MEMBERSHIP

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An integrated vision for a sustainable future

Comprehensive Annual Financial Report

Public Employees' Retirement Association of Colorado

For the Year Ended December 31, 2019

COLORADO PERA®

2019 IN REVIEW

Facts and Figures as of December 31, 2019

ASSETS UNDER MANAGEMENT
$52 billion
(DIVISION TRUST FUNDS)

NET RATE OF RETURN
20.3%

MEMBERS ACTIVELY CONTRIBUTING TO PERA
213,294

EMPLOYERS
411

TOTAL COVERED PARTICIPANTS
(IN PERACARE HEALTH BENEFITS PROGRAM)
60,072

FUNDED STATUS
61.9%

RETIREES AND BENEFIT RECIPIENTS
125,328

ANNUAL RETIREMENT BENEFIT PAYMENTS
$4.7 billion

INVESTED IN COLORADO-BASED COMPANIES, PARTNERSHIPS, AND ASSETS
$742.8 million

ECONOMIC ACTIVITY GENERATED BY COLORADO RETIREMENT BENEFIT PAYMENTS
(JANUARY 2020 ANNUALIZED)
$6.6 billion

Comprehensive Annual Financial Report

For the Year Ended December 31, 2019

Public Employees' Retirement Association of Colorado

Prepared by Colorado PERA Staff

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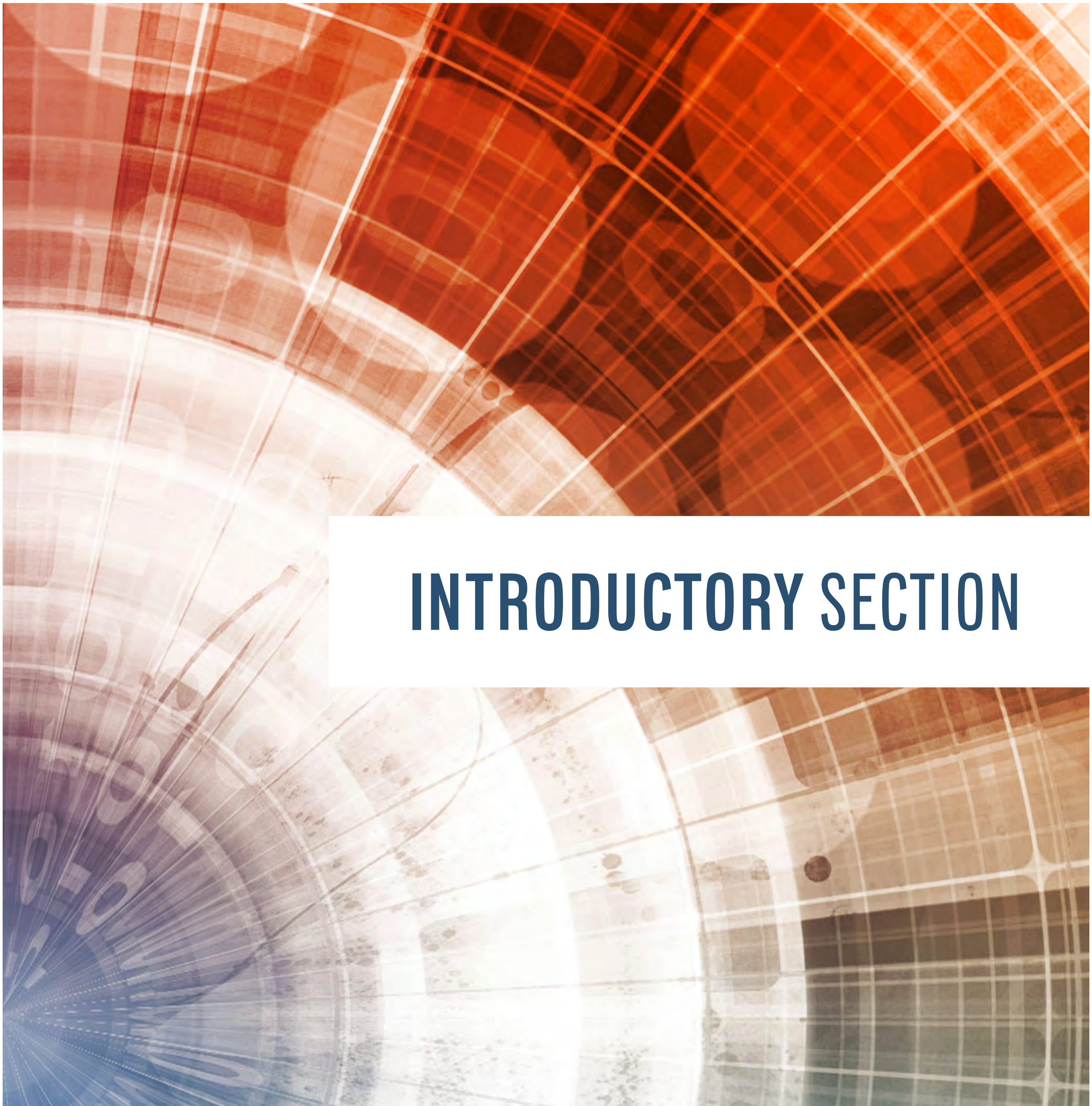

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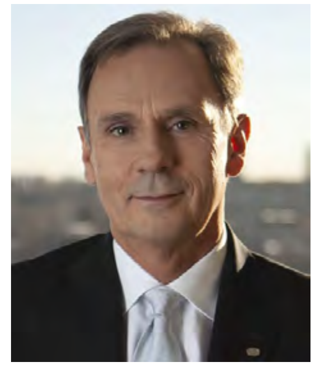
COLORADO PERA

June 30, 2020



Ron Baker
Executive Director

Dear Colorado PERA Members, Benefit Recipients, Employers, and Members of the Board of Trustees:

This *Comprehensive Annual Financial Report (CAFR)* prepared by the Public Employees' Retirement Association of Colorado (PERA) details the plan's performance from January 1, 2019, through December 31, 2019.

As I write this letter, the world is still reeling from the global pandemic that has had a profound impact to our economy, our citizens, and our everyday lives. Throughout this difficult and uncertain time, many PERA members were on the front lines of this crisis. Your work serving all Coloradans is vital and essential in countless ways. We are very proud of the work our members do for Colorado, and it is our privilege to serve you.

Entering this crisis, PERA was showing signs of strength and making progress toward our path to full funding. Aided by a robust global equity market, our 2019 investment returns were strong, and for the year ended December 31, 2019, the defined benefit funds had a time-weighted rate of return of 20.3 percent net-of-fees. PERA's total fund policy benchmark returned 19.8 percent for 2019.

Positive investment returns are only one component of a plan's funded status. The degree to which demographic and employment assumptions align with actual experience are also crucial, and PERA will continue monitoring these factors closely.

While we recognize the strong 2019 performance and the effect of the first full year of Senate Bill (SB) 18-200 reforms, the fiscal impact of the current pandemic permeates throughout the public sector of Colorado and includes PERA. As the Joint Budget Committee (JBC) grappled with balancing the State's budget, the Committee moved forward with introduction of two bills in 2020 as part of the budget-related package concerning PERA:

House Bill (HB) 20-1379: Concerning Suspending the Direct Distribution to the Public Employees' Retirement Association for the 2020-21 State Fiscal Year

SB 18-200 requires that a direct distribution of $225 million from State funds be paid annually to PERA, allocated to the State, School, Judicial, and DPS Divisions. This direct distribution payment is to continue annually until the unfunded liabilities for each division receiving the payments are paid down. HB 20-1379 will suspend the July 1, 2020, $225 million direct distribution payment from the State to PERA for the 2020-21 State fiscal year. This one-year suspension means PERA will not receive a direct distribution until the payment scheduled July 1, 2021.

House Bill (HB) 20-1394: Concerning a Modification to the Contribution Rates to the Public Employees' Retirement Association for the Judicial Division of the Association for Certain Fiscal Years

For the State's fiscal years 2020-21 and 2021-22 only, this bill will decrease the employer contribution rate for employers in the Judicial Division by 5.0 percent and increase the member contribution rate for employees in the Judicial Division by 5.0 percent. For the State's 2020-21 fiscal year, the employer contribution rate is decreased from 13.91 percent to 8.91 percent of salary and the member contribution rate is increased from 9.5 percent to 14.5 percent of salary. For the State's 2021-22 fiscal year, the employer contribution rate is decreased from 13.91 percent to 8.91 percent of salary and the member contribution rate is increased from 10.0 percent to 15.0 percent of salary. This does not apply to the employer or member contribution rates for judges employed by the Denver County Court.

The contribution rates for the Judicial Division will continue to be subject to the automatic adjustment provision (AAP) in PERA law. More information about these changes can be found in Note 12 of the Notes to the Financial Statements in the Financial Section.

Mail: PO Box 5800, Denver, CO 80217-5800 | 1.800.759.PERA (7372) | **www.copera.org**

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A strong and sustainable PERA plan is important not only to our membership, but also to the state of Colorado, where our members live and work in our communities and support our economy. PERA retirement distributions are a steady source of reliable, predictable income for PERA retirees in communities across Colorado. These distributions provide $6.6 billion in economic output for the state, adding critical value and stimulus to the economy. The *2019 Colorado PERA Economic and Fiscal Impacts Report*, prepared by the economic and business analysis firm Pacey Economics, shows that the billions of dollars PERA pays in distributions to more than 104,000 Colorado residents have a significant benefit to local economies in every corner of the state.

The modifications from SB 18-200 and 2019's strong investment returns have improved PERA's funded status and are crucial in building resilience for the plan. However, the COVID-19 crisis will present some challenges for PERA. Like most defined benefit pension plans, we expect an impact on our investment gains/demographic experience and future performance. The extent of the impact is uncertain at this time. However, a highly likely outcome is that, when 2020 concludes, the automatic adjustment will be triggered. If this occurs, the results will be announced in June 2021, with the contribution increases and a decrease in the Annual Increase, taking effect in July 2022.

PERA has weathered many unprecedented challenges especially over the past two decades, and we will continue to make our way through these uncertain times the same way we have made it through other volatile markets. We will continue to be prudent with our members' and employers' contributions and be responsible stewards in making investments on behalf of our membership.

Challenging times present opportunities, and we plan to meet these challenges on behalf of our membership, in partnership with stakeholders and constituents, and with steady leadership as we remain diligent and focused on fortifying PERA's sustainability for the long term knowing that many across Colorado depend on PERA for their retirement security.

2019 Legislation

During the 2019 legislative session, two bills affecting PERA were introduced, one of which was signed into law.

House Bill 19-1217: PERA Local Government Division Member Contribution Rate

Governor Polis signed this bill into law on May 20, 2019, and it eliminated the scheduled 2.0 percent increase in the member contribution rate for the Local Government Division that was included in legislation passed in 2018. That legislation increased contributions paid by all PERA members. While this new bill eliminates those increased contributions for members in the Local Government Division, all members are still subject to any adjustments in contributions required to keep PERA on the path to full funding in 30 years. Contributions for all members can increase (or decrease) by up to 0.5 percent per year.

The PERA Board of Trustees' (Board) original recommendation to the General Assembly presented in late 2017 included increases in member contributions across all divisions.

House Bill 19-1270: PERA Board Assess Climate-Related Financial Risks

The bill would have required that the PERA Board retain a third-party organization by October 31, 2019, to perform a study to include:

- A comprehensive analysis of any climate-related financial risk to PERA's portfolio, and exposure of the fund to long-term risks.
- A summary of climate-related financial risk-related engagement activities undertaken by PERA.
- A description of additional action that should be taken, or planned to be taken, by PERA to address climate-related financial risk, including a list of proxy votes and shareholder proposals initiated by the Board.

The PERA Board had concerns about the redundancy of this study with other required reporting and directed staff to continue to work with the bill sponsors and members of the General Assembly to educate them on these concerns.

This bill was postponed indefinitely by the House Finance Committee on April 8, 2019.

Economic Environment

2019 started out in what would become the longest government shutdown in U.S. history. Protracted trade negotiations with China and four Federal Reserve (Fed) rate increases in 2018, combined with the government shutdown, added to concerns about a recession hitting the U.S. economy. These concerns grew quieter throughout 2019 as the U.S. reached a phase one trade deal with China and the Fed provided monetary stimulus with three rate cuts to end the year in a range of 1.25 to 1.50 percent. By mid-year, the U.S. had experienced the longest economic expansion in U.S. history and by year end the U.S. economy had notched 126 consecutive months of gross domestic product (GDP) growth. In December 2019, more than a decade after the fallout of the global financial crisis of 2008, the U.S. set another milestone by achieving the longest bull market in history, with the S&P 500 up 378 percent (price return) from its low in March 2009.

Consumer spending and confidence, boosted by declining interest rates, generally remained strong, but

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ongoing trade uncertainty held down economic growth in the U.S. with the real rate of growth slowing to 2.3 percent in 2019. Wage growth continued into 2019, with the lowest paid workers experiencing the largest increases as state and local governments across the nation increased their minimum wages. While wage growth increased, it remained lower than expected given record low unemployment. The unemployment rate continued to decline throughout 2019, ending the year at 3.5 percent, which marked its lowest level since the 1960s after having recorded 22 consecutive months at or below 4.0 percent at year end. Both headline inflation and core inflation, which does not include more volatile components such as food and energy, ended the year at 2.3 percent. The risk of rising inflation is muted against the backdrop of a tight labor market and modest wage growth, with the larger concern for the Fed being inflation persistently coming in under its 2.0 percent target. Moreover, the Personal Consumption Expenditures index, the Fed's preferred measurement of inflation, ended 2019 at 1.6 percent.

Growth in the world economy notably slowed to an estimated rate of 2.4 percent in 2019, the lowest level since the global financial crisis. Among advanced economies, growth in the United States held up relatively well at 2.3 percent, while the Euro area and Japan measured at just 1.1 percent. Emerging markets and developing economies fared better than advanced economies with overall growth of 3.5 percent, but this is a marked drop from prior years. The ongoing U.S.-China trade war, and the ensuing tariffs, have given rise to more widespread protectionism among economies, resulting in reduced trade and subdued economic growth. Moreover, increasing levels of debt in economies around the world have further slowed economic growth, although the rising debt burdens are somewhat offset by increasingly accommodative monetary policies with some economies, notably the Euro area, taking rates deeper into negative territory. In the U.S., the dollar continued to strengthen given the comparatively strong economy, while the tail winds provided by tax cuts have shown signs of shifting to headwinds as the increasing deficit may begin to weigh on economic growth.

Colorado, although it began to moderate in its ranking among states, has again shown to be one of the stronger performing U.S. state economies in 2019. This is due, in part, to its employment sector diversification and highly educated workforce, ranking second nationally for percent of workforce with a bachelor's degree or higher. Colorado ranked seventh in the country for real GDP growth in 2019 and well above U.S. GDP of 2.3 percent, at 3.5 percent.

After a slight increase in the unemployment rate in 2018 it began trending down again in 2019 to a historic low of 2.5 percent, among the lowest in the nation, and a full percent lower than the U.S. unemployment rate.

Colorado continues to have one of the highest labor force participation rates (LFPR) in the nation, ranking fourth nationally, at 69.4 percent and exceeding the national average of 63.0 percent. Furthermore, Colorado's population continues to grow at a pace nearly double the U.S. average with positive net migration of working age adults contributing to the high LFPR and employment growth. A tight labor market in 2019 aided in boosting personal income growth and per capita personal income growth, with Colorado ranking fourth and tenth nationally, respectively.

On the housing front, Colorado has consistently been among the markets experiencing the highest appreciation in home values, but this moderated further in 2019 to a rate of 5.5 percent, which still places Colorado in the top third for appreciation. The growth in housing units has now exceeded household formations for the last two years, helping to ease relentless price pressure, but it will take time for the market to find a balance after years of undersupply.

Investments

Investment portfolio income is a significant source of revenue to PERA. The Board's Investment Committee is responsible for assisting the Board in overseeing PERA's investment program.

In 2019, there was a net investment income of $9.9 billion compared with total member contributions of $1.0 billion, employer contributions of $1.9 billion and nonemployer contributions of $225 million.

For the year ended December 31, 2019, the defined benefit funds had a time-weighted rate of return of 20.3 percent net-of-fees. The annualized, net-of-fees, time-weighted, rates of return over the last three and five years were 11.1 percent and 8.4 percent, respectively, and over the last 10 years it was 9.1 percent. The 30-year annualized, gross-of-fees rate of return was 8.6 percent.

Prudent funding and healthy investment returns are important to the financial soundness of PERA. More information on the composition of the portfolio is reflected in the Investment Summary on page 126.

An integral part of the overall investment policy is the strategic asset allocation policy. The strategic asset allocation is designed to provide appropriate diversification and balance expected total rates of return with the volatility of expected returns. The fund is to be broadly diversified across and within asset classes to limit the volatility of the total fund investment returns and to limit the impact of large losses on individual investments. Both traditional and nontraditional assets are incorporated into the asset allocation mix.

In addition to asset class targets, the Board sets ranges within which asset classes are maintained. The interim and long-term asset allocation mix and the specified ranges for each asset class are presented on page 121. All of the asset classes were within their specified ranges at year end.

PERA's investment policy is summarized in the Report on Investment Activity on page 121.

Investment Stewardship

It is PERA's fiduciary duty to serve as stewards of capital for over 620,000 members, participants, and beneficiaries. In 2019, PERA established the Investment Stewardship Division to fortify our longstanding commitment to the financial sustainability of the Fund. Foundational to PERA's investment stewardship are cost-consciousness, materiality to PERA's portfolio, regulatory and market advocacy, and the ongoing evaluation of our investments. Collectively, these efforts are intended to demonstrate PERA's investment stewardship across all asset classes in the portfolio as we continue to prioritize financial sustainability.

Corporate governance advocacy has been one of our most in-depth investment stewardship efforts. In 2019, PERA management reassigned corporate governance functions, including proxy voting, from the Legal Department to the Investment Department in adherence to industry best practices and PERA's strategic vision. The aim of this reorganization is to streamline and advance our stewardship efforts to encourage profitable business practices at the companies in which we invest. In addition, PERA continues to be active in the securities litigation arena, fulfilling the Board's commitment to support corporate governance reforms such as transparency, accountability, and enforcement of shareholders' rights.

Actuarial Results

Actuarial valuations involve assumptions about the probability of events far into the future in order to estimate the financial and actuarial status of the defined benefit trust funds. Two types of actuarial valuations are required to be performed for PERA's five defined benefit pension and two Other Postemployment Benefit (OPEB) trust funds: one for financial accounting and reporting purposes and the other for funding purposes. The results of both actuarial valuations are included in this *CAFR*. The actuarial valuations performed for financial accounting and reporting purposes are prepared in accordance with governmental accounting standards. Pension liabilities, OPEB liabilities, and other related amounts calculated in accordance with these standards emphasize the costs incurred by PERA-affiliated employers for providing benefits to their employees as part of the employment-exchange process. Assets are required to be stated at fair value and the liabilities are determined using a consistent, standardized methodology, which allows for transparency and the comparability of amounts calculated for financial accounting and reporting purposes across U.S. governmental defined benefit pension and OPEB systems.

The actuarial valuations for funding purposes are prepared in accordance with Actuarial Standards of Practice and the Board's pension and OPEB funding policies. Liabilities and other actuarial metrics are calculated for the purpose of determining a systematic approach to pre-funding costs of the five defined benefit pension and two OPEB trust funds, as well as to assess the adequacy of moneys that are available to pay post-employment benefits earned by the membership. Pre-funding future liabilities defrays the ultimate cost of providing benefits as dollars held in the trust funds generate investment returns. The amount of actuarial accrued liability (AAL) in excess of the actuarial value of assets is referred to as the unfunded actuarial accrued liability (UAAL). The ratio of assets to AAL represents the funded status of each plan.

For the year ended December 31, 2019, the UAAL calculated for purposes of systematically funding the five defined benefit pension trust funds was $29.8 billion compared to the unfunded liabilities, referred to as the net pension liabilities calculated for accounting and financial reporting purposes of $26.1 billion. Although some of the objectives and calculation methodologies of these valuations are similar, the liabilities calculated for financial reporting purposes and funding purposes can be notably different under certain circumstances. For the year ended, December 31, 2018, the UAAL calculated for purposes of systematically funding the five defined benefit pension trust funds was $31.0 billion compared to the net pension liabilities calculated for accounting and financial reporting purposes of $31.5 billion.

The decrease in the unfunded liabilities calculated for accounting and financial reporting purposes is primarily due to favorable investment performance during 2019 and the reduced annual increase (AI) maximum, known as the AI cap, from 1.50 percent to 1.25 percent, per annum. In accordance with GASB 67, the discount rate determination for 2019 required the use of the long-term expected rate of return of 7.25 percent for the five defined benefit pension trust funds. When calculating the AAL for purposes of funding, the discount rate used is always equal to the long-term expected rate of return set by the Board.

Information on certain actuarial metrics that assess the moneys required to systematically fund the five defined benefit pension and two OPEB trust funds can be found in the Management's Discussion and Analysis (MD&A) on pages 35-38 of the Financial Section. A comprehensive discussion of the results of the actuarial valuation performed for financial accounting and reporting purposes can be found in the MD&A on pages 40-42, as well as in Notes 10 and 11 of the Notes to the Financial Statements in the Financial Section. A comprehensive discussion of the results of the actuarial valuations performed for funding purposes, as well as other analysis utilized by PERA can be found below and also in the Actuarial Section.

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Funding

On December 31, 2019, the funded ratio for PERA's five defined benefit pension trust funds was 61.9 percent compared to 59.8 percent on December 31, 2018. The unfunded liability as of December 31, 2019, was $29.8 billion, a decrease of approximately $1.2 billion from the previous year. The increase in the funded ratio in 2019 is attributable mainly to favorable investment performance for 2019 compared to the long-term expected rate of return of 7.25 percent and the reduced AI cap, from 1.50 percent to 1.25 percent, per annum.

The development and ongoing review of a pension funding policy are responsibilities of the Board. PERA's current pension funding policy was initially adopted by the Board in March 2015, and last revised in November 2018, for the five defined benefit pension trust funds. The Board adopted a similarly structured OPEB funding policy in January 2018. Both policies focus on the determination of an actuarially determined contribution reflecting closed and layered 30-year amortization periods. The purpose of each policy is three-fold: (1) to define the overall funding benchmarks of the trust fund, (2) to assess the adequacy of the contribution rates set by the Colorado Legislature by comparing each trust fund's statutorily set contribution rate to an actuarially determined contribution benchmark, and (3) to define the annual actuarial metrics which will assist in assessing the sustainability of the plan. The results of these three items help guide the Board when considering whether to pursue or support proposed contribution and benefit legislation.

A goal of the Board's pension and OPEB funding policies is the achievement of a combined Division Trust Fund and a combined Health Care Trust Fund actuarial funded ratio equal to or greater than 110 percent.

Investment income is the most significant driver of the funded status in a defined benefit plan. To understand the significance of this assumption, a sensitivity analysis is included in the Actuarial Section on page 175 for the Division Trust Funds and page 200 for the Health Care Trust Funds. Additional information on PERA's funded ratio, unfunded liabilities, and actuarial assumptions may be found in the Actuarial Section starting on page 147 for the Division Trust Funds and on page 186 for the Health Care Trust Funds.

Employer contributions are also a driver of the funded status. In 2019, actual employer contributions received pursuant to statute for the five defined benefit pension trust funds were $132.9 million less than the actuarially determined contributions required. During the past 17 years, this contribution deficiency totaled $5.5 billion. See page 37 of Management's Discussion and Analysis (MD&A) in the Financial Section for additional details.

Investment Rate of Return Sensitivity Effect on Projected Amortization Periods

In addition to the annual actuarial funding valuation, the Board's actuary performs actuarial projections for each Division Trust Fund. These projections are forward-looking and take into consideration the many tiers of PERA benefit provisions and the statutory contribution rate structures, including the effective date of each tier or contribution rate. The projections also reflect applicable salary, demographic, and economic actuarial assumptions, as well as anticipated member growth. Considering the various benefit tiers currently in effect within PERA, the Board believes the results of the actuarial projections to be the most comprehensive view and best indication of the adequacy of the statutorily prescribed pension contribution schedule.

The main focus of these projections is to provide the amortization period, or rather, the expected funding period, by division, of the estimated number of years until full funding status is achieved. The projected amortization periods reflect all actuarial assumptions and the benefit and contribution provisions currently enacted, even if not yet effective.

The table below shows the projected amortization periods under three scenarios: (1) as of the December 31, 2018, actuarial valuation, (2) as of the December 31, 2019, actuarial valuation, reflecting the greater than expected 2019 investment return and other plan experience, and the anticipated adjustments, resulting from the AAP enacted through SB 18-200, and (3) as of the December 31, 2019, actuarial valuation, reflecting plan experience and the revised contribution provisions enacted under HB 20-1379 and HB 20-1394 (see Note 12 of the Notes to the Financial Statements in the Financial Section for additional details).

	Projected Amortization Periods (in years)		
Division Trust Fund	2019 Valuation Results Considering HB 20-1379 and HB 20-1394	2019 Valuation Results	2018 Valuation Results
State	22	22	28
School	24	24	34
Local Government	14	14	29
Judicial	12	12	21
DPS	11	11	17

Since the projections are based on a wide variety of assumptions, it is important to understand the risks related to defined benefit plans, specifically the risks associated with the selection and application of the long-term expected rate of return on investments. Given the long-term funding horizon and anticipated ongoing aspect of such defined benefit plans, particularly those providing benefits in the public sector, it is generally understood that the existence of the plan, itself, is not

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tied to the financial performance of private enterprise, but rather to the ongoing nature of governmental services. Therefore, it is common practice for plan sponsors/administrators of governmental or public sector pension plans also to apply the expected long-term rate of return as the discount rate used to determine the liabilities of the plan.

In order to derive the long-term rate of return assumption, the PERA Board looks to the expertise of its investment and actuarial consultants to perform a comprehensive asset/liability study on a periodic basis (generally every three to five years). In conjunction with this study, the Board reviews capital market data from numerous sources. PERA concluded the most recent asset/liability study in November 2019. As a result of that study, the Board updated and approved long-term asset allocations and target ranges effective January 1, 2020, and reaffirmed the current 7.25 percent long-term expected rate of return applicable to all five Division Trust Funds as well as the two Health Care Trust Funds.

The table below illustrates the projected amortization periods, in years, of the School Division Trust Fund under the various return scenarios (used for both assumed investment return and to discount liabilities of the plan) which correspond to the confidence levels (probabilities of investment return) as indicated.

This table reflects the results and experience of the December 31, 2019, actuarial funding valuation, the effect of the adjustments due to the results of the 2018 AAP assessment, and the revised contribution provisions enacted under HB 20-1379 and HB 20-1394. The projected funding periods below reflect 50-year probability outlooks (Monte Carlo simulations), provided by the Board's actuaries, and based on 30-year capital market assumptions, employed in the most recent asset/liability study as described above, provided by the Board's investment consultants.

Projected Amortization Periods—School Division Trust Fund

Probability of Achieving at Least the Rate of Return Displayed (or Better), Per Annum	Long-Term Expected Investment Return & Discount Rate				
	4.35%	6.18%	7.25%	8.63%	10.47%
95th Percentile	Infinite				
75th Percentile		45			
53rd Percentile			24		
25th Percentile				11	
5th Percentile					3

Signal Light Methodology

Another way of understanding PERA's financial condition was adopted by the Colorado General Assembly's Legislative Audit Committee in 2015, and further enhanced by the Board in 2019 to incorporate stochastic rather than deterministic modeling. By definition, uncertain or variable factors are built into a stochastic model, whereas variable factors are external to a deterministic model. The stochastic model better reflects actual market activity including the effect of the timing and order of investment returns. This methodology also considers PERA's portfolio, more precisely reflecting capital market assumptions, by investment category within PERA's asset allocation.

Generally, the "signal light" methodology determines the funded position of each division on a projected basis. The results are categorized based on an expanded spectrum of signal light colors ranging from dark green, indicating a well-funded position, to dark red, indicating potential insolvency in the near future.

PERA updates the signal light indicators each year following the release of its *CAFR*. Recognizing the plan experience as of the December 31, 2019, actuarial valuation, including the effect of HB 20-1379 and HB 20-1394, and better reflecting the effect of path dependency, the signal light designation is green for the State and School Divisions and dark green for the Local Government, Judicial, and DPS Divisions.

PERAPlus 401(k)/457 and Defined Contribution Retirement Plans

PERA offers members opportunities to save for retirement through the PERAPlus 401(k), PERAPlus 457, and Defined Contribution Retirement (DC) Plans. As of December 31, 2019, there were a total of 184 employers who recognized the value of offering more choices in savings by affiliating into the PERAPlus 457 Plan. The Roth option was added to the PERAPlus 401(k) and 457 Plans at the end of 2014. As of December 31, 2019, there were a total of 79 employers who have adopted the Roth option. The Roth option in these plans offers advantages over a Roth IRA, including higher contribution limits and no income-based contribution limitations.

The fiduciary net position of the PERAPlus 401(k) Plan, PERAPlus 457, and DC Plans increased for the year ended December 31, 2019. The PERAPlus 401(k), PERAPlus 457, and DC Plans earned \$700.3 million, \$163.9 million, and \$48.6 million of investment income with a fiduciary net position of \$3.7 billion, \$989.6 million, and \$265.9 million, respectively.

Overview of Colorado PERA

Established in 1931, PERA operates by authority of the Colorado General Assembly and is administered under Title 24, Article 51 of the Colorado Revised Statutes. Initially covering all State employees, PERA has expanded to include all Colorado school districts, the State's judicial system, and many municipalities and other local government entities.

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Board Composition

PERA is governed by a 16-member Board of Trustees; 11 Trustees are elected by the membership for staggered four-year terms and serve without compensation except for necessary expenses. In addition, there are three Governor-appointed Trustees confirmed by the Senate who receive limited compensation. The State Treasurer serves as a voting ex officio Trustee, and the DPS Division seat serves as a non-voting ex officio Trustee.

In January 2019, The Honorable Walker Stapleton left the Board when his term as State Treasurer ended. The Honorable Dave Young was elected State Treasurer in November 2018, and he began serving as an ex officio Trustee effective January 2019.

In March 2019, the Board appointed The Honorable Rebecca R. Freyre to the Judicial Division seat and reappointed Timothy M. O'Brien to the retiree seat. Each was the sole candidate duly nominated and eligible to be elected to these seats. Terms for both Trustees began July 1, 2019, and end June 30, 2023.

The Honorable Will Bain did not seek re-election for the Judicial Division seat, which was up for election in 2019. Also in March 2019, Trustee Robert Lamb announced his retirement with Boulder County effective May 1, 2019.

By law, the Board was responsible for appointing a replacement for the vacant Local Government position, and an ad hoc search committee of the Board was formed in March 2019. Cheryl Pattelli was appointed to the vacant Local Government Division seat on June 21, 2019, serving until the next Board election in 2020. Pattelli is the Chief Financial Officer at the City of Boulder.

At the March 2020 Board meeting, the Board re-appointed Trustee Pattelli since her seat was uncontested in the Local Government Division election. She will begin serving a two-year term on July 1, 2020, which completes the term originally held by Trustee Lamb. At this meeting, the Board also re-appointed Amy Grant to the DPS Division seat, and she will begin serving a four-year term beginning on July 1, 2020. Additionally, the Board appointed Nathan Geroche, a science teacher in the Jefferson County School District, to the School Division seat as he was the sole candidate for this seat, which was held by Trustee William Parker who did not seek re-election. Trustee Geroche also begins serving a four-year term on July 1, 2020.

On behalf of the PERA executive team, we thank Trustees Bain, Lamb, Parker, and Stapleton for their contributions and service to the PERA membership.

Management Changes

In August 2019, Rebecca Shelton was promoted to Investment Operating Officer in the Investment Administration Division. Rebecca joined PERA in March 2011 as an Investment Business Analyst in the Investment Operations Division and, in 2013, was promoted to Investment Operations Manager. In her new position, Rebecca is responsible for the overall business management functions in the Investment Department working in conjunction with the Chief Investment Officer.

Also in August 2019, Tara Stacy was promoted to Director of Investment Stewardship in the newly created Investment Stewardship Division. Tara joined PERA in August 2017 as an Investment Compliance and Performance Analyst in the Investment Administration Division. In this new role, Tara is responsible for the development and implementation of PERA's investment stewardship initiatives.

In October 2019, Ryan Ericson was promoted to Director of Application Development replacing Rich Krough who retired after 17 years of service. Ryan joined PERA in March 2011 as a Team Manager in the Application Development Division. In his new role, Ryan is responsible for directing the development, management, and modification of all internal application software developed at PERA.

In January 2020, Keith Tayman was promoted to Director of Fixed Income in the Investment Department replacing Mark Walter who left PERA in October 2019 after nine years of service. Keith joined PERA in April 2008 as a Senior Fixed Income Portfolio Manager. In his new role, Keith is responsible for the leadership of the Fixed Income Division's operations and staff, as well as the overall management of PERA's fixed income asset class in accordance with established investment policies and portfolio risk and return objectives.

In April 2020, Patrick Lane was hired as Chief Benefits Officer, a position previously held by Donna Baros who retired in January 2019. Patrick joined PERA from the Oklahoma Public Employees Retirement System, where he was Director of Member Services. In his new role, Patrick is responsible for providing strategic oversight and management of PERA's retirement, disability, and survivor benefit payments; member account services; benefit counseling; and customer service programs.

In May 2020, Patrick von Keyserling was hired as Senior Director of Communications. This new position was created following the departure of former Chief Communications Officer, Tara May, who left PERA in January 2020 after four years of service. Previously, Patrick was the Communication Director at the City of Boulder. In this position, Patrick will advance PERA's strategic communications, government and public affairs, marketing, and public relations efforts with a variety of stakeholders locally and nationally.

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Financial Information and Management Responsibility

Our *CAFR* must comply with the reporting requirements under Title 24, Article 51, Section 204(8) of the Colorado Revised Statutes (C.R.S.).

PERA's financial statements are prepared by management, who is responsible for the integrity and fairness of the data presented, including the many amounts which must, out of necessity, be based on estimates and judgments. This *CAFR* was prepared to conform to the accounting principles generally accepted in the United States of America. Financial information presented through the annual report is consistent with that which is displayed in the basic financial statements.

Ultimate responsibility for the basic financial statements and annual report rests with PERA management; the Board provides an oversight role over financial reporting. The Board is assisted in its responsibilities by the Audit Committee, which consists of seven Board members and two independent outside members. The Audit Committee is responsible for overseeing the adequacy and effectiveness of PERA's system of internal control and the accounting and financial reporting systems. A more detailed description of the Audit Committee's role can be found in their report on pages 16-17.

Management is responsible for establishing and maintaining adequate internal control over financial reporting. PERA's internal control over financial reporting is designed to provide reasonable, but not absolute assurance, regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. The internal control over financial reporting includes those policies and procedures that:

- Pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of assets;
- Provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures are being made only in accordance with authorizations of management; and
- Provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use or disposition of assets that could have a material effect on the financial statements.

Management has concluded that, as of December 31, 2019, the system of internal controls over financial reporting is effective.

There are inherent limitations in the effectiveness of any system of internal control, including the possibility of human error, the circumvention or overriding of controls, and that the cost of a control should not exceed the benefits to be derived. Accordingly, even an effective internal control system may not prevent or detect misstatements and can provide only reasonable assurance with respect to financial statement preparation. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions or that the degree of compliance with the policies or procedures may deteriorate.

State law requires that the State Auditor conducts or causes to be conducted an annual audit of PERA. Pursuant to this requirement, the State Auditor selected CliftonLarsonAllen LLP in 2015 to perform the independent audit of PERA's annual financial statements, beginning with the year ended December 31, 2015. Under the direction of the State Auditor, CliftonLarsonAllen LLP audited PERA's 2019 basic financial statements in accordance with auditing standards generally accepted in the United States of America and Government Auditing Standards. CliftonLarsonAllen LLP issued an unmodified opinion on PERA's financial statements, which can be found in the Independent Auditors' Report in the Financial Section on pages 25-27. Management has provided the auditors with full and unrestricted access to PERA's records and staff to discuss their audit and related findings to facilitate independent validation of the integrity of the plan's financial reporting and to consider the effectiveness of internal controls.

The Financial Section of the *CAFR* also contains the MD&A that serves as a narrative introduction, overview, and analysis of the basic financial statements. This Letter of Transmittal is designed to complement the MD&A and should be read in conjunction with it.

Recognition of Achievements

The Government Finance Officers Association of the United States and Canada (GFOA) awarded a Certificate of Achievement for Excellence in Financial Reporting to PERA for its *CAFR* for the year ended December 31, 2018. This was the 34th consecutive year that PERA has achieved this prestigious award. In order to be awarded a Certificate of Achievement, a government must publish an easily readable and efficiently organized *CAFR*. This report must satisfy both generally accepted accounting principles 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's requirements, and we are submitting it to the GFOA to determine its eligibility for another certificate.

The GFOA also awarded PERA an Award for Outstanding Achievement in Popular Annual Financial Reporting for its *Popular Annual Financial Report* for the year ended December 31, 2018. The Award for

LETTER OF TRANSMITTAL

Outstanding Achievement in Popular Annual Financial Reporting is a prestigious national award recognizing conformance with the highest standards for preparation of state and local government popular reports.

In order to receive an Award for Outstanding Achievement in Popular Annual Financial Reporting, a government unit must publish a Popular Annual Financial Report, whose contents conform to program standards of creativity, presentation, understandability, and reader appeal.

An award for Outstanding Achievement in Popular Annual Financial Reporting is valid for a period of one year only. PERA has received a Popular Award for the last 17 consecutive years. We believe our current report continues to conform to the Popular Annual Financial Reporting requirements, and we are submitting it to the GFOA.

PPCC Standards Award Program

The Public Pension Coordinating Council (PPCC) presented PERA with its Recognition Award for Administration for meeting professional standards in 2019 for plan administration as set forth in the Public Pension Standards. This is the 17th consecutive year that PERA has received this annual award. In 2019, the PPCC presented PERA with its Recognition Award for Funding by demonstrating the funding adequacy of the pension system. The PPCC is a coalition of three national associations that represent public retirement systems and administrators—the National Association of State Retirement Administrators, National Council on Teacher Retirement, and National Conference on Public Employee Retirement Systems. These three associations represent more than 500 of the largest pension plans in the U.S.

In Memoriam

Recently, PERA lost a visionary and true leader who touched the lives of many. Robert (Bob) J. Scott, former PERA Executive Director, passed away on April 20, 2020. Bob served as PERA's Executive Director from November 1984 until his retirement in July 2000. Prior to being appointed Executive Director, he was Colorado's State Auditor from 1977 to 1984 and served as a Trustee on the PERA Board for seven years.

During Bob's tenure as PERA's fourth Executive Director, the PERA trust fund grew to more than $28 billion. Under his leadership, PERA implemented the 401(k) Voluntary Investment Plan program, the retiree health care program, and earned Certificates of Excellence in Financial Reporting for its *CAFR* for 15 successive years.

Bob was a leader in the public pension industry holding several positions with the National Association of State Retirement Administrators including serving as its President. He served as Chairman of the National Public Pension Coordinating Council, on the Executive Committee of National Conference of State Legislatures, and on the Government Finance Officers Association Committee on Public Employee Retirement Associations. Bob's exemplary credentials prepared him for a life-long career in public service that also included serving as the Executive Director of the Denver Public Schools Retirement System from 2004-2005.

Bob earned the respect of members, retirees, employers, legislators, and peers across the country and will be remembered for his commitment to improve upon past programs and philosophies while drawing blueprints for the future. PERA and Colorado's public employees are still benefitting today from his vision and dedication for a better retirement plan for all PERA members.

It is with profound gratitude that I recognize and memorialize Bob for his many contributions and accomplishments during his 16-year career as PERA's Executive Director.

Acknowledgements

The cooperation of our affiliated employers is significant to the success of PERA, and we thank the staff and management of these employers for their continuing support.

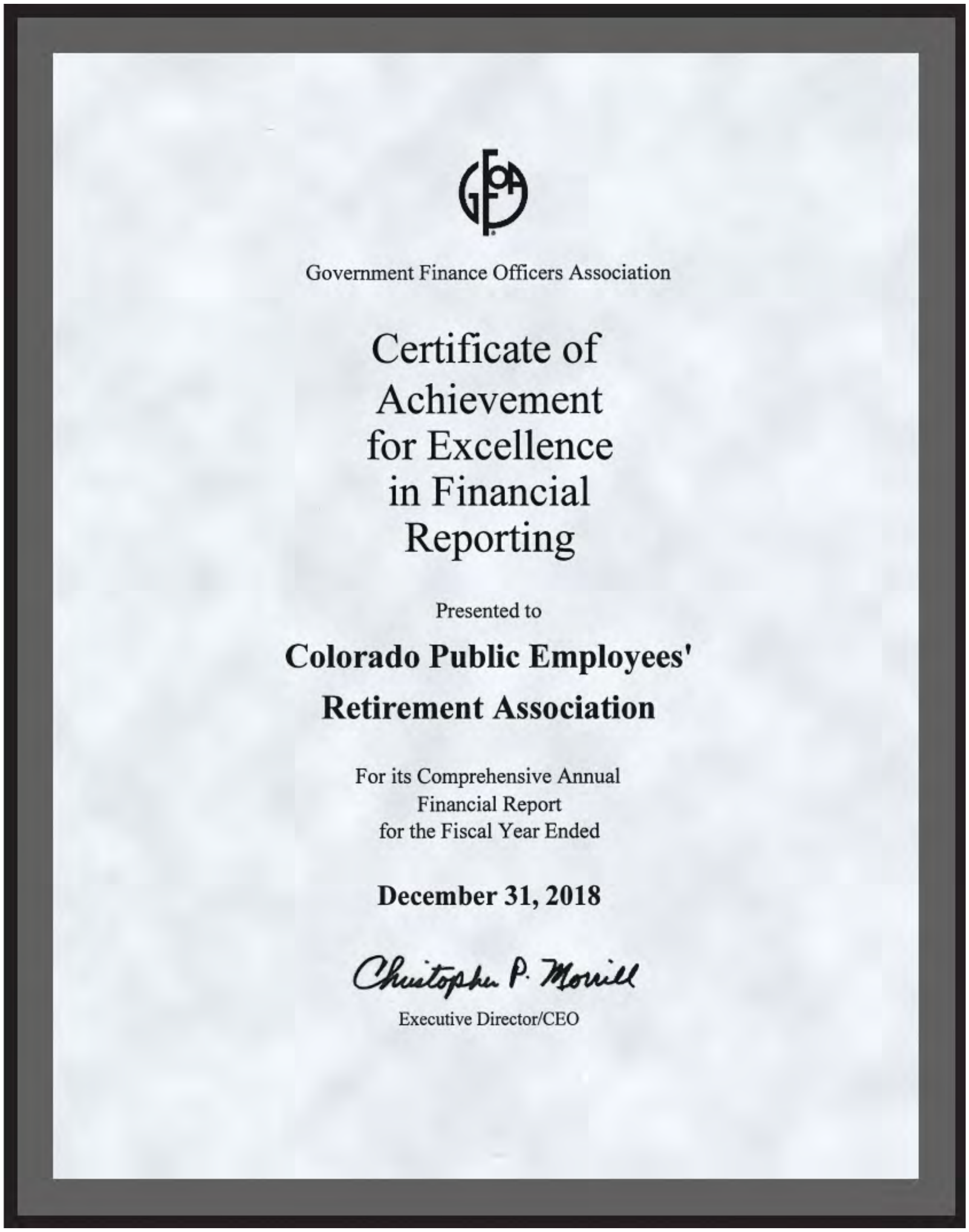
Copies of this *CAFR* are provided to all PERA-affiliated employers and other interested parties; a summary (*Popular Annual Financial Report*) will be sent to members and benefit recipients. Electronic versions of both publications are available on the PERA website at www.copera.org. For questions concerning any of the information provided in this *CAFR*, please email askpera@copera.org.

I also thank the PERA staff and Board of Trustees for their commitment and efforts to ensure that PERA meets the needs of all public employees in Colorado. We are cognizant of the current challenges and uncertainties and will remain diligent and focused on keeping PERA strong and sustainable.

Respectfully submitted,

Ron Baker
Colorado PERA Executive Director

PROFESSIONAL AWARDS



Government Finance Officers Association

Certificate of Achievement for Excellence in Financial Reporting

Presented to

Colorado Public Employees' Retirement Association

For its Comprehensive Annual Financial Report for the Fiscal Year Ended

December 31, 2018

Christopher P. Morrill

Executive Director/CEO

PROFESSIONAL AWARDS

Public Pension Coordinating Council

Public Pension Standards Award
For Funding and Administration
2019

Presented to

Colorado Public 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
Alan H. Winkle
Program Administrator

BOARD CHAIRMAN'S REPORT

COLORADO PERA®

Timothy M. O'Brien
Board Chairman

June 19, 2020

Dear Colorado PERA Members, Benefit Recipients, and Employers:

As Chairman of the Board of Trustees (Board) of the Public Employees' Retirement Association of Colorado, I am pleased to present Colorado PERA's *Comprehensive Annual Financial Report* for the year ended December 31, 2019.

PERA's investments generated a return of 20.3 percent for 2019. Strong investment performance fortifies overall funding; however, during all market cycles, it is important to remember that PERA is a long-term investor whose goal is to provide retirement benefits in perpetuity.

While PERA experienced solid progress toward its funding goal during 2019, the uncertainty and significant market declines related to the 2020 global pandemic will no doubt impact PERA as it will nearly all other investors. The Board recognizes the severity of this crisis and its expected impact on any gains made toward the funding goal and will remain vigilant in monitoring PERA's financial condition. Despite these unprecedented challenges, the Board's top priority is ensuring the long-term viability and sustainability of the PERA fund as we recognize the importance of PERA to our membership and the citizens of Colorado.

Although much of the current focus is related to the COVID-19 crisis, in 2019, several initiatives were completed or in progress as part of the Board's five-year strategic plan, which officially started in 2019. I would like to highlight a few of these initiatives below.

As part of the Board's ongoing commitment to sound stewardship, the Board commissioned an asset/liability study during 2019, which was prepared by Aon Hewitt Investment Consulting, Inc. (Aon). The objective of the study was to determine the optimal strategic asset allocation policy that will ultimately allow PERA to meet its financial obligations, while also ensuring that PERA incurs appropriate levels of risk and liquidity. There will be a range of investment returns in any given short period but, over the long term, Aon's modeling indicated 7.25 percent was near the median expectation. As a result of this study, the Board slightly modified the asset allocation ranges and targets, while reaffirming the investment return assumption of 7.25 percent.

Additionally, in August 2019, the Board directed PERA staff to issue a Request for Proposal from qualified firms to provide investment consulting services for the Voluntary Investment Program (401(k) Plan), Deferred Compensation Plan (457 Plan), and Defined Contribution Retirement Plan (DC Plan), collectively referred to as the Capital Accumulation Plans (CAP). In November 2019, the Board identified three finalists and ultimately selected Callan LLC as the CAP Investment Consultant in December 2019.

Throughout 2019, the Board spent considerable time completing a comprehensive review of the Governance Manual as outlined in the Strategic Plan. This document codifies the policies and practices of the Board and provides a sound governance framework for the Board's mandate to set policy and oversee the programs and operations of PERA. To help streamline the operation of the Board, some roles and responsibilities were realigned within the committee structure and a few committees were eliminated and absorbed into other committees. As a result, the responsibilities of the Shareholder Relations Committee transferred to the Investment Committee and the Stakeholder Relations Committee was eliminated with the responsibility to oversee and report on communications to the Board transferred to the Executive Director. Additionally, the CAP investment responsibilities transferred from the Benefits Committee to the Investment Committee.

Finally, as outlined in the Strategic Plan as a goal to clarify the role and value of PERA to members and retirees, the PERA Communications Department completed a significant research project in 2019 to better understand satisfaction among the PERA membership. Using existing data as well as new data from survey results, areas of service strengths and weaknesses within the organization were identified with recommendations for ways to increase member satisfaction.

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BOARD CHAIRMAN'S REPORT

In addition to the work related to the Strategic Plan, the Board also amended its Statement on Divestment in January 2019. As referenced in the revised Statement: "The issues facing our world today are not easily separated into gradations of severity or importance. Consensus as to the priority of these types of issues and the proper recourse is difficult to achieve. As a result, once a divestment mandate is imposed to address one issue, the resulting 'slippery slope' makes differentiation among the remaining issues contentious and divisive. Increased divestment is costly and limits PERA's ability to effectively seek the best risk-adjusted returns to secure the retirement benefits of public servants. For these reasons, PERA will oppose divestment efforts unless such opposition is inconsistent with its fiduciary duty, but will implement divestment mandates passed by the Colorado General Assembly."

These initiatives and many others highlight the Board's continued commitment to sound stewardship on behalf of all PERA members. I would like to recognize the following Trustees, who left the Board in 2019, for their diligence and thoughtful contributions while serving on the Board: The Honorable Will Bain (Judicial Division), Bob Lamb (Local Government Division), and The Honorable Walker Stapleton (outgoing State Treasurer). With these departures we also welcomed the following new Trustees to the Board: The Honorable Rebecca R. Freyre (Judicial Division), The Honorable Dave Young (new State Treasurer), and Cheryl Pattelli (Local Government Division), who was appointed to fill the Local Government seat due to Bob Lamb's retirement. Trustees devote many hours in fulfilling their fiduciary duties while serving the membership, and all Trustees are recognized for their significant contributions of time and service.

As we continue to work through challenging times, requiring PERA to be adaptive and responsible, I would like to extend my gratitude to the Trustees for their dedication and continued perseverance as we work on behalf of our members, beneficiaries, and employers. The Board's guidance and support are essential to the success of PERA. As Trustees, we are committed to ensuring the integrity and sustainability of the plan for all of Colorado's public employees.

Sincerely,

Timothy M. O'Brien
Chairman, Colorado PERA Board of Trustees

REPORT OF THE COLORADO PERA AUDIT COMMITTEE

COLORADO PERA®

As described more fully in its Charter, the purpose of the Colorado PERA Audit Committee (Audit Committee) is to assist the Board of Trustees (Board) in fulfilling its fiduciary responsibilities as they relate to accounting policies and financial reporting, the system of internal control, PERA's *Standards of Professional and Ethical Conduct*, the internal audit process, and the practices of the Director of Internal Audit. Management is responsible for the preparation, presentation, and integrity of PERA's financial statements; accounting and financial reporting principles; internal control; and procedures designed to reasonably ensure compliance with accounting standards, applicable laws, and regulations. PERA has a full-time Internal Audit Division that reports functionally to the Audit Committee. The Internal Audit Division is responsible for independently and objectively reviewing and evaluating the effectiveness and efficiency of PERA's system of internal control.

In 2015, the State Auditor selected CliftonLarsonAllen LLP to perform the independent audit of PERA's annual financial statements, commencing with the year ended December 31, 2015. CliftonLarsonAllen LLP is responsible for performing an independent audit of PERA's financial statements in accordance with generally accepted auditing standards and the standards applicable to financial audits contained in Government Auditing Standards issued by the Comptroller General of the United States. In accordance with law, the State Auditor has ultimate authority and responsibility for selecting, evaluating, and, when appropriate, replacing PERA's Independent Auditor.

The Audit Committee serves a Board-level oversight role in which it provides advice, counsel, and direction to management and to the Internal Audit function on the basis of the information it receives, discussions with management and Internal Audit, and the experience of the Audit Committee's members in business, financial, and accounting matters. In this role, the Audit Committee also reviews the audit plan of the Independent Auditor, the results of the audit, and the status of management's actions to implement recommendations from the audit.

The Audit Committee believes that a candid, substantive, and focused dialogue with the internal auditors and the Independent Auditor is fundamental to the Audit Committee's oversight responsibilities. To support this belief, the Audit Committee periodically meets separately with both the Director of Internal Audit and the Independent Auditor, without management present. In the course of its discussions in these meetings, the Audit Committee asked a number of questions intended to bring to light any areas of potential concern related to PERA's financial reporting and internal control. These questions include, but are not limited to:

- Are there any significant accounting judgments, estimates, or adjustments made by management in preparing the financial statements that would have been made differently had the Independent Auditor prepared and been responsible for the financial statements?
- Based on the Independent Auditors' expertise, and their knowledge of PERA and PERA's financial statements, have subsequent events been appropriately disclosed in the financial statements?
- Based on the Independent Auditors' experience, and their knowledge of PERA, do PERA's financial statements fairly present to users, with clarity and completeness, PERA's financial position and performance for the reporting period in accordance with generally accepted accounting principles?
- Based on the Independent Auditors' experience, and their knowledge of PERA, has PERA implemented internal control and internal audit procedures that are appropriate for PERA?
- Are the Independent Auditor and internal auditors getting the support they need from management to execute their duties?

Questions raised by the Audit Committee regarding these matters were answered to the Audit Committee's satisfaction.

The Audit Committee had an agenda for 2019 that included the following items:

- Recommending the *Comprehensive Annual Financial Report (CAFR)* to the Board for its approval;
- Recruiting and hiring a new Director of Internal Audit;

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REPORT OF THE COLORADO PERA AUDIT COMMITTEE

- Reviewing and approving the plan and budget of the Internal Audit Division;
- Reviewing the adequacy of resources made available to the Internal Audit Division;
- Reviewing the scope, objectives, and timing of the annual independent audit of PERA's financial statements;
- Providing input into the Executive Director's annual performance evaluation of the Director of Internal Audit;
- Reviewing PERA's compliance with its *Standards of Professional and Ethical Conduct*;
- Meeting with the Independent Auditor separately, without management present;
- Meeting separately with the Executive Director, Director of Internal Audit, Controller, and General Counsel; and
- Meeting with the Director of Internal Audit and with management to discuss the effectiveness of PERA's internal control.

The Audit Committee has reviewed and discussed the audited financial statements for the year ended December 31, 2019, with management and the Independent Auditor. Management represented to the Audit Committee that PERA's audited financial statements were prepared in accordance with accounting principles generally accepted in the United States of America that apply to governmental accounting for fiduciary funds. The Independent Auditor represented that their presentations to the Audit Committee included the matters required by auditing standards on auditor communication to be discussed with the Independent Auditor. This review included a discussion with management of the quality (not merely the acceptability) of PERA's accounting principles, the reasonableness of significant estimates and judgments, and the clarity of disclosure in PERA's financial statements, including the disclosures related to critical accounting estimates.

In reliance on these reviews and discussions, and the reports of the Independent Auditor, the Audit Committee has recommended to the Board, and the Board has approved PERA's *CAFR* for the year ended December 31, 2019.

Audit Committee as of June 19, 2020

David Hall, Chairman

Ramon Alvarado

Honorable Rebecca R. Freyre

Julie Friedemann

A. Tom Hall

Tammie Lowrie

Susan G. Murphy

Timothy M. O'Brien

Cheryl Pattelli

BOARD OF TRUSTEES

By State law, authority over the public employees' retirement association is vested in the Board of Trustees (Board). The Board is composed of the following 16 Trustees:

- Nine members elected by members from their respective Divisions to serve on the Board for four-year terms; four from the School Division, three from the State Division, one from the Local Government Division, and one from the Judicial Division.
- Two retirees elected by retirees to serve on the Board for four-year terms.
- Three Trustees appointed by the Governor and confirmed by the State Senate to serve on the Board for four-year terms.
- The State Treasurer.
- One ex officio (non-voting) member or retiree elected by members and retirees of the Denver Public Schools (DPS) Division to serve on the Board for a four-year term.

If a Board member resigns, a new Trustee is appointed from the respective Division until the next election of Trustees.

Timothy M. O'Brien
Chairman

Elected by Retirees
Retired Colorado State Auditor
Office of the State Auditor
Current term expires June 30, 2023

Thomas J. Barrett

Appointed by the Governor
Current term expires July 10, 2022

Marcus Pennell
Vice Chairman

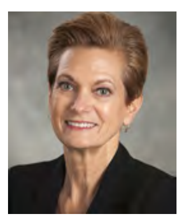
Elected by School Members
Physics Teacher
Jefferson County School District
Current term expires June 30, 2021

Guillermo Barriga

Elected by School Members
Project Manager
Aurora Public Schools
Current term expires June 30, 2022

Ramon Alvarado

Elected by State Members
Adjunct Faculty
Metropolitan State University of Denver
Current term expires June 30, 2022



Honorable Rebecca R. Freyre

Appointed to Judicial Division seat
Judge
Colorado Court of Appeals
Current term expires June 30, 2023

Honorable Will Bain

Elected by Judicial Members
Judge
4th Judicial District
Term expired June 30, 2019

Julie Friedemann

Appointed to Retiree seat
Retired Mathematics Teacher
Jefferson County School District
Current term expires June 30, 2021

BOARD OF TRUSTEES

Amy Grant

Non-voting, Ex officio member
Elected by DPS Division active members and retirees
Former Chair of the Denver Public Schools Retirement System Board
Retired Secretary
Current term expires June 30, 2024

David Hall

Elected by State Members
Sergeant and Legislative Liaison
Colorado State Patrol
Current term expires June 30, 2024

Roger P. Johnson

Appointed by the Governor
Current term expires July 10, 2020

Suzanne E. Kubec

Appointed to State Division seat
Liability Claims Manager
State Office of Risk Management
Current term expires June 30, 2021

Robert Lamb

Elected by Local Government Members
Finance Division Director
Boulder County
Retired May 2019

Tina Mueh

Elected by School Members
Middle School Science Teacher
Boulder Valley School District
Current term expires June 30, 2021

Susan G. Murphy

Appointed by the Governor
Current term expires July 10, 2021

William N. Parker

Elected by School Members
International Baccalaureate Coordinator and Literacy Teacher
Brighton School District 27J
Term to expire June 30, 2020

Cheryl Pattelli

Appointed to Local Government Division seat
Chief Financial Officer
City of Boulder
Current term expires June 30, 2022

Eric Rothaus

Deputy State Treasurer
Delegated Substitute for the State Treasurer
Continuous term effective January 2019

Honorable Walker Stapleton

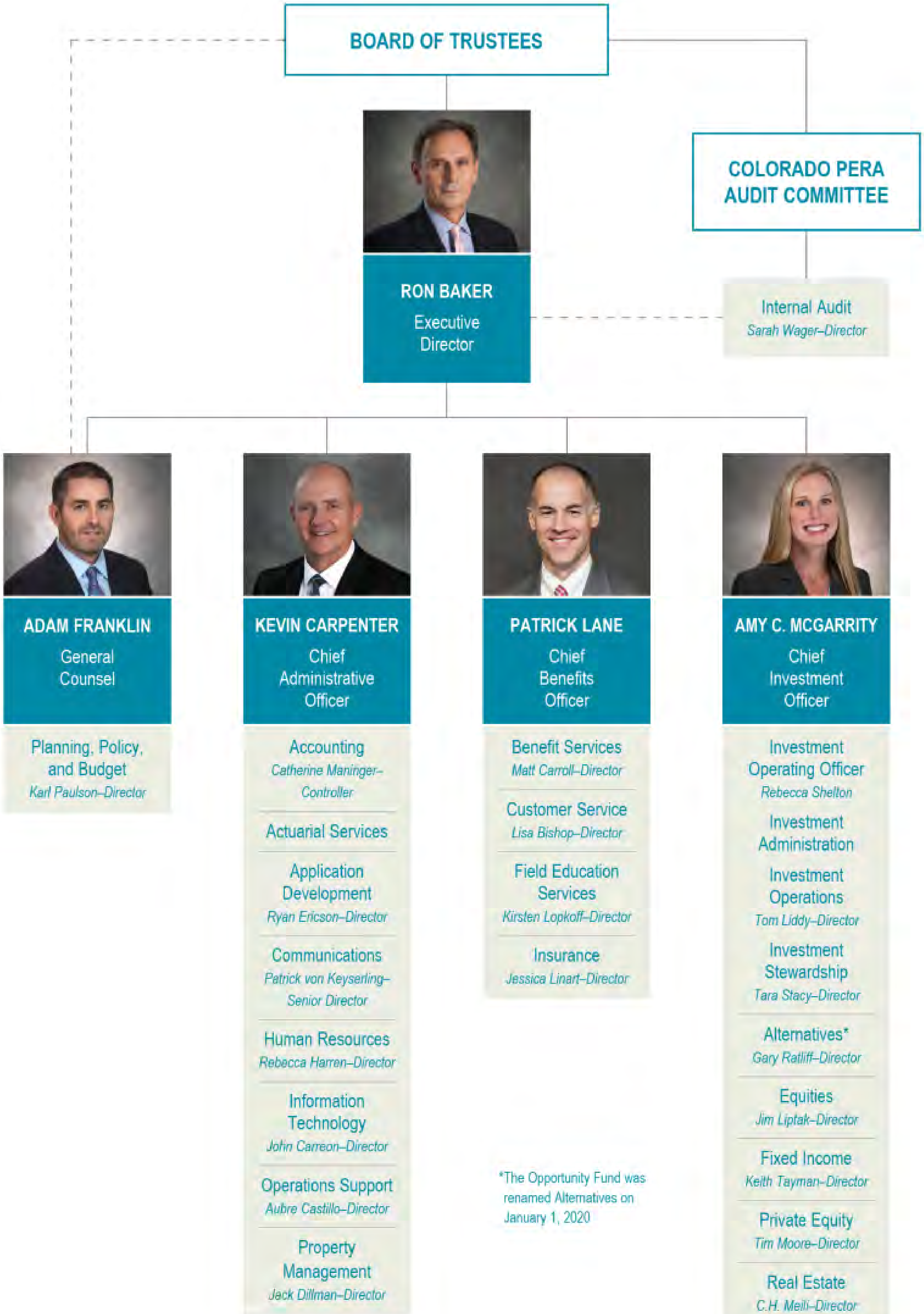
Ex officio member
State Treasurer
Term ended January 2019

Honorable Dave Young

Ex officio member
State Treasurer
Continuous term effective January 2019

ADMINISTRATIVE ORGANIZATIONAL CHART AND EXECUTIVE MANAGEMENT

As of June 1, 2020



CONSULTANTS

As of December 31, 2019

Fiduciary Counsel

Brownstein Hyatt Farber Schreck
410 17th Street
Suite 2200
Denver, CO 80202

Governance Consultant

Cortex Applied Research, Inc.
2489 Bloor Street West
Suite 304
Toronto, ON M6S 1R6
Canada

Health Care Program Consultant

IMA Financial Group, Inc.
1705 17th Street
Suite 100
Denver, CO 80202

Independent Auditors

CliftonLarsonAllen LLP
370 Interlocken Boulevard
Suite 500
Broomfield, CO 80021

Investment Performance Consultants

Aon Hewitt Investment Consulting, Inc.
200 East Randolph Street
Suite 1500
Chicago, IL 60601

The Northern Trust Company
50 South LaSalle Street
Chicago, IL 60603

Investments—Portfolio Consultant

Aon Hewitt Investment Consulting, Inc.
200 East Randolph Street
Suite 1500
Chicago, IL 60601

Investments—Real Estate Performance

Aon Hewitt Investment Consulting, Inc.
200 East Randolph Street
Suite 1500
Chicago, IL 60601

Master Custodian

The Northern Trust Company
50 South LaSalle Street
Chicago, IL 60603

Pension and Health Care Program Actuary

Segal
7951 East Maplewood Avenue
Suite 327
Greenwood Village, CO 80111

Pharmacy Benefits Consultants

ARMSRx Pharmacy Benefit Consulting
105 Down Court
Windermere, FL 34786

Risk Management

IMA of Colorado
1705 17th Street
Suite 100
Denver, CO 80202

Voluntary Investment Program, Defined Contribution Retirement, and Deferred Compensation Plan Investment and Performance Consultant

RVK, Inc.
1211 SW 5th Avenue
Suite 900
Portland, OR 97204

Voluntary Investment Program, Defined Contribution Retirement, and Deferred Compensation Plan Service Provider

Voya Institutional Plan Services, LLC
30 Braintree Hill Office Park
Braintree, MA 02184

A list of PERA's Investment Brokers/Advisers, the Schedule of Commissions, and other information related to investment expenses can be found in the Investment Section on pages 123-125.

FINANCIAL SECTION

REPORT OF THE INDEPENDENT AUDITOR

CliftonLarsonAllen LLP
CLAconnect.com

INDEPENDENT AUDITORS' REPORT

Board of Trustees
Public Employees' Retirement Association of Colorado
Denver, Colorado

Report on the Financial Statements

We have audited the accompanying financial statements of Public Employees' Retirement Association of Colorado (Colorado PERA), as of and for the year ended December 31, 2019, and the related notes to the financial statements, which collectively comprise Colorado PERA's basic financial statements, as listed in the table of contents. We have also audited the financial statements of each individual fund of Colorado PERA as of and for the year ended December 31, 2019 as displayed in Colorado PERA's basic financial statements.

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.

Auditors' Responsibility

Our responsibility is to express opinions 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 auditors' 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 the entity'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 the entity'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 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 opinions.

A member of Nexia International

REPORT OF THE INDEPENDENT AUDITOR

Board of Trustees
Public Employees' Retirement Association of Colorado

Opinion

In our opinion, the financial statements referred to above present fairly, in all material respects, the fiduciary net position of Colorado PERA as of December 31, 2019, and the respective changes in its fiduciary net position for the year then ended in accordance with accounting principles generally accepted in the United States of America. In addition, in our opinion, the financial statements referred to previously present fairly, in all material respects, the respective fiduciary net position of each individual fund of Colorado PERA as of December 31, 2019, and the respective changes in fiduciary net position thereof for the year then ended in conformity 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, the division trust funds' schedules of changes in net pension liability, net pension liability, employer and nonemployer contributions, and investment returns and related notes, and the health care trust funds' schedules of changes in net OPEB liability, net OPEB liability, contributions from employers and other contributing entities, and investment returns and related notes, 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 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.

Supplementary and Other Information

Our audit was conducted for the purpose of forming an opinion on Colorado PERA's basic financial statements. The schedules of administrative expenses, other additions, other deductions, investment expenses, and payments to consultants (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 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 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, as listed in the table of contents, 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 OF THE INDEPENDENT AUDITOR

Board of Trustees
Public Employees' Retirement Association of Colorado

We also previously audited, in accordance with auditing standards generally accepted in the United States of America, the financial statements of Colorado PERA as of and for the year ended December 31, 2018 (not presented herein), and have issued our report thereon dated June 21, 2019, which contained an unmodified opinion on the respective financial statements of fiduciary net position and changes for the year then ended. The schedules of administrative expenses, other additions, other deductions, investment expenses, and payments to consultants (supplementary information) for the year ended December 31, 2018 is presented for purposes of additional analysis and is not a required part of the basic financial statements. Such information is the responsibility of management and was derived from and relates directly to the underlying accounting and other records used to prepare the 2018 financial statements. The supplementary information has been subjected to the auditing procedures applied in the audit of the 2018 basic financial statements and certain additional procedures, including comparing and reconciling such information directly to the underlying accounting and other records used to prepare those financial statements or to those financial statements themselves, and other additional procedures in accordance with auditing standards generally accepted in the United States of America. In our opinion, the accompanying supplementary information is fairly stated in all material respects in relation to the financial statements as a whole for the year ended December 31, 2018.

Other Reporting Required by *Government Auditing Standards*

In accordance with *Government Auditing Standards*, we have also issued our report dated June 30, 2020 on our consideration of Colorado PERA's internal control over financial reporting and on our tests of its compliance with certain provisions of laws, regulations, contracts, and grant agreements and other matters. The purpose of that report is solely 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 effectiveness of PERA's 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 Colorado PERA's internal control over financial reporting and compliance.

CliftonLarsonAllen LLP

CliftonLarsonAllen LLP

Denver, Colorado
June 30, 2020

MANAGEMENT'S DISCUSSION AND ANALYSIS (UNAUDITED)

(Dollars in Thousands)

This Management's Discussion and Analysis (MD&A) section provides a narrative overview and analysis of the financial activities of the Public Employees' Retirement Association of Colorado (PERA) for the year ended December 31, 2019. Please consider the information presented here in conjunction with additional information in the Letter of Transmittal starting on page 3 of this *Comprehensive Annual Financial Report (CAFR)* and with the basic financial statements of PERA on pages 44-47.

In addition to historical information, this MD&A includes forward-looking statements, which involve certain risks and uncertainties. PERA's actual results, performance, and achievements may differ materially from the results, performance, and achievements expressed or implied in such forward-looking statements, due to a wide range of factors, including changes in interest rates, changes in the capital markets, general economic conditions, legislative changes, as well as other factors.

Overview of the Association

PERA administers the following 11 fiduciary funds:

Plan Name
Defined Benefit Pension Plans (Division Trust Funds)
State Division Trust Fund
School Division Trust Fund
Local Government Division Trust Fund
Judicial Division Trust Fund
Denver Public Schools (DPS) Division Trust Fund
Defined Benefit Other Postemployment Benefit Plans (Health Care Trust Funds)
Health Care Trust Fund (HCTF)
Denver Public Schools Health Care Trust Fund (DPS HCTF)
Defined Contribution Plans
Voluntary Investment Program
Defined Contribution Retirement Plan
Deferred Compensation Plan
Deferred Compensation Plan
Private Purpose Trust Fund
Life Insurance Reserve

Additional information regarding the contribution and benefit provisions of the plans can be found in Notes 1, 8, and 9 of the Notes to the Financial Statements.

Legislative Initiatives

Governor Polis signed House Bill (HB) 19-1217: *Concerning the Elimination of the Two Percent Increase in the Member Contribution Rate to the Public Employees' Retirement Association in the Local Government of the Association* into law on May 20, 2019, which eliminated the scheduled 2.0 percent increase in the member contribution rate for the Local Government Division that was included in legislation passed in 2018. That legislation increased contributions paid by all PERA members. While this new bill eliminates those increased contributions for members in the Local Government Division, all members are still subject to any adjustments in contributions required to keep PERA on the path to full funding by 2048 as defined within Senate Bill (SB) 18-200. Contributions for all members, within certain constraints, can increase (or decrease) by up to 0.5 percent per year.

Financial Statement Overview

PERA's financial statements are prepared in accordance with governmental accounting standards and the actuarial valuations that are reported in the Actuarial Section are prepared in accordance with the Actuarial Standards of Practice and the PERA Board's Funding Policy.

Basic Financial Statements

PERA's financial statements include the following components:

1. Basic Financial Statements

   -Statements of Fiduciary Net Position

   -Statements of Changes in Fiduciary Net Position

2. Notes to the Basic Financial Statements

3. Required Supplementary Information - Unaudited

4. Supplementary Schedules

The Statements of Fiduciary Net Position presents information on PERA's assets and liabilities, with the difference between the two reported as fiduciary net position. Over time, the increase or decrease in fiduciary net position serves as an indicator of PERA's financial condition and our ability to fund future benefits.

The Statements of Changes in Fiduciary Net Position reflects how PERA's fiduciary net position (FNP) changed during the fiscal year, and includes additions such as contributions and investment income and deductions such as benefit payments and administrative expenses.

Notes to the Financial Statements

The Notes to the Financial Statements provide information essential to understanding the basic financial statements.

Note 1—Plan Description: provides a general description of PERA, the funds administered by PERA,

MANAGEMENT'S DISCUSSION AND ANALYSIS (UNAUDITED)

(Dollars in Thousands)

and a general overview of plan provisions for the defined benefit pension trust funds.

Note 2—Summary of Significant Accounting Policies: provides a summary of significant accounting policies, including the basis of accounting for PERA, and management's use of estimates.

Note 3—Interfund Transfers and Balances: provides information related to interfund activity and balances.

Note 4—Contributions: provides information related to contribution requirements of the defined benefit pension trust funds and the authority for establishing or amending those requirements.

Note 5—Investments: provides information related to deposits and investments, required investment disclosures, and risks related to credit (including custodial credit and concentrations of credit risk), interest rate and foreign currency.

Note 6—Derivative Instruments: provides information on PERA's investment derivative instruments.

Note 7—Commitments and Contingencies: provides a summary of PERA's significant commitments and generally describes any potential contingencies of PERA.

Note 8—Voluntary Investment Program, Defined Contribution Retirement Plan, and Deferred Compensation Plan: identifies and describes the defined contribution plans and deferred compensation plan.

Note 9—Health Care Trust Funds: identifies and describes the types of defined benefit other postemployment benefit (OPEB) plans.

Note 10—Net Pension Liability (NPL) of the Division Trust Funds: provides a summary of the NPL of employers and the nonemployer contributing entity in accordance with GASB Statement No. 67, *Financial Reporting for Pension Plans*.

Note 11—Net OPEB Liability (NOL) of the Health Care Trust Funds: provides a summary of the NOL of employers in accordance with GASB Statement No. 74, *Financial Reporting for Postemployment Benefit Plans Other Than Pension Plans*.

Note 12—Subsequent Events: provides a summary of conditions that did not exist at the date of the Statements of Fiduciary Net Position but arose subsequent to that date.

Required Supplementary Information (RSI)

The following 10 year RSI is found after the notes to the basic financial statements:

Division Trust Funds	Health Care Trust Funds
Schedule of Changes in Net Pension Liability	Schedule of Changes in Net OPEB Liability
Schedule of Net Pension Liability	Schedule of Net OPEB Liability
Schedule of Employer and Nonemployer Contributions	Schedule of Contributions from Employers and Other Contributing Entities
Schedule of Investment Returns	Schedule of Investment Returns

Supplementary Information (SI)

The SI section includes details on expenses of PERA and a breakdown of other additions and deductions. The schedules available in the SI section include:

-Schedule of Administrative Expenses

-Schedule of Other Additions

-Schedule of Other Deductions

-Schedule of Investment Expenses

-Schedule of Payments to Consultants

Comparative Financial Statements

Following are the comparative condensed statements of fiduciary net position and changes in fiduciary net position for five Division Trust Funds, two Health Care Trust Funds, and the Life Insurance Reserve. This information has been derived from PERA's audited financial statements. For the year ended December 31, 2019, the FNP for five Division Trust Funds, two Health Care Trust Funds, and the Life Insurance Reserve increased by $6,871,234, $93,925, and $3,299, respectively. The increase was principally due to an increase in investment income. While the annual changes in FNP can provide meaningful insight into the financial activities and financial status, long-term views and trend analysis is a critical factor in reporting and understanding the financial status of PERA.

MANAGEMENT'S DISCUSSION AND ANALYSIS (UNAUDITED)

(Dollars in Thousands)

FIDUCIARY NET POSITION

As of December 31

	Division Trust Funds			Health Care Trust Funds			Private Purpose Trust Fund		
	2019	2018	% Chg	2019	2018	% Chg	2019	2018	% Chg
Assets									
Cash and short-term investments	**$679,525**	$414,063	64.1%	**$4,932**	$2,827	74.5%	**$312**	$181	72.4%
Securities lending collateral	**1,302,451**	814,060	60.0%	**9,452**	5,558	70.1%	**600**	356	68.5%
Receivables	**443,179**	777,943	(43.0%)	**53,459**	44,588	19.9%	**131**	274	(52.2%)
Investments, at fair value	**50,908,381**	44,215,308	15.1%	**369,463**	301,889	22.4%	**23,403**	19,319	21.1%
Capital assets, net of accumulated depreciation	**14,315**	13,824	3.6%	**—**	—	—%	**—**	—	—%
Total assets	**53,347,851**	46,235,198	15.4%	**437,306**	354,862	23.2%	**24,446**	20,130	21.4%
Liabilities									
Investment settlements and other liabilities	**268,014**	515,909	(48.1%)	**30,711**	46,093	(33.4%)	**2,706**	1,933	40.0%
Securities lending obligations	**1,301,955**	812,641	60.2%	**9,449**	5,548	70.3%	**599**	355	68.7%
Total liabilities	**1,569,969**	1,328,550	18.2%	**40,160**	51,641	(22.2%)	**3,305**	2,288	44.4%
Fiduciary net position	**$51,777,882**	**$44,906,648**	**15.3%**	**$397,146**	**$303,221**	**31.0%**	**$21,141**	**$17,842**	**18.5%**

CHANGES IN FIDUCIARY NET POSITION

For the Years Ended December 31

	Division Trust Funds			Health Care Trust Funds			Private Purpose Fund		
	2019	2018	% Chg	2019	2018	% Chg	2019	2018	% Chg
Additions									
Employer contributions	**$1,754,628**	$1,632,725	7.5%	**$99,660**	$93,976	6.0%	**$—**	$—	—%
Nonemployer contributions	**225,000**	225,000	—%	**—**	—	—%	**—**	—	—%
Member contributions	**817,241**	737,781	10.8%	**—**	—	—%	**—**	—	—%
Purchased service	**66,453**	61,956	7.3%	**—**	—	—%	**—**	—	—%
Investment income (loss)	**8,927,933**	(1,604,013)	656.6%	**58,759**	(10,572)	655.8%	**3,901**	(684)	670.3%
Other	**10,127**	17,680	(42.7%)	**7,172**	8,578	(16.4%)	**—**	4	(100.0%)
Total additions	**11,801,382**	1,071,129	1001.8%	**165,591**	91,982	80.0%	**3,901**	(680)	673.7%
Deductions									
Benefit payments	**4,708,541**	4,611,125	2.1%	**61,865**	65,935	(6.2%)	**—**	—	—%
Refunds	**161,202**	168,387	(4.3%)	**—**	—	—%	**—**	—	—%
Disability and life insurance premiums	**6,162**	6,487	(5.0%)	**—**	—	—%	**479**	433	10.6%
Administrative expenses	**39,186**	41,089	(4.6%)	**9,767**	21,246	(54.0%)	**123**	111	10.8%
Other	**15,057**	14,813	1.6%	**34**	110	(69.1%)	**—**	—	—%
Total deductions	**4,930,148**	4,841,901	1.8%	**71,666**	87,291	(17.9%)	**602**	544	10.7%
Change in fiduciary net position	**6,871,234**	(3,770,772)	282.2%	**93,925**	4,691	1902.2%	**3,299**	(1,224)	369.5%
Fiduciary net position									
Beginning of year	**44,906,648**	48,677,420	(7.7%)	**303,221**	298,530	1.6%	**17,842**	19,066	(6.4%)
End of year	**$51,777,882**	**$44,906,648**	**15.3%**	**$397,146**	**$303,221**	**31.0%**	**$21,141**	**$17,842**	**18.5%**

MANAGEMENT'S DISCUSSION AND ANALYSIS (UNAUDITED)

(Dollars in Thousands)

Additions to Net Position

Investments

INVESTMENT INCOME/(LOSS)

Trust Fund	Net Appreciation/ (Depreciation) in Fair Value	Interest and Dividends	Real Estate, Private Equity, and Oppty Fund Net Operating Inc	Investment Expenses	Net Securities Lending Income	Net Investment Income/(Loss)
State Division	$2,465,215	$264,401	$83,288	($50,398)	$2,213	$2,764,719
School Division	4,169,424	447,738	141,042	(85,343)	3,746	4,676,607
Local Government Division	706,325	75,827	23,885	(14,453)	635	792,219
Judicial Division	55,007	5,926	1,867	(1,130)	49	61,719
DPS Division	564,109	60,524	19,066	(11,536)	506	632,669
HCTF	47,979	5,198	1,637	(991)	44	53,867
DPS HCTF	4,354	475	150	(91)	4	4,892
Life Insurance Reserve	3,476	375	118	(71)	3	3,901
2019 Total	**$8,015,889**	**$860,464**	**$271,053**	**($164,013)**	**$7,200**	**$8,990,593**
2018 Total	**($2,588,210)**	**$860,594**	**$271,362**	**($168,193)**	**$9,178**	**($1,615,269)**
2017 Total	**$6,749,932**	**$836,085**	**$272,097**	**($172,801)**	**$8,950**	**$7,694,263**
2016 Total	**$2,124,689**	**$808,744**	**$256,216**	**($161,800)**	**$10,177**	**$3,038,026**
2015 Total	**($216,959)**	**$807,322**	**$233,535**	**($165,392)**	**$10,843**	**$669,349**

Investments, which are managed in a single investment pool, are the largest asset in PERA's defined benefit plans. Investment income generated by PERA ultimately defrays the cost of benefits that are provided to PERA's membership. For the year ended December 31, 2019, PERA generated $8,990,593 in net investment income, an increase of $10,605,862 from 2018. The global equity market, in which over 50 percent of the portfolio is invested, is the single greatest driver of PERA's annual return. 2019 was a tremendous year for global equity investors. Stocks rallied during the first several months of 2019, after experiencing a significant decline during the last few months of 2018, and the rally continued throughout most of the year. Upbeat economic data helped ease worries, and growth was driven by a strong U.S. jobs market, solid U.S. consumer spending, better-than-expected corporate earnings, and a shift in monetary policy at the Federal Reserve. The global equity markets finished the year with a 26.8 percent gain (MSCI ACWI IMI). For fixed income investments, 2019 was marked by lower interest rates and tighter credit spreads. The U.S. economy remained relatively strong in 2019 with real gross domestic product growing 2.3 percent, mainly driven by strong consumer spending. Job creation was robust throughout the year and unemployment declined to 3.5 percent by year end. The fixed income market, in which over 20 percent of the portfolio is invested, ended the year with an 8.7 percent gain (Bloomberg Barclays U.S. Aggregate Index). In addition to the growth experience by the global equity and fixed income markets, the private market asset classes (private equity, real estate, and components of the Opportunity Fund) all experienced positive returns in 2019.

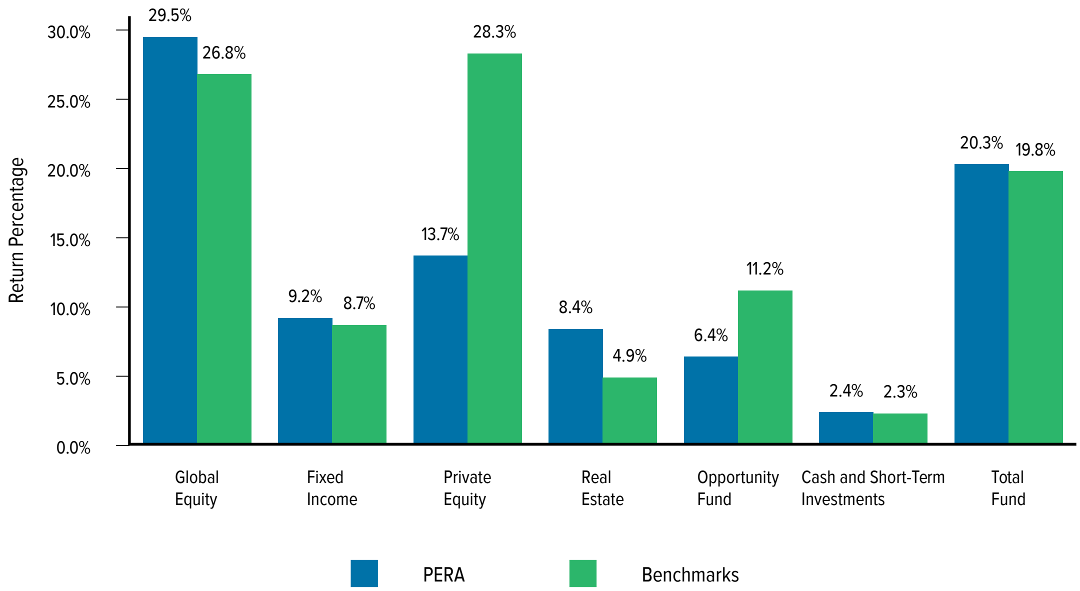
PERA's actual net-of-fees, time-weighted rate of return was 20.3 percent for the year ended December 31, 2019. To assess investment performance, PERA closely monitors the performance of the Board's selected fund benchmarks to actual performance returns. For the year ended December 31, 2019, PERA's investments outperformed the total fund's benchmark by 50 basis points.

PERA's target and actual investment allocation includes equity and fixed income investments in public markets and private equity, real estate and opportunistic funds in private markets. A modest allocation to cash provides ongoing liquidity to meet PERA's cash needs. Additional information on limitations, an overview of the Investment Policy, the targeted investment asset allocation, as well as the permissible ranges of asset allocation for PERA's investment program can be found on page 121 of the Investment Section. The time-weighted rates of return of the various asset classes, the total fund, and the various benchmarks can be found on the next page.

MANAGEMENT'S DISCUSSION AND ANALYSIS (UNAUDITED)

(Dollars in Thousands)

2019 Actual Time-Weighted Returns versus Benchmarks

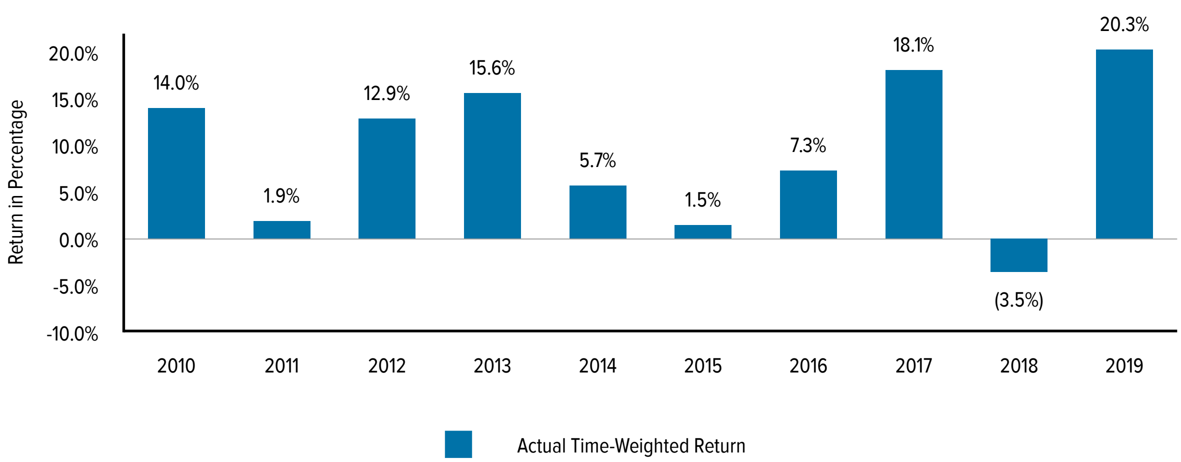


Long-Term Performance Returns

While the annual performance returns can provide meaningful insight into the financial activities and financial status, long-term views and trend analysis are critical factors in understanding the financial status of PERA. The chart below shows the annual performance returns for the total fund for each of the past 10 years.

Additional information on longer-term performance returns for the investment program and benchmarks for the three-, five-, and ten-year periods for each investment asset class, as well as a comprehensive discussion of the 2019 performance evaluation can be found in the Investment Section.

Historical Time-Weighted Returns



MANAGEMENT'S DISCUSSION AND ANALYSIS (UNAUDITED)

(Dollars in Thousands)

Contributions

TOTAL CONTRIBUTIONS FOR DIVISION AND HEALTH CARE TRUST FUNDS

Trust Fund	Employer Contributions[1]	Nonemployer Contributions[2]	Member Contributions	Purchased Service	Retiree Health and Life Premiums	Employer Disaffiliation Payment	Other	Total Contributions and Other
State Division	$612,282	$77,088	$257,803	$29,494	$—	$—	$22	$976,689
School Division	1,002,760	127,367	436,899	25,992	—	—	364	1,593,382
Local Government Division	85,597	—	55,003	7,820	—	—	14	148,434
Judicial Division	10,649	1,344	4,575	612	—	—	6,697	23,877
DPS Division	43,340	19,201	62,961	2,535	—	—	3,030	131,067
HCTF	92,011	—	—	—	—	—	6,984	98,995
DPS HCTF	7,649	—	—	—	—	—	188	7,837
2019 Total	**$1,854,288**	**$225,000**	**$817,241**	**$66,453**	**$—**	**$—**	**$17,299**	**$2,980,281**
2018 Total	**$1,726,701**	**$225,000**	**$737,781**	**$61,956**	**$—**	**$—**	**$26,258**	**$2,777,696**
2017 Total	**$1,625,673**	**$—**	**$706,499**	**$67,454**	**$—**	**$1,159**	**$32,231**	**$2,433,016**
2016 Total	**$1,522,319**	**$—**	**$687,202**	**$58,152**	**$144,759**	**$—**	**$24,362**	**$2,436,794**
2015 Total	**$1,409,632**	**$—**	**$665,662**	**$61,383**	**$134,148**	**$—**	**$18,686**	**$2,289,511**

[1] Employer contributions include the employer statutory rate, AED, and SAED, less an offset of 13.48 percent in 2019 for the DPS Division as required by C.R.S. § 24-51-412 *et seq.*

[2] Contributions from a nonemployer contributing entity are required by C.R.S. § 24-51-414 *et seq.*

Contribution rates are set in statute and are thus determined by the Colorado General Assembly. See pages 243-250 in the Statistical Section for the Schedule of Contribution Rate History.

Contributions	2019	2018
From members to the Division Trust Funds	**$817,241**	$737,781
From employers to the Division Trust Funds, HCTF, and DPS HCTF	**1,854,288**	1,726,701

Contributions increased due to increases in payroll and increases in member and contribution rates subject to C.R.S. § 24-51-413. The contribution of $225 million (actual dollars) from the nonemployer contributing entity commenced in 2018 in accordance with C.R.S. § 24-51-414. At the end of 2019, PERA had receivables in the amount of $208,702 which primarily represents contributions owed by members and employers for service credit earned in December 2019 and anticipated health care subsidies. Over the past 30 years, member contributions represent 17 percent of the inflows into the Division Trust Funds, and contributions from employer and nonemployer contributing entities represent 21 percent of the inflows into the Division Trust Funds and Health Care Trust Funds.

C.R.S. § 24-51-412 *et seq.* provides for a unique offset to the employer contributions that otherwise would go toward financing the unfunded actuarial accrued liability (UAAL) of the DPS Division, allowing relief to DPS Division employers by recognizing the dollars they contribute toward the pension certificates of participation (PCOPs). The statute states that as long as the funded status of the DPS Division exceeds that of the School Division, the Denver Public Schools is allowed this offset to the DPS Division employer contribution rate. The offset, expressed as a percentage of payroll, is equal to the annual assumed payment obligations for PCOPs issued in 1997 and 2008, including subsequent refinancing by the Denver Public Schools at a fixed effective annual interest rate of 8.50 percent. At a minimum, the DPS Division employer contribution rate must be sufficient to fund the DPS HCTF (1.02 percent) and the Annual Increase Reserve (AIR) (1.00 percent) applicable to the DPS Division. The annual increase (AI) is a post-retirement, cost-of-living adjustment meeting certain criteria as described in Note 1 of the Notes to the Financial Statements. The staff of Denver Public Schools calculated the PCOP offset rate of 13.48 percent for 2019.

C.R.S. § 24-51-401(1.7)(e) requires a periodic "true-up" calculation to be performed beginning in 2015 and every five years following, with the purpose of determining the total DPS Division employer contribution rate that would result in the equalization of the ratio of unfunded actuarial accrued liability (UAAL) over payroll between the DPS and School Divisions at the end of the 30-year period beginning January 1, 2010. Both the 2015 calculation and the 2020 calculation indicated that a

MANAGEMENT'S DISCUSSION AND ANALYSIS (UNAUDITED)

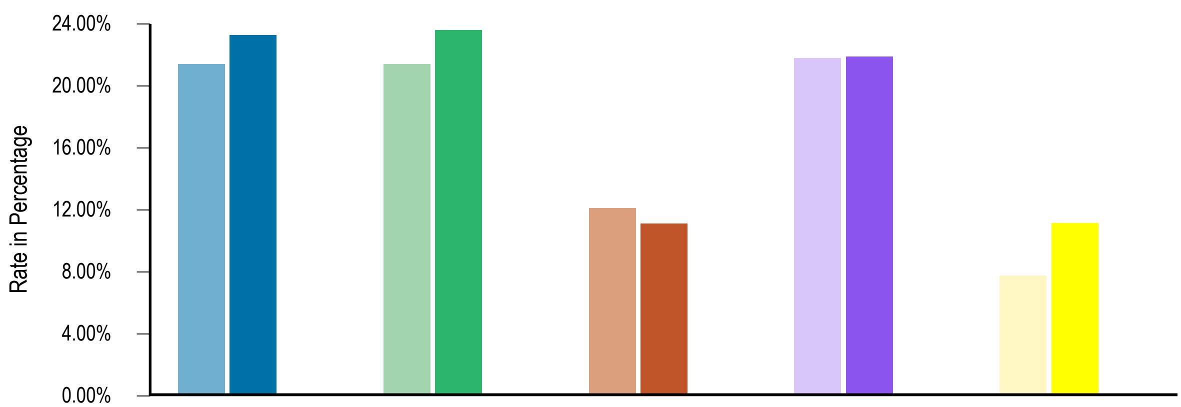
(Dollars in Thousands)

reduction to the total DPS Division employer rate would be needed to equalize the defined ratio. It should be noted that the recently enacted automatic adjustment provision (AAP) compares the blended actual contribution rates to the blended actuarially determined contribution rates, resulting in one ratio considering all five Division Trust Funds. Therefore, a reduction in an employer contribution rate for any one Division Trust Fund could potentially endanger the passage of the AAP assessment. A failed assessment would trigger additional employer and member contributions for all divisions, and a decrease in the AI cap, affecting all benefit recipients of the plan.

While the annual contribution amounts can provide meaningful insight into the financial activities and financial status of PERA, the assessment of the adequacy of contributions on an actuarial funding basis is a critical factor in reporting the financial status of PERA. In accordance with the actuarial standards of practice and the Board’s pension and OPEB funding policies, a plan-specific actuarially determined contribution (ADC) benchmark is developed against which to gauge the adequacy of PERA’s statutory contribution rates for the five Division Trust Funds and two OPEB Funds. The ADC for each trust fund is developed annually and reported by management to be used as a benchmark for contributions two years in the future.

The two charts below and on the next page show the ADC and actual contributions as a percentage of covered payroll for each trust fund for 2019. Additional information on long-term trends can be found in the Actuarial Section.

State, School, Local Government, Judicial, and DPS Divisions
2019 Year End Actual Contributions/ADC Comparison



State Actual[1,2]	21.42%	Local Govt Actual[2]	12.12%	DPS Actual[2]	7.76%
State ADC[3]	23.28%	Local Govt ADC[3,4]	11.13%	DPS ADC[3]	11.14%
School Actual[2]	21.42%	Judicial Actual[2]	21.79%		
School ADC[3]	23.59%	Judicial ADC[3]	21.90%		

1 Actual rates are for non-State Troopers.

2 Actual contributions include employer, AED and SAED, and nonemployer, as applicable, less the AIR and health care contributions.

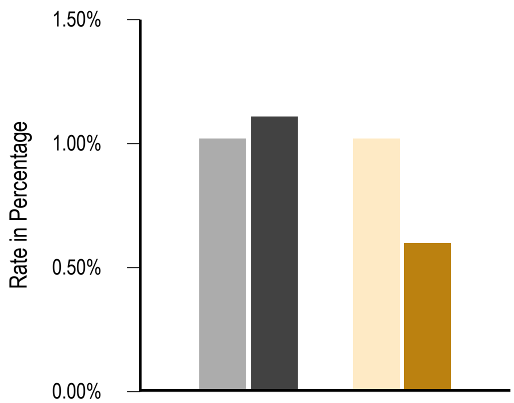
3 ADC rates for 2019 are based on the 2017 actuarial valuations.

4 The 2019 ADC for the Local Government Division has been updated since the production of the 2017 actuarial valuation report to reflect HB 19-1217.

MANAGEMENT'S DISCUSSION AND ANALYSIS (UNAUDITED)

(Dollars in Thousands)

HCTF and DPS HCTF
2019 Year End Actual Contributions/ADC Comparison



HCTF Actual	1.02%	DPS HCTF Actual	1.02%
HCTF ADC[1]	1.11%	DPS HCTF ADC[1]	0.60%

[1] ADC rates for 2019 are based on the 2017 actuarial valuations.

Contribution Deficiency/(Excess)

Governmental accounting standards require the disclosure of the amount of contributions recognized by the defined benefit plan, the ADC amount, and the difference between these two amounts as RSI. An annual contribution deficiency arises when actual contributions are less than the ADC. The ADC is calculated using the investment rate of return and discount rate assumptions according to the Board's funding policies. The ADC for 2019 was determined based on the results of the December 31, 2017, actuarial valuation. The 10-year schedules illustrating the annual contribution deficiency can be found in the RSI on pages 96-98 and 107-108.

Contribution deficiency/(excess) on an actuarial funding basis is determined through a similar process. Each year, the actuaries assess the increase or decrease to the expected unfunded liability by comparing the expected dollar inflows into each fund versus the actual dollar amounts recognized. This calculation for funding purposes is slightly different than the approach required by governmental accounting standards in that it considers additional contributions occurring during each year from all sources, as well as the timing of contributions made during the year. Taking these factors into consideration results in a total contribution deficiency of $132.9 million for the Division Trust Funds in 2019. During the past 17 years, shortfalls in funding for the Division Trust Funds totaled $5.5 billion.

Due to the timing of prior and future contribution increases versus the remaining portion of members with legacy (more expensive) benefit structures, contribution deficiencies are expected to continue in the near-term. However, with recent legislative actions such as the implementation of the AAP, specifically designed to better align actual contributions with actuarially determined contributions, and the State's annual direct distribution, progress is being made to dampen and eventually eliminate contribution deficiencies. A chart with the breakdown of benefit structures by division and type can be found on page 225 in the Statistical Section.

SB 18-200 implemented the AAP, which annually assesses actual contributions compared to required contributions to ascertain if adjustments to certain plan provisions are required in accordance with State statute beginning July 1, 2020. Based on certain statutory parameters, the AAP requires, as necessary, adjustments to member contributions, employer contributions, the direct distribution from the State, and the AI cap. The AAP is designed to help mitigate future contribution deficiencies and to keep PERA on the path to full funding. Additional information on this AAP can be found in Note 4 of the Notes to the Financial Statements, the Actuarial Section, and C.R.S. § 24-51-413.

MANAGEMENT'S DISCUSSION AND ANALYSIS (UNAUDITED)

(Dollars in Thousands)

CONTRIBUTION DEFICIENCY/(EXCESS)

(Dollars in Millions)

Trust Fund	2019	2018	2017	2016	2015	Cumulative Deficiency/(Excess) 2003–2019
State Division	**$21.1**[1]	$117.8[1]	$32.2	$59.9	$116.7	$1,756.5
School Division	**94.2**[1]	261.2[1]	133.0	144.4	187.7	2,767.5
State and School Division[2]	**N/A**	N/A	N/A	N/A	N/A	685.5
Local Government Division	**(6.3)**	17.8	(7.1)[3]	(3.3)	8.4	(194.7)
Judicial Division	**(0.1)**[1]	4.4[1]	(0.2)	(0.1)	2.6	23.9
DPS Division[4]	**24.0**[1]	48.8[1]	37.3	48.7	65.5	463.1
Total Division Trust Funds	**$132.9**	**$450.0**	**$195.2**	**$249.6**	**$380.9**	**$5,501.8**
HCTF	**($1.0)**	($0.9)	($5.0)[3]	($3.6)	$0.1	($90.0)
DPS HCTF[4]	**(3.5)**	(2.9)	(2.6)	(2.2)	(1.6)	(17.6)
Total OPEB Trust Funds	**($4.5)**	**($3.8)**	**($7.6)**	**($5.8)**	**($1.5)**	**($107.6)**

1 Includes contributions from a nonemployer contributing entity as required by C.R.S. § 24-51-412 *et seq.*

2 The State and School Divisions merged July 1, 1997, and separated on January 1, 2006.

3 Includes the receipt of the disaffiliation payment for Cunningham Fire Protection District. See “2017 Changes in Plan Provisions Since 2016,” in Note 1 of the Notes to the RSI—Division Trust Funds for more information.

4 The DPS Division and DPS HCTF were established on January 1, 2010.

Amortization of Unfunded Actuarial Accrued Liabilities

The table below shows the amortization periods for the Division Trust Funds and Health Care Trust Funds for the prior and current valuation year. The amortization periods determined as of the December 31, 2019, actuarial valuation are shown prior to and after consideration of the contribution provisions enacted under HB 20-1379 and HB 20-1394:

	Actuarial Funding Valuation Results		
Trust Fund	2019 Amortization Period After Consideration of HB 20-1379 and HB 20-1394	2019 Amortization Period	2018 Amortization Period
State Division	**27 Years**	**27 Years**	35 Years
School Division	**28 Years**	**27 Years**	37 Years
Local Govt Division	**22 Years**	**22 Years**	37 Years
Judicial Division	**16 Years**	**16 Years**	23 Years
DPS Division	**25 Years**	**24 Years**	Infinite
HCTF	**20 Years**	**20 Years**	25 Years
DPS HCTF	**6 Years**	**6 Years**	8 Years

The amortization periods for the Judicial Division consider the future additional contributions of Amortization Equalization Disbursement (AED) and Supplemental Amortization Equalization Disbursement (SAED) which began in 2019 with continued increases scheduled through 2023. Additionally, no adjustment has been made to the DPS Division for the current PCOP offset. However, considering anticipated reductions in the future PCOP offset to DPS employer contribution requirements for the cost of certain PCOPs as currently structured, the realized amortization period is expected to be lower if the DPS Division’s statutory employer contribution amounts are maintained at their current level.

The amortization periods for the five Division Trust Funds do not include the full effect of legislation enacted in 2006, 2010, and 2018. This legislation includes plan changes designed to lower the normal cost over time as new members are added to PERA’s population, and to allow a greater proportion of the employers’ contribution to be used to amortize the unfunded liability. The 2018 legislation also increases future contributions to the Division Trust Funds in order to further accelerate the amortization of the unfunded liability. The decrease in amortization periods from 2018 to the baseline calculations for 2019 is primarily due to favorable investment experience during 2019, and the reduced AI cap from 1.50 percent to 1.25 percent, per annum. The first column in the table to the left reflects the impact of the revised contribution provisions enacted under HB 20-1379 and HB 20-1394.

Unless otherwise temporarily altered by statute, the amortization periods shown in the table to the left consider ongoing employer, member, AED, and SAED contributions, including any future statutory increases, and the direct distribution, where applicable.

C.R.S. § 24-51-211 states that a maximum amortization period of 30 years shall be deemed actuarially sound.

MANAGEMENT'S DISCUSSION AND ANALYSIS (UNAUDITED)

(Dollars in Thousands)

As stated by Segal in the Certification Letter on pages 141-146 in the Actuarial Section:

"The results indicate that for all Division Trust Funds, the combined employer and member contribution rates, including the direct distribution from the State, as appropriate, are sufficient to fund the normal cost for all members, and each division's unfunded actuarial accrued liability, with consideration of the amounts allocated to finance the the Annual Increase Reserve (AIR) Funds, and provide additional contributions to help finance both Health Care Trust Funds. In addition, the employer contribution rate with anticipated service purchase transfers is sufficient to eventually finance benefits to the HCTFs"

"At the direction of PERA, Segal has prepared deterministic financial projections for all Division Trust Funds with the lower cost benefit structure for new members and using the following assumptions:

- All actuarial assumptions, including achieving 7.25% investment returns are realized
- Performed on an open-group basis with assumed active membership growth, as follows:
  –For State, School and Denver Public Schools—1.25% each year
  –For Local Government and Judicial—1.00% per year

These projections[2] indicate that the goal of funding 100% of the actuarial accrued liability under the PERA revised benefit structure created by SB 18-200, is achievable within a projection period of 24 years."

Deductions from Net Position

Benefits

SUMMARY OF BENEFITS AND EXPENSES BY TRUST FUND

Trust Fund	Benefit Payments	Refunds	Disability and Life Insurance Premiums	Administrative Expenses	Other	Total Deductions
State Division	$1,637,168	$61,832	$1,965	$11,294	$2,707	$1,714,966
School Division	2,468,021	73,871	3,338	22,619	8,293	2,576,142
Local Government Division	297,447	14,761	421	2,476	3,975	319,080
Judicial Division	28,056	—	41	84	27	28,208
DPS Division	277,849	10,738	397	2,713	55	291,752
HCTF	58,221	—	—	9,290	33	67,544
DPS HCTF	3,644	—	—	477	1	4,122
Life Insurance Reserve	—	—	479	123	—	602
2019 Total	**$4,770,406**	**$161,202**	**$6,641**	**$49,076**	**$15,091**	**$5,002,416**
2018 Total	**$4,677,060**	**$168,387**	**$6,920**	**$62,446**	**$14,923**	**$4,929,736**
2017 Total	**$4,567,349**	**$158,147**	**$6,604**	**$60,711**	**$30,321**	**$4,823,132**
2016 Total	**$4,516,566**	**$147,420**	**$6,748**	**$59,508**	**$22,383**	**$4,752,625**
2015 Total	**$4,320,646**	**$162,172**	**$6,569**	**$57,461**	**$16,802**	**$4,563,650**

MANAGEMENT'S DISCUSSION AND ANALYSIS (UNAUDITED)

(Dollars in Thousands)

At the end of 2019, PERA was paying benefits to more than 125,000 retired public employees and their beneficiaries who received an average benefit of $3,153 per month (actual dollars) compared to at the end of 2018, PERA was paying benefits to more than 121,000 retired public employees and their beneficiaries who received an average benefit of $3,180 per month (actual dollars). Historical information about benefit payments, average benefit payments, and the number of retirees receiving payments and earned service credit can be found in the Statistical Section. For benefit recipients, this may be the primary source of retirement income as most PERA benefit recipients do not qualify for Social Security payments. At the end of 2019, approximately 69.3 percent (86,589) of recipients received less than $50,000 (actual dollars) a year in PERA benefits compared to 68.8 percent (83,851) at the end of 2018, as the chart below demonstrates. Slightly less than 1.7 percent of recipients received an annual benefit payment of $100,000 or more (actual dollars), 2,120 at the end of 2019 compared to 2,070 at the end of 2018. Generally, these benefit recipients had high salaries and a significant number of years of service credit.

PERA BENEFIT PAYMENTS BY DOLLAR AMOUNT OF ANNUAL BENEFIT AND NUMBER OF BENEFIT RECIPIENTS

Benefit Range[1]	2019 Number of Benefit Recipients[2]	Percent of Total Benefit Recipients	2018 Number of Benefit Recipients[3]	Percent of Total Benefit Recipients
$0 - $4,999	9,110	7.29%	8,479	6.96%
$5,000 - $9,999	10,294	8.24%	9,807	8.05%
$10,000 - $24,999	26,752	21.40%	26,010	21.34%
$25,000 - $49,999	40,433	32.34%	39,555	32.46%
$50,000 - $99,999	36,309	29.04%	35,944	29.49%
$100,000 - $149,999	1,915	1.53%	1,878	1.54%
$150,000 - $199,999	149	0.12%	143	0.12%
$200,000+	56	0.04%	49	0.04%
Total Benefit Recipients	**125,018**		**121,865**	

[1] Includes amounts paid under replacement benefit arrangements.

[2] Does not include 310 survivors.

[3] Does not include 324 survivors.

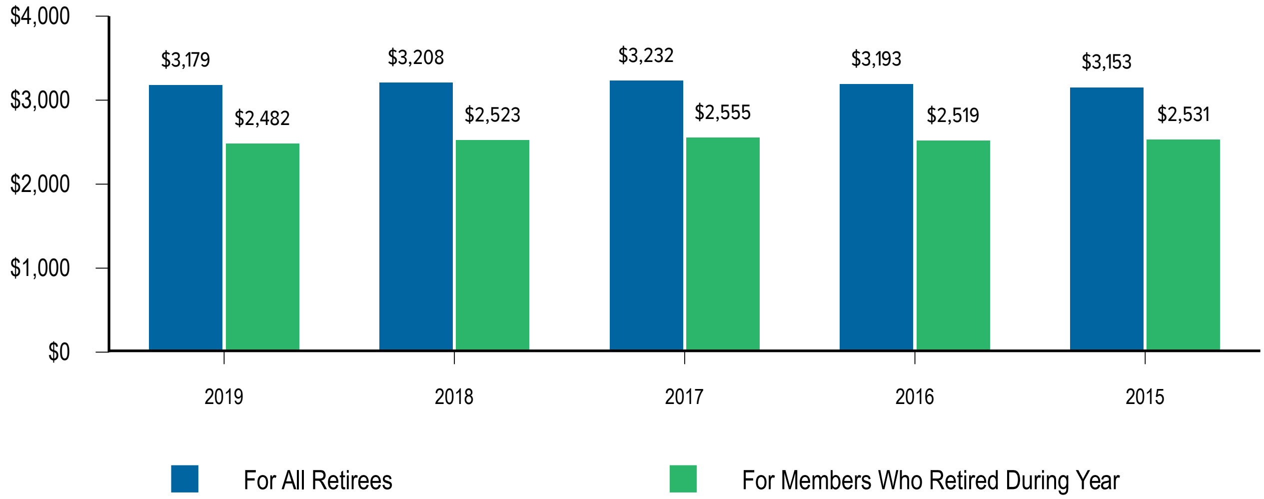
There are many changes to plan provisions that have been enacted into law since 2000 that do not have an immediate effect on PERA's financial activities and financial status, but have had a substantial effect over time. The effect of these changes are tracked and monitored by PERA's management and reported as part of the overall governance structure of PERA.

New retirees are retiring with lower benefits due to changes to retirement eligibility and benefit calculations as shown in the chart on the next page:

MANAGEMENT'S DISCUSSION AND ANALYSIS (UNAUDITED)

(Dollars in Thousands)

Average Benefits Payable Per Month (In Actual Dollars)



Other Changes

For the year ended December 31, 2019, PERA had cash and short-term investments of $684,769, an increase of $267,698 from 2018. The increase was primarily due to a greater overall need for liquidity.

For the year ended December 31, 2019, PERA had securities lending collateral of $1,312,503 and securities lending obligations of $1,312,003, an increase of $492,529 and $493,459, respectively, from 2018. The securities lending collateral and obligations increased primarily due to an increase in the securities on loan as a result of increased borrower demand.

For the year ended December 31, 2019, PERA had investment settlements and other liabilities of $301,431, a decrease of $262,504 from 2018. The decrease was primarily due to lower pending settlements of fixed income investment purchases.

For the year ended December 31, 2019, PERA had total receivables of $496,769, a decrease of $326,036 from 2018. The decrease was primarily due to lower pending settlements of fixed income investment sales.

For the year ended December 31, 2019, other additions for the Division Trust Funds decreased by $7,553. The decrease was primarily due to a one-time investment settlement income received in 2018.

Administrative expenses of the Health Care Trust Funds decreased from $21,246 in 2018 to $9,767 in 2019. The decrease was primarily due to the Medicare portion of Anthem changing to fully insured. This change resulted in reduced membership in the self-insured portion thereby lowering the administrative expense paid.

For the year ended December 31, 2019, other deductions decreased by $76 for the Health Care Trust Funds. The decrease was primarily due to lower self-insured membership counts, as a result of the change in the Medicare plan, used to calculate the health care fees related to the Affordable Care Act.

Actuarial Valuations: Accounting

Separate actuarial valuations are prepared for accounting and funding purposes for the Division Trust Funds and the Health Care Trust Funds. Calculations for purposes of financial reporting for the pension and OPEB plans are determined in accordance with GASB 67 and GASB 74, respectively.

The actuarial valuation for accounting purposes emphasizes the obligation an employer incurs to employees through the employment-exchange process. The primary purpose of the valuation for accounting purposes is to provide a consistent, standardized methodology that allows comparability of amounts and increased transparency of liabilities across U.S. plans complying with GASB 67 and GASB 74. One of the key measurements in the accounting valuation which assesses the pension liabilities for financial reporting purposes is the NPL. The NPL is the difference between the FNP and the total pension liability (TPL). Similarly, one of the key measurements which assesses the OPEB liabilities for financial reporting purposes is the NOL. The NOL is the difference between the FNP and the total OPEB liability (TOL). The individual components which collectively comprise the FNP can be found in the Statements of Fiduciary Net Position on pages 44-45.

MANAGEMENT'S DISCUSSION AND ANALYSIS (UNAUDITED)

(Dollars in Thousands)

PERA-affiliated employers who comply with GASB 68 and GASB 75 are required to report their proportionate share of the collective NPL, collective NOL, and other related amounts for the plan(s) they participate in. GASB requires that employer contributions and nonemployer contributions (if applicable) be used as a basis for the proportion.

The schedules below show the collective NPLs and NOLs as of December 31, 2019, and December 31, 2018, as well as the breakdown of changes in the collective NPLs and NOLs for 2019. The reduction of the liabilities for the Division Trust Funds is primarily due to positive investment performance during 2019.

SCHEDULE OF CHANGES IN NET PENSION LIABILITY

	State Division Trust Fund	School Division Trust Fund	Local Government Division Trust Fund	Judicial Division Trust Fund	DPS Division Trust Fund	All Division Trust Funds[1]
2018 Net pension liability	$11,378,673	$17,707,054	$1,257,213	$141,258	$1,022,901	$31,507,099
Service cost	344,666	618,937	75,305	8,774	91,764	1,139,446
Interest	1,800,848	2,938,492	373,200	32,105	301,210	5,445,855
Changes of benefit terms	(501,768)	(856,299)	(105,812)	(8,459)	(82,064)	(1,554,402)
Differences between expected and actual experience	408,792	770,676	65,687	2,732	86,001	1,333,888
Changes of assumptions or other inputs	—	—	—	—	—	—
Contributions—employer	(612,282)	(1,002,760)	(85,597)	(10,649)	(43,340)	(1,754,628)
Contributions—nonemployer	(77,088)	(127,367)	—	(1,344)	(19,201)	(225,000)
Contributions—active member (includes purchased service)	(287,297)	(462,891)	(62,823)	(5,187)	(65,496)	(883,694)
Net investment gain	(2,764,719)	(4,676,607)	(792,219)	(61,719)	(632,669)	(8,927,933)
Administrative expense	11,294	22,619	2,476	84	2,713	39,186
Other	2,685	7,929	3,961	(6,670)	(2,975)	4,930
2019 Net pension liability	**$9,703,804**	**$14,939,783**	**$731,391**	**$90,925**	**$658,844**	**$26,124,747**

1 The data in this table is aggregated for informational purposes. The assets of each trust fund are for the sole purpose of its members and cannot be used by another fund.

SCHEDULE OF CHANGES IN NET OPEB LIABILITY

	Health Care Trust Fund	DPS Health Care Trust Fund	All Health Care Trust Funds[1]
2018 Net OPEB liability	$1,360,542	$45,170	$1,405,712
Service cost	18,159	1,342	19,501
Interest	117,840	4,970	122,810
Changes of benefit terms	—	—	—
Differences between expected and actual experience	(224,212)	(2,070)	(226,282)
Changes of assumptions or other inputs	2,006	—	2,006
Contributions—employer	(92,011)	(7,649)	(99,660)
Purchased service transfers	(4,484)	(36)	(4,520)
Net investment gain	(53,867)	(4,892)	(58,759)
Administrative expense[2]	2,492	154	2,646
Other	(2,467)	(152)	(2,619)
2019 Net OPEB liability	**$1,123,998**	**$36,837**	**$1,160,835**

1 The data in this table is aggregated for informational purposes. The assets of each trust fund are for the sole purpose of its members and cannot be used by another fund.

2 Excludes administrative and other health care claims processing fees.

MANAGEMENT'S DISCUSSION AND ANALYSIS (UNAUDITED)

(Dollars in Thousands)

Additional information regarding the net pension liabilities and net OPEB liabilities, assumptions used to determine these liabilities, sensitivity analysis of pension liabilities based on different discount rates, sensitivity analysis based on different discount and health care trend rates, and development of the investment rate of return assumption can be found in Notes 10 and 11 of the Notes to the Financial Statements.

Defined Contribution and Deferred Compensation Plans

Comparative Financial Statements

PERA administers two defined contribution plans and a deferred compensation plan. Below and to the right are the comparative condensed statements of fiduciary net position and changes in fiduciary net position for the Voluntary Investment Program (PERAPlus 401(k) Plan), Defined Contribution Retirement Plan (DC Plan), and Deferred Compensation Plan (PERAPlus 457 Plan). This information has been derived from PERA's audited financial statements. While the annual changes in FNP can provide meaningful insight into the financial activities and financial status of PERA, long-term views and trend analysis are critical factors in reporting and understanding the financial status of the plans.

DEFINED CONTRIBUTION AND DEFERRED COMPENSATION PLANS FIDUCIARY NET POSITION
As of December 31

	2019	2018	% Chg
Assets			
Cash and short-term investments	**$38,047**	$33,070	15.0%
Securities lending collateral	**111,317**	21,772	411.3%
Receivables	**101,728**	107,788	(5.6%)
Investments, at fair value	**4,813,786**	3,955,337	21.7%
Total assets	**5,064,878**	4,117,967	23.0%
Liabilities			
Investment settlements and other liabilities	**25,233**	30,101	(16.2%)
Securities lending obligations	**111,299**	21,729	412.2%
Total liabilities	**136,532**	51,830	163.4%
Fiduciary net position	**$4,928,346**	**$4,066,137**	**21.2%**

DEFINED CONTRIBUTION AND DEFERRED COMPENSATION PLANS CHANGES IN FIDUCIARY NET POSITION
For the Years Ended December 31

	2019	2018	% Chg
Additions			
Employer contributions	**$20,917**	$18,639	12.2%
Member contributions	**217,637**	200,743	8.4%
Investment income (loss)	**912,712**	(228,294)	499.8%
Other	**3,042**	2,907	4.6%
Total additions	**1,154,308**	(6,005)	19,322.4%
Deductions			
Refunds	**283,772**	271,974	4.3%
Administrative expenses	**5,777**	5,223	10.6%
Other	**2,550**	2,520	1.2%
Total deductions	**292,099**	279,717	4.4%
Change in fiduciary net position	**862,209**	(285,722)	401.8%
Fiduciary net position			
Beginning of year	**4,066,137**	4,351,859	(6.6%)
End of year	**$4,928,346**	**$4,066,137**	**21.2%**

Investments

Investments for the two defined contribution plans and the deferred compensation plan are managed in a single investment pool. Underlying investments are grouped into one of 16 white label PERAdvantage funds which participants can choose to contribute to and/or make transfers from on a daily basis. In addition, participants can choose to select their own investments by transferring funds into a TD Ameritrade Self-Directed Brokerage Account. The PERAdvantage investments provide diversification and cover a wide risk/return spectrum within each of the seven primary investment options and nine target retirement date funds. The target retirement date funds are broadly diversified across global asset classes and automatically adjust the underlying asset allocation to become more conservative over time. By investing in a single target retirement date fund, participants may capture diversified investment opportunities without having to manage multiple funds. More information about investment options and results can be found in the Investment Section on pages 133-138.

MANAGEMENT'S DISCUSSION AND ANALYSIS (UNAUDITED)

(Dollars in Thousands)

For the year ended December 31, 2019, the defined contribution and deferred compensation plans net investment income changed from a loss of $228,294 in 2018 to a gain of $912,712 in 2019, an increase of $1,141,006. Investments at fair value increased by $858,449 or 21.7 percent for the year ended December 31, 2019. The increase was primarily due to positive investment returns arising from global equity markets. Additional information on longer-term performance and benchmarks for the three- and five-year periods for each investment class can be found in the Investment Section.

Plan Fees

Plan administrative fees consist of a flat $1.00 (actual dollars) per month per plan for all participants and an asset-based fee of up to 0.03 percent. Participants also pay asset-based investment management fees which vary for each investment option. As a result of PERAdvantage U.S. Small and Mid Cap Stock Fund and PERAdvantage Socially Responsible Investment Fund restructures in 2019, asset based fees were reduced by 28 and 14 basis points respectively, as shown in the table below. See "2019 Changes" in the Investment Section on page 135 for additional information.

Fund	2019	2018
PERAdvantage Capital Preservation Fund	0.24%	0.24%
PERAdvantage Fixed Income Fund	0.21%	0.23%
PERAdvantage Real Return Fund	0.20%	0.20%
PERAdvantage U.S. Large Cap Stock Fund	0.08%	0.08%
PERAdvantage International Stock Fund	0.30%	0.31%
PERAdvantage U.S. Small and Mid Cap Stock Fund	0.18%	0.46%
PERAdvantage Socially Responsible Investment Fund	0.23%	0.37%
PERAdvantage Target Retirement Funds	0.10%	0.10%

Note: Fees shown include both administrative fees and investment management fees. Participants who have a Self-Directed Brokerage Account pay an annual $50 (actual dollars) self-directed brokerage fee, with no asset-based administrative fee (revenue sharing offsets administrative fees).

Securities Lending

For the year ended December 31, 2019, the securities lending collateral and securities lending obligations in the defined contribution and deferred compensation plans increased by $89,545 and $89,570, respectively, from 2018. The securities lending collateral and obligations were higher due to an increase in the market value of securities on loan due to additional investment portfolios added to the securities lending program. See information about securities lending transactions in Note 5 of the Notes to the Financial Statements on pages 69-70.

Plan Participants and Contributions

In 2019, overall participation in the PERAPlus 401 (k) Plan, DC Plan, and PERAPlus 457 Plan increased by 1,236 participants from 2018. The following table shows number of participants in each plan at the end of fiscal years 2019 and 2018.

Plan	2019	2018	Change
PERAPlus 401(k) Plan	**68,920**	68,700	220
DC Plan	**6,939**	6,363	576
PERAPlus 457 Plan	**18,919**	18,479	440
Total	**94,778**	**93,542**	**1,236**

The table below shows the breakdown of the number of participant accounts for the specified ranges in contributions recognized during 2019 within the PERAPlus 401(k) Plan and PERAPlus 457 Plan. See current annual contribution limits in Note 8 of the Notes to the Financial Statements on pages 75-77.

	PERAPlus 401(k) Plan		PERAPlus 457 Plan	
Annual contribution ranges (actual dollars)	2019	2018	2019	2018
$0 - $5,000	20,307	20,656	7,237	7,339
$5,001 - $10,000	3,515	3,411	1,151	1,066
$10,001 - $15,000	1,320	1,296	530	503
$15,001 and above	2,265	2,173	1,614	1,510

Distributions

Participants can take normal distributions when they reach a certain age depending on the plan, in-service withdrawals and transfer of funds after termination of employment. For the year ended December 31, 2019, the defined contribution and deferred compensation plans had refunds of $283,772, an increase of $11,798 from 2018. The increase was primarily due to an increase in participant distributions. See Note 8 of the Notes to the Financial Statements for additional information about allowable in-service withdrawals in each plan.

Other Significant Matters

In 2020, Governor Polis signed two bills that impact PERA. HB 20-1379 suspends the $225,000 (actual dollars) direct distribution payment for the State's 2020-2021 fiscal year. HB 20-1394 adjusts member and employer contributions for the Judicial Division during the State’s 2020-2021 and 2021-2022 fiscal years.

Please see Note 12 of the Notes to the Financial Statements for further details and information on this and other subsequent events.

STATEMENTS OF FIDUCIARY NET POSITION

As of December 31, 2019

(Dollars in Thousands)

	State Division Trust Fund	School Division Trust Fund	Local Government Division Trust Fund	Judicial Division Trust Fund	Denver Public Schools Division Trust Fund	Total Defined Benefit Pension Plans
Assets						
Cash and short-term investments						
Cash and short-term investments	$209,607	$356,722	$60,361	$4,765	$48,070	$679,525
Securities lending collateral	401,755	683,732	115,695	9,133	92,136	1,302,451
Total cash and short-term investments	611,362	1,040,454	176,056	13,898	140,206	1,981,976
Receivables						
Benefit	71,476	71,181	7,797	2,221	4,642	157,317
Interfund	223	380	65	5	51	724
Investment settlements and income	87,954	149,685	25,328	1,999	20,172	285,138
Total receivables	159,653	221,246	33,190	4,225	24,865	443,179
Investments, at fair value						
Global equity	8,985,946	15,292,842	2,587,726	204,272	2,060,782	29,131,568
Fixed income	3,447,652	5,867,429	992,837	78,373	790,664	11,176,955
Private equity	1,291,510	2,197,972	371,922	29,359	296,187	4,186,950
Real estate	1,418,101	2,413,413	408,377	32,237	325,220	4,597,348
Opportunity fund	560,029	953,092	161,274	12,731	128,434	1,815,560
Multi-asset class funds	—	—	—	—	—	—
Self-directed brokerage	—	—	—	—	—	—
Total investments, at fair value	15,703,238	26,724,748	4,522,136	356,972	3,601,287	50,908,381
Capital assets, at cost, net of accumulated depreciation of $27,797	4,082	8,315	910	30	978	14,315
Total assets	16,478,335	27,994,763	4,732,292	375,125	3,767,336	53,347,851
Liabilities						
Investment settlements and other liabilities	83,870	139,894	23,679	1,762	18,809	268,014
Securities lending obligations	401,602	683,472	115,651	9,129	92,101	1,301,955
Interfund	—	—	—	—	—	—
Total liabilities	485,472	823,366	139,330	10,891	110,910	1,569,969
Commitments and contingencies (Note 7)						
Fiduciary net position restricted for pensions and other postemployment benefits, and held in trust for deferred compensation benefits and private purpose trust fund participants	**$15,992,863**	**$27,171,397**	**$4,592,962**	**$364,234**	**$3,656,426**	**$51,777,882**

The accompanying notes are an integral part of these financial statements.

STATEMENTS OF FIDUCIARY NET POSITION

As of December 31, 2019

(Dollars in Thousands)

Voluntary Investment Program	Defined Contribution Retirement Plan	Deferred Compensation Plan	Health Care Trust Fund	Denver Public Schools Health Care Trust Fund	Life Insurance Reserve	Combined Total
$24,602	$5,151	$8,294	$4,512	$420	$312	**$722,816**
80,563	5,526	25,228	8,647	805	600	**1,423,820**
105,165	10,677	33,522	13,159	1,225	912	**2,146,636**
64,928	2,427	16,258	49,128	2,257	—	**292,315**
—	—	—	5	—	—	**729**
13,441	829	3,845	1,893	176	131	**305,453**
78,369	3,256	20,103	51,026	2,433	131	**598,497**
2,082,480	96,513	476,560	193,416	18,004	13,392	**32,011,933**
590,160	25,461	243,138	74,208	6,908	5,138	**12,121,968**
—	—	—	27,798	2,588	1,925	**4,219,261**
—	—	—	30,524	2,841	2,113	**4,632,826**
—	—	—	12,054	1,122	835	**1,829,571**
885,577	131,638	226,114	—	—	—	**1,243,329**
30,467	4,930	20,748	—	—	—	**56,145**
3,588,684	258,542	966,560	338,000	31,463	23,403	**56,115,033**
—	—	—	—	—	—	**14,315**
3,772,218	272,475	1,020,185	402,185	35,121	24,446	**58,874,481**
18,380	942	5,182	29,031	1,680	2,706	**325,935**
80,538	5,526	25,235	8,644	805	599	**1,423,302**
493	67	169	—	—	—	**729**
99,411	6,535	30,586	37,675	2,485	3,305	**1,749,966**
$3,672,807	**$265,940**	**$989,599**	**$364,510**	**$32,636**	**$21,141**	**$57,124,515**

STATEMENTS OF CHANGES IN FIDUCIARY NET POSITION

For the Year Ended December 31, 2019

(Dollars in Thousands)

	State Division Trust Fund	School Division Trust Fund	Local Government Division Trust Fund	Judicial Division Trust Fund	Denver Public Schools Division Trust Fund	Total Defined Benefit Pension Plans
Additions						
Contributions						
Employers	$612,282	$1,002,760	$85,597	$10,649	$43,340	$1,754,628
Nonemployer	77,088	127,367	—	1,344	19,201	225,000
Members	257,803	436,899	55,003	4,575	62,961	817,241
Purchased service	29,494	25,992	7,820	612	2,535	66,453
Total contributions	976,667	1,593,018	148,420	17,180	128,037	2,863,322
Investment income						
Net appreciation in fair value of investments	2,465,215	4,169,424	706,325	55,007	564,109	7,960,080
Interest	97,829	165,664	28,056	2,193	22,394	316,136
Dividends	166,572	282,074	47,771	3,733	38,130	538,280
Real estate, private equity, and opportunity fund net operating income	83,288	141,042	23,885	1,867	19,066	269,148
Less investment expense	(50,398)	(85,343)	(14,453)	(1,130)	(11,536)	(162,860)
Net income from investing activities	2,762,506	4,672,861	791,584	61,670	632,163	8,920,784
Securities lending income	2,482	4,203	712	55	568	8,020
Less securities lending expense	(269)	(457)	(77)	(6)	(62)	(871)
Net income from securities lending	2,213	3,746	635	49	506	7,149
Net investment income	2,764,719	4,676,607	792,219	61,719	632,669	8,927,933
Other additions	22	364	14	6,697	3,030	10,127
Total additions	3,741,408	6,269,989	940,653	85,596	763,736	11,801,382
Deductions						
Benefits						
Benefits paid to retirees/cobeneficiaries	1,622,172	2,452,143	294,858	27,705	276,314	4,673,192
Benefits paid to survivors	14,996	15,878	2,589	351	1,535	35,349
Benefits paid on behalf of health care participants	—	—	—	—	—	—
Total benefits	1,637,168	2,468,021	297,447	28,056	277,849	4,708,541
Refunds of contribution accounts, including match and interest	61,832	73,871	14,761	—	10,738	161,202
Disability and life insurance premiums	1,965	3,338	421	41	397	6,162
Administrative expenses	11,294	22,619	2,476	84	2,713	39,186
Other deductions	2,707	8,293	3,975	27	55	15,057
Total deductions	1,714,966	2,576,142	319,080	28,208	291,752	4,930,148
Net increase in fiduciary net position	**2,026,442**	**3,693,847**	**621,573**	**57,388**	**471,984**	**6,871,234**
Fiduciary net position restricted for pensions and other postemployment benefits, and held in trust for deferred compensation benefits and private purpose trust fund participants						
Beginning of year	13,966,421	23,477,550	3,971,389	306,846	3,184,442	44,906,648
End of year	**$15,992,863**	**$27,171,397**	**$4,592,962**	**$364,234**	**$3,656,426**	**$51,777,882**

The accompanying notes are an integral part of these financial statements.

STATEMENTS OF CHANGES IN FIDUCIARY NET POSITION

For the Year Ended December 31, 2019

(Dollars in Thousands)

Voluntary Investment Program	Defined Contribution Retirement Plan	Deferred Compensation Plan	Health Care Trust Fund	Denver Public Schools Health Care Trust Fund	Life Insurance Reserve	Combined Total
$5,701	$15,184	$32	$92,011	$7,649	$—	**$1,875,205**
—	—	—	—	—	—	**225,000**
140,519	12,967	64,151	—	—	—	**1,034,878**
—	—	—	—	—	—	**66,453**
146,220	28,151	64,183	92,011	7,649	—	**3,201,536**
653,069	46,441	150,924	47,979	4,354	3,476	**8,866,323**
11,442	555	4,976	1,923	176	139	**335,347**
37,355	1,726	8,581	3,275	299	236	**589,752**
—	—	—	1,637	150	118	**271,053**
(1,995)	(181)	(689)	(991)	(91)	(71)	**(166,878)**
699,871	48,541	163,792	53,823	4,888	3,898	**9,895,597**
449	20	98	49	4	3	**8,643**
(46)	(2)	(11)	(5)	—	—	**(935)**
403	18	87	44	4	3	**7,708**
700,274	48,559	163,879	53,867	4,892	3,901	**9,903,305**
2,443	21	578	6,984	188	—	**20,341**
848,937	76,731	228,640	152,862	12,729	3,901	**13,125,182**
—	—	—	—	—	—	**4,673,192**
—	—	—	—	—	—	**35,349**
—	—	—	58,221	3,644	—	**61,865**
—	—	—	58,221	3,644	—	**4,770,406**
213,010	15,445	55,317	—	—	—	**444,974**
—	—	—	—	—	479	**6,641**
3,592	997	1,188	9,290	477	123	**54,853**
1,656	135	759	33	1	—	**17,641**
218,258	16,577	57,264	67,544	4,122	602	**5,294,515**
630,679	**60,154**	**171,376**	**85,318**	**8,607**	**3,299**	7,830,667
3,042,128	205,786	818,223	279,192	24,029	17,842	**49,293,848**
$3,672,807	**$265,940**	**$989,599**	**$364,510**	**$32,636**	**$21,141**	**$57,124,515**

NOTES TO THE FINANCIAL STATEMENTS

(Dollars in Thousands)

Note 1—Plan Description

Organization

Public Employees' Retirement Association of Colorado (PERA) was established in 1931. The statute governing PERA is Title 24, Article 51 of the Colorado Revised Statutes (C.R.S.). PERA administers the following plans:

Plan Name	Type of Plan
Defined Benefit Pension Plans (Division Trust Funds)	
State Division Trust Fund	Cost-sharing multiple-employer
School Division Trust Fund	Cost-sharing multiple-employer
Local Government Division Trust Fund	Cost-sharing multiple-employer
Judicial Division Trust Fund	Cost-sharing multiple-employer
Denver Public Schools (DPS) Division Trust Fund	Single-employer
Defined Benefit Other Postemployment Benefit Plans (Health Care Trust Funds)	
Health Care Trust Fund (HCTF)	Cost-sharing multiple-employer
Denver Public Schools Health Care Trust Fund (DPS HCTF)	Single-employer
Defined Contribution Plans	
Voluntary Investment Program	Multiple-employer
Defined Contribution Retirement Plan	Multiple-employer
Deferred Compensation Plan	
Deferred Compensation Plan	Multiple-employer
Private Purpose Trust Fund	
Life Insurance Reserve	Multiple-employer

Responsibility for the organization and administration of these plans rests with the PERA Board of Trustees (Board). The Board is composed of the following 16 Trustees:

- Nine members elected by members from their respective Divisions to serve on the Board for four–year terms; four from the School Division, three from the State Division, one from the Local Government Division, and one from the Judicial Division.
- Two retirees elected by retirees to serve on the Board for four-year terms.
- Three Trustees appointed by the Governor and confirmed by the State Senate to serve on the Board for four-year terms.
- The State Treasurer.
- One ex officio (non-voting) member or retiree elected by members and retirees of the DPS Division to serve on the Board for a four-year term.

Listed below is the number of active participating employers for the five Division Trust Funds. Guidance under the Governmental Accounting Standards Board (GASB) Statement No. 67 classifies a primary government and its component units as one employer.

Division	As of December 31, 2019[1]
State	32
School	235
Local Government	141
Judicial	2
DPS	1
Total employers	**411**

[1] This employer count is presented for purposes of complying with GASB 67 only. For all other purposes, the definition of an employer is governed by Title 24, Article 51 of the C.R.S., PERA's Rules, 8 CCR 1502-1, and, if applicable, the employer's affiliation agreement with PERA.

NOTES TO THE FINANCIAL STATEMENTS

(Dollars in Thousands)

Membership—Division Trust Funds-Defined Benefit Pension Plans

Benefit recipients and members of PERA consisted of the following as of December 31, 2019, with comparative combined totals for 2018:

	State Division	School Division	Local Government Division	Judicial Division	DPS Division	2019	2018
Retirees and beneficiaries	41,305	68,523	7,951	401	7,148	**125,328**	122,189
Inactive members eligible but not yet receiving benefits	7,412	17,693	2,677	14	1,988	**29,784**	28,563
Inactive members not eligible for benefits	81,012	132,833	26,274	6	13,522	**253,647**	241,844
Active members							
Vested general employees	30,065	69,254	6,124	267	7,508	**113,218**	111,558
Vested State Troopers	672	—	—	—	—	**672**	651
Non-vested general employees	24,315	59,684	6,962	72	8,171	**99,204**	99,138
Non-vested State Troopers	200	—	—	—	—	**200**	237
Total active members	55,252	128,938	13,086	339	15,679	**213,294**	211,584
Total	**184,981**	**347,987**	**49,988**	**760**	**38,337**	**622,053**	**604,180**

Membership—Voluntary Investment Program, Defined Contribution Retirement Plan, and Deferred Compensation Plan

See Note 8.

Membership—Health Care Trust Funds

See Note 9.

Benefit Provisions—Division Trust Funds

Plan benefits are specified in Title 24, Article 51 of the C.R.S. and applicable provisions of the federal Internal Revenue Code (IRC). Colorado State law provisions may be amended from time to time by the Colorado General Assembly.

The Colorado General Assembly passed significant pension reform through Senate Bill (SB) 18-200: *Concerning Modifications To the Public Employees' Retirement Association Hybrid Defined Benefit Plan Necessary To Eliminate with a High Probability the Unfunded Liability of the Plan Within the Next Thirty Years.* The bill was signed into law by Governor Hickenlooper on June 4, 2018. SB 18-200 makes changes to certain benefit provisions of the plans administered by PERA. Some, but not all, of these changes were in effect at the end of 2019.

Plan Eligibility

All employees of PERA employers who work in a position eligible for PERA membership must be enrolled in the PERA Hybrid Defined Benefit Plan, except for employees who are hired into a position that makes them eligible for a choice between enrolling in the PERA Defined Benefit Plan or the PERA Defined Contribution Retirement Plan (PERAChoice). PERAChoice eligibility applies to certain new employees of State agencies and departments, most community colleges, and the District Attorney within each Judicial District. If authorized by the county and the District Attorney, the attorneys within that Judicial District may also have access to PERAChoice. Pursuant to C.R.S. § 24-51-1501(4), effective January 1, 2019, PERAChoice was extended to certain new employees in the Local Government Division and certain new classified employees at State Colleges and Universities. If an eligible employee does not make a choice of which plan to participate in within 60 days of the starting date of employment, the employee is automatically enrolled in the PERA Defined Benefit Plan. Between the second and fifth year of participation in their original plan, employees may make a one-time, irrevocable election to switch to the other plan. After the fifth year of participation, this option to switch plan participation no longer exists.

Some positions within PERA-affiliated employers are not eligible for PERA membership and may be covered by another separate retirement program.

Benefit Provisions

The Division Trust Funds have various benefit provisions depending upon the member's date of hire or upon the member's date of retirement. The differences in plan benefit provisions are detailed in the following pages in this Note as of December 31, 2019. On January 1, 2010, the Denver Public Schools Retirement System (DPSRS) merged with PERA. On that date, all liabilities and assets of DPSRS transferred to and became liabilities and assets of the DPS Division of PERA. The benefit provisions of DPSRS were incorporated into PERA as the DPS benefit structure. The benefit provisions of existing members of PERA on the merger date and all new hires post-merger date are identified as the PERA benefit structure.

NOTES TO THE FINANCIAL STATEMENTS

(Dollars in Thousands)

Member Accounts

During 2019, most members, with the exception of members in the Local Government Division and members classified as State Troopers (as defined in the next paragraph), contributed 8.00 percent of their PERA-includable salary to their member accounts from January 1 to June 30 and contributed 8.75 percent from July 1 to December 31. State Troopers and Colorado Bureau of Investigation (CBI) agents contributed 10.00 percent from January 1 to June 30 and contributed 10.75 percent from July 1 to December 31. Members of the Local Government Division contributed 8.00 percent of their PERA-includable salary during 2019.

"State Trooper" means an employee of the Colorado State Patrol or CBI vested with the powers of peace officers. For new members, "State Trooper" also includes a county sheriff, undersheriff, deputy sheriff, noncertified deputy sheriff, or detention officer hired by a Local Government Division employer on or after January 1, 2020, and a corrections officer classified as I through IV by a State Division employer on or after January 1, 2020.

State law authorizes the Board to determine annually the interest to be credited to member accounts, but in no event may the Board specify a rate that exceeds 5 percent. Effective January 1, 2009, the annual rate was set at 3 percent and has been reconfirmed each November since adoption.

Service Credit

Members earn service credit for each month of work performed as an employee of a PERA-affiliated employer for which salary is earned for such services.

A full month of service credit is earned for each month of work where the salary earned by the employee is equal to or greater than 80 multiplied by the federal minimum hourly wage in effect for that month. Earned salary which is less than this amount results in a partial month of service credit.

Eligible members may purchase additional service credit based upon (1) other employment that is not covered by PERA or another retirement program or (2) the service credit forfeited as the result of a withdrawn PERA member account. Such service credit purchases are subject to limits in State and federal law. The amounts used to purchase service credit are credited to the member's account and may include tax-paid funds and eligible rollovers of tax-deferred funds. Such amounts are eligible for an interest accrual, but no match if the member account is refunded in a lump-sum distribution.

Refund or Distribution Provisions

Upon termination of employment with all PERA employers, members have the following options concerning their member account:

- Leave the account invested in the Division Trust Funds for a future distribution or retirement benefit; however, a distribution must begin by April 1 in the year following the year in which the member reaches age 70½. Due to the passage of the federal SECURE Act of 2019, for members who have not yet reached 70½ on December 31, 2019, the member must begin a distribution by April 1 in the year following the year in which the member reaches age 72, rather than age 70½.
- Request a distribution of the member account plus an applicable match. Such a distribution cancels the refunding member's service credit and any benefit entitlements associated with the account. The distribution may be taken as cash with the resulting tax consequences or as a rollover to an eligible qualified plan.

Matching Amounts

Members under the PERA benefit structure who withdraw their accounts on or after reaching retirement eligibility or age 65 receive their member account plus a 100 percent match on eligible amounts. For members under the PERA benefit structure who withdraw their accounts before reaching retirement eligibility, all contributions received prior to January 1, 2011, are eligible for the 50 percent match regardless of how much service credit the member has earned. However, contributions received after January 1, 2011, will not be eligible for the 50 percent match until the member earns five years of service credit.

Members under the DPS benefit structure who terminated employment on or after January 1, 2001, and withdraw their accounts on or after reaching retirement eligibility receive their member account plus a 100 percent match on eligible amounts. Members under the DPS benefit structure who withdraw their accounts before reaching retirement eligibility receive a refund of their member accounts, but do not receive any match.

Members reaching retirement eligibility who choose to take a retirement benefit are entitled to a minimum monthly benefit which incorporates the member's account plus a 100 percent match on eligible amounts, annuitized into a monthly benefit using PERA's expected rate of return.

NOTES TO THE FINANCIAL STATEMENTS

(Dollars in Thousands)

Highest Average Salary

Plan benefits, described below, generally are calculated as a percentage of the member's three- or five- year Highest Average Salary (HAS). The following conditions apply to the HAS calculation:

- ***For all members of the PERA benefit structure, except judges, who were eligible to retire as of January 1, 2011, who were hired before January 1, 2007, and who retire on or after January 1, 2009:*** HAS is determined by the highest annual salaries associated with four periods of 12 consecutive months of service credit. The four 12 month periods selected do not have to be consecutive nor do they have to include the last four years of membership. The lowest of the four periods becomes a base year used as a starting point for a 15 percent cap on annual salary increases for the next three periods used to determine the applicable HAS. This salary cap applies regardless of when the annual salaries used in the HAS calculation occurred.
- ***For all members of the PERA benefit structure, except judges, who were not eligible to retire as of January 1, 2011, or members of the PERA benefit structure who are hired on or after January 1, 2007, who have at least five years of service credit on December 31, 2019:*** HAS is determined by the highest annual salaries associated with four periods of 12 consecutive months of service credit. The four 12-month periods selected do not have to be consecutive nor do they have to include the last four years of membership. The lowest of the four periods becomes a base year used as a starting point for an 8 percent cap on annual salary increases for the next three periods used to determine the applicable HAS. This salary cap applies regardless of when the annual salaries used in the HAS calculation occurred.
- ***For all members of the PERA and DPS benefit structures, except judges, regardless of hire date, who do not have at least five years of service credit on December 31, 2019:*** HAS is determined by the highest annual salaries associated with six periods of 12 consecutive months of service credit. The six 12-month periods selected do not have to be consecutive nor do they have to include the last six years of membership. The lowest of the six periods becomes a base year used as a starting point for an 8 percent cap on annual salary increases for the next five periods used to determine the applicable HAS. This salary cap applies regardless of when the annual salaries used in the HAS calculation occurred.
- ***For members of the Judicial Division Trust Fund (judges) who have at least five years of service credit on December 31, 2019:*** HAS is one-twelfth of the highest annual salary associated with one period of 12 consecutive months of service credit.
- ***For members of the Judicial Division Trust Fund (judges) who do not have at least five years of service credit on December 31, 2019, regardless of the date of hire:*** HAS is determined by the highest annual salaries associated with four periods of 12 consecutive months of service credit. The four 12-month periods selected do not have to be consecutive nor do they have to include the last four years of membership. The lowest of the four periods becomes a base year used as a starting point for an 8 percent cap on annual salary increases for the next three periods used to determine the applicable HAS. This salary cap applies regardless of when the annual salaries used in the HAS calculation occurred.
- ***For members of the DPS benefit structure who are eligible to retire as of January 1, 2011:*** HAS is the average monthly salary of the 36 months of earned service having the highest salaries.
- ***For members of the DPS benefit structure who are not eligible to retire as of January 1, 2011, and have at least five years of service credit on December 31, 2019:*** HAS is determined by the highest annual salaries associated with four periods of 12 consecutive months of service credit. The four 12-month periods selected do not have to be consecutive nor do they have to include the last four years of membership. The lowest of the four periods becomes a base year used as a starting point for an 8 percent cap on annual salary increases for the next three periods used to determine the applicable HAS. This salary cap applies regardless of when the annual salaries used in the HAS calculation occurred.

Service Retirement Benefits for Members Other Than State Troopers—PERA Benefit Structure

Upon termination of PERA-covered employment and reaching eligibility for service retirement benefits, a member may begin receipt of benefits as shown below and on the next page.

Members Hired Before July 1, 2005, With Five Years of Service Credit on January 1, 2011

Age Requirement (in years)	Service Credit Requirement (in years)
50	30
55	Age and Service = 80 or more
60	20
65	5
65	Less than 5 but 60 payroll postings[1]

[1] Retiring members who are age 65 and have less than five years of service credit and less than 60 payroll postings will receive a service retirement benefit under the Money Purchase Formula only.

NOTES TO THE FINANCIAL STATEMENTS

(Dollars in Thousands)

Members Hired on or After July 1, 2005, But Before January 1, 2007, With Five Years of Service Credit on January 1, 2011

Age Requirement (in years)	Service Credit Requirement (in years)
Any Age	35
55	Age and Service = 80 or more
60	20
65	5
65	Less than 5 but 60 payroll postings[1]

[1] Retiring members who are age 65 and have less than five years of service credit and less than 60 payroll postings will receive a service retirement benefit under the Money Purchase Formula only.

Members Hired on or After January 1, 2007, But Before January 1, 2011, With Five Years of Service Credit on January 1, 2011

Age Requirement (in years)	Service Credit Requirement (in years)
Any Age	35
55	30
55	Age and Service = 85 or more
60	25
65	5
65	Less than 5 but 60 payroll postings[1]

[1] Retiring members who are age 65 and have less than five years of service credit and less than 60 payroll postings will receive a service retirement benefit under the Money Purchase Formula only.

Members Hired Before January 1, 2011, With Less Than Five Years of Service Credit on January 1, 2011

Age Requirement (in years)	Service Credit Requirement (in years)
Any Age	35
55	30
55	Age and Service = 85 or more
60	25
65	5
65	Less than 5 but 60 payroll postings[1]

[1] Retiring members who are age 65 and have less than five years of service credit and less than 60 payroll postings will receive a service retirement benefit under the Money Purchase Formula only.

Members Hired on or After January 1, 2011, But Before January 1, 2017, or Hired on or After January 1, 2017, But Before January 1, 2020, Whose Most Recent 10 Years of Service are in the School or DPS Divisions

Age Requirement (in years)	Service Credit Requirement (in years)
Any Age	35
58	30
58	Age and Service = 88 or more
60	28
65	5
65	Less than 5 but 60 payroll postings[1]

[1] Retiring members who are age 65 and have less than five years of service credit and less than 60 payroll postings will receive a service retirement benefit under the Money Purchase Formula only.

Members Hired on or After January 1, 2017, But Before January 1, 2020, Whose Most Recent 10 Years of Service are not in the School or DPS Divisions

Age Requirement (in years)	Service Credit Requirement (in years)
Any Age	35
60	30
60	Age and Service = 90 or more
65	5
65	Less than 5 but 60 payroll postings[1]

[1] Retiring members who are age 65 and have less than five years of service credit and less than 60 payroll postings will receive a service retirement benefit under the Money Purchase Formula only.

Members Hired on or After January 1, 2020

Age Requirement (in years)	Service Credit Requirement (in years)
Any Age	35
64	30
64	Age and Service = 94 or more
65	5
65	Less than 5 but 60 payroll postings[1]

[1] Retiring members who are age 65 and have less than five years of service credit and less than 60 payroll postings will receive a service retirement benefit under the Money Purchase Formula only.

(Dollars in Thousands)

Service Retirement Benefits for State Troopers—PERA Benefit Structure

Upon termination of PERA-covered employment and reaching eligibility for service retirement benefits, a State Trooper may begin receipt of benefits as shown below.

State Troopers Hired Before January 1, 2020

Age Requirement (in years)	Service Credit Requirement (in years)
Any Age	30
50	25
55	20
60	Age and Service = 80 or more
65	5
65	Less than 5 but 60 payroll postings[1]

[1] Retiring members who are age 65 and have less than five years of service credit and less than 60 payroll postings will receive a service retirement benefit under the Money Purchase Formula only.

State Troopers Hired on or After January 1, 2020

Age Requirement (in years)	Service Credit Requirement (in years)
Any Age	35
55	25
55	Age and Service = 80 or more
65	5
65	Less than 5 but 60 payroll postings[1]

[1] Retiring members who are age 65 and have less than five years of service credit and less than 60 payroll postings will receive a service retirement benefit under the Money Purchase Formula only.

The service retirement benefit for all retiring members is the greater of the Defined Benefit Formula or the Money Purchase Formula as explained below:

- **Defined Benefit Formula**
  HAS multiplied by 2.5 percent and then multiplied by years of service credit. The service retirement benefit is limited to 100 percent of HAS.

- **Money Purchase Formula**
  Values the retiring member's account plus a 100 percent match on eligible amounts as of the member's retirement date. This amount is then annuitized into a monthly benefit using the retiring member's life expectancy, expected rates of return, and other actuarial factors.

In all cases, a service retirement benefit cannot exceed the maximum benefit amount allowed by federal law.

Reduced Service Retirement—PERA Benefit Structure

Reduced service retirement benefits are calculated in the same manner as a service retirement benefit with a reduction for each month prior to the member's first eligible date for a service retirement. The benefit calculation reduction factors applicable to members who were eligible to retire as of January 1, 2011, are specified in C.R.S. § 24-51-605.

Members and State Troopers Hired Before January 1, 2020

Age Requirement (in years)	Service Credit Requirement (in years)
50	25
50 (State Troopers only)	20
55	20
60	5

Members and State Troopers Hired on or After January 1, 2020

Age Requirement (in years)	Service Credit Requirement (in years)
55	25
55 (State Troopers only)	20
60	5

For members not eligible to retire as of January 1, 2011, the early retirement reduction factors used to determine the reduced service retirement benefit reflect an actuarial equivalent reduction.

Service Retirement Benefits—DPS Benefit Structure

Members in the DPS benefit structure are eligible to receive a monthly retirement benefit when they meet the age and service requirements listed below.

Members With Five Years of Service Credit on January 1, 2011

Age Requirement (in years)	Service Credit Requirement (in years)
50	30
55	25[1]
65	5

[1] 15 years must be earned service credit

Member With Less Than Five Years of Service Credit on January 1, 2011

Age Requirement (in years)	Service Credit Requirement (in years)
Any Age	35
55	30[1]
55	Age and Service = 85 or more[1]
60	25
65	5

[1] 20 years must be earned service credit

NOTES TO THE FINANCIAL STATEMENTS

(Dollars in Thousands)

Reduced Service Retirement Benefits—DPS Benefit Structure

Member With Five Years of Service Credit on January 1, 2011

Age Requirement (in years)	Service Credit Requirement (in years)
Less than 50	30
Less than 55	25
55	15

Member With Less Than Five Years of Service Credit on January 1, 2011

Age Requirement (in years)	Service Credit Requirement (in years)
50	25
55	20
60	5

If the member has less than five years of service credit under the DPS benefit structure, the member does not have the option to apply for a benefit and the member is only eligible for a refund of his or her account.

The service retirement benefit for all retiring members is the greater of the two calculations as explained below:

- HAS multiplied by 2.5 percent and then multiplied by years of service credit.
- $15 (actual dollars) times the first 10 years of service credit plus $20 (actual dollars) times service credit over 10 years plus a monthly amount equal to the annuitized member balance (which may include matching dollars if eligible) using the retiring member's life expectancy, expected rates of return, and other actuarial factors.

In all cases, a service retirement benefit is limited to 100 percent of HAS and cannot exceed the maximum benefit amount allowed by federal law.

Disability Program

Eligible active members, other than judges, with five or more years of earned service credit are covered by the PERA Disability Program. Judges are immediately covered under the disability program. The earned service credit requirement may be waived for State Troopers who become disabled as the result of injuries in the line of duty.

Medical determinations for the disability program are made by UNUM, PERA's disability program administrator pursuant to C.R.S. § 24-51-703. Applicants found to be disabled receive payments under one of two tiers:

- **Short-Term Disability:** Disability applicants are eligible for short-term disability payments if they are found to be mentally or physically incapacitated from performance of essential job duties after reasonable accommodation, and who are medically unable to earn at least 75 percent of their pre-disability earnings from any job, but who are not totally and permanently incapacitated from regular and substantial gainful employment. PERA's short-term disability program is an insurance product with PERA's disability program administrator, and payments are made directly to the individual from PERA's disability program administrator. The maximum income replacement is 60 percent of the member's pre-disability PERA salary for up to 22 months.
- **Disability Retirement Benefits:** Disability applicants who are found to be totally and permanently mentally or physically incapacitated from regular and substantial gainful employment are eligible for disability retirement benefits. These benefits are paid by PERA for as long as the disability retiree remains disabled. The benefit is calculated as a percentage of the disabled member's HAS using accrued, and in some cases, projected service credit.

Benefit Options

Service retirees in the PERA benefit structure and all members in either the DPS benefit structure or the PERA benefit structure who meet the requirements of a disability retirement may elect to receive their retirement or disability retirement benefits in the form of a single-life benefit payable for the retiree's lifetime only or one of two joint-life benefits payable for the lifetime of the retiree with a continuing benefit paid upon the retiree's death to the retiree's cobeneficiary. Such option designations may only be changed under limited conditions specified in State law. The options are as follows:

- *Option 1:* A single-life benefit payable for the life of the retiree and, upon the death of the retiree, no further monthly benefits are payable.
- *Option 2:* A joint-life benefit payable for the life of the retiree and, upon the death of the retiree, one-half of the benefit becomes payable to the cobeneficiary of the retiree for life. Upon the death of the cobeneficiary prior to the death of the retiree, an Option 1 benefit becomes payable to the retiree.
- *Option 3:* A joint-life benefit payable for the life of the retiree and, upon the death of the retiree, the same benefit becomes payable to the cobeneficiary of the retiree for life. Upon the death of the cobeneficiary prior to the death of the retiree, an Option 1 benefit becomes payable to the retiree.

Options 2 and 3 are reduced to be the actuarial equivalent of Option 1, to ensure equitable benefits are provided regardless of the payment option chosen.

Service retirees in the DPS benefit structure have the following options:

- *Option A:* A single-life benefit payable for the life of the retiree and, upon the death of the retiree, no further monthly benefits are payable.

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- *Option B:* A single-life benefit, reduced from an Option A benefit to provide benefits to designated beneficiaries for a fixed period of time after retirement. As part of the retirement calculation, a guaranteed payment period is determined and if the retiree dies before the guaranteed period ends, the benefit will continue to the Option B beneficiary(ies) for the remainder of the guaranteed period. If the death of the retiree occurs after the guaranteed period, the benefit ends.
- *Option P2:* A joint-life benefit payable for the life of the retiree and, upon the death of the retiree, one-half of the benefit becomes payable to the cobeneficiary of the retiree for life. Upon the death of the cobeneficiary prior to the death of the retiree, an Option A benefit becomes payable to the retiree.
- *Option P3:* A joint-life benefit payable for the life of the retiree and, upon the death of the retiree, the same benefit becomes payable to the cobeneficiary of the retiree for life. Upon the death of the cobeneficiary prior to the death of the retiree, an Option A benefit becomes payable to the retiree.

Options B, P2, and P3 are reduced to be the actuarial equivalent of Option A, to ensure equitable benefits are provided regardless of the payment option chosen.

Survivor Benefits Program—PERA Benefit Structure

Members who have at least one year of earned service credit are covered by the PERA survivor benefits program. This one-year requirement is waived if a member's death is job-incurred.

In the event of the covered member's death, monthly survivor benefits may be paid to the qualified survivors of the deceased. Qualified survivors generally include minor children, a surviving spouse, dependent parents, or a cobeneficiary (for deceased members who were eligible for retirement at the time of death).

Monthly benefits are specified in statute and vary based upon the deceased's HAS, years of service credit, the qualified survivor to whom benefits are to be paid, and the number of qualified survivors receiving benefits.

If at the time of death, a member has less than one year of earned service credit or does not have any qualified survivors, the deceased's named beneficiary or the estate receives a lump-sum payment of the deceased member's account plus a 100 percent match on eligible amounts.

Survivor Benefits Program—DPS Benefit Structure

Active members who have at least five years of continuous service under the DPS benefit structure prior to the date of death and DPS disability retirements (prior to age 65) are covered by the survivor benefits program applicable to the DPS benefit structure.

In the event of the covered member's death, the member's qualified survivors are eligible for survivor benefits as long as the named beneficiary(ies) waive their right to receive a refund of the member's contributions. Qualified survivors generally include minor children, a surviving spouse, or dependent parents.

Monthly benefits are specified in statute and vary based upon the deceased's HAS, years of service credit, the qualified survivor to whom benefits are to be paid, and the number of qualified survivors receiving benefits.

If at the time of death, a member has not met the eligibility requirements for the DPS benefit structure survivor benefits program that are specified in statute, the member's named beneficiary(ies) will receive a lump-sum payment of the deceased member's account without a match.

Annual Increases

On an annual basis, eligible benefit recipients receive post-retirement, cost-of-living adjustments called annual increases (AI). The AI eligibility and amounts are determined by the date the retiree or deceased member began membership in PERA.

The AI provisions are explained below:

- For benefit recipients of the PERA benefit structure who began membership before January 1, 2007, and whose benefit is paid based on a retirement date prior to January 1, 2011, and benefit recipients of the DPS benefit structure whose benefit is paid based on a retirement date prior to January 1, 2011:
  - ***Payment Month:*** The AI is paid in July.
  - ***Eligibility:*** The benefit recipient has been receiving benefits for at least seven months immediately preceding the July in which the AI is to be paid.
  - ***AI Amount:*** The AI for 2019 is 0 percent and will be 1.25 percent in 2020. Thereafter, the AI is 1.25 percent per year unless it is adjusted by the automatic adjustment provision (AAP). The AAP may raise or lower the amount of the AI by up 0.25 percent if the AAP ratio of the Division Trust Funds is outside the parameters specified in C.R.S. § 24-51-413. The amount of the first AI will be prorated from the month of retirement to the first AI payment date.
- For benefit recipients of the PERA benefit structure who began membership before January 1, 2007, and whose benefit is paid based on a retirement date on or after January 1, 2011, and benefit recipients of the DPS benefit structure whose benefit is paid based on a retirement date on or after January 1, 2011, the following eligibility criteria is required:
  - ***Payment Month:*** The AI is paid in July.
  - ***Eligibility:*** For full service retirees, disability retirees, and reduced service retirees who are eligible to receive a benefit on January 1, 2011, and survivor benefit

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recipients, who already received the first AI on or before May 1, 2018, the benefit recipient has received benefit payments for the 12 months prior to the July in which the AI is to be paid.

For full service retirees, disability retirees, and reduced service retirees who are eligible to receive a benefit on January 1, 2011, and survivor benefit recipients, who had not yet received the first AI on or before May 1, 2018, the benefit recipient has received benefit payments for 36 months total, including for the 12 months prior to the July in which the AI is to be paid.

For reduced service retirees who are not eligible to retire as of January 1, 2011, but who already received the first AI on or before May 1, 2018: A reduced service retiree is eligible to receive the AI in July of the year in which both of the following conditions are met: (1) the retiree has received benefit payments for 12 months immediately preceding the July in which the AI is to be paid and (2) as of January 1 of the year the AI is paid, the retiree has either reached age 60 or the age and service Rule for unreduced service retirement applicable to the retiree's Plan.

For reduced service retirees who are not eligible to retire as of January 1, 2011, and who had not yet received the AI on or before May 1, 2018: A reduced service retiree is eligible to receive the AI in July of the year in which all of the following conditions are met: (1) the retiree has received benefit payments for 36 months total; (2) the retiree has received benefit payments for 12 months immediately preceding the July in which the AI is to be paid; and (3) as of January 1 of the year the AI is paid, the retiree has either reached age 60 or the age and service Rule for unreduced service retirement applicable to the retiree's Plan.

- ***AI Amount:*** The AI for 2019 is 0 percent and will be 1.25 percent in 2020. Thereafter, the AI is 1.25 percent per year unless it is adjusted by the AAP. The AAP may raise or lower the amount of the AI by up to 0.25 percent if the AAP ratio of the Division Trust Funds is outside the parameters specified in C.R.S. § 24-51-413.

- For benefit recipients of the PERA benefit structure who began membership on and after January 1, 2007:
  - ***Payment Month:*** The AI is paid in July.
  - ***Eligibility:*** For full service retirees, disability retirees, and survivor benefit recipients who had already received an AI on or before May 1, 2018: The benefit recipient becomes eligible in July of the calendar year following the calendar year in which the benefit recipient has received 12 months of benefit payments.

    For full service retirees, disability retirees, and survivor benefit recipients who had not yet received an AI on or before May 1, 2018: The benefit recipient becomes eligible in July if the benefit recipient has received 36 months of benefit payments total including 12 months of benefit payments in the prior calendar year.

    A reduced service retiree who had already received an AI on or before May 1, 2018, is eligible to receive the AI in July of the year in which both of the following conditions are met: (1) as of January 1 of the year the AI is to be paid, the retiree has received 12 months of benefit payments in the prior calendar year and (2) as of January 1 of the year the AI is paid, the retiree has either reached age 60 or the age and service Rule for unreduced service retirement applicable to the retiree's Plan.

    A reduced service retiree who had not yet received an AI on or before May 1, 2018, is eligible to receive the AI in July of the year in which all of the following conditions are met: (1) as of January 1 of the year the AI is to be paid, the retiree has received 36 months of benefit payments total; (2) the retiree received 12 months of benefit payments in the prior calendar year; and (3) as of January 1 of the year the AI is paid, the retiree has either reached age 60 or the age and service Rule for unreduced service retirement applicable to the retiree's Plan.
  - ***AI Amount:*** The AI for 2019 is 0 percent and will be 1.25 percent in 2020. Thereafter, the AI is the lesser of 1.25 percent (unless adjusted by the AAP) or the average of the monthly Consumer Price Index for Urban Wage Earners and Clerical Workers (CPI-W) amounts for the prior calendar year. In no case can the present value of the year's AIs paid to a Division's benefit recipients exceed 10 percent of the Division's Annual Increase Reserve (AIR).

Changes to the AI Cap: If PERA's overall funded status (actuarial value of assets/actuarial accrued liability) is at or above 103 percent, the AI cap will increase by 0.25 percent. This adjustment will occur separately from any impact of the AAP.

Automatic Adjustment Provision

Adjustments may be made to the AI cap, member and employer contribution rates, and, under certain circumstances, the direct distribution from the State of Colorado (State).

Based on the results of the AAP assessment which utilized the December 31, 2019, actuarial valuation performed for funding purposes, including the consideration of House Bill (HB) 20-1379 and HB 20-1394, effective July 1, 2021, no adjustment to the AI cap is required at this time.

A summary of AAP provisions is provided in Note 4.

Indexing of Benefits

Inactive members, who meet the following conditions, have their benefit amounts increased by the applicable AI granted by PERA from their date of membership termination to their effective date of retirement.

- Covered by the plan as of December 31, 2006;
- Eligible to retire as of January 1, 2011;
- Have 25 or more years of service credit; and
- Have not started receiving monthly benefits.

Suspending Benefits

If a retiree suspends retirement on or after January 1, 2011, returns to membership, and earns at least one year of service credit, a separate benefit will be earned. In this case, the retiree may opt to refund the contributions remitted with interest and an applicable match or receive a second, separate benefit. The original benefit will not be recalculated. Individuals who suspended retirement prior to January 1, 2011, are eligible to have their original benefit recalculated upon re-retirement.

If less than one year of service credit is earned during the return to membership, the retiree will be required to refund the contributions remitted with interest and an applicable match before the original benefit will resume.

Working After Retirement Without Suspending Benefits

- **Retiree Contributions:** With a few statutory exceptions, employers are required to remit employer contributions, Amortization Equalization Disbursement (AED), and Supplemental Amortization Equalization Disbursement (SAED) on salary earned by retirees who work for them, but do not suspend retirement and return to membership. Beginning January 1, 2011, working retirees are required to make contributions at a percentage equal to the member contribution rate. Under C.R.S. § 24-51-101(53), working retiree contributions are nonrefundable and are not deposited into member accounts. PERA deposits these contributions into the employer reserve.
- **Limits on Working After Retirement:** With a few statutory exceptions, retirees may work up to 110 days/720 hours per calendar year for a PERA employer with no reduction in benefits. In addition, each employer assigned to the School Division Trust Fund, DPS Division Trust Fund, and each Higher Education Institution assigned to the State Division Trust Fund may designate on a calendar year basis, up to 10 service retirees who may work up to 30 additional days for a total of 140 days/916 hours in a calendar year. The employer contributions, AED, SAED, and working retiree contributions are due on all salary earned.
- **PERA Retirees Employed By Rural School Districts:** Through June 30, 2023, a service retiree who is a teacher, a school bus driver, or a school food services cook and who is hired by an employer in the School Division that satisfies the criteria below may receive salary without a reduction in retirement benefits for any length of employment in a calendar year if the service retiree has not worked for any PERA employer during the month of the effective date of retirement.
  - The employer that hires the service retiree is a rural school district as determined by the Department of Education based on certain criteria and the school district enrolls 6,500 students or fewer in kindergarten through 12th grade;
  - The school district hires the service retiree for the purpose of providing classroom instruction or school bus transportation to students enrolled by the district or for the purpose of being a school food services cook; and
  - The school district determines that there is a critical shortage of qualified teachers, school bus drivers, or school food services cooks, as applicable, and that the service retiree has specific experience, skills, or qualifications that would benefit the district.

  The following provisions concerning employment for the service retiree also apply:

  - Is not required to resume PERA membership upon employment.
  - Will not have a benefit recalculation reflecting additional service credit or any increase in HAS.
  - Will not receive a PERA health care premium subsidy during employment.
  - May not be employed by the school district from which he or she retired until two years after retirement if he or she retired without a full service retirement benefit.
  - May not receive salary without reduction in benefits and without limitation in a calendar year for more than six consecutive years.

In addition, the employer that hires the service retiree is required to provide full payment of all PERA employer contributions, disbursements, and working retiree contributions.

Benefit Provisions—Voluntary Investment Program, Defined Contribution Retirement Plan, and Deferred Compensation Plan

See Note 8.

Benefit Provisions—Health Care Trust Funds

See Note 9.

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Life Insurance Reserve

PERA offers an optional life insurance program where members can purchase varying amounts of coverage. The Life Insurance Reserve is an accumulation of dividends received in the past from the insurance company based upon plan experience. The investment income from the Life Insurance Reserve is used to pay the current administrative costs of the plan.

Termination of PERA

If PERA is partially or fully terminated for any reason, C.R.S. § 24-51-217 provides that the rights of all members and benefit recipients to all benefits on the date of termination, to the extent then funded, will become nonforfeitable.

Note 2—Summary of Significant Accounting Policies

Reporting Entity

The Board oversees all funds included in the financial statements of PERA and has the ability to influence operations. The Board's responsibilities include designation of management, membership eligibility, investment of funds, and accountability for fiscal matters.

PERA is an instrumentality of the State; it is not an agency of State government. In addition, it is not subject to administrative direction by any department, commission, board, bureau, or agency of the State. Accordingly, PERA's financial statements are not included in the financial statements of any other organization.

Basis of Presentation

The accompanying financial statements are prepared in accordance with accounting principles generally accepted in the United States of America that apply to governmental accounting for fiduciary funds.

Basis of Accounting

The accompanying financial statements for the defined benefit and defined contribution pension trust funds (DB and DC trust funds), the deferred compensation trust fund, the private purpose trust fund, the HCTF, and the DPS HCTF are prepared using the economic resources measurement focus and the accrual basis of accounting. The preparation of financial statements in conformity with accounting principles generally accepted in the United States of America requires PERA to use estimates and assumptions that affect the accompanying financial statements and disclosures. Actual results could differ from those estimates. Member and employer contributions are recognized as revenues in the period in which the compensation becomes payable to the member and the employer is statutorily committed to pay these contributions to the DB and DC trust funds, the deferred compensation trust fund, the HCTF, and the DPS HCTF. Benefits and refunds are recognized when due and payable.

Fund Accounting

The financial activities of the State Division Trust Fund, the School Division Trust Fund, the Local Government Division Trust Fund, the Judicial Division Trust Fund, the DPS Division Trust Fund, the HCTF, the DPS HCTF, the Life Insurance Reserve, the Voluntary Investment Program, the Defined Contribution Retirement Plan, and the Deferred Compensation Plan are recorded in separate funds. The State, School, Local Government, Judicial, and DPS Division Trust Funds maintain separate accounts, and all actuarial determinations are made using separate division-based information.

The Division Trust Funds, the HCTF, the DPS HCTF, and the Life Insurance Reserve pool their investments into a combined investment portfolio. Investment value and earnings of the investment pool are allocated among the funds based on each fund's percentage ownership. As of December 31, 2019, the ownership percentages of each fund are shown in the following table.

Trust Fund	Ownership Percentages
State Division	30.61%
School Division	52.09%
Local Government Division	8.81%
Judicial Division	0.70%
DPS Division	7.02%
HCTF	0.66%
DPS HCTF	0.06%
Life Insurance Reserve	0.05%
Total	**100.00%**

The administrative activities and operating assets and liabilities are pooled and recorded in a Common Operating Fund. Expenses incurred and net operating assets are allocated from the Common Operating Fund to the Division Trust Funds based on administrative staff workload devoted to these funds and the ratio of the number of active and retired members in each division to the total for all the Division Trust Funds. Expenses are allocated to the HCTF and DPS HCTF based on administrative fees charged to participants. Expenses are allocated to the Voluntary Investment Program, the Defined Contribution Retirement Plan, and the Deferred Compensation Plan based on administrative staff workload and the ratio of fiduciary net position (FNP) of each program or plan to the total for the program and plans. Expenses are allocated to the Life Insurance Reserve based on administrative staff workload.

Fair Value of Investments

Plan investments are presented at fair value in the Statements of Fiduciary Net Position. See Note 5 for additional information.

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Note 3—Interfund Transfers and Balances

Interfund transfers of assets take place on a regular basis between the Division Trust Funds. The transfers occur upon the initiation of a retirement or survivor benefit where the member earned or purchased service in another division in addition to the Fund that is paying the benefit.

Transfers also occur from the Division Trust Funds to the Health Care Trust Funds to allocate a portion of the amount paid by members to purchase service credit. The transfers for the year ended December 31, 2019, consisted of the following amounts:

INTERFUND TRANSFERS

	State Division Trust Fund	School Division Trust Fund	Local Government Division Trust Fund	Judicial Division Trust Fund	DPS Division Trust Fund	HCTF	DPS HCTF
Transfers in from other Funds for retirements	$19,236	$16,444	$4,347	$6,745	$8,262	$—	$—
Transfers out to other Funds for retirements	(19,835)	(22,528)	(7,352)	(50)	(5,269)	—	—
Transfers in from other Funds for survivor benefits	399	101	1	—	—	—	—
Transfers out to other Funds for survivor benefits	(102)	(399)	—	—	—	—	—
Transfers out to Health Care Trust Funds for purchased service credit	(1,849)	(1,798)	(809)	(27)	(35)	—	—
Transfers in to Health Care Trust Funds for purchased service credit	—	—	—	—	—	4,483	35

As of December 31, 2019, interfund balances existed between funds due to unreimbursed internal operating expenses. The interfund balances consisted of the following amounts:

INTERFUND BALANCES

Trust Fund	Amount
State Division	$223
School Division	380
Local Government Division	65
Judicial Division	5
DPS Division	51
Voluntary Investment Program	(493)
Defined Contribution Retirement Plan	(67)
Deferred Compensation Plan	(169)
HCTF	5
Total	**$—**

NOTES TO THE FINANCIAL STATEMENTS

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Note 4—Contributions

Division Trust Funds—Defined Benefit Pension Plans

Members and employers are required to contribute to PERA at a rate set by Colorado statute. The contribution requirements of plan members and affiliated employers are established under C.R.S. § 24-51-401 *et seq.* Colorado State law provisions may be amended from time to time by the Colorado General Assembly.

SB 18-200 makes changes to contribution provisions of the defined benefit pension plans administered by PERA. Some, but not all, of these changes to contribution provisions were in effect at the end of 2019.

Members are required to contribute a percent of their PERA-includable salary as shown in the contribution rate tables on the next page. PERA records these contributions in individual member accounts. Member contributions are tax-deferred for federal and Colorado income tax purposes, effective July 1, 1984, (January 1, 1986, for members of the DPS benefit structure) and January 1, 1987, respectively. Prior to those dates, contributions were on an after-tax basis. PERA-affiliated employers contribute a percentage of active member covered payrolls depending on division as shown on the next page.

Employers that rehire a PERA retiree as an employee or under any other work arrangement (working retiree) are required to report and pay employer contributions on the amounts paid to the working retiree. In addition, effective January 1, 2011, working retirees are required to make contributions at a percentage of salary equal to the member contribution rate. However, under C.R.S. § 24-51-101(53), these contributions are not member contributions, are not deposited into a member account, and, therefore, are nonrefundable to the working retiree.

For purposes of deferring federal income tax imposed on salary, member contributions and working retiree contributions shall be treated as employer contributions pursuant to the provisions of 26 U.S.C. § 414 (h)(2), as amended. For all other purposes, these contributions shall be treated as member contributions and working retiree contributions as described above.

Beginning January 1, 2006, employers are required to pay the AED, and beginning January 1, 2008, employers are required to pay the SAED. The employers pay these amounts on the PERA-includable salary for all employees working for the employer who are members of PERA, or who are eligible to elect to become members of PERA on or after January 1, 2006, including any amounts paid in connection with the employment of a retiree by an employer. PERA uses these payments to help amortize the unfunded actuarial accrued liability (UAAL). The AED and SAED are set to increase in future years for the Judicial Division Trust Fund, as described in the table on page 62. SB 10-001 provides for adjustment of the AED and SAED based on the year end funded status within a particular Division Trust Fund. If a particular Division Trust Fund reaches a funded status of 103 percent, a decrease in the AED and SAED is mandated and if it subsequently falls below a funded status of 90 percent, an increase in the AED and SAED is mandated. For the Local Government and Judicial Divisions, if the funded ratio reaches 90 percent and subsequently falls below 90 percent, an increase in the AED and SAED is mandated. AED and SAED rates cannot exceed the maximums listed in the table on page 62.

C.R.S. § 24-51-412 permits a pension certificates of participation (PCOP) offset to the DPS Division employer contribution rate. The offset, expressed as a percentage of covered payroll, is equal to the annual assumed payment obligations for PCOPs issued in 1997 and 2008, including subsequent refinancing, by the DPS at a fixed effective annual interest rate of 8.50 percent. At a minimum, the DPS Division employer rate, after applying the PCOP offset, must be sufficient to fund the DPS HCTF and the AIR contribution rates applicable to the DPS Division. The staff of Denver Public Schools provided the PCOP offset rate of 13.48 percent for 2019, which is reviewed and analyzed by PERA staff.

C.R.S. § 24-51-401(1.7)(e) requires a periodic "true-up" calculation to be performed beginning in 2015 and every five years following, with the purpose of determining the total DPS Division employer contribution rate that would result in the equalization of the ratio of UAAL over payroll between the DPS and School Divisions at the end of the 30-year period beginning January 1, 2010. Both the 2015 calculation and the 2020 calculation indicated that a reduction to the total DPS Division employer rate would be needed to equalize the defined ratio. As of December 31, 2019, the ratio of UAAL over payroll is 333.3 percent for the School Division and 115.9 percent for the DPS Division. It should be noted that a reduction in an employer contribution rate for any one Division Trust Fund could potentially influence the outcome of the assessment of contributions (actual versus actuarially determined) considering all five Division Trust Funds, annually performed under the recently adopted AAP, enacted through SB 18-200, and described in greater detail below.

PERA-affiliated employers forward the contributions to PERA for deposit. PERA transfers a portion of these contributions, equal to 1.02 percent of the reported salaries, into the HCTF or DPS HCTF for health care benefits. Beginning in 2007, the AIR was created within each division for the purpose of funding future benefit increases. Funding for this reserve comes from the employer contributions and is calculated at 1.0 percent of the salary reported for members in the PERA benefit

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structure hired on or after January 1, 2007. Beginning in 2020, post-retirement benefit increases for these members are limited to a maximum of 1.25 percent (unless adjusted by the AAP) compounded annually, subject to the availability of assets in the AIR for each division. As of December 31, 2019, the value of the AIR was $173,020 in the State Division, $234,907 in the School Division, $47,002 in the Local Government Division, $2,126 in the Judicial Division, and $39,777 in the DPS Division. The remainder of these contributions is transferred into a trust fund established for each division for the purpose of meeting current benefit accruals and future benefit payments.

The combined employer contribution rates for retirement and health care benefits along with the member contribution rates for 2019 are shown below. "State Trooper" means an employee of the Colorado State Patrol or CBI vested with the powers of peace officers.

Effective July 1, 2019, the employer contribution rates increased 0.25 percent and the member contribution rates increased 0.75 percent for all divisions except the Local Government Division.

CONTRIBUTION RATES

Trust Fund	Membership	Employer Contribution Rate	AED	SAED	PCOP Offset	Total Contribution Rate Paid by Employer	Member Contribution Rate
January 1, 2019 - June 30, 2019							
State Division	All members (except State Troopers)	10.15%	5.00%	5.00%	—%	20.15%	8.00%
State Division	State Troopers	12.85%	5.00%	5.00%	—%	22.85%	10.00%
School Division	All members	10.15%	4.50%	5.50%	—%	20.15%	8.00%
Local Government Division	All members	10.00%	2.20%	1.50%	—%	13.70%	8.00%
Judicial Division	All members	13.66%	3.40%	3.40%	—%	20.46%	8.00%
DPS Division	All members	10.15%	4.50%	5.50%	(13.35%)[1]	6.80%	8.00%
July 1, 2019 - December 31, 2019							
State Division	All members (except State Troopers)	10.40%	5.00%	5.00%	—%	20.40%	8.75%
State Division	State Troopers	13.10%	5.00%	5.00%	—%	23.10%	10.75%
School Division	All members	10.40%	4.50%	5.50%	—%	20.40%	8.75%
Local Government Division	All members	10.00%	2.20%	1.50%	—%	13.70%	8.00%
Judicial Division	All members	13.91%	3.40%	3.40%	—%	20.71%	8.75%
DPS Division	All members	10.40%	4.50%	5.50%	(13.60%)[1]	6.80%	8.75%

[1] To conform with this presentation of contribution rates, the annual PCOP offset of 13.48 percent for 2019 has been adjusted based on the portion of the PCOP offset used to satisfy employer contribution requirements.

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FUTURE AED AND SAED RATES

	2020 Rates		Future Annual Increases in Rates Prescribed by Colorado Revised Statutes		Maximum Allowable Limitations	
Trust Fund	**AED**	**SAED**	**AED**	**SAED**	**AED**	**SAED**
State Division	5.00%	5.00%	N/A	N/A	5.00%	5.00%
School Division	4.50%	5.50%	N/A	N/A	4.50%	5.50%
Local Government Division	2.20%	1.50%	N/A	N/A	5.00%	5.00%
Judicial Division	3.80%	3.80%	Yes[1]	Yes[2]	5.00%	5.00%
DPS Division[3]	4.50%	5.50%	N/A	N/A	4.50%	5.50%

[1] C.R.S. § 24-51-411(4.5) increased the AED payment to 3.80 percent of PERA-includable salary for 2020 and requires the AED payment to increase by 0.40 percent at the start of each of the following three calendar years through 2023 at which time the AED payment will be 5.00 percent of PERA-includable salary.

[2] C.R.S. § 24-51-411(7.5) increased the SAED payment to 3.80 percent of PERA-includable salary for 2020 and requires the SAED payment to increase by 0.40 percent at the start of each of the following three calendar years through 2023 at which time the SAED payment will be 5.00 percent of PERA-includable salary.

[3] DPS Division employers are permitted to reduce the AED and SAED by the PCOP offset, as specified in C.R.S. § 24-51-412 *et seq.*

Funding of the plan assumes statutory contributions will be made on a timely basis. Any significant reduction in contributions would have an impact on the ability of the plan to make benefit payments in the future.

Direct Distribution

Pursuant to C.R.S. § 24-51-414, PERA is to receive an annual direct distribution from the State in the amount of $225 million (in actual dollars). Beginning in 2018, the distribution will occur each July 1 until there are no unfunded actuarial accrued liabilities in the trust fund of any division that receives such distribution. PERA shall allocate the distribution to the trust funds as it would an employer contribution in a manner that is proportionate to the annual payroll of each division except there shall be no allocation to the Local Government Division.

The allocation for 2019 was as follows:

Trust Fund	Direct Distribution
State Division	$77,088
School Division	127,367
Judicial Division	1,344
DPS Division	19,201
Total	**$225,000**

HB 20-1379, signed by Governor Polis on June 29, 2020, suspends the July 1, 2020, direct distribution. Please see Note 12 for more information.

Future Contribution Changes

Subject to C.R.S. § 21-51-413, the member contribution rates incrementally increase as follows:

- 0.75 percent on July 1, 2020.
- 0.50 percent on July 1, 2021.

HB 19-1217 repealed the member contribution increases scheduled for the Local Government Division pursuant to SB 18-200.

Pursuant to HB 20-1394, effective for the State's 2020-21 and 2021-22 fiscal years, the employer contribution rate for the Judicial Division decreases by 5.0 percent and the member contribution rate for the Judicial Division increases by 5.0 percent. This does not apply to the employer or member contribution rates for judges employed by the Denver County Court. See Note 12 for more information.

Effective January 1, 2021, and every year thereafter, C.R.S. § 24-51-415 adjusts employer contribution rates for the State and Local Government Divisions to include a defined contribution supplement. The defined contribution supplement for these two divisions will be determined based on the employer contribution amounts paid on behalf of eligible employees who commence employment on or after January 1, 2019, to defined contribution plan participant accounts that would have otherwise gone to the defined benefit trusts to pay down the unfunded liability. This calculation includes defined benefit investment earnings thereon, and is expressed as a percentage of salary on which employer contributions are made.

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(Dollars in Thousands)

Automatic Adjustment Provision

The primary intent of the AAP is to gauge the adequacy of the contributions coming into the pension trust fund against the amount required, and if determined necessary, to initiate automatic changes to member and employer contribution rates, the AI cap, and, under certain circumstances, the direct distribution from the State. This assessment commenced with the December 31, 2018, actuarial funding valuation and is performed annually, thereafter.

Pursuant to C.R.S. § 24-51-413, the AAP assessment involves the comparison of two blended rates, weighted across all five Division Trust Funds, defined as: the "Blended Total Contribution Amount" (employer contribution rates + member contribution rate + direct distribution as a rate of pay) divided by the "Blended Total Required Contribution" (actuarially determined contribution (ADC) rate + member contribution rate), determining a resulting ratio. If the resulting ratio falls within an acceptable corridor (98 percent to 119 percent), no adjustments are made. If the resulting ratio does not achieve a minimum benchmark (less than 98 percent), adjustments are applied in an equitable manner of impact resulting in increases in contributions and a decrease in the AI cap. If the resulting ratio exceeds the acceptable corridor (120 percent or greater), adjustments are applied in an equitable manner of impact resulting in decreases in contributions and an increase in the AI cap.

Per statute, the first adjustment required as a result of the AAP cannot occur prior to July 1, 2020. The AAP defines the limited amounts of total adjustment available in each category, and also the increments of adjustments that can occur in any one year. Multiple steps over multiple years are allowed for a required adjustment as is necessary, but cannot exceed the ultimate limits as set forth in statute. An adjustment (increase or decrease) to each of the employer contribution rates and the member contribution rates cannot exceed 0.50 percent in any one year, and cannot exceed 2.00 percent above or fall below the contribution rates in effect prior to the enactment of SB 18-200. An adjustment to the direct distribution cannot exceed $20 million (actual dollars) in any one year, and cannot exceed the initially legislated annual $225 million (actual dollars) amount, but can be reduced to $0.

Further, adjustments that are required because funding is below the 98 percent AAP ratio threshold will be made to an extent that will bring the revised AAP ratio to 103 percent following the corrective efforts but in no event can the adjustments in one year be greater than the limits as described above. Similarly, adjustments that are required because funding has reached the 120 percent AAP ratio threshold must not cause the AAP ratio to fall below 103 percent.

Based on the results of the AAP assessment which utilized the December 31, 2018, actuarial valuation performed for funding purposes, effective July 1, 2020, there will be an increase to both member and employer contribution rates of 0.50 percent. While the AAP assessment did not result in an adjustment to the scheduled direct distribution payment of $225 million (actual dollars) on July 1, 2020, HB 20-1379 suspends this payment for the State's 2020-2021 fiscal year. More information can be found in Note 12.

Based on the results of the AAP assessment which utilized the December 31, 2019, actuarial valuation performed for funding purposes, effective July 1, 2021, no adjustments regarding the member and employer contribution rates or the direct distribution are required at this time.

Replacement Benefit Arrangements

IRC § 415 limits the amount of the benefit payable to a retiree or survivor in a defined benefit plan. In some cases, the IRC limit is lower than the benefit calculated under the plan provisions. For 2019, this limit is set at $225,000 (actual dollars) for retirees who are age 62 or older. This dollar amount is actuarially decreased for retirees younger than 62. IRC § 415(m) allows a government plan to set up a "qualified governmental excess benefit arrangement" to pay the difference to those retirees. To accomplish this, PERA has entered into agreements with the employers who last employed the affected retirees. Under the agreement, the employer pays the benefit difference to the retiree from a portion of the current employer contributions. In 2019, employers under these agreements used current employer contributions to pay retirees $2,954 in the State Division; $969 in the School Division; $1,724 in the Local Government Division; $0 in the Judicial Division, and $0 in the DPS Division.

Contributions—Voluntary Investment Program, Defined Contribution Retirement Plan, and Deferred Compensation Plan

See Note 8.

Contributions—Health Care Trust Funds

See Note 9.

NOTES TO THE FINANCIAL STATEMENTS

(Dollars in Thousands)

Note 5—Investments

Investment Authority

Under C.R.S. § 24-51-206, the Board has complete responsibility for the investment of PERA's funds, with the following investment limitations:

- The aggregate amount of moneys invested in corporate stocks or corporate bonds, notes, or debentures that are convertible into corporate stock or in investment trust shares cannot exceed 65 percent of the then book value of the fund.
- No investment of the fund in common or preferred stock (or both) of any single corporation can exceed 5 percent of the then book value of the fund.
- The fund cannot acquire more than 12 percent of the outstanding stock or bonds of any single corporation.
- The origination of mortgages or deeds of trust on real residential property is prohibited.

Additionally, C.R.S. § 24-54.8-201 *et seq.* imposes targeted divestment from companies that have economic prohibitions against Israel.

Colorado PERA Board's Statutory Fiduciary Responsibility

By State law, the management of PERA's retirement fund is vested in the Board who is held to the standard of conduct of fiduciaries in discharging their responsibilities. According to C.R.S. § 24-51-207(2), the Board, as fiduciaries, must carry out their functions solely in the interest of PERA members and benefit recipients and for the exclusive purpose of providing benefits.

Investment Committee

The Investment Committee is responsible for assisting the Board in overseeing the PERA investment program. Specific responsibilities include recommending to/advising the Board of the following:

- Written statements of investment policy and philosophy, and any amendments thereto.
- Strategies to achieve investment goals and objectives.
- New investment mandates.
- Use of internal or external management for the investment mandates.
- On any other investment matters and make recommendations for Board action when necessary.

Overview of Investment Policy

PERA's investment policy is established and may be amended by a majority vote of the Board. The policy outlines the investment philosophy and guidelines within which the fund's investments will be managed, and includes the following:

- Strategic asset allocation is the most significant factor influencing long-term investment performance and asset volatility.
- The fund's liabilities are long term and the investment strategy will therefore be long term in nature.
- The asset allocation policy will be periodically re-examined to ensure its appropriateness to the then prevailing liability considerations.
- As a long-term investor, PERA will invest across a wide spectrum of investments in a prudent manner.
- Active management may be expected to add value over passive investment alternatives under appropriate conditions.

The Board determines the strategic asset allocation policy for the fund. This strategic asset allocation contains a long-term target allocation and specific ranges within which each asset class may operate. Because the long-term target allocation will be achieved over time, an interim target allocation was also approved. See current asset allocation targets and ranges in the Investment Section on page 121.

The asset allocation policy is determined by an intensive asset/liability study which considers expected investment returns, risks, and correlations of returns. The characteristics of the fund's liabilities are analyzed in conjunction with expected investment risks and returns. The targeted strategic asset allocation is designed to provide appropriate diversification and to balance the expected returns, while ensuring an appropriate level of risk is incurred.

The asset allocation targets are adhered to through the implementation of a rebalancing policy. Investments are managed and monitored in a manner which seeks to balance return and risk within the asset/liability framework. The Chief Investment Officer is authorized to execute investment transactions on behalf of the Board. Assets are managed both internally and externally. In making investment decisions, the Board and staff utilize external experts in various fields including risk and performance analysis, and other important investment functions and issues.

See information on the most recent asset/liability study in the Investment Section on page 122.

Investment Performance

For the year ended December 31, 2019, the net-of-fees, money-weighted rate of return on the pooled investment assets was 20.4 percent.

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A money-weighted rate of return considers the effect of timing of transactions that increase the amount of pension plan investments (such as contributions) and those that decrease the amount of pension plan investments (such as benefit payments). Additionally, the money-weighted rate of return provides information that is comparable with the long-term assumed rate of return on the pooled investment assets.

Fair Value

Investments are measured at fair value in accordance with GASB 72. Fair value is defined as the amount for which an investment could be sold in an orderly transaction between market participants at the measurement date in the principal or most advantageous market of the investment. This Statement establishes a three-tier, hierarchical disclosure framework which prioritizes and ranks the level of market price observability used in measuring fair value. The hierarchy is based on the valuation inputs used to measure the fair value of the investment 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). Inputs refer broadly to the assumptions that market participants would use in pricing the asset or liability, including assumptions about risk, for example, the risk inherent in a particular valuation technique used to measure fair value (such as a pricing model) and/or the risk inherent in the inputs to the valuation technique. The categorization of investments within the hierarchy is based upon the pricing transparency of the instrument and should not be perceived as the particular investment's risk. The three-tier framework is summarized below:

- **Level 1—**Unadjusted quoted prices for identical instruments in active markets.
- **Level 2—**Quoted prices for similar instruments in active markets; quoted prices for identical or similar instruments in markets that are not active; and model-derived valuations in which all significant inputs are observable.
- **Level 3—**Valuations derived from valuation techniques in which significant inputs are unobservable.

Investments in certain entities that calculate a net asset value (NAV) per share (or its equivalent) sometimes do not have a readily determinable fair value. For these investments, governmental accounting standards permit establishment of fair value using a practical expedient based on the NAV per share (or its equivalent).

The table on the next page presents PERA's investments within the hierarchical framework, as well as investments where fair value is determined using the practical expedient, as of December 31, 2019.

NOTES TO THE FINANCIAL STATEMENTS

(Dollars in Thousands)

INVESTMENTS MEASURED AT FAIR VALUE

		Fair Value Measurements Using		
	12/31/2019	Quoted Prices in Active Markets for Identical Assets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Global Equity				
Public market investments[1]				
Information technology	$5,978,659	$5,930,580	$47,987	$92
Financials	4,743,077	4,663,940	79,014	123
Health care	4,125,406	4,085,662	39,744	—
Consumer discretionary	3,861,422	3,792,484	68,902	36
Industrials	3,526,928	3,468,637	58,264	27
Communication services	2,341,133	2,312,241	28,892	—
Consumer staples	2,185,591	2,160,012	25,579	—
Energy	1,232,032	1,219,190	12,832	10
Materials	1,189,113	1,169,463	19,650	—
Real estate	988,090	979,854	8,236	—
Utilities	693,926	688,707	5,219	—
Non-public market investments and other	64	—	—	64
Total global equity investments	**30,865,441**	**30,470,770**	**394,319**	**352**
Fixed Income				
U.S. government treasuries	4,000,009	4,000,009	—	—
U.S. government mortgage-backed securities	3,053,907	9,373	3,044,534	—
U.S. corporate bonds	2,158,177	—	2,158,177	—
Non-U.S. corporate bonds	492,111	—	491,898	213
Non-U.S. government/agency bonds	365,947	—	365,947	—
Non-agency MBS/CMBS	253,859	—	253,859	—
U.S. municipal bonds	84,802	—	77,308	7,494
U.S. government agencies	76,604	—	76,604	—
Fixed income mutual funds	10,349	10,349	—	—
Total fixed income investments	**10,495,765**	**4,019,731**	**6,468,327**	**7,707**
Real estate	1,045,617	—	—	1,045,617
Self-directed brokerage	56,145	55,891	254	—
Total investments by fair value level	**$42,462,968**	**$34,546,392**	**$6,862,900**	**$1,053,676**
Investments Measured at the NAV				
Global equity	1,146,492			
Fixed income	1,210,451			
Private equity	4,219,261			
Real estate	3,587,209			
Opportunity fund	1,829,571			
Multi-asset class funds	1,243,329			
Total investments measured at the NAV	**13,236,313**			
Total investments measured at fair value	**$55,699,281**			

[1] Approximately $374,000 of public market investments are classified in Level 2 due to the election of fair value pricing for international equity portfolios. This election employs the use of intra-day movements of the Russell 1000 index as a factor in pricing individual equity investments to ensure equitability between participants in the PERAdvantage International Stock Fund.

NOTES TO THE FINANCIAL STATEMENTS

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RECONCILIATION OF INVESTMENT LEVELING DISCLOSURE TO THE STATEMENTS OF FIDUCIARY NET POSITION

	Investments by Fair Value Level	Investments Measured at the NAV	Stable Value Fund[1]	Fixed Income Classified as Short-Term Investments	Statements of Fiduciary Net Position Combined Total
Global equity	$30,865,441	$1,146,492	$—	$—	$32,011,933
Fixed income	10,495,765	1,210,451	447,685	(31,933)	12,121,968
Private equity	—	4,219,261	—	—	4,219,261
Real estate	1,045,617	3,587,209	—	—	4,632,826
Opportunity fund	—	1,829,571	—	—	1,829,571
Multi-asset class funds	—	1,243,329	—	—	1,243,329
Self-directed brokerage	56,145	—	—	—	56,145
Total	**$42,462,968**	**$13,236,313**	**$447,685**	**($31,933)**	**$56,115,033**

[1] The Stable Value Fund is the underlying investment in the PERAdvantage Capital Preservation Fund which is available to participants in the two defined contribution plans and the deferred compensation plan. The value of the investment is based on the contract value, which approximates fair value. Contract value represents what is owed to the plan participants and what the shares of the stable value fund are being bought and sold for.

Global equity investments classified in Level 1 of the hierarchical framework include securities which trade on a national or international exchange. These investments are primarily valued at the official closing price or last reported sales price of the instrument according to the rules of the exchange. Mutual funds classified in Level 1 of the hierarchical framework include instruments which trade on a national exchange and the fund's NAV is the basis for the fund's transactions. Fixed income securities classified as Level 1 include U.S. Treasuries and U.S. mortgage-backed securities purchased in the to-be-announced forward market. These securities are valued using the bid price, which is the price prospective buyer(s) are prepared to pay to purchase the security. Self-directed brokerage is an investment vehicle available to participants in PERA's Voluntary Investment Program, Defined Contribution Retirement Plan, and Deferred Compensation Plan. Equity investments contained in the self-directed brokerage accounts trade on an exchange, and therefore are classified in Level 1 of the hierarchical framework.

Global equity investments classified in Level 2 of the hierarchical framework include securities valued using a theoretical price which utilizes a standardized formula to derive a price from a related security or from the intra-day movement of a market index. Fixed income investments classified as Level 2 typically do not trade on a national or international exchange and their fair value is based on equivalent values of the same or comparable securities with similar yield and risk, otherwise known as matrix pricing. Fixed income investments contained in the self-directed brokerage are typically valued using a matrix pricing approach, and therefore are classified in Level 2 of the hierarchical framework.

Global equity public market investments classified in Level 3 of the hierarchical framework are valued using one or more unobservable inputs. This includes instruments that have been delisted from an exchange, instruments where trading has been suspended, and instruments that lack recent transaction information. Fixed income securities classified in Level 3 of the hierarchical framework include instruments that are in default and instruments whose values are estimated, out of necessity, using unobservable inputs due to lack of comparable securities in the market place. Real estate investments classified in Level 3 of the hierarchical framework were valued by an independent appraiser.

Typically, pricing information for public market investments is made available to PERA by independent, third-party pricing services and other third-party vendors.

The table on the next page presents PERA's unfunded commitments, the investment redemption frequency and redemption notice period as of December 31, 2019, for PERA investments measured at the NAV.

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INVESTMENTS MEASURED AT THE NET ASSET VALUE

	12/31/2019	Unfunded Commitments	Redemption Frequency (If Currently Eligible)	Redemption Notice Period
Global equity commingled funds	$1,146,492	$—	Daily	1 - 3 days
Fixed income commingled funds	1,210,451	—	Daily	1 - 3 days
Private equity partnerships	4,219,261	2,384,259	N/A	N/A
Private real estate[1]				
Directly held joint ventures	574,532	23,008	N/A	N/A
Real estate partnerships	1,075,850	399,904	Quarterly	90 days
Commingled open-end funds	1,936,827	98,406	Daily, Quarterly	30 - 90 days
Opportunity fund				
Opportunity fund partnerships	837,359	1,020,673	Quarterly, Biennial, Quinquennial	30 - 180 days
Commingled open-end funds	992,212	246,973	Daily, Monthly, Quarterly, Annually, Biennial	1 - 180 days
Multi-asset class commingled funds	1,243,329	—	Daily	1 - 3 days
Total investments measured at the NAV	**$13,236,313**	**$4,173,223**		

[1] Excludes $129,406 of unfunded commitments related to real estate presented in Level 3 of the hierarchical framework.

The fair value of the investments in global equity, fixed income, and multi-asset class commingled funds has been determined using NAV of the units held at December 31, 2019. Commingled funds are only offered to a limited group of investors, and the most significant element of the NAV is the fair value of the underlying investment holdings of the fund. Unit values are determined by dividing each fund's net assets by the number of units outstanding on the valuation date. Global equity commingled funds include seven funds which primarily consist of investments whose objective is to produce returns that either match or exceed the total rate of return of a particular benchmark. Fixed income commingled funds include four funds that seek results which correspond generally to the price and yield performance of a particular index or to produce returns in excess of the total rate of return of a particular benchmark. Multi-asset class commingled funds include nine target date retirement funds which are broadly diversified across global asset classes, where asset allocations become more conservative over time with the objective of providing for retirement outcomes consistent with investor preferences throughout the savings and drawdown phase. Additionally, this asset class also includes one fund whose objective is to produce returns that exceed inflation.

Private equity partnerships include 164 private equity limited partnership funds, with various strategies including: buyout, venture capital, generalist debt, mezzanine debt, distressed debt, secondary funds, fund-of-funds, and energy-related strategies. The fair values of the investments in this type have been determined using the NAV per share (or its equivalent) of PERA's ownership interest in partners' capital. The most significant element of NAV is the fair value of the investment holdings. The valuation techniques vary based on investment type and involve a certain degree of expert judgment. These holdings are valued by the general partners in conjunction with management, investment advisers, and valuation specialists and are generally audited annually. These investments cannot be redeemed during the term of the partnership. Typically, private equity partnerships have an approximate life of 10 years, with the first four to six years deemed as the investment period when capital is deployed. The remaining years are typically the harvest period in which distributions are received through the liquidation of the underlying assets of the fund. The fair value for these investments could differ significantly if a ready market for these assets existed.

Private real estate includes 75 funds that invest primarily in U.S. institutional quality commercial real estate across a broad range of real estate asset types and locations. The fair values of the investments in this type have been determined using the NAV per share (or its equivalent) of PERA's ownership interest in partners' capital. The most significant element of NAV is the fair value of the investment holdings. The valuation techniques vary based on investment type and involve a certain degree of expert judgment. These holdings are valued by the general partners in conjunction with management, investment advisers, and valuation specialists and are generally audited annually. There are 54 real estate closed-end limited partnership funds, which are considered illiquid as these investments cannot typically be redeemed during the term of the partnership. Distributions can be made periodically based on the sole discretion of the General Partner.

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There are four majority owned joint venture investments which consist of industrial and multifamily assets in various locations throughout the U.S. These investments are considered illiquid. There are 17 real estate commingled open-ended funds which are considered liquid real estate funds by nature of the open-end structure of the fund. Open-end funds generally offer periodic distributions of net cash flow, which investors may elect to reinvest. Additionally, open-end funds generally offer quarterly redemption windows for requesting portions, or all, of PERA's investments. Two of the open-ended funds contain a lock-out period with respect to redemptions. The fair value for these investments could differ significantly if a ready market for these assets existed.

The Opportunity Fund includes 27 funds that invest in timber, real assets, tactical, credit, global macro, multi-strategy, and other opportunistic strategies. The fair values of the investments in this type have been determined using the NAV per share (or its equivalent) of PERA's ownership interest in partners' capital. The most significant element of NAV is the fair value of the investment holdings. The valuation techniques vary based on investment type and involve a certain degree of expert judgment. These holdings are valued by the general partners in conjunction with management, investment advisers, and valuation specialists and are generally audited annually. There are 16 partnerships within the Opportunity Fund that are considered illiquid as these investments cannot be redeemed during the term of the partnership. Illiquid funds represent approximately 30.7 percent of the value of the Opportunity Fund. There are seven investments within the Opportunity Fund that are considered liquid by nature of the open-end structure of the fund. Open-end funds generally offer periodic distributions of net cash flow, which investors may elect to reinvest. Additionally, open-end funds generally offer daily and monthly redemption windows for requesting portions, or all, of PERA's investments. Distributions from each fund will be received as the underlying investments of the funds are liquidated. It is expected that the underlying assets of the funds will be liquidated over the next two to 10 years. The fair value for these investments could differ significantly if a ready market for these assets existed.

Cash and Short-Term Investments

Cash balances represent both operating cash accounts and investment cash on deposit held by banks. To maximize investment income, the float caused by outstanding checks is invested, thus causing a possible negative book balance. Negative book balances are reflected in the liabilities section of the Statements of Fiduciary Net Position.

The carrying value of cash and short-term investments at December 31, 2019, in the Statements of Fiduciary Net Position includes short-term fixed income securities of $31,933, pending foreign exchange contracts of $49, and deposit and short-term investment funds of $690,834 for a total of $722,816. PERA considers fixed income securities with a remaining maturity of 12 months or less to be short-term investments.

The table below presents the PERA combined total deposits and short-term investment funds as of December 31, 2019.

	Carrying Value
Deposits with banks (held in accounts insured by the FDIC)	$18,364
Deposits held at bank (uncollateralized, held by PERA's agent in PERA's name)	19,403
Short-term investment funds held at bank (shares in commingled funds, held by PERA's agent in PERA's name)	653,067
Total deposits and short-term investment funds	**$690,834**

Securities Lending Transactions

C.R.S. § 24-51-206 and Board policies permit PERA to lend its securities to broker-dealers and other entities with a simultaneous agreement to return the collateral for the same securities in the future. PERA utilized two lending agents in 2019, its custodian, The Northern Trust Company (Northern Trust) and Deutsche Bank AG, New York Branch (Deutsche Bank).

Northern Trust primarily lends international equity and fixed income securities for cash collateral. U.S. securities are loaned versus collateral valued at 102 percent of the fair value of the securities plus any accrued interest. Non-U.S. securities are loaned versus collateral valued at 105 percent of the fair value of the securities plus any accrued interest. Collateral is marked-to-market daily. PERA cannot pledge or sell the collateral securities unless the borrower defaults.

Northern Trust invests the cash collateral related to PERA's loaned securities in a separate account according to guidelines stipulated by PERA. Northern Trust's Senior Credit Committee sets borrower credit limits. As of December 31, 2019, the total fair value of securities on loan with Northern Trust cannot exceed $600,000.

Deutsche Bank lends domestic and international equities for cash collateral. U.S. securities are loaned versus collateral valued at a minimum of 102 percent of the fair value of the securities. International securities are loaned versus collateral valued at a minimum of 105 percent of the fair value of the securities. Collateral is marked-to-market daily. PERA cannot pledge or sell the collateral securities unless the borrower defaults.

Deutsche Bank invests the cash collateral related to PERA's loaned securities in a separate account according to guidelines stipulated by PERA. Deutsche Bank's

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Global Credit Risk Department sets borrower credit limits. As of December 31, 2019, the total fair value of securities on loan with Deutsche Bank cannot exceed $1,500,000.

The table below details the balances relating to the securities lending transactions at December 31, 2019.

Securities Lent for Cash Collateral	Fair Value of Underlying Securities	Cash Collateral Received	Cash Collateral Investment Value
Cash and cash equivalents	$—	$—	$1,252,360
Global equity	1,374,465	1,408,055	—
Fixed income	14,896	15,247	171,460
Total	**$1,389,361**	**$1,423,302**	**$1,423,820**

PERA's income, including realized and unrealized gain/(loss), net of rebates and fees from securities lending, was $7,708 for the year ended December 31, 2019. Included in net securities lending income for the year ended December 31, 2019, was $105 from commingled funds.

As of December 31, 2019, PERA had no credit risk exposure to borrowers because the associated value of the collateral held exceeded the value of the securities loaned. The contracts with PERA's lending agents provide that the lending agents will indemnify PERA if loaned securities are not returned and PERA suffers direct losses due to a borrower's default or the lending agent's noncompliance with the contract. PERA had no losses on securities lending transactions resulting from the default of a borrower or the lending agent for the year ended December 31, 2019. PERA has limited the total fair value of securities outstanding to one borrower to 25 percent of the total fair value of all borrowed securities in the Deutsche Bank lending program and $50,000 per borrower in the Northern Trust lending program.

PERA or the borrower may terminate any security loan on demand. Though every loaned security may be sold and reclaimed at any time from the borrower, the weighted average loan life of overall loans outstanding at Northern Trust and Deutsche Bank was approximately 53 days and 77 days, respectively, as of December 31, 2019. At Northern Trust and Deutsche Bank, all loans were made on an overnight (one day) basis throughout 2019. The weighted average maturity (to the next reset date) at Northern Trust was 1 day and at Deutsche Bank was 12 days as of December 31, 2019. Since all securities loans are made on an overnight basis, there is usually a difference between the weighted average maturity of the investments made with the cash collateral provided by the borrower and the maturities of the securities loans.

As of December 31, 2019, reinvested securities lending collateral of $1,423,820 primarily consisted of investments totaling $1,304,953 valued at par, and accordingly are not classified within the fair value hierarchical framework. At December 31, 2019, $118,867 of the $1,423,820 in reinvested securities lending collateral consisted of fixed income investments and were considered to be Level 2 investments in the fair value hierarchical framework. Fixed income investments classified as Level 2 typically do not trade on a national or international exchange and their fair value is based on equivalent values of the same or comparable securities with similar yield and risk, otherwise known as matrix pricing.

Custodial Credit Risk

Governmental accounting standards limit the disclosure of custodial credit risk to investment securities that are uninsured, held in physical or book entry form, are not registered in PERA's name, and are held by either the counterparty or the counterparty's trust department or agent but not in PERA's name. Disclosure of custodial credit risk is also required when deposits are not covered by depository insurance and are uncollateralized, collateralized with securities held by the pledging financial institution, or collateralized with securities held by the pledging financial institution's trust department or agent but not in PERA's name.

To mitigate custodial credit risk, PERA's custodial credit risk policy has requirements governing how securities are held by the master custodian and for the effective management of cash balances. To further minimize custodial credit risk, periodic reviews are required to be completed on the master custodian's credit quality and capital levels. Additionally, assessments of counterparty risk are completed periodically using internal analysis and information obtained from third-party research and rating agency reports.

Northern Trust is the master custodian for the majority of PERA's securities. At December 31, 2019, there were no investments, or collateral securities subject to custodial credit risk. At December 31, 2019, there were $19,403 of foreign currency deposits and $55,806 of margin which were uninsured and uncollateralized and, therefore, exposed to custodial credit risk.

Concentration of Credit Risk

Concentration of credit risk is the risk of loss that may be attributed to the magnitude of PERA's investment in a single issuer. C.R.S. § 24-51-206(3) requires that no investment of the fund in common or preferred stock, or both, of any single corporation shall be of an amount which exceeds 5 percent of the then book value of the fund, nor shall the fund acquire more than 12 percent of the outstanding stock or bonds of any single corporation. The 12 percent requirement does not apply

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to governmental securities (U.S. Treasuries, sovereigns, etc.), Government Sponsored Enterprise securities (agencies including FNMA, FHLMC, etc.), mortgage-backed securities (agency or non-agency), commercial mortgage-backed securities (CMBS), asset-backed securities, or municipal securities. There is no single issuer exposure that comprises 5 percent of the then book value of the fund and no holdings greater than 12 percent of the outstanding stock or bonds of any single corporation at December 31, 2019.

RECONCILIATION OF CREDIT AND INTEREST RATE RISK DISCLOSURES TO FINANCIAL STATEMENTS

	As of December 31, 2019
Fixed income	$12,121,968
Fixed income securities classified as short term	31,933
Total fixed income securities	**$12,153,901**

Credit Risk

Credit risk is the risk that an issuer or other counterparty to an investment will not fulfill its obligation. As of December 31, 2019, PERA held investments across the credit ratings spectrum, with the majority invested in investment grade issuers defined as having a minimum rating of Baa3/BBB-/BBB-, issued by Moody's, Standard and Poor's (S&P), and Fitch, respectively. PERA's credit risk policy is as follows: Fixed income portfolios generally have guidelines that establish limits on holdings within each credit rating category. Some investment grade managers are allowed to purchase below investment grade securities, but in general are limited to no more than 5 percent exposure to below investment grade securities. The table below provides Moody's credit quality ratings for PERA's fixed income holdings as of December 31, 2019.

CREDIT QUALITY RATING DISPERSION SCHEDULE

Quality Rating Moody's	Total	U.S. Govt Mortgage-Backed Securities	U.S. Corporate Bonds	Non-U.S. Corporate Bonds	Stable Value Fund	Non-U.S. Govt/ Agency Bonds	Non-Agency MBS/CMBS	U.S. Municipal Bonds	U.S. Govt Agencies[1]
Aaa	$459,889	$2,850	$14,477	$—	$—	$191,832	$163,014	$11,112	$76,604
Aa1	69,570	—	35,173	—	—	18,414	1,537	14,446	—
Aa2	166,925	—	89,795	24,905	—	26,905	5,437	19,883	—
Aa3	121,928	—	80,701	22,858	—	—	2,129	16,240	—
A1	163,862	—	82,186	49,136	—	25,681	—	6,859	—
A2	519,652	—	439,108	61,955	—	7,358	—	11,231	—
A3	523,056	—	437,910	59,256	—	25,890	—	—	—
Baa1	320,643	—	207,078	109,110	—	4,455	—	—	—
Baa2	372,483	—	251,566	92,866	—	28,051	—	—	—
Baa3	356,930	—	288,957	42,028	—	25,923	—	22	—
Ba1	184,365	—	154,344	29,784	—	237	—	—	—
Ba2	14,080	—	14,080	—	—	—	—	—	—
B2	10,043	—	10,043	—	—	—	—	—	—
Not rated[2]	2,909,107	2,310,498	52,759	213	447,685	11,201	81,742	5,009	—
Subtotal	$6,192,533	$2,313,348	$2,158,177	$492,111	$447,685	$365,947	$253,859	$84,802	$76,604
U.S. govt treasuries	4,000,009								
Explicit U.S. govt agencies[3]	740,559								
Fixed income commingled funds[2,4]	1,210,451								
Fixed income mutual funds[2]	10,349								
Total	**$12,153,901**								

[1] Includes bonds issued by Federal Home Loan Bank, Federal Home Loan Mortgage Corporation, Federal National Mortgage Association, and other government-sponsored agencies.

[2] Not rated by Moody's.

[3] Bonds issued by the Government National Mortgage Association.

[4] The fair value and fund-level credit quality ratings as reported by the commingled fund managers are: $8,053—Aaa; $1,104,413—Aa2; $97,985—A1.

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Interest Rate Risk

Interest rate risk is the risk that changes in interest rates will adversely affect the fair value of an investment. PERA's policy is to manage its exposure to fair value losses arising from changes in interest rates by requiring that the duration of individual portfolios stays within defined bands of the duration of each portfolio's benchmark. PERA utilizes effective duration as the primary measure of interest rate risk within its fixed income investments. Duration estimates the sensitivity of a bond's price to interest rate changes. Effective duration makes assumptions regarding the most likely timing and amounts of variable cash flows arising from such investments as callable bonds, mortgage-backed securities, and variable-rate debt.

Effective duration for PERA's fixed income holdings as of December 31, 2019, is shown in the table below:

INTEREST RATE RISK—EFFECTIVE DURATION

	Fair Value Total	Fair Value Duration Not Available	Fair Value Duration Available	Effective Weighted Duration in Years
U.S. government treasuries	$4,000,009	$—	$4,000,009	6.81
U.S. government mortgage-backed securities	3,053,907	—	3,053,907	3.25
U.S. corporate bonds	2,158,177	—	2,158,177	8.42
Fixed income commingled funds	1,210,451	—	1,210,451	5.68
Non-U.S. corporate bonds	492,111	213	491,898	5.88
Stable value fund	447,685	—	447,685	2.90
Non-U.S. government/agency bonds	365,947	—	365,947	4.58
Non-agency MBS/CMBS	253,859	—	253,859	5.24
U.S. municipal bonds	84,802	2,007	82,795	10.86
U.S. government agencies	76,604	—	76,604	7.03
Fixed income mutual funds	10,349	—	10,349	5.85
Total	**$12,153,901**	**$2,220**	**$12,151,681**	**5.84**

Mortgage-Backed Securities

PERA invests in residential and commercial mortgage-backed securities which are reported at fair value in the Statements of Fiduciary Net Position under Investments at fair value, fixed income. PERA invests in mortgage-backed securities for diversification and to enhance fixed income returns.

A residential mortgage-backed security depends on the underlying pool of single-family mortgage loans to provide the cash flow to make principal and interest payments on the security. Mortgage-backed securities are subject to credit risk, the risk that the borrower will be unable to meet its obligations. In many cases, the payment of principal and interest is guaranteed by an agency of the U.S. Government, or a Government Sponsored Enterprise. While these guarantees reduce credit risk, residential mortgage-backed securities are also subject to prepayment risk as the timing of principal and interest payments remains uncertain. A decline in interest rates can result in call risk as prepayments accelerate, which reduces the weighted average life of the security. Alternatively, an increase in interest rates can result in extension risk as prepayment rates decline, which may cause the weighted average life of a mortgage investment to be longer than anticipated.

CMBS depend on underlying pools of commercial real estate loans to provide the cash flow to make principal and interest payments on the security. CMBS are subject to credit risk, the risk that the borrower will be unable to meet its obligations. These loans are typically for a fixed term, cannot be repaid early by the borrower without penalty and, accordingly, have lower prepayment risk than residential mortgage-backed securities.

To reduce PERA's counterparty credit risk while trading residential mortgage-backed securities, PERA has entered into Master Securities Forward Transaction Agreements with a number of counterparties which require margin collateral to be pledged or received when the change in net value of unsettled trades exceeds an agreed-upon threshold. As of December 31, 2019, the change in net value of all unsettled trades was below the agreed upon thresholds, and as a result, no collateral was pledged or held in relation to unsettled trades of mortgage-backed securities.

As of December 31, 2019, the fair value of residential and commercial mortgage-backed securities was $2,998,926 and $308,840, respectively, which excludes the fair value of mortgage-backed securities held in commingled funds.

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Foreign Currency Risk

Foreign currency risk is the risk that changes in exchange rates will adversely impact the fair value of an investment or a deposit. PERA's currency risk exposure resides primarily within the Global Equity asset class. In accordance with governmental accounting standards, this disclosure is limited to investments denominated in non-U.S. dollars. There may be additional foreign currency risk in investments that contain underlying securities or business operations exposed to a foreign currency. PERA's formal policy regarding foreign currency risk is to evaluate the risk as part of the fund's periodic asset/liability study and to consider it in determining the total fund asset allocation. At December 31, 2019, PERA did not have a currency hedging program at the total fund level. However, at the manager level, hedging currency risk may be permitted which allows the manager to actively manage currency exposure at their discretion in accordance with their individual investment guidelines. PERA monitors currency risk at the total fund, asset class, and portfolio levels.

PERA's exposure to foreign currency risk as of December 31, 2019, is shown in the following table.

FOREIGN CURRENCY RISK

Currency	Total	Global Equity	Private Equity	Real Estate	Income Receivable	Cash and Short-Term Investments	Corporate Bonds	Pending Trades	Pending Foreign Exchange Trades
Euro	$3,176,144	$2,722,613	$378,618	$35,745	$17,966	$7,358	$—	($123)	$13,967
Japanese yen	1,979,786	1,976,527	—	—	3,034	81	—	(2,408)	2,552
British pound sterling	1,666,178	1,613,153	48,689	—	3,081	877	—	515	(137)
Hong Kong dollar	842,310	841,595	—	—	34	697	—	—	(16)
Swiss franc	735,271	719,577	—	—	15,692	2	—	—	—
Canadian dollar	697,883	694,511	—	—	1,149	2,223	—	—	—
Australian dollar	448,495	446,400	—	—	732	1,363	—	(527)	527
Swedish krona	358,541	357,956	—	—	557	28	—	(91)	91
South Korean won	217,388	213,877	—	—	2,267	1,244	—	—	—
Indian rupee	214,980	213,489	—	—	—	2,027	—	(536)	—
New Taiwan dollar	195,910	195,172	—	—	629	109	—	—	—
Danish krone	192,657	188,751	—	—	3,892	14	—	—	—
Singapore dollar	165,471	165,011	—	—	406	54	—	(471)	471
Brazilian real	153,899	152,904	—	—	489	375	131	—	—
Chinese yuan renminbi (offshore)	75,744	75,163	—	—	—	581	—	—	—
South African rand	59,006	58,973	—	—	—	33	—	—	—
Norwegian krone	51,900	51,900	—	—	—	—	—	—	—
Mexican peso	48,305	47,963	—	—	1	341	—	—	—
Indonesian rupiah	47,338	47,338	—	—	—	—	—	—	—
Israeli shekel	40,799	40,767	—	—	7	84	—	(59)	—
Malaysian ringgit	33,521	33,241	—	—	9	271	—	1	(1)
Turkish lira	21,629	21,099	—	—	1	529	—	—	—
Thai baht	20,197	20,109	—	—	85	2	—	(1,181)	1,182
New Zealand dollar	19,752	19,413	—	—	—	339	—	—	—
Hungarian forint	15,929	15,929	—	—	—	—	—	—	—
United Arab Emirates dirham	14,984	14,828	—	—	—	156	—	—	—
Czech koruna	12,308	12,147	—	—	149	12	—	—	—
Polish zloty	10,807	10,345	—	—	10	452	—	(483)	483
Philippine peso	5,381	5,346	—	—	—	35	—	—	—
Russian ruble	4,006	4,006	—	—	—	—	—	—	—
Qatari riyal	3,269	3,171	—	—	—	98	—	—	—
Saudi riyal	1,867	1,858	—	—	—	9	—	—	—
Colombian peso	294	291	—	—	1	2	—	—	—
Peruvian sol	7	—	—	—	—	7	—	—	—
Egyptian pound	4	4	—	—	—	—	—	—	—
Total	**$11,531,960**	**$10,985,427**	**$427,307**	**$35,745**	**$50,191**	**$19,403**	**$131**	**($5,363)**	**$19,119**

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Note 6—Derivative Instruments

PERA reports derivative instruments at fair value. These derivative instruments involve, to varying degrees, elements of market risk to the extent of future market movements in excess of amounts recognized in the Statements of Fiduciary Net Position. For accounting purposes, derivative instruments are considered to be investments and not hedges.

The following table summarizes the derivative instruments outstanding as of December 31, 2019, that have been deemed significant by management. These instruments are recorded in investment receivables in the Statements of Fiduciary Net Position and the changes in fair value are included in investment income in the Statements of Changes in Fiduciary Net Position. Investments in limited partnerships and commingled funds include derivative instruments that are not reported in the following disclosure.

DERIVATIVE INSTRUMENTS—DEFINED BENEFIT PLANS

	Changes in Fair Value		Fair Value at December 31, 2019	
Investment Derivatives	Classification	Amount	Classification	Amount
Fixed income futures	Investment income	$4,851	Investment receivables	$55,806
Equity futures	Investment income	84,064		
Total		**$88,915**	**Total**	**$55,806**

Equity/Fixed Income Futures

Equity and fixed income futures represent contracts between two parties to purchase or sell securities or cash at a future date for a specified price. Futures contracts trade on organized exchanges. Recognition of investment income, with a corresponding change to the amount of investment receivables or liabilities, occurs on a daily basis according to the fluctuation of value of the futures contract. Payments are received or made to settle the fluctuation of the contract's value on a periodic basis. Upon entering into a futures contract, PERA is required to pledge an amount of cash or securities (known as an initial margin deposit) equal to a percentage of the contract amount.

Investment in futures contracts exposes PERA to credit risk. No losses related to counterparty nonperformance occurred in 2019. Credit risk is minimized by central counterparty clearing, margin deposits, and periodic settlement payments.

At December 31, 2019, PERA's defined benefit plans had 4,897 outstanding futures contracts with a total notional market exposure of $562,375 and total investment receivables of $55,806 reflecting counterparty margin deposits and fluctuation of the contract value since the last periodic settlement payment.

FUTURES CONTRACTS OUTSTANDING—DEFINED BENEFIT PLANS

As of December 31, 2019

Contract Type	Year of Maturity	Notional Amount (Market Exposure)
Equity	2020	$427,793
Fixed income	2020	134,582
Total		**$562,375**

Note 7—Commitments and Contingencies

As of December 31, 2019, PERA had commitments for future investments in Private Equity of $2,384,259, Real Estate of $650,724, and the Opportunity Fund of $1,267,646.

Pending or Threatened Litigation

PERA is involved in various lawsuits or threatened legal proceedings arising in the normal course of business. In the opinion of management, the ultimate resolution of these other matters will not have a material effect on the financial condition of PERA.

Note 8—Voluntary Investment Program, Defined Contribution Retirement Plan, and Deferred Compensation Plan

PERA administers the Voluntary Investment Program (PERAPlus 401(k) Plan), the Defined Contribution Retirement Plan (DC Plan), and the Deferred Compensation Plan (PERAPlus 457 Plan), collectively, Plans. The PERAPlus 401(k) Plan and DC Plan are both defined contribution plans. The PERAPlus 457 Plan is a deferred compensation plan. The Board has the authority to establish and amend the Plans pursuant to C.R.S. § 24-51-1401, C.R.S. § 24-51-1501, and C.R.S. § 24-51-1601, respectively. The complete provisions of the PERAPlus 401(k) Plan and the DC Plan are incorporated into *PERA's 401(k) and Defined Contribution Plan and Trust Document.* The complete provisions of the PERAPlus 457 Plan are incorporated into *The PERA Deferred Compensation Plan Document.*

All Plans

The following investment, distribution, and fee provisions are the same under all three Plans.

- Participants have the choice of contributing to 17 different investment options. In addition, participants may also make transfers, at any time, among the following listed investment options:
    - PERAdvantage Capital Preservation Fund
    - PERAdvantage Fixed Income Fund
    - PERAdvantage Real Return Fund
    - PERAdvantage U.S. Large Cap Stock Fund
    - PERAdvantage International Stock Fund
    - PERAdvantage U.S. Small and Mid-Cap Stock Fund
    - PERAdvantage Socially Responsible Investment (SRI) Fund
    - PERAdvantage Income Fund
    - PERAdvantage 2025 Fund
    - PERAdvantage 2030 Fund
    - PERAdvantage 2035 Fund
    - PERAdvantage 2040 Fund
    - PERAdvantage 2045 Fund
    - PERAdvantage 2050 Fund
    - PERAdvantage 2055 Fund
    - PERAdvantage 2060 Fund
    - TD Ameritrade Self-Directed Brokerage Account
- The participant's entire account balance becomes available for distribution upon termination from all PERA-affiliated and/or PERAPlus 457-affiliated employers. All distributions are in accordance with the Plan documents and IRC requirements.
- Voya Institutional Plan Services, LLC, administers the recordkeeping for all participant transactions. Northern Trust provides an array of financial services in support of day to day operations of the Plans, including custodial services.
- TD Ameritrade, Inc. provides brokerage services for the Self-Directed Brokerage Account. The TD Ameritrade Self-Directed Brokerage Account, which consists of cash, equities, fixed income, mutual funds, and exchange traded funds, is presented at fair value.
- The Great-West Stable Value Fund is offered within PERAdvantage Capital Preservation Fund through a group fixed and variable deferred annuity contract issued by Great-West Life & Annuity Insurance Company. As of December 31, 2019, the value of the variable deferred annuity contract including interest receivable and pending trade payable was $447,685. Fair value as of December 31, 2019, was $451,575.
- Cash balances represent both operating cash accounts and investment cash on deposit held by the custodians.
- Plan administration expenses are paid through a monthly administrative fee charged to participant accounts and an asset-based fee paid directly from each PERAdvantage fund. In addition, the underlying investment portfolio managers within each PERAdvantage fund charge an investment management fee, which is paid directly from investment proceeds.

PERAPlus 401(k) Plan

The PERAPlus 401(k) Plan was established January 1, 1985, and is an IRC § 401(k) plan that allows for voluntary participation to provide additional benefits at retirement for PERA members. All employees working for a PERA-affiliated employer may contribute to the PERAPlus 401(k) Plan. There were 411 employers eligible to participate in 2019 (see Note 1). The employer count is presented for purposes of complying with GASB 67 only. For all other purposes, the definition of an employer is governed by Title 24, Article 51 of the C.R.S., PERA's Rules, 8 CCR 1502-1, and, if applicable, the employer's affiliation agreement with PERA.

In 2019, participants could contribute the lesser of $19,000 (actual dollars) or 100 percent of compensation less PERA member contributions. Catch-up contributions up to $6,000 (actual dollars) in 2019 were allowed for participants who had attained age 50 before the close of

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the plan year, subject to the limitations of IRC § 414(v). Employer matching and discretionary contributions are allowable with total participant and employer contributions limited to $56,000 (actual dollars) per participant in 2019.

Provisions of the PERAPlus 401(k) Plan permit in-service withdrawals by participants while employed with a PERA-affiliated employer through loans, hardship withdrawals, or by a trustee-to-trustee transfer to the PERA defined benefit plan to purchase service credit. The balance of outstanding loans as of December 31, 2019, was $58,257 and was recorded as a benefit receivable on the Statements of Fiduciary Net Position. As of December 31, 2019, there were 68,920 participants with balances. Of the participants with balances, 24,540 made contributions within the last three months of the year, including 742 retirees. There were 13,681 terminated participants and 18,893 non-contributing retirees with balances. During 2019, the PERAPlus 401(k) Plan had a total of 2,512 terminated participants take full distributions of their accounts.

DC Plan

The DC Plan was established January 1, 2006, and is an IRC § 401(a) governmental profit-sharing plan. Its purpose is to offer a defined contribution alternative to the PERA defined benefit plan. Participation is available to certain new employees of State agencies and departments, most community college employees, and the District Attorney within each Judicial District, and if authorized by the county and the District Attorney, the attorneys within that Judicial District. Pursuant to C.R.S. § 24-51-1501(4), DC Plan eligibility was extended to certain new employees in the Local Government Division and certain new classified employees at State Colleges and Universities beginning on January 1, 2019 (see Note 1 for additional details). The eligible employees have the option to choose the PERA defined benefit plan or the DC Plan. There were 164 employers eligible to participate in 2019. The employer count is presented for purposes of complying with GASB 67 only. For all other purposes, the definition of an employer is governed by Title 24, Article 51 of the C.R.S., PERA's Rules, 8 CCR 1502-1, and, if applicable, the employer's affiliation agreement with PERA.

Between the second and fifth year of participation in the DC Plan, eligible participants may elect to terminate membership in the DC Plan and become a member of the PERA defined benefit plan. Similarly, an eligible employee of the PERA defined benefit plan may elect, between the second and fifth year of membership, to terminate membership in the PERA defined benefit plan and become a participant of the DC Plan. Either election is irrevocable.

2019 employer and member contribution rates for DC Plan are shown in the table below.

Division	Employer Contribution Rate	Member Contribution Rate
January 1, 2019 - June 30, 2019		
State Division (except State Troopers)	10.15%	8.00%
State Division (State Troopers)	12.85%	10.00%
Local Government Division	10.00%	8.00%
July 1, 2019 - December 31, 2019		
State Division (except State Troopers)	10.40%	8.75%
State Division (State Troopers)	13.10%	10.75%
Local Government Division	10.00%	8.00%

In addition, employers in the State and Local Government Divisions contribute the AED and SAED to the respective Division Trust Fund (see Note 4 for additional details on AED and SAED and for definition of "State Trooper"). DC Plan participants immediately vest in 50 percent of their employer contributions, together with accumulated investment earnings on the vested portion. For each full year of participation, vesting increases by 10 percent. Contribution requirements are established under C.R.S. § 24-51-1505.

Provisions of the DC Plan allow for the transfer of DC funds to the PERAPlus 401(k) Plan if a participant is still a PERA member but not active in the DC Plan. Additionally, the election to purchase service credit is available to those who are eligible and who are members of the PERA defined benefit plan with an existing DC Plan account. As of December 31, 2019, the DC Plan had 6,939 participants with balances. Of the participants with balances, 2,640 made contributions within the last three months of the year, including five retirees. There were 3,581 terminated participants and 32 non-contributing retirees with balances. During the year, 444 participants took full distributions of their accounts.

PERAPlus 457 Plan

On July 1, 2009, PERA assumed the administrative and fiduciary responsibilities for the State of Colorado Deferred Compensation Plan previously administered under C.R.S. Part 1 of Article 52 of Title 24, as said part existed prior to its repeal in 2009.

The PERAPlus 457 Plan is an IRC § 457 plan that allows for voluntary participation to provide additional benefits at retirement. All employees working for a PERA employer affiliated with the PERAPlus 457 Plan may contribute to the PERAPlus 457 Plan. All employers that were affiliated with the State 457 Plan prior to July 1, 2009, including those that are not PERA-affiliated employers, remained affiliated with the PERAPlus 457 Plan and their employees remained eligible to contribute. In 2019, participants could defer the lesser of $19,000 (actual dollars) or 100 percent of compensation less PERA member contributions. Catch-up deferrals, up to the greater of $6,000 (actual dollars) for participants who had attained age 50 before the close of the plan year or the limits of the special section 457 plan catch-up, were allowed in 2019, subject to the limitations of IRC § 414(v) and § 457(b).

Provisions of the PERAPlus 457 Plan permit in-service withdrawals by participants while employed with a PERAPlus 457 Plan-affiliated employer through loans, unforeseen emergency withdrawals, de minimis distributions, or by a trustee-to-trustee transfer to the PERA defined benefit plan to purchase service credit. The balance of outstanding loans as of December 31, 2019, was $11,902 and was recorded as a benefit receivable on the Statements of Fiduciary Net Position. As of December 31, 2019, there were 18,919 participants with balances. Of the participants with balances, 9,355 made contributions within the last three months of the year, including 233 retirees. There were 3,044 terminated participants and 4,279 non-contributing retirees with balances. During the year, the PERAPlus 457 Plan had a total of 781 terminated participants take full distributions of their accounts.

Note 9—Health Care Trust Funds—Defined Benefit Health Care Plans

PERA offers two defined benefit other postemployment benefit (OPEB) health care plans to benefit recipients and retirees. The HCTF and the DPS HCTF were created under C.R.S. § 24-51-1201(1) and (2), respectively. The HCTF is a cost-sharing multiple-employer plan and the DPS HCTF is a single-employer plan. These funds provide a health care premium subsidy to eligible participating PERA benefit recipients and retirees who choose to enroll in one of the PERA health care plans; however, the subsidy is not available if only enrolled in the dental and/or vision plan (s). The health care premium subsidy is based upon the benefit structure under which the member retires and the member's years of service credit. For members who retire having service credit with employers in the DPS Division and one or more of the other four divisions, the premium subsidy is allocated between the two Health Care Trust Funds. The basis for the amount of the premium subsidy funded by each trust fund is the percentage of the member contribution account balance from each division as it relates to the total member contribution account balance from which the retirement benefit is paid.

PERA Board Authority

Title 24, Article 51, Part 12 of the C.R.S., as amended, sets forth a framework that grants authority to the Board to contract, self-insure, and authorize disbursements necessary in order to carry out the purposes of the PERACare program, including the administration of the premium subsidies. PERA contracts with a national insurance carrier to administer claims for the self-insured health care plans, with a national prescription benefit manager to administer a pharmacy benefit for the self-insured plans, and with health insurance companies to provide fully insured health care plans providing services within Colorado.

Plan Description and Benefit Provisions

C.R.S. § 24-51-1202 *et seq.* specifies the eligibility for enrollment in the health care plans offered by PERA and the amount of the premium subsidy. The law governing a benefit recipient's eligibility for the subsidy and the amount of the subsidy differs slightly depending under which benefit structure the benefits are calculated. All benefit recipients under the PERA benefit structure and all retirees under the DPS benefit structure are eligible for a premium subsidy, if enrolled in a health care plan under PERACare. Upon the death of a DPS benefit structure retiree, no further subsidy is paid.

Membership Eligibility

Enrollment in the PERACare health benefits program is voluntary and available to the following eligible individuals:

- Benefit recipients and their dependents.
- Guardians of children receiving PERA survivor benefits if the children are enrolled in the health care program.
- Surviving spouses of deceased retirees who chose single-life annuity options, if the surviving spouse was enrolled in the program when the retiree's death occurred.
- Divorced spouses of retirees who are not receiving PERA benefits, but were enrolled in the program when the divorce occurred.
- Members while receiving short-term disability program payments.
- Members whose employers have elected to provide coverage through the health care program and such members' dependents.

Available Health Care Premium Subsidy

PERA Benefit Structure

The maximum service-based premium subsidy is $230 (actual dollars) per month for benefit recipients who are under 65 years of age and who are not entitled to Medicare; the maximum service-based subsidy is $115 (actual dollars) per month for benefit recipients who are 65 years of age or older or who are under 65 years of age and entitled to Medicare. The basis for the maximum service-based subsidy, in each case, is for benefit recipients with retirement benefits based on 20 or more years of service credit. There is a 5 percent reduction in the subsidy for each year less than 20. The benefit recipient pays the remaining portion of the premium to the extent the subsidy does not cover the entire amount.

(Dollars in Thousands)

For benefit recipients who have not participated in Social Security and who are not otherwise eligible for premium-free Medicare Part A for hospital-related services, C.R.S. § 24-51-1206(4) provides an additional subsidy. According to the statute, PERA cannot charge premiums to benefit recipients without Medicare Part A that are greater than premiums charged to benefit recipients with Part A for the same plan option, coverage level, and service credit. Currently, for each individual PERACare enrollee, the total premium for Medicare coverage is determined assuming plan participants have both Medicare Part A and Part B and the difference in premium cost is paid by the HCTF or the DPS HCTF on behalf of benefit recipients not covered by Medicare Part A.

DPS Benefit Structure

The maximum service-based premium subsidy is $230 (actual dollars) per month for retirees who are under 65 years of age and who are not entitled to Medicare; the maximum service-based subsidy is $115 (actual dollars) per month for retirees who are 65 years of age or older or who are under 65 years of age and entitled to Medicare. The basis for the maximum subsidy, in each case, is for retirees with retirement benefits based on 20 or more years of service credit. There is a 5 percent reduction in the subsidy for each year less than 20. The retiree pays the remaining portion of the premium to the extent the subsidy does not cover the entire amount.

For retirees who have not participated in Social Security and who are not otherwise eligible for premium-free Medicare Part A for hospital-related services, the HCTF or the DPS HCTF pays an alternate service-based premium subsidy. Each individual retiree meeting these conditions receives the maximum $230 (actual dollars) per month subsidy reduced appropriately for service less than 20 years, as described above. Retirees who do not have Medicare Part A pay the difference between the total premium and the monthly subsidy.

Medicare Prescription Drugs

The Medicare Prescription Drug, Improvement, and Modernization Act of 2003 established prescription drug coverage for Medicare beneficiaries under Medicare Part D. Beginning January 1, 2014, PERACare's prescription drug coverage for the self-insured Medicare supplement plans was moved to Employer Group Waiver Plan (EGWP) Medicare Part D prescription drug coverage. The EGWP provides three types of anticipated subsidies which the HCTF and DPS HCTF use to reduce the required premiums collected from the enrollees. Each fund pays for the full claims during the year and recoups the additional cost offsetting claims expense when the subsidies are received from the EGWP.

The subsidies provided by the EGWP include the following:

- A monthly direct subsidy based on the number of enrollees in the plan.
- A quarterly Coverage Gap Discount Program which is funded by pharmaceutical manufacturers and reimburses the funds a portion of the cost of certain drugs retirees have filled.
- An annual catastrophic coverage federal reinsurance which reimburses a portion of drug costs for retirees who reach a certain level of drug costs in a year.

The following amounts were recognized by the funds in 2019:

Subsidy	HCTF	DPS HCTF
Monthly direct subsidy	$1,679	$75
Quarterly Coverage Gap Discount	18,021	799
Annual federal reinsurance	31,813	1,403
Total	**$51,513**	**$2,277**

Contributions

Contribution requirements are established by statute under C.R.S. § 24-51-208. Colorado State law provisions may be amended from time to time by the Colorado General Assembly. PERA-affiliated employers must submit contributions for all PERA members equal to 1.02 percent of covered salaries. PERA-affiliated employers of the State Division, School Division, Local Government Division, and Judicial Division contribute to the HCTF. Affiliated employers of the DPS Division contribute to the DPS HCTF.

Listed below is the number of active participating employers for the two Health Care Trust Funds. Guidance under GASB 74 classifies a primary government and its component units as one employer.

Trust Fund	As of December 31, 2019[1]
HCTF	410
DPS HCTF	1
Total employers	**411**

[1] This employer count is presented for purposes of complying with GASB 74 only. For all other purposes, the definition of an employer is governed by Title 24, Article 51 of the C.R.S., PERA's Rules, 8 CCR 1502-1, and, if applicable, the employer's affiliation agreement with PERA.

Employer contributions and investment earnings on the assets primarily pay for the cost of the premium subsidies and the administrative costs incurred by the funds.

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Plan Data

Benefit recipients and members of PERA consisted of the following as of December 31, 2019:

MEMBERSHIP—HEALTH CARE TRUST FUNDS[1]

	HCTF	DPS HCTF	2019
Retirees and beneficiaries[2]	118,180	7,148	**125,328**
Inactive members eligible but not yet receiving benefits[3]	27,796	1,988	**29,784**
Active members[3]	197,615	15,679	**213,294**
Total	**343,591**	**24,815**	**368,406**

[1] PERA's inactive members not eligible for benefits are not included in this membership count for Health Care Trust Funds.

[2] Currently receiving or eligible for OPEB benefits.

[3] May be eligible for future OPEB benefits.

PARTICIPATION IN PERACARE FOR ELIGIBLE RETIREES AND BENEFICIARIES

	HCTF	DPS HCTF	Total
Enrolled in PERACare			
Under age 65	10,853	475	11,328
Age 65 and older	45,599	3,145	48,744
	56,452	3,620	60,072
Not enrolled in PERACare			
Under age 65	14,561	588	15,149
Age 65 and older	47,167	2,940	50,107
	61,728	3,528	65,256
Total eligible retirees and beneficiaries	**118,180**	**7,148**	**125,328**

Summary of HCTF and DPS HCTF

PERA offers two general types of health plans: fully insured plans offered through a health care organization and self-insured plans administered by third-party vendors. The plans offered include HMO, PPO, and Medicare Advantage plans.

Premiums collected and payments made are reported in two ways, depending on whether or not the funds bear any level of risk with regard to the health coverage. When there is no transfer of risk to the funds, the premiums collected are reported as a liability and the liability is relieved when the premiums are paid to the health insurance company that provides the fully insured health plan. When there is no health coverage risk, the only benefit payment reported is the subsidy benefit which is equal to the difference between the premiums collected from the enrollees and the full premium due to the health insurance company.

When the health care plan bears risk, all claims paid are reported as benefit payments and premiums collected are reported as a reduction to benefit payments. The health care plan that involves risk to the funds is the self-insured plan administered by Anthem Blue Cross Blue Shield (Anthem). In 2019, the prescription portion of claims remained self-insured, while the Medicare portion of medical claims changed to fully insured. Due to PERA's premium structure, these Medicare premiums paid to Anthem are reported as an expense within the Anthem plan and included in benefit payments. PERA uses an outside consultant to determine the premiums required to cover anticipated health claims. The cost to the enrollee is reduced by the amount of the enrollee's calculated subsidy, if applicable. Implicit in this process is the risk that actual claims experience and the subsidies received from the EGWP could be different from the consultant's determination resulting in either a gain or a loss to the funds. In addition, other estimates and assumptions are made for these funds. It is possible that actual results could significantly differ from these estimates.

Dental and Vision Plans

Dental and vision plans are also available to benefit recipients. PERA offers fully insured and self-insured dental plans and self-insured vision plans. The funds provide no subsidy and the participants pay the full premiums for dental and vision coverage. For the fully insured dental plan, premiums collected are reported as a liability and the liability is relieved when the premiums are paid to the insurance company who provides the coverage. For this plan, the risk is borne by the insurance company contracted to provide the coverage. The claims paid for the self-insured dental and vision plans are recorded as benefit payments and the premiums collected are recorded as a reduction to benefit payments. PERA uses an outside consultant to determine the premiums required to cover anticipated claims. The risk to these plans is that actual claims experience could be different from the estimates resulting in either a gain or loss to the funds. As of December 31, 2019, there were 64,568 participants enrolled in the dental plans and 52,027 participants enrolled in the vision plans in both the HCTF and the DPS HCTF.

PERA-Affiliated Employer Program Participation

In addition, fully insured pre-Medicare health plans offered through Anthem and Kaiser Permanente are available to any PERA-affiliated employer who voluntarily elects to provide health care coverage through the health care plan for its employees who are PERA members. The program acts as a purchaser of private insurance to obtain economies of scale for the employers that elect to join in the joint purchasing arrangement. As of December 31, 2019, there were 15 employers in the program with 150 active members enrolled.

Fully insured dental and vision plans are also available to eligible employees of employers who have elected to provide health care coverage through PERA. As of

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December 31, 2019, there were 216 participants enrolled in the dental plans and 254 participants enrolled in the vision plans.

The insurance companies, who provide coverage through the program, set the rates for each employer group. There is no transfer of risk to the funds, PERA, or between the participating employers. The funds provide no subsidy and the insurance companies providing the benefits bear the risk for the plans. The participants and/or employers pay the full premiums for the coverage. PERA collects the premiums and remits them to the insurance companies who provide the coverage.

Note 10—Net Pension Liability of the Division Trust Funds

The components of the net pension liability (NPL) for participating employers for each Division Trust Fund as of December 31, 2019, are as follows:

	State Division	School Division	Local Government Division	Judicial Division	DPS Division
Total pension liability	$25,696,667	$42,111,180	$5,324,353	$455,159	$4,315,270
Plan fiduciary net position	15,992,863	27,171,397	4,592,962	364,234	3,656,426
Net pension liability	**$9,703,804**	**$14,939,783**	**$731,391**	**$90,925**	**$658,844**
Plan fiduciary net position as a percentage of the total pension liability	62.24%	64.52%	86.26%	80.02%	84.73%

Actuarial Methods and Assumptions

Actuarial valuations involve estimates of the value of reported amounts and assumptions about the probability of events far into the future. Actuarially determined amounts are subject to continual revision as actual results are compared to past expectations and new estimates are made about the future. A Schedule of Net Pension Liability is included in the RSI, which follows the Notes to the Financial Statements. It presents multi-year trend information about whether the FNP is increasing or decreasing over time relative to the total pension liability (TPL). Calculations are based on the benefits provided under the terms of the substantive plan in effect at the time of each pension actuarial valuation and on the pattern of sharing of costs between employers of each Division Trust Fund and/or plan members to that point. Actuarial calculations reflect a long-term perspective.

The TPL for the Division Trust Funds was determined by actuarial valuations as of December 31, 2018, and generally accepted actuarial techniques were applied to roll forward the TPL to December 31, 2019 (measurement date). The December 31, 2018, actuarial valuations used the following actuarial cost method and key actuarial assumptions and other inputs:

	State Division	School Division	Local Government Division	Judicial Division	DPS Division
Actuarial cost method	Entry age	Entry age	Entry age	Entry age	Entry age
Price inflation	2.40%	2.40%	2.40%	2.40%	2.40%
Real wage growth	1.10%	1.10%	1.10%	1.10%	1.10%
Wage inflation	3.50%	3.50%	3.50%	3.50%	3.50%
Salary increases, including wage inflation	3.50%–9.17%	3.50%–9.70%	3.50%–10.45%	4.00%–5.00%	3.50%–9.70%
Long-term investment rate of return, net of pension plan investment expenses, including price inflation	7.25%	7.25%	7.25%	7.25%	7.25%
Discount rate at prior measurement date	7.25%	7.25%	7.25%	7.25%	7.25%
Discount rate at measurement date	7.25%	7.25%	7.25%	7.25%	7.25%
Post-retirement benefit increases:					
PERA benefit structure hired prior to 1/1/07 and DPS benefit structure[1]	1.25%	1.25%	1.25%	1.25%	1.25%
PERA benefit structure hired after 12/31/06[1,2]	Financed by the AIR	Financed by the AIR	Financed by the AIR	Financed by the AIR	Financed by the AIR

[1] For 2019, the AI was 0.00 percent.

[2] Post-retirement benefit increases are provided by the AIR, accounted separately within each Division Trust Fund, and subject to moneys being available; therefore, liabilities related to increases for members of these benefit tiers can never exceed available assets.

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The TPL as of December 31, 2019, included the anticipated adjustments to contribution rates and the AI cap, resulting from the 2018 AAP assessment, statutorily recognized July 1, 2019, and effective July 1, 2020.

Healthy mortality assumptions for active members were based on the RP-2014 White Collar Employee Mortality Table, a table specifically developed for actively working people. To allow for an appropriate margin of improved mortality prospectively, the mortality rates incorporate a 70 percent factor applied to male rates and a 55 percent factor applied to female rates.

Post-retirement non-disabled mortality assumptions for State and Local Government Divisions were based on the RP-2014 Healthy Annuitant Mortality Table, adjusted as follows:

- Males: Mortality improvement projected to 2018 using the MP-2015 projection scale, a 73 percent factor applied to rates for ages less than 80, a 108 percent factor applied to rates for ages 80 and above, and further adjustments for credibility.
- Females: Mortality improvement projected to 2020 using the MP-2015 projection scale, a 78 percent factor applied to rates for ages less than 80, a 109 percent factor applied to rates for ages 80 and above, and further adjustments for credibility.

Post-retirement non-disabled mortality assumptions for School, Judicial, and DPS Divisions were based on the RP-2014 White Collar Healthy Annuitant Mortality Table, adjusted as follows:

- Males: Mortality improvement projected to 2018 using the MP-2015 projection scale, a 93 percent factor applied to rates for ages less than 80, a 113 percent factor applied to rates for ages 80 and above, and further adjustments for credibility.
- Females: Mortality improvement projected to 2020 using the MP-2015 projection scale, a 68 percent factor applied to rates for ages less than 80, a 106 percent factor applied to rates for ages 80 and above, and further adjustments for credibility.

The mortality assumption for disabled retirees was based on 90 percent of the RP-2014 Disabled Retiree Mortality Table.

The actuarial assumptions used in the December 31, 2018, valuations were based on the results of the 2016 experience analysis for the periods January 1, 2012, through December 31, 2015, as well as the October 28, 2016, actuarial assumptions workshop and were adopted by the Board during the November 18, 2016, Board meeting.

The long-term expected return on plan assets is reviewed as part of regular experience studies prepared every four or five years for PERA. Recently, this assumption has been reviewed more frequently. The most recent analyses were outlined in presentations to the Board on October 28, 2016.

Several factors were considered in evaluating the long-term rate of return assumption, including long-term historical data, estimates inherent in current market data, and a log-normal distribution analysis in which best-estimate ranges of expected future real rates of return (expected return, net of investment expense and inflation) were developed for each major asset class. These ranges were 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 and then adding expected inflation. The capital market assumptions may cover a shorter investment horizon and may not be useful in setting the long-term rate of return for funding pension plans which covers a longer time frame. The assumption is intended to be a long-term assumption and is not expected to change absent a significant change in the asset allocation, a change in the inflation assumption, or a fundamental change in the market that alters expected returns in future years.

As of the most recent adoption of the long-term rate of return by the Board, the target asset allocation and best estimates of geometric real rates of return for each major asset class are summarized in the table as follows:

Asset Class	Target Allocation	30-Year Expected Geometric Real Rate of Return
U.S. Equity – Large Cap	21.20%	4.30%
U.S. Equity – Small Cap	7.42%	4.80%
Non-U.S. Equity – Developed	18.55%	5.20%
Non-U.S. Equity – Emerging	5.83%	5.40%
Core Fixed Income	19.32%	1.20%
High Yield	1.38%	4.30%
Non-U.S. Fixed Income – Developed	1.84%	0.60%
Emerging Market Debt	0.46%	3.90%
Core Real Estate	8.50%	4.90%
Opportunity Fund	6.00%	3.80%
Private Equity	8.50%	6.60%
Cash	1.00%	0.20%
Total	**100.00%**	

Note: In setting the long-term expected rate of return for the plan, projections employed to model future returns provide a range of expected long-term returns that, including expected inflation, ultimately support a long-term expected rate of return assumption of 7.25 percent.

Discount Rate/Single Equivalent Interest Rate

The projection of cash flows used to determine the discount rate was performed in accordance with GASB 67. The basis for the projection of the liabilities and the FNP was an actuarial valuation performed as of December 31, 2018, and the financial status of the funds as of the prior measurement date (December 31, 2018). In addition to the actuarial cost method and assumptions of the December 31, 2018, actuarial valuation presented earlier, the projection of cash flows applied the following methods and assumptions:

(Dollars in Thousands)

- Total covered payroll for the initial projection year consists of the covered payroll of the active membership present on the valuation date and the covered payroll of future plan members assumed to be hired during the year. In subsequent projection years, total covered payroll was assumed to increase annually at a rate of 3.50 percent.
- Employee contributions were assumed to be made at the member contribution rates in effect for each year, including the scheduled increases in SB 18-200 and the additional 0.50 percent for each of the five Division Trust Funds, resulting from the 2018 AAP assessment, statutorily recognized July 1, 2019, and effective July 1, 2020. Employee contributions for future plan members were used to reduce the estimated amount of total service costs for future plan members.
- Employer contributions were assumed to be made at rates equal to the fixed statutory rates specified in law for each year, including the scheduled increase in SB 18-200 and the additional 0.50 percent for each of the five Division Trust Funds, resulting from the 2018 AAP assessment, statutorily recognized July 1, 2019, and effective July 1, 2020. Employer contributions also include current and estimated future AED and SAED, until the actuarial value funding ratio reaches 103 percent, at which point the AED and SAED will each drop 0.50 percent every year until they are zero. Additionally, estimated employer contributions reflect reductions for the funding of the AIR and retiree health care benefits. For future plan members, employer contributions were further reduced by the estimated amount of total service costs for future plan members not financed by their member contributions.
- Employer contributions for the DPS Division Trust Fund are reduced by an amount equal to the principal payments plus interest necessary each year to finance the PCOPs issued in 1997 and 2008 and refinanced thereafter.
- As specified in law, the State, as a nonemployer contributing entity, provides an annual direct distribution of $225 million (actual dollars), which commenced July 1, 2018, that is proportioned between the State, School, Judicial, and DPS Division Trust Funds based upon the covered payroll of each Division. The annual direct distribution ceases when all Division Trust Funds are fully funded.
- Employer contributions and the amount of total service costs for future plan members were based upon a process to estimate future ADCs assuming an analogous future plan member growth rate.
- The AIR balance was excluded from the initial FNP, as per statute, AIR amounts cannot be used to pay benefits until transferred to either the retirement benefits reserve or the survivor benefits reserve, as appropriate. AIR transfers to the FNP and the subsequent AIR benefit payments were estimated and included in the projections.
- The projected benefit payments reflect the lowered AI cap, from 1.50 percent to 1.25 percent, resulting from the 2018 AAP assessment, statutorily recognized July 1, 2019, and effective July 1, 2020.
- Benefit payments and contributions were assumed to be made at the middle of the year.

Based on those methods and assumptions and the GASB 67 projection test methodology, the FNP for all Division Trust Funds were projected to be available to make all projected future benefit payments of current plan members and were not projected to reach a depletion date. Therefore, the long-term expected rate of return on plan investments was applied to all periods of projected benefit payments to determine the TPL for each fund. The discount rate determination did not use a municipal bond index rate, and therefore, the discount rate used to measure the TPL for these funds as of the measurement date (December 31, 2019) was 7.25 percent.

The results of the GASB 67 projection test methodology and development of the discount rate for each fund do not necessarily indicate the fund's ability to make benefit payments in the future.

Sensitivity of the Net Pension Liability to Changes in the Discount Rate

The following presents the NPL for participating employers for each fund using the current discount rate, as well the fund's NPL if calculated using a discount rate that is one percentage point lower or one percentage point higher than the current rate:

Trust Fund	1.0 Percent Decrease in Discount Rate	Net Pension Liability
State Division	6.25%	$12,483,645
School Division	6.25%	19,813,351
Local Government Division	6.25%	1,343,511
Judicial Division	6.25%	137,205
DPS Division	6.25%	1,168,699

Trust Fund	Current Discount Rate	Net Pension Liability
State Division	**7.25%**	**$9,703,804**
School Division	**7.25%**	**14,939,783**
Local Government Division	**7.25%**	**731,391**
Judicial Division	**7.25%**	**90,925**
DPS Division	**7.25%**	**658,844**

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Trust Fund	1.0 Percent Increase in Discount Rate	Net Pension Liability
State Division	8.25%	$7,351,374
School Division	8.25%	10,847,998
Local Government Division	8.25%	216,604
Judicial Division	8.25%	51,020
DPS Division	8.25%	234,736

As shown above, if there is a significant deviation, over a long period, in the actual rate of return compared to the assumed discount rate, the measurement of the NPL could be materially under- or over-reported as of December 31, 2019.

Note 11—Net OPEB Liability of the Health Care Trust Funds

The components of the net OPEB liability (NOL) for participating employers for each Health Care Trust Fund as of December 31, 2019, are as follows:

	HCTF	DPS HCTF
Total OPEB liability	$1,488,508	$69,473
Plan fiduciary net position	364,510	32,636
Net OPEB liability	**$1,123,998**	**$36,837**
Plan fiduciary net position as a percentage of the total OPEB liability	24.49%	46.98%

Actuarial Methods and Assumptions

Actuarial valuations involve estimates of the value of reported amounts and assumptions about the probability of events far into the future. Actuarially determined amounts are subject to continual revision as actual results are compared to past expectations and new estimates are made about the future. A Schedule of Net OPEB Liability is included in the RSI, which follows the Notes to the Financial Statements. It presents multi-year trend information about whether the FNP is increasing or decreasing over time relative to the total OPEB liability (TOL). Calculations are based on the benefits provided under the terms of the substantive plan in effect at the time of each actuarial valuation and on the pattern of sharing of costs between employers of each fund to that point. Actuarial calculations reflect a long-term perspective.

The TOL for the Health Care Trust Funds was determined by actuarial valuations as of December 31, 2018, and generally accepted actuarial techniques were applied to roll forward the TOL to December 31, 2019 (measurement date). The December 31, 2018, actuarial valuations used the following actuarial cost method and key actuarial assumptions and other inputs:

	HCTF	DPS HCTF
Actuarial cost method	Entry age	Entry age
Price inflation	2.40%	2.40%
Real wage growth	1.10%	1.10%
Wage inflation	3.50%	3.50%
Salary increases, including wage inflation	3.50% in aggregate	3.50% in aggregate
Long-term investment rate of return, net of OPEB plan investment expenses, including price inflation	7.25%	7.25%
Discount rate at prior measurement date	7.25%	7.25%
Discount rate at measurement date	7.25%	7.25%
Health care cost trend rates		
PERA benefit structure:		
Service-based premium subsidy	0.00%	0.00%
PERACare Medicare plans	5.60% in 2019, gradually decreasing to 4.50% in 2029	5.60% in 2019, gradually decreasing to 4.50% in 2029
Medicare Part A premiums	3.50% in 2019, gradually increasing to 4.50% in 2029	3.50% in 2019, gradually increasing to 4.50% in 2029
DPS benefit structure:		
Service-based premium subsidy	0.00%	0.00%
PERACare Medicare plans	N/A	N/A
Medicare Part A premiums	N/A	N/A

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In determining the additional liability for PERACare enrollees who are age 65 or older and who are not eligible for premium-free Medicare Part A, the following monthly costs/premiums (in actual dollars) are assumed for 2019 for the PERA benefit structure:

Medicare Plan	Cost for Members Without Medicare Part A	Premiums for Members Without Medicare Part A
Medicare Advantage/Self-Insured Prescription	$601	$240
Kaiser Permanente Medicare Advantage HMO	605	237

The 2019 Medicare Part A premium is $437 (actual dollars) per month.

In determining the additional liability for PERACare enrollees in the PERA benefit structure who are age 65 or older and who are not eligible for premium–free Medicare Part A, the following chart details the initial expected value of Medicare Part A benefits (in actual dollars), age adjusted to age 65 for the year following the valuation date:

Medicare Plan	Cost for Members Without Medicare Part A
Medicare Advantage/Self-Insured Prescription	$562
Kaiser Permanente Medicare Advantage HMO	571

All costs are subject to the health care cost trend rates, as discussed below.

Health care cost trend rates reflect the change in per capita health costs over time due to factors such as medical inflation, utilization, plan design, and technology improvements. For the PERA benefit structure, health care cost trend rates are needed to project the future costs associated with providing benefits to those PERACare enrollees not eligible for premium-free Medicare Part A.

Health care cost trend rates for the PERA benefit structure are based on published annual health care inflation surveys in conjunction with actual plan experience (if credible), building block models and industry methods developed by health plan actuaries and administrators. In addition, projected trends for the Federal Hospital Insurance Trust Fund (Medicare Part A premiums) provided by the Centers for Medicare & Medicaid Services are referenced in the development of these rates. Effective December 31, 2018, the health care cost trend rates for Medicare Part A premiums were revised to reflect the current expectation of future increases in rates of inflation applicable to Medicare Part A premiums.

The PERA benefit structure health care cost trend rates that were used to measure the TOL are summarized in the table below:

Year	PERACare Medicare Plans	Medicare Part A Premiums
2019	5.60%	3.50%
2020	8.60%	3.50%
2021	7.30%	3.50%
2022	6.00%	3.75%
2023	5.70%	3.75%
2024	5.50%	3.75%
2025	5.30%	4.00%
2026	5.10%	4.00%
2027	4.90%	4.25%
2028	4.70%	4.25%
2029+	4.50%	4.50%

Mortality assumptions detailed in Note 10 for the determination of the TPL for each the Division Trust Funds as shown below are applied, as applicable, in the determination of the TOL for the Health Care Trust Funds. Affiliated employers of the State, School, Local Government, and Judicial Divisions participate in the HCTF. Affiliated employers of the DPS Division participate in the DPS HCTF.

Healthy mortality assumptions for active members were based on the RP-2014 White Collar Employee Mortality Table, a table specifically developed for actively working people. To allow for an appropriate margin of improved mortality prospectively, the mortality rates incorporate a 70 percent factor applied to male rates and a 55 percent factor applied to female rates.

Post-retirement non-disabled mortality assumptions for State and Local Government Divisions were based on the RP-2014 Healthy Annuitant Mortality Table, adjusted as follows:

- Males: Mortality improvement projected to 2018 using the MP-2015 projection scale, a 73 percent factor applied to rates for ages less than 80, a 108 percent factor applied to rates for ages 80 and above, and further adjustments for credibility.
- Females: Mortality improvement projected to 2020 using the MP-2015 projection scale, a 78 percent factor applied to rates for ages less than 80, a 109 percent factor applied to rates for ages 80 and above, and further adjustments for credibility.

Post-retirement non-disabled mortality assumptions for School, Judicial, and DPS Divisions were based on the RP-2014 White Collar Healthy Annuitant Mortality Table, adjusted as follows:

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- Males: Mortality improvement projected to 2018 using the MP-2015 projection scale, a 93 percent factor applied to rates for ages less than 80, a 113 percent factor applied to rates for ages 80 and above, and further adjustments for credibility.
- Females: Mortality improvement projected to 2020 using the MP-2015 projection scale, a 68 percent factor applied to rates for ages less than 80, a 106 percent factor applied to rates for ages 80 and above, and further adjustments for credibility.

The mortality assumption for disabled retirees was based on 90 percent of the RP-2014 Disabled Retiree Mortality Table.

The following health care costs assumptions were updated and used in the measurement of the obligations for the HCTF and DPS HCTF:

- Initial per capita health care costs for those PERACare enrollees under the PERA benefit structure who are expected to attain age 65 and older ages and are not eligible for premium-free Medicare Part A benefits were updated to reflect the change in costs for the 2019 plan year.
- The morbidity assumptions were updated to reflect the assumed standard aging factors.
- The health care cost trend rates for Medicare Part A premiums were revised to reflect the then-current expectation of future increases in rates of inflation applicable to Medicare Part A premiums.

The actuarial assumptions used in the December 31, 2018, valuations were based on the results of the 2016 experience analysis for the periods January 1, 2012, through December 31, 2015, as well as, the October 28, 2016, actuarial assumptions workshop and were adopted by the Board during the November 18, 2016, Board meeting. In addition, certain actuarial assumptions pertaining to per capita health care costs and their related trend rates are analyzed and updated annually by the Board's actuary, as discussed above.

The long-term expected return on plan assets is reviewed as part of regular experience studies prepared every four or five years for PERA. Recently, this assumption has been reviewed more frequently. The most recent analyses were outlined in presentations to the Board on October 28, 2016.

Several factors were considered in evaluating the long-term rate of return assumption, including long-term historical data, estimates inherent in current market data, and a log-normal distribution analysis in which best-estimate ranges of expected future real rates of return (expected return, net of investment expense and inflation) were developed for each major asset class. These ranges were 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 and then adding expected inflation. The capital market assumptions may cover a shorter investment horizon and may not be useful in setting the long-term rate of return for funding OPEB plans which covers a longer time frame. The assumption is intended to be a long-term assumption and is not expected to change absent a significant change in the asset allocation, a change in the inflation assumption, or a fundamental change in the market that alters expected returns in future years.

As of the most recent adoption of the long-term rate of return by the Board, the target asset allocation and best estimates of geometric real rates of return for each major asset class are summarized in the table as follows:

Asset Class	Target Allocation	30-Year Expected Geometric Real Rate of Return
U.S. Equity – Large Cap	21.20%	4.30%
U.S. Equity – Small Cap	7.42%	4.80%
Non-U.S. Equity – Developed	18.55%	5.20%
Non-U.S. Equity – Emerging	5.83%	5.40%
Core Fixed Income	19.32%	1.20%
High Yield	1.38%	4.30%
Non-U.S. Fixed Income – Developed	1.84%	0.60%
Emerging Market Debt	0.46%	3.90%
Core Real Estate	8.50%	4.90%
Opportunity Fund	6.00%	3.80%
Private Equity	8.50%	6.60%
Cash	1.00%	0.20%
Total	**100.00%**	

Note: In setting the long-term expected rate of return for the plan, projections employed to model future returns provide a range of expected long-term returns that, including expected inflation, ultimately support a long-term expected rate of return assumption of 7.25 percent.

NOTES TO THE FINANCIAL STATEMENTS

(Dollars in Thousands)

Sensitivity of the Net OPEB Liability to Changes in the Health Care Cost Trend Rates

The following presents the NOL using the current health care cost trend rates applicable to the PERA benefit structure, as well as the fund's NOL if calculated using health care cost trend rates that are one percentage point lower or one percentage point higher than the current rates:

	1.0 Percent Decrease in Trend Rates	Current Trend Rates	1.0 Percent Increase in Trend Rates
Initial PERACare Medicare trend rate	4.60%	5.60%	6.60%
Ultimate PERACare Medicare trend rate	3.50%	4.50%	5.50%
Initial Medicare Part A trend rate	2.50%	3.50%	4.50%
Ultimate Medicare Part A trend rate	3.50%	4.50%	5.50%
Net OPEB liability			
HCTF	$1,097,298	$1,123,998	$1,154,852
DPS HCTF	36,829	36,837	36,845

Discount Rate/Single Equivalent Interest Rate

The projection of cash flows used to determine the discount rate was performed in accordance with GASB 74. The basis for the projections of the liabilities and the FNP was an actuarial valuation performed as of December 31, 2018 and the financial status of the fund as of the prior measurement date (December 31, 2018). In addition to the actuarial cost method and assumptions of the December 31, 2018, actuarial valuation presented earlier, the projection of cash flows applied the following methods and assumptions:

- Updated health care cost trend rates for Medicare Part A premiums as of the December 31, 2019, measurement date.
- Total covered payroll for the initial projection year consists of the covered payroll of the active membership present on the valuation date and the covered payroll of future plan members assumed to be hired during the year. In subsequent projection years, total covered payroll was assumed to increase annually at a rate of 3.50 percent.
- Employer contributions were assumed to be made at rates equal to the fixed statutory rates specified in law and effective as of the measurement date.
- Employer contributions and the amount of total service costs for future plan members were based upon a process to estimate future ADCs assuming an analogous future plan member growth rate.
- Benefit payments and contributions were assumed to be made at the middle of the year.

Based on those methods and assumptions and the GASB 74 projection test methodology, the FNP for the HCTF and DPS HCTF were projected to be available to make all projected future benefit payments of current plan members and were not projected to reach a depletion date. Therefore, the long-term expected rate of return on plan investments was applied to all periods of projected benefit payments to determine the TOL for each fund. The discount rate determination did not use a municipal bond index rate, and therefore, the discount rate used to measure the TOL for these funds as of the measurement date (December 31, 2019) was 7.25 percent.

The results of the GASB 74 projection test methodology and development of the discount rate for each fund do not necessarily indicate the fund's ability to make benefit payments in the future.

Sensitivity of the Net OPEB Liability to Changes in the Discount Rate

The following presents the NOL for participating employers for each fund using the current discount rate, as well as the fund's NOL if calculated using a discount rate that is one percentage point lower or one percentage point higher than the current rate:

	1.0 Percent Decrease in Discount Rate	Net OPEB Liability
HCTF	6.25%	$1,270,906
DPS HCTF	6.25%	43,544

	Current Discount Rate	Net OPEB Liability
HCTF	**7.25%**	**$1,123,998**
DPS HCTF	**7.25%**	**36,837**

	1.0 Percent Increase in Discount Rate	Net OPEB Liability
HCTF	8.25%	$998,361
DPS HCTF	8.25%	31,112

As shown above, if there is a significant deviation, over a long period, in the actual rate of return compared to the assumed discount rate, the measurement of the NOL could be materially under- or over-reported as of December 31, 2019.

Note 12—Subsequent Events

Subsequent to December 31, 2019, as a result of the COVID-19 pandemic, the global economic outlook has changed. The duration and full effects of the pandemic are currently unknown, as the global picture continues to evolve. Although unprecedented federal fiscal and monetary stimulus have helped to stabilize and soften the

NOTES TO THE FINANCIAL STATEMENTS

(Dollars in Thousands)

impact of economic contraction, the near-term negative impact on PERA's investment portfolio, as well the short-medium term impact on PERA's membership and demographics, remains uncertain.

HB 20-1379: *Suspend Direct Distribution to PERA Public Employees Retirement Association for 2020-21 Fiscal Year,* passed during the 2020 legislative session and signed by Governor Polis on June 29, 2020, suspends the July 1, 2020, $225 million (actual dollars) direct distribution allocated to the State, School, Judicial, and DPS Divisions, as required under SB 18-200.

HB 20-1394: *Public Employees' Retirement Association Judicial Division Contribution Rate Modification*, passed during the 2020 legislative session and signed by Governor Polis on June 29, 2020, modifies the source of the dollars otherwise anticipated to be contributed to the pension plan over the next three-year period (plan years 2020-2022). The bill's main provision requires 5.0 percent of the Judicial Division base employer contributions rate to be paid by the members of the Judicial Division for the State's 2020-21 and 2021-22 fiscal years. This does not apply to the employer or member contribution rates for judges employed by the Denver County Court.

Governmental accounting standards require the net pension liabilities for financial reporting purposes be measured using the plan provisions in effect as of the pension plan's year end. The passage of HB 20-1379 and HB 20-1394 into law is considered a nonrecognized subsequent event as these statutory changes to plan provisions did not exist as of the December 31, 2019, measurement date.

REQUIRED SUPPLEMENTARY INFORMATION (UNAUDITED)—DIVISION TRUST FUNDS

(Dollars in Thousands)

SCHEDULE OF CHANGES IN NET PENSION LIABILITY—STATE DIVISION[1]

For the Years Ended December 31

	2019	2018	2017	2016	2015	2014
Total pension liability						
Service cost	**$344,666**	$727,319	$518,360	$317,466	$309,351	$285,311
Interest	**1,800,848**	1,658,186	1,640,426	1,741,390	1,700,903	1,663,542
Changes of benefit terms	**(501,768)**	(1,967,940)	—	—	—	—
Difference between expected and actual experience	**408,792**	330,007	416,731	176,889	237,147	(1,069)
Changes of assumptions or other inputs	**—**	(8,968,282)	2,286,877	7,313,068	(192,776)	—
Benefit payments, refunds, and disability premiums	**(1,700,965)**	(1,675,880)	(1,615,021)	(1,546,071)	(1,483,517)	(1,415,754)
Net change in total pension liability	**351,573**	(9,896,590)	3,247,373	8,002,742	571,108	532,030
Total pension liability – beginning	**25,345,094**	35,241,684	31,994,311	23,991,569	23,420,461	22,888,431
Total pension liability – ending (a)	**$25,696,667**	**$25,345,094**	**$35,241,684**	**$31,994,311**	**$23,991,569**	**$23,420,461**
Plan fiduciary net position						
Contributions – employer	**$612,282**	$583,164	$563,977	$521,804	$484,005	$444,372
Contributions – nonemployer	**77,088**	78,489	—	—	—	—
Contributions – active member (includes purchased service)	**287,297**	261,540	256,420	247,533	244,926	234,056
Net investment income (loss)	**2,764,719**	(497,562)	2,391,683	947,981	210,337	780,762
Benefit payments, refunds, and disability premiums	**(1,700,965)**	(1,675,880)	(1,615,021)	(1,546,071)	(1,483,517)	(1,415,754)
Administrative expense	**(11,294)**	(11,903)	(11,745)	(11,271)	(10,779)	(10,067)
Other additions and deductions	**(2,685)**	4,871	12,208	5,668	1,617	118
Net change in plan fiduciary net position	**2,026,442**	(1,257,281)	1,597,522	165,644	(553,411)	33,487
Plan fiduciary net position – beginning	**13,966,421**	15,223,702	13,626,180	13,460,536	14,013,947	13,980,460
Plan fiduciary net position – ending (b)	**$15,992,863**	**$13,966,421**	**$15,223,702**	**$13,626,180**	**$13,460,536**	**$14,013,947**
Net pension liability – ending (a)-(b)	**$9,703,804**	**$11,378,673**	**$20,017,982**	**$18,368,131**	**$10,531,033**	**$9,406,514**

[1] Information is not available prior to 2014. In future reports, additional years will be added until 10 years of historical data are presented.

The accompanying notes are an integral part of the Required Supplementary Information.

REQUIRED SUPPLEMENTARY INFORMATION (UNAUDITED)—DIVISION TRUST FUNDS

(Dollars in Thousands)

SCHEDULE OF CHANGES IN NET PENSION LIABILITY—SCHOOL DIVISION[1]

For the Years Ended December 31

	2019	2018	2017	2016	2015	2014
Total pension liability						
Service cost	**$618,937**	$1,270,011	$954,368	$567,247	$548,358	$511,059
Interest	**2,938,492**	2,759,146	2,690,433	2,722,256	2,652,731	2,582,865
Changes of benefit terms	**(856,299)**	(3,247,230)	—	—	—	—
Difference between expected and actual experience	**770,676**	443,651	564,155	346,658	278,464	(1,387)
Changes of assumptions or other inputs	**—**	(15,247,222)	3,547,294	13,572,334	(298,005)	—
Benefit payments, refunds, and disability premiums	**(2,545,230)**	(2,492,928)	(2,411,987)	(2,300,644)	(2,208,452)	(2,113,547)
Net change in total pension liability	**926,576**	(16,514,572)	5,344,263	14,907,851	973,096	978,990
Total pension liability – beginning	**41,184,604**	57,699,176	52,354,913	37,447,062	36,473,966	35,494,976
Total pension liability – ending (a)	**$42,111,180**	**$41,184,604**	**$57,699,176**	**$52,354,913**	**$37,447,062**	**$36,473,966**
Plan fiduciary net position						
Contributions – employer	**$1,002,760**	$923,910	$857,740	$812,740	$754,182	$686,323
Contributions – nonemployer	**127,367**	126,505	—	—	—	—
Contributions – active member (includes purchased service)	**462,891**	414,336	399,053	386,481	372,378	356,520
Net investment income (loss)	**4,676,607**	(838,899)	3,982,275	1,569,026	344,000	1,274,862
Benefit payments, refunds, and disability premiums	**(2,545,230)**	(2,492,928)	(2,411,987)	(2,300,644)	(2,208,452)	(2,113,547)
Administrative expense	**(22,619)**	(23,560)	(23,019)	(21,991)	(20,865)	(19,290)
Other additions and deductions	**(7,929)**	5,456	(22,378)	(17,334)	(9,082)	(4,264)
Net change in plan fiduciary net position	**3,693,847**	(1,885,180)	2,781,684	428,278	(767,839)	180,604
Plan fiduciary net position – beginning	**23,477,550**	25,362,730	22,581,046	22,152,768	22,920,607	22,740,003
Plan fiduciary net position – ending (b)	**$27,171,397**	**$23,477,550**	**$25,362,730**	**$22,581,046**	**$22,152,768**	**$22,920,607**
Net pension liability – ending (a)-(b)	**$14,939,783**	**$17,707,054**	**$32,336,446**	**$29,773,867**	**$15,294,294**	**$13,553,359**

[1] Information is not available prior to 2014. In future reports, additional years will be added until 10 years of historical data are presented.

The accompanying notes are an integral part of the Required Supplementary Information.

REQUIRED SUPPLEMENTARY INFORMATION (UNAUDITED)—DIVISION TRUST FUNDS

(Dollars in Thousands)

SCHEDULE OF CHANGES IN NET PENSION LIABILITY—LOCAL GOVERNMENT DIVISION[1]

For the Years Ended December 31

	2019	2018	2017	2016	2015	2014
Total pension liability						
Service cost	**$75,305**	$84,331	$75,417	$65,250	$63,005	$58,676
Interest	**373,200**	386,381	360,995	346,944	338,616	329,156
Changes of benefit terms	**(105,812)**	(412,930)	(110)	—	—	—
Difference between expected and actual experience	**65,687**	77,207	125,585	42,105	14,930	(322)
Changes of assumptions or other inputs	**—**	—	—	179,802	(36,449)	—
Benefit payments, refunds, and disability premiums	**(312,629)**	(302,903)	(289,218)	(272,344)	(265,789)	(256,972)
Net change in total pension liability	**95,751**	(167,914)	272,669	361,757	114,313	130,538
Total pension liability – beginning	**5,228,602**	5,396,516	5,123,847	4,762,090	4,647,777	4,517,239
Total pension liability – ending (a)	**$5,324,353**	**$5,228,602**	**$5,396,516**	**$5,123,847**	**$4,762,090**	**$4,647,777**
Plan fiduciary net position						
Contributions – employer	**$85,597**	$81,358	$78,291	$75,132	$70,415	$68,719
Contributions – employer disaffiliation	**—**	—	1,063	—	—	186,006
Contributions – active member (includes purchased service)	**62,823**	58,063	56,797	52,451	51,986	49,290
Net investment income (loss)	**792,219**	(142,476)	669,011	261,276	56,328	200,394
Benefit payments, refunds, and disability premiums	**(312,629)**	(302,903)	(289,218)	(272,344)	(265,789)	(256,972)
Administrative expense	**(2,476)**	(2,621)	(2,541)	(2,395)	(2,253)	(2,091)
Other additions and deductions	**(3,961)**	(3,118)	(3,823)	(1,123)	(1,646)	(2,190)
Net change in plan fiduciary net position	**621,573**	(311,697)	509,580	112,997	(90,959)	243,156
Plan fiduciary net position – beginning	**3,971,389**	4,283,086	3,773,506	3,660,509	3,751,468	3,508,312
Plan fiduciary net position – ending (b)	**$4,592,962**	**$3,971,389**	**$4,283,086**	**$3,773,506**	**$3,660,509**	**$3,751,468**
Net pension liability – ending (a)-(b)	**$731,391**	**$1,257,213**	**$1,113,430**	**$1,350,341**	**$1,101,581**	**$896,309**

[1] Information is not available prior to 2014. In future reports, additional years will be added until 10 years of historical data are presented.

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REQUIRED SUPPLEMENTARY INFORMATION (UNAUDITED)—DIVISION TRUST FUNDS

(Dollars in Thousands)

SCHEDULE OF CHANGES IN NET PENSION LIABILITY—JUDICIAL DIVISION[1]

For the Years Ended December 31

	2019	2018	2017	2016	2015	2014
Total pension liability						
Service cost	**$8,774**	$13,516	$14,364	$12,639	$10,813	$9,024
Interest	**32,105**	30,417	27,480	25,774	25,005	24,820
Changes of benefit terms	**(8,459)**	(33,997)	—	—	—	—
Difference between expected and actual experience	**2,732**	3,122	16,644	22,804	7,289	(5)
Changes of assumptions or other inputs	**—**	(100,437)	(14,394)	43,576	21,485	21,294
Benefit payments, refunds, and disability premiums	**(28,097)**	(26,463)	(25,298)	(22,888)	(21,200)	(19,903)
Net change in total pension liability	**7,055**	(113,842)	18,796	81,905	43,392	35,230
Total pension liability – beginning	**448,104**	561,946	543,150	461,245	417,853	382,623
Total pension liability – ending (a)	**$455,159**	**$448,104**	**$561,946**	**$543,150**	**$461,245**	**$417,853**
Plan fiduciary net position						
Contributions – employer	**$10,649**	$8,299	$8,080	$8,024	$7,702	$7,070
Contributions – nonemployer	**1,344**	1,385	—	—	—	—
Contributions – active member (includes purchased service)	**5,187**	4,700	4,863	4,037	4,197	4,296
Net investment income (loss)	**61,719**	(11,006)	51,173	19,783	4,149	15,299
Benefit payments, refunds, and disability premiums	**(28,097)**	(26,463)	(25,298)	(22,888)	(21,200)	(19,903)
Administrative expense	**(84)**	(86)	(86)	(81)	(77)	(72)
Other additions and deductions	**6,670**	155	2,226	2,678	3,081	156
Net change in plan fiduciary net position	**57,388**	(23,016)	40,958	11,553	(2,148)	6,846
Plan fiduciary net position – beginning	**306,846**	329,862	288,904	277,351	279,499	272,653
Plan fiduciary net position – ending (b)	**$364,234**	**$306,846**	**$329,862**	**$288,904**	**$277,351**	**$279,499**
Net pension liability – ending (a)-(b)	**$90,925**	**$141,258**	**$232,084**	**$254,246**	**$183,894**	**$138,354**

[1] Information is not available prior to 2014. In future reports, additional years will be added until 10 years of historical data are presented.

The accompanying notes are an integral part of the Required Supplementary Information.

REQUIRED SUPPLEMENTARY INFORMATION (UNAUDITED)—DIVISION TRUST FUNDS

(Dollars in Thousands)

SCHEDULE OF CHANGES IN NET PENSION LIABILITY—DPS DIVISION[1]

For the Years Ended December 31

	2019	2018	2017	2016	2015	2014
Total pension liability						
Service cost	**$91,764**	$90,657	$91,986	$85,988	$82,079	$76,564
Interest	**301,210**	313,294	295,838	283,862	281,752	274,862
Changes of benefit terms	**(82,064)**	(318,480)	—	—	—	—
Difference between expected and actual experience	**86,001**	35,147	47,121	(2,839)	45,767	(174)
Changes of assumptions or other inputs	**—**	—	—	205,645	(113,772)	—
Benefit payments, refunds, and disability premiums	**(288,984)**	(287,825)	(281,844)	(272,071)	(263,323)	(255,434)
Net change in total pension liability	**107,927**	(167,207)	153,101	300,585	32,503	95,818
Total pension liability – beginning	**4,207,343**	4,374,550	4,221,449	3,920,864	3,888,361	3,792,543
Total pension liability – ending (a)	**$4,315,270**	**$4,207,343**	**$4,374,550**	**$4,221,449**	**$3,920,864**	**$3,888,361**
Plan fiduciary net position						
Contributions – employer	**$43,340**	$35,994	$27,578	$17,071	$8,494	$18,478
Contributions – nonemployer	**19,201**	18,621	—	—	—	—
Contributions – active member (includes purchased service)	**65,496**	61,098	56,820	54,852	53,558	49,409
Net investment income (loss)	**632,669**	(114,070)	548,585	218,415	49,172	182,823
Benefit payments, refunds, and disability premiums	**(288,984)**	(287,825)	(281,844)	(272,071)	(263,323)	(255,434)
Administrative expense	**(2,713)**	(2,919)	(2,857)	(2,754)	(2,599)	(2,377)
Other additions and deductions	**2,975**	(4,497)	3,781	3,135	(1,764)	(1,547)
Net change in plan fiduciary net position	**471,984**	(293,598)	352,063	18,648	(156,462)	(8,648)
Plan fiduciary net position – beginning	**3,184,442**	3,478,040	3,125,977	3,107,329	3,263,791	3,272,439
Plan fiduciary net position – ending (b)	**$3,656,426**	**$3,184,442**	**$3,478,040**	**$3,125,977**	**$3,107,329**	**$3,263,791**
Net pension liability – ending (a)-(b)	**$658,844**	**$1,022,901**	**$896,510**	**$1,095,472**	**$813,535**	**$624,570**

[1] Information is not available prior to 2014. In future reports, additional years will be added until 10 years of historical data are presented.

The accompanying notes are an integral part of the Required Supplementary Information.

REQUIRED SUPPLEMENTARY INFORMATION (UNAUDITED)—DIVISION TRUST FUNDS

(Dollars in Thousands)

SCHEDULE OF NET PENSION LIABILITY[1]

For the Years Ended December 31

State Division	2019	2018	2017	2016
Total pension liability	**$25,696,667**	$25,345,094	$35,241,684	$31,994,311
Plan fiduciary net position	**15,992,863**	13,966,421	15,223,702	13,626,180
Net pension liability	**$9,703,804**	**$11,378,673**	**$20,017,982**	**$18,368,131**
Plan fiduciary net position as a percentage of the total pension liability	**62.24%**	55.11%	43.20%	42.59%
Covered payroll	**$2,995,453**	$2,898,827	$2,774,207	$2,710,651
Net pension liability as a percentage of covered payroll	**323.95%**	392.53%	721.57%	677.63%

	2015	2014	2013
Total pension liability	$23,991,569	$23,420,461	$22,888,431
Plan fiduciary net position	13,460,536	14,013,947	13,980,460
Net pension liability	**$10,531,033**	**$9,406,514**	**$8,907,971**
Plan fiduciary net position as a percentage of the total pension liability	56.11%	59.84%	61.08%
Covered payroll	$2,641,867	$2,564,670	$2,474,965
Net pension liability as a percentage of covered payroll	398.62%	366.77%	359.92%

School Division	2019	2018	2017	2016
Total pension liability	**$42,111,180**	$41,184,604	$57,699,176	$52,354,913
Plan fiduciary net position	**27,171,397**	23,477,550	25,362,730	22,581,046
Net pension liability	**$14,939,783**	**$17,707,054**	**$32,336,446**	**$29,773,867**
Plan fiduciary net position as a percentage of the total pension liability	**64.52%**	57.01%	43.96%	43.13%
Covered payroll	**$5,104,431**	$4,789,503	$4,471,357	$4,349,320
Net pension liability as a percentage of covered payroll	**292.68%**	369.71%	723.19%	684.56%

	2015	2014	2013
Total pension liability	$37,447,062	$36,473,966	$35,494,976
Plan fiduciary net position	22,152,768	22,920,607	22,740,003
Net pension liability	**$15,294,294**	**$13,553,359**	**$12,754,973**
Plan fiduciary net position as a percentage of the total pension liability	59.16%	62.84%	64.07%
Covered payroll	$4,235,290	$4,063,236	$3,938,650
Net pension liability as a percentage of covered payroll	361.12%	333.56%	323.84%

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REQUIRED SUPPLEMENTARY INFORMATION (UNAUDITED)—DIVISION TRUST FUNDS

(Dollars in Thousands)

SCHEDULE OF NET PENSION LIABILITY[1] (CONTINUED)

For the Years Ended December 31

Local Government Division	2019	2018	2017	2016
Total pension liability	**$5,324,353**	$5,228,602	$5,396,516	$5,123,847
Plan fiduciary net position	**4,592,962**	3,971,389	4,283,086	3,773,506
Net pension liability	**$731,391**	**$1,257,213**	**$1,113,430**	**$1,350,341**
Plan fiduciary net position as a percentage of the total pension liability	**86.26%**	75.96%	79.37%	73.65%
Covered payroll	**$681,093**	$660,998	$632,768	$608,223
Net pension liability as a percentage of covered payroll	**107.38%**	190.20%	175.96%	222.01%

	2015	2014	2013
Total pension liability	$4,762,090	$4,647,777	$4,517,239
Plan fiduciary net position	3,660,509	3,751,468	3,508,312
Net pension liability	**$1,101,581**	**$896,309**	**$1,008,927**
Plan fiduciary net position as a percentage of the total pension liability	76.87%	80.72%	77.66%
Covered payroll	$561,518	$540,468	$529,003
Net pension liability as a percentage of covered payroll	196.18%	165.84%	190.72%

Judicial Division	2019	2018	2017	2016
Total pension liability	**$455,159**	$448,104	$561,946	$543,150
Plan fiduciary net position	**364,234**	306,846	329,862	288,904
Net pension liability	**$90,925**	**$141,258**	**$232,084**	**$254,246**
Plan fiduciary net position as a percentage of the total pension liability	**80.02%**	68.48%	58.70%	53.19%
Covered payroll	**$53,427**	$50,506	$48,948	$48,700
Net pension liability as a percentage of covered payroll	**170.19%**	279.69%	474.14%	522.07%

	2015	2014	2013
Total pension liability	$461,245	$417,853	$382,623
Plan fiduciary net position	277,351	279,499	272,653
Net pension liability	**$183,894**	**$138,354**	**$109,970**
Plan fiduciary net position as a percentage of the total pension liability	60.13%	66.89%	71.26%
Covered payroll	$46,870	$42,977	$39,942
Net pension liability as a percentage of covered payroll	392.35%	321.93%	275.32%

1 Information is not available prior to 2013. In future reports, additional years will be added until 10 years of historical data are presented.

The accompanying notes are an integral part of the Required Supplementary Information.

REQUIRED SUPPLEMENTARY INFORMATION (UNAUDITED)—DIVISION TRUST FUNDS

(Dollars in Thousands)

SCHEDULE OF NET PENSION LIABILITY[1] (CONTINUED)

For the Years Ended December 31

DPS Division	2019	2018	2017	2016
Total pension liability	**$4,315,270**	$4,207,343	$4,374,550	$4,221,449
Plan fiduciary net position	**3,656,426**	3,184,442	3,478,040	3,125,977
Net pension liability	**$658,844**	**$1,022,901**	**$896,510**	**$1,095,472**
Plan fiduciary net position as a percentage of the total pension liability	**84.73%**	75.69%	79.51%	74.05%
Covered payroll	**$736,264**	$722,040	$658,198	$642,177
Net pension liability as a percentage of covered payroll	**89.48%**	141.67%	136.21%	170.59%

	2015	2014	2013
Total pension liability	$3,920,864	$3,888,361	$3,792,543
Plan fiduciary net position	3,107,329	3,263,791	3,272,439
Net pension liability	**$813,535**	**$624,570**	**$520,104**
Plan fiduciary net position as a percentage of the total pension liability	79.25%	83.94%	86.29%
Covered payroll	$621,115	$584,319	$547,660
Net pension liability as a percentage of covered payroll	130.98%	106.89%	94.97%

[1] Information is not available prior to 2013. In future reports, additional years will be added until 10 years of historical data are presented.

The accompanying notes are an integral part of the Required Supplementary Information.

REQUIRED SUPPLEMENTARY INFORMATION (UNAUDITED)—DIVISION TRUST FUNDS

(Dollars in Thousands)

SCHEDULE OF EMPLOYER AND NONEMPLOYER CONTRIBUTIONS

For the Years Ended December 31

State Division	2019	2018	2017	2016	2015
Actuarially determined contribution rate (a)	**23.28%**	26.30%	22.71%	22.31%	22.35%
Covered payroll (b)	**$2,995,453**	$2,898,827	$2,774,207	$2,710,651	$2,641,867
Annual Increase Reserve contribution (c)	**17,663**	15,919	14,355	12,838	11,400
Actuarially determined contribution (a) x (b) + (c)	**715,004**	778,311	644,377	617,584	601,857
Contributions in relation to the actuarially determined contribution[1]	**689,370**	661,653	563,977	521,804	484,005
Annual contribution deficiency	**$25,634**	**$116,658**	**$80,400**	**$95,780**	**$117,852**
Actual contributions as a percentage of covered payroll	**23.01%**	22.82%	20.33%	19.25%	18.32%

	2014	2013	2012	2011	2010
Actuarially determined contribution rate (a)	20.45%	20.01%	16.52%	13.63%	18.93%
Covered payroll (b)	$2,564,670	$2,474,965	$2,384,934	$2,393,791	$2,392,080
Annual Increase Reserve contribution (c)	9,984	N/A	N/A	N/A	N/A
Actuarially determined contribution (a) x (b) + (c)	534,459	495,241	393,991	326,274	452,821
Contributions in relation to the actuarially determined contribution	444,372	393,218	328,055	277,122	282,640
Annual contribution deficiency	**$90,087**	**$102,023**	**$65,936**	**$49,152**	**$170,181**
Actual contributions as a percentage of covered payroll	17.33%	15.89%	13.76%	11.58%	11.82%

School Division	2019	2018	2017	2016	2015
Actuarially determined contribution rate (a)	**23.59%**	26.80%	22.54%	22.36%	21.94%
Covered payroll (b)	**$5,104,431**	$4,789,503	$4,471,357	$4,349,320	$4,235,290
Annual Increase Reserve contribution (c)	**26,062**	22,497	19,903	17,868	15,648
Actuarially determined contribution (a) x (b) + (c)	**1,230,197**	1,306,084	1,027,747	990,376	944,871
Contributions in relation to the actuarially determined contribution[1]	**1,130,127**	1,050,415	857,740	812,740	754,182
Annual contribution deficiency	**$100,070**	**$255,669**	**$170,007**	**$177,636**	**$190,689**
Actual contributions as a percentage of covered payroll	**22.14%**	21.93%	19.18%	18.69%	17.81%

	2014	2013	2012	2011	2010
Actuarially determined contribution rate (a)	19.65%	19.79%	17.60%	15.73%	18.75%
Covered payroll (b)	$4,063,236	$3,938,650	$3,819,066	$3,821,603	$3,900,662
Annual Increase Reserve contribution (c)	13,280	N/A	N/A	N/A	N/A
Actuarially determined contribution (a) x (b) + (c)	811,706	779,459	672,156	601,138	731,374
Contributions in relation to the actuarially determined contribution	686,323	613,738	564,444	534,230	512,391
Annual contribution deficiency	**$125,383**	**$165,721**	**$107,712**	**$66,908**	**$218,983**
Actual contributions as a percentage of covered payroll	16.89%	15.58%	14.78%	13.98%	13.14%

[1] Includes an annual contribution from a nonemployer contributing entity required by C.R.S. § 24-51-414 *et seq.* starting on July 1, 2018.

The accompanying notes are an integral part of the Required Supplementary Information.

REQUIRED SUPPLEMENTARY INFORMATION (UNAUDITED)—DIVISION TRUST FUNDS

(Dollars in Thousands)

SCHEDULE OF EMPLOYER AND NONEMPLOYER CONTRIBUTIONS (CONTINUED)

For the Years Ended December 31

Local Government Division	2019	2018	2017	2016	2015
Actuarially determined contribution rate (a)	**11.13%**	14.27%	11.92%	11.98%	13.62%
Covered payroll (b)	**$681,093**	$660,998	$632,768	$608,223	$561,518
Annual Increase Reserve contribution (c)	**4,201**	3,779	3,390	2,969	2,522
Actuarially determined contribution (a) x (b) + (c)	**80,007**	98,103	78,816	75,834	79,001
Contributions in relation to the actuarially determined contribution	**85,597**	81,358	78,291[1]	75,132	70,415
Annual contribution deficiency (excess)	**($5,590)**	**$16,745**	**$525**	**$702**	**$8,586**
Actual contributions as a percentage of covered payroll	**12.57%**	12.31%	12.37%	12.35%	12.54%
	2014	**2013**	**2012**	**2011**	**2010**
Actuarially determined contribution rate (a)	11.78%	10.62%	9.79%	8.98%	12.31%
Covered payroll (b)	$540,468	$529,003	$523,668	$718,169	$705,265
Annual Increase Reserve contribution (c)	2,180	N/A	N/A	N/A	N/A
Actuarially determined contribution (a) x (b) + (c)	65,847	56,180	51,267	64,492	86,818
Contributions in relation to the actuarially determined contribution	68,719[2]	65,329	83,816	89,536	87,731
Annual contribution deficiency (excess)	**($2,872)**	**($9,149)**	**($32,549)**	**($25,044)**	**($913)**
Actual contributions as a percentage of covered payroll	12.71%	12.35%	16.01%	12.47%	12.44%

Judicial Division	2019	2018	2017	2016	2015
Actuarially determined contribution rate (a)	**21.90%**	27.26%	22.54%	22.07%	21.45%
Covered payroll (b)	**$53,427**	$50,506	$48,948	$48,700	$46,870
Annual Increase Reserve contribution (c)	**251**	207	191	164	141
Actuarially determined contribution (a) x (b) + (c)	**11,952**	13,975	11,224	10,912	10,195
Contributions in relation to the actuarially determined contribution[3]	**11,993**	9,684	8,080	8,024	7,702
Annual contribution deficiency (excess)	**($41)**	**$4,291**	**$3,144**	**$2,888**	**$2,493**
Actual contributions as a percentage of covered payroll	**22.45%**	19.17%	16.51%	16.48%	16.43%
	2014	**2013**	**2012**	**2011**	**2010**
Actuarially determined contribution rate (a)	20.07%	21.53%	18.28%	16.30%	18.63%
Covered payroll (b)	$42,977	$39,942	$39,045	$39,033	$37,412
Annual Increase Reserve contribution (c)	116	N/A	N/A	N/A	N/A
Actuarially determined contribution (a) x (b) + (c)	8,741	8,599	7,137	6,362	6,970
Contributions in relation to the actuarially determined contribution	7,070	6,494	5,840	5,356	5,605
Annual contribution deficiency	**$1,671**	**$2,105**	**$1,297**	**$1,006**	**$1,365**
Actual contributions as a percentage of covered payroll	16.45%	16.26%	14.96%	13.72%	14.98%

1 Contributions do not include the disaffiliation payment of $1,063 for Cunningham Fire Protection District.

2 Contributions do not include the disaffiliation payment of $186,006 for Memorial Health System.

3 Includes an annual contribution from a nonemployer contributing entity required by C.R.S. § 24-51-414 *et seq.* starting on July 1, 2018.

The accompanying notes are an integral part of the Required Supplementary Information.

REQUIRED SUPPLEMENTARY INFORMATION (UNAUDITED)—DIVISION TRUST FUNDS

(Dollars in Thousands)

SCHEDULE OF EMPLOYER AND NONEMPLOYER CONTRIBUTIONS (CONTINUED)

For the Years Ended December 31

DPS Division	2019	2018	2017	2016	2015
Actuarially determined contribution rate (a)	**11.14%**	13.50%	10.28%	10.46%	11.06%
Covered payroll (b)	**$736,264**	$722,040	$658,198	$642,177	$621,115
Annual Increase Reserve contribution (c)	**4,989**	4,624	4,100	3,685	3,186
Actuarially determined contribution (a) x (b) + (c)	**87,009**	102,099	71,763	70,857	71,881
Contributions in relation to the actuarially determined contribution[1]	**62,541**	54,615	27,578	17,071	8,494
Annual contribution deficiency	**$24,468**	**$47,484**	**$44,185**	**$53,786**	**$63,387**
Actual contributions as a percentage of covered payroll	**8.49%**	7.56%	4.19%	2.66%	1.37%

	2014	2013	2012	2011	2010
Actuarially determined contribution rate (a)	9.67%	11.53%	9.60%	11.85%	14.61%
Covered payroll (b)	$584,319	$547,660	$510,872	$491,646	$470,774
Annual Increase Reserve contribution (c)	2,633	N/A	N/A	N/A	N/A
Actuarially determined contribution (a) x (b) + (c)	59,137	63,145	49,044	58,260	68,780
Contributions in relation to the actuarially determined contribution	18,478	23,104	13,145	11,722	5,733
Annual contribution deficiency	**$40,659**	**$40,041**	**$35,899**	**$46,538**	**$63,047**
Actual contributions as a percentage of covered payroll	3.16%	4.22%	2.57%	2.38%	1.22%

[1] Includes an annual contribution from a nonemployer contributing entity required by C.R.S. § 24-51-414 *et seq.* starting on July 1, 2018.

The accompanying notes are an integral part of the Required Supplementary Information.

SCHEDULE OF INVESTMENT RETURNS[1]

For the Years Ended December 31

	2019	2018	2017	2016	2015	2014
Annual money-weighted rate of return, net of investment expenses	**20.4%**	(3.3%)	18.1%	7.3%	1.6%	5.8%

[1] Information is not available prior to 2014. In future reports, additional years will be added until 10 years of historical data are presented.

The accompanying notes are an integral part of the Required Supplementary Information.

NOTES TO THE REQUIRED SUPPLEMENTARY INFORMATION (UNAUDITED)—DIVISION TRUST FUNDS

(Dollars in Thousands)

Note 1—Significant Changes in Plan Provisions Affecting Trends in Actuarial Information

2019 Changes in Plan Provisions Since 2018

- Senate Bill (SB) 18-200 was enacted on June 4, 2018, which included the adoption of the automatic adjustment provision (AAP). The following changes reflect the anticipated adjustments resulting from the 2018 AAP assessment, statutorily recognized July 1, 2019, and effective July 1, 2020:
    - Member contribution rates increase by 0.50 percent.
    - Employer contribution rates increase by 0.50 percent.
    - Annual Increase (AI) cap is lowered from 1.50 percent per year to 1.25 percent per year.
- House Bill (HB) 19-1217, enacted May 20, 2019, repealed the member contribution increases scheduled for the Local Government Division pursuant to SB 18–200.
- Actual employer contributions to the DPS Division are reduced by an amount equal to the principal payments plus interest necessary each year to finance the pension certificates of participation (PCOPs) issued in 1997 and 2008 and refinanced thereafter.

2018 Changes in Plan Provisions Since 2017

- The following changes were made to the plan provisions as part of SB 18-200:
    - Member contribution rates increase by 0.75 percent effective July 1, 2019, an additional 0.75 percent effective July 1, 2020, and an additional 0.50 percent effective July 1, 2021.
    - Employer contribution rates increase by 0.25 percent effective July 1, 2019 for State, School, Judicial, and DPS Divisions.
    - An annual direct distribution of $225 million (actual dollars) from the State of Colorado, recognized as a nonemployer contributing entity, is distributed between the State, School, Judicial, and DPS Divisions proportionally based on payroll.
    - AI cap is lowered from 2.00 percent per year to 1.50 percent per year.
    - Initial AI waiting period is extended from one year after retirement to three years after retirement.
    - AI payments are suspended for 2018 and 2019.
    - The number of years used in the Highest Average Salary calculation for non-vested members as of January 1, 2020, increases from three to five years for the State, School, Local Government, and DPS Divisions and increases from one to three years for the Judicial Division.
- Actual employer contributions to the DPS Division are reduced by an amount equal to the principal payments plus interest necessary each year to finance the PCOPs issued in 1997 and 2008 and refinanced thereafter.

2017 Changes in Plan Provisions Since 2016

- The Cunningham Fire Protection District (CFPD) disaffiliated from the Local Government Division on December 2, 2017. For the purpose of the December 31, 2017, measurement date, liabilities were determined assuming no additional benefit accruals for the disaffiliated membership of the CFPD that had not refunded their PERA member contribution accounts. The total disaffiliation payment of $1,159 was allocated to the Local Government Division Trust Fund and the Health Care Trust Fund (HCTF) in the amount of $1,063 and $96, respectively.
- Pursuant to HB 17-1265, the Amortization Equalization Disbursement (AED) and Supplemental Amortization Equalization Disbursement (SAED) contribution rates are adjusted for employers in the Judicial Division as follows:
    - For the calendar year beginning in 2019, C.R.S. § 24-51-411(4.5) increased the AED payment to 3.40 percent of PERA-includable salary and requires the AED payment to increase by 0.40 percent at the start of each of the following four calendar years through 2023 at which time the AED payment will be 5.00 percent of PERA-includable salary.
    - For the calendar year beginning in 2019, C.R.S. § 24-51-411(7.5) increased the SAED payment to 3.40 percent of PERA-includable salary and requires the SAED payment to increase by 0.40 percent at the start of each of the following four calendar years through 2023 at which time the SAED payment will be 5.00 percent of PERA-includable salary.
- Actual employer contributions to the DPS Division are reduced by an amount equal to the principal payments plus interest necessary each year to finance the PCOPs issued in 1997 and 2008 and refinanced thereafter.

2016 Changes in Plan Provisions Since 2015

- Actual employer contributions to the DPS Division are reduced by an amount equal to the principal payments plus interest necessary each year to finance the PCOPs issued in 1997 and 2008 and refinanced thereafter.

2015 Changes in Plan Provisions Since 2014

- Actual employer contributions to the DPS Division are reduced by an amount equal to the principal payments plus interest necessary each year to finance the PCOPs issued in 1997 and 2008 and refinanced thereafter.
- As required under C.R.S. § 24-51-401(1.7)(e), PERA calculated and provided to the Colorado General

NOTES TO THE REQUIRED SUPPLEMENTARY INFORMATION (UNAUDITED)—DIVISION TRUST FUNDS

(Dollars in Thousands)

Assembly an adjustment to the DPS Division's employer contribution rate to assure the equalization of the School Division's and the DPS Division's ratios of unfunded actuarial accrued liability (UAAL) to payroll as of December 31, 2039. Subsequently, the Colorado General Assembly passed HB 15-1391, reducing the employer contribution rate of the DPS Division from 13.75 percent to 10.15 percent, effective January 1, 2015.

2014 Changes in Plan Provisions Since 2013

- Actual employer contributions to the DPS Division are reduced by an amount equal to the principal payments plus interest necessary each year to finance the PCOPs issued in 1997 and 2008 and refinanced thereafter.

2013 Changes in Plan Provisions Since 2012

- Actual employer contributions to the DPS Division are reduced by an amount equal to the principal payments plus interest necessary each year to finance the PCOPs issued in 1997 and 2008 and refinanced thereafter.

2012 Changes in Plan Provisions Since 2011

- The valuation reflects the disaffiliation of Memorial Health System (Memorial), formerly the largest employer of the Local Government Division, as of October 1, 2012. For the purposes of the December 31, 2012, actuarial valuation, liabilities were determined assuming no additional benefit accruals for the disaffiliated membership of Memorial that had not refunded their PERA member contribution accounts. Additionally, no additional incoming dollars were assumed added to the Local Government Division Trust Fund, as there was ongoing litigation regarding the potential dollars owed to the Local Government Division Trust Fund due to the disaffiliation.
- Pursuant to SB 11-076, there was a short-term contribution "swap" between employers and active members in the State and Judicial Divisions covering the period July 1, 2011, through June 30, 2012. Active member contributions for the period were increased by 2.5 percent of pensionable payroll and employer contributions were reduced by that amount.
- Actual employer contributions to the DPS Division are reduced by an amount equal to the principal payments plus interest necessary each year to finance the PCOPs issued in 1997 and 2008 and refinanced thereafter.

2011 Changes in Plan Provisions Since 2010

- Pursuant to SB 10-146, there was a short-term contribution "swap" between employers and active members in the State and Judicial Divisions covering the period July 1, 2010, through June 30, 2011. The enactment of SB 11-076 extended the contribution swap an additional year, from July 1, 2011, through June 30, 2012. Active member contributions for both periods were increased by 2.5 percent of pensionable payroll and employer contributions were reduced by that amount.
- Actual employer contributions to the DPS Division are reduced by an amount equal to the principal payments plus interest necessary each year to finance the PCOPs issued in 1997 and 2008 and refinanced thereafter.

2010 Changes in Plan Provisions Since 2009

- The valuation reflects the addition of the DPS benefit structure as a result of the merger of DPSRS into PERA as a separate division, effective January 1, 2010. Major plan provisions adopted as part of the merger legislation (SB 09-282) include:
  - Transfers from the DPS Division to other Divisions may build upon a DPS benefit structure benefit within those Divisions.
  - Hourly and part-time employees of Denver Public Schools become members of the DPS Division as of January 1, 2010, with no past service credit.
  - Actual employer contributions to the DPS Division are reduced by an amount equal to the principal payments plus interest necessary each year to finance the PCOPs issued in 1997 and 2008. Colorado statutes call for a "true-up" in 2015, and every five years following, with the expressed purpose of adjusting the total DPS contribution rate to ensure equalization of the ratio of UAAL over payroll between the DPS and School Divisions at the end of the 30-year period beginning January 1, 2010.
- Pursuant to SB 10-146, there was a short-term contribution "swap" between employers and active members in the State and Judicial Divisions covering the period July 1, 2010, through June 30, 2011. Active member contributions for this period were increased by 2.5 percent of pensionable payroll and employer contributions were reduced by that amount.

Note 2—Significant Changes in Assumptions or Other Inputs Affecting Trends in Actuarial Information

2019 Changes in Assumptions or Other Inputs Since 2018

- The assumption used to value the AI cap benefit provision was changed from 1.50 percent to 1.25 percent.

2018 Changes in Assumptions or Other Inputs Since 2017

- The single equivalent interest rate (SEIR) for the State Division was increased from 4.72 percent to 7.25 percent to reflect the changes to the projection's valuation basis which no longer resulted in a projected year of depletion of the fiduciary net position (FNP), thereby eliminating the need to apply the municipal bond index rate.

NOTES TO THE REQUIRED SUPPLEMENTARY INFORMATION (UNAUDITED)—DIVISION TRUST FUNDS

(Dollars in Thousands)

- The SEIR for the School Division was increased from 4.78 percent to 7.25 percent to reflect the changes to the projection's valuation basis which no longer resulted in a projected year of depletion of the FNP, thereby eliminating the need to apply the municipal bond index rate.
- The SEIR for the Judicial Division was increased from 5.41 percent to 7.25 percent to reflect the changes to the projection's valuation basis which no longer resulted in a projected year of depletion of the FNP, thereby eliminating the need to apply the municipal bond index rate.

2017 Changes in Assumptions or Other Inputs Since 2016

- The SEIR for the State Division was lowered from 5.26 percent to 4.72 percent to reflect the changes to the projection's valuation basis, a projected year of depletion of the FNP, and the resulting application of the municipal bond index rate.
- The SEIR for the School Division was lowered from 5.26 percent to 4.78 percent to reflect the changes to the projection's valuation basis, a projected year of depletion of the FNP, and the resulting application of the municipal bond index rate.
- The SEIR for the Judicial Division was increased from 5.18 percent to 5.41 percent to reflect the changes to the projection's valuation basis, a projected year of depletion of the FNP, and the resulting application of the municipal bond index rate.
- The municipal bond index rate used in the determination of the SEIR for the State, School, and Judicial Divisions changed from 3.86 percent on the prior measurement date to 3.43 percent on the measurement date.

2016 Changes in Assumptions or Other Inputs Since 2015

- The investment return assumption was lowered from 7.50 percent to 7.25 percent.
- The price inflation assumption was lowered from 2.80 percent to 2.40 percent.
- The wage inflation assumption was lowered from 3.90 percent to 3.50 percent.
- The post-retirement mortality assumption for healthy lives for the State and Local Government Divisions was changed to the RP-2014 Healthy Annuitant Mortality Table with adjustments for credibility and gender adjustments of a 73 percent factor applied to ages below 80 and a 108 percent factor applied to age 80 and above, projected to 2018, for males, and a 78 percent factor applied to ages below 80 and a 109 percent factor applied to age 80 and above, projected to 2020, for females.
- The post-retirement mortality assumption for healthy lives for the School, Judicial, and DPS Divisions was changed to the RP-2014 White Collar Healthy Annuitant Mortality Table with adjustments for credibility and gender adjustments of a 93 percent factor applied to ages below 80 and a 113 percent factor applied to age 80 and above, projected to 2018, for males, and a 68 percent factor applied to ages below 80 and a 106 percent factor applied to age 80 and above, projected to 2020, for females.
- For disabled retirees, the mortality assumption was changed to reflect 90 percent of RP-2014 Disabled Retiree Mortality Table.
- The mortality assumption for active members was changed to RP-2014 White Collar Employee Mortality Table, a table specifically developed for actively working people. To allow for an appropriate margin of improved mortality prospectively, the mortality rates incorporate a 70 percent factor applied to male rates and a 55 percent factor applied to female rates.
- The rates of retirement, withdrawal, and disability were revised to reflect more closely actual experience.
- The estimated administrative expense as a percentage of covered payroll was increased from 0.35 percent to 0.40 percent.
- The SEIR for the State and School Divisions was lowered from 7.50 percent to 5.26 percent to reflect the changes to the projection's valuation basis, a projected year of depletion of the FNP, and the resulting application of the municipal bond index rate of 3.86 percent on the measurement date.
- The SEIR for the Local Government Division was lowered from 7.50 percent to 7.25 percent, reflecting the change in the long-term expected rate of return.
- The SEIR for the Judicial Division was lowered from 5.73 percent to 5.18 percent to reflect the changes to the projection's valuation basis, a projected year of depletion of the FNP, and the resulting application of the municipal bond index rate from 3.57 percent on the prior measurement date to 3.86 percent on the measurement date.
- The SEIR for the DPS Division was lowered from 7.50 percent to 7.25 percent, reflecting the change in the long-term expected rate of return.

2015 Changes in Assumptions or Other Inputs Since 2014

- The SEIR for the Judicial Division was lowered from 6.14 percent to 5.73 percent to reflect the changes to the projection's valuation basis, a projected year of depletion of the FNP, and the resulting application of the municipal bond index rate from 3.70 percent on the

NOTES TO THE REQUIRED SUPPLEMENTARY INFORMATION (UNAUDITED)—DIVISION TRUST FUNDS

(Dollars in Thousands)

prior measurement date to 3.57 percent on the measurement date.

- The following programming changes were made:
  - Valuation of the full survivor benefit without any reduction for possible remarriage.
  - Reflection of the employer match on separation benefits for all eligible years.
  - Reflection of one year of service eligibility for survivor annuity benefit.
  - Refinement of the 18-month AI timing.
  - Refinements to directly value certain and life, modified cash refund and pop-up benefit forms.
- The following methodology changes were made:
  - Recognition of merit salary increases in the first projection year.
  - Elimination of the assumption that 35 percent of future disabled members elect to receive a refund.
  - Removal of the negative value adjustment for liabilities associated with refunds of future terminating members.
  - Adjustments to the timing of the normal cost and UAAL payment calculations to reflect contributions throughout the year.

2014 Changes in Assumptions or Other Inputs Since 2013

- The SEIR for the Judicial Division was lowered from 6.66 percent to 6.14 percent to reflect the changes to the projection's valuation basis, a projected year of depletion of the FNP, and the resulting application of the municipal bond index rate from 4.73 percent on the prior measurement date to 3.70 percent on the measurement date.
- In 2012, a lawsuit was initiated to determine the amount owed to PERA by Memorial and the City of Colorado Springs (City) for Memorial's departure from PERA. In September 2014, PERA and the City agreed to resolve the lawsuit. The agreement provided for the City to pay PERA $190,000 for the liabilities associated with the retirement and health care benefits already earned by 7,666 Memorial employees for the work that they performed before Memorial ceased to be a PERA employer. On October 3, 2014, PERA received a disaffiliation payment from the City, which was allocated to the Local Government Division Trust Fund and the HCTF in the amount of $186,006 and $3,994, respectively.

2013 Changes in Assumptions or Other Inputs Since 2012

- The investment return assumption was lowered from 8.00 percent to 7.50 percent.
- The price inflation assumption was lowered from 3.50 percent to 2.80 percent.
- The wage inflation assumption was lowered from 4.25 percent to 3.90 percent.

2012 Changes in Assumptions or Other Inputs Since 2011

- The price inflation assumption was lowered from 3.75 percent to 3.50 percent.
- The wage inflation assumption was lowered from 4.50 percent to 4.25 percent.
- The rates of retirement, withdrawal, mortality and disability were revised to more closely reflect actual experience.
- The post-retirement mortality tables used were changed to the RP-2000 Combined Mortality tables projected with Scale AA to 2020, set back one year for males and two years for females.
- The investment return assumption was changed to be only net of investment expenses to better represent the investment consultant's assumptions and predictions and also to better align with recent changes in GASB accounting and reporting requirements. An ongoing estimated administrative expense of 0.35 percent of pensionable payroll was added to the normal cost beginning with the December 31, 2012, actuarial valuation.
- To reflect the short-term contribution "swap" between employers and active members covering the period July 1, 2010, through June 30, 2012, the actuarially determined contribution (ADC) has been adjusted in the State and Judicial Divisions.

2011 Changes in Assumptions or Other Inputs Since 2010

- To reflect the short-term contribution "swap" between employers and active members covering the period July 1, 2010, through June 30, 2012, the ADC has been adjusted in the State and Judicial Division.

2010 Changes in Assumptions or Other Inputs Since 2009

- Assumptions were supplemented to provide for the valuation of the DPS benefit structure added as a result of the merger of DPSRS into PERA as a separate division, effective January 1, 2010.
- To reflect the short-term contribution "swap" between employers and active members covering the period July 1, 2010, through June 30, 2012, the ADC has been adjusted in the State and Judicial Division.

NOTES TO THE REQUIRED SUPPLEMENTARY INFORMATION (UNAUDITED)—DIVISION TRUST FUNDS

(Dollars in Thousands)

Note 3—Methods and Assumptions Used in Calculations of ADC

The ADC rates, as a percentage of covered payroll, used to determine the ADC amounts in the Schedule of Employer and Nonemployer Contributions are calculated as of December 31, two years prior to the end of the year in which ADC amounts are reported. The following actuarial methods and assumptions from the December 31, 2017, actuarial valuation were used to determine contribution rates reported in that schedule for the year ending December 31, 2019:

Actuarial cost method	Entry age
Amortization method	Level percentage of payroll
Amortization period	30 years, closed, layered[1]
Equivalent single amortization period	28 years (26 years for State Division)
Asset valuation method	4-year smoothed market
Price inflation	2.40 percent
Real wage growth	1.10 percent
Wage inflation	3.50 percent
Salary increases, including wage inflation	3.50 to 10.45 percent[2]
Long-term investment rate of return, net of pension plan investment expense, including price inflation	7.25 percent
Future post-retirement benefit increases	
PERA benefit structure hired prior to 1/1/07 and DPS benefit structure	1.50 percent compounded annually
PERA benefit structure hired after 12/31/06	0.00 percent, as financed by the AIR

1 Effective with the December 31, 2014, actuarial valuation, gains and losses are to be amortized over a closed period.

2 Salary increases range by Division Trust Fund.

REQUIRED SUPPLEMENTARY INFORMATION (UNAUDITED)—HEALTH CARE TRUST FUNDS

(Dollars in Thousands)

SCHEDULE OF CHANGES IN NET OPEB LIABILITY—HEALTH CARE TRUST FUND[1]

For the Years Ended December 31

	2019	2018	2017
Total OPEB liability			
Service cost	**$18,159**	$19,328	$20,036
Interest	**117,840**	112,849	108,625
Changes of benefit terms	**—**	—	5
Difference between expected and actual experience	**(224,212)**	(2,482)	7,354
Changes of assumptions or other inputs	**2,006**	11,438	—
Benefit payments and health care claims/ administrative processing fees	**(65,019)**	(77,221)	(116,960)
Net change in total OPEB liability	**(151,226)**	63,912	19,060
Total OPEB liability – beginning	**1,639,734**	1,575,822	1,556,762
Total OPEB liability – ending (a)	**$1,488,508**	**$1,639,734**	**$1,575,822**
Plan fiduciary net position			
Contributions – employer	**$92,011**	$86,559	$83,077
Contributions – employer disaffiliation	**—**	—	96
Other additions (includes purchased service transfers)	**6,984**	8,373	9,760
Net investment income (loss)	**53,867**	(9,678)	44,990
Benefit payments	**(58,221)**	(61,777)	(102,665)
Administrative expense	**(9,290)**	(20,401)	(19,162)
Other deductions	**(33)**	(106)	(102)
Net change in plan fiduciary net position	**85,318**	2,970	15,994
Plan fiduciary net position – beginning	**279,192**	276,222	260,228
Plan fiduciary net position – ending (b)	**$364,510**	**$279,192**	**$276,222**
Net OPEB liability – ending (a)-(b)	**$1,123,998**	**$1,360,542**	**$1,299,600**

[1] Information is not available prior to 2017. In future reports, additional years will be added until 10 years of historical data are presented.

The accompanying notes are an integral part of the Required Supplementary Information.

REQUIRED SUPPLEMENTARY INFORMATION (UNAUDITED)—HEALTH CARE TRUST FUNDS

(Dollars in Thousands)

SCHEDULE OF CHANGES IN NET OPEB LIABILITY—DPS HEALTH CARE TRUST FUND[1]

For the Years Ended December 31

	2019	2018	2017
Total OPEB liability			
Service cost	**$1,342**	$1,420	$1,591
Interest	**4,970**	5,245	5,057
Changes of benefit terms	**—**	—	—
Difference between expected and actual experience	**(2,070)**	(6,045)	(35)
Changes of assumptions or other inputs	**—**	5	—
Benefit payments and health care claims/ administrative processing fees	**(3,968)**	(4,693)	(6,191)
Net change in total OPEB liability	**274**	(4,068)	422
Total OPEB liability – beginning	**69,199**	73,267	72,845
Total OPEB liability – ending (a)	**$69,473**	**$69,199**	**$73,267**
Plan fiduciary net position			
Contributions – employer	**$7,649**	$7,417	$6,930
Other additions (includes purchased service transfers)	**188**	205	242
Net investment income (loss)	**4,892**	(894)	3,305
Benefit payments	**(3,644)**	(4,158)	(5,694)
Administrative expense	**(477)**	(845)	(808)
Other deductions	**(1)**	(4)	(4)
Net change in plan fiduciary net position	**8,607**	1,721	3,971
Plan fiduciary net position – beginning	**24,029**	22,308	18,337
Plan fiduciary net position – ending (b)	**$32,636**	**$24,029**	**$22,308**
Net OPEB liability – ending (a)-(b)	**$36,837**	**$45,170**	**$50,959**

[1] Information is not available prior to 2017. In future reports, additional years will be added until 10 years of historical data are presented.

The accompanying notes are an integral part of the Required Supplementary Information.

REQUIRED SUPPLEMENTARY INFORMATION (UNAUDITED)—HEALTH CARE TRUST FUNDS

(Dollars in Thousands)

SCHEDULE OF NET OPEB LIABILITY[1]

For the Years Ended December 31

Health Care Trust Fund	2019	2018	2017	2016
Total OPEB liability	**$1,488,508**	$1,639,734	$1,575,822	$1,556,762
Plan fiduciary net position	**364,510**	279,192	276,222	260,228
Net OPEB liability	**$1,123,998**	**$1,360,542**	**$1,299,600**	**$1,296,534**
Plan fiduciary net position as a percentage of the total OPEB liability	**24.49%**	17.03%	17.53%	16.72%
Covered payroll	**$8,834,404**	$8,399,835	$7,927,280	$7,716,894
Net OPEB liability as a percentage of covered payroll	**12.72%**	16.20%	16.39%	16.80%

DPS Health Care Trust Fund	2019	2018	2017	2016
Total OPEB liability	**$69,473**	$69,199	$73,267	$72,845
Plan fiduciary net position	**32,636**	24,029	22,308	18,337
Net OPEB liability	**$36,837**	**$45,170**	**$50,959**	**$54,508**
Plan fiduciary net position as a percentage of the total OPEB liability	**46.98%**	34.72%	30.45%	25.17%
Covered payroll	**$736,264**	$722,040	$658,198	$642,177
Net OPEB liability as a percentage of covered payroll	**5.00%**	6.26%	7.74%	8.49%

[1] Information is not available prior to 2016. In future reports, additional years will be added until 10 years of historical data are presented.

The accompanying notes are an integral part of the Required Supplementary Information.

REQUIRED SUPPLEMENTARY INFORMATION (UNAUDITED)—HEALTH CARE TRUST FUNDS

(Dollars in Thousands)

SCHEDULE OF CONTRIBUTIONS FROM EMPLOYERS AND OTHER CONTRIBUTING ENTITIES

For the Years Ended December 31

Health Care Trust Fund	2019	2018	2017	2016	2015
Actuarially determined contribution rate (a)	**1.11%**	1.12%	1.08%	1.09%	1.15%
Covered payroll (b)	**$8,834,404**	$8,399,835	$7,927,280	$7,716,894	$7,485,545
Actuarially determined contribution (a) x (b)	**98,062**	94,078	85,615	84,114	86,084
Contributions in relation to the actuarially determined contribution	**92,011**	86,559	83,077[1]	80,825	78,463
Annual contribution deficiency	**$6,051**	**$7,519**	**$2,538**	**$3,289**	**$7,621**
Actual contributions as a percentage of covered payroll	**1.04%**	1.03%	1.05%	1.05%	1.05%

	2014	2013	2012	2011	2010
Actuarially determined contribution rate (a)	1.32%	1.24%	1.18%	1.28%	1.12%
Covered payroll (b)	$7,211,351	$6,982,560	$6,766,713	$6,972,596	$7,035,419
Retiree drug subsidy (c)	—	15,731	14,198	14,151	14,169
Actuarially determined contribution (a) x (b) + (c)	95,190	102,315	94,045	103,400	92,966
Contributions in relation to the actuarially determined contribution	75,631[2]	88,515	86,751	87,600	88,216
Annual contribution deficiency	**$19,559**	**$13,800**	**$7,294**	**$15,800**	**$4,750**
Actual contributions as a percentage of covered payroll	1.05%	1.27%	1.28%	1.26%	1.25%

1 Contributions do not include the disaffiliation payment of $96 for Cunningham Fire Protection District.

2 Contributions do not include the disaffiliation payment of $3,994 for Memorial Health System.

The accompanying notes are an integral part of the Required Supplementary Information.

REQUIRED SUPPLEMENTARY INFORMATION (UNAUDITED)—HEALTH CARE TRUST FUNDS

(Dollars in Thousands)

SCHEDULE OF CONTRIBUTIONS FROM EMPLOYERS AND OTHER CONTRIBUTING ENTITIES

For the Years Ended December 31

DPS Health Care Trust Fund	2019	2018	2017	2016	2015
Actuarially determined contribution rate (a)	**0.60%**	0.67%	0.68%	0.75%	0.81%
Covered payroll (b)	**$736,264**	$722,040	$658,198	$642,177	$621,115
Actuarially determined contribution (a) x (b)	**4,418**	4,838	4,476	4,816	5,031
Contributions in relation to the actuarially determined contribution	**7,649**	7,417	6,930	6,723	6,371
Annual contribution deficiency (excess)	**($3,231)**	**($2,579)**	**($2,454)**	**($1,907)**	**($1,340)**
Actual contributions as a percentage of covered payroll	**1.04%**	1.03%	1.05%	1.05%	1.03%
	2014	**2013**	**2012**	**2011**	**2010**
Actuarially determined contribution rate (a)	0.87%	0.86%	0.92%	0.92%	0.95%[1]
Covered payroll (b)	$584,319	$547,660	$510,872	$491,646	$470,774
Retiree drug subsidy (c)	—	563	488	499	537
Actuarially determined contribution (a) x (b) + (c)	5,084	5,273	5,188	5,022	5,002
Contributions in relation to the actuarially determined contribution	6,003	6,121	5,731	5,528	5,298
Annual contribution deficiency (excess)	**($919)**	**($848)**	**($543)**	**($506)**	**($296)**
Actual contributions as a percentage of covered payroll	1.03%	1.12%	1.12%	1.12%	1.13%

[1] The actuarially determined contribution rate of 0.9484 percent has been rounded to two decimal places for presentation purposes.

The accompanying notes are an integral part of the Required Supplementary Information.

SCHEDULE OF INVESTMENT RETURNS[1]

For the Years Ended December 31

	2019	2018	2017	2016	2015	2014
Annual money-weighted rate of return, net of investment expenses	**20.4%**	(3.3%)	18.1%	7.3%	1.6%	5.8%

[1] Information is not available prior to 2014. In future reports, additional years will be added until 10 years of historical data are presented.

The accompanying notes are an integral part of the Required Supplementary Information.

NOTES TO THE REQUIRED SUPPLEMENTARY INFORMATION (UNAUDITED)— HEALTH CARE TRUST FUNDS

(Dollars in Thousands)

Note 1—Significant Changes in Plan Provisions Affecting Trends in Actuarial Information

2019 Changes in Plan Provisions Since 2018

- There were no changes made to plan provisions.

2018 Changes in Plan Provisions Since 2017

- There were no changes made to plan provisions.

2017 Changes in Plan Provisions Since 2016

- The Cunningham Fire Protection District (CFPD) disaffiliated from the Local Government Division, thereby ending participation in the Health Care Trust Fund (HCTF) on December 2, 2017. For the purpose of disclosure as of the December 31, 2017, measurement date, liabilities were determined assuming no additional service accruals impacting possible future premium subsidies for the disaffiliated membership of the CFPD that had not refunded their PERA member contribution accounts. The total disaffiliation payment of $1,159 was allocated to the Local Government Division Trust Fund and the HCTF in the amount of $1,063 and $96, respectively.

2016 Changes in Plan Provisions Since 2015

- There were no changes made to plan provisions.

2015 Changes in Plan Provisions Since 2014

- There were no changes made to plan provisions.

2014 Changes in Plan Provisions Since 2013

- There were no changes made to plan provisions.

2013 Changes in Plan Provisions Since 2012

- There were no changes made to plan provisions.

2012 Changes in Plan Provisions Since 2011

- The Memorial Health System (Memorial), disaffiliated from the Local Government Division, hence ending participation in the HCTF, on October 1, 2012. For the purpose of disclosure as of the December 31, 2012, measurement date, liabilities were determined assuming no additional service accruals impacting possible future premium subsidies for the disaffiliated membership of Memorial that had not refunded their PERA member contribution accounts. Additionally, no additional incoming dollars were assumed added to the HCTF as of December 31, 2012, as there was ongoing litigation regarding the potential dollars owed to the Local Government Division Trust Fund and the HCTF due to the disaffiliation.

2011 Changes in Plan Provisions Since 2010

- There were no changes made to plan provisions.

2010 Changes in Plan Provisions Since 2009

- The Denver Public Schools Retirement System (DPSRS) merged into PERA, effective January 1, 2010, as a separate division, the Denver Public Schools (DPS) Division. Also effective January 1, 2010, the liabilities and assets of the Denver Public Schools Retiree Health Benefit Trust were transferred into the newly created DPS HCTF. The valuation reflects the addition of the DPS benefit structure as a result of the merger. Hence, transfers from the DPS Division to the other PERA divisions covered by the HCTF may build upon a DPS benefit structure benefit within the HCTF and transfers from the other PERA divisions to the DPS Division covered by the DPS HCTF may build upon a PERA benefit structure benefit within the DPS HCTF.

Note 2—Significant Changes in Assumptions or Other Inputs Affecting Trends in Actuarial Information

2019 Changes in Assumptions or Other Inputs Since 2018

- There were no changes made to the actuarial methods or assumptions.

2018 Changes in Assumptions or Other Inputs Since 2017

- There were no changes made to the actuarial methods or assumptions.

2017 Changes in Assumptions or Other Inputs Since 2016

- There were no changes made to the actuarial methods or assumptions.

2016 Changes in Assumptions or Other Inputs Since 2015

- The following methodology change was made:
  - The Entry Age Normal actuarial cost method allocation basis has been changed from a level dollar amount to a level percentage of pay.
- The following changes were made to the actuarial assumptions:
  - The investment rate of return assumption decreased from 7.50 percent to 7.25 percent.
  - The price inflation assumption decreased from 2.80 percent to 2.40 percent.
  - The wage inflation assumption decreased from 3.90 percent to 3.50 percent.
  - The mortality assumption for active members was changed to RP-2014 White Collar Employee Mortality Table, a table specifically developed for actively working people. To allow for an appropriate margin of improved mortality prospectively, the mortality rates incorporate a 70 percent factor applied to male rates and a 55 percent factor applied to female rates.

NOTES TO THE REQUIRED SUPPLEMENTARY INFORMATION (UNAUDITED)—HEALTH CARE TRUST FUNDS

(Dollars in Thousands)

- The post-retirement mortality assumption for healthy lives for the State and Local Government Divisions was changed to the RP-2014 Healthy Annuitant Mortality Table with adjustments for credibility and gender adjustments of a 73 percent factor applied to ages below 80 and a 108 percent factor applied to age 80 and above, projected to 2018, for males, and a 78 percent factor applied to ages below 80 and a 109 percent factor applied to age 80 and above, projected to 2020, for females.
- The post-retirement mortality assumption for healthy lives for the School, Judicial, and DPS Divisions was changed to the RP-2014 White Collar Healthy Annuitant Mortality Table with adjustments for credibility and gender adjustments of a 93 percent factor applied to ages below 80 and a 113 percent factor applied to age 80 and above, projected to 2018, for males, and a 68 percent factor applied to ages below 80 and a 106 percent factor applied to age 80 and above, projected to 2020, for females.
- For disabled retirees, the mortality assumption was changed to reflect 90 percent of RP-2014 Disabled Retiree Mortality Table.
- The assumed rates of withdrawal, retirement, and disability have been adjusted to more closely reflect experience.
- The assumed rates of PERACare participation have been revised to reflect more closely actual experience.
- Initial per capita health care costs for those PERACare enrollees under the PERA benefit structure who are expected to attain age 65 and older ages and are not eligible for premium-free Medicare Part A benefits have been updated to reflect the change in costs for the 2017 plan year.
- The percentage of PERACare enrollees who will attain age 65 and older ages and are assumed to not qualify for premium-free Medicare Part A coverage have been revised to reflect more closely actual experience.
- The percentage of disabled PERACare enrollees who are assumed to not qualify for premium-free Medicare Part A coverage has been revised to reflect more closely actual experience.
- The health care cost trend rates for Medicare Part A premiums have been revised to reflect the then-current expectation of future increases in rates of inflation applicable to Medicare Part A premiums.
- Assumed election rates for the PERACare coverage options that would be available to future PERACare enrollees who will qualify for the "No Part A Subsidy" when they retire have been revised to more closely reflect actual experience.
- Assumed election rates for the PERACare coverage options that will be available to those current PERACare enrollees, who qualify for the "No Part A Subsidy" but have not reached age 65, have been revised to more closely reflect actual experience.
- The rates of PERACare coverage election for spouses of eligible inactive members and future retirees was revised to reflect more closely actual experience.
- The assumed age differences between future retirees and their participating spouses have been revised to reflect more closely actual experience.

2015 Changes in Assumptions or Other Inputs Since 2014

- The following methodology changes were made:
  - Rates of morbidity to model the growth in assumed claims as a PERACare enrollee ages have been added to the process used to project per capita health care costs of those PERACare enrollees under the PERA benefit structure who have attained age 65 and older and are not eligible for premium-free Medicare Part A benefits.
  - Adjustments were made to the timing of the normal cost and unfunded actuarial accrued liability (UAAL) payment calculations to reflect contributions throughout the year.
- The following changes were made to the actuarial assumptions:
  - The percentage of PERACare enrollees who will attain age 65 and older ages and are assumed to not qualify for premium-free Medicare Part A coverage have been revised to more closely reflect actual experience.
  - Initial per capita health care costs for those PERACare enrollees under the PERA benefit structure who are expected to attain age 65 and older ages and are not eligible for premium-free Medicare Part A benefits have been updated to reflect the change in costs for the 2016 plan year.
  - The health care cost trend rates for Medicare Part A premiums have been revised to reflect the current expectation of future increases in rates of inflation applicable to Medicare Part A premiums.

2014 Changes in Assumptions or Other Inputs Since 2013

- The following change was made to the actuarial assumptions:
  - Initial per capita health care costs for those PERACare enrollees under the PERA benefit structure who are expected to attain age 65 and older ages and are not eligible for premium-free Medicare Part A benefits have been updated to reflect the change in costs for the 2015 plan year.

NOTES TO THE REQUIRED SUPPLEMENTARY INFORMATION (UNAUDITED)— HEALTH CARE TRUST FUNDS

(Dollars in Thousands)

- The following other change was made:
  - In 2012, a lawsuit was initiated to determine the amount owed to PERA by Memorial and the City of Colorado Springs (City) for Memorial's disaffiliation from PERA. In September 2014, PERA and the City agreed to resolve the lawsuit. The agreement provided for the City to pay PERA $190,000 for the liabilities associated with the retirement and health care benefits already earned by 7,666 Memorial employees for the work that they performed before Memorial ceased to be a PERA employer. On October 3, 2014, PERA received a disaffiliation payment from the City, which was allocated to the Local Government Division Trust Fund and the HCTF in the amount of $186,006 and $3,994, respectively.

2013 Changes in Assumptions or Other Inputs Since 2012

- The following changes were made to the actuarial assumptions:
  - The investment rate of return assumption decreased from 8.00 percent to 7.50 percent per annum.
  - The price inflation assumption decreased from 3.50 percent to 2.80 percent per annum.
  - The wage inflation assumption decreased from 4.25 percent to 3.90 percent per annum.
  - Effective January 1, 2014, PERACare no longer participates in the Centers for Medicare & Medicaid Services (CMS) Retiree Drug Subsidy (RDS) program. PERACare enrollees participating in the self-insured Medicare supplement plans and the Medicare HMO plan offered by Rocky Mountain Health Plans now receive their prescription drug benefits through a Medicare Prescription Drug Plan. The liability associated with the RDS has been eliminated.
  - Initial per capita health care costs for those PERACare enrollees under the PERA benefit structure who are expected to attain age 65 and older ages and are not eligible for premium-free Medicare Part A benefits have been updated to reflect the change in costs for the 2014 plan year.
  - The health care cost trend rates for Medicare Part A premiums have been revised to reflect the current expectation of future increases in rates of inflation applicable to Medicare Part A premiums.
  - The utilization rates for the No Part A subsidy of both retirees and their spouses have been revised.

2012 Changes in Assumptions or Other Inputs Since 2011

- The following changes were made to the actuarial assumptions:
  - The price inflation assumption decreased from 3.75 percent to 3.50 percent.
  - The wage inflation assumption decreased from 4.50 percent to 4.25 percent.
  - The post-retirement mortality assumption for healthy lives changed to the RP-2000 Combined Mortality Table rates projected with Scale AA to 2020 (set back one year for males and two years for females).
  - The active member mortality assumption was revised to match the post-retirement mortality table. However, the percentages of the post-retirement mortality tables reflected on active member lives were changed to 55 percent for males and 40 percent for females.
  - The RP-2000 Disability Mortality Table was retained. The setback applied to the male disability mortality rates remains unchanged at two years, however, the setback applied to the female mortality rates changed from five years to two years.
  - The rates of withdrawal were revised to more closely reflect actual experience.
  - The rates of early, reduced retirement for all divisions decreased and the rates for unreduced retirements increased to more closely reflect actual experience.
  - The rates of disability from active service decreased slightly to more closely reflect actual experience.
  - The investment return assumption was changed to be only net of investment expenses to better represent the investment consultant's assumptions and predictions and also to better align with recent changes in GASB accounting and reporting requirements.
  - The rates of participation in PERACare for current and future participants of all divisions and DPS Division deferred vested members have been revised to more closely reflect actual experience.
  - The percentage of PERACare enrollees who will attain age 65 and older ages and are assumed to not qualify for premium-free Medicare Part A coverage have been revised to more closely reflect actual experience.
  - The average age difference between covered male and female spouses has been updated to reflect actual experience.
  - Initial per capita health care costs for those PERACare enrollees under the PERA benefit structure who are expected to attain age 65 and older ages and are not eligible for premium-free Medicare Part A benefits have been updated to reflect the change in costs for the 2013 plan year.
  - The initial per capita payments estimated to be made by CMS under the RDS program have been updated based upon the most recent attestation of actuarial equivalence.

NOTES TO THE REQUIRED SUPPLEMENTARY INFORMATION (UNAUDITED)— HEALTH CARE TRUST FUNDS

(Dollars in Thousands)

- The health care cost trend rates for Medicare Part A premiums and RDS payments have been revised to reflect the current expectation of future increases in rates of inflation applicable to Medicare Part A premiums.
- The last year in which the prescription drug benefit provided to those members eligible for Medicare Part D is deemed to be actuarially equivalent has been increased to 2023.

2011 Changes in Assumptions or Other Inputs Since 2010

- The following changes were made to the actuarial assumptions:
  - Initial per capita health care costs for those PERACare enrollees under the PERA benefit structure who are expected to attain age 65 and older ages and are not eligible for premium-free Medicare Part A benefits have been updated to reflect the change in costs for the 2012 plan year.
  - The initial per capita payments estimated to be made by CMS under the RDS have been updated based upon the most recent attestation of actuarial equivalence.
  - The health care cost trend rates for Medicare Part A premiums and RDS payments have been revised to reflect the current expectation of future increases in rates of inflation applicable to Medicare Part A premiums.
  - The last year in which the prescription drug benefit provided to those members eligible for Medicare Part D is deemed to be actuarially equivalent has been increased to 2019.

2010 Changes in Assumptions or Other Inputs Since 2009

- The following changes were made to the actuarial assumptions:
  - Assumptions were supplemented to provide for the valuation of the DPS benefit structure added as a result of the merger of the DPSRS into PERA, effective January 1, 2010.
  - DPS HCTF was created on January 1, 2010, to provide health care subsidies for DPS retirees participating in PERACare.
  - Initial per capita health care costs for those PERACare enrollees under the PERA benefit structure who are expected to attain age 65 and older ages and are not eligible for premium-free Medicare Part A benefits have been updated to reflect the change in costs for the 2011 plan year.
  - PERACare funding rates are used to determine the health care costs for participants enrolled in the self-insured plans who are expected to attain age 65 and older ages and not eligible for premium-free Medicare Part A.
  - The starting per capita payments estimated to be made by the CMS under the RDS have been updated based upon the most recent attestation of actuarial equivalence.
  - The health care cost trend rates for Medicare Part A premiums and RDS payments have been revised to reflect the current expectation of future increases in rates of inflation applicable to Medicare Part A premiums.
  - The percentage of PERACare enrollees who are projected to be age 65 and older, and estimated to not be eligible for premium-free Medicare Part A has been revised to reflect plan experience.
  - The last year in which the prescription drug benefit provided to those members eligible for Medicare Part D is deemed to be actuarially equivalent has been increased to 2018.
  - Liabilities for those members represented under both the PERA benefit structure and the DPS benefit structure have been allocated based upon member contribution account balances.

NOTES TO THE REQUIRED SUPPLEMENTARY INFORMATION (UNAUDITED)— HEALTH CARE TRUST FUNDS

(Dollars in Thousands)

Note 3—Methods and Assumptions Used in Calculations of ADC

The ADC rates, as a percentage of covered payroll, used to determine the ADC amounts in the Schedule of Contributions from Employers and Other Contributing Entities are calculated as of December 31, two years prior to the end of the year in which ADC amounts are reported. The following actuarial methods and assumptions from the December 31, 2017, actuarial valuation were used to determine contribution rates reported in that schedule for the year ending December 31, 2019:

Actuarial cost method	Entry age
Amortization method	Level percentage of payroll
Amortization period	30 years, closed, layered[1]
Asset valuation method	4-year smoothed market
Price inflation	2.40 percent
Real wage growth	1.10 percent
Wage inflation	3.50 percent
Salary increases, including wage inflation	3.50 percent in aggregate
Long-term investment rate of return, net of pension plan investment expense, including price inflation	7.25 percent
Health care inflation factors	
PERA benefit structure:	
Service-based premium subsidy	0.00 percent
Medicare Part A premiums	3.25 percent initial 5.00 percent ultimate
Carrier premiums	5.00 percent
DPS benefit structure:	
Service-based premium subsidy	0.00 percent
Medicare Part A premiums	N/A
Carrier premiums	N/A

[1] Effective with the December 31, 2017, actuarial valuation, gains and losses are to be amortized over a closed period.

SUPPLEMENTARY SCHEDULES

(Dollars in Thousands)

SCHEDULE OF ADMINISTRATIVE EXPENSES

For the Years Ended December 31

	2019	2018
Personnel Services		
Salaries	**$35,113**	$33,091
Employee benefits	**9,431**	12,079
Total personnel services	**44,544**	45,170
Professional Services		
Actuarial contracts	**786**	416
Audits	**304**	171
Investment services	**3,100**	2,969
Legal and legislative counsel	**2,634**	2,398
Computer services and consulting	**1,599**	1,495
Management consulting	**1,305**	1,492
Health care consulting	**387**	385
Other	**1,454**	1,572
Total professional services	**11,569**	10,898
Miscellaneous		
Equipment rental and services	**2,055**	1,851
Memberships	**366**	329
Publications and subscriptions	**71**	68
Travel and local expense	**787**	758
Auto expense	**17**	22
Telephone	**366**	351
Postage	**1,481**	1,940
Insurance	**577**	535
Printing	**412**	444
Office supplies	**740**	805
Building rent, supplies, and utilities	**952**	1,003
Total miscellaneous	**7,824**	8,106
Direct Expense		
Health Care Trust Fund	**6,812**	17,913
DPS Health Care Trust Fund	**324**	689
Voluntary Investment Program	**1,365**	1,442
Defined Contribution Retirement Plan	**371**	372
Deferred Compensation Plan	**589**	605
Total direct expense	**9,461**	21,021
Depreciation expense	**307**	358
Tenant and other expense	**684**	804
Internal investment manager expense	**(19,536)**	(18,688)
Total administrative expense	**$54,853**	**$67,669**

SUPPLEMENTARY SCHEDULES

(Dollars in Thousands)

SCHEDULE OF ADMINISTRATIVE EXPENSES (CONTINUED)

For the Years Ended December 31

	2019	2018
Allocation of Administrative Expenses		
State Division Trust Fund	**$11,294**	$11,903
School Division Trust Fund	**22,619**	23,560
Local Government Division Trust Fund	**2,476**	2,621
Judicial Division Trust Fund	**84**	86
DPS Division Trust Fund	**2,713**	2,919
Voluntary Investment Program	**3,592**	3,310
Defined Contribution Retirement Plan	**997**	819
Deferred Compensation Plan	**1,188**	1,094
Health Care Trust Fund	**9,290**	20,401
DPS Health Care Trust Fund	**477**	845
Life Insurance Reserve	**123**	111
Total administrative expense	**$54,853**	**$67,669**

Note: The ratio of administrative expenses to fiduciary net position for the Division Trust Funds is eight basis points (0.08 percent) for 2019 and nine basis points (0.09 percent) for 2018.

See accompanying Independent Auditors' Report.

SUPPLEMENTARY SCHEDULES

(Dollars in Thousands)

SCHEDULE OF OTHER ADDITIONS
For the Years Ended December 31

	State Division Trust Fund	School Division Trust Fund	Local Govt Division Trust Fund	Judicial Division Trust Fund	DPS Division Trust Fund	Voluntary Investment Program	Defined Contribution Retirement Plan	Deferred Compensation Plan	HCTF	DPS HCTF	Life Insurance Reserve	TOTAL 2019	TOTAL 2018
Administrative fee income	$—	$—	$—	$—	$—	$—	$—	$—	$2,478	$153	$—	**$2,631**	$2,644
Revenue sharing	—	—	—	—	—	49	6	26	—	—	—	**81**	211
Participant loan interest	—	—	—	—	—	2,359	—	548	—	—	—	**2,907**	2,646
Interfund transfers at retirement	—	—	—	6,695	2,993	—	—	—	—	—	—	**9,688**	8,103
Purchase service transfer to health care	—	—	—	—	—	—	—	—	4,483	35	—	**4,518**	5,784
Settlement income	47	79	13	1	11	—	—	—	15	—	—	**166**	9,632
Miscellaneous	(25)	285	1	1	26	35	15	4	8	—	—	**350**	149
Total other additions	**$22**	**$364**	**$14**	**$6,697**	**$3,030**	**$2,443**	**$21**	**$578**	**$6,984**	**$188**	**$—**	**$20,341**	**$29,169**

SCHEDULE OF OTHER DEDUCTIONS
For the Years Ended December 31

	State Division Trust Fund	School Division Trust Fund	Local Govt Division Trust Fund	Judicial Division Trust Fund	DPS Division Trust Fund	Voluntary Investment Program	Defined Contribution Retirement Plan	Deferred Compensation Plan	HCTF	DPS HCTF	Life Insurance Reserve	TOTAL 2019	TOTAL 2018
Interfund transfers at retirement	$302	$6,382	$3,004	$—	$—	$—	$—	$—	$—	$—	$—	**$9,688**	$8,103
Purchase service transfer to health care	1,849	1,798	809	27	35	—	—	—	—	—	—	**4,518**	5,784
Miscellaneous	556	113	162	—	20	1,656	135	759	33	1	—	**3,435**	3,556
Total other deductions	**$2,707**	**$8,293**	**$3,975**	**$27**	**$55**	**$1,656**	**$135**	**$759**	**$33**	**$1**	**$—**	**$17,641**	**$17,443**

See accompanying Independent Auditors' Report.

SUPPLEMENTARY SCHEDULES

(Dollars in Thousands)

SCHEDULE OF INVESTMENT EXPENSES

For the Years Ended December 31

	2019	2018
External Manager Expenses		
Global equity	**$24,565**	$27,885
Fixed income	**225**	2,585
Private equity	**55,558**	54,183
Real estate	**40,155**	44,669
Opportunity fund	**21,597**	17,875
Cash and short-term investments	**192**	470
Total external manager expenses	**142,292**	147,667
Internal manager expenses	**19,536**	18,688
Other investment expenses and custody fees	**2,185**	1,838
Defined contribution and deferred compensation plan investment expenses	**2,865**	3,371
Total investment expenses	**$166,878**	**$171,564**

SCHEDULE OF PAYMENTS TO CONSULTANTS

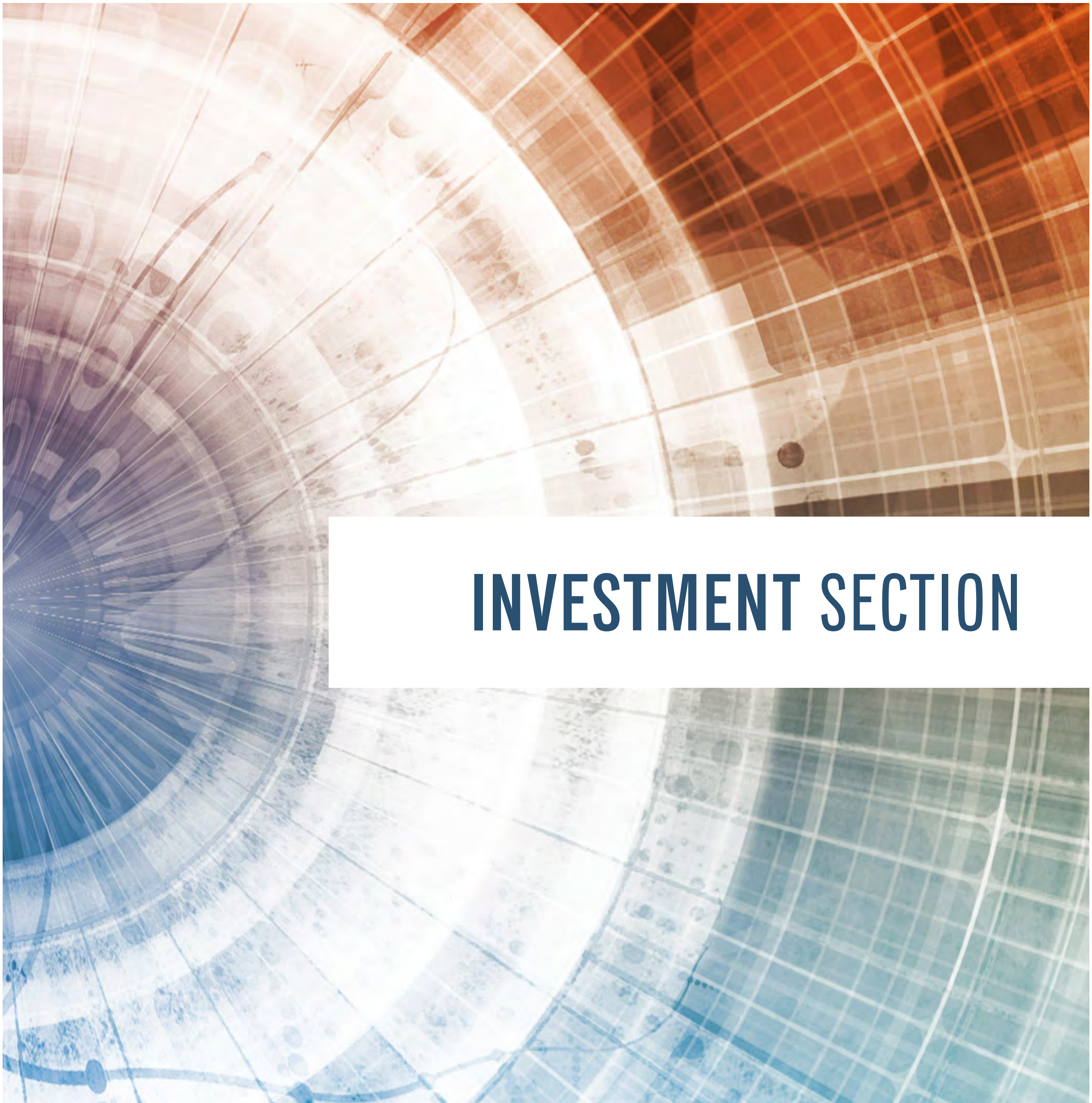
For the Years Ended December 31

	2019	2018
Professional Contracts		
Actuarial	**$786**	$416
Audits	**304**	171
Legal and legislative counsel	**2,634**	2,398
Computer services and consulting	**1,599**	1,495
Management consulting	**1,305**	1,492
Health care consulting	**387**	385
Other	**1,454**	1,572
Total payments to consultants[1]	**$8,469**	**$7,929**

[1] Excludes investment advisers.

The Schedule of Commissions and other information related to investment expenses can be found in the Investment Section on pages 123-125.

See accompanying Independent Auditors' Report.



INVESTMENT SECTION

DEFINED BENEFIT PLANS

INTRODUCTION

The Division Trust Funds, the Health Care Trust Funds, and the Life Insurance Reserve are included in the information discussed in this subsection on PERA's defined benefit plans.

REPORT ON INVESTMENT ACTIVITY

State Law

State law gives complete responsibility for the investment of PERA's funds to the PERA Board of Trustees (Board), with some stipulations including:

- The aggregate amount of moneys invested in corporate stocks or corporate bonds, notes, or debentures, which are convertible into corporate stock or in investment trust shares cannot exceed 65 percent of the then book value of the fund.
- No investment of the fund in common or preferred stock, or both, of any single corporation can exceed 5 percent of the then book value of the fund.
- The fund cannot acquire more than 12 percent of the outstanding stock or bonds of any single corporation.
- The origination of mortgages or deeds of trust on real residential property is prohibited.

Additionally, Colorado Revised Statutes (C.R.S.) § 24-54.8-201 *et seq.* imposes targeted divestment from companies that have economic prohibitions against Israel.

Colorado PERA Board's Statutory Fiduciary Responsibility

By State law, the management of PERA's retirement fund is vested in the Board who is held to the standard of conduct of fiduciaries in discharging their responsibilities. According to C.R.S. § 24-51-207(2), the Board, as fiduciaries, must carry out their functions solely in the interest of PERA members and benefit recipients and for the exclusive purpose of providing benefits.

Goal

The function of PERA is to provide present and future retirement or survivor benefits for its members. The investment function is managed in a manner to promote long-term financial security for our membership while maintaining the stability of the fund.

Overview of Investment Policy

PERA's investment policy outlines the investment philosophy and guidelines within which the fund's investments will be managed, and includes the following:

- Strategic asset allocation is the most significant factor influencing long-term investment performance and asset volatility.
- The fund's liabilities are long term and the investment strategy will therefore be long term in nature.
- The asset allocation policy will be periodically re-examined to ensure its appropriateness to the then-prevailing liability considerations.
- As a long-term investor, PERA will invest across a wide spectrum of investments in a prudent manner.
- Active management may be expected to add value over passive investment alternatives under appropriate conditions.

The Board determines the strategic asset allocation policy for the fund. This strategic asset allocation contains a long-term target allocation and specific ranges within which each asset class may operate. Because the long-term target allocation will be achieved over time, an interim target allocation was also approved. The asset allocation targets and ranges in effect for 2019 are listed below.

ASSET ALLOCATION TARGETS AND RANGES[1]

	Interim Asset Allocation Target	Long-Term Asset Allocation Target	Target Range
Global Equity	53.5%	53.0%	47.0% – 59.0%
Fixed Income	23.5%	23.0%	18.0% – 28.0%
Private Equity	8.5%	8.5%	5.0% – 12.0%
Real Estate	8.5%	8.5%	5.0% – 12.0%
Opportunity Fund	5.0%	6.0%	0.0% – 9.0%
Cash and Short-Term Investments	1.0%	1.0%	0.0% – 3.0%

[1] See Note 5 of the Notes to the Financial Statements in the Financial Section for detailed disclosures about each asset class.

The asset allocation policy is determined by an intensive asset/liability study which considers expected investment returns, risks, and correlations of returns. The characteristics of the fund's liabilities are analyzed in conjunction with expected investment risks and returns. The targeted strategic asset allocation is designed to provide appropriate diversification and to balance the expected total rate of return with the volatility of expected returns, while ensuring an appropriate level of risk is incurred.

The asset allocation targets are adhered to through the implementation of portfolio rebalancing. Investments are managed and monitored in a manner which seeks to balance return and risk within the asset/liability framework. The Chief Investment Officer is authorized to execute investment transactions on behalf of the Board. Assets are managed both internally and externally. In making investment decisions, the Board and staff utilize external experts in various fields including risk and performance analysis, and other important investment functions and issues.

The Board commissioned an asset/liability study during 2019, which was prepared by Aon Hewitt Investment Consulting, Inc. (Aon). The objective of the study was to determine the optimal strategic asset allocation policy that will ultimately allow PERA to meet its financial obligations, while also ensuring that PERA incurs appropriate levels of risk and liquidity. As a result of this study, the Board slightly modified the asset allocation ranges and targets effective January 1, 2020, while reaffirming the investment return assumption of 7.25 percent.

Basis of Presentation

Aon, the Board's Investment Performance consultant, provides the investment returns for the fund based on data made available by the fund's custodian, The Northern Trust Company (Northern Trust). Performance calculations were prepared using time-weighted rates of return and are net-of-fees unless otherwise indicated. Returns for periods longer than one year are annualized.

Investment Stewardship

It is the fiduciary duty of the Board and Investment staff to manage plan assets with prudence and care in pursuit of long-term financial sustainability for the benefit of members and plan participants. PERA staff demonstrate stewardship of plan assets by: protecting members' interests through cost-conscious investments; integrating financially material factors into investment decisions; advocating for stronger markets that support long-term value; and evaluating portfolio exposures and performance on an ongoing basis.

Investment staff initiatives and philosophy supporting the pursuit of financial sustainability through stewardship are discussed in greater detail in PERA's *Investment Stewardship Report*. The report also highlights environmental, social, and governance (ESG) related investing themes more broadly. The *Investment Stewardship Report* is updated annually, and can be found on PERA's website at www.copera.org.

Proxy Voting

As part of investment stewardship, PERA continues promoting strong corporate governance practices through proxy voting. Although PERA is not subject to the Employee Retirement Income Security Act of 1974 (ERISA), the Board complies with the position taken by the U.S. Department of Labor (DOL) in February 1988. The DOL has stated that the right to vote shares of stock owned by a pension plan is, in itself, an asset of the plan, and therefore the fiduciary's responsibility to manage the assets includes proxy voting.

To assist the Board in carrying out its fiduciary responsibilities in voting proxies, the Board established a Shareholder Responsibility Committee. The Board and its Shareholder Responsibility Committee have delegated to Investment Stewardship Division staff the authority to review and vote on proxy proposals in compliance with PERA's Proxy Voting Policy. Accordingly, Investment Stewardship staff vote proxies for all domestic and international stocks held by PERA's portfolios.

PERA's Proxy Voting Policy sets forth guidance on a broad range of issues affecting the oversight and management of public companies in which PERA invests. The Board regularly updates its Proxy Voting Policy to maintain relevance in seeking alignment of corporate management interests with the interests of shareholders. PERA's Proxy Voting Policy can be viewed on PERA's website at www.copera.org.

(The Colorado PERA Report on Investment Activity was prepared by internal staff.)

DEFINED BENEFIT PLANS

(Dollars in Thousands)

INVESTMENT BROKERS/ADVISERS (INTERNALLY MANAGED ASSETS)

Amherst Pierpont Securities, LLC
Bank of America Merrill Lynch
Barclays Capital, Inc.
BMO Capital Markets Corp.
BNP Paribas Securities Corp.
Cantor Fitzgerald & Co.
Citigroup Global Markets, Inc.
Credit Suisse Securities (USA), LLC
Deutsche Bank Securities, Inc.
Goldman Sachs & Co.
HSBC Securities (USA), Inc.
J.P. Morgan Securities, Inc.
Jefferies & Co., Inc.
Jones Trading Institutional Services, LLC
Liquidnet, Inc.
Loop Capital Markets, LLC
MarketAxess Corp.
Mitsubishi UFJ Securities (USA), Inc.
Mizuho Securities USA, Inc.
Morgan Stanley & Co., Inc.
Nomura Securities International, Inc.
RBC Capital Markets Corp.
RBS Securities, Inc.
State Street Global Markets, LLC
Stifel, Nicolaus & Company, Inc.
Sumitomo Mitsui Banking Corp.
Susquehanna International Group, LLC
The Bank of NewYork Mellon Corp.
The Northern Trust Company
Themis Trading, LLC
U.S. Bancorp
UBS Securities, LLC
Wells Fargo Securities, LLC

Note: A list of investment managers is available upon request.

SCHEDULE OF COMMISSIONS[1]

As of December 31, 2019

	Internally Managed Investments		Externally Managed Investments		
Asset Class	Commissions	Percentage of Asset Class	Commissions	Percentage of Asset Class	Total Commissions
Global Equity	$837	75%	$1,570	25%	**$2,407**
Fixed Income[2]	17,827	91%	—	9%	**17,827**
Total commissions	**$18,664**		**$1,570**		**$20,234**

1 Does not include commingled funds or commissions within Private Equity, Real Estate, and the Opportunity Fund.

2 Fixed Income commissions are estimated.

DEFINED BENEFIT PLANS

(Dollars in Thousands)

(In actual dollars for this paragraph only)
Total investment expenses for internal and external asset management of PERA's $52.1 billion investment portfolio were $164.0 million representing about 31.5 basis points (bps), a decrease of 5.5 bps from 2018. PERA strives to manage the investment assets in a cost efficient manner. The driving factor in the low overall cost is PERA's use of internal management. PERA staff manages approximately 63 percent of total fund assets in-house at a calculated cost for internal asset management of $12.1 million (3.7 bps); outsourcing such management would cost an estimated $85.0 million (26.0 bps).

SCHEDULE OF INVESTMENT EXPENSES[1]

As of December 31, 2019

	Investment Expense
Global Equity	$24,565
Fixed Income	225
Private Equity	55,558
Real Estate	40,155
Opportunity Fund	21,597
Cash and Short-Term Investments	192
Total External Manager Expenses	**142,292**
Internal Manager Expenses	19,536
Other Investment Expenses and Custody Fees	2,185
Total Investment Expenses	**$164,013**

[1] See the Investment Summary on page 126 for information about fair value of investments.

The table below breaks out both the dollar amount and percentage of each asset class managed internally. It is important to note that all accounts, both internal and external, are held to the same high performance standards.

SCHEDULE OF INTERNAL AND EXTERNAL ASSET MANAGEMENT

As of December 31, 2019

	Internal		External		
Asset Class	Amount	Percent	Amount	Percent	Total Amount
Global Equity	$22,180,736	74.9%	$7,445,159	25.1%	$29,625,895
Fixed Income	10,505,373	91.3%	1,006,308	8.7%	11,511,681
Private Equity	—	—	4,219,262	100.0%	4,219,262
Real Estate	—	—	4,621,450	100.0%	4,621,450
Opportunity Fund	—	—	1,829,580	100.0%	1,829,580
Cash and Short-Term Investments	—	—	264,569	100.0%	264,569
Total	**$32,686,109**	**62.8%**	**$19,386,328**	**37.2%**	**$52,072,437**

DEFINED BENEFIT PLANS

(Dollars in Thousands)

SCHEDULE OF INVESTMENT INCOME AND EXPENSE BY ASSET CLASS

As of December 31, 2019

Asset Class	Net Appreciation in Fair Value[1]	Interest and Dividends	Net Operating Income[2]	Investment Expenses[3]	Net Securities Lending Income	Net Investment Income
Global Equity	$6,397,219	$545,559	$—	($35,060)	$7,899	$6,915,617
Fixed Income	676,344	306,093	—	(4,601)	232	978,068
Private Equity	576,157	4	17,226	(58,653)	—	534,734
Real Estate	215,189	—	187,869	(42,163)	—	360,895
Opportunity Fund	62,065	9	65,958	(23,313)	—	104,719
Cash and Short-Term Investments	88,915	8,799	—	(223)	(931)[4]	96,560
Total	**$8,015,889**	**$860,464**	**$271,053**	**($164,013)**	**$7,200**	**$8,990,593**

1 Global Equity and Fixed Income include realized gain/(loss) recognized on securities sold during 2019, current year unrealized gain/(loss) and unrealized translation gain/(loss), and class action revenue. Private Equity, Real Estate, and Opportunity Fund include current year realized and unrealized gain/(loss), paid carried interest, and adjustments to accrued carried interest as reported by the General Partner.

2 Private Equity, Real Estate, and Opportunity Fund include investment income and expenses as reported by the General Partner.

3 Includes external and internal investment management, custody, and other investment expenses.

4 Represents current year realized and unrealized loss on investments in the invested collateral pool.

SCHEDULE OF PRIVATE MARKET INVESTMENT CONTRIBUTIONS, DISTRIBUTIONS, AND PAID CARRIED INTEREST

As of December 31, 2019

Asset Class	Contributions[1]	Distributions[2]	Paid Carried Interest[3]
Private Equity	$721,494	$997,763	$52,153
Real Estate	446,071	520,778	9,221
Opportunity Fund	313,542	206,142	4,273
Total	**$1,481,107**	**$1,724,683**	**$65,647**

1 Represents money sent to external entities for the purpose of funding private market investments and/or fees during the current fiscal year.

2 Represents money or shares of companies received from external entities during the current fiscal year, generally due to PERA receiving its proportionate share of an investment's exited value.

3 Represents the share of profits paid to external entities due to investment returns surpassing agreed-upon thresholds. Amounts will vary, potentially significantly, from year to year depending on the timing of sales of the underlying investments and the magnitude of the gains. Amounts are based on best available information provided by external entities. Actual results could differ from those amounts.

DEFINED BENEFIT PLANS

(Dollars in Thousands)

INVESTMENT SUMMARY

	Fair Value Per Financial Statements December 31, 2019	Reallocation of Investment Amounts[1]	Non-Investment Amounts[2]	Fair Value Per Investment Portfolio December 31, 2019	Interim Asset Allocation Target During 2019[3]	Actual Asset Allocation (Percent of Fair Value) 12/31/19	12/31/18	12/31/17
Global Equity	$29,356,380	$269,515	$—	$29,625,895	53.5%	**56.9%**	53.4%	57.7%
Fixed Income	11,263,209	248,472	—	11,511,681	23.5%	**22.1%**	24.0%	21.9%
Private Equity	4,219,261	1	—	4,219,262	8.5%	**8.1%**	8.8%	8.0%
Real Estate	4,632,826	(11,376)	—	4,621,450	8.5%	**8.9%**	9.6%	8.6%
Opportunity Fund	1,829,571	9	—	1,829,580	5.0%	**3.5%**	3.6%	3.4%
Cash and Short-Term Investments								
Operating Cash	10,497	—	(10,497)	—				
Cash and Short-Term Investments	674,272	(409,703)	—	264,569	1.0%	**0.5%**	0.6%	0.4%
Net securities lending collateral and obligations	500	(500)	—	—				
Net investment settlements and income and other liabilities[4]	(14,093)	(96,418)	110,511	—				
Benefit and interfund receivables and capital assets[5]	223,746	—	(223,746)	—				
Total	**$52,196,169**	**$—**	**($123,732)**	**$52,072,437**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

[1] Investment receivables, payables, accruals, securities lending collateral, securities lending obligations, and cash and short-term investments are allocated back to the investment portfolios that hold them.

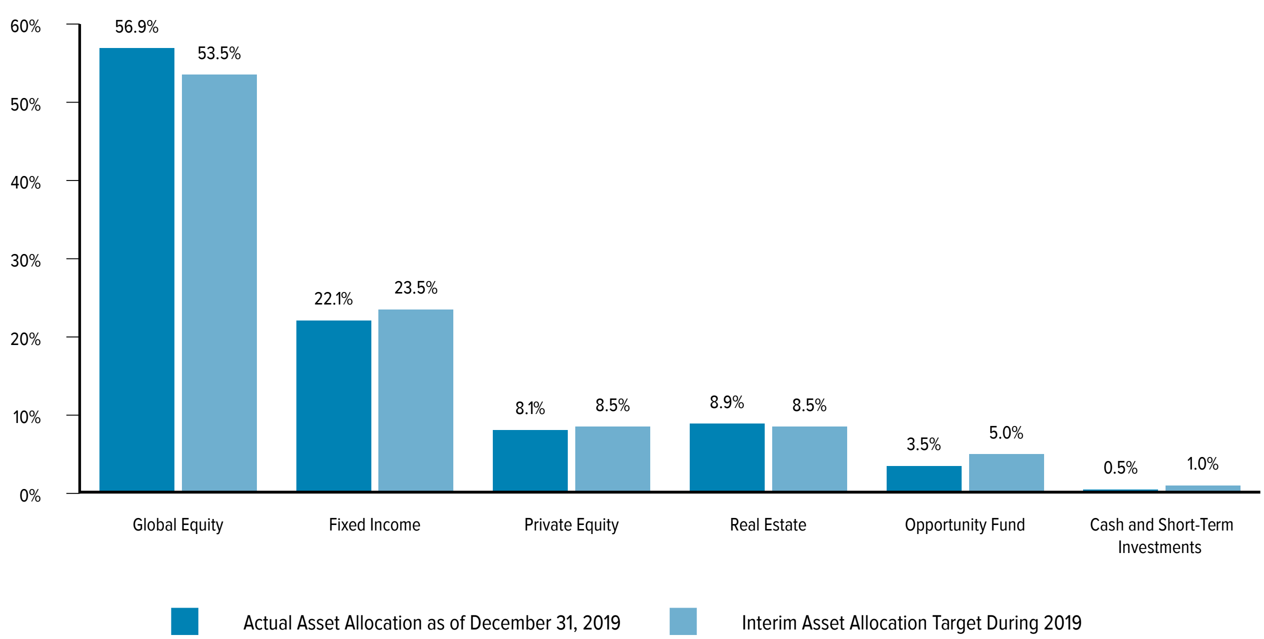
[2] Non-investment amounts are not included in the determination of actual investment asset allocation.

[3] See page 121 for more information about the strategic asset allocation policy of the fund.

[4] Includes non-investment payables of $110,511.

[5] Includes benefit receivables of $208,702, interfund receivables of $729, and capital assets of $14,315.

Asset Allocation versus Target



DEFINED BENEFIT PLANS

Aon provides the investment returns for the fund based on data made available by Northern Trust. Listed below are the annualized one-, three-, five-, and ten-year net-of-fees time-weighted rates of return for each asset class and their respective benchmarks.

SCHEDULE OF INVESTMENT RESULTS

As of December 31, 2019

	2019	3–Year	5–Year	10–Year
PERA Total Portfolio	**20.3%**	11.1%	8.4%	9.1%
Total Fund Policy Benchmark[1]	**19.8%**	10.2%	7.6%	8.8%
Median Plan (BNY Mellon Performance and Risk Analytics' and Investment Metrics' Median Public Fund Universe)	**16.9%**	9.0%	6.7%	7.9%
Global Equity	**29.5%**	14.1%	9.7%	10.5%
Global Equity Custom Benchmark[2]	**26.8%**	12.3%	8.4%	9.7%
Fixed Income	**9.2%**	4.3%	3.4%	4.3%
Fixed Income Custom Benchmark[3]	**8.7%**	4.3%	3.4%	4.1%
Private Equity	**13.7%**	13.0%	11.3%	12.2%
Private Equity Custom Benchmark[4]	**28.3%**	18.4%	13.9%	16.2%
Real Estate	**8.4%**	9.7%	11.3%	12.7%
Real Estate Custom Benchmark[5]	**4.9%**	6.7%	8.5%	11.0%
Opportunity Fund	**6.4%**	6.8%	5.4%	4.1%
Opportunity Fund Custom Benchmark[6]	**11.2%**	7.3%	5.6%	5.3%
Cash and Short-Term Investments	**2.4%**	1.8%	1.2%	0.8%
ICE BofAML U.S. 3-Month Treasury Bill Index	**2.3%**	1.7%	1.1%	0.6%

Note: Performance calculations were prepared using net-of-fees time-weighted rates of return.

1 The PERA Board adopted benchmarks beginning April 1, 2004, for each of the various asset classes. The adopted benchmarks have changed over time and, accordingly, the benchmark returns presented represent a blend, as follows:

- The Total Fund Policy Benchmark—A combination of 53.5 percent of the Global Equity Custom Benchmark; 23.5 percent of the Fixed Income Custom Benchmark; 8.5 percent of the Private Equity Custom Benchmark; 8.5 percent of the Real Estate Custom Benchmark; 5.0 percent of the Opportunity Fund Custom Benchmark; and 1.0 percent of the ICE BofAML U.S. 3-Month Treasury Bill Index. Prior to July 2016, a combination of 55.0 percent of the Global Equity Custom Benchmark; 24.0 percent of the Fixed Income Custom Benchmark; 7.5 percent of the Real Estate Custom Benchmark; 7.5 percent of the Private Equity Custom Benchmark; 5.0 percent of the Opportunity Fund Custom Benchmark; and 1.0 percent of the ICE BofAML U.S. 3-Month Treasury Bill Index. Prior to July 2015, a combination of 56.0 percent of the Global Equity Custom Benchmark; 25.0 percent of the Fixed Income Custom Benchmark; 7.0 percent of the Real Estate Custom Benchmark; 7.0 percent of the Private Equity Custom Benchmark; and 5.0 percent of the Opportunity Fund Custom Benchmark. Prior to January 2011, a combination of 58.0 percent of the Global Equity Custom Benchmark; 25.0 percent of the Fixed Income Custom Benchmark; 7.0 percent of the Real Estate Custom Benchmark; 7.0 percent of the Private Equity Custom Benchmark; and 3.0 percent of the Public Markets Benchmark.

2 MSCI ACWI IMI (Net) with USA Gross. Prior to July 1, 2018, MSCI ACWI IMI. Prior to February 1, 2013, 52.0 percent DJ U.S. Total Stock Market Index and 48.0 percent MSCI ACWI ex-U.S. Index. Prior to October 1, 2012, 58.0 percent DJ U.S. Total Stock Market Index and 42.0 percent MSCI ACWI ex-U.S. Index. Prior to April 1, 2012, 64.0 percent DJ U.S. Total Stock Market Index and 36.0 percent MSCI ACWI ex-U.S. Index. Prior to October 1, 2011, 69.0 percent DJ U.S. Total Stock Market Index and 31.0 percent MSCI ACWI ex-U.S. Index. Prior to April 1, 2011, 74.1 percent DJ U.S. Total Stock Market Index and 25.9 percent MSCI ACWI ex-U.S. Index.

3 Bloomberg Barclays U.S. Aggregate. Prior to August 1, 2018, Bloomberg Barclays U.S. Universal Bond Index. Prior to July 1, 2015, 98.0 percent of the Bloomberg Barclays Capital U.S. Universal Bond Index and 2.0 percent of the Bloomberg Barclays Capital U.S. Long Government/Credit Index. Prior to July 1, 2010, Bloomberg Barclays Capital U.S. Universal Bond Index.

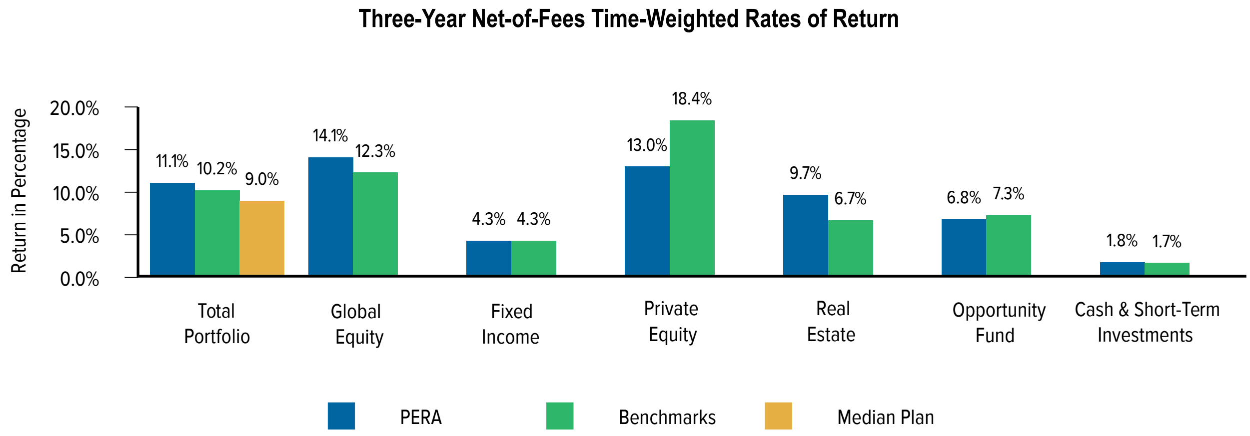
4 MSCI ACWI IMI (Net) with USA Gross plus 150 basis points. Prior to January 1, 2019, Burgiss Time Weighted Rate of Return Benchmark. Prior to January 1, 2015, DJ U.S. Total Stock Market Index plus 250 basis points annually. Prior to January 1, 2012, DJ U.S. Total Stock Market Index plus 300 basis points annually.

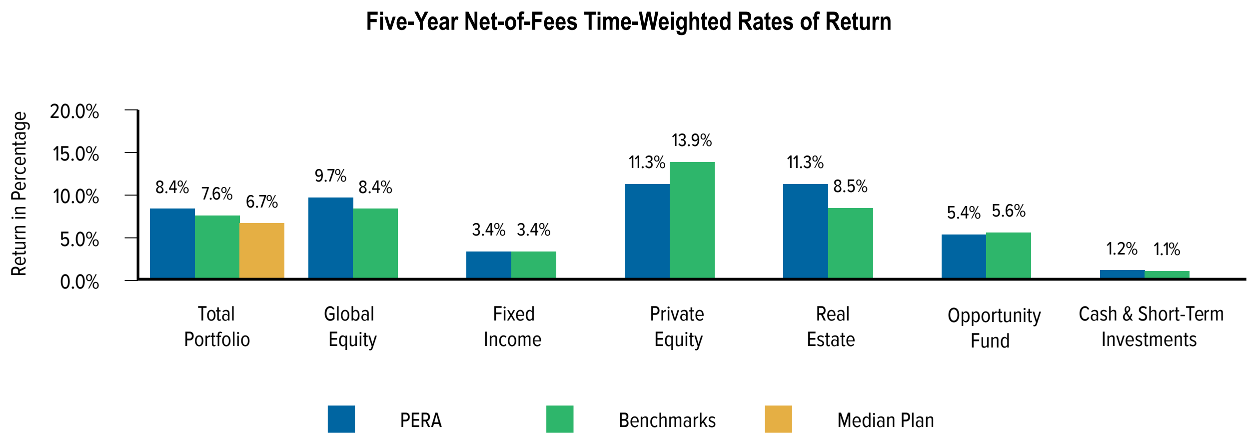
5 NCREIF Open End Diversified Core Equity Index (NFI-ODCE) plus 50 basis points annually. Prior to January 1, 2012, NFI-ODCE plus 100 basis points annually.

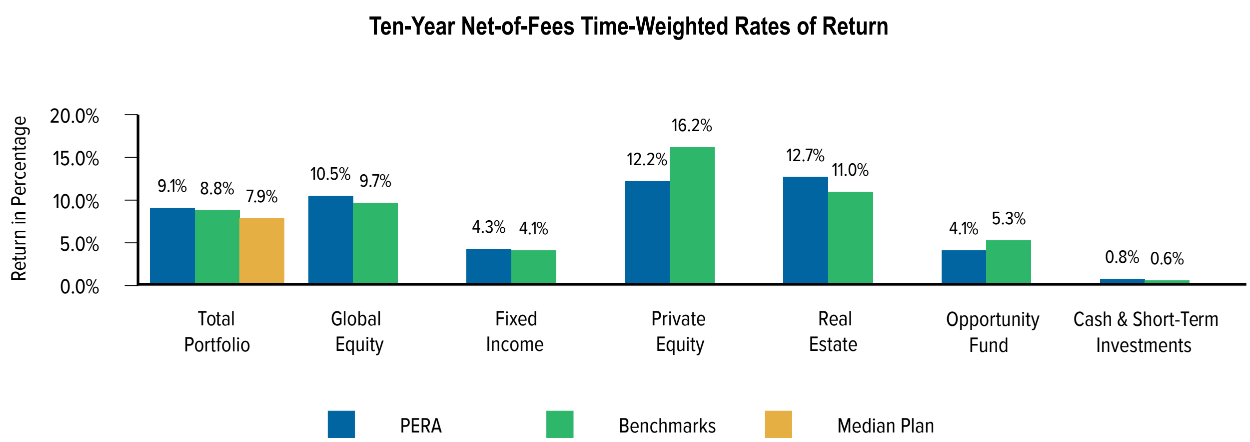
6 Weighted average of beginning of year market values for each of the three objectives (Risk Mitigation: HFRI FOF Market Defensive Index, Real Assets: CPI plus 400 basis points, Opportunistic: PERA Public Markets plus 150 basis points). (Note, the term "market value" is used in this instance to be consistent with the language approved by the Board. The term "market value" is synonymous with the term "fair value" as used elsewhere in this CAFR). Prior to January 1, 2019, market value weighted aggregate of the benchmarks of the individual strategies included in the Opportunity Fund. Prior to January 1, 2012, a combination of 69.1 percent of the Global Equity Custom Benchmark and 30.9 percent of the Fixed Income Custom Benchmark. Prior to January 1, 2011, a combination of 51.8 percent DJ U.S. Total Stock Market Index; 18.1 percent MSCI ACWI ex-U.S. Index; and 30.1 percent Fixed Income Custom Benchmark.

DEFINED BENEFIT PLANS

Listed below are the three-, five-, and ten-year net-of-fees time-weighted rates of return for the total fund and each asset class and their respective benchmarks.







DEFINED BENEFIT PLANS

FUND PERFORMANCE EVALUATION

(Performance returns are net-of-fees unless otherwise indicated)

Total Portfolio Results

For the year ended December 31, 2019, PERA’s total fund returned 20.3 percent, outperforming the policy benchmark’s return of 19.8 percent. PERA's policy benchmark is a passive representation of the asset allocation policy adopted by the Board. The total fund has outperformed the policy benchmark over the one-, three-, five-, and ten-year periods.

The total fund return of 20.3 percent for the year ended December 31, 2019, also exceeded the BNY Mellon Performance and Risk Analytics’ and Investment Metrics’ Median Public Fund Universe return of 16.9 percent. As of December 31, 2019, this universe was comprised of 165 public pension funds with assets of approximately $3.0 trillion. The total fund has performed better than this universe over the one-, three-, five-, and ten-year periods.

For the year ended December 31, 2019, the total fund returned 20.3 percent, compared to a hypothetical portfolio consisting of 60 percent global equities, based on the MSCI ACWI IMI Index, and 40 percent fixed income, based on the Bloomberg Barclay's U.S. Aggregate Bond Index, which collectively returned 19.5 percent. The total fund has performed better than this hypothetical portfolio over the one-, three-, five- and ten-year periods (11.1 percent versus 9.2 percent, 8.4 percent versus 6.6 percent, and 9.1 percent versus 7.6 percent, for the three-, five-, and ten-year periods, respectively).

Global Equity

2019 was a tremendous year for equity investors, as the global stock market surged over 26 percent (MSCI ACWI IMI). This gain defied most forecasts, which began the year focusing on threats from the U.S.-China trade negotiations and a slowdown in economic and corporate earnings growth.

Stocks rallied during the first several months of 2019, after experiencing a significant decline during the last few months of 2018. Growing concerns regarding a potential U.S. recession and global trade tensions flustered markets in May and most of the summer. However, incrementally upbeat economic data helped ease worries, driven by a strong U.S. jobs market, solid U.S. consumer spending, and better-than-expected corporate earnings. Robust stock market gains in the fourth quarter reflected reduced investor anxiety concerning the global economy and U.S.-China relations, as trade tensions eased with the announcement of a “phase one” trade deal. The stock market rally was also supported by a shift in monetary policy at the Federal Reserve (Fed) which, in July, cut rates for the first time in a decade. This was followed by additional rate cuts in September and October.

U.S. large cap tech stocks led the global equity rally in 2019. The technology sector was up over 46 percent during the year. A large portion of the market rally resulted from Apple and Microsoft, which surged 89 percent and 58 percent, respectively, during 2019. The gains were particularly notable given the companies’ sizes, as they are the two largest publicly traded companies, with each having a market value in excess of $1.2 trillion at the end of the year.

In 2019, PERA’s Global Equity portfolio returned 29.5 percent, outperforming its custom benchmark’s return of 26.8 percent. The Global Equity portfolio has outperformed its custom benchmark over the one-, three-, five-, and ten-year periods.

Fixed Income

2019 was marked by lower interest rates and tighter credit spreads. The U.S. economy remained relatively strong in 2019 with real gross domestic product (GDP) growing 2.3 percent, mainly driven by solid consumer spending. Job creation was robust throughout the year and unemployment declined to 3.5 percent by year end. However, as the year progressed, global economic activity decelerated due to heightened U.S.-China trade tensions. The U.S. yield curve inverted for a brief period (the yield on the 2-year Treasury note exceeded that of the 10-year). The Fed responded by reducing the Fed Funds rate by 75 basis points, which normalized the yield curve.

The yield on the 10-year Treasury note declined over the year, beginning the year at 2.69 percent and closing at 1.92 percent. Risk assets performed well, aided by earnings growth and robust investor inflows into all spread-related fixed income products such as corporate bonds, agency securities, and mortgage-backed securities. U.S. investment grade corporate bonds outperformed all major fixed income sectors with option-adjusted credit spreads tightening 60 basis points over the year.

In 2019, PERA’s Fixed Income portfolio returned 9.2 percent, outperforming its custom benchmark's return of 8.7 percent. The Fixed Income portfolio has outperformed its custom benchmark over the one- and ten-year periods and has performed in line over the three- and five-year periods.

Private Equity

Private equity investment activity remained strong in 2019, posting the second most active year on record. Deal valuations came down modestly from prior years as trade concerns and other economic indicators steered investors toward downside protection. Although there was a more conservative stance among many sponsors, non-traditional investors, such as sovereign wealth funds, continued to drive competition. Moreover, software deals, which tend to command higher valuations, continued to grow in volume, further contributing to elevated pricing.

DEFINED BENEFIT PLANS

After a relatively modest decline in 2018, 2019 was a record year for private equity fundraising in terms of dollars raised. However, the number of individual funds raised was the lowest annual number since 2012. A high proportion of mega funds (> $5 billion) drove these record levels. Furthermore, nearly all funds raised in 2019 were larger than their predecessor funds. Strong private equity performance, corresponding high levels of capital distributions, and an increasingly diverse set of investors seeking exposure to the asset class, were further contributors to private equity's robust fundraising levels.

2019 venture deal activity was a continuation of 2018's strong pace. Larger deals closed at every stage and in nearly every sector, propelling record deal activity. 2019 saw record-breaking venture capital exit value, most of which came from venture-backed initial public offerings (IPOs). Favorable public market conditions gave investors an enticing exit option; however, post-IPO performance of venture-backed deals was uneven, tempering some of the IPO enthusiasm.

In 2019, PERA's Private Equity portfolio returned 13.7 percent, compared with its custom benchmark's return of 28.3 percent. The Private Equity portfolio has underperformed its custom benchmark over the one-, three-, five-, and ten-year periods. The ultimate goal of private equity is to outperform public equities over the long term. Over the past ten years, the Private Equity Portfolio has outperformed the Global Equity Custom Benchmark by 2.5 percent. The portfolio's since inception net internal rate of return as of December 31, 2019, was 10.5 percent compared to its custom benchmark's since inception internal rate of return of 7.4 percent.

Real Estate

Real estate transaction activity remained relatively flat in 2019 in total value of institutional grade property sales. The aggregate number of trades declined slightly as larger portfolio transactions were more prevalent in the marketplace. Financial conditions and monetary policy eased considerably throughout the year, and while treasury yields decreased in 2019, overall capitalization rates remained consistent across all property types and debt financing was widely available. The real estate risk premium remained intact in 2019 at approximately 440 basis points over the rate on 10-year Treasury notes, and the spread widened as treasury yields declined. Late cycle dynamics pushed investors to be strategic in their investment selection by identifying properties in markets with strong income and appreciation potential to drive returns.

The industrial sector continued one of the longest expansions on record as it benefited from the impact of e-commerce. Development began to trend above its long-term average, but supply and demand were largely in balance. The multifamily sector remained one of the primary defensive investment strategies. Despite record levels of new supply, low vacancy and sustained rent growth helped drive continued growth in appreciation and income. The office sector appeared to plateau after a period of cyclical expansion, and fundamentals were more balanced than prior cycles as the job market neared full employment. Retail remained maligned, not only because of the structural shift away from traditional brick and mortar formats, but also due to several decades of overbuilding in the mall subsector. It remains unclear what long-term impact e-commerce will have on physical retail structures.

In 2019, PERA's Real Estate portfolio returned 8.4 percent, compared with its custom benchmark's return of 4.9 percent. The Real Estate portfolio has outperformed its custom benchmark over the one-, three-, five-, and ten-year periods.

Opportunity Fund

Most traditional asset classes achieved surprisingly strong returns in 2019, resulting in muted diversification benefits of alternative investments due to the defensive positioning and risk minimization approach of several investment managers utilized by the Opportunity Fund.

Although an emphasis on risk-adjusted returns can result in lagging performance during momentum-driven markets such as 2019, the Opportunity Fund remains focused on adding long-term value by selectively investing in return-enhancing private investments and seeking non-correlated investments that reduce the risk of capital loss in declining markets. The Opportunity Fund allocates across three sub-asset classes including opportunistic, real assets, and risk mitigation. Opportunistic focuses on funds that target returns in excess of public markets, real assets generates consistent income and a return on capital that exceeds inflation, and risk mitigation uses multi-strategy and global macro hedge funds for diversification and capital preservation in down markets. All three sub-asset classes generated modestly positive returns in 2019.

In 2019, PERA's Opportunity Fund portfolio returned 6.4 percent, compared with its custom benchmark's return of 11.2 percent. The Opportunity Fund portfolio has underperformed its custom benchmark over the one-, three-, five-, and ten-year periods.

DEFINED BENEFIT PLANS

(Dollars in Thousands)

PROFILE OF INVESTMENTS IN COLORADO

As of December 31, 2019

	Fair Value
Public Equity[1]	$142,298
Bonds	
Bonds and notes[1]	6,397
Colorado Housing Finance Authority	2,341
Total Bonds	8,738
Real Estate	
Portfolio investments[2]	88,545
Future commitments to Colorado-based general partnerships or funds	72,286
Total Real Estate Fund	160,831
Private Equity	
Portfolio investments[2]	172,962
Future commitments to Colorado-based general partnerships or funds	53,571
Total Private Equity	226,533
Opportunity Fund	
Portfolio investments[2]	119,462
Future commitments to Colorado-based general partnerships or funds	84,943
Total Opportunity Fund	204,405
Total	**$742,805**

1 Companies headquartered in Colorado.

2 Portfolio investments domiciled in Colorado.

DEFINED BENEFIT PLANS

(Dollars in Thousands)

LARGEST EQUITY HOLDINGS BY FAIR VALUE[1]

As of December 31, 2019

	Shares	Fair Value
Apple Inc.	2,779,785	$816,284
Microsoft Corp.	4,876,175	768,973
Amazon.com, Inc.	342,896	633,617
Alphabet Inc.	377,307	505,361
Facebook Inc.	1,548,060	317,739
Visa Inc.	1,599,002	300,452
JP Morgan Chase & Co.	1,921,622	267,874
Alibaba Group Holding Ltd.	1,192,665	252,964
Johnson & Johnson	1,641,807	239,490
Costco Wholesale Corp.	781,075	229,574

[1] Does not include commingled funds.

Note: A complete list of holdings is available upon request.

LARGEST FIXED INCOME HOLDINGS BY FAIR VALUE[1]

As of December 31, 2019

	Par Value	Income Rate	Maturity Date	Fair Value
US Treasury Notes	$173,000	2.750%	2/15/24	$180,454
US Treasury Notes	160,000	2.250%	11/15/24	164,194
US Treasury Notes	160,000	1.625%	5/15/26	158,381
US Treasury Notes	150,000	2.375%	4/30/26	155,285
US Treasury Notes	150,000	1.875%	1/31/22	150,879
US Treasury Bonds	150,000	1.750%	5/15/23	150,580
US Treasury Notes	145,000	2.000%	6/30/24	147,011
US Treasury Notes	145,000	1.375%	5/31/21	144,558
US Treasury Notes	142,000	1.250%	7/31/23	140,097
US Treasury Notes	130,000	1.375%	9/30/23	128,705

[1] Does not include commingled funds.

Note: A complete list of holdings is available upon request.

DEFINED CONTRIBUTION AND DEFERRED COMPENSATION PLANS

(Dollars in Thousands)

REPORT ON INVESTMENT ACTIVITY

Overview

PERA established the Voluntary Investment Program (PERAPlus 401(k) Plan) on January 1, 1985, under Section 401(k) of the Internal Revenue Code (IRC). The PERAPlus 401(k) Plan includes voluntary contributions made by employees of PERA-affiliated employers in the State, School, Local Government, Judicial, and Denver Public Schools Division Trust Funds. These contributions are entirely separate from those that members make to the defined benefit plan each month.

The Defined Contribution Retirement Plan (DC Plan) was established on January 1, 2006, as an IRC § 401(a) governmental profit-sharing plan. The DC Plan offers a defined contribution alternative to the PERA defined benefit plan for certain new employees of State agencies and departments, most community colleges, and the District Attorney within each Judicial District, and if authorized by the county and the District Attorney, the attorneys within each Judicial District. Pursuant to C.R.S. § 24-51-1501(4), DC Plan eligibility was extended to certain new employees in the Local Government Division and certain new classified employees at State Colleges and Universities beginning on January 1, 2019 (see Note 1 of the Notes to the Financial Statements in the Financial Section for additional details).

On July 1, 2009, PERA assumed the administrative and fiduciary responsibility for the State of Colorado Deferred Compensation Plan, now known as the PERAPlus 457 Plan. The PERAPlus 457 Plan includes voluntary contributions made by employees working for a PERA-affiliated employer that have also affiliated with the PERAPlus 457 Plan. The employees of some employers that had affiliated with the State of Colorado Deferred Compensation Plan prior to July 1, 2009, and were not affiliated with PERA, remain eligible to contribute.

These three Plans are known collectively as the Capital Accumulation Plans (CAPs). PERA publishes an Annual Report for the CAPs and distributes it to all plan participants.

YEAR END STATISTICS

	Fiduciary Net Position			Number of Accounts			Actively Contributing Participants[1]		
	2019	2018	% Chg	2019	2018	% Chg	2019	2018	% Chg
PERAPlus 401(k) Plan	**$3,672,807**	$3,042,128	20.73%	**68,920**	68,700	0.32%	**24,540**	24,557	(0.07%)
DC Plan	**265,940**	205,786	29.23%	**6,939**	6,363	9.05%	**2,640**	2,407	9.68%
PERAPlus 457 Plan	**989,599**	818,223	20.94%	**18,919**	18,479	2.38%	**9,355**	9,189	1.81%

[1] Defined as contributing within the last three months of the year.

Outline of Investment Policies

Objectives

The Board is responsible for approving an appropriate range of investments that addresses the needs of the participants in the Plans. The objectives of selecting the investment options under each Plan are to:

- Provide a wide range of investment opportunities in various asset classes so as to allow for diversification and to cover a wide risk/return spectrum.
- Maximize returns within reasonable and prudent levels of risk.
- Provide returns comparable to returns for similar investment options.
- Control administrative and management costs to the plan and participants.

Investment Stewardship

The Plans adhere to the same principles of investment stewardship as the defined benefit plans. For more information, please refer to the Investment Stewardship section on page 122.

PERAdvantage Investment Options

The PERAdvantage investments provide diversification within each of the seven primary funds and nine target retirement date funds. The white label structure of the PERAdvantage investments simplifies choices, increases diversification, and helps participants identify investments based on how the fund invests the money rather than name familiarity. In addition, the Plans also provide a self-directed brokerage account for participants to select their own investments.

DEFINED CONTRIBUTION AND DEFERRED COMPENSATION PLANS

(Dollars in Thousands)

Participants invest assets in one or more of the following investments:

Primary Investment Options

PERAdvantage Capital Preservation Fund

The fund seeks to provide consistent investment income with a stable net asset value primarily by investing in a portfolio of high-quality, medium-term fixed income securities. This fund invests in securities issued by the U.S. Government or one of its agencies, including agency mortgage bonds, as well as high-grade corporate bonds. Since the underlying investments fluctuate in market value, the portfolio is paired with an insurance contract to provide a more stable return. The fund is managed by Great West Capital Management, LLC.

PERAdvantage Fixed Income Fund

The fund seeks to generate income, preserve capital, and provide long-term capital appreciation by investing in a diversified portfolio of fixed income instruments. This fund primarily invests in investment grade debt securities, but may invest a portion of its assets in high-yield securities. The fund may invest in derivative instruments or in mortgage- or asset-backed securities. The fund combines active and passive management. The fund is managed by BlackRock (targeted at 50 percent of the portfolio) and Wells Fargo Asset Management (targeted at 50 percent of the portfolio).

PERAdvantage Real Return Fund

The fund seeks to provide broad exposure to real assets and Treasury Inflation Protected Securities (TIPS) and to produce a return over a full market cycle that exceeds the rate of inflation. This fund invests in U.S. TIPS, Real Estate Investment Trusts (REITs), commodities, and global natural resources and infrastructure stocks. The fund is managed by State Street Global Advisors.

PERAdvantage Socially Responsible Investment (SRI) Fund

The fund seeks to invest in a portfolio of developed and emerging market stocks screened on environmental, social, and governance (ESG) factors, and fixed income securities across the investment grade spectrum that demonstrate ESG leadership. The equity portion seeks to replicate the return of the MSCI ACWI ESG Focus Index. The fixed income portion invests in U.S. dollar denominated securities and may invest a significant portion of its assets in corporate bonds or mortgage-backed securities. The fund is managed by BlackRock (targeted at 60 percent of the portfolio) and TIAA-CREF (targeted at 40 percent of the portfolio).

PERAdvantage U.S. Large Cap Stock Fund

The fund seeks to provide long-term capital appreciation and dividend income primarily by investing in the common stock of companies located in the United States with large market capitalizations. This fund invests in a wide array of U.S. stocks with market capitalizations similar to those found in the MSCI USA Large Cap Index. The fund combines active and passive management. The fund is managed by PERA.

PERAdvantage U.S. Small and Mid Cap Stock Fund

The fund seeks to provide long-term capital appreciation and dividend income primarily by investing in the common stock of companies located in the United States with small and mid-market capitalizations. This fund invests in a wide array of U.S. stocks with market capitalizations similar to those found in the MSCI USA SMID Cap Index. The fund is managed by Dimensional Fund Advisors (targeted at 50 percent of the portfolio) and PERA (targeted at 50 percent of the portfolio).

PERAdvantage International Stock Fund

The fund seeks to provide long-term capital appreciation and dividend income primarily by investing in the common stock of companies located outside the United States. This fund invests in a wide array of international stocks similar to those found in the MSCI ACWI ex USA Index. The fund is managed by Schroder Investment Management (targeted at 60 percent of the portfolio) and PERA (targeted at 40 percent of the portfolio).

Additional Investment Options

PERAdvantage Target Retirement Date Funds

There are nine funds with varying asset mixes and risk levels based on expected retirement date. Each of the funds is invested in the corresponding BlackRock LifePath® Index Target Retirement Date Fund. These funds use passive management strategies and become more conservative as the retirement date approaches. BlackRock manages the funds.

TD Ameritrade Self-Directed Brokerage Account

This account allows selection from numerous mutual funds and other types of securities, such as stocks and bonds, for an additional fee. Investment in the self-directed brokerage account is offered through TD Ameritrade, a Division of TD Ameritrade, Inc.

DEFINED CONTRIBUTION AND DEFERRED COMPENSATION PLANS

(Dollars in Thousands)

2019 Changes

In the PERAdvantage SRI Fund, BlackRock replaced the allocation to Northern Trust Investments and TIAA-CREF replaced the allocation to J.P. Morgan Asset Management. BlackRock manages 60 percent of the portfolio and TIAA-CREF manages 40 percent of the portfolio.

In the PERAdvantage U.S. Small and Mid Cap Stock Fund, TimesSquare Capital Management and BlackRock were removed as managers. Dimensional Fund Advisors was retained as a manager, but the investment style changed from value to core, and a PERA managed portfolio was added. Dimensional Fund Advisors manages 50 percent of the portfolio and PERA manages 50 percent of the portfolio, and the Fund began participating in securities lending through Deutsche Bank AG.

The assets of the PERAdvantage 2020 Fund were transferred into the PERAdvantage Income Fund.

Loans

Participants in the PERAPlus 401(k) and PERAPlus 457 Plans may access their funds through loans as allowed under plan policy and the Internal Revenue Service. The DC Plan prohibits participant loans.

Administrative Fees

Plan administrative fees pay for recordkeeping, custodial services, consulting, and internal PERA administrative expenses.

The administrative fee consists of a flat $1.00 per month per participant per plan and an asset-based fee of up to 0.03 percent on each underlying PERAdvantage portfolio. Investments with revenue sharing reduce the asset-based administrative fee by the amount of such revenue sharing.

(The Colorado PERA Report on Investment Activity was prepared by internal staff.)

DEFINED CONTRIBUTION AND DEFERRED COMPENSATION PLANS

(Dollars in Thousands)

SCHEDULE OF INVESTMENT RESULTS

As of December 31, 2019

Fund/Benchmark	2019	3-Year	5-Year
PERAdvantage Capital Preservation Fund	**2.3%**	2.1%	2.0%
Hueler Stable Value Index (Equal Wtd Avg)	**2.5%**	2.2%	2.1%
PERAdvantage Fixed Income Fund	**9.0%**	4.1%	3.0%
Bloomberg Barclays U.S. Aggregate Bond Index	**8.7%**	4.0%	3.1%
PERAdvantage Real Return Fund	**12.0%**	4.2%	2.4%
Real Return Custom Index[1]	**12.2%**	4.3%	2.5%
PERAdvantage SRI Fund	**19.6%**	9.2%	6.5%
SRI Custom Index[2]	**20.2%**	9.3%	6.5%
PERAdvantage U.S. Large Cap Stock Fund	**33.3%**	16.1%	11.7%
MSCI USA Large Cap Index	**31.0%**	14.9%	11.4%
PERAdvantage U.S. Small and Mid Cap Stock Fund	**28.4%**	9.2%	7.7%
MSCI USA SMID Cap Index	**28.5%**	10.6%	9.1%
PERAdvantage International Stock Fund	**24.5%**	10.0%	5.9%
MSCI ACWI ex USA Index	**21.5%**	9.9%	5.5%
PERAdvantage Income Fund	**15.6%**	7.0%	5.1%
BlackRock LifePath® Retirement Index	**15.6%**	7.1%	5.2%
PERAdvantage 2025 Fund	**18.6%**	8.6%	6.2%
BlackRock LifePath® 2025 Index	**18.5%**	8.6%	6.3%
PERAdvantage 2030 Fund	**20.8%**	9.6%	6.8%
BlackRock LifePath® 2030 Index	**20.7%**	9.6%	6.9%
PERAdvantage 2035 Fund	**22.8%**	10.5%	7.4%
BlackRock LifePath® 2035 Index	**22.7%**	10.4%	7.4%
PERAdvantage 2040 Fund	**24.7%**	11.3%	7.9%
BlackRock LifePath® 2040 Index	**24.6%**	11.2%	7.9%
PERAdvantage 2045 Fund	**26.0%**	11.8%	8.2%
BlackRock LifePath® 2045 Index	**25.9%**	11.7%	8.2%
PERAdvantage 2050 Fund	**26.6%**	12.0%	8.4%
BlackRock LifePath® 2050 Index	**26.5%**	11.9%	8.3%
PERAdvantage 2055 Fund	**26.6%**	12.0%	8.4%
BlackRock LifePath® 2055 Index	**26.6%**	11.9%	8.3%
PERAdvantage 2060 Fund	**26.6%**	11.9%	8.3%
BlackRock LifePath® 2060 Index	**26.6%**	11.9%	8.3%

Note: Performance is net of management and administrative fees. Performance is calculated using time-weighted net asset values. All performance is calculated by RVK, Inc.

1 Index consists of 70 percent State Street Real Asset Strategy DC Index (25 percent Bloomberg Roll Select Commodity Index, 25 percent S&P Global LargeMidCap Commodity and Resources Index, 10 percent S&P Global Infrastructure Index, 15 percent Dow Jones U.S. Select REIT Index, 25 percent Bloomberg Barclays U.S. TIPS Index) / 30 percent Bloomberg Barclays U.S. TIPS Index

2 Prior to October, 2019, the SRI Custom Index consisted of 60 percent MSCI World ESG Leaders Index (Net) and 40 percent Bloomberg Barclays U.S. Government Bond Index. After 10/2019, the SRI Custom Index consists of 60 percent MSCI ACW ESG Focus Index (Net) and 40 percent Bloomberg Barclays U.S. Government Bond Index.

DEFINED CONTRIBUTION AND DEFERRED COMPENSATION PLANS

(Dollars in Thousands)

INVESTMENT SUMMARY

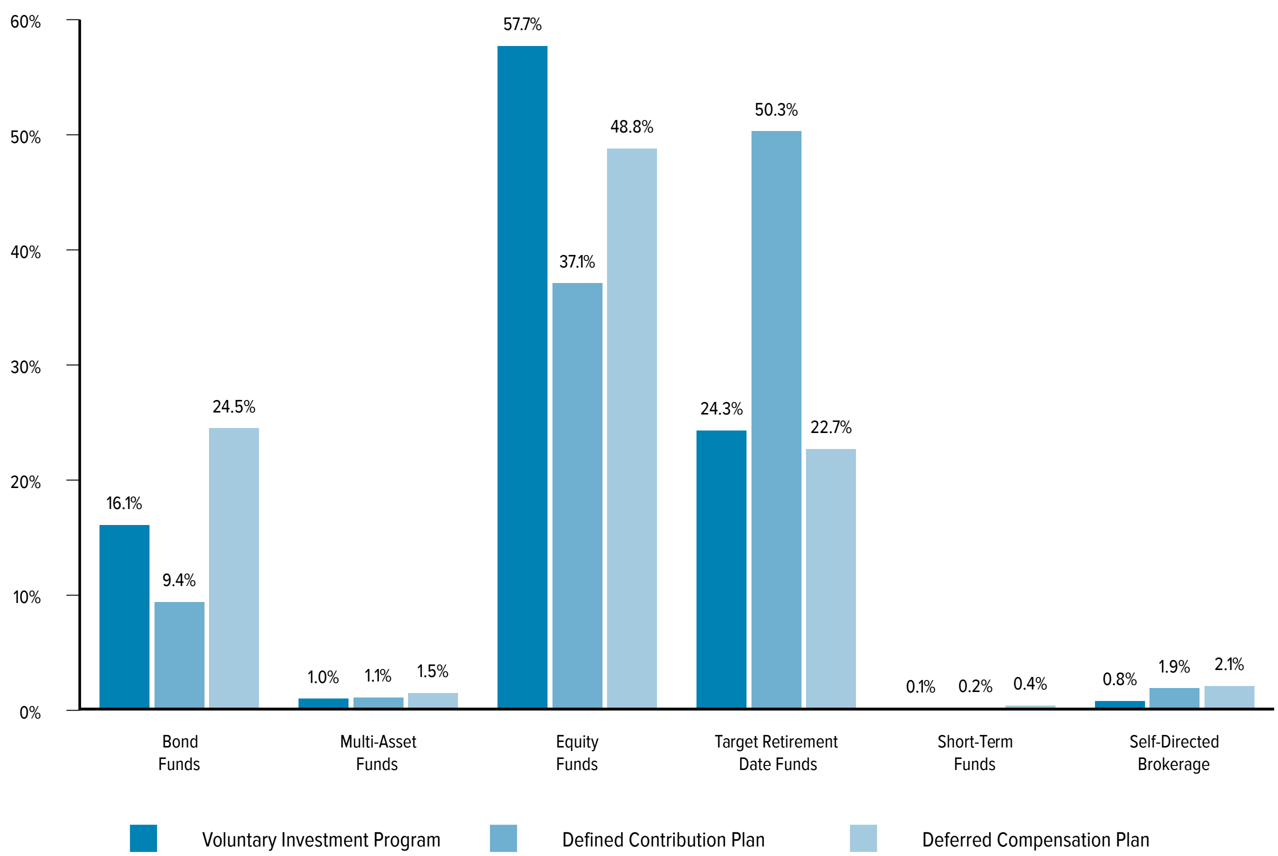
Fund	Fair Value as of December 31, 2019 Voluntary Investment Program	Defined Contribution Retirement Plan	Deferred Compensation Plan
PERAdvantage Capital Preservation Fund[1]	$279,117	$12,279	$156,289
PERAdvantage Fixed Income Fund	297,757	12,179	81,783
Bond Funds	**576,874**	**24,458**	**238,072**
PERAdvantage Real Return Fund	18,361	1,434	7,454
PERAdvantage SRI Fund	18,994	1,401	6,831
Multi-Asset Funds	**37,355**	**2,835**	**14,285**
PERAdvantage U.S. Large Cap Stock Fund	1,572,591	48,498	250,832
PERAdvantage U.S. Small and Mid Cap Stock Fund	199,670	24,881	120,547
PERAdvantage International Stock Fund	305,227	22,751	103,117
Equity Funds	**2,077,488**	**96,130**	**474,496**
PERAdvantage Income Fund	241,486	14,376	57,015
PERAdvantage 2025 Fund	161,931	10,353	43,077
PERAdvantage 2030 Fund	135,174	13,531	32,285
PERAdvantage 2035 Fund	117,716	13,538	31,720
PERAdvantage 2040 Fund	85,155	16,827	24,002
PERAdvantage 2045 Fund	57,636	25,478	14,548
PERAdvantage 2050 Fund	40,561	20,918	9,275
PERAdvantage 2055 Fund	24,633	12,562	5,271
PERAdvantage 2060 Fund	8,243	3,029	3,643
Target Retirement Date Funds	**872,535**	**130,612**	**220,836**
TD Ameritrade Insured Deposit Account	3,894	636	3,564
Short-Term Funds	**3,894**	**636**	**3,564**
TD Ameritrade Self-Directed Brokerage Account	30,467	4,930	20,748
Self-Directed Brokerage	**30,467**	**4,930**	**20,748**
Total	**$3,598,613**	**$259,601**	**$972,001**

[1] The Stable Value Fund in the PERAdvantage Capital Preservation Fund is reported at contract value.

DEFINED CONTRIBUTION AND DEFERRED COMPENSATION PLANS

(Dollars in Thousands)

Asset Breakdown
As of December 31, 2019



ACTUARIAL SECTION

COLORADO PERA

ACTUARY'S CERTIFICATION LETTER

Segal

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segalco.com

June 29, 2020

Board of Trustees
Public Employees' Retirement Association of Colorado
1301 Pennsylvania Street
Denver, CO 80203-2386

Re: Actuarial Certification of PERA Division and Health Care Trust Funds

Dear Members of the Board:

Per the "Colorado PERA Defined Benefit Pension Plan Funding Policy", adopted by the Board of Trustees on March 20, 2015 and most recently revised on November 16, 2018 and the "Colorado PERA Defined Benefit OPEB Plan Funding Policy", adopted by the Board of Trustees on January 19, 2018, the main funding objectives of the Public Employees' Retirement Association of Colorado (Colorado PERA) are:

- Preservation of the defined benefit plan structure,
- Demonstration of transparency and accountability,
- Achievement of a funded ratio greater than or equal to 110%,
- Balance of contribution rate stability and intergenerational equity,
- Reduction of Unfunded Actuarial Accrued Liabilities, and
- Recognition of beneficial elements of pooled risk.

With these goals in mind, an annual actuarial valuation is performed as a measure of the progress towards them. The most recent valuations are based on the plan provisions and actuarial assumptions and methods in effect on December 31, 2019. The valuation reflects recent legislation enacted in June 2020 in response to budgetary needs due to the COVID-19 pandemic. In completing the valuation of the five defined benefit pension plans, referred to as the Division Trust Funds, and the two defined benefit Other Post-employment Benefit plans, referred to as the Health Care Trust Funds (HCTFs), Segal relied on membership and financial data provided by Colorado PERA. We have reviewed this data for reasonableness, and made some general edit checks to impute certain information that may not have been provided with the original member data. We have not audited this data, but we have reconciled the data used in the prior year's valuation with this current valuation data.

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ACTUARY'S CERTIFICATION LETTER

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This valuation reflects the following changes from the prior valuation including:

- The AAP assessment of SB 18-200, performed as of December 31, 2018, increases employer and member contributions each by 0.50% of salary and reduces the maximum AI rate, referred to as the "AI cap", by 0.25%, beginning July 1, 2020.
- HB 20-1379 suspends the $225 million Direct Distribution payment from the State, payable to PERA July 1, 2020, for the 2020-21 state fiscal year.
- HB 20-1394 lowers the contribution rate by 5% of pay for Judicial Division employers for the fiscal years ending June 30, 2021 and June 30, 2022 and increases the contribution rate by 5% of pay for Judicial Division members for the same period. These contribution modifications affect all Judicial Division members except judges employed by the Denver County Court.
- An actuarially determined Defined Contribution (DC) Supplement is to be paid to the State and Local Government Division Trust Funds on behalf of employees of these divisions, hired on or after January 1, 2019, who chose to participate in the PERAChoice DC Plan in lieu of participating in PERA's Defined Benefit (DB) Plan. Designed to compensate for the employer contributions paid to the DC Plan participant accounts that otherwise would have been payment toward the Unfunded Actuarial Accrued Liability (UAAL), this supplement is determined separately for the State and Local Government Divisions as a rate of pay and is payable as of January 1, 2021, by all employers of the two divisions.
- Changes to retiree health care cost and trend assumptions.

In our opinion, the assumptions are individually reasonable, taking into account the experience of the Division Trust Funds and the HCTFs and reasonable expectations, are internally consistent, and, in combination, offer our best estimate of anticipated experience affecting the Division Trust Funds and the HCTFs.

Future actuarial results may differ significantly from the current results 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 or additional cost or contribution requirements based on the plan's funded status); and
- Changes in plan provisions or applicable law.

Additionally, retiree group benefits models necessarily rely on the use of approximations and estimates, and are sensitive to changes in these approximations and estimates. Small variations in these approximations and estimates may lead to significant changes in actuarial measurements. Since the potential impact of such factors is outside the scope of a normal annual actuarial valuation, an analysis of the range of results is not presented herein.

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Segal

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Segal provided the following information and/or schedules for the December 31, 2019 CAFR:

Financial Section

- Prepared for the Division Trust Funds and HCTFs
  - Yearly Contribution Deficiency
  - Required Discount Rate Sensitivity Information providing the Net Pension Liability and the Net OPEB Liability at a discount rate that is one percentage point lower and one percentage point higher than the discount rate at Measurement Date
  - Membership Data
  - Notes to Required Supplementary Information
- Prepared for the Division Trust Funds Only
  - Average Monthly Benefit By Division – for 2019, considering entire retired population and those retiring in 2019
  - Required Supplementary Information
    - Schedule of Changes in Net Pension Liability
    - Schedule of the Net Pension Liability
    - Schedule of Employer Contributions
- Prepared for the HCTFs Only
  - Required Health Care Cost Trend Rate Sensitivity Information at health care cost trend rates that are one percentage point lower and one percentage point higher than the health care cost trend rates applied at Measurement Date
  - Participation Data
  - Required Supplementary Information
    - Schedule of Changes in Net OPEB Liability
    - Schedule of the Net OPEB Liability
    - Schedule of Employer Contributions

Actuarial Section

- Prepared for the Division Trust Funds and HCTFs
  - Schedule of Retirees and Beneficiaries Added to and Removed from the Benefit Payroll
  - Solvency Test
  - Schedule of Funding Progress
  - Analysis of Financial Experience
  - Schedule of Gains and Losses in Accrued Liabilities and Reconciliation of Unfunded Actuarial Accrued Liabilities
  - Schedule of Computed Employer Contribution Rates for the 2021 Fiscal Year
  - Actuarial Statistics
  - Actuarially Determined Contributions (ADCs)
  - Alternative ADCs using 25-year, 20-year and 15-year amortization periods
  - Funded Ratios
  - Funded Ratio, Unfunded Actuarial Accrued Liability and Actuarially Determined Contributions using 6.25%, 7.25% and 8.25% investment return assumptions
  - Schedule of Active Member Actuarial Valuation Data
- Prepared for the Division Trust Funds Only
  - Member – Retiree Comparison

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ACTUARY'S CERTIFICATION LETTER

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Statistical Section

- Prepared for the Division Trust Funds and HCTFs
  - Schedule of Average Benefit Payments
- Prepared for the Division Trust Funds Only
  - Member and Benefit Recipient Statistics
  - Breakdown of Membership by Tiers
  - PERA Benefit Payments
    - Benefit Payments by Benefit Range
    - Benefit Payments by Benefit Range including RBA amounts
    - Benefit Payments by Decile
  - Schedule of Average Retirement Benefits Payable by Year of Retirement
    - For all retirees
    - For members who retired during the year
  - Schedule of Retirees and Survivors by Types of Benefits

In aggregate, the Division Trust Funds have a funded ratio of 62% based on the Actuarial Value of Assets and 66% based on the Market Value of Assets. For the HCTFs combined, the funded ratios are 25% on an Actuarial Value of Assets basis and 26% on a Market Value of Assets basis.

The results indicate that for all Division Trust Funds, the combined employer and member contribution rates, including the direct distribution from the State, as appropriate, are sufficient to fund the normal cost for all members, and each division's UAAL, with consideration of the amounts allocated to finance the Annual Increase Reserve (AIR) Funds, and provide additional contributions to help finance both Health Care Trust Funds. In addition, the employer contribution rate with anticipated service purchase transfers is sufficient to eventually finance benefits for the HCTFs.

Shown in the following tables are the resulting amortization periods for each division trust fund as of December 31, 2019, recognizing all current sources of income from employer contributions, member contributions, and the direct distribution (except for the July 1, 2020 payment suspended pursuant to HB 20-1379) as applicable, and any future increases to the base employer contributions, member contributions, Amortization Equalization Disbursement (AED), and Supplemental Amortization Equalization Disbursement (SAED):

Trust Fund	Amortization Period[1]
State Division	27 years
School Division	28 years
Local Government Division	22 years
Judicial Division	16 years
Denver Public Schools (DPS) Division	25 years
HCTF	20 years
DPS HCTF	6 years

[1] Calculations completed on an actuarial valuation basis with a closed population (i.e., based upon the membership, normal cost rate and UAAL as of December 31, 2019)

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ACTUARY'S CERTIFICATION LETTER

At the direction of PERA, Segal has prepared deterministic financial projections for all Division Trust Funds with the lower cost benefit structure for new members and using the following assumptions:

- All actuarial assumptions, including achieving 7.25% investment returns are realized
- Performed on an open-group basis with assumed active membership growth, as follows:
  - For State, School and Denver Public Schools – 1.25% each year
  - For Local Government and Judicial – 1.00% per year

These projections[2] indicate that the goal of funding 100% of the actuarial accrued liability under the PERA revised benefit structure created by SB 18-200, is achievable within a projection period of 24 years. The projected number of years until each trust fund is expected to be 100% funded is shown in the table below:

Trust Fund	Projected Years Until 100% Funded Under Current Provisions
State Division	22 years
School Division	24 years
Local Government Division	14 years
Judicial Division	12 years
DPS Division	11 years
HCTF	17 years
DPS HCTF	6 years

In addition, the AAP assessment implemented through SB 18-200, performed as of December 31, 2019, achieved a resulting ratio of 102.94%. Since this ratio falls between 98% and 120%, no additional modifications to contribution rates, the AI cap, or the Direct Distribution payments are required as of July 1, 2021.

Actuarial computations presented in the December 31, 2019 actuarial valuation reports are for purposes of determining the actuarially determined contribution rates and evaluating the funding of the Division Trust Funds and HCTFs. Determinations for purposes other than meeting these requirements may be significantly different from the results shown in the December 31, 2019 actuarial valuation reports.

We also prepared actuarial computations as of December 31, 2019 for purposes of fulfilling financial accounting requirements for PERA under Governmental Accounting Standards Board (GASB) Statement No. 67 and Statement No. 74. The actuarial assumptions used in the funding valuations were also used for GASB 67 and GASB 74 reporting except GASB 74 reporting reflects health care cost and trend assumptions effective as of December 31, 2018. In addition, the entry

[2] Completed on a projected basis with an open, increasing population (i.e., active members expected to retire, terminate, or die are replaced by new members who will accrue pension benefits under a lower cost basis)

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ACTUARY'S CERTIFICATION LETTER

Board of Trustees
June 29, 2020
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age actuarial cost method, which is required to be used under GASB 67 and GASB 74, is also used for purposes of the funding valuations. The actuarial assumptions used in the funding and the GASB 67 and GASB 74 accounting valuations, as detailed in Segal's reports, meet the parameters set by the Actuarial Standards of Practice (ASOPs), as issued by the Actuarial Standards Board, and generally accepted accounting principles (GAAP) applicable in the United States of America as promulgated by the Governmental Accounting Standards Board.

On the basis of the foregoing, we hereby certify that, to the best of our knowledge and belief, this information is complete and accurate and that the valuation was performed in accordance with standards of practice and by qualified actuaries as prescribed by the American Academy of Actuaries and the Actuarial Standards Board. The undersigned are members of the American Academy of Actuaries and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein. All of the consultants listed below have experience in performing valuations for large statewide public retirement systems.

Sincerely yours,

Matthew A. Strom FSA, MAAA, EA
Senior Vice President, Actuary

Brad Ramirez, FSA, MAAA, EA
Vice President & Consulting Actuary

Tatsiana Dybal, FSA, MAAA, EA
Actuary

Melissa A. Krumholz, FSA, MAAA
Sr. Consultant, Health Actuary

Thomas Bergman, ASA, MAAA
Retiree Health Actuary

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DIVISION TRUST FUNDS—PENSION

Actuarial Topics

The standard promulgated by the Governmental Accounting Standards Board (GASB) Statement No. 67, results in the preparation of two actuarial valuations—one for funding purposes and one for accounting and financial reporting purposes. Unless otherwise noted, this Division Trust Funds subsection reports on the actuarial valuation performed for funding purposes, but also includes information on specific differences between the two actuarial valuations.

The plan provisions in effect on December 31, 2019, are summarized in Note 1 of the Notes to the Financial Statements in the Financial Section. Changes to plan provisions enacted into law after December 31, 2019, and included in the actuarial valuation are summarized below under 'Changes Since Last Actuarial Valuation.'

PERA BOARD GOVERNANCE - FIVE DEFINED BENEFIT PENSION PLANS	
PERA Defined Benefit Pension Plans	The five defined benefit pension plans of the Public Employees' Retirement Association of Colorado (PERA), include the State Division, School Division, Local Government Division, Judicial Division, and Denver Public Schools (DPS) Division Trust Funds. All but the DPS Division Trust Fund are cost-sharing multiple-employer plans and the DPS Division Trust Fund is a single-employer plan.
PERA Board Pension Funding Policy	The PERA Board of Trustees (Board) is responsible for maintaining a pension funding policy applicable to these plans. The current pension funding policy initially was adopted by the Board on March 20, 2015, effective for the December 31, 2014, funding actuarial valuation and last amended on November 16, 2018. The pension funding policy requires the calculation of an actuarially determined contribution (ADC) for each of the five Division Trust Funds for the purpose of assessing the adequacy of the statutory contribution rates of each division. The ADC is determined in accordance with the pension plan provisions in effect as of the date of the actuary's Letter of Certification and is expressed as a level percentage of assumed future covered payroll.
Actuarial Service Provider	The Board retains an external actuary, and effective November 1, 2018, Segal was retained to perform annual actuarial valuations and sustainability projections as well as periodic experience studies to review the actuarial assumptions versus actual plan experience.
Actuarial Service Provider Funding Method Statement	Per their actuarial valuation report, "Segal strongly recommends an actuarial funding method that targets 100% funding of the actuarial accrued liability. Generally, this implies payments that are ultimately at least enough to cover normal cost, interest on the unfunded actuarial accrued liability and a portion of the principal balance. The pension funding policy adopted by PERA...meets this standard."

ACTUARIAL METHODS	
Actuarial Methods	The Board is responsible for the actuarial methods and assumptions used in the actuarial valuations in accordance with C.R.S. § 24-51-204(5). Through formal action, the Board updates, replaces, or adopts new actuarial methods and assumptions as deemed necessary.

Actuarial Methods	Type	Description/Source/Basis	Adoption / Effective Date
Asset Valuation Method	Smoothed Actuarial Value of Assets	In 1992, the Board adopted a method for valuing assets that determines a smoothed market value of assets to help mitigate volatile investment market experience. Note, the term "market value" is used in the Board's pension funding policy regarding the description of the determination of the asset valuation method used for funding purposes. The term "market value" is used consistently throughout the Actuarial Section, which has the identical meaning of the term "fair value" as is used in other sections of this CAFR. The smoothed market value of assets recognizes the differences between actual and expected investment experience for each year in equal amounts over a four-year period. The smoothed market value of assets excludes the Annual Increase Reserve (AIR).	Initially Adopted: 1992; Effective: Dec 31, 1992; Reinitialized to Market Value as of: Dec 31, 2004; Effective: Dec 31, 2005

DIVISION TRUST FUNDS—PENSION

Actuarial Methods	Type	Description/Source/Basis	Adoption / Effective Date
Actuarial Cost Method	Entry Age Actuarial Cost Method (EA)	The EA funding or cost method is designed to keep annual costs level as a percent of covered payroll and for this reason, was selected by the Board to be used in the actuarial valuations. Under the EA cost method, early and service retirement, termination (including the possibility of refunds), disability, and death benefits are projected for all active members. Cost factors, which are developed to produce level annual costs in each year from the age at hire (entry age) to the assumed retirement age, are applied to the projected benefits to determine the normal cost. The normal cost is the portion of the total plan cost allocated to the current year. Normal cost is determined only for active members currently accruing benefits. The actuarial accrued liability (AAL) for active members is the portion of the total plan cost allocated to prior years. The total AAL for the plan includes the AAL for active members and the present value of the expected benefit payments to members currently receiving benefits and inactive members entitled to future benefits. The excess of the total AAL over the actuarial value of plan assets is the unfunded actuarial accrued liability (UAAL). The effect of differences between the actuarial assumptions and the actual experience of the plan is determined within each annual actuarial valuation. These differences produce actuarial gains or losses that result in an adjustment of the UAAL.	State, School, and Local Government (Municipal) Divisions - Effective: Jun 30, 1968; Judicial Division - Effective: Dec 31, 1980 DPS Division - Initially Adopted: June 30, 1950; Last Revised: Merger, Jan 1, 2010
Amortization Method	Defined, Closed and Layered Periods	The ADC is determined by adding the normal cost and the cost to amortize, over defined, closed periods, any existing UAAL or new UAAL, including the impact of any experience actuarial gains and losses, actuarial assumption changes, and changes in plan provisions. Each amortized item is tracked over the closed period defined for that category. The 30-year period used to amortize the legacy UAAL was initialized as of December 31, 2017. All gains, losses, and changes in actuarial methods and assumptions on and after January 1, 2018, are recognized each year and amortized separately over closed 30-year periods. The impact of any changes in plan provisions will be recognized over a closed period relating to the demographics of the group affected and/or the duration of the enhancement provided, not to exceed 25 years. If any future actuarial valuation indicates a division has a negative UAAL, the ADC shall be set equal to the normal cost until such time as the funded ratio equals or exceeds 120 percent. At that time, the ADC shall be equal to the normal cost less an amount equal to 15 year amortization of the portion of the negative UAAL above the 120 percent funded ratio.	Initially Adopted: Mar 20, 2015; Last amended: Nov 16, 2018; Effective: Dec 31, 2018

DIVISION TRUST FUNDS—PENSION

ACTUARIAL ASSUMPTIONS

Actuarial Assumptions[1]	Unless otherwise noted, it can be assumed that the economic and demographic actuarial assumptions applied to the actuarial valuation for funding purposes also were applied to the actuarial valuation for accounting and financial reporting purposes. Periodically, the Board participates in an actuarial assumptions workshop to ensure understanding and to provide for the retention or adoption of all economic and non-economic assumptions under the guidance provided by Actuarial Standards of Practice (ASOP) No. 27, *Selection of Economic Assumptions for Measuring Pension Obligations,* and ASOP No. 35, *Selection of Demographic and Other Noneconomic Assumptions for Measuring Pension Obligations,* as prescribed by the Actuarial Standards Board. The most recent workshop took place on October 28, 2016. Presentations were given to the Board by the retained actuary, Cavanaugh Macdonald Consulting, LLC (CMC), which included a detailed description of the results of the 2016 experience analysis, review of long-term historical data, the 2016 survey of capital market assumptions by Horizon Actuarial Services, LLC, and a log-normal distribution analysis. The Board's investment consultant, Aon Hewitt Investment Consulting, Inc. (Aon), and other actuarial and investment experts also provided their market outlooks. In addition, the Board reviewed a variety of current and projected economic and financial information prior to the meeting.	
	Basis for Actuarial Assumptions Used	Unless otherwise noted, the basis of all selected economic and non-economic actuarial assumptions resulted from the 2016 Experience Analysis and/or discussions that took place during the October 28, 2016, Assumptions Workshop. It also should be noted that as a result of the 2019 Asset Liability Study, concluded at the November 15, 2019, Board meeting, the Board reaffirmed the 7.25 percent assumed long-term rate of investment return effective as of January 1, 2020.

[1] See Exhibits A through I for detailed assumption information.

Economic Assumptions	Value(s) / Type	Description/Source/Basis	Adoption / Effective Date
Rate of Investment Return	7.25%	Long-term assumed rate of investment return represented as a percent per year, compounded annually, net of investment expenses.	Last Revised: Nov 18, 2016; Effective: Dec 31, 2016
Real Rate of Investment Return	4.85%	Long-term assumed rate of *real* investment return (net of price inflation) represented as a percent per year, compounded annually, net of investment expenses.	
Price Inflation	2.40%	Long-term assumed rate of price inflation represented as a percent per year, compounded annually.	
Wage Inflation	3.50%	Long-term assumed rate of wage inflation composed of the plan's assumed price inflation and the assumed real wage growth, represented as a percent per year, compounded annually.	
Pay Increases	Exhibits A, B, C, D, and E	Sample pay increase assumptions for individual members as developed and recommended by the Board's retained actuary.	
Board Crediting Interest Rate	3.00%	Annually, the Board reviews the rate at which interest is credited to member accounts. On November 15, 2019, the Board voted to continue the annual interest rate at 3.00 percent for interest earned during 2020. Basis: Board Crediting Interest Rate Policy and Board discussion at the November 15, 2019, Board Meeting.	Annual Review Policy initiated in 2006, slight revisions since. Last Adopted: Nov 15, 2019; Effective: Jan 1, 2020

DIVISION TRUST FUNDS—PENSION

Non-Economic Assumptions	Value(s) / Type	Description/Source/Basis	Adoption / Effective Date
Rates of Withdrawal	Ultimate Withdrawal Rates - Exhibits A, B, C, D, and E; Select Rates - Exhibit F	Beginning in 1986, PERA uses a select and ultimate approach, for all members except State Troopers and members of the Judicial Division, in applying rates of withdrawal or termination when estimating the number of members who will leave service prior to retirement. As of 2016, more than five years had passed since the merger of the Denver Public School Retirement System (DPSRS) into PERA, thus, the application of a select period was discontinued for the members in the DPS benefit structure. As a result of the 2016 experience analysis, changes were made to the withdrawal rates applicable to all members.	Last Revised: Nov 18, 2016; Effective: Dec 31, 2016
Rates of Retirement	Reduced Early Retirement Rates - Exhibit G	As a result of the 2016 experience analysis, minor changes were made to the reduced early retirement rates applicable to all members.	
	Unreduced Retirement Rates - Exhibit H	As a result of the 2016 experience analysis, minor increases were made to all the rates of unreduced retirement and an extension of the certain retirement age from age 70 to age 75 was adopted for all members except State Troopers.	
Rates of Disability	Exhibits A, B, C, D, and E	As a result of the 2016 experience analysis, the rates of disability from active service were decreased at most ages for the State, School and DPS, and Judicial Divisions, State Troopers, and the DPS benefit structure and slightly increased for the Local Government Division.	
Rates of Mortality	Healthy Pre-Retirement Mortality - Exhibits A, B, C, D, and E	RP-2014 White Collar Employee Mortality Table, a table specifically developed for pre-retirement mortality for actively working people. To allow for an appropriate margin of improved mortality prospectively, the mortality rates incorporate a 70 percent factor applied to male rates and a 55 percent factor applied to female rates.	
	Healthy Post-Retirement Mortality - Exhibit I	State and Local Government Divisions: RP-2014 Healthy Annuitant Mortality Table with adjustments for credibility and gender adjustments of a 73 percent factor applied to ages below 80 and a 108 percent factor applied to age 80 and above, projected to 2018, for males, and a 78 percent factor applied to ages below 80 and a 109 percent factor applied to age 80 and above, projected to 2020, for females. School, DPS, and Judicial Divisions: RP-2014 White Collar Healthy Annuitant Mortality Table with adjustments for credibility and gender adjustments of a 93 percent factor applied to ages below 80 and a 113 percent factor applied to age 80 and above, projected to 2018, for males, and a 68 percent factor applied to ages below 80 and a 106 percent factor applied to age 80 and above, projected to 2020, for females.	
	Disabled Post-Retirement Mortality	RP-2014 Disabled Retiree Mortality Table with a 90 percent factor applied to both male and female mortality rates.	
Rate of Vested Terminated Members to Refund Member Account	Non-Judicial - 35%	The current assumption is that 35 percent of the vested members who terminate will elect to withdraw their accounts while the remaining 65 percent will elect to leave their accounts in the plan to be eligible for a benefit at retirement date.	Last Revised: 2009; Effective: Dec 31, 2009
	Judicial - 0%	The current assumption is that none of the vested members who terminate will elect to withdraw their accounts while 100 percent will elect to leave their accounts in the plan to be eligible for a benefit at retirement date.	
Rate of Non-Vested Terminated Members to Refund Member Account	100%	The current assumption is that 100 percent of the non-vested members who terminate will elect to withdraw their accounts.	Since inception of termination benefits, but only first mentioned in Dec 31, 2011 actuarial valuation report

DIVISION TRUST FUNDS—PENSION

Non-Economic Assumptions	Value(s) / Type	Description/Source/Basis	Adoption / Effective Date
Administrative Expense Load	0.40%	The element of the normal cost for each division, referred to as the administrative expense load, was first adopted by the Board as of November 5, 2012, effective for the December 31, 2012, actuarial valuation, resulting from a recommendation from the 2012 Experience Analysis and last revised based on the 2016 Experience Analysis.	Initially adopted: Nov 5, 2012; Effective: Dec 31, 2012; Last Revised: Nov 18, 2016; Effective: Dec 31, 2016

Annual Increase (AI) Assumptions	Value(s)	Description/Source/Basis	Adoption / Effective Date
AI Rate for 2019	0.00%	Regardless of benefit structure, the AI rate is assumed to be 0.00 percent in 2019. Basis: Pursuant to SB 18-200.	Enacted: Jun 4, 2018; Effective: Dec 31, 2017
AI Rate Cap 2020 and Thereafter (Membership Prior to Jan 1, 2007 with PERA Benefit Structure & Members with DPS Benefit Structure)	1.25%	The AI cap that may be awarded by the Board in 2020 and thereafter is assumed to be 1.25 percent per year after payments begin and eligibility requirements for payment of the AI have been met. Basis: Adjusted pursuant to C.R.S. § 24-51-413, based on results of the 2018 AAP assessment.	Effective: Dec 31, 2019
AI Rate Cap 2020 and Thereafter (Membership After Dec 31, 2006 with PERA Benefit Structure)	0.00%	An AIR was established for each Division Trust Fund to provide AIs, to the extent affordable, once benefits become payable for these members. Therefore, the AI actuarial assumption applied to these members is 0.00 percent, since members in this category receive AIs through the affiliated AIR only to the extent affordable in accordance with C.R.S. § 24-51-1009. Basis: AI provisions Pursuant to SB 06-235, Enacted May 25, 2006.	Enacted: May 25, 2006; Effective: Dec 31, 2006
AI Waiting Period	36 months	The waiting period to meet the eligibility for AI payments was extended from 12 months to 36 months. Basis: Pursuant to SB 18-200, Enacted June 4, 2018.	Enacted: Jun 4, 2018; Effective: Dec 31, 2017

DIVISION TRUST FUNDS—PENSION

ACTUARIAL STUDIES

Governance Studies	Following their adopted governance procedures and practices, the Board performs periodic asset/liability modeling studies, actuarial audits, and actuarial experience analyses approximately every three to five years.

Actuarial Studies	Description / Result	Last Conducted By	Completed	Next Scheduled
Asset Liability Modeling (ALM) Study	The Board commissioned an asset/liability study during 2019, which was prepared by Aon. The objective of the study was to determine the optimal strategic asset allocation policy that will ultimately allow PERA to meet its financial obligations, while also ensuring that PERA incurs appropriate levels of risk and cash liquidity. As a result of this study, the Board slightly modified the asset allocation ranges and targets effective January 1, 2020, while reaffirming the investment return assumption of 7.25 percent.	Aon	Nov 15, 2019	2022 - 2024
Actuarial Audit	The primary focus of an actuarial audit is to ensure independence, accuracy, and conformity with the accepted ASOPs with regard to results of the annual actuarial valuation and the appropriateness of the actuarial assumptions used to calculate those results. The actuarial audit originally scheduled for 2019 was satisfied by a change in the actuarial service provider, as detailed in the Board's Governance Manual. In assuming responsibility for actuarial services, Segal's initial tasks included review of the current actuarial methods and assumptions, and replication of the most recent actuarial valuation results within a reasonable margin in accordance with the ASOPs. Within their letter detailing the transition of actuarial services they state: "Segal determined that the data used by CMC were reasonable, were able to closely match benefit and valuation asset amounts, and determined that the actuarial methods and assumptions applied were in conformity with the Actuarial Standards of Practice. Segal found no grounds on which to suggest a revision of the previous year's actuarial valuations."	Segal	Jun 13, 2019	2024
Experience Analysis	In October of 2016, CMC completed an experience analysis covering plan experience for the four-year period from 2012 through 2015, to provide the Board an updated view of all economic and demographic assumptions. CMC presented their results and recommendations at the actuarial assumption workshop held October 28, 2016. Based on the results of the experience analysis and presentations from CMC and other experts, the Board adopted updated economic and demographic assumptions at the November 18, 2016, Board meeting to be effective for the December 31, 2016, actuarial valuation.	CMC (Board's Actuarial Service Provider at the time)	Oct 19, 2016	2020

DIVISION TRUST FUNDS—PENSION

CHANGES SINCE LAST ACTUARIAL VALUATION

Changes in Actuarial Methods	There are no changes in actuarial methods incorporated in the December 31, 2019, actuarial valuation, since the last actuarial valuation as of December 31, 2018.
Changes in Actuarial Assumptions	Except for the AI assumption described below, there are no changes in economic and demographic actuarial assumptions incorporated in the December 31, 2019, actuarial valuation, since the last actuarial valuation as of December 31, 2018. • Due to the results of the 2018 AAP assessment, the assumed AI cap was decreased from 1.50 percent to 1.25 percent, applicable to PERA benefit structure members with a membership date prior to January 1, 2007, and DPS benefit structure members. Since this assumption used to value the AI cap is driven by the change in AI cap benefit provisions, the impact of the change in assumption from 1.50 percent to 1.25 percent is fully recognized as a "Change in Plan Provisions," as noted below.
Changes in Plan Provisions	Due to the results of the 2018 AAP assessment, the following are changes to contribution and AI provisions applicable to all five Division Trust Funds incorporated in the December 31, 2019, actuarial valuation, since the last actuarial valuation as of December 31, 2018. • The member contribution rate for all members increases by 0.50 percent of pay effective July 1, 2020. • The employer contribution rate for all employers increases by 0.50 percent of pay effective July 1, 2020. • The AI cap decreases from 1.50 percent to 1.25 percent, effective as of July 1, 2020. For employees of employers of the State and Local Government Divisions, hired on or after January 1, 2019, who chose to participate in the PERAChoice Defined Contribution (DC) Plan in lieu of participating in PERA's Defined Benefit (DB) Plan, a DC Supplement is paid to the DB Plan to help fund the unfunded actuarial accrued liability. Although enacted in 2018 pursuant to SB 18-200, the DC Supplement is first determined based on the results of the December 31, 2019, actuarial valuation, and is calculated separately for the State and Local Government Divisions as a rate of pay. This annually determined supplemental contribution will be payable beginning January 1, 2021, by all employers of the two divisions. Pursuant to HB 20-1379 and HB 20-1394, enacted in response to budgetary needs due to the COVID-19 pandemic, contribution rates of employers and members, as well as the direct distribution from the State are impacted as follows: • HB 20-1379 suspends the July 1, 2020, payment of the $225 million direct distribution allocated to the State, School, Judicial, and DPS Divisions, as required under SB 18-200. • HB 20-1394 requires five percent of the Judicial Division base employer contribution rate to be paid by the members of the Judicial Division for the State's 2020-21 and 2021-22 fiscal years. This contribution rate modification does not apply to judges employed by the Denver County Court within the Judicial Division.

SIGNIFICANT EVENTS

In response to budgetary concerns of the State of Colorado due to the COVID-19 pandemic, legislation was enacted during June 2020. The key elements of this legislation are listed below. Note that HB 20-1394 directly affects contribution provisions which are reflected within the actuarial valuation results presented in this Actuarial Section and both HB 20-1379 and HB 20-1394 have an immediate and continuing impact on the amortization periods of the Division Trust Funds as discussed in the Letter of Transmittal, the MD&A and this Actuarial Section:

- HB 20-1379 suspends the July 1, 2020, payment of the $225 million Direct Distribution allocated to the State, School, Judicial, and DPS Divisions, as required under SB 18-200.
- HB 20-1394 modifies the source of the dollars otherwise anticipated to be contributed to the pension plan over the next three-year period (plan years 2020-2022) by requiring five percent of the Judicial Division base employer contribution rate to be paid by the members of the Judicial Division for the State's 2020-21 and 2021-22 fiscal years. For the State's 2020-21 fiscal year, the employer contribution rate is decreased from 13.91 percent to 8.91 percent of salary and the member contribution rate is increased from 9.5 percent to 14.5 percent of salary. For the State's 2021-22 fiscal year, the employer contribution rate is decreased from 13.91 percent to 8.91 percent of salary and the member contribution rate is increased from 10.0 percent to 15.0 percent of salary. This contribution rate modification does not apply to judges employed by the Denver County Court within the Judicial Division.

DIVISION TRUST FUNDS—PENSION

DIFFERENCES IN ACTUARIAL VALUATION METHODS AND ASSUMPTIONS

- The actuarial valuation for funding purposes was performed as of December 31, 2019. The actuarial valuation for accounting and financial reporting purposes was performed as of December 31, 2018, and the total pension liability (TPL) was rolled forward to the measurement date as of December 31, 2019.
- Census data used for the actuarial valuation for funding purposes reflects membership data as of December 31, 2019, and the census data used for the actuarial valuation for accounting and financial reporting purposes reflects membership data as of December 31, 2018. Therefore, all summaries and schedules, regarding actuarial valuation results for funding purposes, shown in the Actuarial Section, reflect census data as of December 31, 2019.
- The actuarial valuation for funding purposes applies an asset valuation method that recognizes a four-year smoothed market value of assets for purposes of determining the UAAL. The actuarial valuation for accounting and financial reporting purposes applies the fair value of assets to determine the net pension liability.
- The actuarial valuation for funding purposes does not apply an AI assumption for members of the PERA benefit structure hired on or after January 1, 2007, in the determination of the AAL. Therefore, the ADC established by the funding valuation does not consider future increases for this member group and the assets attributable to the AIR are not included in the actuarial value of assets. A separate annual actuarial valuation is performed on the AIR to determine the applicable AI payable to eligible members after benefit commencement. AIR plan provisions are deemed substantively automatic, ad hoc cost-of-living adjustments. Liabilities associated with the AIR statutorily can never exceed available assets. As a result, the actuarial valuation for accounting and financial reporting purposes includes the balance of the AIR both in the plan assets, at fair value, and in the TPL of the applicable division.
- The actuarial valuation for funding purposes as of December 31, 2019, reflects, to the extent applicable, the revised plan provisions for the State, School, Judicial, and DPS Divisions pursuant to HB 20-1379 and HB 20-1394 as described above. The actuarial valuation for accounting and financial reporting purposes does not reflect these changes to plan provisions as this legislation was passed into law after the December 31, 2019, measurement date.

DIVISION TRUST FUNDS—PENSION

Actuarial Assumptions: Exhibits A–I

Exhibit A: Separations from Employment Before Retirement and Individual Pay Increase Assumptions—State Division

	Percent of Members Separating Within the Next Year						Pay Increase Assumptions for an Individual Member		
	Ultimate Withdrawal[1]		Death[2]		Disability				
Sample Ages	Male	Female	Male	Female	Male	Female	Merit and Seniority	Inflation and Productivity	Total Increase (Next Year)
State Members *(Other Than State Troopers)*									
20	30.00%	20.00%	0.020%	0.008%	0.01%	0.01%	5.67%	3.50%	9.17%
25	10.00%	14.50%	0.024%	0.008%	0.01%	0.01%	3.75%	3.50%	7.25%
30	7.00%	10.00%	0.022%	0.010%	0.01%	0.01%	2.80%	3.50%	6.30%
35	6.00%	7.50%	0.026%	0.013%	0.03%	0.03%	2.05%	3.50%	5.55%
40	5.00%	6.75%	0.031%	0.018%	0.05%	0.05%	1.50%	3.50%	5.00%
45	4.25%	5.50%	0.048%	0.031%	0.09%	0.09%	0.85%	3.50%	4.35%
50	4.25%	5.25%	0.083%	0.051%	0.20%	0.20%	0.50%	3.50%	4.00%
55	4.25%	5.25%	0.137%	0.078%	0.27%	0.27%	0.10%	3.50%	3.60%
60	4.25%	5.25%	0.230%	0.113%	0.30%	0.30%	0.00%	3.50%	3.50%
65	4.25%	5.25%	0.406%	0.172%	0.30%	0.30%	0.00%	3.50%	3.50%
70	4.25%	5.25%	0.720%	0.299%	0.30%	0.30%	0.00%	3.50%	3.50%
State Troopers									
20	8.00%	8.00%	0.020%	0.008%	0.01%	0.01%	5.50%	3.50%	9.00%
25	6.00%	6.00%	0.024%	0.008%	0.02%	0.02%	3.75%	3.50%	7.25%
30	4.00%	4.00%	0.022%	0.010%	0.04%	0.04%	2.80%	3.50%	6.30%
35	3.75%	3.75%	0.026%	0.013%	0.06%	0.06%	2.05%	3.50%	5.55%
40	3.00%	3.00%	0.031%	0.018%	0.10%	0.10%	1.50%	3.50%	5.00%
45	3.00%	3.00%	0.048%	0.031%	0.25%	0.25%	1.20%	3.50%	4.70%
50	3.00%	3.00%	0.083%	0.051%	0.30%	0.30%	0.80%	3.50%	4.30%
55	3.00%	3.00%	0.137%	0.078%	0.30%	0.30%	0.40%	3.50%	3.90%
60	3.00%	3.00%	0.230%	0.113%	0.30%	0.30%	0.00%	3.50%	3.50%
65	3.00%	3.00%	0.406%	0.172%	0.30%	0.30%	0.00%	3.50%	3.50%
70	3.00%	3.00%	0.720%	0.299%	0.30%	0.30%	0.00%	3.50%	3.50%

1 There are no select withdrawal assumptions for State Troopers.

2 Rates are shown for active members. Separate post-retirement and disability mortality tables are used for retirees.

DIVISION TRUST FUNDS—PENSION

Exhibit B: Separations from Employment Before Retirement and Individual Pay Increase Assumptions—School Division and Denver Public Schools (DPS) Division—PERA Benefit Structure

	Percent of Members Separating Within the Next Year						Pay Increase Assumptions for an Individual Member		
	Ultimate Withdrawal		Death[1]		Disability		Merit and Seniority	Inflation and Productivity	Total Increase (Next Year)
Sample Ages	Male	Female	Male	Female	Male	Female			
20	20.00%	14.50%	0.020%	0.008%	0.01%	0.01%	6.20%	3.50%	9.70%
25	10.00%	12.00%	0.024%	0.008%	0.01%	0.01%	4.10%	3.50%	7.60%
30	6.50%	8.00%	0.022%	0.010%	0.01%	0.01%	2.95%	3.50%	6.45%
35	5.25%	6.50%	0.026%	0.013%	0.02%	0.02%	2.50%	3.50%	6.00%
40	4.25%	5.00%	0.031%	0.018%	0.04%	0.04%	1.95%	3.50%	5.45%
45	4.00%	5.00%	0.048%	0.031%	0.06%	0.06%	1.35%	3.50%	4.85%
50	4.00%	5.00%	0.083%	0.051%	0.09%	0.09%	0.80%	3.50%	4.30%
55	4.00%	5.00%	0.137%	0.078%	0.15%	0.15%	0.35%	3.50%	3.85%
60	4.00%	5.00%	0.230%	0.113%	0.21%	0.21%	0.00%	3.50%	3.50%
65	4.00%	5.00%	0.406%	0.172%	0.21%	0.21%	0.00%	3.50%	3.50%
70	4.00%	5.00%	0.720%	0.299%	0.21%	0.21%	0.00%	3.50%	3.50%

[1] Rates are shown for active members. Separate post-retirement and disability mortality tables are used for retirees.

Exhibit C: Separations from Employment Before Retirement and Individual Pay Increase Assumptions—Local Government Division

	Percent of Members Separating Within the Next Year						Pay Increase Assumptions for an Individual Member		
	Ultimate Withdrawal		Death[1]		Disability		Merit and Seniority	Inflation and Productivity	Total Increase (Next Year)
Sample Ages	Male	Female	Male	Female	Male	Female			
20	13.00%	16.00%	0.020%	0.008%	0.01%	0.01%	6.95%	3.50%	10.45%
25	12.00%	16.00%	0.024%	0.008%	0.01%	0.01%	4.30%	3.50%	7.80%
30	8.00%	11.00%	0.022%	0.010%	0.01%	0.01%	2.64%	3.50%	6.14%
35	6.00%	9.00%	0.026%	0.013%	0.03%	0.03%	1.72%	3.50%	5.22%
40	5.25%	6.50%	0.031%	0.018%	0.04%	0.04%	1.23%	3.50%	4.73%
45	4.50%	6.50%	0.048%	0.031%	0.11%	0.11%	0.99%	3.50%	4.49%
50	4.50%	6.00%	0.083%	0.051%	0.15%	0.15%	0.79%	3.50%	4.29%
55	4.50%	6.00%	0.137%	0.078%	0.17%	0.17%	0.60%	3.50%	4.10%
60	4.50%	6.00%	0.230%	0.113%	0.25%	0.25%	0.25%	3.50%	3.75%
65	4.50%	6.00%	0.406%	0.172%	0.25%	0.25%	0.00%	3.50%	3.50%
70	4.50%	6.00%	0.720%	0.299%	0.25%	0.25%	0.00%	3.50%	3.50%

[1] Rates are shown for active members. Separate post-retirement and disability mortality tables are used for retirees.

DIVISION TRUST FUNDS—PENSION

Exhibit D: Separations from Employment Before Retirement and Individual Pay Increase Assumptions—Judicial Division

	Percent of Members Separating Within the Next Year						Pay Increase Assumptions for an Individual Member		
	Withdrawal[1]		Death[2]		Disability		Merit and Seniority[3]	Inflation and Productivity	Total Increase (Next Year)
Sample Ages	Male	Female	Male	Female	Male	Female			
30	1.65%	1.65%	0.022%	0.010%	0.01%	0.01%	1.50%	3.50%	5.00%
35	1.65%	1.65%	0.026%	0.013%	0.02%	0.02%	1.50%	3.50%	5.00%
40	1.65%	1.65%	0.031%	0.018%	0.04%	0.04%	0.67%	3.50%	4.17%
45	1.65%	1.65%	0.048%	0.031%	0.08%	0.08%	0.50%	3.50%	4.00%
50	1.65%	1.65%	0.083%	0.051%	0.10%	0.10%	0.50%	3.50%	4.00%
55	1.65%	1.65%	0.137%	0.078%	0.20%	0.20%	0.50%	3.50%	4.00%
60	1.65%	1.65%	0.230%	0.113%	0.30%	0.30%	0.50%	3.50%	4.00%
65	1.65%	1.65%	0.406%	0.172%	0.30%	0.30%	0.50%	3.50%	4.00%
70	1.65%	1.65%	0.720%	0.299%	0.30%	0.30%	0.50%	3.50%	4.00%

[1] There are no select withdrawal assumptions for members in the Judicial Division.

[2] Rates are shown for active members. Separate post-retirement and disability mortality tables are used for retirees.

[3] Pay raises are subject to legislative approval. Percentages shown are based on prior experience.

Exhibit E: Separations from Employment Before Retirement and Individual Pay Increase Assumptions—All Division Trust Funds—DPS Benefit Structure

	Percent of Members Separating Within the Next Year						Pay Increase Assumptions for an Individual Member		
	Withdrawal[1]		Death[2]		Disability		Merit and Seniority	Inflation and Productivity	Total Increase (Next Year)
Sample Ages	Male	Female	Male	Female	Male	Female			
20	8.00%	10.00%	0.020%	0.008%	0.01%	0.01%	3.50%	3.50%	7.00%
25	8.00%	10.00%	0.024%	0.008%	0.01%	0.01%	3.50%	3.50%	7.00%
30	7.00%	9.00%	0.022%	0.010%	0.01%	0.01%	3.20%	3.50%	6.70%
35	7.00%	8.00%	0.026%	0.013%	0.02%	0.02%	2.76%	3.50%	6.26%
40	5.75%	6.50%	0.031%	0.018%	0.05%	0.05%	2.12%	3.50%	5.62%
45	5.00%	4.50%	0.048%	0.031%	0.09%	0.09%	1.34%	3.50%	4.84%
50	4.50%	4.50%	0.083%	0.051%	0.20%	0.20%	0.80%	3.50%	4.30%
55	4.25%	4.50%	0.137%	0.078%	0.24%	0.24%	0.42%	3.50%	3.92%
60	4.25%	4.50%	0.230%	0.113%	0.38%	0.38%	0.20%	3.50%	3.70%
65	4.25%	4.50%	0.406%	0.172%	0.40%	0.40%	0.00%	3.50%	3.50%
70	4.25%	4.50%	0.720%	0.299%	0.40%	0.40%	0.00%	3.50%	3.50%

[1] There are no select withdrawal assumptions for members in the DPS benefit structure.

[2] Rates are shown for active members. Separate post-retirement and disability mortality tables are used for retirees.

DIVISION TRUST FUNDS—PENSION

Exhibit F: Select Rates of Separation Assumptions—State Division, School and DPS Divisions, and Local Government Division

Percent of Members With Less Than Five Years of Service Withdrawing from Employment Next Year[1]

Completed Years of Service	State Division		School and DPS Divisions[2]		Local Government Division	
	Male	Female	Male	Female	Male	Female
0	41.5%	41.5%	37.0%	34.0%	41.0%	39.0%
1	20.5%	21.5%	21.0%	20.0%	24.0%	23.0%
2	14.5%	16.0%	16.0%	15.0%	17.0%	18.0%
3	11.5%	13.0%	12.0%	12.0%	12.0%	14.0%
4	9.5%	11.5%	11.0%	11.0%	10.0%	11.0%

1 There are no select withdrawal assumptions for State Troopers or Judicial Division members.

2 Rates shown are for PERA benefit structure members in the School or DPS Divisions. Effective December 31, 2016, a select withdrawal period is no longer applied to members in the DPS benefit structure.

Exhibit G: Percent of Members Eligible for Reduced Retirement Benefits Retiring Next Year

Retirement Ages	State Division		State Troopers	School and DPS Divisions[1]		Local Government Division		Judicial Division	DPS Benefit Structure[2]	
	Male	Female		Male	Female	Male	Female		Male	Female
50	9.5%	10.0%	10.0%	8.0%	8.0%	8.0%	9.0%	6.0%	8.0%	5.0%
51	9.5%	10.0%	10.0%	8.0%	8.0%	8.0%	9.0%	6.0%	8.0%	5.0%
52	9.5%	10.0%	10.0%	8.0%	8.0%	8.0%	9.0%	6.0%	8.0%	5.0%
53	9.5%	10.0%	10.0%	8.0%	8.0%	8.0%	9.0%	6.0%	8.0%	10.0%
54	9.5%	10.0%	10.0%	10.0%	10.0%	8.0%	9.0%	6.0%	11.0%	10.0%
55	9.5%	10.0%	5.0%	10.0%	10.0%	8.0%	12.0%	6.0%	11.0%	10.0%
56	9.5%	10.0%	5.0%	10.0%	11.0%	8.0%	12.0%	6.0%	11.0%	10.0%
57	9.5%	10.0%	5.0%	10.0%	11.0%	8.0%	12.0%	6.0%	11.0%	10.0%
58	9.5%	10.0%	5.0%	10.0%	11.0%	8.0%	12.0%	6.0%	11.0%	10.0%
59	9.5%	10.0%	5.0%	10.0%	11.0%	10.0%	11.5%	6.0%	15.0%	12.0%
60	9.5%	10.0%	10.0%	10.0%	11.0%	11.0%	11.5%	8.0%	15.0%	15.0%
61	9.5%	10.0%	10.0%	12.0%	11.0%	11.0%	11.5%	8.0%	17.0%	15.0%
62	9.5%	10.0%	10.0%	12.0%	11.0%	11.0%	11.5%	8.0%	17.0%	15.0%
63	9.5%	10.0%	10.0%	12.0%	11.0%	11.0%	11.5%	8.0%	17.0%	15.0%
64	9.5%	10.0%	10.0%	12.0%	11.0%	11.0%	11.5%	8.0%	17.0%	15.0%
65 and over	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

1 Rates shown are for PERA benefit structure members in the School or DPS Divisions.

2 Rates shown are for DPS benefit structure members in any division.

DIVISION TRUST FUNDS—PENSION

Exhibit H: Percent of Members Eligible for Unreduced Retirement Benefits Retiring Next Year

Retirement Ages	State Division Male	State Division Female	State Troopers[1]	School and DPS Divisions[2] Male	School and DPS Divisions[2] Female	Local Government Division Male	Local Government Division Female	Judicial Division	DPS Benefit Structure[3] Male	DPS Benefit Structure[3] Female
50	60%	55%	40%	55%	60%	60%	60%	6%	40%	40%
51	50%	40%	32%	48%	54%	46%	52%	6%	40%	40%
52	42%	36%	32%	46%	48%	30%	40%	6%	35%	30%
53	38%	34%	32%	42%	42%	25%	40%	6%	35%	30%
54	32%	26%	32%	40%	40%	22%	40%	6%	30%	30%
55	25%	25%	32%	28%	29%	22%	28%	6%	30%	30%
56	20%	24%	32%	25%	25%	25%	30%	6%	20%	25%
57	20%	20%	32%	25%	25%	22%	21%	6%	24%	25%
58	18%	18%	32%	22%	22%	20%	21%	6%	22%	20%
59	20%	18%	32%	22%	22%	20%	21%	6%	25%	24%
60	20%	21%	32%	25%	25%	22%	21%	8%	22%	30%
61	18%	18%	32%	25%	24%	22%	20%	8%	20%	28%
62	22%	19%	32%	24%	27%	24%	27%	8%	25%	30%
63	20%	19%	32%	24%	24%	25%	22%	8%	40%	30%
64	20%	19%	32%	24%	24%	25%	22%	8%	20%	30%
65	24%	22%	100%	27%	26%	25%	25%	15%	30%	35%
66	26%	26%	100%	28%	28%	30%	25%	15%	30%	35%
67	25%	24%	100%	25%	25%	20%	30%	15%	30%	32%
68	22%	25%	100%	24%	22%	25%	20%	15%	30%	30%
69	22%	24%	100%	24%	22%	25%	20%	15%	30%	30%
70	25%	25%	100%	22%	25%	25%	24%	40%	30%	30%
71	25%	25%	100%	22%	23%	25%	24%	40%	30%	30%
72	25%	25%	100%	22%	23%	25%	24%	40%	30%	30%
73	25%	25%	100%	22%	23%	25%	24%	40%	30%	30%
74	25%	25%	100%	22%	23%	25%	24%	40%	30%	30%
75 and over	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

1 For State Troopers prior to age 50, it is assumed that 40 percent of the eligible members will retire at each age from age 45 through age 49.

2 Rates shown are for PERA benefit structure members in the School or DPS Divisions.

3 Rates shown are for DPS benefit structure members in any division.

DIVISION TRUST FUNDS—PENSION

Exhibit I: Rates of Post-Retirement Mortality and Single Life Retirement Values[1]

(In Actual Dollars)

MORTALITY ASSUMPTIONS–STATE AND LOCAL GOVERNMENT DIVISIONS

Sample Attained Ages	Percent of Retirees Deceasing Within the Next Year		Present Value of $1 Monthly for Life		Present Value of $1 Monthly Increasing 1.25% Annually		Future Life Expectancy in Years	
	Male	Female	Male	Female	Male	Female	Male	Female
40	0.031%	0.018%	$159.33	$161.37	$186.55	$189.59	43.92	46.29
45	0.048%	0.031%	154.77	157.53	179.82	183.74	39.00	41.34
50	0.297%	0.198%	148.50	152.23	171.07	176.09	34.11	36.41
55	0.458%	0.277%	142.13	146.36	162.18	167.71	29.67	31.80
60	0.635%	0.393%	134.41	138.72	151.74	157.27	25.40	27.26
65	0.831%	0.595%	124.54	128.88	138.93	144.41	21.22	22.84
70	1.185%	0.965%	111.83	116.53	123.14	128.94	17.14	18.59
75	1.830%	1.627%	95.82	101.49	104.11	110.84	13.21	14.58
80	3.824%	3.123%	76.84	84.09	82.49	90.71	9.59	10.92
85	7.940%	6.061%	59.12	66.51	62.88	70.99	6.77	7.89

MORTALITY ASSUMPTIONS–SCHOOL, DPS, AND JUDICIAL DIVISIONS

Sample Attained Ages	Percent of Retirees Deceasing Within the Next Year		Present Value of $1 Monthly for Life		Present Value of $1 Monthly Increasing 1.25% Annually		Future Life Expectancy in Years	
	Male	Female	Male	Female	Male	Female	Male	Female
40	0.031%	0.018%	$159.92	$162.72	$187.41	$191.69	44.51	48.05
45	0.048%	0.031%	155.60	159.46	180.97	186.54	39.58	43.10
50	0.257%	0.130%	149.69	154.97	172.62	179.83	34.70	38.18
55	0.397%	0.181%	143.43	149.57	163.82	171.96	30.19	33.44
60	0.544%	0.257%	135.67	142.39	153.29	161.97	25.83	28.76
65	0.728%	0.422%	125.61	132.99	140.23	149.50	21.55	24.18
70	1.117%	0.690%	112.71	120.96	124.21	134.24	17.38	19.74
75	1.849%	1.191%	96.88	105.82	105.36	115.86	13.44	15.50
80	3.630%	2.537%	78.48	87.79	84.29	94.88	9.84	11.59
85	7.332%	5.320%	60.30	69.46	64.13	74.23	6.91	8.34

[1] Rates are shown for healthy members. Separate disability mortality tables are used for disabled retirees.

DIVISION TRUST FUNDS—PENSION

Summary of Funding Progress

The PERA funding objective is to pay long-term benefit promises through contributions that remain approximately level from year to year as a percent of covered payroll earned by PERA members. The following schedules presented in this section provide an overview of funding progress:

- The solvency test shows the degree to which existing liabilities are funded, including prior history.
- A schedule of funding progress shows the UAAL as a percentage of annual covered payroll, including prior history.
- Schedules detailing actuarial gains and losses, by source, including prior history and a reconciliation of UAAL considering the total of all five Division Trust Funds, over the past five years.
- The scheduled contribution requirements based on the December 31, 2019, actuarial valuation for the period ending December 31, 2021.

Solvency Test

The solvency test compares the plan's actuarial value of assets with: (A) member contributions (with interest) on deposit, (B) the liabilities for future benefits to persons who have retired, died or become disabled, and to those who have terminated service with the right to a future benefit, and (C) the liabilities for service already rendered by active members.

The actuarial valuation of December 31, 2019, shows that plan assets fully cover liability A. In addition, the remainder of plan assets covers a portion of the liabilities for future benefits to persons who have retired or terminated service with the right to a future benefit (liability B). Generally, if the system follows the discipline of level contribution rate financing, the funded portion of liability B and C is expected to increase over time.

DIVISION TRUST FUNDS—PENSION

SOLVENCY TEST

(Dollars in Thousands)

	Aggregate Accrued Liabilities				Portion of Actuarial Accrued Liabilities Covered by Valuation Assets		
Valuation Date	Active Member Contributions (A)[1]	Retirees, Beneficiaries, and Inactive Members (B)	Employer-Financed Portion of Active Members (C)	Actuarial Value of Plan Assets	Liability (A)	Liability (B)	Liability (C)
State Division							
12/31/2010	$2,569,046	$13,149,658	$4,637,472	$12,791,946	100.0%	77.7%	0.0%
12/31/2011	2,629,640	13,710,393	4,486,510	12,010,045	100.0%	68.4%	0.0%
12/31/2012	2,668,942	14,191,469	4,331,084	12,538,675	100.0%	69.5%	0.0%
12/31/2013	2,675,469	15,296,368	4,871,888	13,129,460	100.0%	68.3%	0.0%
12/31/2014	2,688,514	15,846,200	4,873,607	13,523,488	100.0%	68.4%	0.0%
12/31/2015	2,685,014	16,470,370	4,930,287	13,882,820	100.0%	68.0%	0.0%
12/31/2016	2,678,312	17,933,227	5,058,377	14,026,332	100.0%	63.3%	0.0%
12/31/2017	2,668,406	17,395,423	4,718,256	14,256,410	100.0%	66.6%	0.0%
12/31/2018	2,682,956	18,095,951	4,730,945	14,303,726	100.0%	64.2%	0.0%
12/31/2019	**2,737,022**	**18,157,929**	**4,822,697**	**14,922,050**	**100.0%**	**67.1%**	**0.0%**
School Division							
12/31/2010	$3,779,760	$19,658,749	$7,901,245	$20,321,736	100.0%	84.1%	0.0%
12/31/2011	3,783,336	20,666,021	7,536,842	19,266,110	100.0%	74.9%	0.0%
12/31/2012	3,823,348	21,466,078	7,329,607	20,266,574	100.0%	76.6%	0.0%
12/31/2013	3,881,145	23,301,641	8,254,526	21,369,380	100.0%	75.1%	0.0%
12/31/2014	3,915,705	24,247,868	8,222,959	22,143,356	100.0%	75.2%	0.0%
12/31/2015	4,003,251	25,133,168	8,540,734	22,871,661	100.0%	75.1%	0.0%
12/31/2016	4,108,961	27,922,423	9,321,584	23,263,344	100.0%	68.6%	0.0%
12/31/2017	4,212,088	26,937,539	8,896,588	23,780,045	100.0%	72.6%	0.0%
12/31/2018	4,344,574	27,922,414	9,331,412	24,094,442	100.0%	70.7%	0.0%
12/31/2019	**4,551,132**	**28,014,055**	**9,859,874**	**25,412,014**	**100.0%**	**74.5%**	**0.0%**
Local Government Division							
12/31/2010	$657,847	$2,180,451	$1,167,268	$2,926,045	100.0%	100.0%	7.5%
12/31/2011	666,794	2,330,543	1,162,678	2,882,691	100.0%	95.1%	0.0%
12/31/2012	528,029	2,750,956	878,636	3,098,721	100.0%	93.4%	0.0%
12/31/2013	533,003	2,991,177	978,102	3,291,298	100.0%	92.2%	0.0%
12/31/2014	534,695	3,114,436	961,836	3,629,400	100.0%	99.4%	0.0%
12/31/2015	533,262	3,275,093	972,343	3,777,161	100.0%	99.0%	0.0%
12/31/2016	545,507	3,573,344	1,094,201	3,879,197	100.0%	93.3%	0.0%
12/31/2017	544,525	3,482,526	1,018,881	4,009,413	100.0%	99.5%	0.0%
12/31/2018	549,499	3,679,915	1,011,471	4,070,679	100.0%	95.7%	0.0%
12/31/2019	**565,273**	**3,713,892**	**1,037,268**	**4,288,325**	**100.0%**	**100.0%**	**0.9%**

Please see page 163 for footnote references.

DIVISION TRUST FUNDS—PENSION

SOLVENCY TEST (CONTINUED)

(Dollars in Thousands)

	Aggregate Accrued Liabilities				Portion of Actuarial Accrued Liabilities Covered by Valuation Assets		
Valuation Date	Active Member Contributions (A)[1]	Retirees, Beneficiaries, and Inactive Members (B)	Employer-Financed Portion of Active Members (C)	Actuarial Value of Plan Assets	Liability (A)	Liability (B)	Liability (C)
Judicial Division							
12/31/2010	$53,742	$171,904	$78,193	$227,814	100.0%	100.0%	2.8%
12/31/2011	54,688	186,420	78,329	221,515	100.0%	89.5%	0.0%
12/31/2012	57,762	193,774	75,361	238,807	100.0%	93.4%	0.0%
12/31/2013	59,348	208,236	84,014	256,800	100.0%	94.8%	0.0%
12/31/2014	60,973	214,541	95,739	270,866	100.0%	97.8%	0.0%
12/31/2015	60,118	232,303	109,545	286,891	100.0%	97.6%	0.0%
12/31/2016	58,119	273,416	115,582	297,888	100.0%	87.7%	0.0%
12/31/2017	54,973	277,542	95,593	310,085	100.0%	91.9%	0.0%
12/31/2018	57,922	286,045	103,790	315,970	100.0%	90.2%	0.0%
12/31/2019	**57,145**	**304,173**	**100,720**	**342,071**	**100.0%**	**93.7%**	**0.0%**
DPS Division							
12/31/2010	$317,442	$2,370,217	$645,155	$2,961,720	100.0%	100.0%	42.5%
12/31/2011	333,550	2,435,504	673,473	2,804,706	100.0%	100.0%	5.3%
12/31/2012	348,739	2,479,706	667,104	2,936,695	100.0%	100.0%	16.2%
12/31/2013	364,126	2,672,260	749,486	3,075,895	100.0%	100.0%	5.3%
12/31/2014	379,240	2,665,352	771,501	3,151,456	100.0%	100.0%	13.9%
12/31/2015	394,306	2,732,879	778,055	3,207,327	100.0%	100.0%	10.3%
12/31/2016	402,849	2,999,767	843,814	3,220,935	100.0%	93.9%	0.0%
12/31/2017	419,239	2,867,254	802,033	3,257,770	100.0%	99.0%	0.0%
12/31/2018	438,008	2,941,988	868,606	3,261,338	100.0%	96.0%	0.0%
12/31/2019	**461,075**	**2,906,773**	**895,537**	**3,410,264**	**100.0%**	**100.0%**	**4.7%**
All Division Trust Funds[2]							
12/31/2010	$7,377,837	$37,530,979	$14,429,333	$39,229,261	100.0%	84.9%	0.0%
12/31/2011	7,468,008	39,328,881	13,937,832	37,185,067	100.0%	75.6%	0.0%
12/31/2012	7,426,820	41,081,983	13,281,792	39,079,472	100.0%	77.0%	0.0%
12/31/2013	7,513,091	44,469,682	14,938,016	41,122,833	100.0%	75.6%	0.0%
12/31/2014	7,579,127	46,088,397	14,925,642	42,718,566	100.0%	76.2%	0.0%
12/31/2015	7,675,951	47,843,813	15,330,964	44,025,860	100.0%	76.0%	0.0%
12/31/2016	7,793,748	52,702,177	16,433,558	44,687,696	100.0%	70.0%	0.0%
12/31/2017	7,899,231	50,960,284	15,531,351	45,613,723	100.0%	74.0%	0.0%
12/31/2018	8,072,959	52,926,313	16,046,224	46,046,155	100.0%	71.7%	0.0%
12/31/2019	**8,371,647**	**53,096,822**	**16,716,096**	**48,374,724**	**100.0%**	**75.3%**	**0.0%**

1 Includes accrued interest on member contributions.

2 The data in this table is aggregated for informational purposes. The assets of each trust fund are for the sole purpose of its members and cannot be used by another fund.

DIVISION TRUST FUNDS—PENSION

Unfunded Actuarial Accrued Liability

UAAL is the difference between actuarially calculated liability for service already rendered and the valuation assets of the retirement fund.

In 2018, the ratio of PERA's valuation assets to accrued liabilities was 59.8 percent and increased to 61.9 percent by the end of 2019.

The following factors resulted in higher liabilities (or losses) to PERA during 2019:

- Lower investment returns than assumed in 2016 and 2018.
- More members retired at earlier ages than expected.
- More service and disability retirements were experienced than expected.
- Member pay increases were greater than expected
- New PERA members had some service resulting in accrued liabilities.
- Actual payroll contributions were less than the determined ADC.
- Retirees experienced longer lifespans than expected.
- Fewer members terminated PERA-covered employment and withdrew their accounts than expected.
- Higher than expected administrative expenses

The following factor resulted in lower liabilities (or gains) during 2019:

- Higher investment return than assumed in 2017 and 2019.

Between 2010 and 2016, PERA's funded status was negatively affected primarily by the recognition of adverse economic experience and by the adoption of more conservative economic and demographic assumptions to better reflect anticipated future behaviors, longevity, and economic conditions. In 2017, PERA's funded status improved due to a decrease in plan liabilities reflecting the adoption of SB 18-200 pension reforms along with better than expected investment performance. PERA's funded status was, again, negatively impacted in 2018, reflecting unfavorable demographic experience and lower than assumed investment performance. In 2019, PERA's funded status was positively impacted by better than expected investment performance and the reduced AI cap from 1.50 percent to 1.25 percent, and negatively impacted by demographic losses and, to a lesser extent, the enactment of HB 20-1394 modifying the Judicial Division's employer and member contribution rates for the State's 2020-21 and 2021-22 fiscal years.

Since inflation decreases the dollar's value, it is important to examine more than basic actuarial metrics and data when assessing the plan's financial status. The ratio of UAAL dollars divided by member covered payroll, as shown in the table on the next page, can provide a meaningful index. Opposite of the funded status ratio, the lower the ratio, the greater is the strength of the system.

DIVISION TRUST FUNDS—PENSION

SCHEDULE OF FUNDING PROGRESS

(Dollars in Thousands)

(A) Valuation Date	(B) Actuarial Value of Plan Assets	(C) Actuarial Accrued Liabilities	(D) Unfunded Actuarial Accrued Liabilities (UAAL) (C) – (B)	(E) Funded Ratio (B)/(C)	(F) Annual Covered Payroll	(G) UAAL As a % of Covered Payroll (D)/(F)
State Division						
12/31/2010	$12,791,946	$20,356,176	$7,564,230	62.8%	$2,392,080	316.2%
12/31/2011	12,010,045	20,826,543	8,816,498	57.7%	2,393,791	368.3%
12/31/2012	12,538,675	21,191,495	8,652,820	59.2%	2,384,934	362.8%
12/31/2013	13,129,460	22,843,725	9,714,265	57.5%	2,474,965	392.5%
12/31/2014	13,523,488	23,408,321	9,884,833	57.8%	2,564,670	385.4%
12/31/2015	13,882,820	24,085,671	10,202,851	57.6%	2,641,867	386.2%
12/31/2016	14,026,332	25,669,916	11,643,584	54.6%	2,710,651	429.5%
12/31/2017	14,256,410	24,782,085	10,525,675	57.5%	2,774,207	379.4%
12/31/2018	14,303,726	25,509,852	11,206,126	56.1%	2,898,827	386.6%
12/31/2019	**14,922,050**	**25,717,648**	**10,795,598**	**58.0%**	**2,995,453**	**360.4%**
School Division						
12/31/2010	$20,321,736	$31,339,754	$11,018,018	64.8%	$3,900,662	282.5%
12/31/2011	19,266,110	31,986,199	12,720,089	60.2%	3,821,603	332.8%
12/31/2012	20,266,574	32,619,033	12,352,459	62.1%	3,819,066	323.4%
12/31/2013	21,369,380	35,437,312	14,067,932	60.3%	3,938,650	357.2%
12/31/2014	22,143,356	36,386,532	14,243,176	60.9%	4,063,236	350.5%
12/31/2015	22,871,661	37,677,153	14,805,492	60.7%	4,235,290	349.6%
12/31/2016	23,263,344	41,352,968	18,089,624	56.3%	4,349,320	415.9%
12/31/2017	23,780,045	40,046,215	16,266,170	59.4%	4,471,357	363.8%
12/31/2018	24,094,442	41,598,400	17,503,958	57.9%	4,789,503	365.5%
12/31/2019	**25,412,014**	**42,425,061**	**17,013,047**	**59.9%**	**5,104,431**	**333.3%**
Local Government Division						
12/31/2010	$2,926,045	$4,005,566	$1,079,521	73.0%	$705,265	153.1%
12/31/2011	2,882,691	4,160,015	1,277,324	69.3%	718,169	177.9%
12/31/2012	3,098,721	4,157,621	1,058,900	74.5%	523,668	202.2%
12/31/2013	3,291,298	4,502,282	1,210,984	73.1%	529,003	228.9%
12/31/2014	3,629,400	4,610,967	981,567	78.7%	540,468	181.6%
12/31/2015	3,777,161	4,780,698	1,003,537	79.0%	561,518	178.7%
12/31/2016	3,879,197	5,213,052	1,333,855	74.4%	608,223	219.3%
12/31/2017	4,009,413	5,045,932	1,036,519	79.5%	632,768	163.8%
12/31/2018	4,070,679	5,240,885	1,170,206	77.7%	660,998	177.0%
12/31/2019	**4,288,325**	**5,316,433**	**1,028,108**	**80.7%**	**681,093**	**150.9%**
Judicial Division						
12/31/2010	$227,814	$303,839	$76,025	75.0%	$37,412	203.2%
12/31/2011	221,515	319,437	97,922	69.3%	39,033	250.9%
12/31/2012	238,807	326,897	88,090	73.1%	39,045	225.6%
12/31/2013	256,800	351,598	94,798	73.0%	39,942	237.3%
12/31/2014	270,866	371,253	100,387	73.0%	42,977	233.6%
12/31/2015	286,891	401,966	115,075	71.4%	46,870	245.5%
12/31/2016	297,888	447,117	149,229	66.6%	48,700	306.4%
12/31/2017	310,085	428,108	118,023	72.4%	48,948	241.1%
12/31/2018	315,970	447,757	131,787	70.6%	50,506	260.9%
12/31/2019	**342,071**	**462,038**	**119,967**	**74.0%**	**53,427**	**224.5%**

Please see page 166 for footnote references.

DIVISION TRUST FUNDS—PENSION

SCHEDULE OF FUNDING PROGRESS (CONTINUED)

(Dollars in Thousands)

(A) Valuation Date	(B) Actuarial Value of Plan Assets	(C) Actuarial Accrued Liabilities	(D) Unfunded Actuarial Accrued Liabilities (UAAL) (C) – (B)	(E) Funded Ratio (B)/(C)	(F) Annual Covered Payroll	(G) UAAL As a % of Covered Payroll (D)/(F)
DPS Division						
12/31/2010	$2,961,720	$3,332,814	$371,094	88.9%	$470,774	78.8%
12/31/2011	2,804,706	3,442,527	637,821	81.5%	491,646	129.7%
12/31/2012	2,936,695	3,495,549	558,854	84.0%	510,872	109.4%
12/31/2013	3,075,895	3,785,872	709,977	81.2%	547,660	129.6%
12/31/2014	3,151,456	3,816,093	664,637	82.6%	584,319	113.7%
12/31/2015	3,207,327	3,905,240	697,913	82.1%	621,115	112.4%
12/31/2016	3,220,935	4,246,430	1,025,495	75.9%	642,177	159.7%
12/31/2017	3,257,770	4,088,526	830,756	79.7%	658,198	126.2%
12/31/2018	3,261,338	4,248,602	987,264	76.8%	722,040	136.7%
12/31/2019	**3,410,264**	**4,263,385**	**853,121**	**80.0%**	**736,264**	**115.9%**
All Division Trust Funds[1]						
12/31/2010	$39,229,261	$59,338,149	$20,108,888	66.1%	$7,506,193	267.9%
12/31/2011	37,185,067	60,734,721	23,549,654	61.2%	7,464,242	315.5%
12/31/2012	39,079,472	61,790,595	22,711,123	63.2%	7,277,585	312.1%
12/31/2013	41,122,833	66,920,789	25,797,956	61.5%	7,530,220	342.6%
12/31/2014	42,718,566	68,593,166	25,874,600	62.3%	7,795,670	331.9%
12/31/2015	44,025,860	70,850,728	26,824,868	62.1%	8,106,660	330.9%
12/31/2016	44,687,696	76,929,483	32,241,787	58.1%	8,359,071	385.7%
12/31/2017	45,613,723	74,390,866	28,777,143	61.3%	8,585,478	335.2%
12/31/2018	46,046,155	77,045,496	30,999,341	59.8%	9,121,874	339.8%
12/31/2019	**48,374,724**	**78,184,565**	**29,809,841**	**61.9%**	**9,570,668**	**311.5%**

[1] The data in this table is aggregated for informational purposes. The assets of each trust fund are for the sole purpose of its members and cannot be used by another fund.

Note: A history of contributions by Division Trust Fund, the ADC compared to the actual contributions paid, including the deficiency (or excess), for each of the last 10 years, is shown in the Schedule of Employer and Nonemployer Contributions, found on pages 96-98 in the Required Supplementary Information (RSI) in the Financial Section.

DIVISION TRUST FUNDS—PENSION

Actuarial Gains and Losses

ANALYSIS OF FINANCIAL EXPERIENCE

(Dollars in Millions)

	State Division	School Division	Local Government Division	Judicial Division	DPS Division
Amounts					
From differences between assumed and actual experience on liabilities					
Age and service retirements[1]	$42.6	$49.4	$3.8	$3.9	($4.3)
Disability retirements[2]	1.5	6.3	0.8	0.1	0.8
Deaths[3]	12.8	6.5	(10.5)	1.5	(5.6)
Withdrawals[4]	13.0	143.3	12.9	(0.8)	(18.3)
New members[5]	65.6	99.3	12.8	5.6	30.1
Pay increases[6]	68.7	300.6	14.5	(0.7)	8.5
Administrative expenses and other[7]	31.4	29.6	9.2	0.2	(22.9)
Subtotal	235.6	635.0	43.5	9.8	(11.7)
From differences between assumed and actual experience on assets	(364.7)	(616.2)	(103.7)	(7.9)	(84.2)
From changes in plan assumptions and methods	—	—	—	—	—
From changes in plan provisions	(480.6)	(829.6)	(100.0)	(8.1)	(76.0)
Total actuarial (gains)/losses on 2019 activities	**($609.7)**	**($810.8)**	**($160.2)**	**($6.2)**	**($171.9)**
Total actuarial (gains)/losses on 2018 activities	**$543.4**	**$977.6**	**$129.8**	**$11.1**	**$120.9**

1 *Age and service retirements*: If members retire at older ages than assumed, there is a gain. If members retire at younger ages than assumed, there is a loss.

2 *Disability retirements*: If disability claims are lower than assumed, there is a gain. If disability claims are higher than assumed, there is a loss.

3 *Deaths*: If survivor claims are lower than assumed, there is a gain. If survivor claims are higher than assumed, there is a loss. If retirees die sooner than assumed, there is a gain. If retirees live longer than assumed, there is a loss.

4 *Withdrawal from employment*: If more members terminate and more liabilities are released by withdrawals than assumed, there is a gain. If fewer liabilities are released by terminations than assumed, there is a loss.

5 *New members*: If new members entering the plan have prior service, there is a loss.

6 *Pay increases*: If there are smaller salary increases than assumed, there is a gain. If greater salary increases occur than assumed, there is a loss.

7 *Administrative expenses and other:* Includes miscellaneous gains and losses resulting from valuation software updates and refinements, data adjustments, timing of financial transactions, etc.

DIVISION TRUST FUNDS—PENSION

The table below identifies the components that contributed to the change in the underfunded status of the Division Trust Funds for the period 2015 to 2019.

SCHEDULE OF GAINS AND LOSSES IN ACCRUED LIABILITIES AND RECONCILIATION OF UNFUNDED ACTUARIAL ACCRUED LIABILITIES

(Dollars in Millions)

	(Gain) or Loss for Years Ended December 31					
Type of Activity	**2015**	**2016**	**2017**	**2018**	**2019**	**2015 - 2019**
UAAL beginning of year	$25,874.6	$26,824.9	$32,241.8	$28,777.1	**$30,999.3**	$25,874.6
Experience (gains) and losses						
Age and service retirements	132.1	139.0	211.4	177.5	**95.4**	755.4
Disability retirements	22.7	22.3	22.9	13.3	**9.5**	90.7
Deaths	68.5	79.9	(21.0)	118.0	**4.7**	250.1
Withdrawal from employment	172.7	205.9	251.2	(5.2)	**150.1**	774.7
New members	149.9	213.0	238.3	231.4	**213.4**	1,046.0
Pay increases	(64.4)	(275.0)	(214.3)	162.0	**391.6**	(0.1)
Investment (income) loss	(418.0)	236.3	(175.5)	580.4	**(1,176.7)**	(953.5)
Other	(35.7)	68.2	61.2	511.0[1]	**47.5**	652.2
Experience (gain) loss during year	27.8	689.6	374.2	1,788.4	**(264.5)**	2,615.5
Non-recurring items						
Change in plan assumptions and methods	—	3,947.3[2]	—	—	**—**	3,947.3
Change in plan provisions	—	—	(4,832.3)[3]	(5.6)	**(1,494.3)**[4]	(6,332.2)
Non-recurring items	—	3,947.3	(4,832.3)	(5.6)	**(1,494.3)**	(2,384.9)
Contribution deficiency	380.9	249.6	195.2	450.0	**132.9**	1,408.6[5]
Expected change in UAAL	541.6	530.4	798.2	(10.6)	**436.4**	2,296.0[6]
Total (gain)/loss for year	**950.3**	**5,416.9**	**(3,464.7)**	**2,222.2**	**(1,189.5)**	**3,935.2**
UAAL end of year	**$26,824.9**	**$32,241.8**	**$28,777.1**	**$30,999.3**	**$29,809.8**	**$29,809.8**

The previous schedule shows where gains and losses occurred over the five-year period compared to what was expected or assumed. These include the following significant gains and losses:

1 $0.5 billion loss in 2018, primarily due to the change in actuarial service provider and actuarial valuation software. Although the total present value of benefits matched closely as determined by the prior and current actuarial service provider, the loss shown represents the different methods of attribution applied to allocate costs between future normal costs and AAL for earned service.

2 $3.9 billion loss, in 2016, primarily due to the reduction of the long-term expected investment rate of return assumption from 7.50 percent to 7.25 percent and the adoption of revised mortality tables to recognize extended member longevity.

3 $4.8 billion gain, in 2017, primarily due to the changes in pension plan provisions enacted pursuant to SB 18-200.

4 $1.5 billion gain, in 2019, due to the reduction in the AI cap from 1.50% to 1.25%, effective July 1, 2020, as required by the 2018 AAP assessment.

5 $1.4 billion cumulative loss resulting from contribution deficiencies; occurring when actual contributions flowing into the plans are less than the determined ADC.

6 $2.3 billion cumulative loss indicating the five-year difference between each prior year's UAAL and the expected current year UAAL considering the normal cost earned, less the required employer contributions all of which is adjusted for interest.

DIVISION TRUST FUNDS—PENSION

Actuarial Valuation Results

Contribution rates for the year ending December 31, 2021, are derived from the results of the December 31, 2019, annual actuarial valuation and are determined in advance for purposes of budgeting, completing the required assessments related to the automatic adjustment provision (AAP) and consideration of any necessary legislative action.

SCHEDULE OF COMPUTED EMPLOYER CONTRIBUTION AND DIRECT DISTRIBUTION RATES FOR THE 2021 FISCAL YEAR

	Expressed as a percentage of Covered Payroll				
	State Division	School Division	Local Government Division	Judicial Division	DPS Division
Contributions					
Service retirement benefits	6.93%	8.09%	6.51%	14.13%	8.11%
Disability retirement benefits	0.36%	0.23%	0.27%	0.60%	0.30%
Survivor benefits	0.17%	0.15%	0.17%	0.48%	0.15%
Termination withdrawals	2.85%	3.06%	2.82%	1.08%	2.80%
Refunds	0.95%	0.80%	0.97%	0.07%[1]	0.43%
Administrative expense load	0.40%	0.40%	0.40%	0.40%	0.40%
Total normal cost	11.66%	12.73%	11.14%	16.76%	12.19%
Less member contributions[2]	(10.31%)[3,4]	(10.25%)[3]	(8.50%)	(14.97%)[3,4,5]	(10.25%)[3]
Employer normal cost	**1.35%**	**2.48%**	**2.64%**	**1.79%**	**1.94%**
Percentage available to amortize unfunded actuarial accrued liabilities	18.01%	16.87%	9.91%	14.80%	5.17%
Amortization period[6]	27 Years	28 Years	22 Years	16 Years	25 Years
Total employer contribution rate for actuarially funded benefits[7]	10.98%[4]	10.90%	10.50%	9.69%[4,5]	10.90%
Amortization Equalization Disbursement	5.00%	4.50%	2.20%	4.20%	4.50%
Supplemental Amortization Equalization Disbursement	5.00%	5.50%	1.50%	4.20%	5.50%
Less Health Care Trust Fund	(1.02%)	(1.02%)	(1.02%)	(1.02%)	(1.02%)
Less Annual Increase Reserve	(0.60%)	(0.53%)	(0.63%)	(0.48%)	(0.68%)
Less PCOP credit	N/A	N/A	N/A	N/A	(12.09%)[8]
Employer contribution rate for defined benefit plan	**19.36%**	**19.35%**	**12.55%**	**16.59%**	**7.11%**
Direct distribution[9]	**2.40%**	**2.33%**	**N/A**	**2.35%**	**2.43%**
DC Supplement rates[10]	**0.05%**	**N/A**	**0.02%**	**N/A**	**N/A**

1 Assumes no judge will elect a refund of contributions made for the 17th through the 20th year of service.

2 Includes 100 percent of the 0.50 percent additional member contribution effective July 1, 2020 due to the results of the 2018 AAP assessment.

3 Includes 100 percent of the phased-in amount of 0.75 percent additional member contribution effective July 1, 2020, and 50 percent of the phased-in amount of 0.50 percent additional member contribution effective July 1, 2021.

4 Weighted average of more than one statutory rate.

5 HB 20-1394, requires that 5.0 percent of the Judicial Division base employer contribution rate be paid by the members of the Judicial Division for the State's 2020-21 and the 2021-22 fiscal years. This contribution rate modification does not apply to judges employed by the Denver County Court.

6 The amortization periods shown consider ongoing employer, member, AED, and SAED contributions including any future increases, and the direct distribution, where and when applicable.

7 Includes 100 percent of the 0.50 percent additional employer contribution effective July 1, 2020, due to the results of the 2018 AAP assessment.

8 An offset to the DPS Division rate is provided for under C.R.S. § 24-51-412. See Note 4 of the Notes to the Financial Statements in the Financial Section.

9 Rates for the direct distribution have been estimated and are shown as a percentage of 2021 projected covered payroll.

10 The DC Supplement will be paid to the State and Local Government Divisions on behalf of employees of these divisions, hired on or after January 1, 2019, who chose to participate in the PERAChoice DC Plan in lieu of participating in PERA's DB Plan. Designed to compensate for the employer contributions paid to the DC Plan participant accounts that otherwise would have been payment toward the UAAL, this supplement is determined separately for the State and Local Government Divisions as a rate of pay and is payable as of January 1, 2021, by all employers of the two divisions.

Note: The underlying calculations involve more precision than what is presented in the schedule above and the rounded numbers shown may not add as a result.

DIVISION TRUST FUNDS—PENSION

The AED and SAED are set to increase in future years for the Judicial Division, as shown below. With the passage of SB 10-001, the AED and the SAED can be adjusted based on the year end funded status within a particular Division Trust Fund. If a particular Division Trust Fund reaches a funded status of 103 percent, a decrease in the AED and SAED is mandated and if it subsequently falls below a funded status of 90 percent, an increase is mandated. For the Local Government and Judicial Divisions, if the funded ratio reaches 90 percent and subsequently falls below 90 percent, an increase in the AED and SAED is mandated. Increases cannot exceed the maximum allowable limitations shown below:

FUTURE AED AND SAED RATES

	2020 Rates		Future Annual Increases in Rates Prescribed by Colorado Revised Statutes		Maximum Allowable Limitations	
Trust Fund	AED	SAED	AED	SAED	AED	SAED
State Division	5.00%	5.00%	N/A	N/A	5.00%	5.00%
School Division	4.50%	5.50%	N/A	N/A	4.50%	5.50%
Local Government Division	2.20%	1.50%	N/A	N/A	5.00%	5.00%
Judicial Division	3.80%	3.80%	Yes[1]	Yes[2]	5.00%	5.00%
DPS Division[3]	4.50%	5.50%	N/A	N/A	4.50%	5.50%

[1] C.R.S. § 24-51-411(4.5) increased the AED payment to 3.80 percent of PERA-includable salary for 2020 and requires the AED payment to increase by 0.40 percent at the start of each of the following three calendar years through 2023 at which time the AED payment will be 5.00 percent of PERA-includable salary.

[2] C.R.S. § 24-51-411(7.5) increased the SAED payment to 3.80 percent of PERA-includable salary for 2020 and requires the SAED payment to increase by 0.40 percent at the start of each of the following three calendar years through 2023 at which time the SAED payment will be 5.00 percent of PERA-includable salary.

[3] DPS Division employers are permitted to reduce the AED and SAED by the PCOP offset, as specified in C.R.S. § 24-51-412 *et seq.*

Note: A history of contributions by Division Trust Fund, the ADC compared to the actual contributions paid, including the deficiency (or excess), for each of the last 10 years, is shown in the Schedule of Employer and Nonemployer Contributions, found on pages 96-98, in the RSI in the Financial Section.

DIVISION TRUST FUNDS—PENSION

Annual Actuarial Valuation Statistics

As of December 31, 2019, the Funded Ratio, the UAAL, the ADC for 2021 as a percentage of covered payroll, and the amortization period considering current funding and future increases prescribed by Colorado statute, for each Division Trust Fund, are shown in the following table. The results in this table are based on the actuarial valuation for funding purposes, which does not consider the impact of reduced benefits for those hired in the future as provided for in Colorado law.

ACTUARIAL STATISTICS
(Dollars in Thousands)

Trust Fund	Funded Ratio	UAAL	ADC[1]	Amortization Period[2]
State Division	58.0%	$10,795,598	21.05%	27 Years
School Division	59.9%	17,013,047	20.61%	28 Years
Local Government Division	80.7%	1,028,108	10.84%	22 Years
Judicial Division	74.0%	119,967	14.13%	16 Years
DPS Division	80.0%	853,121	8.22%	25 Years
All Division Trust Funds[3]		**$29,809,841**		

[1] Determined considering the 30-year target amortization period defined in the pension funding policy for purposes of funding benchmarks and RSI reporting as shown in the Financial Section.

[2] The determination of each amortization period considers future statutory increases in base employer and member contribution rates, increases in AED and SAED, and inclusion of the direct distribution, as applicable. Pursuant to HB 20-1379, the July 1, 2020, payment of the direct distribution is not considered.

[3] The data in this table is aggregated for informational purposes. The assets of each trust fund are for the sole purpose of its members and cannot be used by another fund.

Pursuant to the pension funding policy, for reporting purposes, alternative ADCs also are determined by applying the layered amortization methodology as previously described. Under the target and alternative calculations, the legacy UAAL as of December 31, 2017, was amortized using a 30-year period, but the alternative ADCs use a 25-year closed period, a 20-year closed period, and a 15-year closed period, in lieu of the 30-year period, for amortization of any ”new” UAAL recognized on and after January 1, 2018. The 2021 target and alternative ADCs, by division, are displayed below:

	Target ADC	Alternative ADCs		
Trust Fund	30-Year[1]	25-Year[2]	20-Year[2]	15-Year[2]
State Division	21.05%	21.12%	21.22%	21.40%
School Division	20.61%	20.70%	20.84%	21.10%
Local Government Division	10.84%	10.90%	10.99%	11.14%
Judicial Division	14.13%	14.16%	14.21%	14.30%
DPS Division	8.22%	8.23%	8.24%	8.27%

[1] Refers to the amortization period used to amortize the legacy UAAL as of December 31, 2017, and any “new” UAAL recognized on and after January 1, 2018.

[2] Refers to the amortization period used to amortize any “new” UAAL recognized on and after January 1, 2018.

DIVISION TRUST FUNDS—PENSION

Automatic Adjustment Provision

The primary intent of the AAP is to gauge the adequacy of the contributions coming into the pension trust fund against the amount required, and if determined necessary, to initiate automatic changes to member and employer contribution rates, the AI cap, and, under certain circumstances, the direct distribution from the State of Colorado, to better insure achievement of the targeted 30-year funding goal, as delineated in SB 18-200. Pursuant to C.R.S. § 24-51-413, this assessment commenced with the December 31, 2018, actuarial valuation and is performed annually, thereafter.

The AAP assessment compares two blended rates, weighted across all five Division Trust Funds, defined as: the "Blended Total Contribution Amount" (employer contribution rate + member contribution rate + direct distribution as a rate of pay) divided by the "Blended Total Required Contribution" (ADC Rate + member contribution rate), determining a resulting ratio. If the resulting ratio falls within an acceptable corridor (98 percent to 119 percent), no adjustments are made. If the resulting ratio does not achieve a minimum benchmark (is less than 98 percent) or exceeds a maximum benchmark (is 120 percent or greater), adjustments are applied in an equitable manner of impact. The following table shows the results of the AAP assessment which was conducted to determine if adjustments are necessary as of July 1, 2021.

Elements of Test Ratio (Shown as a percentage of pay)	2021 Input Percentages	Resulting Ratio	Adjustments, if Necessary, Determined by the Board's Actuary (Effective July 1, 2021)	Revised Resulting Ratio
2021 Blended Total Contribution Amount[1,2] *(Divided by):* 2021 Blended Total Required Contribution[1,2]	31.17% *(Divided by):* 30.28%	(Equals) 102.94%[3]	N/A	N/A

[1] The blended rate is weighted based on the UAAL of each Division Trust Fund and is not appropriate for any other use.

[2] Determined from rates shown on pages 169-171.

[3] Calculation considers HB 20-1394, which had negligible impact.

Below is a summary of the AAP guidelines. An automatic adjustment will occur under the following conditions:

- If the resulting ratio is less than 98 percent, there will be adjustments of equitable impact, increasing the employer contribution rate, increasing the member contribution rate, decreasing the AI cap, and increasing the direct distribution (if permitted).
- If the resulting ratio is greater than or equal to 120 percent, there will be adjustments of equitable impact, decreasing the employer contribution rate, decreasing the member contribution rate, increasing the AI cap, and decreasing the direct distribution.

The AAP defines the limited amounts of total adjustment available in each category, and also the increments of adjustments that can occur in any one year. Multiple steps over multiple years are allowed for a required adjustment as necessary, but cannot exceed the ultimate limits as set forth in statute, as detailed below:

- First adjustment cannot occur prior to July 1, 2020.
- Adjustment (increase or decrease) to each of the employer contribution rates and the member contribution rates cannot exceed 0.50 percent in any one year, and
  - Cannot exceed 2.00 percent above the contribution rates reflecting SB 18-200 statutory reforms.
  - Cannot fall below the contribution rates in effect immediately prior to the passage of SB 18-200.
- Adjustment (increase or decrease) to the AI rate cannot exceed 0.25 percent in any one year, and
  - Cannot exceed a 2.00 percent AI cap maximum.
  - Cannot fall below a 0.50 percent AI cap minimum.
- Adjustment to the direct distribution cannot exceed $20 million in any one year, and
  - Cannot exceed the initial $225 million amount.
  - Can be reduced to $0.

DIVISION TRUST FUNDS—PENSION

- Adjustments that are required because funding is below the 98 percent threshold will be made to an extent that will bring the revised ratio to 103 percent following the corrective efforts but in no event can the adjustments in one year be greater than the limit described above.
- Adjustments that are required because funding has reached the 120 percent threshold must not cause the ratio to fall below 103 percent.

Additional information on the AAP can be found in C.R.S. § 24-51-413.

AAP ASSESSMENT HISTORY

Assessment	Information Based on Valuation Date	Compare Contribution Rates for Plan Year	Triggered Adjustments?	Adjustments to be Made	Effective Date for Adjustments
2018	December 31, 2018	2020	Yes	0.50% increase to member rate 0.50% increase to employer rate 0.25% decrease to AI cap No change to $225M direct distribution[1]	July 1, 2020
2019	December 31, 2019	2021	No	N/A	N/A

[1] Pursuant to HB 20-1379, the direct distribution, payable July 1, 2020, is suspended.

Funded Ratio

(Dollars in Thousands)

The funded ratio for the plan is determined by dividing the actuarial value of assets by the AAL. The actuarial value of assets is not the current market value but a market-related value, which recognizes the differences between actual and expected investment experience for each year in equal amounts over a four-year period. The actuarial value of the assets as of December 31, 2019, was $48,374,724 compared to a market value of assets of $51,281,050, and to the AAL of $78,184,565. The funded ratio for each of the funds, based on the actuarial value of assets, at December 31 for each of the last five years is shown below:

Trust Fund	2015	2016	2017	2018	2019
State Division	57.6%	54.6%	57.5%	56.1%	**58.0%**
School Division	60.7%	56.3%	59.4%	57.9%	**59.9%**
Local Government Division	79.0%	74.4%	79.5%	77.7%	**80.7%**
Judicial Division	71.4%	66.6%	72.4%	70.6%	**74.0%**
DPS Division	82.1%	75.9%	79.7%	76.8%	**80.0%**
All Division Trust Funds[1]	**62.1%**	**58.1%**	**61.3%**	**59.8%**	**61.9%**

[1] The data in this table is aggregated for informational purposes. The assets of each trust fund are for the sole purpose of its members and cannot be used by another fund.

The Board's pension funding policy states that the targeted actuarial funded ratio is greater than or equal to 110 percent on a combined Division Trust Fund basis. The funded ratios listed above give an indication of progress made toward achieving the stated objective. A larger funded ratio indicates that a plan is better funded. As an example, for every $1.00 of the actuarially determined benefits earned for the School Division Trust Fund as of December 31, 2019, approximately $0.60 of assets are available for payment based on the actuarial value of assets. These benefits earned will be payable over the life span of members after their retirement and therefore, it is not imperative that the AAL equal the actuarial value of assets at any given moment in time.

DIVISION TRUST FUNDS—PENSION

At December 31, 2018, and December 31, 2019, PERA had the following funded status for the Division Trust Funds:

FUNDED STATUS FOR THE DIVISION TRUST FUNDS

(Dollars in Thousands)

	Market Value of Assets[1]		Actuarial Value of Assets[2]	
	12/31/2018	12/31/2019	12/31/2018	12/31/2019
State Division Trust Fund				
Actuarial accrued liability[3]	$25,509,852	**$25,717,648**	$25,509,852	**$25,717,648**
Assets held to pay those liabilities	13,837,863	**15,819,843**	14,303,726	**14,922,050**
Unfunded actuarial accrued liability	**$11,671,989**	**$9,897,805**	**$11,206,126**	**$10,795,598**
Funded ratio	54.2%	**61.5%**	56.1%	**58.0%**
School Division Trust Fund				
Actuarial accrued liability[3]	$41,598,400	**$42,425,061**	$41,598,400	**$42,425,061**
Assets held to pay those liabilities	23,304,911	**26,936,490**	24,094,442	**25,412,014**
Unfunded actuarial accrued liability	**$18,293,489**	**$15,488,571**	**$17,503,958**	**$17,013,047**
Funded ratio	56.0%	**63.5%**	57.9%	**59.9%**
Local Government Division Trust Fund				
Actuarial accrued liability[3]	$5,240,885	**$5,316,433**	$5,240,885	**$5,316,433**
Assets held to pay those liabilities	3,935,921	**4,545,960**	4,070,679	**4,288,325**
Unfunded actuarial accrued liability	**$1,304,964**	**$770,473**	**$1,170,206**	**$1,028,108**
Funded ratio	75.1%	**85.5%**	77.7%	**80.7%**
Judicial Division Trust Fund				
Actuarial accrued liability[3]	$447,757	**$462,038**	$447,757	**$462,038**
Assets held to pay those liabilities	305,304	**362,108**	315,970	**342,071**
Unfunded actuarial accrued liability	**$142,453**	**$99,930**	**$131,787**	**$119,967**
Funded ratio	68.2%	**78.4%**	70.6%	**74.0%**
DPS Division Trust Fund				
Actuarial accrued liability[3]	$4,248,602	**$4,263,385**	$4,248,602	**$4,263,385**
Assets held to pay those liabilities	3,155,738	**3,616,649**	3,261,338	**3,410,264**
Unfunded actuarial accrued liability	**$1,092,864**	**$646,736**	**$987,264**	**$853,121**
Funded ratio	74.3%	**84.8%**	76.8%	**80.0%**
All Division Trust Funds[4]				
Actuarial accrued liability[3]	$77,045,496	**$78,184,565**	$77,045,496	**$78,184,565**
Assets held to pay those liabilities[5]	44,539,737	**51,281,050**	46,046,155	**48,374,724**
Unfunded actuarial accrued liability	**$32,505,759**	**$26,903,515**	**$30,999,341**	**$29,809,841**
Funded ratio	57.8%	**65.6%**	59.8%	**61.9%**

1 The market value of assets is the fair value of the investments.

2 The actuarial value of assets is calculated by spreading any market gains or losses above or below the assumed rate of return over four years.

3 Based upon an assumed rate of return on investments of 7.25 percent and an assumed rate of 7.25 percent to discount the liabilities to be paid in the future to a value as of December 31, 2018, and December 31, 2019.

4 The data in this table is aggregated for informational purposes. The assets of each trust fund are for the sole purpose of its members and cannot be used by another fund.

5 In aggregate, the market value of the assets as of December 31, 2019, is $2,906,326 greater than the actuarial value of assets calculated by the actuaries, as they are recognizing the gains and losses in value over four years, rather than only in the year they occurred. The remaining gains and (losses) to be smoothed for 2017 are $1,138,428, for 2018 are ($2,506,076), and for 2019 are $4,273,974.

DIVISION TRUST FUNDS—PENSION

Sensitivity of Actuarial Valuation to Changes in Assumed Investment Rate of Return and Discount Rate

The most important long-term driver of a pension plan is investment income. The investment return assumption and the discount rate for liabilities should be based on an estimated long-term investment yield for the plan, considering the nature and mix of current and expected plan investments and the basis used to determine the actuarial value of assets.

To understand the importance of the investment rate of return assumption, which is used to discount the actuarial liabilities of PERA, a one percent fluctuation in the assumed investment rate of return and discount rate would change the funded ratio, UAAL, and ADC (for contributions for the fiscal year ended December 31, 2021) as shown on the tables below:

INVESTMENT RETURN ASSUMPTION (DISCOUNT RATE) EQUAL TO 6.25 PERCENT

(Dollars in Thousands)

	Actuarial Value of Assets			Market Value of Assets
Trust Fund	Funded Ratio	UAAL	ADC	UAAL
State Division	52.4%	$13,559,474	26.80%	$12,661,681
School Division	53.7%	21,905,974	27.14%	20,381,498
Local Government Division	72.4%	1,635,176	17.51%	1,377,542
Judicial Division	67.2%	167,266	21.22%	147,229
DPS Division	71.7%	1,346,887	14.31%	1,140,502
All Division Trust Funds[1]		**$38,614,777**		**$35,708,452**

[1] The data in this table is aggregated for informational purposes. The assets of each trust fund are for the sole purpose of its members and cannot be used by another fund.

CURRENT INVESTMENT RETURN ASSUMPTION (DISCOUNT RATE) EQUAL TO 7.25 PERCENT

(Dollars in Thousands)

	Actuarial Value of Assets			Market Value of Assets
Trust Fund	Funded Ratio	UAAL	ADC	UAAL
State Division	**58.0%**	**$10,795,598**	**21.05%**	**$9,897,805**
School Division	**59.9%**	**17,013,047**	**20.61%**	**15,488,571**
Local Government Division	**80.7%**	**1,028,108**	**10.84%**	**770,473**
Judicial Division	**74.0%**	**119,967**	**14.13%**	**99,930**
DPS Division	**80.0%**	**853,121**	**8.22%**	**646,736**
All Division Trust Funds[1]		**$29,809,841**		**$26,903,515**

[1] The data in this table is aggregated for informational purposes. The assets of each trust fund are for the sole purpose of its members and cannot be used by another fund.

INVESTMENT RETURN ASSUMPTION (DISCOUNT RATE) EQUAL TO 8.25 PERCENT

(Dollars in Thousands)

	Actuarial Value of Assets			Market Value of Assets
Trust Fund	Funded Ratio	UAAL	ADC	UAAL
State Division	63.8%	$8,452,145	15.95%	$7,554,352
School Division	66.3%	12,896,520	14.88%	11,372,043
Local Government Division	89.3%	516,513	4.77%	258,879
Judicial Division	81.2%	79,265	7.62%	59,227
DPS Division	88.6%	440,645	2.89%	234,260
All Division Trust Funds[1]		**$22,385,088**		**$19,478,761**

[1] The data in this table is aggregated for informational purposes. The assets of each trust fund are for the sole purpose of its members and cannot be used by another fund.

Note: The time-weighted, net-of-fees annualized rate of return for the pooled investment assets was 8.4 percent for the past five years and 9.1 percent for the past 10 years. The 30-year annualized gross-of-fees rate of return for the pooled investment assets was 8.6 percent.

DIVISION TRUST FUNDS—PENSION

Plan Data

SCHEDULE OF RETIREES, BENEFICIARIES, AND SURVIVORS ADDED TO AND REMOVED FROM THE BENEFIT PAYROLL

(In Actual Dollars)

	Added to Payroll		Removed from Payroll		Payroll—End of Year			
Valuation Date	No.[1]	Annual Benefits	No.[1]	Annual Benefits	No.[1]	Annual Benefits	Average Annual Benefits	Increase (Decrease) in Average Benefits
State Division[2]								
12/31/2010					32,367	$1,142,735,232	$35,306	—
12/31/2011	1,477	$52,575,840	767	$18,206,208	33,077	1,198,047,252	36,220	2.6%
12/31/2012	1,753	60,313,800	835	17,053,956	33,995	1,259,715,132	37,056	2.3%
12/31/2013	1,472	49,314,648	621	15,343,872	34,846	1,316,530,332	37,781	2.0%
12/31/2014	1,688	70,625,718	728	17,912,280	35,806	1,369,243,770	38,241	1.2%
12/31/2015	1,862	92,808,306	803	20,891,508	36,865	1,441,160,568	39,093	2.2%
12/31/2016	1,953	90,963,480	805	22,828,296	38,013	1,509,295,752	39,705	1.6%
12/31/2017	2,029	96,524,376	810	23,794,584	39,232	1,582,025,544	40,325	1.6%
12/31/2018	1,948	64,439,160	865	29,030,196	40,315	1,617,434,508	40,120	(0.5%)
12/31/2019	**1,805**	**60,004,122**	**939**	**33,418,682**	**41,181**	**1,644,019,948**	**39,922**	**(0.5%)**
School Division[2]								
12/31/2010					49,744	$1,677,950,928	$33,732	—
12/31/2011	2,783	$83,582,412	809	$17,059,212	51,718	1,776,539,052	34,350	1.8%
12/31/2012	3,044	87,700,656	985	18,719,640	53,777	1,876,340,508	34,891	1.6%
12/31/2013	2,744	79,704,816	713	17,081,472	55,808	1,974,615,348	35,382	1.4%
12/31/2014	3,016	111,392,724	843	19,419,540	57,981	2,066,588,532	35,643	0.7%
12/31/2015	2,990	130,162,524	1,027	23,409,984	59,944	2,173,341,072	36,256	1.7%
12/31/2016	3,023	123,292,224	1,027	25,461,636	61,940	2,271,171,660	36,667	1.1%
12/31/2017	3,249	130,564,260	1,026	26,635,332	64,163	2,375,100,588	37,017	1.0%
12/31/2018	3,319	90,191,556	1,106	32,160,792	66,376	2,433,131,352	36,657	(1.0%)
12/31/2019	**3,149**	**84,865,404**	**1,163**	**39,402,271**	**68,362**	**2,478,594,485**	**36,257**	**(1.1%)**
Local Government Division[2]								
12/31/2010					5,052	$171,596,184	$33,966	—
12/31/2011	332	$11,254,980	88	$1,645,992	5,296	184,500,768	34,838	2.6%
12/31/2012	687	23,576,376	105	1,892,688	5,878	209,260,764	35,601	2.2%
12/31/2013	345	10,330,380	76	1,456,248	6,147	221,838,300	36,089	1.4%
12/31/2014	392	13,412,585	93	2,018,928	6,446	233,231,957	36,182	0.3%
12/31/2015	408	18,760,927	97	2,215,488	6,757	249,777,396	36,966	2.2%
12/31/2016	388	15,843,636	100	2,491,764	7,045	263,129,268	37,350	1.0%
12/31/2017	420	18,329,400	114	2,916,156	7,351	278,542,512	37,892	1.5%
12/31/2018	421	14,336,628	128	3,227,280	7,644	289,651,860	37,893	0.0%
12/31/2019	**426**	**13,283,210**	**137**	**4,898,210**	**7,933**	**298,036,860**	**37,569**	**(0.9%)**

Please see page 177 for footnote references.

DIVISION TRUST FUNDS—PENSION

SCHEDULE OF RETIREES, BENEFICIARIES, AND SURVIVORS ADDED TO AND REMOVED FROM THE BENEFIT PAYROLL (CONTINUED)

(In Actual Dollars)

	Added to Payroll		Removed from Payroll		Payroll—End of Year			
Valuation Date	No.[1]	Annual Benefits	No.[1]	Annual Benefits	No.[1]	Annual Benefits	Average Annual Benefits	Increase (Decrease) in Average Benefits
Judicial Division[2]								
12/31/2010					293	$15,935,640	$54,388	—
12/31/2011	21	$1,224,480	3	$103,752	311	17,320,980	55,694	2.4%
12/31/2012	19	1,089,288	11	337,308	319	18,331,992	57,467	3.2%
12/31/2013	9	740,508	6	156,468	322	19,219,128	59,687	3.9%
12/31/2014	16	1,068,823	8	368,520	330	19,919,431	60,362	1.1%
12/31/2015	20	2,111,405	6	323,940	344	21,706,896	63,101	4.5%
12/31/2016	28	2,406,072	12	287,580	360	23,825,388	66,182	4.9%
12/31/2017	24	2,554,728	9	398,184	375	25,981,932	69,285	4.7%
12/31/2018	8	696,864	3	129,084	380	26,549,712	69,868	0.8%
12/31/2019	**27**	**2,115,235**	**8**	**400,305**	**399**	**28,264,642**	**70,839**	**1.4%**
DPS Division[2]								
12/31/2010					6,199	$216,886,500	$34,987	—
12/31/2011	252	$7,977,360	155	$4,143,396	6,296	224,954,832	35,730	2.1%
12/31/2012	274	8,333,292	168	3,949,860	6,402	232,858,044	36,373	1.8%
12/31/2013	284	9,255,936	135	3,704,628	6,551	242,733,072	37,053	1.9%
12/31/2014	306	12,537,532	171	5,065,860	6,686	250,204,744	37,422	1.0%
12/31/2015	295	14,799,992	178	5,884,980	6,803	259,119,756	38,089	1.8%
12/31/2016	322	14,412,348	190	5,854,992	6,935	267,677,112	38,598	1.3%
12/31/2017	283	13,847,400	181	6,388,008	7,037	275,136,504	39,099	1.3%
12/31/2018	297	9,717,816	184	6,345,060	7,150	278,509,260	38,952	(0.4%)
12/31/2019	**234**	**6,854,297**	**241**	**9,248,121**	**7,143**	**276,115,436**	**38,655**	**(0.8%)**
All Division Trust Funds[2]								
12/31/2010					93,655	$3,225,104,484	$34,436	—
12/31/2011	4,865	$156,615,072	1,822	$41,158,560	96,698	3,401,362,884	35,175	2.1%
12/31/2012	5,777	181,013,412	2,104	41,953,452	100,371	3,596,506,440	35,832	1.9%
12/31/2013	4,854	149,346,288	1,551	37,742,688	103,674	3,774,936,180	36,412	1.6%
12/31/2014	5,418	209,037,382	1,843	44,785,128	107,249	3,939,188,434	36,729	0.9%
12/31/2015	5,575	258,643,154	2,111	52,725,900	110,713	4,145,105,688	37,440	1.9%
12/31/2016	5,714	246,917,760	2,134	56,924,268	114,293	4,335,099,180	37,930	1.3%
12/31/2017	6,005	261,820,164	2,140	60,132,264	118,158	4,536,787,080	38,396	1.2%
12/31/2018	5,993	179,382,024	2,286	70,892,412	121,865	4,645,276,692	38,118	(0.7%)
12/31/2019	**5,641**	**167,122,268**	**2,488**	**87,367,589**	**125,018**	**4,725,031,371**	**37,795**	**(0.8%)**

1 The number does not include deferred survivors.

2 Amounts derived on an accrual basis.

DIVISION TRUST FUNDS—PENSION

The number of persons receiving monthly retirement benefits has grown steadily in relation to membership. As shown in the table below, this trend has substantially stabilized over the last few years as PERA has reached a mature plan status. The retirement benefit disbursements shown in the right-hand column include cost-of-living increases paid in years since 1970. Prior to 1981, figures are for years ended June 30.

MEMBER-RETIREE COMPARISON–ALL DIVISION TRUST FUNDS[1]

(In Actual Dollars)

Year	Number of Retiree Accounts on 12/31	Number of Member Accounts on 12/31[2]	Retiree Accounts as % of Members on 12/31	Total Benefits Paid–Year Ended 12/31
1940	93	3,715	2.5%	$72,588
1945	171	5,585	3.1%	137,442
1950	280	11,853	2.4%	237,866
1955	747	21,185	3.5%	745,679
1960	1,775	33,068	5.4%	2,055,139
1965	3,631	49,701	7.3%	5,486,225
1970	6,308	65,586	9.6%	13,115,234
1975	11,650	84,781	13.7%	32,820,433
1980	17,301	96,473	17.9%	71,289,456
1985	24,842	101,409	24.5%	192,456,029
1990	32,955	115,350	28.6%	350,398,094
1995	41,909	203,102	20.6%	639,501,796
2000	53,015	248,104	21.4%	1,093,779,068
2005	69,416	306,139	22.7%	1,973,240,491
2010	91,412	378,264	24.2%	3,161,773,781
2015	108,426	436,465	24.8%	4,073,789,897
2016	111,975	451,760	24.8%	4,260,156,437
2017	115,801	465,590	24.9%	4,458,990,801
2018	119,435	481,991	24.8%	4,611,125,071
2019	**122,568**	**496,725**	**24.7%**	**4,708,541,219**

[1] Amounts derived on a cash basis. Data prior to 2010 does not include the DPS Division.

[2] Includes inactive member accounts.

DIVISION TRUST FUNDS—PENSION

SCHEDULE OF MEMBERS IN ACTUARIAL VALUATION

By Attained Age and Years of Service as of December 31, 2019

(In Actual Dollars)

State Division

For State Division members (excluding State Troopers) the average age was 45.4 years, the average service was 8.7 years, and the average expected remaining service life was 9.0 years. For State Troopers the average age was 42.1 years, the average service was 12.7 years, and the average expected remaining service life was 10.8 years.

	Years of Service to Valuation Date							Total	
Attained Age	0–4	5–9	10–14	15–19	20–24	25–29	30+	No.	Annual Valuation Payroll
Up to 20	232	—	—	—	—	—	—	232	$2,271,123
20 - 24	1,879	14	—	—	—	—	—	1,893	53,843,916
25 - 29	4,319	497	9	—	—	—	—	4,825	196,347,094
30 - 34	4,133	1,788	333	6	—	—	—	6,260	301,359,834
35 - 39	3,242	1,908	1,212	286	17	—	—	6,665	359,095,263
40 - 44	2,382	1,549	1,267	942	291	10	—	6,441	377,120,951
45 - 49	3,375	1,595	1,281	1,032	902	337	22	8,544	501,959,956
50 - 54	1,776	1,223	1,104	940	887	636	168	6,734	421,656,080
55 - 59	1,483	1,009	1,140	966	758	496	303	6,155	369,950,929
60	234	156	210	183	131	80	64	1,058	61,559,077
61	234	175	208	183	106	77	68	1,051	61,864,878
62	198	168	191	163	103	80	55	958	55,921,902
63	181	168	152	123	93	64	61	842	49,194,007
64	133	123	170	139	72	72	49	758	44,430,136
65	119	133	111	103	68	41	36	611	32,889,148
66	95	93	98	83	59	33	31	492	26,759,585
67	95	66	70	56	33	23	20	363	18,030,793
68	74	46	51	49	27	21	19	287	14,721,879
69	80	45	45	37	24	19	21	271	12,383,933
70 +	251	135	131	114	66	48	67	812	34,092,337
Total	**24,515**	**10,891**	**7,783**	**5,405**	**3,637**	**2,037**	**984**	**55,252**	**$2,995,452,821**

DIVISION TRUST FUNDS—PENSION

SCHEDULE OF MEMBERS IN ACTUARIAL VALUATION

By Attained Age and Years of Service as of December 31, 2019

(In Actual Dollars)

School Division

For School Division members the average age was 44.6 years, the average service was 8.4 years, and the average expected remaining service life was 9.3 years.

	Years of Service to Valuation Date							Total	
Attained Age	0–4	5–9	10–14	15–19	20–24	25–29	30+	No.	Annual Valuation Payroll
Up to 20	1,261	—	—	—	—	—	—	1,261	$11,141,941
20 - 24	5,487	96	—	—	—	—	—	5,583	122,233,347
25 - 29	9,864	1,791	50	—	—	—	—	11,705	390,366,815
30 - 34	7,432	4,601	1,073	35	—	—	—	13,141	496,891,658
35 - 39	7,263	3,631	3,676	1,014	30	—	—	15,614	631,431,303
40 - 44	9,645	3,296	3,036	3,279	676	25	—	19,957	803,513,721
45 - 49	5,965	3,104	2,870	2,710	2,404	568	25	17,646	822,923,734
50 - 54	4,263	2,499	2,720	2,482	1,950	1,600	226	15,740	746,953,246
55 - 59	3,509	1,978	2,290	2,555	1,678	1,057	505	13,572	584,327,251
60	565	339	382	489	281	156	75	2,287	90,119,166
61	550	286	351	376	253	148	67	2,031	81,006,757
62	544	246	303	345	226	115	68	1,847	69,374,132
63	491	224	256	271	186	101	65	1,594	58,822,548
64	393	220	207	232	162	111	48	1,373	50,585,550
65	367	163	139	168	110	73	38	1,058	35,302,792
66	297	162	124	117	69	58	23	850	27,502,159
67	251	101	84	70	46	38	24	614	17,381,005
68	272	98	75	54	40	29	18	586	15,291,365
69	261	74	45	56	28	19	15	498	11,938,713
70 +	1,004	369	279	145	86	49	49	1,981	37,323,685
Total	**59,684**	**23,278**	**17,960**	**14,398**	**8,225**	**4,147**	**1,246**	**128,938**	**$5,104,430,888**

DIVISION TRUST FUNDS—PENSION

SCHEDULE OF MEMBERS IN ACTUARIAL VALUATION

By Attained Age and Years of Service as of December 31, 2019

(In Actual Dollars)

Local Government Division

For Local Government Division members the average age was 44.0 years, the average service was 7.5 years, and the average expected remaining service life was 8.3 years.

	Years of Service to Valuation Date							Total	
Attained Age	0–4	5–9	10–14	15–19	20–24	25–29	30+	No.	Annual Valuation Payroll
Up to 20	643	—	—	—	—	—	—	643	$4,046,401
20 - 24	658	12	—	—	—	—	—	670	14,392,462
25 - 29	1,025	120	8	—	—	—	—	1,153	44,793,856
30 - 34	985	307	79	10	—	—	—	1,381	69,968,088
35 - 39	740	355	193	80	12	—	—	1,380	79,378,118
40 - 44	801	330	248	172	64	3	—	1,618	93,884,391
45 - 49	544	266	249	287	139	57	8	1,550	103,784,941
50 - 54	458	254	226	240	138	87	19	1,422	93,113,640
55 - 59	412	224	235	265	158	86	69	1,449	90,708,709
60	74	49	42	40	20	18	13	256	14,471,383
61	73	28	45	33	22	21	8	230	14,635,890
62	56	31	39	39	22	7	15	209	12,810,019
63	55	38	25	25	21	16	6	186	10,463,606
64	53	20	27	32	20	11	7	170	8,726,875
65	41	17	20	23	8	9	4	122	6,466,021
66	46	23	16	11	7	1	4	108	4,125,055
67	42	20	10	12	6	3	4	97	4,199,390
68	31	13	14	5	4	5	5	77	3,490,043
69	27	10	7	7	1	1	1	54	1,740,240
70 +	198	43	33	24	6	5	2	311	5,894,392
Total	**6,962**	**2,160**	**1,516**	**1,305**	**648**	**330**	**165**	**13,086**	**$681,093,520**

DIVISION TRUST FUNDS—PENSION

SCHEDULE OF MEMBERS IN ACTUARIAL VALUATION

By Attained Age and Years of Service as of December 31, 2019

(In Actual Dollars)

Judicial Division

For Judicial Division members the average age was 55.3 years, the average service was 13.1 years, and the average expected remaining service life was 11.0 years.

	Years of Service to Valuation Date							Total	
Attained Age	0–4	5–9	10–14	15–19	20–24	25–29	30+	No.	Annual Valuation Payroll
Up to 20	—	—	—	—	—	—	—	—	$—
20 - 24	—	—	—	—	—	—	—	—	—
25 - 29	—	—	—	—	—	—	—	—	—
30 - 34	1	1	—	—	—	—	—	2	106,152
35 - 39	6	6	4	—	—	—	—	16	2,201,079
40 - 44	18	10	1	4	—	—	—	33	5,023,990
45 - 49	16	8	7	8	1	—	—	40	6,504,543
50 - 54	16	17	21	9	7	2	1	73	11,593,632
55 - 59	6	13	15	10	9	6	5	64	10,440,386
60	3	2	3	1	2	4	2	17	2,832,360
61	2	—	5	3	1	2	—	13	2,038,964
62	—	2	2	3	—	1	—	8	1,358,868
63	2	3	3	1	4	—	1	14	2,283,013
64	1	—	1	1	—	—	1	4	651,279
65	—	1	1	2	2	2	1	9	1,439,437
66	—	2	1	2	1	2	—	8	1,262,749
67	—	—	3	1	2	3	1	10	1,525,931
68	—	—	1	2	1	—	—	4	665,321
69	1	2	2	1	—	—	1	7	1,017,827
70 +	—	2	2	3	4	4	2	17	2,481,820
Total	**72**	**69**	**72**	**51**	**34**	**26**	**15**	**339**	**$53,427,351**

DIVISION TRUST FUNDS—PENSION

SCHEDULE OF MEMBERS IN ACTUARIAL VALUATION

By Attained Age and Years of Service as of December 31, 2019

(In Actual Dollars)

DPS Division

For DPS Division members the average age was 40.8 years, the average service was 6.6 years, and the average expected remaining service life was 10.3 years.

	Years of Service to Valuation Date							Total	
Attained Age	0–4	5–9	10–14	15–19	20–24	25–29	30+	No.	Annual Valuation Payroll
Up to 20	109	—	—	—	—	—	—	109	$1,420,419
20 - 24	795	8	—	—	—	—	—	803	20,889,814
25 - 29	1,903	307	6	—	—	—	—	2,216	89,555,017
30 - 34	1,493	972	163	3	—	—	—	2,631	126,807,321
35 - 39	950	766	435	42	1	—	—	2,194	115,291,527
40 - 44	1,429	529	380	182	41	1	—	2,562	120,803,425
45 - 49	506	397	281	239	115	21	3	1,562	84,979,309
50 - 54	348	303	225	173	139	74	9	1,271	69,529,220
55 - 59	263	262	208	128	103	63	26	1,053	54,042,367
60	49	38	28	23	16	4	4	162	7,715,285
61	48	53	30	19	18	6	4	178	7,935,541
62	26	55	27	13	13	7	6	147	6,589,573
63	37	38	29	17	11	6	5	143	6,358,028
64	27	36	16	23	11	4	4	121	5,618,949
65	26	32	22	18	6	2	2	108	4,883,558
66	25	17	7	9	8	6	4	76	3,182,052
67	28	15	8	3	5	1	2	62	2,263,963
68	20	14	8	5	5	—	1	53	1,895,362
69	19	12	4	3	2	1	—	41	1,258,422
70 +	70	66	26	7	7	7	4	187	5,244,646
Total	**8,171**	**3,920**	**1,903**	**907**	**501**	**203**	**74**	**15,679**	**$736,263,798**

DIVISION TRUST FUNDS—PENSION

SCHEDULE OF ACTIVE MEMBER ACTUARIAL VALUATION DATA

As of December 31

(In Actual Dollars)

Year	Number of Participating Employers[1]	Number of Active Members	Annual Payroll for Active Members	Average Annual Pay for Active Members	% Increase (Decrease) in Average Annual Pay
State Division					
2010	70	54,977	$2,392,080,128	$43,511	—
2011	70	54,956	2,393,791,402	43,558	0.11%
2012	70	54,804	2,384,933,961	43,518	(0.09%)
2013	70	55,354	2,474,965,482	44,712	2.74%
2014	32	55,300	2,564,669,718	46,377	3.72%
2015	32	55,291	2,641,866,650	47,781	3.03%
2016	32	55,725	2,710,650,565	48,643	1.80%
2017	32	55,686	2,774,207,203	49,819	2.42%
2018	32	55,511	2,898,827,271	52,221	4.82%
2019	**32**	**55,252**	**2,995,452,821**	**54,214**	**3.82%**
School Division					
2010	271[2]	116,486	$3,900,661,576	$33,486	—
2011	275[2]	114,820	3,821,603,410	33,283	(0.61%)
2012	281[2]	115,294	3,819,065,598	33,125	(0.47%)
2013	294[2]	117,727	3,938,649,818	33,456	1.00%
2014	224	119,618	4,063,235,757	33,968	1.53%
2015	227	120,239	4,235,290,282	35,224	3.70%
2016	229	121,945	4,349,319,783	35,666	1.25%
2017	234	122,990	4,471,356,847	36,355	1.93%
2018	234	126,333	4,789,503,451	37,912	4.28%
2019	**235**	**128,938**	**5,104,430,888**	**39,588**	**4.42%**
Local Government Division					
2010	142	16,144	$705,265,331	$43,686	—
2011	145	16,065	718,169,015	44,704	2.33%
2012	143	12,097	523,668,446	43,289	(3.17%)
2013	146	11,954	529,003,436	44,253	2.23%
2014	141	12,084	540,468,037	44,726	1.07%
2015	140	12,176	561,518,205	46,117	3.11%
2016	141	12,736	608,222,609	47,756	3.55%
2017	140	12,770	632,768,337	49,551	3.76%
2018	141	13,260	660,998,127	49,849	0.60%
2019	**141**	**13,086**	**681,093,520**	**52,047**	**4.41%**
Judicial Division					
2010	6	317	$37,412,139	$118,019	—
2011	6	329	39,033,369	118,642	0.53%
2012	6	329	39,045,008	118,678	0.03%
2013	6	332	39,941,730	120,306	1.37%
2014	2	334	42,976,979	128,674	6.96%
2015	2	334	46,869,730	140,329	9.06%
2016	2	335	48,699,531	145,372	3.59%
2017	2	332	48,947,607	147,433	1.42%
2018	2	332	50,505,856	152,126	3.18%
2019	**2**	**339**	**53,427,351**	**157,603**	**3.60%**

Please see page 185 for footnote references.

DIVISION TRUST FUNDS—PENSION

SCHEDULE OF ACTIVE MEMBER ACTUARIAL VALUATION DATA (CONTINUED)

As of December 31

(In Actual Dollars)

Year	Number of Participating Employers[1]	Number of Active Members	Annual Payroll for Active Members	Average Annual Pay for Active Members	% Increase (Decrease) in Average Annual Pay
DPS Division					
2010	28[2]	13,171	$470,773,746	$35,743	—
2011	27[2]	13,571	491,646,251	36,228	1.36%
2012	29[2]	13,911	510,872,366	36,724	1.37%
2013	31[2]	14,816	547,659,912	36,964	0.65%
2014	1	15,414	584,319,269	37,908	2.55%
2015	1	15,929	621,114,573	38,993	2.86%
2016	1	15,950	642,177,158	40,262	3.25%
2017	1	15,991	658,198,306	41,161	2.23%
2018	1	16,148	722,040,073	44,714	8.63%
2019	**1**	**15,679**	**736,263,798**	**46,959**	**5.02%**
All Division Trust Funds					
2010	517[2]	201,095	$7,506,192,920	$37,327	—
2011	523[2]	199,741	7,464,243,447	37,370	0.12%
2012	529[2]	196,435	7,277,585,379	37,048	(0.86%)
2013	547[2]	200,183	7,530,220,378	37,617	1.54%
2014	400	202,750	7,795,669,760	38,450	2.21%
2015	402	203,969	8,106,659,440	39,745	3.37%
2016	405	206,691	8,359,069,646	40,442	1.75%
2017	409	207,769	8,585,478,300	41,322	2.18%
2018	410	211,584	9,121,874,778	43,112	4.33%
2019	**411**	**213,294**	**9,570,668,378**	**44,871**	**4.08%**

1 Prior to 2014, employer counts were based on separate units of government. Effective in 2014, GASB 67 classifies a primary government and its component units as one employer. Employer counts for the years 2014 and beyond are presented for purposes of complying with GASB 67 only. For all other purposes, the definition of an employer is governed by Title 24, Article 51 of the C.R.S., PERA's Rules, 8 CCR 1502-1, and, if applicable, the employer's affiliation agreement with PERA.

2 Includes charter schools operating within the School and DPS Divisions.

HEALTH CARE TRUST FUNDS—OPEB

Actuarial Topics

The standard promulgated by the GASB Statement No. 74 results in the preparation of two actuarial valuations—one for funding purposes and one for accounting and financial reporting purposes. Unless otherwise noted, this Health Care Trust Funds subsection reports on the actuarial valuation performed for funding purposes, but also includes information on specific differences between the two actuarial valuations.

The Other Postemployment Benefit (OPEB) plan provisions in effect on December 31, 2019, are summarized in Note 9 of the Notes to the Financial Statements in the Financial Section.

PERA BOARD GOVERNANCE - TWO DEFINED BENEFIT OPEB PLANS	
PERA Defined Benefit OPEB Plans	PERA's two defined benefit OPEB plans include the Health Care Trust Fund (HCTF), a cost-sharing multiple-employer plan, and the Denver Public Schools Health Care Trust Fund (DPS HCTF), a single-employer plan. The HCTF and the DPS HCTF provide a subsidy for PERACare, PERA's health benefits program. Participation in the HCTF and the DPS HCTF is voluntary pursuant to C.R.S. § 24-51-1201. Employer contributions and investment earnings on the assets of the plans pay for the costs. The HCTF was established as of July 1, 1985, and the DPS HCTF was established January 1, 2010, with the asset transfer from the Denver Public Schools Retiree Health Benefit Trust held by the DPS Board of Education. The HCTF and the DPS HCTF provide a health care premium subsidy based upon the benefit structure under which a member retires and the member's years of service credit. There is an allocation of the premium subsidy between the trust funds for members who retire with service credit in the DPS Division and one or more of the other divisions, as set forth in C.R.S. § 24-51-1206.5. The basis for the allocation of the premium subsidy is the percentage of the member contribution balance from each division as it relates to the total member contribution account balance.
PERA Board OPEB Funding Policy	The PERA Board is responsible for maintaining an OPEB funding policy applicable to these plans. The current OPEB funding policy initially was adopted by the Board on January 19, 2018, effective for the December 31, 2017, funding actuarial valuation. The OPEB funding policy requires the calculation of an ADC for each of the two Health Care Trust Funds for the purpose of assessing the adequacy of the statutory contribution rate of each fund. The ADC is determined in accordance with the OPEB plan provisions in effect as of the date of the actuary's Letter of Certification and is expressed as a level percentage of assumed future covered payroll.
Actuarial Service Provider & Other Responsibilities	The Board retains an external actuary, and effective November 1, 2018, Segal was retained to perform annual actuarial valuations and sustainability projections as well as periodic experience studies to review the actuarial assumptions versus actual plan experience. In addition, the Board has the authority to contract, self-insure, and authorize disbursements necessary in order to carry out the purposes of the PERACare program including the administration of the health care subsidies.
Actuarial Service Provider Funding Method Statement	Per their actuarial valuation report, "Segal strongly recommends an actuarial funding method that targets 100% funding of the actuarial accrued liability. Generally, this implies payments that are ultimately at least enough to cover normal cost, interest on the unfunded actuarial accrued liability and a portion of the principal balance. The OPEB funding policy adopted by PERA meets this standard."

ACTUARIAL METHODS	
Actuarial Methods	The Board is responsible for the actuarial methods and assumptions used in the actuarial valuations in accordance with C.R.S. § 24-51-204(5). Through formal action, the Board updates, replaces, or adopts new actuarial methods and assumptions as deemed necessary. Initial valuations were performed on an "open group" basis approximately once every two years. Annual valuations commenced with the December 31, 1998, actuarial valuation.

HEALTH CARE TRUST FUNDS—OPEB

Actuarial Methods	Type	Description/Source/Basis	Adoption / Effective Date
Asset Valuation Method	Smoothed Actuarial Value of Assets	In 1992, the Board adopted a method for valuing assets that determines a smoothed market value (or "fair value," as used in other sections of this *CAFR*) of assets to help mitigate volatile investment market experience. The smoothed market value of assets recognizes the differences between actual and expected investment experience for each year in equal amounts over a four-year period.	Initially Adopted: 1992; Effective: Jan 1, 1993; Reinitialized to Market Value as of: Dec 31, 2004; Effective: Dec 31, 2005
Actuarial Cost Method	Entry Age Actuarial Cost Method (EA)	The EA funding or cost method is designed to keep annual costs level as a percent of covered payroll and for this reason, was selected by the Board to be used in the actuarial valuations. The method to determine normal cost, original based on credited service, is determined based on compensation as of the December 31, 2016, actuarial valuation. The effect of differences between the actuarial assumptions and the actual experience of the plan is determined within each annual actuarial valuation. These differences produce actuarial gains or losses that result in an adjustment of the UAAL.	EA Effective: Jan 1, 1991; Normal Cost basis changed from service to compensation - Effective: Dec 31, 2016
Amortization Method	Defined, Closed and Layered Periods	The ADC is determined by adding the normal cost and the cost to amortize, over defined, closed periods, any existing UAAL or new UAAL, including the impact of any experience actuarial gains and losses, actuarial assumption changes, and changes in plan provisions. Each amortized item is tracked over the closed period defined for that category. The 30-year period used to amortize the legacy UAAL was initialized as of December 31, 2017. All gains, losses, and changes in actuarial methods and assumptions on and after January 1, 2018, are recognized each year and amortized separately over closed 30-year periods. The impact of any changes in plan provisions will be recognized over a closed period relating to the demographics of the group affected and/or the duration of the enhancement provided, not to exceed 25 years. If any future actuarial valuation indicates a division has a negative UAAL, the ADC shall be set equal to the normal cost until such time as the funded ratio equals or exceeds 120 percent. At that time, the ADC shall be equal to the normal cost less an amount equal to 15 year amortization of the portion of the negative UAAL above the 120 percent funded ratio.	Initially Adopted: Jan 19, 2018; Effective: Dec 31, 2017

HEALTH CARE TRUST FUNDS—OPEB

ACTUARIAL ASSUMPTIONS

Actuarial Assumptions[1]	Unless otherwise noted, it can be assumed that the economic and demographic actuarial assumptions applied to the actuarial valuation for funding purposes also were applied to the actuarial valuation for accounting and financial reporting purposes. All actuarial methods and assumptions necessary to assess OPEB liabilities, in addition to those already provided on previous pages, are described below. The actuary followed ASOP No. 6, *Measuring Retiree Group Benefit Obligations*, for purposes of recommending appropriate OPEB-specific assumptions.	
	Basis of Actuarial Assumptions Used	Unless otherwise noted, the basis of all selected economic and non-economic actuarial assumptions resulted from the 2016 Experience Analysis and/or discussions that took place during the October 28, 2016, Assumptions Workshop. It also should be noted that as a result of the 2019 Asset Liability Study, concluded at the November 15, 2019, Board meeting, the Board reaffirmed the 7.25 percent assumed long-term rate of investment return effective as of January 1, 2020.

[1] See Exhibits J through N for detailed assumption information.

Economic Assumptions	Value(s) / Type	Description/Source/Basis	Adoption / Effective Date
Initial Per Capita Health Care Costs - PERA Benefit Structure	Exhibit J	Exhibit J contains the assumptions used in determining the additional liability for PERACare enrollees under the PERA benefit structure who are age 65 or older and who are not eligible for premium-free Medicare Part A. Shown are the monthly costs/premiums assumed for 2020, which are subject to the morbidity rates and health care cost trend rates. Basis: Reviewed and updated annually	Updated Effective: Dec 31, 2019
Age-Related Morbidity Rates - PERA Benefit Structure	Exhibit J	See above	Initially Effective: Dec 31, 2015; Last Updated Effective: Dec 31, 2018
Health Care Cost Trend Rates - PERA Benefit Structure	Exhibit J	See above	Updated Effective: Dec 31, 2019
Additional Premium Subsidy Assumptions - DPS Benefit Structure	Exhibit K	Dollar subsidy amounts used in determining the additional liability for PERACare enrollees under the DPS benefit structure who are age 65 or older and who are not eligible for premium-free Medicare Part A. Basis: Additional subsidy for DPS Benefit Structure in effect as of January 1, 2010	Subsidy amounts in effect as of Merger of the DPS Retirement System into PERA, Effective: Jan 1, 2010

HEALTH CARE TRUST FUNDS—OPEB

Non-Economic Assumptions	Value(s) / Type	Description/Source/Basis	Adoption / Effective Date
Health Care Participation Rate Assumptions	Exhibit L	Current PERACare participants are assumed to maintain their current health care benefit elections in perpetuity. For active members retiring directly from covered employment, Exhibit L provides the assumed participation rates. The participation of current PERACare enrollees and members retiring directly from active service is adjusted to reflect the increasing rate of participation with age, as described in Exhibit L.	Updated and Effective: Dec 31, 2016; reviewed and updated annually, as necessary
Survivors of Retirees Choosing Joint & Survivor Payment Options	70%	Survivors of retirees under the PERA benefit structure electing health care coverage are eligible to receive the subsidy. To anticipate future liabilities driven by these survivors, it is assumed that 70 percent of the current members assumed to elect PERACare coverage will choose a joint and survivor optional payment and thus, their survivors will qualify for the subsidy.	Last Confirmed Effective: Dec 31, 2016
Age Differences	Male Retiree: Three Years Older; Female Retiree: One Year Older	The assumed average number of years a covered male spouse is older than a covered female spouse is three years for a male retiree and one year for a female retiree. These assumptions initially were determined from actual census data and were revised from the previous non-gender specific assumptions used in prior actuarial valuations.	Last Revised: Nov 18, 2016; Effective: Dec 31, 2016
Health Care Participation Election Assumption for Inactive Members	Inactive Members: 25%	The current assumption for eligible inactive members is that 25 percent are assumed to elect health care coverage upon commencement of their monthly benefit.	Last Revised: Sept 2009; Effective: Dec 31, 2009
Health Care Participation Spousal Election Assumption for Inactive Members and Future Retirees	Spouses: 20% (DPS Division, 15%)	The assumed percentage of eligible inactive members and future retirees electing coverage for their spouses is 20 percent for all divisions except the DPS Division, which is 15 percent.	Last Revised: Nov 18, 2016; Effective: Dec 31, 2016
Commencement Age Assumed for Inactive Members	Ranging From Age 50 to 65	For eligible inactive members, an average age at which health benefits are to begin must be assumed. Here, the assumed age of initial benefit receipt is determined using the same approach used for terminating active members who are assumed to leave their contributions in the plan in order to be eligible for a pension benefit at their retirement date. This assumption varies from age 50 to age 65 depending on benefit structure and years of service.	Effective: Dec 31, 2015
Medicare Health Care Plan Election Rate Assumptions	Exhibit M	Exhibit M shows the assumed plan elections for current and future Medicare-eligible retirees who are not eligible for premium-free Medicare Part A.	Effective: Dec 31, 2015; Last Revised: Dec 31, 2018; Reviewed and updated annually, as necessary
Percent Qualifying for "No Part A" Subsidy Assumptions	Exhibit N	For those current PERACare enrollees who are age 65 and older, the premium-free Medicare Part A eligibility status is provided by PERA and is assumed to be maintained in perpetuity. For current PERACare enrollees not yet age 65, estimated to have been hired prior to April 1, 1986, and not assumed eligible for premium-free Medicare Part A coverage through their spouse, and for those active employees hired prior to April 1, 1986, Exhibit N lists the percentage, by estimated age at hire, of PERACare enrollees assumed to not qualify for premium-free Medicare Part A benefits, thus qualifying for the applicable "No Part A" subsidy. The percentage of disability retirees enrolled in PERACare assumed to qualify for the "No Part A" subsidy is 10 percent. Regarding spousal coverage, of the PERACare enrollees assumed to receive the "No Part A" subsidy from the PERA benefit structure, 10 percent are assumed to cover a spouse.	Effective: Dec 31, 2015; Last Revised: Dec 31, 2016; Reviewed and updated annually, as necessary

HEALTH CARE TRUST FUNDS—OPEB

Non-Economic Assumptions	Value(s) / Type	Description/Source/Basis	Adoption / Effective Date
Mortality	Exhibits A, B, C, D, E, and Exhibit I	The revised pre- and post-retirement and disability retirement mortality assumptions described in the Division Trust Funds subsection of this Actuarial Section appropriately reflect PERA's recent and anticipated plan experience and are used to estimate the value of expected future subsidy payments. Exhibits A, B, C, D, and E in the Division Trust Funds subsection of this Actuarial Section, list the healthy pre-retirement mortality rates at sample ages and Exhibit I lists the healthy post-retirement mortality rates and values at sample ages.	Effective: Dec 31, 2016
AI Rate	N/A	As the service-based premium subsidy does not increase over time, there is no need for an assumption regarding increasing benefit amounts. Basis: N/A	N/A

ACTUARIAL STUDIES

Governance Studies	All actuarial studies described in the Division Trust Funds subsection of this Actuarial Section titled, Actuarial Studies, incorporated a review and analysis of actuarial methods and assumptions pertaining to the HCTF and the DPS HCTF.

CHANGES SINCE LAST ACTUARIAL VALUATION

Changes in Actuarial Methods	There are no changes in actuarial methods incorporated in the December 31, 2019, actuarial valuation, since the last actuarial valuation as of December 31, 2018.
Changes in Actuarial Assumptions	Listed below are the actuarial assumption changes, specific to the HCTF and the DPS HCTF, incorporated into the December 31, 2019, actuarial valuation, since the last actuarial valuation as of December 31, 2018: • Initial per capita health care costs for those PERACare enrollees under the PERA benefit structure who are expected to attain age 65 and older ages and are not eligible for premium-free Medicare Part A benefits have been updated to reflect the change in costs for the 2020 plan year. • The health care cost trend rates for Medicare Part A premiums have been revised to reflect the current expectation of future increases in rates of inflation applicable to Medicare Part A premiums.
Changes in Plan Provisions	There are no changes in OPEB plan provisions incorporated in the December 31, 2019, actuarial valuation, since the last actuarial valuation as of December 31, 2018.

SIGNIFICANT EVENTS

There were no significant events during 2019.

DIFFERENCES IN ACTUARIAL VALUATION METHODS AND ASSUMPTIONS

- The actuarial valuation for funding purposes was performed as of December 31, 2019. The actuarial valuation for accounting and financial reporting purposes was performed as of December 31, 2018, and the total OPEB liability was rolled forward to the measurement date as of December 31, 2019.
- Census data used for the actuarial valuation for funding purposes reflects membership data as of December 31, 2019, and the census data used for the actuarial valuation for accounting and financial reporting purposes reflects membership data as of December 31, 2018. Therefore, all summaries and schedules, regarding actuarial valuation results for funding purposes, shown in the Actuarial Section, reflect census data as of December 31, 2019.
- The actuarial valuation for funding purposes applies an asset valuation method that recognizes a four-year smoothed market value of assets for purposes of determining the UAAL. The actuarial valuation for accounting and financial reporting purposes applies the fair value of assets to determine the net OPEB liability.
- The actuarial valuation for funding purposes reflects updated initial per capita health care costs and health care trend rates to 2020. The actuarial valuation for accounting and financial reporting purposes reflects updated initial per capita health care costs and health care trend rates to 2019 and updated the morbidity assumptions.

HEALTH CARE TRUST FUNDS—OPEB

Actuarial Assumptions: Exhibits J–N

The following exhibits (Exhibits J through N) show the actuarial assumptions employed to determine the actuarial valuation results. The basic economic and demographic actuarial assumptions as detailed in Exhibits A through I, in the Division Trust Funds subsection of the Actuarial Section, also were applied, as applicable, for purposes of determining OPEB liabilities.

Exhibit J: Initial Health Care Costs, Age-Related Morbidity, and Trend Rate Assumptions—PERA Benefit Structure

INITIAL HEALTH CARE COSTS

(In Actual Dollars)

	Initial Costs for 2020 Members Without Medicare Part A		
Plan	Monthly Cost	Monthly Premium	Monthly Cost Adjusted to Age 65
Medicare Advantage/Self-Insured Prescription	$588	$227	$550
Kaiser Permanente Medicare Advantage HMO	621	232	586
	2020 Medicare Part A Premium — $458		

AGE-RELATED MORBIDITY ASSUMPTIONS

Participant Age	Annual Increase (Male)	Annual Increase (Female)
65-69	3.0%	1.5%
70	2.9%	1.6%
71	1.6%	1.4%
72	1.4%	1.5%
73	1.5%	1.6%
74	1.5%	1.5%
75	1.5%	1.4%
76-77	1.5%	1.5%
78	1.5%	1.6%
79	1.5%	1.5%
80	1.4%	1.5%
81+	0.0%	0.0%

HEALTH CARE COST TREND RATE ASSUMPTIONS[1]

Year	PERACare Medicare Plans	Medicare Part A Premiums
2020	8.10%	3.50%
2021	6.40%	3.75%
2022	6.00%	3.75%
2023	5.70%	3.75%
2024	5.50%	4.00%
2025	5.30%	4.00%
2026	5.10%	4.00%
2027	4.90%	4.25%
2028	4.70%	4.25%
2029+	4.50%	4.50%

[1] Applies only to PERACare enrollees who are age 65 or older and who are not eligible for premium-free Medicare Part A.

HEALTH CARE TRUST FUNDS—OPEB

Exhibit K: Additional Premium Subsidy Assumptions—DPS Benefit Structure[1]

Years of Service	Monthly Subsidy for Members Without Medicare Part A	Years of Service	Monthly Subsidy for Members Without Medicare Part A
20+	$115.00	10	$57.50
19	109.25	9	51.75
18	103.50	8	46.00
17	97.75	7	40.25
16	92.00	6	34.50
15	86.25	5	28.75
14	80.50	4	23.00
13	74.75	3	17.25
12	69.00	2	11.50
11	63.25	1	5.75

1 Health care assumptions for future PERACare enrollees who are age 65 or older and who are assumed to not be eligible for premium-free Medicare Part A.

Exhibit L: Health Care Participation Rate Assumptions

	Percent Electing Health Care Coverage			Percent Electing Health Care Coverage	
Attained Age(s)	Other Divisions	DPS Division	Attained Age(s)	Other Divisions	DPS Division
15 – 48	20%	20%	61	50%	60%
49	25%	25%	62	55%	60%
50	25%	25%	63	55%	60%
51	35%	35%	64	55%	60%
52	35%	35%	65	55%	60%
53	40%	40%	66	55%	60%
54	40%	50%	67	55%	60%
55	40%	50%	68	55%	60%
56	45%	50%	69	55%	60%
57	45%	50%	70	55%	60%
58	50%	55%	71	55%	60%
59	50%	55%	72+	60%	65%
60	50%	55%			

HEALTH CARE TRUST FUNDS—OPEB

Exhibit M: Medicare Health Care Plan Election Rate Assumptions

	Percent Electing Medicare Plan	
Medicare Plan	Other Divisions	DPS Division
Medicare Advantage/Self-Insured Prescription[1]	60%	40%
Kaiser Permanente Medicare Advantage HMO	40%	60%

[1] Eighty (80) percent of those PERACare enrollees participating in the self-insured plans are assumed to elect MS #1, 17 percent MS #2, and 3 percent MS #3.

	Percent Electing Medicare Plan	
Medicare Plan	Pre-Medicare Anthem Plans	Pre-Medicare Kaiser Plans
Medicare Advantage/Self-Insured Prescription[1]	88%	2%
Kaiser Permanente Medicare Advantage HMO	12%	98%

[1] Eighty (80) percent of those PERACare enrollees participating in the self-insured plans are assumed to elect MS #1, 17 percent MS #2, and 3 percent MS #3.

Exhibit N: Percent Qualifying for “No Part A” Subsidy Assumptions

	Percent Qualifying for “No Part A” Subsidy	
Hire Age	HCTF[1,2]	DPS HCTF[2]
15 – 24	17%	17%
25 – 29	11%	11%
30+	4%	4%

[1] Ten (10) percent of the PERACare enrollees assumed to qualify for the “No Part A” subsidy from the PERA benefit structure are assumed to cover a spouse.

[2] Ten (10) percent of the PERACare enrollees receiving health care benefits as a result of disability retirement are assumed to qualify for the “No Part A” subsidy. One-hundred (100) percent of eligible inactive (or deferred vested) members enrolled in PERACare are assumed to obtain the 40 or more quarters of Medicare-covered employment required for premium-free Medicare Part A coverage as a result of their subsequent employment.

HEALTH CARE TRUST FUNDS—OPEB

Summary of Funding Progress

The PERA funding objective is to pay long-term benefit promises through contributions that remain approximately level from year to year as a percent of covered payroll earned by PERA members. The following schedules presented in this section provide an overview of funding progress:

- The solvency test shows the degree to which existing liabilities are funded, including prior history.
- A schedule of funding progress shows the UAAL as a percentage of annual covered payroll, including prior history.
- A schedule detailing actuarial gains and losses, by source, for the current year.
- The scheduled contribution requirements based on the December 31, 2019, actuarial valuation for the period ending December 31, 2021.

Solvency Test

The solvency test compares the plan's actuarial value of assets with: (A) member contributions (with interest) on deposit, (B) the liabilities for future benefits to persons who have retired, died or become disabled, and to those who have terminated service with the right to a future benefit, and (C) the liabilities for service already rendered by active members. Since the HCTF and the DPS HCTF are funded only through employer contributions, there are no member contribution accounts (liability A). Each table below and on the next page shows the funded level of the liabilities for future benefits to current retirees (liability B) and the unfunded liabilities associated with service already rendered by active members (liability C).

SOLVENCY TEST

(Dollars in Thousands)

	Aggregate Accrued Liabilities				Portion of Actuarial Accrued Liabilities Covered by Valuation Assets		
Valuation Date	Active Member Contributions (A)	Retirees, Beneficiaries, and Inactive Members (B)	Employer-Financed Portion of Active Members (C)	Actuarial Value of Plan Assets	Liability (A)	Liability (B)	Liability (C)
HCTF							
12/31/2010	N/A	$1,179,809	$463,184	$288,193	N/A	24.4%	0.0%
12/31/2011	N/A	1,251,579	459,211	282,228	N/A	22.5%	0.0%
12/31/2012	N/A	1,259,557	463,938	285,097	N/A	22.6%	0.0%
12/31/2013	N/A	1,092,438	464,968	293,556	N/A	26.9%	0.0%
12/31/2014	N/A	1,085,995	448,466	297,377	N/A	27.4%	0.0%
12/31/2015	N/A	1,099,045	457,224	285,588	N/A	26.0%	0.0%
12/31/2016	N/A	1,153,015	403,747	270,150	N/A	23.4%	0.0%
12/31/2017	N/A	1,178,160	403,062	260,282	N/A	22.1%	0.0%
12/31/2018	N/A	1,084,313	393,801	288,323	N/A	26.6%	0.0%
12/31/2019	**N/A**	**1,048,219**	**398,950**	**348,433**	**N/A**	**33.2%**	**0.0%**
DPS HCTF							
12/31/2010	N/A	$58,432	$20,081	$14,086	N/A	24.1%	0.0%
12/31/2011	N/A	57,093	20,382	14,448	N/A	25.3%	0.0%
12/31/2012	N/A	54,727	22,942	14,443	N/A	26.4%	0.0%
12/31/2013	N/A	52,106	24,530	15,482	N/A	29.7%	0.0%
12/31/2014	N/A	50,998	25,028	16,502	N/A	32.4%	0.0%
12/31/2015	N/A	49,891	25,006	17,557	N/A	35.2%	0.0%
12/31/2016	N/A	51,357	21,488	18,945	N/A	36.9%	0.0%
12/31/2017	N/A	50,796	19,496	21,117	N/A	41.6%	0.0%
12/31/2018	N/A	48,268	21,184	25,018	N/A	51.8%	0.0%
12/31/2019	**N/A**	**46,398**	**21,539**	**31,189**	**N/A**	**67.2%**	**0.0%**

Please see page 195 for footnote references.

HEALTH CARE TRUST FUNDS—OPEB

SOLVENCY TEST (CONTINUED)

(Dollars in Thousands)

	Aggregate Accrued Liabilities				Portion of Actuarial Accrued Liabilities Covered by Valuation Assets		
Valuation Date	Active Member Contributions (A)	Retirees, Beneficiaries, and Inactive Members (B)	Employer-Financed Portion of Active Members (C)	Actuarial Value of Plan Assets	Liability (A)	Liability (B)	Liability (C)
Total of Health Care Trust Funds[1]							
12/31/2010	N/A	$1,238,241	$483,265	$302,279	N/A	24.4%	0.0%
12/31/2011	N/A	1,308,672	479,593	296,676	N/A	22.7%	0.0%
12/31/2012	N/A	1,314,284	486,880	299,540	N/A	22.8%	0.0%
12/31/2013	N/A	1,144,544	489,498	309,038	N/A	27.0%	0.0%
12/31/2014	N/A	1,136,993	473,494	313,879	N/A	27.6%	0.0%
12/31/2015	N/A	1,148,936	482,230	303,145	N/A	26.4%	0.0%
12/31/2016	N/A	1,204,372	425,235	289,095	N/A	24.0%	0.0%
12/31/2017	N/A	1,228,956	422,558	281,399	N/A	22.9%	0.0%
12/31/2018	N/A	1,132,581	414,985	313,341	N/A	27.7%	0.0%
12/31/2019	**N/A**	**1,094,617**	**420,489**	**379,622**	**N/A**	**34.7%**	**0.0%**

[1] The data in this table is aggregated for informational purposes. The assets of each trust fund are for the sole purpose of its members and cannot be used by another fund.

Unfunded Actuarial Accrued Liability

UAAL is the difference between actuarially calculated liability for service already rendered and the valuation assets of the fund.

The following factors resulted in lower liabilities (or gains) during 2019:

- Fewer members retired at earlier ages than expected.
- Fewer service and disability retirements were experienced than expected.
- Higher investment return than assumed in 2017 and 2019.
- Retirees experienced shorter lifespans than expected.
- Favorable benefit utilization and claims experience after reflecting administrative expenses.
- Actual payroll contributions were greater than the determined ADC for the HCTF and the DPS HCTF.

The following factors resulted in higher liabilities (or losses) during 2019:

- Lower investment returns than assumed in 2016 and 2018.
- Fewer members terminated PERA-covered employment and withdrew their accounts than expected.
- New PERA members had some service resulting in accrued liabilities.

HEALTH CARE TRUST FUNDS—OPEB

SCHEDULE OF FUNDING PROGRESS

(Dollars in Thousands)

(A) Valuation Date	(B) Actuarial Value of Plan Assets	(C) Actuarial Accrued Liabilities	(D) Unfunded Actuarial Accrued Liabilities (UAAL) (C)–(B)	(E) Funded Ratio (B)/(C)	(F) Annual Covered Payroll	(G) UAAL As a % of Covered Payroll (D)/(F)
HCTF						
12/31/2010	$288,193	$1,642,993	$1,354,800	17.5%	$7,035,419	19.3%
12/31/2011	282,228	1,710,790	1,428,562	16.5%	6,972,596	20.5%
12/31/2012	285,097	1,723,495	1,438,398	16.5%	6,766,713	21.3%
12/31/2013	293,556	1,557,406	1,263,850	18.8%	6,982,560	18.1%
12/31/2014	297,377	1,534,461	1,237,084	19.4%	7,211,351	17.2%
12/31/2015	285,588	1,556,269	1,270,681	18.4%	7,485,545	17.0%
12/31/2016	270,150	1,556,762	1,286,612	17.4%	7,716,894	16.7%
12/31/2017	260,282	1,581,222	1,320,940	16.5%	7,927,280	16.7%
12/31/2018	288,323	1,478,114	1,189,791	19.5%	8,399,835	14.2%
12/31/2019	**348,433**	**1,447,169**	**1,098,736**	**24.1%**	**8,834,404**	**12.4%**
DPS HCTF						
12/31/2010	$14,086	$78,513	$64,427	17.9%	$470,774	13.7%
12/31/2011	14,448	77,475	63,027	18.6%	491,646	12.8%
12/31/2012	14,443	77,669	63,226	18.6%	510,872	12.4%
12/31/2013	15,482	76,636	61,154	20.2%	547,660	11.2%
12/31/2014	16,502	76,026	59,524	21.7%	584,319	10.2%
12/31/2015	17,557	74,897	57,340	23.4%	621,115	9.2%
12/31/2016	18,945	72,845	53,900	26.0%	642,177	8.4%
12/31/2017	21,117	70,292	49,175	30.0%	658,198	7.5%
12/31/2018	25,018	69,452	44,434	36.0%	722,040	6.2%
12/31/2019	**31,189**	**67,937**	**36,748**	**45.9%**	**736,264**	**5.0%**
Total of Health Care Trust Funds[1]						
12/31/2010	$302,279	$1,721,506	$1,419,227	17.6%	$7,506,193	18.9%
12/31/2011	296,676	1,788,265	1,491,589	16.6%	7,464,242	20.0%
12/31/2012	299,540	1,801,164	1,501,624	16.6%	7,277,585	20.6%
12/31/2013	309,038	1,634,042	1,325,004	18.9%	7,530,220	17.6%
12/31/2014	313,879	1,610,487	1,296,608	19.5%	7,795,670	16.6%
12/31/2015	303,145	1,631,166	1,328,021	18.6%	8,106,660	16.4%
12/31/2016	289,095	1,629,607	1,340,512	17.7%	8,359,071	16.0%
12/31/2017	281,399	1,651,514	1,370,115	17.0%	8,585,478	16.0%
12/31/2018	313,341	1,547,566	1,234,225	20.2%	9,121,875	13.5%
12/31/2019	**379,622**	**1,515,106**	**1,135,484**	**25.1%**	**9,570,668**	**11.9%**

[1] The data in this table is aggregated for informational purposes. The assets of each trust fund are for the sole purpose of its members and cannot be used by another fund.

Note: A history of contributions by Health Care Trust Fund, the ADC compared to the actual contributions paid, including the deficiency (or excess), for each of the last 10 years, is shown in the Schedule of Contributions from Employers and Other Contributing Entities, found on pages 107-108 in the RSI in the Financial Section.

HEALTH CARE TRUST FUNDS—OPEB

Actuarial Gains and Losses

ANALYSIS OF FINANCIAL EXPERIENCE

(Dollars in Millions)

	HCTF	DPS HCTF
Amounts		
From differences between assumed and actual experience on liabilities		
Age and service retirements[1]	($8.3)	($1.3)
Disability retirements[2]	(0.7)	—
Deaths[3]	(0.3)	—
Withdrawals[4]	1.2	0.1
New members[5]	1.9	0.2
Administrative expenses and other[6]	(54.0)	0.9
Subtotal	(60.2)	(0.1)
From differences between assumed and actual experience on assets	(6.6)	(0.5)
From change in plan assumptions	(26.4)	—
From change in actuarial methods	—	—
From change in plan provisions	—	—
Total actuarial (gains)/losses on 2019 activities	**($93.2)**	**($0.6)**
Total actuarial (gains)/losses on 2018 activities	**($149.3)**	**($1.9)**

1 *Age and service retirements*: If members retire at older ages than assumed, there is a gain. If members retire at younger ages than assumed, there is a loss.

2 *Disability retirements*: If disability claims are lower than assumed, there is a gain. If disability claims are higher than assumed, there is a loss.

3 *Deaths*: If survivor claims are lower than assumed, there is a gain. If survivor claims are higher than assumed, there is a loss. If retirees die sooner than assumed, there is a gain. If retirees live longer than assumed, there is a loss.

4 *Withdrawal from employment*: If more members terminate and more liabilities are released by withdrawals than assumed, there is a gain. If fewer liabilities are released by terminations than assumed, there is a loss.

5 *New members*: If new members entering the plan have prior service, there is a loss.

6 *Administrative expenses and other:* Includes miscellaneous gains and losses resulting from purchased service transfers, claims experience, benefit utilization, software updates and refinements, data adjustments, timing of financial transactions, etc.

Actuarial Valuation Results

Contribution rates for the year ending December 31, 2021, are derived from the results of the December 31, 2019, annual actuarial valuation and are determined in advance for purposes of budgeting and consideration of any necessary legislative action.

SCHEDULE OF COMPUTED EMPLOYER CONTRIBUTION RATES FOR THE 2021 FISCAL YEAR

	Expressed as a Percentage of Member Payroll	
	HCTF	DPS HCTF
Contributions		
Service retirement benefits	0.17%	0.15%
Disability retirement benefits	0.00%	0.00%
Survivor benefits	0.00%	0.00%
Separation benefits	0.03%	0.02%
Total normal cost	0.20%	0.17%
Less member contributions	(0.00%)	(0.00%)
Employer normal cost	**0.20%**	**0.17%**
Percentage available to amortize unfunded actuarial accrued liabilities	0.82%	0.85%
Amortization period	20 Years	6 Years
Total employer contribution rate for actuarially funded benefits	**0.89%**	**0.44%**

HEALTH CARE TRUST FUNDS—OPEB

Annual Actuarial Valuation Statistics

As of December 31, 2019, the Funded Ratio, the UAAL, the ADC for 2021 as a percentage of covered payroll, and the amortization period are shown in the following table. The results in this table are based on the actuarial valuation for funding purposes.

ACTUARIAL STATISTICS

(Dollars in Thousands)

Trust Fund	Funded Ratio	UAAL	ADC[1]	Amortization Period
HCTF	24.1%	$1,098,736	0.89%	20 Years
DPS HCTF	45.9%	36,748	0.44%	6 Years
Total of Health Care Trust Funds[2]		**$1,135,484**		

[1] Determined considering the 30-year target amortization period defined in the OPEB funding policy for purposes of funding benchmarks and RSI reporting as shown in the Financial Section.

[2] The data in this table is aggregated for informational purposes. The assets of each trust fund are for the sole purpose of its members and cannot be used by another fund.

Pursuant to the OPEB funding policy, for reporting purposes, alternative ADCs also are determined by applying the layered amortization methodology as previously described. Under the target and alternative calculations, the legacy UAAL as of December 31, 2017, was amortized using a 30-year period, but the alternative ADCs use a 25-year closed period, a 20-year closed period, and a 15-year closed period, in lieu of the 30-year period, for amortization of any ″new″ UAAL recognized on and after January 1, 2018. The 2021 target and alternative ADCs, by division, are displayed below:

	Target ADC	Alternative ADCs		
Trust Fund	30-Year[1]	25-Year[2]	20-Year[2]	15-Year[2]
HCTF	0.89%	0.87%	0.84%	0.79%
DPS HCTF	0.44%	0.44%	0.43%	0.41%

[1] Refers to the amortization period used to amortize the legacy UAAL as of December 31, 2017, and any “new” UAAL recognized on and after January 1, 2018.

[2] Refers to the amortization period used to amortize any “new” UAAL recognized on and after January 1, 2018.

Funded Ratio

(Dollars in Thousands)

The funded ratio for the plan is determined by dividing the actuarial value of assets by the AAL. The actuarial value of assets is not the current market value but a market-related value, which recognizes the differences between actual and expected investment experience for each year in equal amounts over a four-year period. The actuarial value of the assets as of December 31, 2019, was $379,622 compared to a market value of assets of $397,146, and to the AAL of $1,515,106. The funded ratio for each of the funds, based on the actuarial value of assets, at December 31 for each of the last five years is shown below:

Trust Fund	2015	2016	2017	2018	2019
HCTF	18.4%	17.4%	16.5%	19.5%	**24.1%**
DPS HCTF	23.4%	26.0%	30.0%	36.0%	**45.9%**
Total of Health Care Trust Funds[1]	**18.6%**	**17.7%**	**17.0%**	**20.2%**	**25.1%**

[1] The data in this table is aggregated for informational purposes. The assets of each trust fund are for the sole purpose of its members and cannot be used by another fund.

The Board’s OPEB funding policy states that the targeted actuarial funded ratio is greater than or equal to 110 percent on a combined trust fund basis. The funded ratios listed above give an indication of progress made toward achieving the stated objective. A larger funded ratio indicates that a plan is better funded. As an example, for every $1.00 of the actuarially determined benefits earned for the HCTF as of December 31, 2019, approximately $0.24 of assets are available for payment based on the actuarial value of assets. These benefits earned will be payable over a period dependent upon factors, such as, the life span of members after their retirement and participation in PERACare. Therefore, it is not imperative that the AAL equal the actuarial value of assets at any given moment in time.

HEALTH CARE TRUST FUNDS—OPEB

At December 31, 2018, and December 31, 2019, PERA had the following funded status for the Health Care Trust Funds:

FUNDED STATUS FOR THE HEALTH CARE TRUST FUNDS

(Dollars in Thousands)

	Market Value of Assets[1]		Actuarial Value of Assets[2]	
	12/31/2018	12/31/2019	12/31/2018	12/31/2019
Health Care Trust Fund				
Actuarial accrued liability[3]	$1,478,114	**$1,447,169**	$1,478,114	**$1,447,169**
Assets held to pay those liabilities	279,192	**364,510**	288,323	**348,433**
Unfunded actuarial accrued liability	**$1,198,922**	**$1,082,659**	**$1,189,791**	**$1,098,736**
Funded ratio	18.9%	**25.2%**	19.5%	**24.1%**
DPS Health Care Trust Fund				
Actuarial accrued liability[3]	$69,452	**$67,937**	$69,452	**$67,937**
Assets held to pay those liabilities	24,029	**32,636**	25,018	**31,189**
Unfunded actuarial accrued liability	**$45,423**	**$35,301**	**$44,434**	**$36,748**
Funded ratio	34.6%	**48.0%**	36.0%	**45.9%**
Total of Health Care Trust Funds[4]				
Actuarial accrued liability[3]	$1,547,566	**$1,515,106**	$1,547,566	**$1,515,106**
Assets held to pay those liabilities[5]	303,221	**397,146**	313,341	**379,622**
Unfunded actuarial accrued liability	**$1,244,345**	**$1,117,960**	**$1,234,225**	**$1,135,484**
Funded ratio	19.6%	**26.2%**	20.2%	**25.1%**

1 The market value of assets is the fair value of the investments.

2 The actuarial value of assets is calculated by spreading any market gains or losses above or below the assumed rate of return over four years.

3 Based upon an assumed rate of return on investments of 7.25 percent and an assumed rate of 7.25 percent to discount the liabilities to be paid in the future to a value as of December 31, 2018, and December 31, 2019.

4 The data in this table is aggregated for informational purposes. The assets of each trust fund are for the sole purpose of its members and cannot be used by another fund.

5 In aggregate, the market value of the assets as of December 31, 2019, is $17,524 greater than the actuarial value of assets calculated by the actuaries, as they are recognizing the gains and losses in value over four years, rather than only in the year they occurred. The remaining gains and (losses) to be smoothed for 2017 are $7,283, for 2018 are ($16,385), and for 2019 are $26,626.

HEALTH CARE TRUST FUNDS—OPEB

Sensitivity of Actuarial Valuation to Changes in Assumed Investment Rate of Return and Discount Rate

The most important long-term driver of an OPEB plan is investment income. The investment return assumption and the discount rate for liabilities should be based on an estimated long-term investment yield for the plan, considering the nature and mix of current and expected plan investments and the basis used to determine the actuarial value of assets.

To understand the importance of the investment rate of return, which is used to discount the actuarial liabilities, a one percent fluctuation in the investment rate of return and discount rate would change the funded ratio, UAAL, and ADC (for contributions for the fiscal year ended December 31, 2021) as shown on the tables below:

INVESTMENT RETURN ASSUMPTION (DISCOUNT RATE) EQUAL TO 6.25 PERCENT

(Dollars in Thousands)

	Actuarial Value of Assets			Market Value of Assets
Trust Fund	**Funded Ratio**	**UAAL**	**ADC**	**UAAL**
HCTF	21.9%	$1,243,595	0.93%	$1,227,517
DPS HCTF	41.9%	43,293	0.50%	41,846
Total of Health Care Trust Funds[1]		**$1,286,888**		**$1,269,363**

[1] The data in this table is aggregated for informational purposes. The assets of each trust fund are for the sole purpose of its members and cannot be used by another fund.

CURRENT INVESTMENT RETURN ASSUMPTION (DISCOUNT RATE) EQUAL TO 7.25 PERCENT

(Dollars in Thousands)

	Actuarial Value of Assets			Market Value of Assets
Trust Fund	**Funded Ratio**	**UAAL**	**ADC**	**UAAL**
HCTF	**24.1%**	**$1,098,736**	**0.89%**	**$1,082,659**
DPS HCTF	**45.9%**	**36,748**	**0.44%**	**35,301**
Total of Health Care Trust Funds[1]		**$1,135,484**		**$1,117,960**

[1] The data in this table is aggregated for informational purposes. The assets of each trust fund are for the sole purpose of its members and cannot be used by another fund.

INVESTMENT RETURN ASSUMPTION (DISCOUNT RATE) EQUAL TO 8.25 PERCENT

(Dollars in Thousands)

	Actuarial Value of Assets			Market Value of Assets
Trust Fund	**Funded Ratio**	**UAAL**	**ADC**	**UAAL**
HCTF	26.3%	$975,066	0.84%	$958,989
DPS HCTF	50.0%	31,162	0.39%	29,715
Total of Health Care Trust Funds[1]		**$1,006,228**		**$988,704**

[1] The data in this table is aggregated for informational purposes. The assets of each trust fund are for the sole purpose of its members and cannot be used by another fund.

Note: The time-weighted, net-of-fees annualized rate of return for the pooled investment assets was 8.4 percent for the past five years and 9.1 percent for the past 10 years. The 30-year annualized gross-of-fees rate of return for the pooled investment assets was 8.6 percent.

HEALTH CARE TRUST FUNDS—OPEB

Plan Data

Except for the "Inactive members not eligible for benefits," the PERA membership is potentially eligible for participation in OPEB benefits through receipt of a PERA-provided benefit and enrollment in PERACare. The table below represents all individuals included in the assessment of the AAL associated with the Health Care Trust Funds as of December 31, 2019:

MEMBERSHIP—HEALTH CARE TRUST FUNDS

	HCTF	DPS HCTF	2019
Retirees and beneficiaries[1]	118,180	7,148	**125,328**
Inactive members eligible but not yet receiving benefits[2]	27,796	1,988	**29,784**
Inactive members not eligible for benefits	N/A	N/A	**N/A**
Active members[2]	197,615	15,679	**213,294**
Total	**343,591**	**24,815**	**368,406**

[1] Currently receiving or eligible for OPEB benefits.

[2] May be eligible for future OPEB benefits.

PARTICIPATION IN PERACARE FOR ELIGIBLE RETIREES AND BENEFICIARIES

As of December 31, 2019

	HCTF	DPS HCTF	Total
Enrolled in PERACare			
Under age 65	10,853	475	11,328
Age 65 and older	45,599	3,145	48,744
	56,452	3,620	60,072
Not enrolled in PERACare			
Under age 65	14,561	588	15,149
Age 65 and older	47,167	2,940	50,107
	61,728	3,528	65,256
Total eligible retirees and beneficiaries	**118,180**	**7,148**	**125,328**

HEALTH CARE TRUST FUNDS—OPEB

SCHEDULE OF RETIREES, BENEFICIARIES, AND SURVIVORS ADDED TO AND REMOVED FROM THE BENEFIT PAYROLL

(In Actual Dollars)

	Added to Payroll		Removed from Payroll		Payroll—End of Year			Increase (Decrease) in Average Benefits
Valuation Date	No.	Annual Benefits	No.	Annual Benefits	No.[1]	Annual Benefits	Average Annual Benefits	
HCTF[2]								
12/31/2010					48,718	$85,247,016	$1,750	—
12/31/2011	3,399	$7,638,162	1,900	$2,999,430	50,217	86,755,011	1,728	(1.3%)
12/31/2012	3,489	7,844,610	2,040	3,548,532	51,666	90,123,660	1,744	0.9%
12/31/2013	3,256	7,098,720	1,881	3,383,139	53,041	91,009,965	1,716	(1.6%)
12/31/2014	3,231	6,954,234	2,196	3,945,282	54,076	91,222,002	1,687	(1.7%)
12/31/2015	3,271	6,998,325	2,255	3,920,028	55,092	91,545,543	1,662	(1.5%)
12/31/2016	3,217	6,921,114	2,520	4,463,334	55,789	91,567,554	1,641	(1.3%)
12/31/2017	3,352	7,255,971	2,667	7,153,713	56,474	91,669,812	1,623	(1.1%)
12/31/2018	3,337	7,068,843	3,169	5,498,610	56,642	89,984,901	1,589	(2.1%)
12/31/2019	**3,265**	**6,495,867**	**3,455**	**6,074,346**	**56,452**	**89,033,598**	**1,577**	**(0.8%)**
DPS HCTF[2]								
12/31/2010					3,944	$6,446,394	$1,634	—
12/31/2011	203	$411,792	189	$292,905	3,958	6,296,871	1,591	(2.6%)
12/31/2012	168	340,929	165	258,957	3,961	6,086,352	1,537	(3.4%)
12/31/2013	198	428,532	164	241,845	3,995	6,098,082	1,526	(0.7%)
12/31/2014	184	368,943	217	346,587	3,962	5,961,324	1,505	(1.4%)
12/31/2015	174	360,111	206	330,648	3,930	5,829,741	1,483	(1.5%)
12/31/2016	156	322,230	201	302,220	3,885	5,703,954	1,468	(1.0%)
12/31/2017	149	325,128	218	445,188	3,816	5,583,894	1,463	(0.3%)
12/31/2018	160	346,794	351	550,827	3,625	5,905,296	1,629	11.3%
12/31/2019	**276**	**468,441**	**281**	**492,591**	**3,620**	**5,805,591**	**1,604**	**(1.5%)**
Total of Health Care Trust Funds[2]								
12/31/2010					52,662	$91,693,410	$1,741	—
12/31/2011	3,602	$8,049,954	2,089	$3,292,335	54,175	93,051,882	1,718	(1.3%)
12/31/2012	3,657	8,185,539	2,205	3,807,489	55,627	96,210,012	1,730	0.7%
12/31/2013	3,454	7,527,252	2,045	3,624,984	57,036	97,108,047	1,703	(1.6%)
12/31/2014	3,415	7,323,177	2,413	4,291,869	58,038	97,183,326	1,674	(1.7%)
12/31/2015	3,445	7,358,436	2,461	4,250,676	59,022	97,375,284	1,650	(1.4%)
12/31/2016	3,373	7,243,344	2,721	4,765,554	59,674	97,271,508	1,630	(1.2%)
12/31/2017	3,501	7,581,099	2,885	7,598,901	60,290	97,253,706	1,613	(1.0%)
12/31/2018	3,497	7,415,637	3,520	6,049,437	60,267	95,890,197	1,591	(1.4%)
12/31/2019	**3,541**	**6,964,308**	**3,736**	**6,566,937**	**60,072**	**94,839,189**	**1,579**	**(0.8%)**

1 Enrolled in PERACare.

2 The annual benefit is based upon creditable service and varies by attained age. Results do not include benefits valued for “No Part A” benefits or Retiree Drug Subsidy (RDS) program subsidies prior to December 31, 2013.

HEALTH CARE TRUST FUNDS—OPEB

SCHEDULE OF ACTIVE MEMBER ACTUARIAL VALUATION DATA

As of December 31

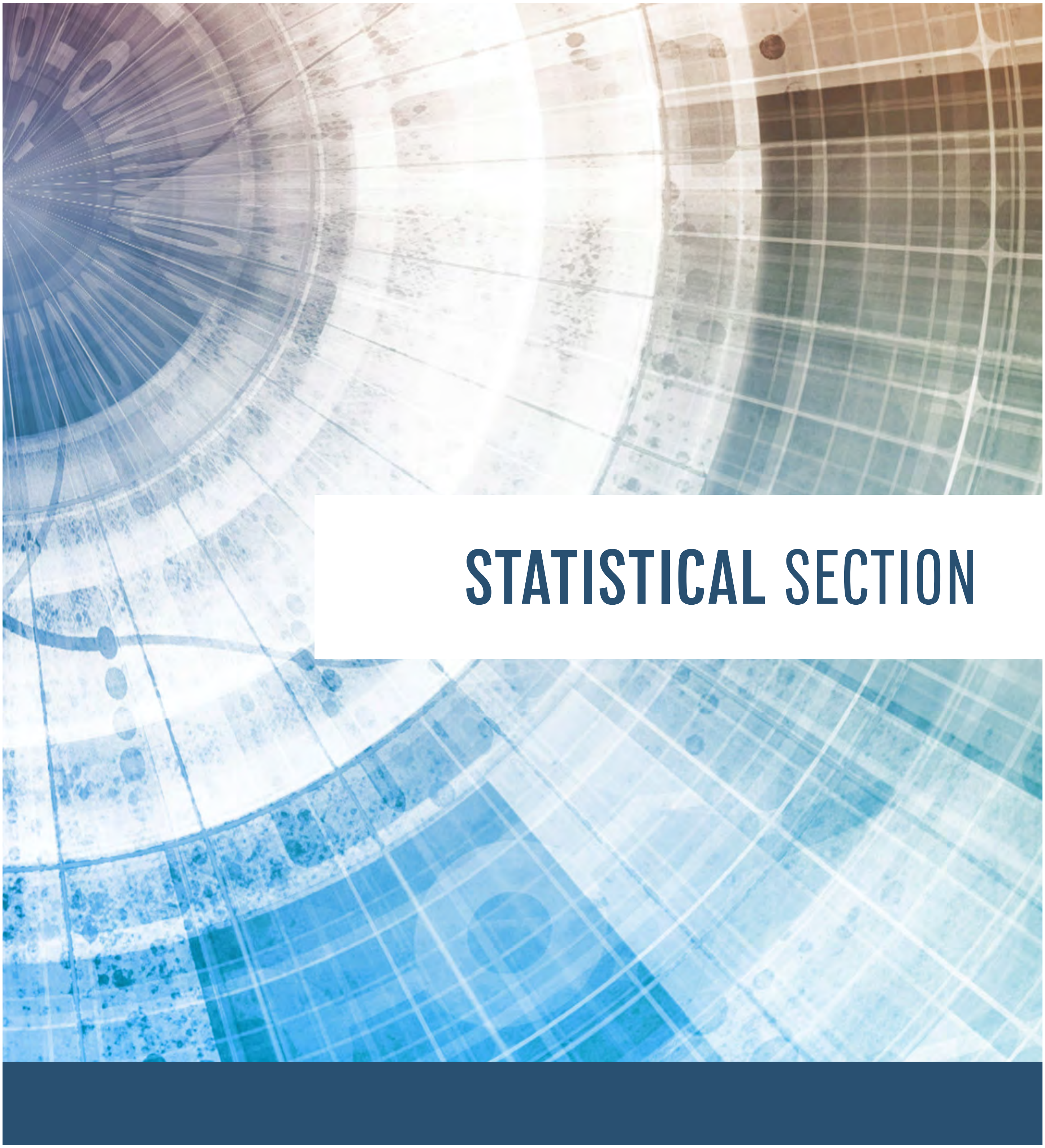
(In Actual Dollars)

Year	Number of Participating Employers[1,2]	Total Number of Active Members	Medicare Eligible Active Members[3]	Annual Payroll for Active Members	Average Annual Pay for Active Members	% Increase (Decrease) in Average Annual Pay
HCTF						
2010	489	187,924		$7,035,419,174	$37,438	—
2011	496	186,170		6,972,597,196	37,453	0.04%
2012	500	182,524		6,766,713,013	37,073	(1.01%)
2013	516	185,367		6,982,560,466	37,669	1.61%
2014	531	187,336		7,211,350,491	38,494	2.19%
2015	534	188,040		7,485,544,867	39,808	3.41%
2016	542	190,741		7,716,892,488	40,457	1.63%
2017	408	191,778	8,284	7,927,279,994	41,336	2.17%
2018	409	195,436	8,826	8,399,834,705	42,980	3.98%
2019	**410**	**197,615**	**9,035**	**8,834,404,580**	**44,705**	**4.01%**
DPS HCTF						
2010	28	13,171		$470,773,746	$35,743	—
2011	27	13,571		491,646,251	36,228	1.36%
2012	29	13,911		510,872,366	36,724	1.37%
2013	31	14,816		547,659,912	36,964	0.65%
2014	34	15,414		584,319,269	37,908	2.55%
2015	38	15,929		621,114,573	38,993	2.86%
2016	42	15,950		642,177,158	40,262	3.25%
2017	1	15,991	498	658,198,306	41,161	2.23%
2018	1	16,148	510	722,040,073	44,714	8.63%
2019	**1**	**15,679**	**518**	**736,263,798**	**46,959**	**5.02%**
Total of Health Care Trust Funds						
2010	517	201,095		$7,506,192,920	$37,327	—
2011	523	199,741		7,464,243,447	37,370	0.12%
2012	529	196,435		7,277,585,379	37,048	(0.86%)
2013	547	200,183		7,530,220,378	37,617	1.54%
2014	565	202,750		7,795,669,760	38,450	2.21%
2015	572	203,969		8,106,659,440	39,745	3.37%
2016	584	206,691		8,359,069,646	40,442	1.75%
2017	409	207,769	8,782	8,585,478,300	41,322	2.18%
2018	410	211,584	9,336	9,121,874,778	43,112	4.33%
2019	**411**	**213,294**	**9,553**	**9,570,668,378**	**44,871**	**4.08%**

[1] Prior to 2017, employer counts were based on separate units of government. Beginning in 2017, new guidance under GASB 74 classifies a primary government and its component units as one employer. The 2017 employer count is presented for purposes of complying with GASB 74 only. For all other purposes, the definition of an employer is governed by Title 24, Article 51 of the C.R.S., PERA's Rules, 8 CCR 1502-1, and, if applicable, the employer's affiliation agreement with PERA.

[2] Participating employer counts prior to 2017 include charter schools operating within the School and DPS Divisions.

[3] Information prior to 2017 was not required.



STATISTICAL SECTION

The Statistical Section presents detailed information that assists users in utilizing the basic financial statements, notes to basic financial statements, and required supplementary information to assess the economic condition of PERA.

Overview

Financial Trends

The following schedules show trend information about the changes and growth in PERA's fiduciary net position over the past 10 years:

- ***Changes in Fiduciary Net Position***
- ***Benefits and Refund Deductions From Fiduciary Net Position by Type***

Operating Information

The following schedules contain information related to the services that PERA provides and the activities it performs:

- ***Member and Benefit Recipient Statistics***[1]
- ***Breakdown of Membership by Percentage***[1]
- ***Schedule of Average Retirement Benefits Payable—All Division Trust Funds***[1]
- ***Schedule of Average Retirement Benefits Payable***[1]
- ***Colorado PERA Benefit Payments—All Division Trust Funds***[1]
- ***Schedule of Retirees and Survivors by Types of Benefits***[1]
- ***Schedule of Average Benefit Payments***[1]
- ***Schedule of Contribution Rate History***
- ***Principal Participating Employers***
- ***Schedule of Affiliated Employers***

1 Data for schedules are provided by the consulting actuary, Segal

Note: Schedules and information are derived from PERA internal sources unless otherwise noted.

CHANGES IN FIDUCIARY NET POSITION

For the Years Ended December 31

(Dollars in Thousands)

State Division Trust Fund

	2019	2018	2017	2016	2015
Additions					
Employer contributions[1]	**$612,282**	$583,164	$563,977	$521,804	$484,005
Nonemployer contributions[1]	**77,088**	78,489	—	—	—
Member contributions[1]	**257,803**	236,313	228,978	223,005	217,980
Purchased service	**29,494**	25,227	27,442	24,528	26,946
Investment income (loss)	**2,764,719**	(497,562)	2,391,683	947,981	210,337
Other	**22**	7,888	15,860	8,708	5,023
Total additions	**3,741,408**	433,519	3,227,940	1,726,026	944,291
Deductions					
Benefit payments	**1,637,168**	1,608,534	1,554,290	1,483,828	1,417,862
Refunds	**61,832**	65,253	58,696	60,137	63,567
Disability insurance premiums	**1,965**	2,093	2,035	2,106	2,088
Administrative expenses	**11,294**	11,903	11,745	11,271	10,779
Other	**2,707**	3,017	3,652	3,040	3,406
Total deductions	**1,714,966**	1,690,800	1,630,418	1,560,382	1,497,702
Change in fiduciary net position	**2,026,442**	(1,257,281)	1,597,522	165,644	(553,411)
Fiduciary net position held at beginning of year	**13,966,421**	15,223,702	13,626,180	13,460,536	14,013,947
Fiduciary net position held at end of year	**$15,992,863**	**$13,966,421**	**$15,223,702**	**$13,626,180**	**$13,460,536**

	2014	2013	2012	2011	2010
Additions					
Employer contributions[1]	$444,372	$401,658	$335,073	$283,222	$287,624
Member contributions[1]	211,610	202,799	227,058	258,678	223,240
Purchased service	22,446	22,241	16,358	11,277	12,496
Investment income	780,762	1,931,658	1,511,244	232,669	1,553,142
Other	3,289	4,869	150	331	1
Total additions	1,462,479	2,563,225	2,089,883	786,177	2,076,503
Deductions					
Benefit payments	1,352,293	1,295,780	1,231,922	1,174,707	1,122,435
Refunds	61,152	68,735	69,221	70,090	68,844
Disability insurance premiums	2,309	2,229	1,570	1,685	1,661
Administrative expenses	10,067	9,780	8,568	8,685	8,942
Other	3,171	3,593	3,911	(4,546)	(726)
Total deductions	1,428,992	1,380,117	1,315,192	1,250,621	1,201,156
Change in fiduciary net position	33,487	1,183,108	774,691	(464,444)	875,347
Fiduciary net position held at beginning of year	13,980,460	12,797,352	12,022,661	12,487,105	11,611,758
Fiduciary net position held at end of year	**$14,013,947**	**$13,980,460**	**$12,797,352**	**$12,022,661**	**$12,487,105**

[1] Employer, nonemployer, and member contribution rate history is shown on pages 243-248.

CHANGES IN FIDUCIARY NET POSITION

For the Years Ended December 31

(Dollars in Thousands)

School Division Trust Fund

	2019	2018	2017	2016	2015
Additions					
Employer contributions[1]	**$1,002,760**	$923,910	$857,740	$812,740	$754,182
Nonemployer contributions[1]	**127,367**	126,505	—	—	—
Member contributions[1]	**436,899**	386,811	368,740	359,059	348,537
Purchased service	**25,992**	27,525	30,313	27,422	23,841
Investment income (loss)	**4,676,607**	(838,899)	3,982,275	1,569,026	344,000
Other	**364**	7,957	106	109	96
Total additions	**6,269,989**	633,809	5,239,174	2,768,356	1,470,656
Deductions					
Benefit payments	**2,468,021**	2,413,387	2,334,003	2,231,475	2,134,754
Refunds	**73,871**	76,035	74,637	65,715	70,298
Disability insurance premiums	**3,338**	3,506	3,347	3,454	3,400
Administrative expenses	**22,619**	23,560	23,019	21,991	20,865
Other	**8,293**	2,501	22,484	17,443	9,178
Total deductions	**2,576,142**	2,518,989	2,457,490	2,340,078	2,238,495
Change in fiduciary net position	**3,693,847**	(1,885,180)	2,781,684	428,278	(767,839)
Fiduciary net position held at beginning of year	**23,477,550**	25,362,730	22,581,046	22,152,768	22,920,607
Fiduciary net position held at end of year	**$27,171,397**	**$23,477,550**	**$25,362,730**	**$22,581,046**	**$22,152,768**

	2014	2013	2012	2011	2010
Additions					
Employer contributions[1]	$686,323	$624,784	$573,586	$541,962	$519,044
Member contributions[1]	334,585	322,217	313,923	315,958	316,446
Purchased service	21,935	19,285	17,406	14,465	13,096
Investment income	1,274,862	3,136,269	2,434,176	370,045	2,469,517
Other	112	139	246	544	25
Total additions	2,317,817	4,102,694	3,339,337	1,242,974	3,318,128
Deductions					
Benefit payments	2,032,628	1,932,756	1,832,643	1,731,348	1,642,350
Refunds	77,171	76,980	77,154	78,543	79,012
Disability insurance premiums	3,748	3,655	2,522	2,619	2,802
Administrative expenses	19,290	18,523	16,086	16,322	17,104
Other	4,376	7,132	9,157	9,839	9,396
Total deductions	2,137,213	2,039,046	1,937,562	1,838,671	1,750,664
Change in fiduciary net position	180,604	2,063,648	1,401,775	(595,697)	1,567,464
Fiduciary net position held at beginning of year	22,740,003	20,676,355	19,274,580	19,870,277	18,302,813
Fiduciary net position held at end of year	**$22,920,607**	**$22,740,003**	**$20,676,355**	**$19,274,580**	**$19,870,277**

[1] Employer, nonemployer, and member contribution rate history is shown on pages 243-248.

CHANGES IN FIDUCIARY NET POSITION

For the Years Ended December 31

(Dollars in Thousands)

Local Government Division Trust Fund

	2019	2018	2017	2016	2015
Additions					
Employer contributions[1]	**$85,597**	$81,358	$78,291	$75,132	$70,415
Member contributions[1]	**55,003**	52,421	50,472	48,470	45,400
Purchased service	**7,820**	5,642	6,325	3,981	6,586
Employer disaffiliation	**—**	—	1,063	—	—
Investment income (loss)	**792,219**	(142,476)	669,011	261,276	56,328
Other	**14**	840	14	17	15
Total additions	**940,653**	(2,215)	805,176	388,876	178,744
Deductions					
Benefit payments	**297,447**	286,745	274,258	258,967	244,948
Refunds	**14,761**	15,716	14,530	12,938	20,410
Disability insurance premiums	**421**	442	430	439	431
Administrative expenses	**2,476**	2,621	2,541	2,395	2,253
Other	**3,975**	3,958	3,837	1,140	1,661
Total deductions	**319,080**	309,482	295,596	275,879	269,703
Change in fiduciary net position	**621,573**	(311,697)	509,580	112,997	(90,959)
Fiduciary net position held at beginning of year	**3,971,389**	4,283,086	3,773,506	3,660,509	3,751,468
Fiduciary net position held at end of year	**$4,592,962**	**$3,971,389**	**$4,283,086**	**$3,773,506**	**$3,660,509**

	2014	2013	2012	2011	2010
Additions					
Employer contributions[1]	$68,719	$67,197	$86,113	$91,780	$89,515
Member contributions[1]	43,792	42,627	54,827	58,590	56,728
Purchased service	5,498	7,363	13,927	3,902	3,671
Employer disaffiliation	186,006	—	—	—	—
Investment income	200,394	482,297	368,492	53,130	355,964
Other	14	14	2,663	78	9
Total additions	504,423	599,498	526,022	207,480	505,887
Deductions					
Benefit payments	232,055	217,875	195,945	179,449	165,770
Refunds	24,436	32,480	42,941	22,686	22,942
Disability insurance premiums	481	479	410	442	496
Administrative expenses	2,091	2,021	2,035	2,157	2,215
Other	2,204	4,463	2,072	2,737	5,235
Total deductions	261,267	257,318	243,403	207,471	196,658
Change in fiduciary net position	243,156	342,180	282,619	9	309,229
Fiduciary net position held at beginning of year	3,508,312	3,166,132	2,883,513	2,883,504	2,574,275
Fiduciary net position held at end of year	**$3,751,468**	**$3,508,312**	**$3,166,132**	**$2,883,513**	**$2,883,504**

[1] Employer and member contribution rate history is shown on pages 243-248.

CHANGES IN FIDUCIARY NET POSITION

For the Years Ended December 31

(Dollars in Thousands)

Judicial Division Trust Fund

	2019	2018	2017	2016	2015
Additions					
Employer contributions[1]	**$10,649**	$8,299	$8,080	$8,024	$7,702
Nonemployer contributions[1]	**1,344**	1,385	—	—	—
Member contributions[1]	**4,575**	4,064	3,955	3,928	3,772
Purchased service	**612**	636	908	109	425
Investment income (loss)	**61,719**	(11,006)	51,173	19,783	4,149
Other	**6,697**	225	2,379	2,800	3,247
Total additions	**85,596**	3,603	66,495	34,644	19,295
Deductions					
Benefit payments	**28,056**	26,236	25,250	22,734	21,158
Refunds	**—**	186	7	109	—
Disability insurance premiums	**41**	41	41	45	42
Administrative expenses	**84**	86	86	81	77
Other	**27**	70	153	122	166
Total deductions	**28,208**	26,619	25,537	23,091	21,443
Change in fiduciary net position	**57,388**	(23,016)	40,958	11,553	(2,148)
Fiduciary net position held at beginning of year	**306,846**	329,862	288,904	277,351	279,499
Fiduciary net position held at end of year	**$364,234**	**$306,846**	**$329,862**	**$288,904**	**$277,351**

	2014	2013	2012	2011	2010
Additions					
Employer contributions[1]	$7,070	$6,587	$5,922	$5,430	$5,654
Member contributions[1]	3,461	3,224	3,628	4,120	3,465
Purchased service	835	240	180	5	109
Investment income	15,299	37,096	28,063	4,105	27,400
Other	256	1,451	2,556	6	—
Total additions	26,921	48,598	40,349	13,666	36,628
Deductions					
Benefit payments	19,800	18,616	17,606	16,809	15,394
Refunds	60	385	605	513	104
Disability insurance premiums	43	40	27	26	26
Administrative expenses	72	69	61	61	61
Other	100	52	22	(1,043)	(2,491)
Total deductions	20,075	19,162	18,321	16,366	13,094
Change in fiduciary net position	6,846	29,436	22,028	(2,700)	23,534
Fiduciary net position held at beginning of year	272,653	243,217	221,189	223,889	200,355
Fiduciary net position held at end of year	**$279,499**	**$272,653**	**$243,217**	**$221,189**	**$223,889**

[1] Employer, nonemployer, and member contribution rate history is shown on pages 243-248.

CHANGES IN FIDUCIARY NET POSITION

For the Years Ended December 31

(Dollars in Thousands)

DPS Division Trust Fund[1]

	2019	2018	2017	2016	2015
Additions					
Employer contributions[2]	**$43,340**	$35,994	$27,578	$17,071	$8,494
Nonemployer contributions[2]	**19,201**	18,621	—	—	—
Member contributions[2]	**62,961**	58,172	54,354	52,740	49,973
Purchased service	**2,535**	2,926	2,466	2,112	3,585
Investment income (loss)	**632,669**	(114,070)	548,585	218,415	49,172
Other	**3,030**	770	3,870	3,264	11
Total additions	**763,736**	2,413	636,853	293,602	111,235
Deductions					
Benefit payments	**277,849**	276,223	271,189	263,152	255,068
Refunds	**10,738**	11,197	10,277	8,521	7,897
Disability insurance premiums	**397**	405	378	398	358
Administrative expenses	**2,713**	2,919	2,857	2,754	2,599
Other	**55**	5,267	89	129	1,775
Total deductions	**291,752**	296,011	284,790	274,954	267,697
Change in fiduciary net position	**471,984**	(293,598)	352,063	18,648	(156,462)
Fiduciary net position held at beginning of year	**3,184,442**	3,478,040	3,125,977	3,107,329	3,263,791
Fiduciary net position held at end of year	**$3,656,426**	**$3,184,442**	**$3,478,040**	**$3,125,977**	**$3,107,329**

	2014	2013	2012	2011	2010
Additions					
Employer contributions[2]	$18,478	$25,157	$14,703	$12,859	$6,493
Member contributions[2]	47,083	43,564	41,124	39,422	36,824
Plan transfer	—	—	—	—	2,750,566
Purchased service	2,326	1,834	1,924	1,792	2,056
Investment income	182,823	452,919	354,867	55,081	367,145
Other	13	269	146	77	5
Total additions	250,723	523,743	412,764	109,231	3,163,089
Deductions					
Benefit payments	247,005	237,921	228,742	221,113	215,825
Refunds	8,063	6,733	5,821	4,412	3,029
Disability insurance premiums	366	338	220	238	311
Administrative expenses	2,377	2,240	1,919	1,914	2,944
Other	1,560	150	55	2,409	54
Total deductions	259,371	247,382	236,757	230,086	222,163
Change in fiduciary net position	(8,648)	276,361	176,007	(120,855)	2,940,926
Fiduciary net position held at beginning of year	3,272,439	2,996,078	2,820,071	2,940,926	—
Fiduciary net position held at end of year	**$3,263,791**	**$3,272,439**	**$2,996,078**	**$2,820,071**	**$2,940,926**

1 The Denver Public Schools (DPS) Division Trust Fund was established on January 1, 2010, and received the net assets of the Denver Public Schools Retirement System (DPSRS).

2 Employer, nonemployer, and member contribution rate history is shown on pages 243-248.

CHANGES IN FIDUCIARY NET POSITION

For the Years Ended December 31

(Dollars in Thousands)

Voluntary Investment Program

	2019	2018	2017	2016	2015
Additions					
Employer contributions	**$5,701**	$5,409	$5,072	$4,740	$3,889
Member contributions	**140,519**	132,189	135,303	129,909	129,990
Investment income (loss)	**700,274**	(165,371)	469,233	206,933	(11,773)
Other	**2,443**	2,322	2,207	2,170	2,237
Total additions	**848,937**	(25,451)	611,815	343,752	124,343
Deductions					
Refunds	**213,010**	202,684	162,019	154,202	158,215
Administrative expenses	**3,592**	3,310	2,877	2,814	3,010
Other	**1,656**	1,598	1,411	1,172	1,019
Total deductions	**218,258**	207,592	166,307	158,188	162,244
Change in fiduciary net position	**630,679**	(233,043)	445,508	185,564	(37,901)
Fiduciary net position held at beginning of year	**3,042,128**	3,275,171	2,829,663	2,644,099	2,682,000
Fiduciary net position held at end of year	**$3,672,807**	**$3,042,128**	**$3,275,171**	**$2,829,663**	**$2,644,099**

	2014	2013	2012	2011	2010
Additions					
Employer contributions	$3,866	$3,679	$3,697	$3,610	$3,827
Member contributions	126,112	120,203	119,013	126,331	132,674
Investment income (loss)	188,199	423,877	236,775	(5,752)	194,500
Other	2,291	2,141	2,075	3,298	3,697
Total additions	320,468	549,900	361,560	127,487	334,698
Deductions					
Refunds	144,329	142,064	144,171	133,719	102,056
Administrative expenses	3,050	3,137	2,827	4,717	5,178
Other	839	624	234	29	—
Total deductions	148,218	145,825	147,232	138,465	107,234
Change in fiduciary net position	172,250	404,075	214,328	(10,978)	227,464
Fiduciary net position held at beginning of year	2,509,750	2,105,675	1,891,347	1,902,325	1,674,861
Fiduciary net position held at end of year	**$2,682,000**	**$2,509,750**	**$2,105,675**	**$1,891,347**	**$1,902,325**

CHANGES IN FIDUCIARY NET POSITION

For the Years Ended December 31

(Dollars in Thousands)

Defined Contribution Retirement Plan

	2019	2018	2017	2016	2015
Additions					
Employer contributions	**$15,184**	$13,201	$14,309	$13,060	$12,428
Member contributions	**12,967**	10,573	11,411	10,382	9,830
Investment income (loss)	**48,559**	(15,381)	29,372	12,601	(2,466)
Other	**21**	11	39	92	9
Total additions	**76,731**	8,404	55,131	36,135	19,801
Deductions					
Refunds	**15,445**	12,722	10,593	8,932	9,419
Administrative expenses	**997**	819	739	726	774
Other	**135**	166	116	97	48
Total deductions	**16,577**	13,707	11,448	9,755	10,241
Change in fiduciary net position	**60,154**	(5,303)	43,683	26,380	9,560
Fiduciary net position held at beginning of year	**205,786**	211,089	167,406	141,026	131,466
Fiduciary net position held at end of year	**$265,940**	**$205,786**	**$211,089**	**$167,406**	**$141,026**

	2014	2013	2012	2011	2010
Additions					
Employer contributions	$11,531	$11,090	$7,997	$7,034	$6,428
Member contributions	9,179	8,828	8,364	9,732	6,896
Plan transfer	—	—	—	—	11
Investment income (loss)	6,745	17,416	9,046	(1,130)	5,519
Other	8	6	2	40	35
Total additions	27,463	37,340	25,409	15,676	18,889
Deductions					
Refunds	8,690	6,314	4,869	5,176	2,886
Administrative expenses	738	744	848	282	94
Other	69	49	22	5	—
Total deductions	9,497	7,107	5,739	5,463	2,980
Change in fiduciary net position	17,966	30,233	19,670	10,213	15,909
Fiduciary net position held at beginning of year	113,500	83,267	63,597	53,384	37,475
Fiduciary net position held at end of year	**$131,466**	**$113,500**	**$83,267**	**$63,597**	**$53,384**

CHANGES IN FIDUCIARY NET POSITION

For the Years Ended December 31

(Dollars in Thousands)

Deferred Compensation Plan

	2019	2018	2017	2016	2015
Additions					
Employer contributions	**$32**	$29	$50	$26	$27
Member contributions	**64,151**	57,981	57,088	51,601	49,719
Investment income (loss)	**163,879**	(47,542)	105,027	51,372	(6,427)
Other	**578**	574	510	496	484
Total additions	**228,640**	11,042	162,675	103,495	43,803
Deductions					
Refunds	**55,317**	56,568	47,067	41,922	39,945
Administrative expenses	**1,188**	1,094	993	963	1,071
Other	**759**	756	698	604	562
Total deductions	**57,264**	58,418	48,758	43,489	41,578
Change in fiduciary net position	**171,376**	(47,376)	113,917	60,006	2,225
Fiduciary net position held at beginning of year	**818,223**	865,599	751,682	691,676	689,451
Fiduciary net position held at end of year	**$989,599**	**$818,223**	**$865,599**	**$751,682**	**$691,676**

	2014	2013	2012	2011	2010
Additions					
Employer contributions	$43	$20	$14	$51	$12
Member contributions	50,370	44,449	39,851	42,253	44,203
Plan transfer	—	—	—	4	24
Investment income	32,133	88,565	49,344	10,335	42,232
Other	478	428	354	984	917
Total additions	83,024	133,462	89,563	53,627	87,388
Deductions					
Refunds	35,584	32,854	27,627	27,524	20,869
Administrative expenses	1,074	1,094	1,105	834	822
Other	517	430	278	185	168
Total deductions	37,175	34,378	29,010	28,543	21,859
Change in fiduciary net position	45,849	99,084	60,553	25,084	65,529
Fiduciary net position held at beginning of year	643,602	544,518	483,965	458,881	393,352
Fiduciary net position held at end of year	**$689,451**	**$643,602**	**$544,518**	**$483,965**	**$458,881**

CHANGES IN FIDUCIARY NET POSITION

For the Years Ended December 31

(Dollars in Thousands)

Health Care Trust Fund

	2019	2018	2017	2016	2015
Additions					
Employer contributions[1]	**$92,011**	$86,559	$83,077	$80,825	$78,463
Retiree health care premiums	**—**	—	—	138,021	127,873
Employer disaffiliation	**—**	—	96	—	—
Investment income (loss)	**53,867**	(9,678)	44,990	19,021	4,807
Other	**6,984**	8,373	9,760	9,175	9,993
Total additions	**152,862**	85,254	137,923	247,042	221,136
Deductions					
Benefit payments	**58,221**	61,777	102,665	243,662	234,414
Administrative expenses	**9,290**	20,401	19,162	19,166	19,261
Other	**33**	106	102	491	594
Total deductions	**67,544**	82,284	121,929	263,319	254,269
Change in fiduciary net position	**85,318**	2,970	15,994	(16,277)	(33,133)
Fiduciary net position held at beginning of year	**279,192**	276,222	260,228	276,505	309,638
Fiduciary net position held at end of year	**$364,510**	**$279,192**	**$276,222**	**$260,228**	**$276,505**

	2014	2013	2012	2011	2010
Additions					
Employer contributions[1]	$75,631	$72,784	$72,553	$73,449	$74,047
Retiree health care premiums	105,459	114,364	107,104	108,689	110,158
Federal health care subsidies	—	15,731	14,198	14,151	25,751
Employer disaffiliation	3,994	—	—	—	—
Investment income	18,203	46,097	36,710	5,153	34,676
Other	9,813	10,522	11,668	10,574	16,035
Total additions	213,100	259,498	242,233	212,016	260,667
Deductions					
Benefit payments	200,627	222,860	218,768	203,419	192,044
Administrative expenses	16,612	13,766	13,514	12,481	11,131
Other	832	—	—	—	—
Total deductions	218,071	236,626	232,282	215,900	203,175
Change in fiduciary net position	(4,971)	22,872	9,951	(3,884)	57,492
Fiduciary net position held at beginning of year	314,609	291,737	281,786	285,670	228,178
Fiduciary net position held at end of year	**$309,638**	**$314,609**	**$291,737**	**$281,786**	**$285,670**

[1] Employer contribution rate history is shown on page 249.

CHANGES IN FIDUCIARY NET POSITION

For the Years Ended December 31

(Dollars in Thousands)

DPS Health Care Trust Fund[1]

	2019	2018	2017	2016	2015
Additions					
Employer contributions[2]	**$7,649**	$7,417	$6,930	$6,723	$6,371
Retiree health care premiums	**—**	—	—	6,738	6,275
Investment income (loss)	**4,892**	(894)	3,305	1,235	254
Other	**188**	205	242	289	301
Total additions	**12,729**	6,728	10,477	14,985	13,201
Deductions					
Benefit payments	**3,644**	4,158	5,694	12,748	12,442
Administrative expenses	**477**	845	808	818	822
Other	**1**	4	4	18	22
Total deductions	**4,122**	5,007	6,506	13,584	13,286
Change in fiduciary net position	**8,607**	1,721	3,971	1,401	(85)
Fiduciary net position held at beginning of year	**24,029**	22,308	18,337	16,936	17,021
Fiduciary net position held at end of year	**$32,636**	**$24,029**	**$22,308**	**$18,337**	**$16,936**

	2014	2013	2012	2011	2010
Additions					
Employer contributions[2]	$6,003	$5,558	$5,243	$5,029	$4,762
Plan transfer	—	—	—	—	13,510
Retiree health care premiums	4,442	4,719	4,295	4,529	4,747
Federal health care subsidies	—	563	488	499	1,252
Investment income	938	2,277	1,800	424	1,992
Other	281	312	216	374	109
Total additions	11,664	13,429	12,042	10,855	26,372
Deductions					
Benefit payments	10,432	11,222	11,027	10,770	11,012
Administrative expenses	668	561	547	501	569
Other	32	—	—	—	—
Total deductions	11,132	11,783	11,574	11,271	11,581
Change in fiduciary net position	532	1,646	468	(416)	14,791
Fiduciary net position held at beginning of year	16,489	14,843	14,375	14,791	—
Fiduciary net position held at end of year	**$17,021**	**$16,489**	**$14,843**	**$14,375**	**$14,791**

1 The Denver Public Schools Health Care Trust Fund (DPS HCTF) was established on January 1, 2010, and received the balance of the Denver Public Schools Retiree Health Benefit Trust.

2 Employer contribution rate history is shown on page 249.

CHANGES IN FIDUCIARY NET POSITION

For the Years Ended December 31

(Dollars in Thousands)

Life Insurance Reserve

	2019	2018	2017	2016	2015
Additions					
Investment income (loss)	**$3,901**	($684)	$3,241	$1,289	$302
Other	**—**	4	—	—	—
Total additions	**3,901**	(680)	3,241	1,289	302
Deductions					
Life insurance premiums	**479**	433	373	306	250
Administrative expenses	**123**	111	493	1,032	805
Total deductions	**602**	544	866	1,338	1,055
Change in fiduciary net position	**3,299**	(1,224)	2,375	(49)	(753)
Fiduciary net position held at beginning of year	**17,842**	19,066	16,691	16,740	17,493
Fiduciary net position held at end of year	**$21,141**	**$17,842**	**$19,066**	**$16,691**	**$16,740**

	2014	2013	2012	2011	2010
Additions					
Investment income	$1,068	$2,630	$2,020	$503	$2,280
Total additions	1,068	2,630	2,020	503	2,280
Deductions					
Life insurance premiums	196	131	62	547	545
Administrative expenses	871	871	510	573	575
Total deductions	1,067	1,002	572	1,120	1,120
Change in fiduciary net position	1	1,628	1,448	(617)	1,160
Fiduciary net position held at beginning of year	17,492	15,864	14,416	15,033	13,873
Fiduciary net position held at end of year	**$17,493**	**$17,492**	**$15,864**	**$14,416**	**$15,033**

BENEFITS AND REFUND DEDUCTIONS FROM FIDUCIARY NET POSITION BY TYPE

For the Years Ended December 31

(Dollars in Thousands)

State Division Trust Fund

	2019	2018	2017	2016	2015
Type of Benefit					
Age and service benefits:					
Retirees	**$1,540,738**	$1,510,747	$1,456,159	$1,387,374	$1,322,592
Disability	**81,434**	82,947	83,280	82,221	81,310
Survivors	**14,996**	14,840	14,851	14,233	13,960
Total benefits	**$1,637,168**	**$1,608,534**	**$1,554,290**	**$1,483,828**	**$1,417,862**
Type of Refund					
Separation	**$55,782**	$59,508	$52,079	$54,606	$58,274
Death	**5,909**	5,728	6,561	5,464	5,213
Purchased service	**141**	17	56	67	80
Total refunds	**$61,832**	**$65,253**	**$58,696**	**$60,137**	**$63,567**

	2014	2013	2012	2011	2010
Type of Benefit					
Age and service benefits:					
Retirees	$1,257,767	$1,202,238	$1,140,055	$1,083,722	$1,031,628
Disability	80,753	79,854	78,689	77,715	77,830
Survivors	13,773	13,688	13,178	13,270	12,977
Total benefits	**$1,352,293**	**$1,295,780**	**$1,231,922**	**$1,174,707**	**$1,122,435**
Type of Refund					
Separation	$57,895	$64,072	$65,627	$65,525	$59,330
Death	3,058	4,411	3,503	3,986	9,047
Purchased service	199	252	91	579	467
Total refunds	**$61,152**	**$68,735**	**$69,221**	**$70,090**	**$68,844**

BENEFITS AND REFUND DEDUCTIONS FROM FIDUCIARY NET POSITION BY TYPE

For the Years Ended December 31

(Dollars in Thousands)

School Division Trust Fund

	2019	2018	2017	2016	2015
Type of Benefit					
Age and service benefits:					
Retirees	**$2,384,406**	$2,329,157	$2,249,855	$2,149,415	$2,053,108
Disability	**67,737**	68,774	68,537	67,416	67,203
Survivors	**15,878**	15,456	15,611	14,644	14,443
Total benefits	**$2,468,021**	**$2,413,387**	**$2,334,003**	**$2,231,475**	**$2,134,754**
Type of Refund					
Separation	**$70,200**	$70,227	$68,265	$60,873	$66,494
Death	**3,412**	5,678	6,313	4,756	3,621
Purchased service	**259**	130	59	86	183
Total refunds	**$73,871**	**$76,035**	**$74,637**	**$65,715**	**$70,298**

	2014	2013	2012	2011	2010
Type of Benefit					
Age and service benefits:					
Retirees	$1,952,989	$1,855,195	$1,757,279	$1,657,071	$1,568,637
Disability	65,780	63,741	62,140	61,150	60,920
Survivors	13,859	13,820	13,224	13,127	12,793
Total benefits	**$2,032,628**	**$1,932,756**	**$1,832,643**	**$1,731,348**	**$1,642,350**
Type of Refund					
Separation	$73,522	$73,215	$73,075	$74,446	$74,423
Death	3,521	3,282	3,815	3,676	4,206
Purchased service	128	483	264	421	383
Total refunds	**$77,171**	**$76,980**	**$77,154**	**$78,543**	**$79,012**

BENEFITS AND REFUND DEDUCTIONS FROM FIDUCIARY NET POSITION BY TYPE

For the Years Ended December 31

(Dollars in Thousands)

Local Government Division Trust Fund

	2019	2018	2017	2016	2015
Type of Benefit					
Age and service benefits:					
Retirees	**$278,543**	$267,669	$255,105	$240,432	$226,400
Disability	**16,315**	16,582	16,775	16,274	16,327
Survivors	**2,589**	2,494	2,378	2,261	2,221
Total benefits	**$297,447**	**$286,745**	**$274,258**	**$258,967**	**$244,948**
Type of Refund					
Separation	**$13,070**	$14,587	$13,095	$12,017	$18,062
Death	**1,691**	1,128	1,434	921	2,317
Purchased service	**—**	1	1	—	31
Total refunds	**$14,761**	**$15,716**	**$14,530**	**$12,938**	**$20,410**

	2014	2013	2012	2011	2010
Type of Benefit					
Age and service benefits:					
Retirees	$213,962	$199,821	$178,845	$162,681	$149,260
Disability	16,045	16,022	15,096	14,727	14,572
Survivors	2,048	2,032	2,004	2,041	1,938
Total benefits	**$232,055**	**$217,875**	**$195,945**	**$179,449**	**$165,770**
Type of Refund					
Separation	$23,034	$31,268	$41,696	$21,316	$21,999
Death	1,401	1,201	1,154	1,283	750
Purchased service	1	11	91	87	193
Total refunds	**$24,436**	**$32,480**	**$42,941**	**$22,686**	**$22,942**

BENEFITS AND REFUND DEDUCTIONS FROM FIDUCIARY NET POSITION BY TYPE

For the Years Ended December 31

(Dollars in Thousands)

Judicial Division Trust Fund

	2019	2018	2017	2016	2015
Type of Benefit					
Age and service benefits:					
Retirees	**$26,812**	$24,982	$23,993	$21,485	$19,901
Disability	**893**	926	933	939	938
Survivors	**351**	328	324	310	319
Total benefits	**$28,056**	**$26,236**	**$25,250**	**$22,734**	**$21,158**
Type of Refund					
Separation	**$—**	$50	$7	$109	$—
Death	**—**	136	—	—	—
Total refunds	**$—**	**$186**	**$7**	**$109**	**$—**

	2014	2013	2012	2011	2010
Type of Benefit					
Age and service benefits:					
Retirees	$18,573	$17,362	$16,333	$15,563	$14,126
Disability	917	908	897	889	917
Survivors	310	346	376	357	351
Total benefits	**$19,800**	**$18,616**	**$17,606**	**$16,809**	**$15,394**
Type of Refund					
Separation	$60	$385	$250	$513	$104
Death	—	—	355	—	—
Total refunds	**$60**	**$385**	**$605**	**$513**	**$104**

BENEFITS AND REFUND DEDUCTIONS FROM FIDUCIARY NET POSITION BY TYPE

For the Years Ended December 31

(Dollars in Thousands)

DPS Division Trust Fund

	2019	2018	2017	2016	2015
Type of Benefit					
Age and service benefits:					
Retirees	**$267,956**	$266,260	$261,361	$253,641	$245,683
Disability	**8,358**	8,278	8,221	7,929	7,804
Survivors	**1,535**	1,685	1,607	1,582	1,581
Total benefits	**$277,849**	**$276,223**	**$271,189**	**$263,152**	**$255,068**
Type of Refund					
Separation	**$10,486**	$10,652	$9,873	$7,894	$7,685
Death	**250**	545	349	616	207
Purchased service	**2**	—	55	11	5
Total refunds	**$10,738**	**$11,197**	**$10,277**	**$8,521**	**$7,897**

	2014	2013	2012	2011	2010
Type of Benefit					
Age and service benefits:					
Retirees	$237,955	$228,692	$220,106	$212,524	$207,398
Disability	7,482	7,592	7,070	7,078	6,886
Survivors	1,568	1,637	1,566	1,511	1,541
Total benefits	**$247,005**	**$237,921**	**$228,742**	**$221,113**	**$215,825**
Type of Refund					
Separation	$7,424	$6,558	$5,602	$4,322	$2,947
Death	631	160	217	82	82
Purchased service	8	15	2	8	—
Total refunds	**$8,063**	**$6,733**	**$5,821**	**$4,412**	**$3,029**

MEMBER AND BENEFIT RECIPIENT STATISTICS[1]

(In Actual Dollars)

	State Division	School Division	Local Government Division	Judicial Division	DPS Division	Total
Active Members						
Active members as of 12/31/2019	**55,252**	**128,938**	**13,086**	**339**	**15,679**	**213,294**
Retirements During 2019						
Disability retirements	44	95	10	1	8	**158**
Service retirements	1,701	2,980	405	26	223	**5,335**
Total	**1,745**	**3,075**	**415**	**27**	**231**	**5,493**
Retirement Benefits						
Total receiving disability and service retirement benefits on 12/31/2018	39,368	65,206	7,476	368	7,017	**119,435**
Total retiring during 2019	1,745	3,075	415	27	231	**5,493**
Cobeneficiaries continuing after retiree's death	280	315	50	3	54	**702**
Returning to retirement rolls from suspension	6	13	—	—	—	**19**
Total	41,399	68,609	7,941	398	7,302	**125,649**
Retirees and cobeneficiaries deceased during year	1,176	1,402	180	10	258	**3,026**
Retirees suspending benefits to return to work	4	15	4	—	32	**55**
Total receiving retirement benefits on 12/31/2019	**40,219**	**67,192**	**7,757**	**388**	**7,012**	**122,568**[2]
Annual retirement benefits for retirees as of 12/31/2019	$1,621,595,042	$2,459,173,565	$294,131,268	$27,860,234	$273,624,402	$4,676,384,511
Average monthly benefit on 12/31/2019	$3,360	$3,050	$3,160	$5,984	$3,252	$3,179
Average monthly benefit for all members who retired during 2019	$2,767	$2,267	$2,622	$6,529	$2,464	$2,482
Survivor Benefits						
Survivor benefit accounts						
Total survivors being paid on 12/31/2019	962	1,170	176	11	131	2,450[2]
Annual benefits payable to survivors as of 12/31/2019	$22,424,906	$19,420,920	$3,905,592	$404,408	$2,491,034	$48,646,860
Future Benefits						
Future retirements to age 62 or 65	7,412	17,693	2,677	14	1,988	29,784
Total annual future benefits	$82,216,408	$143,746,179	$35,184,773	$509,706	$21,741,265	$283,398,331
Future survivor beneficiaries of inactive members	124	161	18	2	5	310[2]
Total annual future benefits	$2,264,538	$2,058,097	$224,380	$47,984	$32,180	$4,627,179

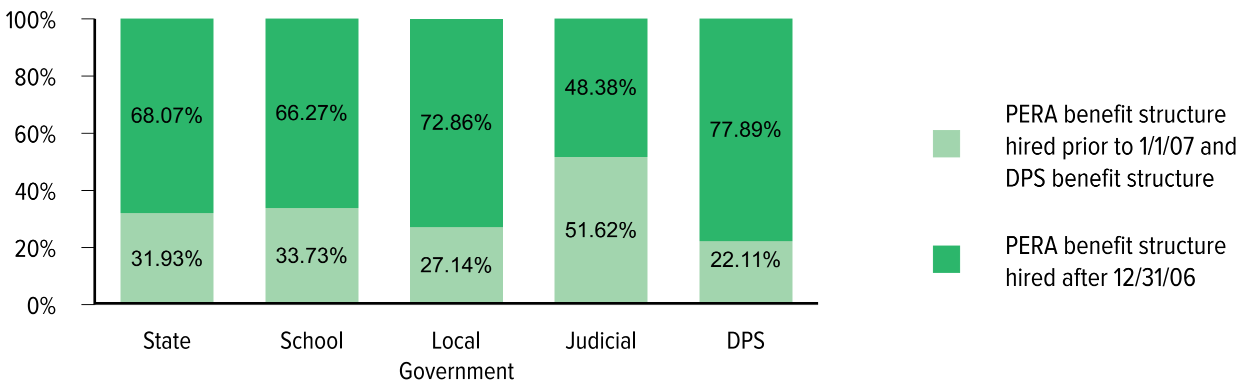
[1] In addition, as of December 31, 2019, there was a total of 253,647 non-vested inactive members due a refund of their contributions as follows: State Division—81,012; School Division—132,833; Local Government Division—26,274; Judicial Division—6; DPS Division—13,522.

[2] These line items make up the total for retirees and beneficiaries reported on page 49 in Note 1 of the Notes to the Financial Statements in the Financial Section.

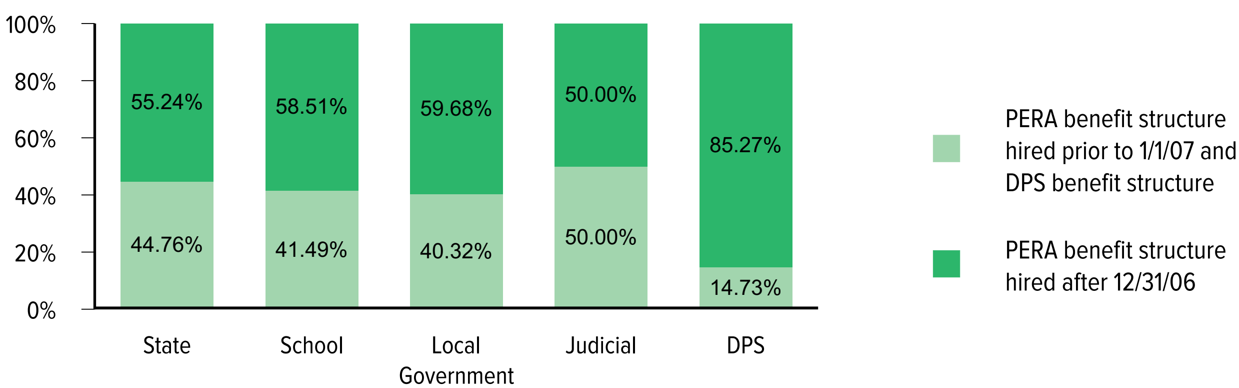
BREAKDOWN OF MEMBERSHIP BY PERCENTAGE

As of December 31, 2019

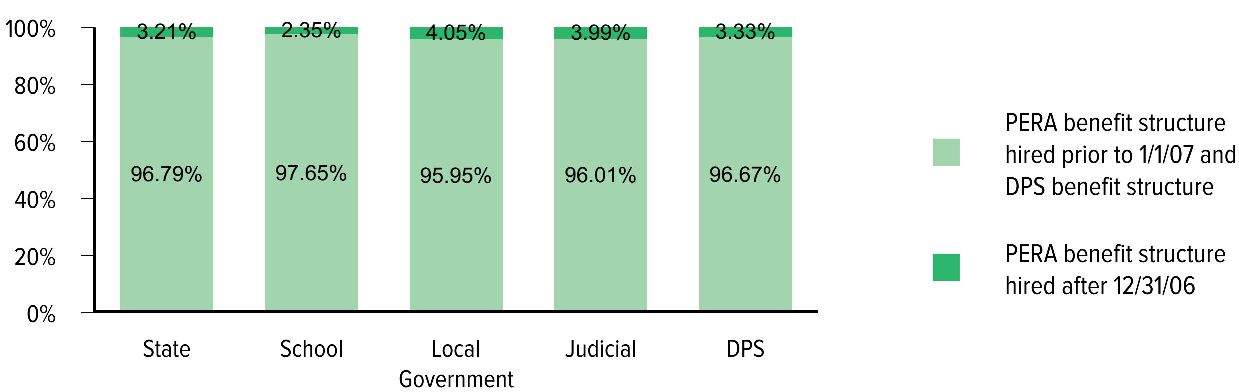
Active Members by Division



Inactive Members by Division (Vested and Non-Vested)



Retirees and Survivors by Division (Includes Deferred Survivors)



SCHEDULE OF AVERAGE RETIREMENT BENEFITS PAYABLE—ALL DIVISION TRUST FUNDS[1]

(In Actual Dollars)

Year Ended	Average Monthly Benefit	Average Age at Retirement	Average Current Age of Retirees	Average Years of Service at Retirement	Average Age at Death
12/31/2019	**$3,179**	**58.8**	**72.0**	**22.9**	**82.3**
12/31/2018	3,208	58.8	71.7	23.0	82.5
12/31/2017	3,232	58.6	71.5	23.1	82.5
12/31/2016	3,193	58.5	71.2	23.2	82.5
12/31/2015	3,153	58.4	70.9	23.3	82.2
12/31/2014	3,112	58.3	70.7	23.4	82.8
12/31/2013	3,068	58.2	70.4	23.5	82.0[2]
12/31/2012	3,020	58.2	70.0	23.5	N/A
12/31/2011	2,966	58.1	69.9	23.6	N/A
12/31/2010	2,905	58.1	69.7	23.6	N/A

1 Includes disability retirements, but not survivor benefits.

2 Information not available prior to December 31, 2013.

SCHEDULE OF AVERAGE RETIREMENT BENEFITS PAYABLE[1]

(In Actual Dollars)

	State Division	School Division	Local Government Division	Judicial Division	DPS Division
For All Retirees Year Ended 12/31/2019					
Average monthly benefit	**$3,360**	**$3,050**	**$3,160**	**$5,984**	**$3,252**
Average age at retirement	**58.6**	**58.9**	**58.6**	**62.0**	**59.4**
Average age	**72.1**	**71.9**	**70.0**	**74.8**	**74.6**
Average years of service at retirement	**22.7**	**23.1**	**21.3**	**23.1**	**24.0**
Average age at death	**82.4**	**82.1**	**79.2**	**86.2**	**84.9**
For Members Who Retired During 2019					
Average monthly benefit	**$2,767**	**$2,267**	**$2,622**	**$6,529**	**$2,464**
Average age	**62.2**	**61.7**	**61.9**	**63.8**	**63.6**
Average years of service	**19.7**	**20.0**	**17.9**	**21.0**	**18.4**
For All Retirees Year Ended 12/31/2018					
Average monthly benefit	$3,379	$3,085	$3,187	$5,915	$3,278
Average age at retirement	58.6	58.8	58.6	62.0	59.4
Average age	71.9	71.6	69.7	75.0	74.3
Average years of service at retirement	22.8	23.2	21.4	23.3	24.2
Average age at death	82.7	82.4	79.8	83.2	84.6
For Members Who Retired During 2018					
Average monthly benefit	$2,795	$2,291	$2,853	$7,556	$2,749
Average age	63.2	62.8	62.8	67.5	63.3
Average years of service	20.1	20.3	18.8	25.1	20.1

Please see page 228 for footnote references.

SCHEDULE OF AVERAGE RETIREMENT BENEFITS PAYABLE[1] (CONTINUED)

(In Actual Dollars)

	State Division	School Division	Local Government Division	Judicial Division	DPS Division
For All Retirees Year Ended 12/31/2017					
Average monthly benefit	$3,397	$3,115	$3,188	$5,864	$3,290
Average age at retirement	58.4	58.7	58.4	61.8	59.3
Average age	71.7	71.3	69.3	74.3	74.2
Average years of service at retirement	22.9	23.3	21.5	23.2	24.4
Average age at death	82.1	82.8	78.2	82.9	85.2
For Members Who Retired During 2017					
Average monthly benefit	$2,866	$2,304	$2,669	$7,747	$2,608
Average age	61.7	61.7	61.9	66.1	62.0
Average years of service	20.6	20.4	18.7	25.6	19.3
For All Retirees Year Ended 12/31/2016					
Average monthly benefit	$3,345	$3,086	$3,145	$5,624	$3,248
Average age at retirement	58.3	58.6	58.2	61.6	59.2
Average age	71.4	71.0	69.0	74.2	74.0
Average years of service at retirement	22.9	23.4	21.7	23.0	24.7
Average age at death	82.4	82.7	80.1	84.2	83.3
For Members Who Retired During 2016					
Average monthly benefit	$2,812	$2,303	$2,467	$6,192	$2,520
Average age	61.6	61.4	61.2	65.6	62.6
Average years of service	20.7	20.7	18.1	21.4	19.2
For All Retirees Year Ended 12/31/2015					
Average monthly benefit	$3,294	$3,052	$3,114	$5,379	$3,206
Average age at retirement	58.2	58.5	58.1	61.4	59.1
Average age	71.2	70.7	68.6	74.5	73.9
Average years of service at retirement	23.0	23.5	21.8	22.9	25.0
Average age at death	81.7	82.2	79.6	78.9	85.3
For Members Who Retired During 2015					
Average monthly benefit	$2,828	$2,293	$2,750	$7,030	$2,493
Average age	61.4	61.3	61.1	65.1	62.9
Average years of service	21.0	20.7	19.7	25.7	18.7
For All Retirees Year Ended 12/31/2014					
Average monthly benefit	$3,241	$3,019	$3,067	$5,158	$3,169
Average age at retirement	58.1	58.4	58.0	61.4	59.0
Average age	71.0	70.4	68.3	74.5	73.7
Average years of service at retirement	23.0	23.6	21.9	22.7	25.3
Average age at death	82.2	83.1	78.8	81.1	85.2
For Members Who Retired During 2014					
Average monthly benefit	$2,760	$2,405	$2,352	$4,969	$2,593
Average age	61.3	60.9	61.3	66.2	63.2
Average years of service	20.8	21.0	18.4	20.0	19.6

Please see page 228 for footnote references.

SCHEDULE OF AVERAGE RETIREMENT BENEFITS PAYABLE[1] (CONTINUED)

(In Actual Dollars)

	State Division	School Division	Local Government Division	Judicial Division	DPS Division
For All Retirees Year Ended 12/31/2013					
Average monthly benefit	$3,185	$2,980	$3,044	$5,077	$3,121
Average age at retirement	58.0	58.3	57.8	61.3	58.8
Average age	70.8	70.0	67.9	74.2	73.5
Average years of service at retirement	23.0	23.6	22.1	22.8	25.5
Average age at death[2]	82.5	81.4	78.6	88.2	84.8
For Members Who Retired During 2013					
Average monthly benefit	$2,837	$2,455	$2,509	$6,857	$2,776
Average age	60.7	60.8	60.1	64.9	61.7
Average years of service	21.2	21.3	18.9	26.2	19.6
For All Retirees Year Ended 12/31/2012					
Average monthly benefit	$3,124	$2,939	$3,007	$4,889	$3,064
Average age at retirement	58.0	58.2	57.7	61.2	58.8
Average age	70.4	69.7	67.5	73.7	73.3
Average years of service at retirement	23.0	23.7	22.2	22.6	25.8
For Members Who Retired During 2012					
Average monthly benefit	$2,890	$2,425	$2,876	$4,841	$2,540
Average age	60.2	60.3	59.8	63.9	62.5
Average years of service	21.8	21.3	20.9	22.7	19.7
For All Retirees Year Ended 12/31/2011					
Average monthly benefit	$3,056	$2,895	$2,948	$4,739	$3,009
Average age at retirement	58.0	58.2	57.5	61.0	58.7
Average age	70.3	69.5	67.8	73.7	73.2
Average years of service at retirement	23.0	23.8	22.3	22.4	26.0
For Members Who Retired During 2011					
Average monthly benefit	$3,010	$2,527	$2,896	$5,130	$2,665
Average age	60.2	60.3	59.3	63.4	62.0
Average years of service	22.3	22.1	21.2	23.4	20.5

1 Includes disability retirements, but not survivor benefits.

2 Information not available prior to December 31, 2013.

COLORADO PERA BENEFIT PAYMENTS—ALL DIVISION TRUST FUNDS

As of December 31, 2019

(In Actual Dollars)

PERA Benefit Payments[1,2]

At the end of 2019, PERA was paying benefits to more than 125,000 retired public employees and their beneficiaries who received an average benefit of $3,153 per month. For benefit recipients, this may be the primary source of retirement income as most PERA benefit recipients do not qualify for Social Security payments.

The PERA service retirement formula for calculating benefits, specified in State law as of December 31, 2019, is 2.5 percent multiplied by years of service multiplied by Highest Average Salary (HAS). As of December 31, 2019, HAS[3] is defined in State law as one-twelfth of the average of the highest annual salaries on which contributions were paid that are associated with three periods of 12 consecutive months of service credit. The three 12-month periods do not have to be consecutive, nor do they have to be the last three years of employment. These three periods are tied to a fourth 12-month period which becomes the base year for the year-to-year salary increase limitation for HAS calculation purposes. The year-to-year limit for members who were eligible to retire on January 1, 2011, and hired before January 1, 2007, is 15 percent. All other members are subject to an 8 percent year-to-year limit in their HAS calculation. This annual limit applied to salaries in the HAS years is designed to moderate salary "spiking."

Approximately 69.3 percent (86,589) of recipients receive less than $50,000 a year in PERA benefits, as the graph below demonstrates. Slightly less than 1.7 percent (2,120) of PERA benefit recipients receive an annual benefit payment of $100,000 or more. Generally, these benefit recipients had high salaries and a significant number of years of service credit.

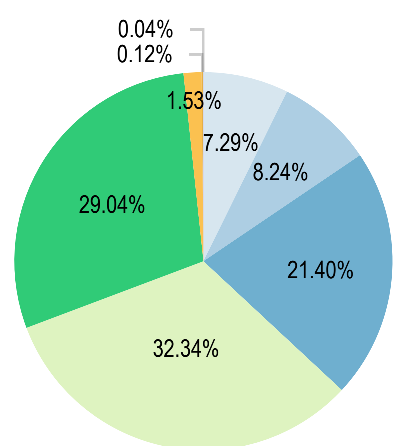
1 Includes amounts paid under replacement benefit arrangements.

2 Does not include deferred survivors and benefits that ended or were suspended in 2019.

3 Some members of the DPS benefit structure, members in the Judicial Division, and members who do not have five years of service credit on December 31, 2019, have different HAS calculations.

PERA BENEFIT PAYMENTS BY DOLLAR AMOUNT OF ANNUAL BENEFIT AND NUMBER OF BENEFIT RECIPIENTS

Benefit Range[1]	Number of Benefit Recipients[2]
$0 - $4,999	9,110
$5,000 - $9,999	10,294
$10,000 - $24,999	26,752
$25,000 - $49,999	40,433
$50,000 - $99,999	36,309
$100,000 - $149,999	1,915
$150,000 - $199,999	149
$200,000+	56
Total Benefit Recipients	**125,018**



1 Includes amounts paid under replacement benefit arrangements.

2 Does not include 310 survivors.

COLORADO PERA BENEFIT PAYMENTS—ALL DIVISION TRUST FUNDS

As of December 31, 2019

(In Actual Dollars)

Benefit Payments by Decile

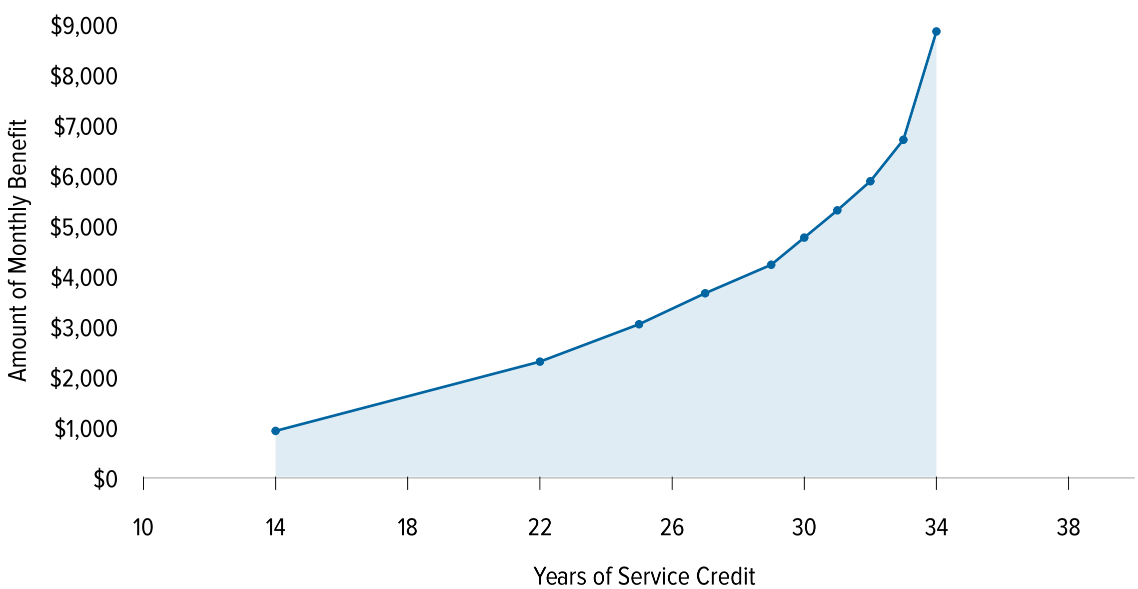
Another way to examine the data is to group benefit recipients and the benefits they receive into benefit payment ranges as a percentage of the total. The table below shows that, for the one-third of PERA benefit recipients (42,244) in the lowest decile, the average benefit is $11,196 a year. This group retired at an average age of 61 with just under 14 years of service credit. For the top decile, on the other end of the scale, the average benefit is $106,368 a year. However, this group, on average, had just over 33 years of service credit, which is more than twice the length of the average service credit of those in the lowest decile. For the 5,493 new retirees in 2019, the average monthly benefit is $2,486. These members retired at an average age of 62 with 19.67 years of service credit.

Decile	Number of Benefit Recipients[1]	Percent of Benefit Recipients	Average Monthly Benefit[2]	Average Age at Retirement	Average Service Credit
1%–10%	42,244	33.79%	$933	61	13.67
11%–20%	17,083	13.66%	2,308	58	21.47
21%–30%	12,923	10.34%	3,051	58	24.65
31%–40%	10,755	8.60%	3,666	58	26.91
41%–50%	9,316	7.45%	4,232	57	28.55
51%–60%	8,263	6.61%	4,771	57	29.74
61%–70%	7,421	5.94%	5,312	57	30.63
71%–80%	6,693	5.35%	5,890	57	31.35
81%–90%	5,872	4.70%	6,713	57	32.20
91%–100%	4,448	3.56%	8,864	58	33.23
Total	**125,018**	**100.00%**	**3,153**	**59**	**22.70**

1 Does not include 310 survivors.

2 Includes amounts paid under replacement benefit arrangements.

Average Monthly Benefit Payment by Years of Service Credit



SCHEDULE OF RETIREES AND SURVIVORS BY TYPES OF BENEFITS

As of December 31, 2019

Types of Benefits

1—Age and service retirement.

2—Disability retirement.

3—Survivor payment—Option 3.

4—Survivor payment—children, spouse, or dependent parent.

5—Surviving spouse with future benefit.

6—Former member with future benefit.

Option Selected

Retirees select one of the following options at retirement:

1—Single-life benefit.

2—Joint benefit with 1/2 to surviving cobeneficiary.

3—Joint and survivor benefit.

4—Joint benefit with 1/2 to either survivor. (No longer offered to members retiring.)

Surviving Cobeneficiary

Retiree has predeceased the cobeneficiary.

Surviving Retiree

Cobeneficiary has predeceased the retiree.

State Division

	Types of Benefits						
Amount of Monthly Benefit *(In Actual Dollars)*	Total (Columns 1–5)	1	2	3	4	5	6
$1-$1,000	5,972	5,350	257	25	273	67	5,039
$1,001-$2,000	7,216	5,488	1,339	48	299	42	1,739
$2,001-$3,000	7,767	6,402	1,210	27	120	8	444
$3,001-$4,000	6,750	6,359	299	30	60	2	127
$4,001-$5,000	5,004	4,885	86	14	18	1	41
$5,001+	8,596	8,515	29	31	17	4	22
Total	**41,305**	**36,999**	**3,220**	**175**	**787**	**124**	**7,412**

	Option Selected					
Amount of Monthly Benefit[1] *(In Actual Dollars)*	1	2	3	4	Surviving Cobeneficiary	Surviving Retiree
$1-$1,000	3,745	357	926	2	559	18
$1,001-$2,000	3,909	768	1,124	2	976	48
$2,001-$3,000	4,263	1,035	1,410	3	838	63
$3,001-$4,000	3,566	1,152	1,382	—	524	34
$4,001-$5,000	2,529	971	1,155	2	294	20
$5,001+	4,080	1,859	2,205	3	376	21
Total	**22,092**	**6,142**	**8,202**	**12**	**3,567**	**204**

[1] For Types of Benefits 1 and 2 above.

SCHEDULE OF RETIREES AND SURVIVORS BY TYPES OF BENEFITS

As of December 31, 2019

Types of Benefits

1—Age and service retirement.

2—Disability retirement.

3—Survivor payment—Option 3.

4—Survivor payment—children, spouse, or dependent parent.

5—Surviving spouse with future benefit.

6—Former member with future benefit.

Option Selected

Retirees select one of the following options at retirement:

1—Single-life benefit.

2—Joint benefit with 1/2 to surviving cobeneficiary.

3—Joint and survivor benefit.

4—Joint benefit with 1/2 to either survivor. (No longer offered to members retiring.)

Surviving Cobeneficiary

Retiree has predeceased the cobeneficiary.

Surviving Retiree

Cobeneficiary has predeceased the retiree.

School Division

Types of Benefits

Amount of Monthly Benefit *(In Actual Dollars)*	Total (Columns 1–5)	1	2	3	4	5	6
$1-$1,000	15,064	13,621	774	51	522	96	14,251
$1,001-$2,000	11,180	9,703	1,109	40	282	46	2,747
$2,001-$3,000	10,072	9,225	685	20	130	12	501
$3,001-$4,000	9,628	9,226	324	18	55	5	135
$4,001-$5,000	9,077	8,928	117	12	19	1	40
$5,001+	13,502	13,441	39	15	6	1	19
Total	**68,523**	**64,144**	**3,048**	**156**	**1,014**	**161**	**17,693**

Option Selected

Amount of Monthly Benefit[1] *(In Actual Dollars)*	1	2	3	4	Surviving Cobeneficiary	Surviving Retiree
$1-$1,000	10,229	1,042	2,121	2	952	49
$1,001-$2,000	6,907	1,347	1,612	3	888	55
$2,001-$3,000	5,886	1,606	1,614	2	738	64
$3,001-$4,000	5,857	1,838	1,466	3	359	27
$4,001-$5,000	5,234	1,989	1,531	2	273	16
$5,001+	8,456	2,848	1,875	6	278	17
Total	**42,569**	**10,670**	**10,219**	**18**	**3,488**	**228**

[1] For Types of Benefits 1 and 2 above.

SCHEDULE OF RETIREES AND SURVIVORS BY TYPES OF BENEFITS

As of December 31, 2019

Types of Benefits

1—Age and service retirement.

2—Disability retirement.

3—Survivor payment—Option 3.

4—Survivor payment—children, spouse, or dependent parent.

5—Surviving spouse with future benefit.

6—Former member with future benefit.

Option Selected

Retirees select one of the following options at retirement:

1—Single-life benefit.

2—Joint benefit with 1/2 to surviving cobeneficiary.

3—Joint and survivor benefit.

4—Joint benefit with 1/2 to either survivor. (No longer offered to members retiring.)

Surviving Cobeneficiary

Retiree has predeceased the cobeneficiary.

Surviving Retiree

Cobeneficiary has predeceased the retiree.

Local Government Division

Types of Benefits

Amount of Monthly Benefit *(In Actual Dollars)*	Total (Columns 1–5)	1	2	3	4	5	6
$1-$1,000	1,451	1,338	54	6	45	8	1,629
$1,001-$2,000	1,554	1,204	279	8	54	9	680
$2,001-$3,000	1,406	1,138	231	10	27	—	249
$3,001-$4,000	1,145	1,062	68	5	9	1	75
$4,001-$5,000	863	844	13	5	1	—	32
$5,001+	1,532	1,519	7	5	1	—	12
Total	**7,951**	**7,105**	**652**	**39**	**137**	**18**	**2,677**

Option Selected

Amount of Monthly Benefit[1] *(In Actual Dollars)*	1	2	3	4	Surviving Cobeneficiary	Surviving Retiree
$1-$1,000	938	102	229	—	120	3
$1,001-$2,000	859	166	285	1	163	9
$2,001-$3,000	718	227	303	—	113	8
$3,001-$4,000	596	234	230	—	65	5
$4,001-$5,000	426	177	218	—	36	—
$5,001+	650	375	450	—	51	—
Total	**4,187**	**1,281**	**1,715**	**1**	**548**	**25**

[1] For Types of Benefits 1 and 2 above.

SCHEDULE OF RETIREES AND SURVIVORS BY TYPES OF BENEFITS

As of December 31, 2019

Types of Benefits

1—Age and service retirement.

2—Disability retirement.

3—Survivor payment—Option 3.

4—Survivor payment—children, spouse, or dependent parent.

5—Surviving spouse with future benefit.

6—Former member with future benefit.

Option Selected

Retirees select one of the following options at retirement:

1—Single-life benefit.

2—Joint benefit with 1/2 to surviving cobeneficiary.

3—Joint and survivor benefit.

4—Joint benefit with 1/2 to either survivor. (No longer offered to members retiring.)

Surviving Cobeneficiary

Retiree has predeceased the cobeneficiary.

Surviving Retiree

Cobeneficiary has predeceased the retiree.

Judicial Division

	Types of Benefits						
Amount of Monthly Benefit *(In Actual Dollars)*	Total (Columns 1–5)	1	2	3	4	5	6
$1-$1,000	18	16	1	—	—	1	2
$1,001-$2,000	28	24	1	—	3	—	1
$2,001-$3,000	32	28	2	—	2	—	5
$3,001-$4,000	33	26	3	—	3	1	3
$4,001-$5,000	39	33	5	—	1	—	2
$5,001+	251	242	7	1	1	—	1
Total	**401**	**369**	**19**	**1**	**10**	**2**	**14**

	Option Selected					
Amount of Monthly Benefit[1] *(In Actual Dollars)*	1	2	3	4	Surviving Cobeneficiary	Surviving Retiree
$1-$1,000	7	1	3	—	6	—
$1,001-$2,000	10	1	4	—	10	—
$2,001-$3,000	5	5	9	—	11	—
$3,001-$4,000	8	4	10	—	7	—
$4,001-$5,000	10	4	14	—	10	—
$5,001+	79	60	88	—	22	—
Total	**119**	**75**	**128**	**—**	**66**	**—**

[1] For Types of Benefits 1 and 2 above.

SCHEDULE OF RETIREES AND SURVIVORS BY TYPES OF BENEFITS

As of December 31, 2019

Types of Benefits

1—Age and service retirement.

2—Disability retirement.

3—Survivor payment—Option 3.

4—Survivor payment—children, spouse, or dependent parent.

5—Surviving spouse with future benefit.

6—Former member with future benefit.

Option Selected

Retirees select one of the following options at retirement:

1—Single-life benefit.

2—Joint benefit with 1/2 to surviving cobeneficiary.

3—Joint and survivor benefit.

4—Joint benefit with 1/2 to either survivor. (No longer offered to members retiring.)

Surviving Cobeneficiary

Retiree has predeceased the cobeneficiary.

Surviving Retiree

Cobeneficiary has predeceased the retiree.

DPS Division

Types of Benefits

Amount of Monthly Benefit (In Actual Dollars)	Total (Columns 1–5)	1	2	3	4	5	6
$1-$1,000	944	805	79	1	54	5	1,347
$1,001-$2,000	1,190	1,048	115	1	26	—	512
$2,001-$3,000	1,175	1,050	89	14	22	—	95
$3,001-$4,000	1,315	1,263	43	7	2	—	24
$4,001-$5,000	1,319	1,298	18	2	1	—	5
$5,001+	1,205	1,200	4	1	—	—	5
Total	**7,148**	**6,664**	**348**	**26**	**105**	**5**	**1,988**

Option Selected[1]

Amount of Monthly Benefit[2] (In Actual Dollars)	1	2	3	4	Surviving Cobeneficiary	Surviving Retiree	Cobeneficiaries Both Deceased
$1-$1,000	611	34	125	—	85	28	1
$1,001-$2,000	706	87	201	—	115	51	3
$2,001-$3,000	616	96	249	—	106	71	1
$3,001-$4,000	660	117	310	—	141	76	2
$4,001-$5,000	626	119	352	—	121	98	—
$5,001+	606	121	327	—	95	55	—
Total	**3,825**	**574**	**1,564**	**—**	**663**	**379**	**7**

[1] Below are the equivalent DPS benefit structure options:
PERA Option 1 = Options A, B, and D (D is discontinued)
PERA Option 2 = Options P2 and E (E is discontinued)
PERA Option 3 = Options P3 and C (C is discontinued)

[2] For Types of Benefits 1 and 2 above.

SCHEDULE OF AVERAGE BENEFIT PAYMENTS

(In Actual Dollars)

State Division

	Years of Service Credit						
Year Retired	0–5	5–10	10–15	15–20	20–25	25–30	30+
Period 1/1/2019 to 12/31/2019							
Average monthly benefit	**$146**	**$674**	**$1,212**	**$1,948**	**$2,897**	**$4,102**	**$5,660**
Average highest average salary	**$2,608**	**$3,902**	**$4,401**	**$4,743**	**$5,607**	**$6,358**	**$7,235**
Number of service retirees	**110**	**229**	**237**	**231**	**287**	**282**	**325**
Period 1/1/2018 to 12/31/2018							
Average monthly benefit	$153	$596	$1,250	$1,997	$2,880	$3,981	$5,571
Average highest average salary	$2,721	$3,531	$4,332	$4,838	$5,559	$6,179	$7,111
Number of service retirees	83	281	228	234	306	303	379
Period 1/1/2017 to 12/31/2017							
Average monthly benefit	$233	$704	$1,287	$2,102	$3,025	$4,355	$5,618
Average highest average salary	$3,134	$3,869	$4,312	$4,860	$5,532	$6,465	$7,162
Number of service retirees	102	238	253	271	338	357	322
Period 1/1/2016 to 12/31/2016							
Average monthly benefit	$240	$641	$1,285	$2,050	$2,983	$4,128	$5,593
Average highest average salary	$3,010	$3,477	$4,394	$4,790	$5,397	$6,130	$6,957
Number of service retirees	103	244	233	238	319	357	319
Period 1/1/2015 to 12/31/2015							
Average monthly benefit	$241	$770	$1,339	$2,111	$2,934	$4,121	$5,232
Average highest average salary	$2,851	$4,043	$4,506	$4,766	$5,260	$6,074	$6,490
Number of service retirees	82	246	214	222	293	348	324
Period 1/1/2014 to 12/31/2014							
Average monthly benefit	$228	$626	$1,239	$1,996	$2,930	$4,002	$5,438
Average highest average salary	$2,960	$3,421	$4,046	$4,609	$5,351	$5,904	$6,642
Number of service retirees	64	204	218	212	278	327	261
Period 1/1/2013 to 12/31/2013							
Average monthly benefit	$269	$628	$1,288	$1,997	$2,853	$4,165	$5,285
Average highest average salary	$2,836	$3,508	$4,030	$4,527	$5,150	$6,196	$6,617
Number of service retirees	64	173	151	167	236	296	252
Period 1/1/2012 to 12/31/2012							
Average monthly benefit	$236	$634	$1,259	$2,121	$2,855	$4,126	$5,035
Average highest average salary	$2,487	$3,355	$4,141	$4,661	$5,248	$5,969	$6,268
Number of service retirees	60	182	196	206	284	351	343
Period 1/1/2011 to 12/31/2011							
Average monthly benefit	$160	$690	$1,214	$1,956	$2,863	$4,096	$5,307
Average highest average salary	$2,254	$3,425	$4,027	$4,413	$5,181	$6,002	$6,661
Number of service retirees	53	184	130	143	237	331	305
Period 1/1/2010 to 12/31/2010							
Average monthly benefit	$266	$617	$1,089	$2,200	$2,816	$4,011	$5,156
Average highest average salary	$2,569	$3,212	$3,504	$4,923	$5,102	$5,983	$6,394
Number of service retirees	34	171	127	164	305	430	362

Note: HAS is defined as one-twelfth of the average of the highest annual salaries associated with three periods of 12 consecutive months of service credit. These three periods are tied to a fourth 12-month period which becomes the base year for the year-to-year increase limitation, which is designed to moderate “spiking.” Some members of the DPS benefit structure, members in the Judicial Division, and members who do not have five years of service credit on December 31, 2019, have different HAS calculations.

SCHEDULE OF AVERAGE BENEFIT PAYMENTS

(In Actual Dollars)

School Division

	Years of Service Credit						
Year Retired	0–5	5–10	10–15	15–20	20–25	25–30	30+
Period 1/1/2019 to 12/31/2019							
Average monthly benefit	**$138**	**$396**	**$786**	**$1,440**	**$2,321**	**$3,503**	**$4,911**
Average highest average salary	**$1,981**	**$2,339**	**$2,854**	**$3,519**	**$4,428**	**$5,374**	**$6,356**
Number of service retirees	**141**	**366**	**440**	**377**	**635**	**509**	**512**
Period 1/1/2018 to 12/31/2018							
Average monthly benefit	$124	$436	$805	$1,440	$2,254	$3,580	$4,833
Average highest average salary	$1,951	$2,574	$2,917	$3,535	$4,296	$5,435	$6,175
Number of service retirees	122	365	451	474	640	551	541
Period 1/1/2017 to 12/31/2017							
Average monthly benefit	$185	$433	$925	$1,582	$2,418	$3,794	$4,891
Average highest average salary	$1,980	$2,351	$3,118	$3,615	$4,393	$5,547	$6,067
Number of service retirees	159	370	463	485	611	590	428
Period 1/1/2016 to 12/31/2016							
Average monthly benefit	$127	$430	$879	$1,684	$2,304	$3,727	$4,695
Average highest average salary	$1,796	$2,325	$2,924	$3,799	$4,156	$5,388	$5,851
Number of service retirees	118	384	388	408	565	589	422
Period 1/1/2015 to 12/31/2015							
Average monthly benefit	$221	$436	$899	$1,565	$2,400	$3,682	$4,621
Average highest average salary	$2,015	$2,317	$3,058	$3,538	$4,322	$5,347	$5,741
Number of service retirees	110	372	398	397	544	618	395
Period 1/1/2014 to 12/31/2014							
Average monthly benefit	$194	$467	$939	$1,661	$2,407	$3,726	$4,778
Average highest average salary	$2,108	$2,580	$3,189	$3,706	$4,372	$5,422	$5,908
Number of service retirees	106	362	401	392	531	597	465
Period 1/1/2013 to 12/31/2013							
Average monthly benefit	$201	$474	$976	$1,687	$2,448	$3,685	$4,739
Average highest average salary	$1,791	$2,726	$3,197	$3,721	$4,357	$5,318	$5,886
Number of service retirees	79	350	339	311	492	571	441
Period 1/1/2012 to 12/31/2012							
Average monthly benefit	$216	$473	$815	$1,632	$2,411	$3,682	$4,592
Average highest average salary	$1,696	$2,575	$2,800	$3,546	$4,368	$5,370	$5,791
Number of service retirees	96	365	349	380	534	634	509
Period 1/1/2011 to 12/31/2011							
Average monthly benefit	$214	$462	$806	$1,625	$2,430	$3,617	$4,632
Average highest average salary	$1,980	$2,563	$2,683	$3,526	$4,344	$5,235	$5,804
Number of service retirees	71	336	273	334	506	651	497
Period 1/1/2010 to 12/31/2010							
Average monthly benefit	$212	$464	$780	$1,543	$2,393	$3,603	$4,602
Average highest average salary	$2,193	$2,572	$2,500	$3,336	$4,243	$5,207	$5,722
Number of service retirees	56	297	252	305	585	755	601

Note: HAS is defined as one-twelfth of the average of the highest annual salaries associated with three periods of 12 consecutive months of service credit. These three periods are tied to a fourth 12-month period which becomes the base year for the year-to-year increase limitation, which is designed to moderate “spiking.” Some members of the DPS benefit structure, members in the Judicial Division, and members who do not have five years of service credit on December 31, 2019, have different HAS calculations.

SCHEDULE OF AVERAGE BENEFIT PAYMENTS

(In Actual Dollars)

Local Government Division

	Years of Service Credit						
Year Retired	**0–5**	**5–10**	**10–15**	**15–20**	**20–25**	**25–30**	**30+**
Period 1/1/2019 to 12/31/2019							
Average monthly benefit	**$204**	**$737**	**$1,336**	**$2,127**	**$3,042**	**$4,447**	**$5,849**
Average highest average salary	**$3,752**	**$4,816**	**$5,056**	**$5,270**	**$6,155**	**$7,081**	**$7,701**
Number of service retirees	**26**	**66**	**71**	**62**	**64**	**62**	**54**
Period 1/1/2018 to 12/31/2018							
Average monthly benefit	$224	$600	$1,496	$2,232	$3,054	$4,745	$6,276
Average highest average salary	$3,698	$3,820	$5,655	$5,428	$5,865	$7,485	$8,237
Number of service retirees	19	63	82	43	76	60	61
Period 1/1/2017 to 12/31/2017							
Average monthly benefit	$240	$621	$1,282	$2,202	$3,241	$4,687	$5,720
Average highest average salary	$4,224	$3,889	$4,675	$5,056	$6,165	$6,969	$7,260
Number of service retirees	29	60	72	52	78	54	55
Period 1/1/2016 to 12/31/2016							
Average monthly benefit	$323	$686	$1,401	$2,195	$2,761	$4,569	$5,378
Average highest average salary	$4,580	$4,031	$5,104	$5,506	$5,255	$6,796	$6,648
Number of service retirees	15	73	77	49	55	52	46
Period 1/1/2015 to 12/31/2015							
Average monthly benefit	$252	$663	$1,202	$2,255	$3,152	$3,970	$5,814
Average highest average salary	$3,727	$4,141	$4,581	$5,481	$5,960	$5,896	$7,317
Number of service retirees	16	64	62	36	76	70	60
Period 1/1/2014 to 12/31/2014							
Average monthly benefit	$241	$680	$1,185	$2,190	$3,110	$4,068	$4,796
Average highest average salary	$4,005	$3,912	$4,206	$5,106	$5,805	$6,299	$6,037
Number of service retirees	15	87	63	42	61	59	48
Period 1/1/2013 to 12/31/2013							
Average monthly benefit	$211	$650	$1,259	$2,156	$2,733	$4,020	$5,692
Average highest average salary	$3,013	$3,743	$4,467	$5,107	$5,311	$6,024	$7,353
Number of service retirees	16	58	47	36	49	73	34
Period 1/1/2012 to 12/31/2012							
Average monthly benefit	$536	$839	$1,264	$2,524	$3,095	$4,323	$4,943
Average highest average salary	$4,726	$4,538	$4,213	$5,649	$5,626	$6,465	$6,275
Number of service retirees	27	96	77	83	138	138	99
Period 1/1/2011 to 12/31/2011							
Average monthly benefit	$338	$665	$1,011	$1,985	$2,908	$4,093	$5,337
Average highest average salary	$5,959	$3,988	$3,469	$4,616	$5,333	$6,070	$6,712
Number of service retirees	13	48	33	32	42	78	60
Period 1/1/2010 to 12/31/2010							
Average monthly benefit	$401	$725	$1,053	$1,955	$2,776	$4,540	$5,024
Average highest average salary	$3,879	$4,141	$3,516	$4,482	$5,184	$6,476	$6,414
Number of service retirees	8	46	32	41	73	116	124

Note: HAS is defined as one-twelfth of the average of the highest annual salaries associated with three periods of 12 consecutive months of service credit. These three periods are tied to a fourth 12-month period which becomes the base year for the year-to-year increase limitation, which is designed to moderate “spiking.” Some members of the DPS benefit structure, members in the Judicial Division, and members who do not have five years of service credit on December 31, 2019, have different HAS calculations.

SCHEDULE OF AVERAGE BENEFIT PAYMENTS

(In Actual Dollars)

Judicial Division

	Years of Service Credit						
Year Retired	**0–5**	**5–10**	**10–15**	**15–20**	**20–25**	**25–30**	**30+**
Period 1/1/2019 to 12/31/2019							
Average monthly benefit	**$—**	**$505**	**$3,822**	**$5,548**	**$6,389**	**$9,190**	**$11,134**
Average highest average salary	**$—**	**$4,208**	**$13,596**	**$13,969**	**$13,267**	**$13,950**	**$13,458**
Number of service retirees	**—**	**2**	**4**	**7**	**3**	**7**	**3**
Period 1/1/2018 to 12/31/2018							
Average monthly benefit	$—	$2,763	$—	$5,841	$6,403	$8,926	$11,277
Average highest average salary	$—	$13,617	$—	$13,351	$13,378	$13,548	$15,287
Number of service retirees	—	1	—	1	2	1	2
Period 1/1/2017 to 12/31/2017							
Average monthly benefit	$—	$1,929	$3,419	$6,000	$—	$8,369	$11,366
Average highest average salary	$—	$13,295	$9,786	$12,308	$—	$12,825	$13,840
Number of service retirees	—	3	3	2	—	8	8
Period 1/1/2016 to 12/31/2016							
Average monthly benefit	$679	$1,868	$3,471	$5,044	$5,641	$8,291	$10,086
Average highest average salary	$6,905	$12,839	$12,526	$12,043	$11,450	$13,030	$13,340
Number of service retirees	2	2	1	6	3	7	5
Period 1/1/2015 to 12/31/2015							
Average monthly benefit	$—	$—	$4,012	$4,158	$5,913	$7,635	$9,227
Average highest average salary	$—	$—	$13,045	$11,602	$11,664	$12,097	$12,331
Number of service retirees	—	—	2	1	6	4	6
Period 1/1/2014 to 12/31/2014							
Average monthly benefit	$—	$1,505	$2,767	$4,432	$6,197	$7,806	$7,287
Average highest average salary	$—	$9,209	$10,444	$10,910	$11,182	$12,370	$9,350
Number of service retirees	—	3	3	1	4	2	3
Period 1/1/2013 to 12/31/2013							
Average monthly benefit	$—	$—	$3,596	$—	$—	$9,561	$9,427
Average highest average salary	$—	$—	$9,119	$—	$—	$11,271	$10,871
Number of service retirees	—	—	3	—	—	1	4
Period 1/1/2012 to 12/31/2012							
Average monthly benefit	$—	$713	$3,376	$4,438	$7,013	$6,927	$2,582
Average highest average salary	$—	$4,363	$10,256	$8,787	$12,913	$10,988	$3,077
Number of service retirees	—	4	1	2	2	8	1
Period 1/1/2011 to 12/31/2011							
Average monthly benefit	$—	$962	$2,332	$3,156	$5,642	$4,768	$7,974
Average highest average salary	$—	$8,192	$10,487	$8,704	$10,430	$7,818	$9,925
Number of service retirees	—	1	2	3	5	3	5
Period 1/1/2010 to 12/31/2010							
Average monthly benefit	$—	$—	$2,246	$—	$5,734	$7,313	$8,959
Average highest average salary	$—	$—	$7,685	$—	$10,717	$10,602	$10,999
Number of service retirees	—	—	1	—	1	4	4

Note: HAS is defined as one-twelfth of the average of the highest annual salaries associated with three periods of 12 consecutive months of service credit. These three periods are tied to a fourth 12-month period which becomes the base year for the year-to-year increase limitation, which is designed to moderate “spiking.” Some members of the DPS benefit structure, members in the Judicial Division, and members who do not have five years of service credit on December 31, 2019, have different HAS calculations.

SCHEDULE OF AVERAGE BENEFIT PAYMENTS

(In Actual Dollars)

DPS Division

	Years of Service Credit						
Year Retired	**0–5**	**5–10**	**10–15**	**15–20**	**20–25**	**25–30**	**30+**
Period 1/1/2019 to 12/31/2019							
Average monthly benefit	**$119**	**$519**	**$1,361**	**$2,205**	**$2,644**	**$4,237**	**$5,801**
Average highest average salary	**$2,828**	**$3,093**	**$5,082**	**$5,691**	**$5,223**	**$6,601**	**$7,292**
Number of service retirees	**8**	**56**	**34**	**28**	**28**	**37**	**32**
Period 1/1/2018 to 12/31/2018							
Average monthly benefit	$77	$475	$1,369	$1,748	$2,727	$4,334	$5,337
Average highest average salary	$1,890	$2,972	$4,821	$4,714	$5,464	$6,788	$6,831
Number of service retirees	5	65	23	34	35	51	61
Period 1/1/2017 to 12/31/2017							
Average monthly benefit	$176	$555	$1,305	$2,089	$3,242	$4,544	$5,416
Average highest average salary	$2,466	$2,926	$4,325	$5,263	$5,682	$6,625	$6,835
Number of service retirees	8	59	21	38	52	58	20
Period 1/1/2016 to 12/31/2016							
Average monthly benefit	$163	$611	$1,462	$1,989	$3,415	$4,133	$5,342
Average highest average salary	$1,938	$3,536	$4,816	$4,955	$6,055	$5,876	$6,785
Number of service retirees	4	59	40	60	59	56	24
Period 1/1/2015 to 12/31/2015							
Average monthly benefit	$230	$702	$1,588	$1,994	$3,147	$4,159	$5,254
Average highest average salary	$1,908	$4,275	$5,022	$4,808	$5,523	$7,318	$6,391
Number of service retirees	12	55	36	37	60	56	19
Period 1/1/2014 to 12/31/2014							
Average monthly benefit	$472	$810	$1,379	$2,233	$3,091	$4,243	$4,862
Average highest average salary	$3,399	$4,593	$4,489	$5,569	$5,607	$6,250	$5,891
Number of service retirees	15	39	44	49	72	44	32
Period 1/1/2013 to 12/31/2013							
Average monthly benefit	$276	$890	$1,365	$1,847	$3,214	$4,350	$5,049
Average highest average salary	$2,532	$5,835	$4,861	$4,618	$5,754	$6,611	$6,097
Number of service retirees	15	30	31	32	69	57	27
Period 1/1/2012 to 12/31/2012							
Average monthly benefit	$274	$840	$1,507	$2,099	$3,032	$3,589	$4,568
Average highest average salary	$2,645	$4,483	$4,919	$5,238	$5,454	$5,478	$5,682
Number of service retirees	8	38	31	42	70	38	33
Period 1/1/2011 to 12/31/2011							
Average monthly benefit	$1,297	$996	$1,479	$2,060	$3,373	$4,188	$4,290
Average highest average salary	$2,751	$4,789	$4,956	$4,948	$5,910	$6,046	$5,198
Number of service retirees	8	30	35	38	57	38	26
Period 1/1/2010 to 12/31/2010							
Average monthly benefit	$1,203	$867	$1,386	$1,943	$2,870	$3,971	$4,710
Average highest average salary	$3,568	$4,608	$4,335	$5,151	$5,312	$5,893	$5,944
Number of service retirees	5	17	20	25	42	33	30

Note: HAS is defined as one-twelfth of the average of the highest annual salaries associated with three periods of 12 consecutive months of service credit. These three periods are tied to a fourth 12-month period which becomes the base year for the year-to-year increase limitation, which is designed to moderate “spiking.” Some members of the DPS benefit structure, members in the Judicial Division, and members who do not have five years of service credit on December 31, 2019, have different HAS calculations.

SCHEDULE OF AVERAGE BENEFIT PAYMENTS

(In Actual Dollars)

All Division Trust Funds

	Years of Service Credit						
Year Retired	**0–5**	**5–10**	**10–15**	**15–20**	**20–25**	**25–30**	**30+**
Period 1/1/2019 to 12/31/2019							
Average monthly benefit	**$147**	**$526**	**$1,005**	**$1,738**	**$2,549**	**$3,831**	**$5,280**
Average highest average salary	**$2,408**	**$3,128**	**$3,670**	**$4,264**	**$4,919**	**$5,919**	**$6,798**
Number of service retirees	**285**	**719**	**786**	**705**	**1,017**	**897**	**926**
Period 1/1/2018 to 12/31/2018							
Average monthly benefit	$142	$514	$1,023	$1,668	$2,516	$3,824	$5,227
Average highest average salary	$2,373	$3,070	$3,671	$4,090	$4,829	$5,876	$6,691
Number of service retirees	229	775	784	786	1,059	966	1,044
Period 1/1/2017 to 12/31/2017							
Average monthly benefit	$207	$553	$1,088	$1,819	$2,707	$4,102	$5,302
Average highest average salary	$2,606	$3,064	$3,684	$4,196	$4,940	$6,039	$6,662
Number of service retirees	298	730	812	848	1,079	1,067	833
Period 1/1/2016 to 12/31/2016							
Average monthly benefit	$192	$540	$1,096	$1,882	$2,621	$3,955	$5,137
Average highest average salary	$2,530	$2,979	$3,730	$4,375	$4,746	$5,783	$6,402
Number of service retirees	242	762	739	761	1,001	1,061	816
Period 1/1/2015 to 12/31/2015							
Average monthly benefit	$231	$587	$1,101	$1,802	$2,686	$3,879	$5,006
Average highest average salary	$2,445	$3,198	$3,753	$4,112	$4,848	$5,738	$6,225
Number of service retirees	220	737	712	693	979	1,096	804
Period 1/1/2014 to 12/31/2014							
Average monthly benefit	$229	$564	$1,084	$1,839	$2,674	$3,863	$5,005
Average highest average salary	$2,620	$3,135	$3,641	$4,207	$4,875	$5,674	$6,165
Number of service retirees	200	695	729	696	946	1,029	809
Period 1/1/2013 to 12/31/2013							
Average monthly benefit	$233	$555	$1,117	$1,822	$2,640	$3,896	$4,999
Average highest average salary	$2,352	$3,196	$3,644	$4,111	$4,747	$5,710	$6,229
Number of service retirees	174	611	571	546	846	998	758
Period 1/1/2012 to 12/31/2012							
Average monthly benefit	$270	$589	$1,038	$1,913	$2,677	$3,910	$4,779
Average highest average salary	$2,413	$3,174	$3,480	$4,227	$4,870	$5,721	$5,999
Number of service retirees	191	685	654	713	1,028	1,169	985
Period 1/1/2011 to 12/31/2011							
Average monthly benefit	$265	$576	$989	$1,770	$2,657	$3,817	$4,919
Average highest average salary	$2,480	$3,063	$2,941	$3,605	$4,371	$5,351	$6,012
Number of service retirees	145	599	473	550	847	1,101	893
Period 1/1/2010 to 12/31/2010							
Average monthly benefit	$292	$549	$922	$1,795	$2,572	$3,836	$4,846
Average highest average salary	$2,515	$2,979	$2,767	$3,754	$4,401	$5,454	$5,881
Number of service retirees	103	531	432	535	1,006	1,338	1,121

Note: HAS is defined as one-twelfth of the average of the highest annual salaries associated with three periods of 12 consecutive months of service credit. These three periods are tied to a fourth 12-month period which becomes the base year for the year-to-year increase limitation, which is designed to moderate “spiking.” Some members of the DPS benefit structure, members in the Judicial Division, and members who do not have five years of service credit on December 31, 2019, have different HAS calculations.

SCHEDULE OF AVERAGE BENEFIT PAYMENTS

(In Actual Dollars)

Health Care Trust Fund[1]

Year Retired	Years of Service Credit 0–5	5–10	10–15	15–20	20–25	25–30	30+
Period 1/1/2019 to 12/31/2019							
Average monthly benefit	**$15**	**$57**	**$102**	**$147**	**$195**	**$203**	**$205**
Number of service retirees[2]	**19**	**57**	**120**	**184**	**316**	**319**	**416**
Period 1/1/2018 to 12/31/2018							
Average monthly benefit	$20	$62	$110	$154	$201	$201	$209
Number of service retirees[2]	7	56	131	177	394	365	482

[1] In future reports, additional years will be added until 10 years of historical data are presented.

[2] Only includes those service retirees participating in PERACare.

DPS Health Care Trust Fund[1]

Year Retired	Years of Service Credit 0–5	5–10	10–15	15–20	20–25	25–30	30+
Period 1/1/2019 to 12/31/2019							
Average monthly benefit	**$6**	**$68**	**$99**	**$131**	**$201**	**$208**	**$203**
Number of service retirees[2]	**1**	**4**	**9**	**7**	**13**	**16**	**17**
Period 1/1/2018 to 12/31/2018							
Average monthly benefit	$—	$65	$67	$170	$203	$208	$208
Number of service retirees[2]	—	8	3	6	13	21	36

[1] In future reports, additional years will be added until 10 years of historical data are presented.

[2] Only includes those service retirees participating in PERACare.

All Health Care Trust Funds[1]

Year Retired	Years of Service Credit 0–5	5–10	10–15	15–20	20–25	25–30	30+
Period 1/1/2019 to 12/31/2019							
Average monthly benefit	**$14**	**$58**	**$102**	**$147**	**$195**	**$203**	**$205**
Number of service retirees[2]	**20**	**61**	**129**	**191**	**329**	**335**	**433**
Period 1/1/2018 to 12/31/2018							
Average monthly benefit	$20	$62	$109	$154	$201	$201	$209
Number of service retirees[2]	7	64	134	183	407	386	518

[1] In future reports, additional years will be added until 10 years of historical data are presented.

[2] Only includes those service retirees participating in PERACare.

SCHEDULE OF CONTRIBUTION RATE HISTORY

State Division (Members Other Than State Troopers)[1]

Years			Member Contribution Rate	Employer Contribution Rate[2]	Amortization Equalization Disbursement	Supplemental Amortization Equalization Disbursement	Nonemployer Contribution Rate	Total Contribution Rate
			Percent of Covered Payroll					
8/1/1931	to	6/30/1938	3.50%	—	—	—	—	3.50%
7/1/1938	to	6/30/1949	3.50%	3.50%	—	—	—	7.00%
7/1/1949	to	6/30/1958	5.00%	5.00%	—	—	—	10.00%
7/1/1958	to	6/30/1969	6.00%	6.00%	—	—	—	12.00%
7/1/1969	to	6/30/1970	7.00%	7.00%	—	—	—	14.00%
7/1/1970	to	6/30/1971	7.00%	8.00%	—	—	—	15.00%
7/1/1971	to	6/30/1973	7.00%	8.50%	—	—	—	15.50%
7/1/1973	to	6/30/1974	7.75%	9.50%	—	—	—	17.25%
7/1/1974	to	6/30/1975	7.75%	10.50%	—	—	—	18.25%
7/1/1975	to	8/31/1980	7.75%	10.64%	—	—	—	18.39%
9/1/1980	to	12/31/1981	7.75%	12.20%	—	—	—	19.95%
1/1/1982	to	6/30/1987	8.00%	12.20%	—	—	—	20.20%
7/1/1987	to	6/30/1988	8.00%	10.20%	—	—	—	18.20%
7/1/1988	to	6/30/1991	8.00%	12.20%	—	—	—	20.20%
7/1/1991	to	4/30/1992	8.00%	11.60%	—	—	—	19.60%
5/1/1992	to	6/30/1992	8.00%	5.60%[3]	—	—	—	13.60%
7/1/1992	to	6/30/1993	8.00%	10.60%	—	—	—	18.60%
7/1/1993	to	6/30/1997	8.00%	11.60%	—	—	—	19.60%
1/1/2006	to	12/31/2006	8.00%	10.15%	0.50%	—	—	18.65%
1/1/2007	to	12/31/2007	8.00%	10.15%	1.00%	—	—	19.15%
1/1/2008	to	12/31/2008	8.00%	10.15%	1.40%	0.50%	—	20.05%
1/1/2009	to	12/31/2009	8.00%	10.15%	1.80%	1.00%	—	20.95%
1/1/2010	to	6/30/2010	8.00%	10.15%	2.20%	1.50%	—	21.85%
7/1/2010	to	12/31/2010	10.50%[4]	7.65%[4]	2.20%	1.50%	—	21.85%
1/1/2011	to	12/31/2011	10.50%[4]	7.65%[4]	2.60%	2.00%	—	22.75%
1/1/2012	to	6/30/2012	10.50%[4]	7.65%[4]	3.00%	2.50%	—	23.65%
7/1/2012	to	12/31/2012	8.00%	10.15%	3.00%	2.50%	—	23.65%
1/1/2013	to	12/31/2013	8.00%	10.15%	3.40%	3.00%	—	24.55%
1/1/2014	to	12/31/2014	8.00%	10.15%	3.80%	3.50%	—	25.45%
1/1/2015	to	12/31/2015	8.00%	10.15%	4.20%	4.00%	—	26.35%
1/1/2016	to	12/31/2016	8.00%	10.15%	4.60%	4.50%	—	27.25%
1/1/2017	to	12/31/2017	8.00%	10.15%	5.00%	5.00%	—	28.15%
1/1/2018	to	12/31/2018	8.00%	10.15%	5.00%	5.00%	2.71%[5]	30.86%
1/1/2019	**to**	**6/30/2019**	**8.00%**	**10.15%**	**5.00%**	**5.00%**	**2.57%**[5,6]	**30.72%**
7/1/2019	**to**	**12/31/2019**	**8.75%**	**10.40%**	**5.00%**	**5.00%**	**2.57%**[5,6]	**31.72%**

1 State and School Divisions merged July 1, 1997, and separated on January 1, 2006.

2 All employer contribution rates shown since July 1, 1985, include the Health Care Trust Fund (HCTF) allocation.

3 Legislation created an annual reduction equal to 1.0 percent of salary retroactive to July 1, 1991, to be taken during May and June of 1992.

4 Senate Bills 10-146 and 11-076 required member contributions to increase by 2.50 percent and employer contributions to decrease by 2.50 percent.

5 Contributions from a nonemployer contributing entity are required by C.R.S. § 24-51-414 *et seq*. and are remitted to PERA as a single sum in July of each year. For purposes of this schedule, the amount allocated to the State Division is expressed as a percentage of annual covered payroll.

6 The amount allocated to the State Division is shown in both six-month segment contribution summaries. The rate presented in each segment is based on annual covered payroll for improved comparative analysis to the prior year.

SCHEDULE OF CONTRIBUTION RATE HISTORY

State Troopers[1]

Years			Member Contribution Rate	Employer Contribution Rate[2]	Amortization Equalization Disbursement	Supplemental Amortization Equalization Disbursement	Nonemployer Contribution Rate	Total Contribution Rate
			Percent of Covered Payroll					
7/1/1945	to	6/30/1969	7.00%	7.00%	—	—	—	14.00%
7/1/1969	to	6/30/1970	8.00%	8.00%	—	—	—	16.00%
7/1/1970	to	6/30/1971	8.00%	9.00%	—	—	—	17.00%
7/1/1971	to	6/30/1973	8.00%	9.50%	—	—	—	17.50%
7/1/1973	to	6/30/1974	8.75%	10.50%	—	—	—	19.25%
7/1/1974	to	6/30/1975	8.75%	11.50%	—	—	—	20.25%
7/1/1975	to	8/31/1980	8.75%	11.64%	—	—	—	20.39%
9/1/1980	to	12/31/1981	8.75%	13.20%	—	—	—	21.95%
1/1/1982	to	6/30/1987	9.00%	13.20%	—	—	—	22.20%
7/1/1987	to	6/30/1988	9.00%	11.20%	—	—	—	20.20%
7/1/1988	to	6/30/1989	9.00%	13.20%	—	—	—	22.20%
7/1/1989	to	4/30/1992	12.30%	13.20%	—	—	—	25.50%
5/1/1992	to	6/30/1992	12.30%	7.20%[3]	—	—	—	19.50%
7/1/1992	to	6/30/1993	11.50%	12.20%	—	—	—	23.70%
7/1/1993	to	6/30/1997	11.50%	13.20%	—	—	—	24.70%
7/1/1997	to	6/30/1999	11.50%	13.10%	—	—	—	24.60%
7/1/1999	to	6/30/2001	10.00%	13.10%	—	—	—	23.10%
7/1/2001	to	6/30/2002	10.00%	12.60%	—	—	—	22.60%
7/1/2002	to	6/30/2003	10.00%	12.74%	—	—	—	22.74%
7/1/2003	to	12/31/2005	10.00%	12.85%	—	—	—	22.85%
1/1/2006	to	12/31/2006	10.00%	12.85%	0.50%	—	—	23.35%
1/1/2007	to	12/31/2007	10.00%	12.85%	1.00%	—	—	23.85%
1/1/2008	to	12/31/2008	10.00%	12.85%	1.40%	0.50%	—	24.75%
1/1/2009	to	12/31/2009	10.00%	12.85%	1.80%	1.00%	—	25.65%
1/1/2010	to	6/30/2010	10.00%	12.85%	2.20%	1.50%	—	26.55%
7/1/2010	to	12/31/2010	12.50%[4]	10.35%[4]	2.20%	1.50%	—	26.55%
1/1/2011	to	12/31/2011	12.50%[4]	10.35%[4]	2.60%	2.00%	—	27.45%
1/1/2012	to	6/30/2012	12.50%[4]	10.35%[4]	3.00%	2.50%	—	28.35%
7/1/2012	to	12/31/2012	10.00%	12.85%	3.00%	2.50%	—	28.35%
1/1/2013	to	12/31/2013	10.00%	12.85%	3.40%	3.00%	—	29.25%
1/1/2014	to	12/31/2014	10.00%	12.85%	3.80%	3.50%	—	30.15%
1/1/2015	to	12/31/2015	10.00%	12.85%	4.20%	4.00%	—	31.05%
1/1/2016	to	12/31/2016	10.00%	12.85%	4.60%	4.50%	—	31.95%
1/1/2017	to	12/31/2017	10.00%	12.85%	5.00%	5.00%	—	32.85%
1/1/2018	to	12/31/2018	10.00%	12.85%	5.00%	5.00%	2.71%[5]	35.56%
1/1/2019	**to**	**6/30/2019**	**10.00%**	**12.85%**	**5.00%**	**5.00%**	**2.57%[5,6]**	**35.42%**
7/1/2019	**to**	**12/31/2019**	**10.75%**	**13.10%**	**5.00%**	**5.00%**	**2.57%[5,6]**	**36.42%**

1 State and School Divisions merged July 1, 1997, and separated on January 1, 2006.

2 All employer contribution rates shown since July 1, 1985, include the HCTF allocation.

3 Legislation created an annual reduction equal to 1.0 percent of salary retroactive to July 1, 1991, to be taken during May and June of 1992.

4 Senate Bills 10-146 and 11-076 required member contributions to increase by 2.50 percent and employer contributions to decrease by 2.50 percent.

5 Contributions from a nonemployer contributing entity are required by C.R.S. § 24-51-414 *et seq.* and are remitted to PERA as a single sum in July of each year. For purposes of this schedule, the amount allocated to the State Division is expressed as a percentage of annual covered payroll.

6 The amount allocated to the State Division is shown in both six-month segment contribution summaries. The rate presented in each segment is based on annual covered payroll for improved comparative analysis to the prior year.

SCHEDULE OF CONTRIBUTION RATE HISTORY

School Division[1]

Years			Member Contribution Rate	Employer Contribution Rate[2]	Amortization Equalization Disbursement	Supplemental Amortization Equalization Disbursement	Nonemployer Contribution Rate	Total Contribution Rate
			Percent of Covered Payroll					
1/1/1944	to	12/31/1949	3.50%	3.50%	—	—	—	7.00%
1/1/1950	to	6/30/1958	5.00%	5.00%	—	—	—	10.00%
7/1/1958	to	6/30/1969	6.00%	6.00%	—	—	—	12.00%
7/1/1969	to	12/31/1969	7.00%	6.00%	—	—	—	13.00%
1/1/1970	to	12/31/1970	7.00%	7.50%	—	—	—	14.50%
1/1/1971	to	12/31/1971	7.00%	8.50%	—	—	—	15.50%
1/1/1972	to	6/30/1973	7.00%	9.25%	—	—	—	16.25%
7/1/1973	to	12/31/1973	7.75%	9.25%	—	—	—	17.00%
1/1/1974	to	12/31/1974	7.75%	10.25%	—	—	—	18.00%
1/1/1975	to	12/31/1975	7.75%	11.25%	—	—	—	19.00%
1/1/1976	to	12/31/1980	7.75%	12.10%	—	—	—	19.85%
1/1/1981	to	12/31/1981	7.75%	12.50%	—	—	—	20.25%
1/1/1982	to	6/30/1987	8.00%	12.50%	—	—	—	20.50%
7/1/1987	to	6/30/1988	8.00%	11.50%	—	—	—	19.50%
7/1/1988	to	6/30/1991	8.00%	12.50%	—	—	—	20.50%
7/1/1991	to	6/30/1992	8.00%	12.20%	—	—	—	20.20%
7/1/1992	to	6/30/1997	8.00%	11.60%	—	—	—	19.60%
1/1/2006	to	12/31/2006	8.00%	10.15%	0.50%	—	—	18.65%
1/1/2007	to	12/31/2007	8.00%	10.15%	1.00%	—	—	19.15%
1/1/2008	to	12/31/2008	8.00%	10.15%	1.40%	0.50%	—	20.05%
1/1/2009	to	12/31/2009	8.00%	10.15%	1.80%	1.00%	—	20.95%
1/1/2010	to	12/31/2010	8.00%	10.15%	2.20%	1.50%	—	21.85%
1/1/2011	to	12/31/2011	8.00%	10.15%	2.60%	2.00%	—	22.75%
1/1/2012	to	12/31/2012	8.00%	10.15%	3.00%	2.50%	—	23.65%
1/1/2013	to	12/31/2013	8.00%	10.15%	3.40%	3.00%	—	24.55%
1/1/2014	to	12/31/2014	8.00%	10.15%	3.80%	3.50%	—	25.45%
1/1/2015	to	12/31/2015	8.00%	10.15%	4.20%	4.00%	—	26.35%
1/1/2016	to	12/31/2016	8.00%	10.15%	4.50%	4.50%	—	27.15%
1/1/2017	to	12/31/2017	8.00%	10.15%	4.50%	5.00%	—	27.65%
1/1/2018	to	12/31/2018	8.00%	10.15%	4.50%	5.50%	2.64%[3]	30.79%
1/1/2019	**to**	**6/30/2019**	**8.00%**	**10.15%**	**4.50%**	**5.50%**	**2.50%**[3,4]	**30.65%**
7/1/2019	**to**	**12/31/2019**	**8.75%**	**10.40%**	**4.50%**	**5.50%**	**2.50%**[3,4]	**31.65%**

1 State and School Divisions merged July 1, 1997, and separated on January 1, 2006.

2 All employer contribution rates shown since July 1, 1985, include the HCTF allocation.

3 Contributions from a nonemployer contributing entity are required by C.R.S. § 24-51-414 *et seq*. and are remitted to PERA as a single sum in July of each year. For purposes of this schedule, the amount allocated to the School Division is expressed as a percentage of annual covered payroll.

4 The amount allocated to the School Division is shown in both six-month segment contribution summaries. The rate presented in each segment is based on annual covered payroll for improved comparative analysis to the prior year.

SCHEDULE OF CONTRIBUTION RATE HISTORY

State and School Division[1]

Years			Percent of Covered Payroll	
			Member Contribution Rate	Employer Contribution Rate[2]
7/1/1997	to	6/30/1998	8.00 %	11.50 %
7/1/1998	to	6/30/2000	8.00 %	11.40 %
7/1/2000	to	6/30/2001	8.00 %	10.40 %
7/1/2001	to	6/30/2002	8.00 %	9.90 %
7/1/2002	to	6/30/2003	8.00 %	10.04 %
7/1/2003	to	12/31/2005	8.00 %	10.15 %

1 State and School Divisions merged July 1, 1997, and separated on January 1, 2006.

2 The employer contribution rates shown include the HCTF allocation.

Local Government Division[1]

Years			Percent of Covered Payroll				
			Member Contribution Rate	Employer Contribution Rate[2]	Amortization Equalization Disbursement	Supplemental Amortization Equalization Disbursement	Total Contribution Rate
1/1/1944	to	12/31/1949	3.50%	3.50%	—	—	7.00%
1/1/1950	to	6/30/1958	5.00%	5.00%	—	—	10.00%
7/1/1958	to	6/30/1969	6.00%	6.00%	—	—	12.00%
7/1/1969	to	12/31/1969	7.00%	6.00%	—	—	13.00%
1/1/1970	to	12/31/1970	7.00%	7.00%	—	—	14.00%
1/1/1971	to	6/30/1973	7.00%	7.50%	—	—	14.50%
7/1/1973	to	12/31/1973	7.75%	7.50%	—	—	15.25%
1/1/1974	to	12/31/1974	7.75%	8.50%	—	—	16.25%
1/1/1975	to	12/31/1975	7.75%	9.50%	—	—	17.25%
1/1/1976	to	12/31/1980	7.75%	9.86%	—	—	17.61%
1/1/1981	to	12/31/1981	7.75%	10.20%	—	—	17.95%
1/1/1982	to	6/30/1991	8.00%	10.20%	—	—	18.20%
7/1/1991	to	12/31/2000	8.00%	10.00%	—	—	18.00%
1/1/2001	to	12/31/2001	8.00%	9.43%	—	—	17.43%
1/1/2002	to	12/31/2002	8.00%	9.19%	—	—	17.19%
1/1/2003	to	12/31/2003	8.00%	9.60%	—	—	17.60%
1/1/2004	to	12/31/2005	8.00%	10.00%	—	—	18.00%
1/1/2006	to	12/31/2006	8.00%	10.00%	0.50%	—	18.50%
1/1/2007	to	12/31/2007	8.00%	10.00%	1.00%	—	19.00%
1/1/2008	to	12/31/2008	8.00%	10.00%	1.40%	0.50%	19.90%
1/1/2009	to	12/31/2009	8.00%	10.00%	1.80%	1.00%	20.80%
1/1/2010	to	**12/31/2019**	**8.00%**	**10.00%**	**2.20%**	**1.50%**	**21.70%**

1 The Local Government Division Trust Fund was the Municipal Division Trust Fund prior to January 1, 2006.

2 All employer contribution rates shown since July 1, 1985, include the HCTF allocation.

SCHEDULE OF CONTRIBUTION RATE HISTORY

Judicial Division

Years			Member Contribution Rate	Employer Contribution Rate[1]	Amortization Equalization Disbursement	Supplemental Amortization Equalization Disbursement	Nonemployer Contribution Rate	Total Contribution Rate
			Percent of Covered Payroll					
7/1/1949	to	6/30/1957	5.00%	5.00%	—	—	—	10.00%
7/1/1957	to	6/30/1973	6.00%	12.00%	—	—	—	18.00%
7/1/1973	to	6/30/1980	7.00%	12.00%	—	—	—	19.00%
7/1/1980	to	8/30/1980	7.00%	13.00%	—	—	—	20.00%
9/1/1980	to	12/31/1981	7.00%	15.00%	—	—	—	22.00%
1/1/1982	to	6/30/1987	8.00%	15.00%	—	—	—	23.00%
7/1/1987	to	6/30/1988	8.00%	13.00%	—	—	—	21.00%
7/1/1988	to	6/30/2000	8.00%	15.00%	—	—	—	23.00%
7/1/2000	to	6/30/2001	8.00%	14.00%	—	—	—	22.00%
7/1/2001	to	6/30/2003	8.00%	11.82%	—	—	—	19.82%
7/1/2003	to	6/30/2004	8.00%	12.66%	—	—	—	20.66%
7/1/2004	to	12/31/2005	8.00%	13.66%	—	—	—	21.66%
1/1/2006	to	12/31/2006	8.00%	13.66%	0.50%	—	—	22.16%
1/1/2007	to	12/31/2007	8.00%	13.66%	1.00%	—	—	22.66%
1/1/2008	to	12/31/2008	8.00%	13.66%	1.40%	0.50%	—	23.56%
1/1/2009	to	12/31/2009	8.00%	13.66%	1.80%	1.00%	—	24.46%
1/1/2010	to	6/30/2010	8.00%	13.66%	2.20%	1.50%	—	25.36%
7/1/2010	to	6/30/2012	10.50%[2]	11.16%[2]	2.20%	1.50%	—	25.36%
7/1/2012	to	12/31/2017	8.00%	13.66%	2.20%	1.50%	—	25.36%
1/1/2018	to	12/31/2018	8.00%	13.66%	2.20%	1.50%	2.74%[3]	28.10%
1/1/2019	**to**	**6/30/2019**	**8.00%**	**13.66%**	**3.40%**	**3.40%**	**2.51%[3,4]**	**30.97%**
7/1/2019	**to**	**12/31/2019**	**8.75%**	**13.91%**	**3.40%**	**3.40%**	**2.51%[3,4]**	**31.97%**

1 All employer contribution rates shown since July 1, 1985, include the HCTF allocation.

2 Senate Bills 10-146 and 11-076 required member contributions to increase by 2.50 percent and employer contributions to decrease by 2.50 percent.

3 Contributions from a nonemployer contributing entity are required by C.R.S. § 24-51-414 *et seq.* and are remitted to PERA as a single sum in July of each year. For purposes of this schedule, the amount allocated to the Judicial Division is expressed as a percentage of annual covered payroll.

4 The amount allocated to the Judicial Division is shown in both six-month segment contribution summaries. The rate presented in each segment is based on annual covered payroll for improved comparative analysis to the prior year.

SCHEDULE OF CONTRIBUTION RATE HISTORY

DPS Division[1]

Years			Member Contribution Rate	Employer Contribution Rate[2]	Amortization Equalization Disbursement	Supplemental Amortization Equalization Disbursement	Employer Contribution PCOP Offset[3]	Nonemployer Contribution Rate	Total Contribution Rate
			Percent of Covered Payroll						
1/1/2010	to	12/31/2010	8.00%	13.75%	2.20%	1.50%	(15.04%)	—	10.41%
1/1/2011	to	12/31/2011	8.00%	13.75%	2.60%	2.00%	(14.72%)	—	11.63%
1/1/2012	to	12/31/2012	8.00%	13.75%	3.00%	2.50%	(15.37%)	—	11.88%
1/1/2013	to	12/31/2013	8.00%	13.75%	3.40%	3.00%	(14.51%)	—	13.64%
1/1/2014	to	12/31/2014	8.00%	13.75%	3.80%	3.50%	(16.89%)	—	12.16%
1/1/2015	to	12/31/2015	8.00%	10.15%[4]	4.20%	4.00%	(15.97%)	—	10.38%
1/1/2016	to	12/31/2016	8.00%	10.15%	4.50%	4.50%	(15.54%)	—	11.61%
1/1/2017	to	12/31/2017	8.00%	10.15%	4.50%	5.00%	(14.56%)	—	13.09%
1/1/2018	to	12/31/2018	8.00%	10.15%	4.50%	5.50%	(14.18%)	2.58%[5]	16.55%
1/1/2019	**to**	**6/30/2019**	**8.00%**	**10.15%**	**4.50%**	**5.50%**	**(13.35%)**[6]	**2.61%**[5,7]	**17.41%**
7/1/2019	**to**	**12/31/2019**	**8.75%**	**10.40%**	**4.50%**	**5.50%**	**(13.60%)**[6]	**2.61%**[5,7]	**18.16%**

1 The DPS Division Trust Fund was established on January 1, 2010, and received the net assets of the DPSRS.

2 All employer contribution rates shown include the DPS HCTF allocation.

3 An offset to the DPS Division rate is provided for under C.R.S. § 24-51-412. See Note 4 of the Notes to the Financial Statements in the Financial Section.

4 On June 3, 2015, House Bill 15-1391 reduced the employer contribution rate with a retroactive effective date of January 1, 2015.

5 Contributions from a nonemployer contributing entity are required by C.R.S. § 24-51-414 *et seq*. and are remitted to PERA as a single sum in July of each year. For purposes of this schedule, the amount allocated to the DPS Division is expressed as a percentage of annual covered payroll.

6 To conform with this presentation of contribution rates, the annual PCOP offset of 13.48 percent for 2019 has been adjusted based on the portion of the PCOP offset used to satisfy employer contribution requirements.

7 The amount allocated to the DPS Division is shown in both six-month segment contribution summaries. The rate presented in each segment is based on annual covered payroll for improved comparative analysis to the prior year.

SCHEDULE OF CONTRIBUTION RATE HISTORY

Employer Contributions to Health Care Trust Funds

Division/Years			Percent of Covered Payroll Allocated from Employer Contribution to Health Care Trust Funds
State Division[1]			
7/1/1985	to	6/30/1997	0.80 %
1/1/2006	to	**12/31/2019**	**1.02 %**
School Division[1]			
7/1/1985	to	6/30/1997	0.80 %
1/1/2006	to	**12/31/2019**	**1.02 %**
State and School Division[1]			
7/1/1997	to	6/30/1999	0.80 %
7/1/1999	to	12/31/2000	1.10 %
1/1/2001	to	12/31/2001	1.42 %
1/1/2002	to	12/31/2002	1.64 %
1/1/2003	to	6/30/2004	1.10 %
7/1/2004	to	12/31/2005	1.02 %
Local Government Division[2]			
7/1/1985	to	6/30/1999	0.80 %
7/1/1999	to	12/31/2000	1.10 %
1/1/2001	to	12/31/2001	1.96 %
1/1/2002	to	12/31/2002	2.31 %
1/1/2003	to	12/31/2003	1.69 %
1/1/2004	to	6/30/2004	1.10 %
7/1/2004	to	**12/31/2019**	**1.02 %**
Judicial Division			
7/1/1985	to	6/30/1999	0.80 %
7/1/1999	to	12/31/2000	1.10 %
1/1/2001	to	12/31/2002	4.37 %
1/1/2003	to	12/31/2003	3.11 %
1/1/2004	to	6/30/2004	1.10 %
7/1/2004	to	**12/31/2019**	**1.02 %**
DPS Division[3]			
1/1/2010	to	**12/31/2019**	**1.02 %**

[1] State and School Divisions merged July 1, 1997, and separated on January 1, 2006.

[2] The Local Government Division Trust Fund was the Municipal Division Trust Fund prior to January 1, 2006.

[3] The DPS HCTF was established on January 1, 2010, and received the balance of the Denver Public Schools Retiree Health Benefit Trust.

SCHEDULE OF CONTRIBUTION RATE HISTORY

Employer Contributions to MatchMaker[1]

Division/Years			Percent of Covered Payroll Available from Employer Contribution for MatchMaker (Maximum Match)
State and School Division[2]			
1/1/2001	to	12/31/2002	3.00 %
1/1/2003	to	12/31/2003	2.00 %
1/1/2004	to	5/31/2004	1.00 %
Local Government Division[3]			
1/1/2001	to	12/31/2001	2.00 %
1/1/2002	to	12/31/2002	3.00 %
1/1/2003	to	12/31/2003	2.00 %
1/1/2004	to	5/31/2004	1.00 %
Judicial Division			
1/1/2001	to	12/31/2002	7.00 %
1/1/2003	to	12/31/2003	6.00 %
1/1/2004	to	5/31/2004	5.00 %

1 Legislation enacted in 2004 ended MatchMaker contributions by June 1, 2004.

2 State and School Divisions merged July 1, 1997, and separated on January 1, 2006.

3 The Local Government Division Trust Fund was the Municipal Division Trust Fund prior to January 1, 2006.

PRINCIPAL PARTICIPATING EMPLOYERS

State Division Trust Fund[1,2]

	2019			2014		
Employer	Covered Active Members December 31	Rank	Percentage of Total System	Covered Active Members December 31	Rank	Percentage of Total System
State of Colorado	**51,203**	**1**	**92.67%**	50,508	1	91.33%

[1] Guidance under GASB 67 classifies a primary government and its component units as one employer. Due to this change, data for the number of members by employer for years prior to 2014 is not available.

[2] This employer count is presented for purposes of complying with GASB 67 only. For all other purposes, the definition of an employer is governed by Title 24, Article 51 of the C.R.S., PERA's Rules, 8 CCR 1502-1, and, if applicable, the employer's affiliation agreement with PERA.

School Division Trust Fund[1,2]

	2019			2014		
Employer	Covered Active Members December 31	Rank	Percentage of Total System	Covered Active Members December 31	Rank	Percentage of Total System
Jefferson County School District R-1	**12,450**	**1**	**9.66%**	12,184	1	10.19%
Douglas County School District Re 1	**9,363**	**2**	**7.26%**	8,345	2	6.98%
Cherry Creek School District 5	**8,344**	**3**	**6.47%**	7,670	3	6.41%
Adams-Arapahoe School District 28J	**5,749**	**4**	**4.46%**	5,453	4	4.56%
Adams 12 Five Star Schools	**5,517**	**5**	**4.28%**	5,261	5	4.40%
Boulder Valley School District RE2	**4,803**	**6**	**3.73%**	4,678	6	3.91%
Poudre School District R-1	**4,797**	**7**	**3.72%**	4,425	7	3.70%
St. Vrain Valley School District RE1J	**4,635**	**8**	**3.59%**	4,189	9	3.50%
Colorado Springs School District 11	**4,424**	**9**	**3.43%**	4,292	8	3.59%
Academy School District #20	**4,110**	**10**	**3.19%**	3,660	10	3.06%

[1] Guidance under GASB 67 classifies a primary government and its component units as one employer. Due to this change, data for the number of members by employer for years prior to 2014 is not available.

[2] This employer count is presented for purposes of complying with GASB 67 only. For all other purposes, the definition of an employer is governed by Title 24, Article 51 of the C.R.S., PERA's Rules, 8 CCR 1502-1, and, if applicable, the employer's affiliation agreement with PERA.

Local Government Division Trust Fund[1,2]

	2019			2014		
Employer	Covered Active Members December 31	Rank	Percentage of Total System	Covered Active Members December 31	Rank	Percentage of Total System
City of Colorado Springs	**3,369**	**1**	**25.75%**	3,054	1	25.27%
Boulder County	**2,122**	**2**	**16.22%**	2,067	2	17.11%
City of Boulder	**1,576**	**3**	**12.04%**	1,413	3	11.69%

[1] Guidance under GASB 67 classifies a primary government and its component units as one employer. Due to this change, data for the number of members by employer for years prior to 2014 is not available.

[2] This employer count is presented for purposes of complying with GASB 67 only. For all other purposes, the definition of an employer is governed by Title 24, Article 51 of the C.R.S., PERA's Rules, 8 CCR 1502-1, and, if applicable, the employer's affiliation agreement with PERA.

PRINCIPAL PARTICIPATING EMPLOYERS (CONTINUED)

Judicial Division Trust Fund[1,2]

Employer	2019 Covered Active Members December 31	2019 Rank	2019 Percentage of Total System	2014 Covered Active Members December 31	2014 Rank	2014 Percentage of Total System
Judicial Department	**326**	**1**	**96.17%**	318	1	95.21%

1 Guidance under GASB 67 classifies a primary government and its component units as one employer. Due to this change, data for the number of members by employer for years prior to 2014 is not available.

2 This employer count is presented for purposes of complying with GASB 67 only. For all other purposes, the definition of an employer is governed by Title 24, Article 51 of the C.R.S., PERA's Rules, 8 CCR 1502-1, and, if applicable, the employer's affiliation agreement with PERA.

DPS Division Trust Fund[1,2]

Employer	2019 Covered Active Members December 31	2019 Rank	2019 Percentage of Total System	2014 Covered Active Members December 31	2014 Rank	2014 Percentage of Total System
Denver Public School District No. 1	**15,679**	**1**	**100.00%**	15,414	1	100.00%

1 Guidance under GASB 67 classifies a primary government and its component units as one employer. Due to this change, data for the number of members by employer for years prior to 2014 is not available.

2 This employer count is presented for purposes of complying with GASB 67 only. For all other purposes, the definition of an employer is governed by Title 24, Article 51 of the C.R.S., PERA's Rules, 8 CCR 1502-1, and, if applicable, the employer's affiliation agreement with PERA.

PRINCIPAL PARTICIPATING EMPLOYERS (CONTINUED)

Health Care Trust Fund[1,2]

	2019			2017		
Employer	Covered Active Members December 31	Rank	Percentage of Total System	Covered Active Members December 31	Rank	Percentage of Total System
State of Colorado	**51,203**	**1**	**25.91%**	51,022	1	26.60%
Jefferson County School District R-1	**12,450**	**2**	**6.30%**	12,295	2	6.41%
Douglas County School District Re 1	**9,363**	**3**	**4.74%**	9,100	3	4.75%
Cherry Creek School District 5	**8,344**	**4**	**4.22%**	7,929	4	4.13%
Adams-Arapahoe School District 28J	**5,749**	**5**	**2.91%**	5,271	5	2.75%
Adams 12 Five Star Schools	**5,517**	**6**	**2.79%**	5,075	6	2.65%
Boulder Valley School District RE2	**4,803**	**7**	**2.43%**	4,763	7	2.48%
Poudre School District R-1	**4,797**	**8**	**2.43%**			
Colorado Springs School District 11				4,448	8	2.32%

1 Guidance under GASB Statement No. 74 classifies a primary government and its component units as one employer. Due to this change, data for the number of members by employer for years prior to 2017 is not available.

2 This employer count is presented for purposes of complying with GASB 74 only. For all other purposes, the definition of an employer is governed by Title 24, Article 51 of the C.R.S., PERA's Rules, 8 CCR 1502-1, and, if applicable, the employer's affiliation agreement with PERA.

DPS Health Care Trust Fund[1,2]

	2019			2017		
Employer	Covered Active Members December 31	Rank	Percentage of Total System	Covered Active Members December 31	Rank	Percentage of Total System
Denver Public School District No. 1	**15,679**	**1**	**100.00%**	15,991	1	100.00%

1 Guidance under GASB Statement No. 74 classifies a primary government and its component units as one employer. Due to this change, data for the number of members by employer for years prior to 2017 is not available.

2 This employer count is presented for purposes of complying with GASB 74 only. For all other purposes, the definition of an employer is governed by Title 24, Article 51 of the C.R.S., PERA's Rules, 8 CCR 1502-1, and, if applicable, the employer's affiliation agreement with PERA.

SCHEDULE OF AFFILIATED EMPLOYERS

State Division

Agencies and Instrumentalities

CollegeInvest
College Assist
Colorado Association of School Boards
Colorado Association of School Executives
Colorado Community College System
Colorado High School Activities Association
Colorado House of Representatives
Colorado Senate
Colorado Water Resources & Power Development Authority
Department of Agriculture
Department of Corrections
Department of Education
Department of Health Care Policy and Financing
Department of Human Services
Department of Labor and Employment
Department of Law
Department of Local Affairs
Department of Military and Veterans Affairs
Department of Natural Resources
Department of Personnel and Administration
Department of Public Health and Environment
Department of Public Safety
Department of Regulatory Agencies
Department of Revenue
Department of State
Department of the Treasury
Department of Transportation
Fire and Police Pension Association
Joint Budget Committee
Judicial Department
Legislative Council
Office of the District Attorneys
Office of Economic Development and International Trade
Office of the Governor
Office of Information Technology
Office of Legislative Legal Services
Office of the Lieutenant Governor
Office of the State Auditor
Pinnacol Assurance
Public Employees' Retirement Association of Colorado
School for the Deaf and the Blind
Special District Association of Colorado
State Historical Society

Institutions of Higher Education

Adams State University
Aims Community College
Arapahoe Community College
Auraria Higher Education Center
Aurora Community College
Colorado Mesa University
Colorado Mountain College
Colorado Northwestern Community College
Colorado School of Mines
Colorado State University
Colorado State University at Pueblo
Commission on Higher Education
Denver Community College
Fort Lewis College
Front Range Community College
Lamar Community College
Metropolitan State University of Denver
Morgan Community College
Northeastern Junior College
Otero Junior College
Pikes Peak Community College
Pueblo Vocational Community College
Red Rocks Community College
State Board for Community Colleges and Occupational Education
Trinidad State Junior College
University of Colorado
University of Northern Colorado
Western State Colorado University

SCHEDULE OF AFFILIATED EMPLOYERS

School Division[1]

Adams County
Adams 12 Five Star Schools
Adams County School District 14
Bennett School District 29J
Brighton School District 27J
Mapleton School District 1
Strasburg School District 31J
Westminster Public Schools

Alamosa County
Alamosa County School District Re-11J
Sangre de Cristo School District Re-22J

Arapahoe County
Adams-Arapahoe School District 28J
Byers School District 32J
Cherry Creek School District 5
Deer Trail School District 26J
Englewood School District 1
Littleton School District 6
Sheridan School District 2

Archuleta County
Archuleta County School District 50 Jt

Baca County
Campo School District RE-6
Pritchett School District RE-3
Springfield School District RE-4
Vilas School District RE-5
Walsh School District RE-1

Bent County
Las Animas School District RE-1
McClave School District RE-2

Boulder County
Boulder Valley School District RE2
St. Vrain Valley School District RE1J

Chaffee County
Buena Vista School District R-31
Salida School District R-32(J)

Cheyenne County
Cheyenne County School District Re-5
Kit Carson School District R-1

Clear Creek County
Clear Creek School District RE-1

Conejos County
North Conejos School District RE1J
Sanford School District 6J
South Conejos School District RE 10

Costilla County
Centennial School District R-1
Sierra Grande School District R-30

Crowley County
Crowley County School District RE-1

Custer County
Custer County Consolidated School District C-1

Delta County
Delta County School District 50(J)

Dolores County
Dolores County School District Re No. 2

Douglas County
Douglas County School District Re 1

Eagle County
Eagle County School District Re 50

Elbert County
Agate School District 300
Big Sandy School District 100J
Elbert School District 200
Elizabeth School District C-1
Kiowa School District C-2

El Paso County
Academy School District #20
Calhan School District RJ1
Cheyenne Mountain School District 12
Colorado Springs School District 11
Edison School District 54 Jt
Ellicott School District 22
Falcon School District 49
Fountain School District 8
Hanover School District 28
Harrison School District 2
Lewis-Palmer School District 38
Manitou Springs School District 14
Miami/Yoder School District 60 Jt
Peyton School District 23 Jt
Widefield School District 3

[1] The list of employers in the School Division does not include charter schools operating within the respective public school districts and under the Colorado Charter School Institute.

SCHEDULE OF AFFILIATED EMPLOYERS

School Division[1] (continued)

Fremont County
Canon City School District Re-1
Cotopaxi School District Re-3
Florence School District Re-2

Garfield County
Garfield School District 16
Garfield School District Re-2
Roaring Fork School District Re-1

Gilpin County
Gilpin County School District Re-1

Grand County
East Grand School District 2
West Grand School District 1

Gunnison County
Gunnison Watershed School District Re1J

Hinsdale County
Hinsdale County School District Re-1

Huerfano County
Huerfano School District Re-1
La Veta School District Re-2

Jackson County
North Park School District R-1

Jefferson County
Jefferson County School District R-1

Kiowa County
Kiowa County School District RE-1
Plainview School District Re-2

Kit Carson County
Arriba-Flagler Consolidated School District No. 20
Bethune School District R-5
Burlington School District Re-6J
Hi-Plains School District R-23
Stratton School District R-4

Lake County
Lake County School District R-1

La Plata County
Bayfield School District 10Jt-R
Durango School District 9-R
Ignacio School District 11 Jt

Larimer County
Estes Park School District
Poudre School District R-1
Thompson School District R-2J

Las Animas County
Aguilar Reorganized School District 6
Branson Reorganized School District 82
Hoehne Reorganized School District 3
Kim Reorganized School District 88
Primero Reorganized School District 2
Trinidad School District 1

Lincoln County
Genoa/Hugo School District C-113
Karval School District Re 23
Limon School District Re 4J

Logan County
Buffalo School District Re-4
Frenchman School District Re-3
Plateau School District Re-5
Valley School District Re-1

Mesa County
De Beque School District 49 Jt
Mesa County Valley School District 51
Plateau Valley School District 50

Mineral County
Creede Consolidated School District 1

Moffat County
Hayden School District Re 1
Moffat County School District Re No. 1

Montezuma County
Dolores School District RE 4A
Mancos School District Re-6
Montezuma-Cortez School District Re 1

Montrose County
Montrose County School District Re-1J
West End School District Re-2

[1] The list of employers in the School Division does not include charter schools operating within the respective public school districts and under the Colorado Charter School Institute.

SCHEDULE OF AFFILIATED EMPLOYERS

School Division[1] (continued)

Morgan County
Brush School District Re-2 (J)
Fort Morgan School District Re-3
Weldon Valley School District Re-20 (J)
Wiggins School District Re-50 (J)

Otero County
Cheraw School District 31
East Otero School District R1
Fowler School District R4J
Manzanola School District 3J
Rocky Ford School District R2
Swink School District 33

Ouray County
Ouray School District R-1
Ridgway School District R-2

Park County
Park County School District Re-2
Platte Canyon School District 1

Phillips County
Haxtun School District Re-2J
Holyoke School District Re-1J

Pitkin County
Aspen School District 1

Prowers County
Granada School District Re-1
Holly School District Re-3
Lamar School District Re-2
Wiley School District Re-13 Jt

Pueblo County
Pueblo City School District 60
Pueblo County Rural School District 70

Rio Blanco County
Meeker School District RE1
Rangely School District RE4

Rio Grande County
Del Norte School District C-7
Monte Vista School District C-8
Sargent School District Re-33J

Routt County
South Routt School District Re 3
Steamboat Springs School District Re 2

Saguache County
Center Consolidated School District 26 Jt
Moffat School District 2
Mountain Valley School District Re 1

San Juan County
Silverton School District 1

San Miguel County
Norwood School District R-2J
Telluride School District R-1

Sedgwick County
Julesburg School District Re 1
Revere School District

Summit County
Summit School District Re 1

Teller County
Cripple Creek-Victor School District Re-1
Woodland Park School District RE-2

Washington County
Akron School District R-1
Arickaree School District R-2
Lone Star School District 101
Otis School District R-3
Woodlin School District R-104

Weld County
Ault-Highland School District Re-9
Briggsdale School District Re-10
Eaton School District Re-2
Greeley School District 6
Johnstown-Milliken School District Re-5J
Keenesburg School District Re-3
Pawnee School District Re-12
Platte Valley School District Re-7
Prairie School District Re-11
Weld County School District RE-1
Weld School District Re-8
Windsor School District Re-4

[1] The list of employers in the School Division does not include charter schools operating within the respective public school districts and under the Colorado Charter School Institute.

SCHEDULE OF AFFILIATED EMPLOYERS

School Division[1] (continued)

Yuma County

Idalia School District RJ-3
Liberty School District J-4
Wray School District RD-2
Yuma School District 1

Boards of Cooperative Educational Services (BOCES)

Adams County BOCES
Centennial BOCES
Colorado River BOCES
East Central BOCES
Education reEnvisioned BOCES
Expeditionary Learning School BOCES
Grand Valley BOCES
Mt. Evans BOCES
Mountain BOCES
Northeast BOCES
Northwest Colorado BOCES
Pikes Peak BOCES
Rio Blanco BOCES
San Juan BOCES
San Luis Valley BOCES
Santa Fe Trail BOCES
South Central BOCES
Southeastern BOCES
Uncompahgre BOCES
Ute Pass BOCES

Vocational Schools

Technical College of the Rockies

Other

Colorado Consortium for Earth and Space Science Education

[1] The list of employers in the School Division does not include charter schools operating within the respective public school districts and under the Colorado Charter School Institute.

SCHEDULE OF AFFILIATED EMPLOYERS

Local Government Division

Adams and Jefferson County Hazardous Response Authority
Alamosa Housing Authority
Arapahoe Park and Recreation District
Aurora Housing Authority
Baca Grande Water & Sanitation District
Beulah Water Works District
Black Hawk-Central City Sanitation District
Blanca-Fort Garland Metropolitan District
Boulder County
Boulder County Public Trustee's Office
Boxelder Sanitation District
Brush Housing Authority
Carbon Valley Park & Recreation District
Castle Pines Metropolitan District
Castle Pines North Metropolitan District
Center Housing Authority
Central Colorado Water Conservancy District
Cheyenne Wells Housing Authority
City of Alamosa
City of Boulder
City of Castle Pines
City of Colorado Springs
City of Fort Morgan
City of Las Animas
City of Lone Tree
City of Manitou Springs
City of Pueblo
City of Wray
City of Yuma
Clearview Library District
Collbran Conservancy District
Colorado District Attorneys' Council
Colorado First Conservation District
Colorado Health Facilities Authority
Colorado Housing and Finance Authority
Colorado Library Consortium
Colorado River Fire Protection District
Colorado School District Self Insurance Pool
Colorado Springs Utilities
Columbine Knolls-Grove Metropolitan Recreation District
Costilla Housing Authority
County Technical Services, Inc.
Cucharas Sanitation & Water District
Douglas County Housing Partnership
Douglas County Libraries
Durango Fire Protection District
East Cheyenne Groundwater Management District
East Larimer County Water District
Eastern Rio Blanco Metropolitan Recreation & Park District
Eaton Housing Authority
Elbert County Library District
Elizabeth Park and Recreation District
El Paso-Teller County Emergency Telephone Service Authority
Estes Park Housing Authority
Estes Park Local Marketing District
Estes Valley Fire Protection District
Estes Valley Public Library District
Forest Lakes Metropolitan District
Fremont Conservation District
Fremont Sanitation District
Garfield County Housing Authority
Grand Junction Regional Airport Authority
Grand Valley Fire Protection District
Green Mountain Water and Sanitation District
GVR Metropolitan District
Housing Authority of Arriba
Housing Authority of the City of Boulder
Housing Authority of the City of Colorado Springs
Housing Authority of the County of Adams
Housing Authority of the Town of Limon
Lamar Housing Authority
Lamar Utilities Board
Left Hand Water District
Longmont Housing Authority
Longs Peak Water District
Louisville Fire Protection District
Meeker Cemetery District
Meeker Regional Library District
Meeker Sanitation District
Montrose Fire Protection District
Montrose Recreation District
Monument Sanitation District
Morgan Conservation District
Morgan County Quality Water District
Mountain View Fire Protection District
Mountain Water and Sanitation District
Niwot Sanitation District
North Carter Lake Water District
North Chaffee County Regional Library
North Front Range Water Quality Planning Association
Northeast Colorado Health Department
Northeastern Colorado Association of Local Governments
Park Center Water District
Pikes Peak Regional Building Department
Pine Drive Water District
Plum Creek Water Reclamation Authority
Pueblo City-County Health Department
Pueblo Library District
Pueblo Transit Authority
Pueblo Urban Renewal Authority
Rampart Regional Library District
Rangely Regional Library District
Red Feather Mountain Library District
Red, White & Blue Fire Protection District
Republican River Water Conservation District
Rio Blanco Fire Protection District
Rio Blanco Water Conservancy District
Routt County Conservation District
Sable-Altura Fire Protection District
San Luis Valley Development Resources Group
San Luis Valley Water Conservancy District
San Miguel County Public Library

SCHEDULE OF AFFILIATED EMPLOYERS

Local Government Division (continued)

San Miguel Regional and Telluride Housing Authority
Scientific and Cultural Facilities District
Sheridan Sanitation District #1
Soldier Canyon Water Treatment Authority
Statewide Internet Portal Authority
Steamboat II Water and Sanitation District
Strasburg Metropolitan Parks & Recreation District
St. Vrain Sanitation District
Tabernash Meadows Water and Sanitation District
Town of Alma
Town of Bayfield
Town of Crawford
Town of Dinosaur
Town of Eckley
Town of Estes Park
Town of Firestone
Town of Lake City
Town of Lochbuie
Town of Mountain Village
Town of Platteville
Town of Rico
Town of Rye
Town of Seibert
Town of Silver Plume
Town of Timnath
Tri-County Health Department
Tri-Lakes Wastewater Treatment Facility
Unison Housing Partners
Upper Colorado Environmental Plant Center
Upper Thompson Sanitation District
Washington-Yuma Counties Combined Communications Center
Weld County Department of Public Health and Environment
West Greeley Conservation District
Western Rio Blanco Metropolitan Recreation and Park District
White River Conservation District
Wray Housing Authority
Yuma Housing Authority

SCHEDULE OF AFFILIATED EMPLOYERS

Judicial Division

1st-22nd District Court
Adams County Court
Alamosa County Court
Arapahoe County Court
Archuleta County Court
Baca County Court
Bent County Court
Boulder County Court
Broomfield County Court
Chaffee County Court
Cheyenne County Court
Clear Creek County Court
Conejos County Court
Costilla County Court
Court of Appeals
Crowley County Court
Custer County Court
Delta County Court
Denver County Court
Denver Juvenile Court
Denver Probate Court
Dolores County Court
Douglas County Court
Eagle County Court
Elbert County Court
El Paso County Court
Fremont County Court
Garfield County Court
Gilpin County Court
Grand County Court
Gunnison County Court
Hinsdale County Court
Huerfano County Court
Jackson County Court
Jefferson County Court
Kiowa County Court
Kit Carson County Court
Lake County Court
La Plata County Court
Larimer County Court
Las Animas County Court
Lincoln County Court
Logan County Court
Mesa County Court
Mineral County Court
Moffat County Court
Montezuma County Court
Montrose County Court
Morgan County Court
Otero County Court
Ouray County Court
Park County Court
Phillips County Court
Pitkin County Court
Prowers County Court
Pueblo County Court
Rio Blanco County Court
Rio Grande County Court
Routt County Court
Saguache County Court
San Juan County Court
San Miguel County Court
Sedgwick County Court
Summit County Court
Supreme Court
Teller County Court
Washington County Court
Weld County Court
Yuma County Court

DPS Division[1]

Denver Public School District No. 1

1 The list of employers in the DPS Division does not include charter schools operating within the Denver Public Schools school district.

COMMONLY USED ACRONYMS

COLORADO PERA®

AAL	Actuarial Accrued Liability
AAP	Automatic Adjustment Provision
ADC	Actuarially Determined Contribution
AED	Amortization Equalization Disbursement
AI	Annual Increase
AIR	Annual Increase Reserve
ARC	Annual Required Contribution
ASOPs	Actuarial Standards of Practice
CBI	Colorado Bureau of Investigation
CMBS	Commercial Mortgage-Backed Securities
CMC	Cavanaugh Macdonald Consulting, LLC
CMS	Centers for Medicare & Medicaid Services
CPI-W	Consumer Price Index for Urban Wage Earners and Clerical Workers
C.R.S.	Colorado Revised Statutes
DB	Defined Benefit
DC	Defined Contribution
DC Plan	Defined Contribution Retirement Plan
DPS	Denver Public Schools
DPS HCTF	Denver Public Schools Health Care Trust Fund
DPSRS	Denver Public Schools Retirement System
EA	Entry Age Actuarial Cost Method
EGWP	Employer Group Waiver Plan
FNP	Fiduciary Net Position
GASB	Governmental Accounting Standards Board
GDP	Gross Domestic Product
HAS	Highest Average Salary
HB	House Bill
HCTF	Health Care Trust Fund
IRC	Internal Revenue Code
MBS	Mortgage-Backed Securities
MD&A	Management's Discussion and Analysis
NAV	Net Asset Value
NOL	Net OPEB Liability
NPL	Net Pension Liability
OPEB	Other Postemployment Benefit
PCOP	Pension Certificates of Participation
RDS	Retiree Drug Subsidy
REITs	Real Estate Investment Trusts
RSI	Required Supplementary Information
SAED	Supplemental Amortization Equalization Disbursement
SB	Senate Bill
SEIR	Single Equivalent Interest Rate
SRI	Socially Responsible Investment
TIPS	Treasury Inflation Protected Securities
TOL	Total OPEB Liability
TPL	Total Pension Liability
UAAL	Unfunded Actuarial Accrued Liability

Public Employees' Retirement Association of Colorado
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Denver, Colorado 80203
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