	15,709
20030N101	411	COMCAST CORP CLASS A	14,002
91324P102	54	UNITEDHEALTH GROUP INC	13,408
09062X103	43	BIOGEN INC	13,003
48251W104	646	KKR + CO INC A	12,683
256677105	114	DOLLAR GENERAL CORP	12,367
		TOTAL LARGEST EQUITY HOLDINGS	**$736,707**

Top 10 Fixed Income Securities
As of December 31, 2018
(Dollars in Thousands)

CUSIP	Security Name	Cost	Fair Value
912828UB4	US TREASURY N/B	$35,095	$35,164
912796QR3	TREASURY BILL	33,759	34,093
912828F39	US TREASURY N/B	32,884	32,965
912828SN1	US TREASURY N/B	32,822	32,925
912828WL0	US TREASURY N/B	32,760	32,866
912828B33	US TREASURY N/B	30,889	30,980
126650CT5	CVS HEALTH CORP	16,277	16,210
80281LAD7	SANTANDER UK GROUP HLDGS	15,435	15,282
046353AQ1	ASTRAZENECA PLC	14,855	14,789
75625QAC3	RECKITT BENCKISER TSY	14,566	14,483
	TOTAL LARGEST FIXED INCOME HOLDINGS		**$259,757**

ACTUARIAL

ACTUARY CERTIFICATION LETTER

Segal Consulting

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

June 7, 2019

Board of Retirement
Contra Costa County Employees' Retirement Association
1355 Willow Way, Suite 221
Concord, CA 94520

Re: Contra Costa County Employees' Retirement Association
December 31, 2017 Actuarial Valuation for Funding Purposes

Dear Members of the Board:

Segal Consulting (Segal) prepared the December 31, 2017 annual actuarial valuation of the Contra Costa County Employees' Retirement Association (CCCERA). We certify that the valuation was performed in accordance with generally accepted actuarial principles and practices and CCCERA's funding policy that was last reviewed with the Board in 2019. In particular, it is our understanding that the assumptions and methods used for funding purposes meet the parameters set by Actuarial Standards of Practice (ASOPs).

As part of the December 31, 2017 actuarial valuation, Segal conducted an examination of all participant data for reasonableness. However, the scope of this examination does not qualify as an audit. Summaries of the employee data used in performing the actuarial valuations over the past several years are provided in our valuation report. We did not audit the Association's financial statements, however, the Association's auditor attested to the Association's financial statements. For actuarial valuation purposes, retirement plan assets are valued at Actuarial Value. Under this method, the assets used to determine employer contribution rates take into account market value by recognizing the semi-annual differences between the total return at market value and the expected investment return over a five-year period.

One of the general goals of an actuarial valuation is to establish contribution rates, which, over time, will remain level as a percentage of payroll for each generation of active members. Actuarial funding is based on the Entry Age Cost Method. Under this method, the employer contribution rate provides for current cost (normal cost) plus a level percentage of payroll to amortize any unfunded actuarial accrued liability (UAAL).

In 2008, the Board of Retirement elected to amortize the remaining balance of the Association's unfunded actuarial accrued liability as of December 31, 2007 over a declining (or closed) period with 5 years remaining as of December 31, 2017. Any change in unfunded actuarial accrued liability that arises due to actuarial gains or losses or due to changes in actuarial assumptions or methods at each valuation after December 31, 2007 is amortized over its own declining (or closed) 18-year period. Effective with the December 31, 2013 valuation, any change in unfunded actuarial accrued liability that arises due to plan amendments is amortized over its own declining (or closed) 10-year period (with the exception of a change due to retirement incentives, which is funded in full upon adoption of the incentive). The progress being made towards meeting the funding objective through December 31, 2017 is illustrated in the Schedule of Funding Progress.

Certain information found in the Notes to Basic Financial Statements and the Required Supplementary Information (RSI) included in the Financial Section was prepared by the Association based on the results of the Governmental Accounting Standards Board (GASB) Statement No. 67 actuarial valuation as of December 31, 2018 prepared by Segal. For the Financial Section of the Comprehensive Annual Financial Report (CAFR), Segal provided the Schedule of Changes in Net Pension Liability of Participating Employers and Schedule of Employer Contributions as shown in the RSI. A listing of the other supporting schedules prepared by the Association based on additional information provided by Segal and the results of the actuarial valuation as of December 31, 2017 for funding purposes is listed below.

- Schedule of Funding Progress
- Schedule of Employer Contributions
- Latest Actuarial Valuation Methods and Assumptions
- Summary of Valuation Results
- Summary of Significant Results
- Schedule of Active Member Valuation Data
- Retirants and Beneficiaries Added to and Removed from Retiree Payroll
- Schedule of Funded Liabilities by Type
- Actuarial Analysis of Financial Experience
- Summary of Statistical Data
- Schedule of Benefits Expenses by Type
- Schedule of Retired Members by Type of Benefit
- Schedule of Average Benefit Payment Amounts
- Participating Employers and Active Members

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The valuation assumptions included in the Actuarial Section were adopted by the Retirement Board based on the December 31, 2014 Experience Study (for both the economic and non-economic assumptions). It is our opinion that the assumptions used in the December 31, 2017 valuation produce results, which in the aggregate, reflect the future experience of the retirement plan. Actuarial valuations are performed on an annual basis. An experience analysis is performed every three years and the most recent experience analysis was performed after the December 31, 2017 valuation. The changes in assumptions from that review will be effective with the December 31, 2018 valuation.

In the December 31, 2017 valuation, the ratio of the valuation value of assets to actuarial accrued liabilities (funded percentage) increased from 86.5% to 88.5% while the funded percentage on a market value of assets basis increased from 84.6% to 90.8%. The aggregate employer contribution rate has decreased from 38.08% of payroll to 36.07% of payroll, while the aggregate member contribution rate has decreased from 12.08% of payroll to 12.03% of payroll.

Under the asset smoothing method, the total unrecognized net investment gains are $195 million as of December 31, 2017. These net investment gains will be recognized in the determination of the actuarial value of assets for funding purposes in the next few years. The net deferred gains of $195 million represent about 2.3% of the market value of assets as of December 31, 2017. Unless offset by future investment losses or other unfavorable experience, the recognition of the $195 million market gains is expected to have an impact on the Association's future funded percentage and contribution rate requirements. This potential impact may be illustrated as follows:

- If the net deferred gains were recognized immediately in the valuation value of assets, the funded percentage would increase from 88.5% to 90.6%.
- If the net deferred gains were recognized immediately in the valuation value of assets, the aggregate employer rate would decrease from 36.1% to about 34.3% of payroll.

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 contained herein.

Sincerely,

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

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SCHEDULE OF FUNDING PROGRESS

Funded Ratio is a measurement of the funded status of the plan. The Funded Ratio is calculated by dividing the Valuation Assets by the Actuarial Accrued Liability. In the following table, Contra Costa County Employees' Retirement Association's (CCCERA) Funded Ratio indicates assets are approximately 12% less than liabilities. The most significant reasons for the increase in the funded ratio have been the market appreciation of investments and contributions by the employer and employee.

Schedule of Funding Progress
For Years 2008 through 2017
(Dollars in Thousands)

Actuarial Valuation Date	Actuarial Value of Assets* (a)	Actuarial Accrued Liability (AAL)** (b)	Unfunded AAL (UAAL) (b) - (a)	Funded Ratio (a) / (b)	Projected Covered Payroll (c)	UAAL as a Percentage of Covered Payroll [(b) - (a)] / (c)
12/31/2008	$5,282,505	$5,972,471	$689,966	88.5%	$704,948	97.9%
12/31/2009	5,290,114	6,314,787	1,024,673	83.8%	694,444	147.6%
12/31/2010	5,341,822	6,654,037	1,312,215	80.3%	687,443	190.9%
12/31/2011	5,426,719	6,915,312	1,488,593	78.5%	666,394	223.4%
12/31/2012	5,482,257	7,761,316	2,279,059	70.6%	652,312	349.4%
12/31/2013	5,907,416	7,731,097	1,823,681	76.4%	679,429	268.4%
12/31/2014	6,557,496	8,027,438	1,469,942	81.7%	697,832	210.6%
12/31/2015	7,136,801	8,448,624	1,311,823	84.5%	746,353	175.8%
12/31/2016	7,606,997	8,794,434	1,187,437	86.5%	784,412	151.4%
12/31/2017	8,179,891	9,239,247	1,059,356	88.5%	860,625	123.1%

*Excludes Accounts Payable. Restated to exclude non-valuation reserves.
**Excludes liabilities for non-valuation reserves.

LATEST ACTUARIAL VALUATION METHODS AND ASSUMPTIONS

The Entry Age Actuarial Cost Method was used in conjunction with the following actuarial assumptions. The actuarial assumptions used in the valuations are intended to estimate the future experience of the members of CCCERA and of CCCERA itself in areas that affect the projected benefit flow and anticipated investment earnings.

The actuarial assumptions used to determine the liabilities for the December 31, 2017 valuation are based on the results of the actuarial experience study for the period January 1, 2012, through December 31, 2014. The study was prepared using updated economic and demographic assumptions, and mortality rates adopted by the Board of Retirement (Board) in April 2016. The experience study was adopted by the Board on June 8, 2016. An actuarial valuation is performed annually.

The actuarial assumptions and methods listed below were recommended by the plan's independent actuary, Segal Consulting, and were approved by the Board.

Latest Actuarial Valuation of Plan Assets and Liabilities	
Valuation Date	December 31, 2017
Actuarial Cost Method	Entry Age Actuarial Cost Method
Amortization Method	Level Percent of payroll for total unfunded liability (3.25% payroll growth assumed)
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.
Remaining Amortization Period	Remaining balance of December 31, 2007 UAAL is amortized over a fixed (decreasing or closed) period with 5 years remaining as of December 31, 2017. Any changes in UAAL after December 31, 2007 will be separately amortized over a fixed 18-year period effective with that valuation. Effective December 31, 2013, any changes in UAAL due to plan amendments (with the exception of a change due to retirement incentives) will be amortized over a 10-year fixed period effective with that valuation. The entire increase in UAAL resulting from a temporary retirement incentive will be funded in full upon adoption of the incentive.
Asset Valuation Method	Fair 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 fair value, and is recognized semi-annually over a five-year period. The Actuarial Value of Assets is reduced by the value of the non-valuation reserves and designations.
Actuarial Assumptions:	
Investment Rate of Return	7.00%, net of pension plan investment expenses, including inflation
Inflation Rate	2.75%
Administrative Expenses	1.13% of payroll allocated to both the employer and member based on the components of the normal cost rates for the employer and member
Real Across-the-Board Salary Increases	0.50%
Projected Salary Increases - General	4.00% to 13.25%[1]
Projected Salary Increases - Safety	4.00% to 13.75%[1]

LATEST ACTUARIAL VALUATION METHODS AND ASSUMPTIONS (Continued)

Latest Actuarial Valuation of Plan Assets and Liabilities (Continued)	
Cost-of-Living Adjustments (COLA)	2.75% per year except for Safety Tier C, PEPRA Tier E benefits and PEPRA Tier 4 (2% COLA) and Tier 5 (2% COLA) benefits for members covered under certain memoranda of understanding are assumed to increase at 2% per year. All increases are contingent upon actual increases in Consumer Price Index (CPI).
Other Assumptions	Same as those used in the December 31, 2016 funding actuarial valuation.

(1) Includes inflation at 2.75%, plus "across-the-board" salary increases of 0.50%, plus promotional and merit increases that vary by service for December 31, 2017.

Demographic Assumptions	
Healthy	
General Members	Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table projected generationally with the two-dimensional MP-2015 projection scale.
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	
General Members	Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table set forward eight years, projected generationally with the two-dimensional MP-2015 projection scale.
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.
Member Contribution Rate	
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.
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.
Disability Rates	Based upon the Experience Analysis as of 12/31/14
Withdrawal Rates	Based upon the Experience Analysis as of 12/31/14
Service Retirement Rates	Based upon the Experience Analysis as of 12/31/14
Salary Scales	Total increase of 5.4% per year reflecting approximately 2.75% for inflation, 0.50% for additional real "across-the-board" salary increases and approximately 2.15% for merit and longevity.
Marriage Assumption At Retirement	
Male members	75%
Female members	50%
Value of Assets for Contribution Rate Purposes	Actuarial Value as described in Actuarial Valuation Methods Section of Valuation Report.

Service Retirement Rates for General and Safety (%)

	General				Safety			
Age	Tier 1 (Enhanced)	Tier 3 (Enhanced)	Tier 1 (Non-Enhanced)	Tiers 4 and 5 (PEPRA)	Tier A (Enhanced)	Tier C (Enhanced)	Tier A (Non-Enhanced)	Tiers D and E (PEPRA)
45	-	-	-	-	4.00	2.00	0.00	0.00
50	5.00	4.00	3.00	0.00	30.00	18.00	5.00	5.00
55	20.00	10.00	10.00	5.00	28.00	18.00	10.00	10.00
60	28.00	15.00	25.00	10.00	35.00	30.00	20.00	18.00
65	35.00	35.00	40.00	25.00	100.00	100.00	100.00	30.00
70	50.00	40.00	50.00	50.00	-	-	-	-
75	100.00	100.00	100.00	100.00	-	-	-	-

Termination Rates (%) Before Retirement
Mortality

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

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

LATEST ACTUARIAL VALUATION METHODS AND ASSUMPTIONS (Concluded)

Termination Rates (%) Before Retirement
Disability

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

*65% of General Tier 1 and Tier 4 disabilities are assumed to be duty disabilities. The other 35% are assumed to be ordinary disabilities.
**30% of General Tier 3 and Tier 5 disabilities are assumed to be duty disabilities. The other 70% are assumed to be ordinary disabilities.
***100% of Safety disabilities are assumed to be duty disabilities.

Termination Rates (%) Before Retirement
Withdrawal*

Years of Service	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.

SUMMARY OF DECEMBER 31, 2017 VALUATION RESULTS

Summary of December 31, 2017 Valuation Results

	December 31, 2017	
***Average Employer Contribution Rates**:**	**Total Rate**	**Estimated Annual Amount**
General		
Cost Group #1 - County and Small Districts (Tiers 1 and 4)	31.10%	$7,606,008
Cost Group #2 - County and Small Districts (Tiers 3 and 5)	26.36%	165,290,829
Cost Group #3 - Central Contra Costa Sanitary District	49.57%	17,028,036
Cost Group #4 - Contra Costa Housing Authority	41.91%	2,339,998
Cost Group #5 - Contra Costa County Fire Protection District	31.82%	1,637,209
Cost Group #6 - Small Districts (Non-Enhanced Tiers 1 and 4)	16.59%	141,096
Safety		
Cost Group #7 - County (Tiers A and D)	71.94%	43,932,485
Cost Group #8 - Contra Costa and East Contra Costa Fire Protection Districts	75.59%	26,986,544
Cost Group #9 - County (Tiers C and E)	62.56%	22,115,804
Cost Group #10 - Moraga-Orinda Fire District	69.74%	5,127,677
Cost Group #11 - San Ramon Valley Fire Protection District	75.25%	16,211,133
Cost Group #12 - Rodeo-Hercules Fire District	92.28%	2,022,595
ALL EMPLOYERS COMBINED	**36.07%**	**$310,439,414**
***Average Member Contribution Rates**:**		
General		
Cost Group #1 - County and Small Districts (Tiers 1 and 4)	10.89%	$2,663,749
Cost Group #2 - County and Small Districts (Tiers 3 and 5)	10.76%	67,468,540
Cost Group #3 - Central Contra Costa Sanitary District	11.45%	3,932,967
Cost Group #4 - Contra Costa Housing Authority	11.70%	653,190
Cost Group #5 - Contra Costa County Fire Protection District	11.08%	570,022
Cost Group #6 - Small Districts (Non-Enhanced Tiers 1 and 4)	13.31%	113,227
Safety		
Cost Group #7 - County (Tiers A and D)	17.92%	10,943,567
Cost Group #8 - Contra Costa and East Contra Costa County Fire Protection Districts	17.54%	6,261,431
Cost Group #9 - County (Tiers C and E)	16.20%	5,727,117
Cost Group #10 - Moraga-Orinda Fire District	17.26%	1,269,068
Cost Group #11 - San Ramon Valley Fire Protection District	16.75%	3,608,279
Cost Group #12 - Rodeo-Hercules Fire District	15.52%	340,150
ALL CATEGORIES COMBINED	**12.03%**	**$103,551,307**

Key Actuarial Assumptions	
Annual Interest Rate:	7.00%
Annual Inflation Rate:	2.75%
Across-the-Board Salary Increase:	0.50%
Average Annual Salary Increase:	5.40%

*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.

SUMMARY OF SIGNIFICANT RESULTS

Summary of Significant Results	
Association Membership	December 31, 2017
Active Members:	
1. Number of Members	10,038
2. Average Age	46.0
3. Average Service	9.8
4. Projected Total Payroll (Compensation)	$860,624,613
5. Average Projected Monthly Payroll	$85,737
Retired Members and Beneficiaries:	
1. Number of Members:	
Service Retirement	6,973
Disability Retirement	896
Beneficiaries	1,398
2. Average Age	70.3
3. Actual Retired Payroll	$429,574,195
4. Average Monthly Benefit	$3,892
Vested Terminated Members:	
1. Number of Terminated Vested Members*	3,327
2. Average Age	46.5
Summary of Financial Data:	
Market Value of Assets	$8,390,581,049
Return on Market Value of Assets	13.31%
Actuarial Value of Assets	$8,195,516,541
Return on Actuarial Value of Assets	8.00%
Valuation Value of Assets	$8,179,891,191
Return on Valuation Value of Assets (VVA)	8.00%
Funded Status:	
Actuarial Accrued Liability (AAL)	$9,239,246,920
Unfunded Actuarial Accrued	
Liability (UAAL) on VVA basis	$1,059,355,729
Funded Ratio	
GASB Statement No. 25	88.5%

*Includes 1,696 terminated members with member contributions on deposit as of December 31, 2017.

SCHEDULE OF ACTIVE MEMBER VALUATION DATA

Schedule of Active Member Valuation Data

Valuation Date	Plan Type	Number	Projected Payroll	Average Annual Salary	% Increase/ (Decrease) in Average Salary
12/31/2008	General	7,781	$544,409,663	$69,967	5.26%
	Safety	1,604	160,538,005	100,086	5.82%
	Total	**9,385**	**$704,947,668**	**$75,114**	**5.37%**
12/31/2009	General	7,406	$536,090,505	$72,386	3.46%
	Safety	1,532	158,353,494	103,364	3.28%
	Total	**8,938**	**$694,443,999**	**$77,696**	**3.44%**
12/31/2010	General	7,325	$533,351,975	$72,813	0.59%
	Safety	1,486	154,091,231	103,695	0.32%
	Total	**8,811**	**$687,443,206**	**$78,021**	**0.42%**
12/31/2011	General	7,183	$518,213,291	$72,144	(0.92%)
	Safety	1,446	148,180,855	102,476	(1.18%)
	Total	**8,629**	**$666,394,146**	**$77,227**	**(1.02%)**
12/31/2012	General	7,244	$513,920,662	$70,944	(1.66%)
	Safety	1,396	138,391,516	99,134	(3.26%)
	Total	**8,640**	**$652,312,178**	**$75,499**	**(2.24%)**
12/31/2013	General	7,682	$540,431,355	$70,350	(0.84%)
	Safety	1,442	138,997,556	96,392	(2.77%)
	Total	**9,124**	**$679,428,911**	**$74,466**	**(1.37%)**
12/31/2014	General	7,774	$561,430,096	$72,219	2.66%
	Safety	1,385	136,401,741	98,485	2.17%
	Total	**9,159**	**$697,831,837**	**$76,191**	**2.32%**
12/31/2015	General	8,213	$602,047,448	$73,304	1.50%
	Safety	1,429	144,305,217	100,983	2.54%
	Total	**9,642**	**$746,352,665**	**$77,406**	**1.60%**
12/31/2016	General	8,378	$634,246,734	$75,704	3.27%
	Safety	1,470	150,165,527	102,153	1.16%
	Total	**9,848**	**$784,412,261**	**$79,652**	**2.90%**
12/31/2017	General	8,565	$697,418,709	$81,427	7.56%
	Safety	1,473	163,205,904	110,798	8.46%
	Total	**10,038**	**$860,624,613**	**$85,737**	**7.64%**

SCHEDULE OF FUNDED LIABILITIES BY TYPE

Schedule of Funded Liabilities by Type
(Dollars in Thousands)

Valuation Data	Aggregate Accrued Liabilities For: 1 Active Member Contributions*	2 Retirants and Beneficiaries	3 Active Members Employer Portion	Reported Assets	Portion of Accrued Liabilities Covered by Reported Assets: 1	2	3
12/31/2007	$446,284	$3,070,770	$2,063,994	$5,016,137	100%	100%	73%
12/31/2008	554,267	3,239,593	2,178,611	5,282,505	100%	100%	68%
12/31/2009	598,973	3,523,414	2,192,400	5,290,114	100%	100%	53%
12/31/2010	645,975	3,811,751	2,196,311	5,341,822	100%	100%	40%
12/31/2011	637,614	4,268,202	2,009,496	5,426,719	100%	100%	26%
12/31/2012	653,236	4,990,760	2,117,320	5,482,257	100%	97%	0%
12/31/2013	844,668	5,086,529	1,799,900	5,907,416	100%	100%	0%
12/31/2014	899,220	5,328,622	1,799,596	6,557,496	100%	100%	18%
12/31/2015	1,011,434	5,525,212	1,911,978	7,136,801	100%	100%	31%
12/31/2016	1,116,824	5,670,811	2,006,799	7,606,998	100%	100%	41%
12/31/2017	1,216,116	5,873,018	2,150,113	8,179,891	100%	100%	51%

*Beginning 12/31/2013, Active Member Contributions are set equal to the reserve account maintained for member contributions.

RETIRANTS AND BENEFICIARIES ADDED TO AND REMOVED FROM RETIREE PAYROLL

Retirants and Beneficiaries Added To and Removed From Retiree Payroll

Year	At Beginning of Year	Added During Year	Allowances Added	Removed During Year	Allowances Removed	At End of Year	Retiree Payroll*	% Increase in Retiree Payroll	Average Annual Allowance	% Increase in Annual Allowance
2007	6,646	492	$24,184,795	(227)	$(4,586,247)	6,911	$235,656,024	9.07%	$34,099	4.89%
2008	6,911	317	20,853,808	(216)	(6,065,270)	7,012	250,444,562	6.28%	35,717	4.74%
2009	7,012	505	22,693,682	(225)	(6,271,784)	7,292	266,866,460	6.56%	36,597	2.47%
2010	7,292	486	27,459,315	(219)	(5,356,600)	7,559	288,969,175	8.28%	38,228	4.46%
2011	7,559	758	37,949,896	(232)	(6,621,254)	8,085	320,297,817	10.84%	39,616	3.63%
2012	8,085	657	34,622,498	(225)	(7,351,271)	8,517	347,569,044	8.51%	40,809	3.01%
2013	8,517	379	30,637,741	(271)	(8,397,382)	8,625	369,809,403	6.40%	42,876	5.07%
2014	8,625	494	25,732,590	(248)	(8,515,665)	8,871	387,026,328	4.66%	43,628	1.75%
2015	8,871	391	19,997,703	(194)	(7,180,211)	9,068	399,843,820	3.31%	44,094	1.07%
2016	9,068	418	25,627,155	(386)	(13,691,575)	9,100	411,779,400	2.99%	45,246	2.61%
2017	9,100	396	26,242,182	(229)	(8,447,387)	9,267	429,574,195	4.32%	46,355	2.45%

*Beginning 12/31/2015, Retiree Payroll excludes death benefits.

ACTUARIAL ANALYSIS OF FINANCIAL EXPERIENCE

Actuarial Analysis of Financial Experience
Changes in the Unfunded Actuarial Accrued Liability (UAAL) During the Years Ended December 31, 2008 through 2017
(Dollars in Thousands)

				Actuarial (Gain) or Loss Due to All Changes				
December 31	Expected UAAL	Change in Plan Provisions	Change in Assumptions/ Methods	Investment Return	Salary Increases (Decreases)	Other*	Total Changes	UAAL
2008	$515,421	$1,100	$-	$154,986	$5,838	$12,621	$173,445	$689,966
2009	674,485	0	63,871	394,647	(47,181)	(61,149)	286,317	1,024,673
2010	1,050,996	0	15,521	313,478	(83,073)	15,293	245,698	1,312,215
2011	1,293,836	0	-	264,597	(77,127)	7,287	194,757	1,488,593
2012	1,463,568	0	570,155	297,215	(102,697)	50,818	245,336	2,279,059
2013	2,238,120	0	(205,332)	(96,259)	(114,771)	1,923	(209,107)	1,823,681
2014	1,773,291	0	(52)	(244,463)	(42,976)	(15,858)	(303,297)	1,469,942
2015	1,409,789	0	115,137	(100,727)	(9,036)	(103,340)	(213,103)	1,311,823
2016	1,234,411	0	0	(2,853)	11,445	(55,566)	(46,974)	1,187,437
2017	1,099,936	0	0	(76,209)	59,574	(23,946)	(40,581)	1,059,356

*Other experience includes employer and employee contributions, COLA increases, mortality, disability, withdrawal, retirement, and leave cashout other than expected.

SUMMARY OF MAJOR PENSION PLAN PROVISIONS

Major Provisions of the Present System

Briefly summarized below are the major provisions of CERL and PEPRA, as amended through December 31, 2013, and as adopted by Contra Costa County and special district employers.

A. GENERAL MEMBERS —

- Tier 1 and Tier 3 Plans Non-Enhanced (Government Code (GC) 31676.11)
- Tier 1 and Tier 3 Plans Enhanced (GC 31676.16)
- Tier 2 Plan (GC 31752)
- PEPRA Tier 4 and Tier 5 Plans (GC 7522.20 (a))

Coverage

Tier 1:

a. All General Members hired before July 1, 1980, and electing not to transfer to Tier 2 Plan.

b. Reciprocal General Members hired before October 1, 2002, electing to not enter Tier 2 Plan.

c. Participating agencies who have elected Tier 1.

d. 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.

Tier 2:

a. All General Members hired before July 1, 1980, and most General Members hired on or after August 1,1980, electing to transfer to the Tier 2 Plan. Effective October 1, 2002, Tier 2 was eliminated for all County employees (except California Nurses Association (CNA) employees); employees were placed in Tier 3.

CNA employees in Tier 2 were placed in Tier 3 as of January 1, 2005.

One special district's Tier 2 employees were placed in Tier 3 effective February 1, 2006.

Tier 3:

All County General Members (except CNA employees) hired on or after October 1, 2002, are placed in Tier 3. All CNA employees hired on or after January 1, 2005, are placed in Tier 3. All Contra Costa Mosquito and Vector Control District employees hired on or after February 1, 2006 are placed in Tier 3. General Members with membership dates before January 1, 2013 who are not placed in Tier 1 are placed in Tier 3.

All Tier 2 members for each of the agencies listed above were placed in Tier 3 as of the above respective dates.

PEPRA Tier 4:

All General Members hired on or after January 1, 2013 hired by specific employers who did not adopt Tier 2 are placed in Tier 4.

PEPRA Tier 5:

All General Members hired on or after January 1, 2013 who are not placed in Tier 4 are placed in Tier 5.

Final Compensation (FC)

Tier 1 and Tier 3 Plans (GC 31462.1, 31462):

a. Highest consecutive twelve months of compensation earnable.

Tier 2 Plan (GC 31462):

a. Highest consecutive thirty-six months of compensation earnable.

PEPRA Tier 4 and Tier 5 Plans (GC 7522.32, 7522.34):

a. Highest consecutive thirty-six months of pensionable compensation. Base compensation subject to annual limit.

Service Retirement

Tier 1 and Tier 3 Plans:

a. Requirement (GC 31672): Age 50 with 10 years of service, or age 70 regardless of service, or after 30 years of service, regardless of age.

b. Non-Enhanced Benefit (GC 31676.11)

Retirement Age	Benefit Formula
50:	(1.24%xFC-1/3x1.24%x$350x12)xYrs
55:	(1.67%xFC-1/3x1.67%x$350x12)xYrs
60:	(2.18%xFC-1/3x2.18%x$350x12)xYrs
62:	(2.35%xFC-1/3x2.35%x$350x12)xYrs
65 or later:	(2.61%xFC-1/3x2.61%x$350x12)xYrs

Maximum Benefit: 100% of Final Compensation.

Tier 2 Plan:

a. Requirement: Age 50 with 10 years of service, or age 70 regardless of service, or after 30 years of service, regardless of age.

b. Benefit (GC 31752)

Retirement Age	Benefit Formula
50:	(0.83% x FC x Yrs-0.57% x Yrs* x PIA)
55:	(1.13% x FC x Yrs-0.87% x Yrs* x PIA)
60:	(1.43% x FC x Yrs-1.37% x Yrs* x PIA)
62:	(1.55% x FC x Yrs-1.67% x Yrs* x PIA)
65 or later:	(1.73% x FC x Yrs-1.67% x Yrs* x PIA)

Maximum Benefit: None.

**Not greater than 30 years, where PIA is the Social Security Primary Insurance Amount.*

c. Tier 1 and 3 Plan Enhanced Benefit (GC 31676.16)

Retirement Age	Benefit Formula
50:	(1.43%xFC-1/3x1.43%x $350x12)xYrs
55:	(2.00%xFC-1/3x2.00%x $350x12)xYrs
60:	(2.26%xFC-1/3x2.26%x $350x12)xYrs
62:	(2.37%xFC-1/3x2.37%x $350x12)xYrs
65 or later:	(2.42%xFC-1/3x2.42%x $350x12xYrs**

Maximum Benefit:100% of Final Compensation

*** Current Tier 1 and Tier 3 members retiring at age 62½ or older will receive the higher benefits formula under GC 31676.11. Employees with membership dates on or after the benefit enhancement effective date will retire with benefits computed under GC 31676.16.*

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

PEPRA Tier 4 and Tier 5 Plans

a. Requirement (GC 7522.20 (a), 31672.3): Age 52 with 5 years of service, or age 70 regardless of service.

b. Benefit (GC 7522.20 (a))

Retirement Age	Benefit Formula
52:	1.00% x FC3 x Yrs
55:	1.30% x FC3 x Yrs
60:	1.80% x FC3 x Yrs
62:	2.00% x FC3 x Yrs
65:	2.30% x FC3 x Yrs
67 or later:	2.50% x FC3 x Yrs

Maximum Benefit: None.

Disability Retirement

Tier 1 and Tier 4:

a. Requirements (GC 31720)
   (1) Service-connected: None
   (2) Nonservice-connected: five years of service

b. Benefit
   (1) Service-connected: 50% Final Compensation or Service retirement benefit, if greater. (GC 31727.4)
   (2) Nonservice-connected: 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. (GC 31727)

Tier 2, Tier 3, and Tier 5:

a. Requirements (GC 31720.1)
   (1) Service-connected: None
   (2) Nonservice-connected: ten years of service
   (3) Definition of disability is more strict than in Tier 1 and Tier 4.

b. Benefit (GC 31727.01)
   (1) Service-connected or nonservice-connected is 40% Final Compensation plus 10% Final Compensation for each minor child (maximum of three).
   (2) Disability benefits are offset by other plans of the County except Workers' Compensation and Social Security.

Death Before Retirement

All tiers other than General Tier 2:

a. No eligibility requirement: Refund of employee contributions with interest plus one month's compensation for each year of service to a maximum of 6 months compensation (GC 31781); 50% of Final Compensation payable to spouse if Service-Connected Death (GC 31787);

- OR -

b. 5 years of service (10 years for Tiers 3 and 5): Option 2 (100%) continuance of Service Retirement or Nonservice-Connected Disability benefit payable to designated eligible beneficiary, if Form 104 is on file with CCCERA.

General Tier 2:

a. Prior to eligibility to retire (less than ten years):
   (1) $2,000 lump sum benefit offset by any Social Security payment and a refund of employee of contributions with interest.

b. While eligible to retire (ten years or service-connected death) 60% of Service or Disability Retirement Benefit (minimum benefit is 24% of Final Compensation) plus, for each minor child, 10% of the allowance otherwise paid to the member. Minimum family benefit is 60% of the member's allowance. Maximum family benefit is 100% of member's allowance.

Death After Retirement

All tiers other than General Tier 2 (GC 31760.1, 31760.2)

a. After Service Retirement or Nonservice-Connected Disability - 60% of unmodified allowance continued to eligible spouse.

- OR -

b. After Service-Connected Disability - 100% of the allowance continued to eligible spouse. (GC 31786, 31786.1)

- AND -

c. Lump sum payment of $5,000. (GC 31789.5)

General Tier 2 (GC 31760.11)

a. After Service or Disability Retirement 60% of unmodified allowance continued to eligible spouse plus 20% of allowance to each minor child. Minimum benefit is 60% of allowance. Maximum benefit is 100% of allowance.

- AND -

b. Lump sum payment of $7,000 less any Social Security lump sum payment. (GC 31789.01, 31789.5)

Withdrawal Benefits

May elect a refund of employee contributions with interest or defer retirement until eligible.

Less than five years of service: Age 70

At least five years of service:

Tier 1, Tier 2 and Tier 3
The later of age 50 and when the member would have reached 10 years of service had the member remained a full-time employee.

Tier 4 and Tier 5
Age 52

Cost-of-Living (COL) Benefits

Tier 1, Tier 3, Tier 4 and Tier 5

Based on changes in Consumer Price Index (CPI).

3% maximum change per year except for Tier 3 and PEPRA Tier 5 disability benefits which can increase 4% per year. Benefits for PEPRA Tier 4 and Tier 5 members covered under certain Memoranda of Understanding have a maximum of 2% per year.

Tier 2
Based on changes in CPI.

4% maximum change per year.

Employee's Contribution Rates

Tier 1 Non-Enhanced (GC 31621.1)
a. Basic: to provide for an average annuity at age 55 equal to 1/120 of FC1.

b. COL: to provide for one-half of future COL costs.

Tier 1 and Tier 3 Enhanced (GC 31621)
a. Basic: to provide for an average annuity at age 60 equal to 1/120 of FC1.

b. COL: to provide for one-half of future COL costs.

PEPRA General Tiers 4 and 5 (GC 7522.30)
a. 50% of the total normal cost rate.

Employer Contribution Rates

Tier 1, Tier 3, Tier 4 and Tier 5
Enough to make up for the balance of the basic and COL contributions needed plus the amount required to amortize the Unfunded Actuarial Accrued Liability.

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 COL 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 will be exempt from paying member contributions after 30 years of service.

B. SAFETY MEMBERS —

- Tiers A and C (GC 31664 and 31664.1)
- PEPRA Safety Members Tiers D and E (GC 7522.25(d))

Coverage

Tiers A and C

a. Safety members with membership dates before January 1, 2013.

b. 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.

Tiers D and E

a. Safety members with membership dates on or after January 1, 2013. Safety members from certain bargaining units are placed in Safety Tier E.

Final Compensation (FC)

Tiers A and C (GC 31462.1, 31462)

a. Highest consecutive twelve months of compensation earnable.

b. Highest consecutive thirty-six months of compensation earnable for Safety Tier C.

Tiers D and E (GC 7522.32, 7522.34)

a. Highest consecutive thirty-six months of pensionable compensation. Base compensation will be subject to annual limit.

Service Retirement

Tiers A and C

a. Requirement (GC 31663.25): Age 50 with 10 years of service, or age 70 regardless of service, or after 20 years of service, regardless of age.

b. Non-Enhanced Benefit at Retirement (GC 31664) (Rodeo-Hercules Fire Protection District)

Age	Benefit Formula
50	2.00% x FC1 x Yrs
55 or later	2.62% x FC1 x Yrs

Maximum Benefit: 100% of Final Compensation

c. Enhanced Benefit at Retirement (GC 31664.1) - (All others)

Age	Benefit Formula
50 or later	3.00% x FC1 x Yrs (Tier A); 3.00% x FC3 x Yrs (Tier C)

Maximum Benefit: 100% of Final Compensation

PEPRA Tiers D and E

a. Requirement (GC 7522.25(a) and 31672.3): Age 50 with 5 years of service, or age 70 regardless of service.

b. Benefit at Retirement (GC 7522.25 (d))

Age	Benefit Formula
50	2.00% x FC3 x Yrs
55	2.50% x FC3 x Yrs
57 or later	2.70% x FC3 x Yrs

Maximum Benefit: None

Disability Retirement

a. Requirements (GC 31720)
   (1) Service-connected: None
   (2) Nonservice-Connected: five years of service

b. Benefit
   (1) Service-connected: 50% Final Compensation or Service Retirement benefit if greater. (GC 31727.4)
   (2) Nonservice-Connected: 1.8% per year of service. If the benefit does not exceed one-third of Final Compensation, the service projected to 55, but total benefit cannot be more than one-third of Final Compensation. (GC 31727.2)

Death Before Retirement

Nonservice-Connected
a. Prior to retirement eligibility (less than 5 years)
   (1) One month's salary for each year of service to a maximum of six month's compensation.
   (2) Return of employee contributions with interest.

b. While eligible to retire (after five years) 60% of Service or Disability Retirement Benefit.

Service-connected
a. 50% of Final Compensation

Death After Retirement

a. After Service Retirement or Nonservice-Connected Disability - 60% of unmodified allowance continued to eligible spouse. (GC 31785, 31785.1)

- OR -

b. After Service-Connected Disability - 100% of the allowance continued to eligible spouse. (GC 31786, 31786.1)

- AND -

c. Lump sum payment of $5,000. (GC 31789.5)

Withdrawal Benefits

May elect a refund of employee contributions with interest or defer retirement until eligible.

Less than five years of service: Age 70

At least five years of service:

Tier A and Tier C
The later of age 50 and when the member would have reached 10 years of service had the member remained a full-time employee.

Tier D and Tier E
Age 50

Cost-of-Living (COL) Benefits

a. Based on change in CPI; 3% maximum change per year or Safety Tier A and Tier D.

b. Based on change in CPI; 2% maximum change per year for Safety Tier C and Tier E.

Employees' Safety Tier A Non-Enhanced (Section 31664) Contribution Rates

a. Basic - to provide for an average annuity at age 50 equal to 1/100 of FC1 (Tier A). (GC 31639.25)

b. COL - to provide for one-half of future COL costs.

Employees' Safety Tier A and Tier C Enhanced (Section 31664.1) Contribution Rates

a. Basic - to provide for an average annuity at age 50 equal to 1/100 of FC1 (Tier A). (GC 31139.25)

   Basic - to provide for an average annuity at age 50 equal to 1/100 of FC3 (Tier C).

b. COL - to provide for one-half of future COL costs.

PEPRA Safety Tiers D and E (GC 7522.30) Contribution Rates

a. 50% of the total normal cost rate.

Employer Contribution Rate

Tiers A, C, D, and E
Enough to make up the balance of the basic and COL contributions needed plus the amount required to amortize the Unfunded Actuarial Accrued Liability.

Other Information

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.

OPEB CERTIFICATION LETTER

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February 18, 2019

Contra Costa County Employees' Retirement Association
1355 Willow Way, Suite 221
Concord, CA 94520

Actuarial Valuation of Other Post Employment Benefits for Staff Employees and Retirees as of January 1, 2018 and GASB 74/75 Disclosures as of December 31, 2018

At the request of the Contra Costa County Employees' Retirement Association ("CCCERA"), we have prepared an actuarial valuation of Other Post Employment Benefits as of January 1, 2018 for CCCERA's staff employees and retirees, and GASB 74 and 75 disclosures for the fiscal year ending December 31, 2018, to comply with Statements No. 74 and 75 of the Governmental Accounting Standards Board (GASB).

In preparing this report, we relied, without audit, on information supplied by CCCERA's staff. This information includes but is not limited to employee census data, financial information and plan provisions. While Milliman has not audited the financial and census data, they have been reviewed for reasonableness and are, in our opinion, sufficient and reliable for the purposes of our calculations. If any of this information as summarized in this report is inaccurate or incomplete, the results shown could be materially affected and this report may need to be revised.

All costs, liabilities, rates of interest, and other factors for CCCERA have been determined on the basis of actuarial assumptions and methods which are individually reasonable (taking into account the experience of CCCERA and reasonable expectations); and which, in combination, offer our best estimate of anticipated experience affecting CCCERA. Further, in our opinion, each actuarial assumption used is reasonably related to the experience of the Plan and to reasonable expectations which, in combination, represent our best estimate of anticipated experience for CCCERA.

This valuation report is only an estimate of the Plan's financial condition as of a single date. It can neither predict the Plan's future condition nor guarantee future financial soundness. Actuarial valuations do not affect the ultimate cost of Plan benefits, only the timing of CCCERA's contributions. While the valuation is based on an array of individually reasonable assumptions, other assumption sets may also be reasonable and valuation results based on those assumptions would be different. No one set of assumptions is uniquely correct. Determining results using alternative assumptions is outside the scope of our engagement.

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. Due to the limited scope of our assignment, we did not perform an analysis of the potential range of future measurements. CCCERA has the final decision regarding the appropriateness of the assumptions.

Offices in Principal Cities Worldwide

Actuarial computations presented in this report under GASB Statements No. 74 and 75 are for purposes of assisting CCCERA in fulfilling its financial accounting requirements. The computations prepared for this purpose may differ as disclosed in our report. The calculations in the enclosed report have been made on a basis consistent with our understanding of CCCERA's funding policy and goals. The calculations in this report have been made on a basis consistent with our understanding of the OPEB plan provisions described in Appendix A of this report, and of GASB Statements No. 74 and 75. Determinations for purposes other than meeting these requirements may be significantly different from the results contained in this report. Accordingly, additional determinations may be needed for other purposes.

Milliman's work is prepared solely for the internal business use of CCCERA. To the extent that Milliman's work is not subject to disclosure under applicable public records laws, Milliman's work may not be provided to third parties without Milliman's prior written consent. Milliman does not intend to benefit or create a legal duty to any third party recipient of its work product. Milliman's consent to release its work product to any third party may be conditioned on the third party signing a Release, subject to the following exceptions:

a) CCCERA may provide a copy of Milliman's work, in its entirety, to CCCERA's professional service advisors who are subject to a duty of confidentiality and who agree to not use Milliman's work for any purpose other than to benefit CCCERA.

b) CCCERA may provide a copy of Milliman's work, in its entirety, to other governmental entities, as required by law.

No third party recipient of Milliman's work product should rely upon Milliman's work product. Such recipients should engage qualified professionals for advice appropriate to their own specific needs. The consultants who worked on this assignment are actuaries. Milliman's advice is not intended to be a substitute for qualified legal or accounting counsel. The signing actuary is independent of the plan sponsor. We are not aware of any relationship that would impair the objectivity of our work.

On the basis of the foregoing, we hereby certify that, to the best of our knowledge and belief, the report is complete and accurate and has been prepared in accordance with generally recognized and accepted actuarial principles and practices which are consistent with the applicable Actuarial Standards of Practice of the American Academy of Actuaries. The undersigned is a member of the American Academy of Actuaries and meets the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

Sincerely,

John R. Botsford, FSA, MAAA
Principal and Consulting Actuary

OPEB SCHEDULE OF FUNDING PROGRESS

Funded Ratio is a measurement of the funded status of the OPEB liabilities. The Funded Ratio is calculated by dividing the Fiduciary Net Position of the OPEB Trust by the Total OPEB Liability. In the following table, Contra Costa County Employees' Retirement Association's (CCCERA) OPEB Trust indicates assets are approximately 46% less than liabilities after the initial employer contribution of $2.5 million.

Schedule of Funding Progress
As of December 31, 2018
(Dollars in Thousands)

Actuarial Valuation Date	Fiduciary Net Position (a)	Total OPEB Liability (TOL) (b)	Net OPEB Liability (NOL) (b) - (a)	Funded Ratio (a) / (b)	Projected Covered Payroll (c)	NOL as a Percentage of Covered Payroll [(b) - (a)] / (c)
12/31/2018	$2,542	$4,710	$2,168	54.0%	$4,997	43.4%

OPEB KEY METHODS AND ASSUMPTIONS

The following is a summary of the assumed rates for mortality, retirement, disability, and withdrawal, which are consistent with Pre/Post Retirement Mortality.

Key Methods and Assumptions Used in Actuarial Valuation of Total OPEB Liability	
Valuation Date	December 31, 2018
Actuarial Cost Method	Entry Age
Amortization Method	Level Percent of payroll
Amortization Period	30 years
Asset Valuation Method	Fair value of assets
Investment Rate of Return	6.75%
Inflation Rate	2.75%
Assumed Salary Increases	4.00% to 13.25% varying by years of service
Other Assumptions	Consistent with those used in the December 31, 2017 CCCERA Actuarial Valuation.

Demographic Assumptions	
Healthy	
General Members	Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table, projected generationally with the two-dimensional MP-2015 projection scale.
Disabled	
General Members	Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table set forward eight 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.
Withdrawal	Sample probabilities of terminating employment from CCCERA are shown below for selected years of CCCERA Service.

Years of Service	General
Less than 1	13.50%
1	9.25%
2	9.00%
3	6.00%
4	4.50%
5	4.25%
10	2.75%
15	2.10%
20 or more	1.50%

SUMMARY OF OPEB BENEFITS

ELIGIBILITY

Eligible for the Premium Subsidy

- Unrepresented CCCERA staff employees who are hired prior to January 1, 2007 and retire with a CCCERA pension benefit.
- Unrepresented CCCERA staff employees who are hired on January 1, 2007 to December 31, 2008 with completion of 15 years of service and retire with a CCCERA pension benefit.
- AFSCME CCCERA staff employees who are hired prior to January 1, 2007 and retire with a CCCERA pension benefit.
- AFSCME CCCERA staff employees who are hired on January 1, 2007 to December 31, 2009 with completion of 15 years of service and retire with a CCCERA pension benefit.

PEMHCA Minimum Contribution

- Unrepresented CCCERA staff employees who are hired on or after January 1, 2009 with completion of 15 years of service and retire with a CCCERA pension benefit.
- AFSCME CCCERA staff employees who are hired on or after January 1, 2010 with completion of 15 years of service and retire with a CCCERA pension benefit.

HEALTH BENEFITS
(Retirement date on or after January 1, 2015)

Eligible CCCERA staff retirees and their dependents may elect coverage under the health plans sponsored by CalPERS. For retirees who meet the eligibility requirements to receive the premium subsidy, CCCERA will pay the monthly premium subject to maximum subsidies shown in the following table by rate tier for 2017.

Medical Coverage	2017
Retiree Only	$746.47
Retiree + 1	1,492.94
Retiree + Family	1,940.82

For 2018 and beyond, if there is an increase in the monthly premium charged by a medical plan, CCCERA and the employee will each pay fifty percent (50%) of the monthly increase that is above the amount of the 2017 plan premium. The fifty percent (50%) share of the monthly medical plan increase paid by CCCERA is in addition to the amount paid by CCCERA for the 2017 plan year.

For dental coverage, CCCERA's monthly premium subsidy is a set dollar amount as shown in the table below.

Dental Coverage	2018
Employee Only	$46.21
Employee and Spouse	103.72
Employee and Child	103.41
Family	169.38

For employees who meet the eligibility to receive the PEMHCA minimum contribution the benefit is ($133 per month for 2018), subject to an annual increase based on the medical Consumer Price Index).

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STATISTICAL

SUMMARY OF STATISTICAL DATA

The objective of the Statistical Section is to provide users with additional detailed information in order to promote a more comprehensive understanding of CCCERA's financial statements, note disclosures and supplemental information. In addition, the multi-year trend information for the financial and operating segments of CCCERA provided in this section is intended to facilitate understanding of how the financial activities and positions have changed over time. The information is presented in two major categories: Financial Trends Information and Operating Information.

Financial Trends Information is intended to assist readers in understanding how CCCERA's financial activities and positions have changed over time. The Changes in Fiduciary Net Position for Years 2009 – 2018 presents additions by source, deductions by type, and the total change in net position for each year. The Schedule of Benefit Expenses by Type for the Last Ten Years presents benefit deductions by type of benefit, such as by Service Retirement and Disability Retirement, as well as by General and Safety benefits.

Operating Information is intended to provide contextual information about CCCERA's operations and membership to assist readers in using financial statement information to comprehend and evaluate CCCERA's fiscal condition. This section includes the Schedule of Retired Members by Type of Benefit, which presents information as of the current valuation period. The Schedule of Average Benefit Payment Amounts for the Last Ten Years shows the average monthly benefit, and number of retirees and beneficiaries, organized by five-year increments. Participating Employers and Active Members for Years 2009 – 2018 presents the employers and number of their corresponding covered employees.

CHANGES IN FIDUCIARY NET POSITION FOR YEARS 2009 - 2018

Changes in Fiduciary Net Position
For Years 2009 - 2018
(Dollars in Thousands)

	2018	2017	2016	2015	2014
Additions					
Employer Contributions	$325,117	$314,836	$307,909	$323,720	$293,760
Employee Contributions	103,542	96,467	88,788	85,361	78,258
Net Investment Income (Loss)	(187,339)	995,678	501,733	82,429	488,873
Security Lending Income	1,582	878	1,630	1,165	1,167
Total Additions	**242,902**	**1,407,859**	**900,060**	**492,675**	**862,058**
Deductions					
Pension Benefits	452,512	430,037	412,073	400,759	387,026
Refunds	8,093	5,518	7,154	4,434	6,798
Administrative Expense	9,337	9,146	8,486	8,115	6,980
Other Expenses	13,555	11,097	10,409	11,695	10,662
Total Deductions	**483,497**	**455,798**	**438,122**	**425,003**	**411,466**
CHANGE IN FIDUCIARY NET POSITION	**$(240,595)**	**$952,061**	**$461,938**	**$67,672**	**$450,592**

	2013	2012	2011	2010	2009
Additions					
Employer Contributions	$235,017	$212,321	$200,389	$183,951	$195,614
Employee Contributions	72,373	73,362	61,575	64,330	66,536
Net Investment Income (Loss)	884,870	680,538	100,363	605,672	748,861
Security Lending Income	1,148	1,535	951	1,097	2,436
Total Additions	**1,193,408**	**967,756**	**363,278**	**855,050**	**1,013,447**
Deductions					
Pension Benefits	369,809	347,569	320,297	288,969	266,866
Refunds	3,844	3,276	3,909	2,647	4,628
Administrative Expense	6,776	6,030	6,290	5,283	7,359
Other Expenses	9,243	8,590	7,649	7,723	7,563
Total Deductions	**389,672**	**365,465**	**338,145**	**304,622**	**286,416**
CHANGE IN FIDUCIARY NET POSITION	**$803,736**	**$602,291**	**$25,133**	**$550,428**	**$727,031**

SCHEDULE OF BENEFIT EXPENSES BY TYPE (Annual Benefit Amounts)

Schedule of Benefit Expenses by Type
Annual Benefit Amounts as of December 31 of Each Year
(Dollars in Thousands)

	2017	2016	2015	2014	2013	2012	2011	2010	2009	2008
Service Retirement Payroll:										
General	$223,019	$213,394	$205,760	$198,783	$188,945	$179,079	$163,514	$144,304	$131,646	$121,929
Safety	115,068	110,178	107,643	107,103	102,791	96,403	87,198	78,221	70,782	66,953
Total	338,087	323,572	313,403	305,886	291,736	275,482	250,712	222,525	202,428	188,882
Disability Retirement Payroll:										
General	12,315	12,432	12,531	12,215	12,371	12,049	11,974	12,013	12,134	12,072
Safety	37,111	35,664	35,168	33,631	32,346	29,725	28,341	27,349	26,708	24,845
Total	49,427	48,096	47,699	45,846	44,717	41,774	40,315	39,362	38,842	36,917
Beneficiary Payroll:										
General	23,971	22,877	22,938	20,249	19,511	18,011	17,825	16,727	16,144	16,030
Safety	18,552	17,528	16,718	15,044	13,845	12,302	11,445	10,355	9,452	8,616
Total	42,523	40,405	39,656	35,293	33,356	30,313	29,270	27,082	25,596	24,646
Total Benefit Expense:										
General	259,305	248,703	241,229	231,248	220,827	209,139	193,313	173,044	159,924	150,031
Safety	170,731	163,370	159,528	155,777	148,982	138,430	126,984	115,925	106,942	100,414
TOTAL	**$430,037**	**$412,073**	**$400,759**	**$387,026**	**$369,809**	**$347,569**	**$320,297**	**$288,969**	**$266,866**	**$250,445**

SCHEDULE OF RETIRED MEMBERS BY TYPE OF BENEFIT

Schedule of Retired Members by Type of Benefit
Summary of Monthly Allowances Being Paid as of December 31, 2017

Amount of Monthly Benefit	Number of Retirees & Beneficiaries	Service	Disability	Beneficiary
General Members				
$0 to $999	1,427	1,107	5	315
$1,000 to $1,999	1,720	1,329	91	300
$2,000 to $2,999	1,317	997	160	160
$3,000 to $3,999	861	683	81	97
$4,000 to $4,999	536	461	28	47
$5,000 to $5,999	374	325	9	40
$6,000 to $6,999	249	232	5	12
$7,000 to $7,999	209	196	1	12
$8,000 to $8,999	126	121	0	5
$9,000 to $9,999	79	77	0	2
$10,000 & Over	209	207	0	2
TOTALS	**7,107**	**5,735**	**380**	**992**
Safety Members				
$0 to $999	95	52	6	37
$1,000 to $1,999	126	51	4	71
$2,000 to $2,999	158	61	38	59
$3,000 to $3,999	266	77	108	81
$4,000 to $4,999	303	98	134	71
$5,000 to $5,999	184	110	47	27
$6,000 to $6,999	147	105	24	18
$7,000 to $7,999	146	108	29	9
$8,000 to $8,999	146	117	21	8
$9,000 to $9,999	139	95	28	16
$10,000 & Over	450	364	77	9
TOTALS	**2,160**	**1,238**	**516**	**406**

SCHEDULE OF AVERAGE BENEFIT PAYMENT AMOUNTS

Schedule of Average Benefit Payment Amounts
Estimates Based on Years of Credited Service - General and Safety Combined

	Years of Credited Service							
Retirement Effective Date	**0-5**	**5-10**	**10-15**	**15-20**	**20-25**	**25-30**	**30+**	**Totals**
1/1/2017 - 12/31/2017								
Average monthly benefit	$929	$1,290	$1,982	$2,943	$3,697	$5,907	$5,253	$3,196
Average Final Compensation	$9,131	$6,537	$6,669	$7,566	$7,477	$9,326	$8,101	$7,605
Number of retired members	12	52	59	72	32	48	34	309
1/1/2016 - 12/31/2016								
Average monthly benefit	$988	$1,445	$1,887	$2,611	$3,569	$4,158	$4,590	$2,719
Average Final Compensation	$8,064	$7,085	$6,616	$6,783	$7,368	$7,953	$7,674	$7,208
Number of retired members	19	48	59	67	51	47	21	312
1/1/2015 - 12/31/2015								
Average monthly benefit	$1,344	$1,151	$1,990	$2,478	$3,351	$4,409	$3,619	$2,257
Average Final Compensation	$8,753	$6,379	$6,536	$6,418	$7,670	$8,065	$7,706	$6,867
Number of retired members	13	55	83	53	34	17	7	262
1/1/2014 - 12/31/2014								
Average monthly benefit	$1,292	$1,139	$1,976	$3,048	$4,431	$6,048	$5,318	$3,408
Average Final Compensation	$7,236	$6,426	$6,959	$7,834	$8,740	$9,941	$8,260	$7,959
Number of retired members	11	51	98	77	68	66	33	404
1/1/2013 - 12/31/2013								
Average monthly benefit	$533	$1,150	$1,824	$3,215	$4,454	$5,020	$4,991	$2,739
Average Final Compensation	$7,171	$6,454	$6,399	$8,744	$8,625	$8,993	$9,138	$7,537
Number of retired members	12	52	87	41	43	27	15	277
1/1/2012 - 12/31/2012								
Average monthly benefit	$1,953	$1,160	$2,096	$3,690	$4,897	$5,991	$6,272	$3,871
Average Final Compensation	$10,284	$5,938	$6,949	$8,901	$9,206	$9,710	$8,780	$8,344
Number of retired members	19	70	126	77	149	81	58	580
1/1/2011 - 12/31/2011								
Average monthly benefit	$436	$1,334	$1,853	$2,663	$4,325	$6,315	$6,829	$4,091
Average Final Compensation	$7,653	$5,871	$6,543	$7,091	$8,476	$9,629	$9,410	$8,044
Number of retired members	12	77	102	86	156	114	116	663

(Schedule continued on next page)

SCHEDULE OF AVERAGE BENEFIT PAYMENT AMOUNTS (Continued)

Schedule of Average Benefit Payment Amounts
Estimates Based on Years of Credited Service - General and Safety Combined

	Years of Credited Service							
Retirement Effective Date	0-5	5-10	10-15	15-20	20-25	25-30	30+	Totals
1/1/2010 - 12/31/2010								
Average monthly benefit	$559	$1,148	$1,781	$3,019	$4,619	$6,126	$6,837	$4,018
Average Final Compensation	$8,826	$6,015	$6,670	$7,280	$9,422	$9,473	$9,099	$8,081
Number of retired members	9	55	73	56	57	69	81	400
1/1/2009 - 12/31/2009								
Average monthly benefit	$1,039	$1,368	$1,844	$2,697	$4,532	$6,595	$7,046	$3,810
Average Final Compensation	$-	$-	$-	$-	$-	$-	$-	$-
Number of retired members	17	67	70	73	78	62	62	429
1/1/2008 - 12/31/2008								
Average monthly benefit	$1,499	$1,454	$2,108	$3,334	$4,426	$5,971	$7,145	$3,738
Average Final Compensation	$-	$-	$-	$-	$-	$-	$-	$-
Number of retired members	15	45	38	51	43	42	28	262
1/1/2007 - 12/31/2007								
Average monthly benefit	$862	$1,044	$1,685	$2,350	$3,044	$6,010	$7,608	$3,287
Average Final Compensation	$-	$-	$-	$-	$-	$-	$-	$-
Number of retired members	21	65	71	79	64	66	51	417

*Average Final Compensation is not available on a historical basis due to system constraints. It will be presented starting with the data for 2010 and subsequent years.

SCHEDULE OF AVERAGE BENEFIT PAYMENT AMOUNTS (Continued)

Schedule of Average Benefit Payment Amounts
Estimates Based on Annualized Benefit Amounts at December 31 of Each Year

	Years of Retirement								
GENERAL TIER 1	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40+
2017 Average Monthly Benefit	$2,978	$5,246	$4,753	$4,236	$3,127	$2,917	$2,198	$2,333	$2,066
Number Retirees & Beneficiaries	227	538	616	563	447	414	301	182	90
2016 Average Monthly Benefit	$3,364	$5,011	$4,649	$3,853	$3,116	$2,694	$2,188	$2,117	$2,011
Number Retirees & Beneficiaries	282	534	622	586	478	377	303	187	81
2015 Average Monthly Benefit	$4,178	$4,674	$4,452	$3,570	$3,025	$2,519	$2,006	$2,081	$1,627
Number Retirees & Beneficiaries	387	503	650	550	489	395	341	194	78
2014 Average Monthly Benefit	$4,505	$4,453	$4,203	$3,336	$2,952	$2,325	$1,927	$2,069	$1,543
Number Retirees & Beneficiaries	471	515	612	543	482	405	322	169	59
2013 Average Monthly Benefit	$4,531	$4,417	$3,861	$3,123	$2,784	$2,240	$1,868	$1,999	$1,465
Number Retirees & Beneficiaries	500	559	602	528	487	435	317	158	47
2012 Average Monthly Benefit	$4,697	$4,202	$3,693	$2,854	$2,618	$2,055	$1,986	$1,773	$1,490
Number Retirees & Beneficiaries	535	631	594	510	514	434	324	141	40
2011 Average Monthly Benefit	$4,522	$4,107	$3,419	$2,824	$2,415	$1,936	$1,923	$1,721	$1,483
Number Retirees & Beneficiaries	524	633	621	550	486	440	328	124	32
2010 Average Monthly Benefit	$4,261	$3,933	$3,238	$2,744	$2,336	$1,764	$1,900	$1,531	$1,477
Number Retirees & Beneficiaries	501	658	594	548	506	467	314	107	24
2009 Average Monthly Benefit	$3,997	$3,747	$3,003	$2,628	$2,133	$1,748	$1,843	$1,466	$1,402
Number Retirees & Beneficiaries	530	633	580	550	535	461	293	94	26
2008 Average Monthly Benefit	$4,135	$3,506	$2,897	$2,490	$2,057	$1,773	$1,830	$1,388	$1,509
Number Retirees & Beneficiaries	546	632	560	578	564	478	264	79	23
2007 Average Monthly Benefit	$3,905	$3,326	$2,611	$2,314	$1,874	$1,836	$1,670	$1,295	$1,324
Number Retirees & Beneficiaries	632	631	537	607	578	478	241	59	18

NOTE: Average Final Compensation is not available on a historical basis due to system constraints for this schedule.

SCHEDULE OF AVERAGE BENEFIT PAYMENT AMOUNTS (Continued)

Schedule of Average Benefit Payment Amounts
Estimates Based on Annualized Benefit Amounts at December 31 of Each Year

	Years of Retirement								
GENERAL TIER 2	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40+
2017 Average Monthly Benefit	$456	$715	$734	$1,118	$1,098	$1,137	$947	$405	
Number Retirees & Beneficiaries	38	55	80	174	154	54	8	1	
2016 Average Monthly Benefit	$303	$698	$905	$1,115	$945	$1,356	$1,030		
Number Retirees & Beneficiaries	34	66	94	197	129	42	8		
2015 Average Monthly Benefit	$366	$731	$940	$1,091	$929	$1,643	$681		
Number Retirees & Beneficiaries	37	72	122	193	120	25	6		
2014 Average Monthly Benefit	$413	$671	$762	$1,109	$1,005	$1,365	$732		
Number Retirees & Beneficiaries	39	73	114	206	100	21	4		
2013 Average Monthly Benefit	$440	$654	$919	$1,003	$1,140	$922	$524		
Number Retirees & Beneficiaries	45	77	136	202	85	15	3		
2012 Average Monthly Benefit	$602	$613	$943	$1,016	$1,082	$951	$517		
Number Retirees & Beneficiaries	58	78	161	186	75	11	2		
2011 Average Monthly Benefit	$600	$651	$1,023	$890	$1,091	$923	$661		
Number Retirees & Beneficiaries	67	80	209	158	51	9	1		
2010 Average Monthly Benefit	$653	$721	$1,039	$821	$1,290	$662			
Number Retirees & Beneficiaries	71	109	215	143	30	8			
2009 Average Monthly Benefit	$611	$713	$1,045	$802	$1,153	$703			
Number Retirees & Beneficiaries	74	126	232	114	27	6			
2008 Average Monthly Benefit	$835	$886	$995	$1,065	$913	$617			
Number Retirees & Beneficiaries	82	144	232	101	17	4			
2007 Average Monthly Benefit	$751	$887	$967	$1,014	$906	$468			
Number Retirees & Beneficiaries	89	176	210	83	13	2			

NOTE: Average Final Compensation is not available on a historical basis due to system constraints for this schedule.

SCHEDULE OF AVERAGE BENEFIT PAYMENT AMOUNTS (Continued)

Schedule of Average Benefit Payment Amounts
Estimates Based on Annualized Benefit Amounts at December 31 of Each Year

	Years of Retirement								
GENERAL TIER 3	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40+
2017 Average Monthly Benefit	$2,388	$3,182	$2,529	$1,581	$1,447	$1,513			
Number Retirees & Beneficiaries	1043	1261	683	175	2	1			
2016 Average Monthly Benefit	$2,549	$3,043	$2,307	$1,494	$1,398	$1,466			
Number Retirees & Beneficiaries	1150	1105	568	140	2	1			
2015 Average Monthly Benefit	$2,721	$2,742	$2,053	$1,464	$1,986	$1,423			
Number Retirees & Beneficiaries	1368	858	476	77	1	1			
2014 Average Monthly Benefit	$2,772	$2,577	$1,811	$1,520	$1,634				
Number Retirees & Beneficiaries	1364	844	375	46	2				
2013 Average Monthly Benefit	$2,769	$2,374	$1,518	$1,677	$1,594				
Number Retirees & Beneficiaries	1297	776	306	3	2				
2012 Average Monthly Benefit	$2,798	$2,210	$1,397	$680	$1,563				
Number Retirees & Beneficiaries	1286	724	220	1	2				
2011 Average Monthly Benefit	$2,672	$2,020	$1,291	$660	$1,518				
Number Retirees & Beneficiaries	1102	626	164	1	2				
2010 Average Monthly Benefit	$2,443	$1,849	$1,267	$1,698	$1,156				
Number Retirees & Beneficiaries	886	518	90	2	2				
2009 Average Monthly Benefit	$2,347	$1,651	$1,465	$1,213	$1,183	$1,965			
Number Retirees & Beneficiaries	852	398	54	6	3	1			
2008 Average Monthly Benefit	$2,237	$1,441	$1,154	$1,479	$1,035				
Number Retirees & Beneficiaries	768	324	2	2	1				
2007 Average Monthly Benefit	$2,020	$1,327	$1,115	$1,287					
Number Retirees & Beneficiaries	752	224	2	3					

NOTE: Average Final Compensation is not available on a historical basis due to system constraints for this schedule.

SCHEDULE OF AVERAGE BENEFIT PAYMENT AMOUNTS (Concluded)

Schedule of Average Benefit Payment Amounts
Estimates Based on Annualized Benefit Amounts at December 31 of Each Year

	Years of Retirement								
SAFETY TIER A and TIER C	**0-4**	**5-9**	**10-14**	**15-19**	**20-24**	**25-29**	**30-34**	**35-39**	**40+**
2017 Average Monthly Benefit	$5,640	$7,737	$7,899	$6,943	$5,574	$5,144	$4,182	$4,553	$4,023
Number Retirees & Beneficiaries	292	495	461	347	199	139	110	70	47
2016 Average Monthly Benefit	$6,069	$7,582	$7,890	$6,126	$5,409	$4,857	$4,176	$4,459	$3,833
Number Retirees & Beneficiaries	341	459	470	298	208	123	108	64	43
2015 Average Monthly Benefit	$6,590	$7,444	$7,262	$5,984	$5,033	$4,775	$3,983	$4,336	$3,676
Number Retirees & Beneficiaries	440	412	438	288	213	122	94	69	49
2014 Average Monthly Benefit	$6,837	$7,376	$6,771	$5,715	$5,227	$4,298	$4,157	$4,170	$3,397
Number Retirees & Beneficiaries	487	426	403	263	205	121	89	73	38
2013 Average Monthly Benefit	$6,858	$7,145	$6,583	$5,150	$5,117	$4,155	$4,255	$3,986	$3,093
Number Retirees & Beneficiaries	493	421	404	226	186	123	90	69	33
2012 Average Monthly Benefit	$6,946	$7,113	$6,165	$5,023	$4,738	$3,951	$4,108	$3,599	$3,272
Number Retirees & Beneficiaries	487	471	364	205	158	125	91	61	28
2011 Average Monthly Benefit	$6,763	$7,040	$5,513	$4,892	$4,409	$3,909	$3,880	$3,711	$2,940
Number Retirees & Beneficiaries	437	486	304	215	142	125	87	55	26
2010 Average Monthly Benefit	$6,791	$6,521	$5,452	$4,623	$4,380	$3,637	$3,891	$3,555	$2,818
Number Retirees & Beneficiaries	406	453	287	223	133	107	86	50	21
2009 Average Monthly Benefit	$6,620	$6,093	$5,110	$4,706	$3,929	$3,756	$3,780	$3,178	$2,619
Number Retirees & Beneficiaries	426	406	268	222	126	98	88	41	21
2008 Average Monthly Benefit	$6,644	$6,126	$4,800	$4,813	$3,884	$3,903	$3,810	$2,926	$2,453
Number Retirees & Beneficiaries	409	406	236	202	128	101	83	30	16
2007 Average Monthly Benefit	$6,517	$5,758	$4,573	$4,438	$3,625	$3,909	$3,397	$2,830	$2,420
Number Retirees & Beneficiaries	465	362	229	168	128	107	76	22	19

NOTE: Average Final Compensation is not available on a historical basis due to system constraints for this schedule.

PARTICIPATING EMPLOYERS AND ACTIVE MEMBERS FOR YEARS 2009 - 2018

Participating Employers and Active Members for Years 2009 - 2018

County of Contra Costa:	2018	% of Totals	2017	2016	2015	2014	2013	2012	2011	2010	2009
General Members	7,624	75.96%	7,643	7,436	7,306	6,897	6,784	6,357	6,280	6,403	6,429
Safety Members	937	9.34%	947	951	936	894	951	912	888	935	956
TOTAL:	**8,561**	**85.29%**	**8,590**	**8,387**	**8,242**	**7,791**	**7,735**	**7,269**	**7,168**	**7,338**	**7,385**
Participating Agencies:											
Bethel Island Municipal Improvement District	4	0.04%	4	1	1	1	2	2	2	3	3
Byron, Brentwood, Knightsen Union Cemetery District	4	0.04%	4	4	5	5	5	5	5	4	3
Central Contra Costa Sanitary District	278	2.77%	279	282	272	262	260	255	248	252	266
Contra Costa County Employees' Retirement Association	56	0.56%	51	47	48	43	44	38	36	37	37
Contra Costa Housing Authority	82	0.82%	82	87	84	82	83	83	91	92	91
Contra Costa Mosquito and Vector Control District	36	0.36%	35	33	33	33	34	33	35	35	35
Local Agency Formation Commission (LAFCO)	2	0.02%	2	2	2	2	2	2	2	2	2
Rodeo Sanitary District	7	0.07%	7	7	8	7	7	6	8	7	8
In-Home Supportive Services Authority (IHSS)	15	0.15%	15	15	13	12	12	12	12	12	12
First 5 - Children & Families Commission	30	0.30%	29	28	26	22	21	20	22	24	22
Contra Costa County Fire Protection District	348	3.47%	326	337	304	297	286	299	331	321	349
East Contra Costa Fire Protection District	37	0.37%	36	43	35	38	49	38	48	49	50
Moraga-Orinda Fire Protection District	61	0.61%	64	63	62	62	70	62	65	73	73
Rodeo-Hercules Fire Protection District	21	0.21%	19	18	24	23	15	14	17	21	21
Superior Court of Contra Costa County	331	3.30%	323	330	331	324	344	342	357	360	405
San Ramon Valley Fire Protection District	164	1.63%	172	164	152	155	155	160	182	181	180
TOTAL:	**1,476**	**14.71%**	**1,448**	**1,461**	**1,400**	**1,368**	**1,389**	**1,371**	**1,461**	**1,473**	**1,557**
TOTAL ACTIVE MEMBERSHIP	**10,037**	**100.00%**	**10,038**	**9,848**	**9,642**	**9,159**	**9,124**	**8,640**	**8,629**	**8,811**	**8,942**

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