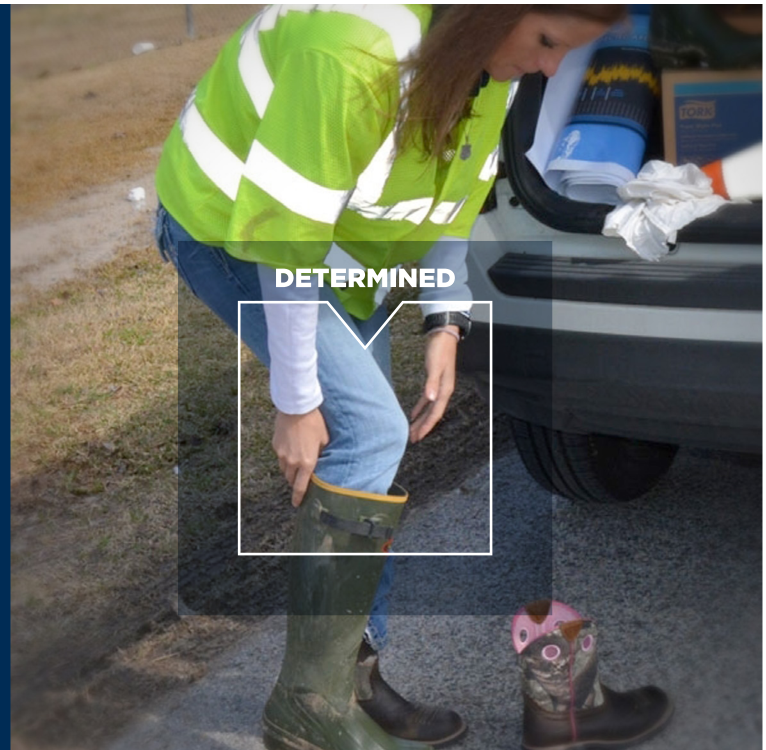
Comprehensive Annual Financial Report

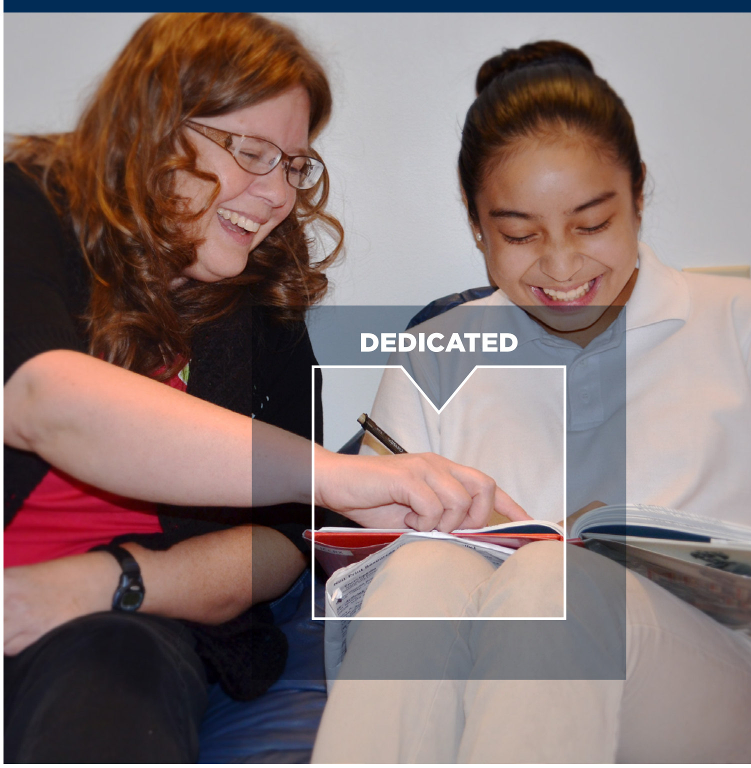
FOR THE YEARS ENDED JUNE 30, 2019 AND JUNE 30, 2018


NURTURING
YOUR
DEDICATION
MAKES EVERYTHING

HMEPS
HOUSTON MUNICIPAL EMPLOYEES PENSION SYSTEM

YOUR COMMITMENT





MAKES ALL

HOUSTON MUNICIPAL EMPLOYEES PENSION SYSTEM

A Component Unit of the City of Houston, Texas

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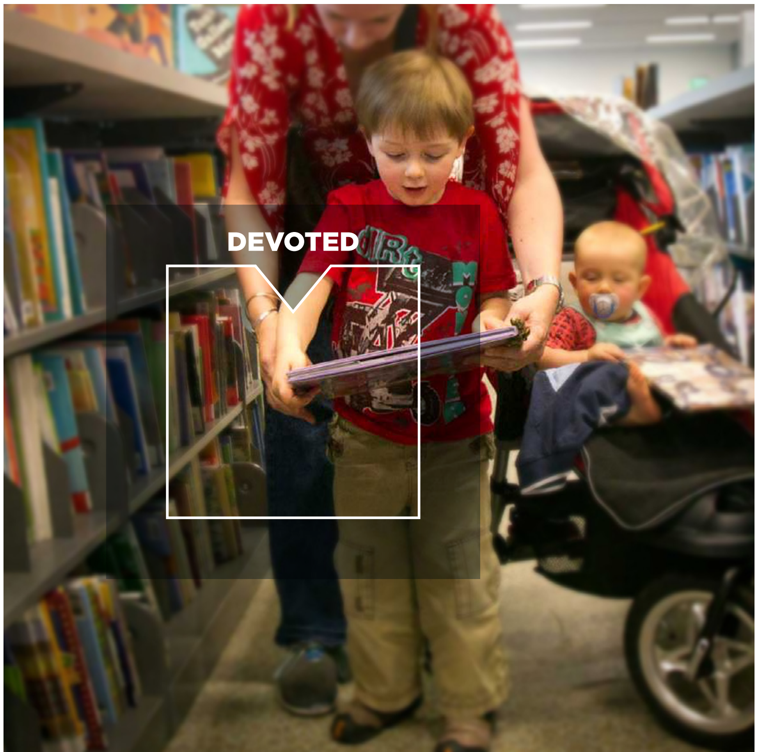


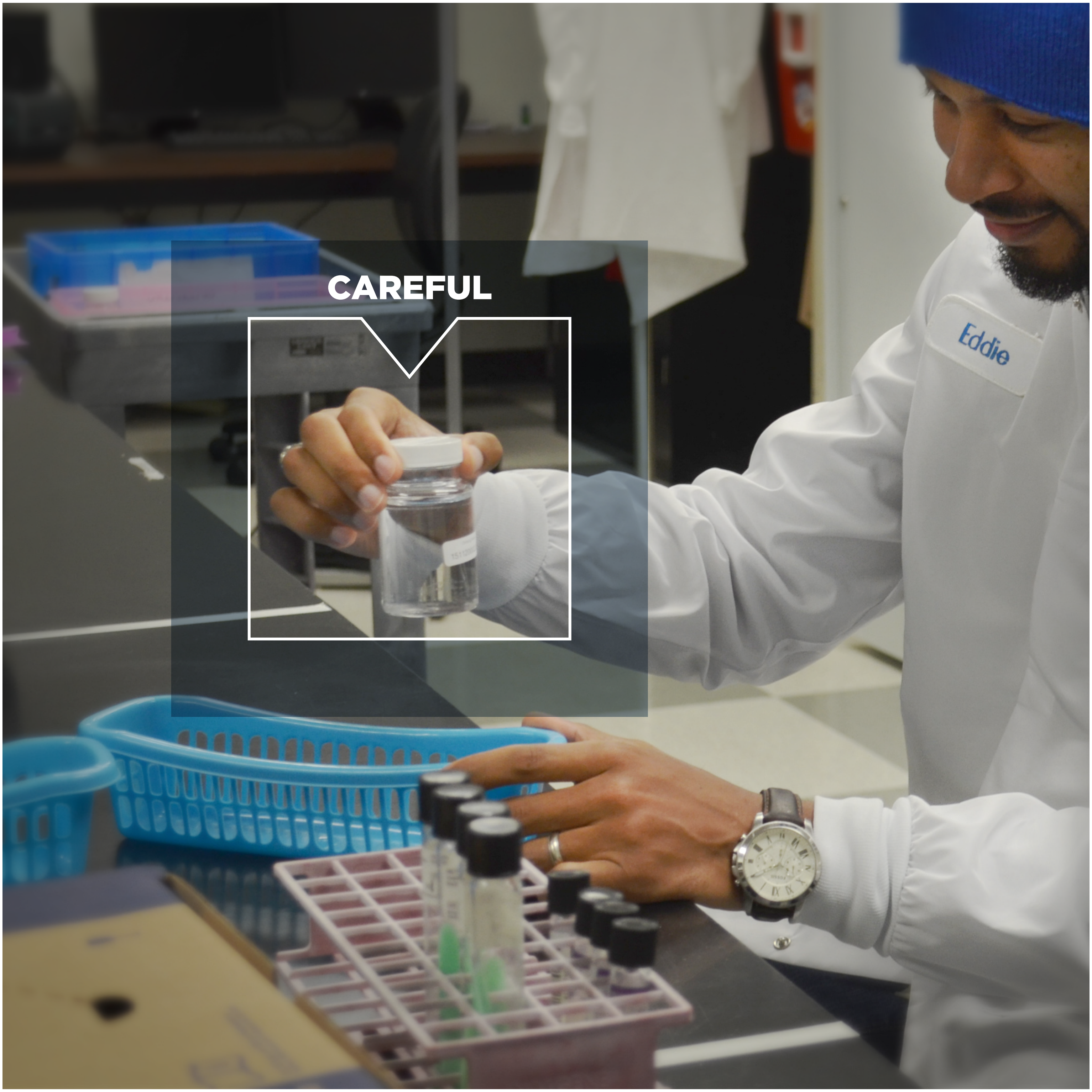
THE DIFFERENCE

HMEPS

INTRODUCTION

- SECTION 1 -

YOU HELP BUILD THE FOUNDATION FOR GREAT COMMUNITIES



HMEPS
HOUSTON MUNICIPAL EMPLOYEES PENSION SYSTEM

HMEPS
HOUSTON MUNICIPAL EMPLOYEES PENSION SYSTEM

December 19, 2019

Tantri Emo
Director, Finance Department
City of Houston
611 Walker, 10th Floor
Houston, Texas 77002

Dear Ms. Emo:

We are pleased to present the Comprehensive Annual Financial Report (CAFR) of the Houston Municipal Employees Pension System (the System), a Component Unit of the City of Houston, Texas (the City), for the fiscal years ended June 30, 2019 and June 30, 2018. The accuracy, fairness of presentation and completeness of this report are the responsibility of the Board of Trustees (the Board) of the System. To the best of our knowledge and belief, the enclosed data is accurate in all material respects and is reported in a manner designed to present fairly the financial position and results of the operations of the System. The System's basic financial statements will be included in the annual financial report of the City.

ACCOUNTING SYSTEM AND INTERNAL CONTROLS

The financial statements have been prepared in accordance with generally accepted accounting principles (GAAP) and presented in accordance with guidance provided by applicable statements issued by the Governmental Accounting Standards Board (GASB).

The System's independent auditors have audited the financial statements and issued an unmodified opinion as of June 30, 2019 and 2018 (pages 12-13). The purpose of the audit is to give reasonable assurance to users of those financial statements, the Board, and participants of the System, that the financial statements present fairly, in all material respects, information regarding the System's net position held in trust for pension benefits and in conformity with accounting principles generally accepted in the United States of America.

A significant responsibility of the Board is to ensure that the System has in place an adequate system of internal controls. A system of internal controls is an entity's plan of organization and its coordinated methods and measures adopted to safeguard its assets, ensure the accuracy and reliability of the accounting system and promote adherence to management policies. These controls include strategic design of the entity's business systems, the appropriate segregation of duties and responsibilities, sound practices in the performance of those duties, retaining capable personnel, and the organizational structure itself. For each implemented control, the cost of the control should not exceed the benefits to be derived. An objective of these controls is to provide reasonable assurance that the financial statements are free of any material misstatement. We believe the System's internal controls are adequate and are working as designed.

FINANCIAL INFORMATION

The Management's Discussion and Analysis (MD&A) that immediately follows the Independent Auditors' Report provides condensed financial information and activities for the current and prior two fiscal years of the System. It provides a narrative introduction, overview, and analysis of the basic financial statements. The MD&A complements this letter of transmittal and should be read in conjunction with it.

PLAN HISTORY AND PROFILE

The System was created in 1943 under Chapter 358, Acts of the 48th Texas Legislature, Regular Session, Article 6243g, Vernon's Annotated Revised Texas Civil Statutes, and was reenacted and continued under HB1573, 77th Texas Legislature, as Article 6243h, Vernon's Annotated Revised Texas Civil Statutes, as amended (the Statute).

The System is a multiple-employer, defined benefit pension plan that provides service retirement, disability retirement and death benefits for eligible participants, which includes all municipal employees, except police officers and fire fighters (other than certain police officers in the System as authorized by the Statute) employed full time by the City, elected City officials, and the full-time employees of the System (collectively referred to as "participants"). The System's plan net assets are used to pay benefits for eligible participants of Group A, Group B and Group D. The System is administered by an eleven-member Board of Trustees. The Trustees include four elected trustees who are members of the System, two elected trustees who are retirees of the System, a trustee appointed by the elected trustees, the mayor's appointee, the controller's appointee, and two city council appointees.

The Statute was amended by SB 2190 in the 85th Texas Legislature, with most funding and benefit changes effective July 1, 2017. The Actuarial Section of this CAFR contains additional information on the funding and benefit changes, as well as the annual risk sharing valuation process for purposes of the funding corridor, corridor midpoints, and legacy liability that are integral to the amended contribution requirements.

BUDGET

The costs of administering the System, consisting of operating administrative expenses and capitalized items, are paid by the System from current earnings pursuant to an annual fiscal budget adopted by the Board.

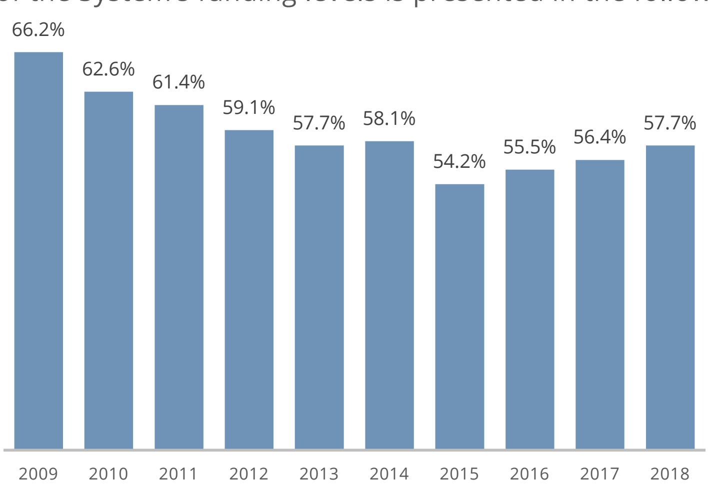
FUNDING STATUS

The System's funding objective is to establish contributions which, when combined with present assets and future investment returns, will be sufficient to meet the financial obligations to present and future retirees and beneficiaries.

HMEPS receives contributions from two sources: employer contributions and member contributions. Under the Statute as amended by SB 2190, the System's actuary assumes that the System's investments will return 7.0 percent annualized over the long-term. The differences between the assumed and actual investment return are phased in over 5 years, yielding an actuarial value of assets. This smoothing is intended to avoid extreme volatility in employer contribution rates due to short-term fluctuations in the investment markets. However, as part of SB 2190, all prior years' bases were fully recognized as of July 1, 2016, and therefore the smoothing process recommenced for purposes of the actuarial valuation as of July 1, 2017. The funded ratio, the ratio of the actuarial value of assets (AVA) to the actuarial accrued liability (AAL), is a standard measure of a plan's funded status. In the absence of benefit improvements or reduced funding, a plan's funded ratio should increase over time, until it reaches 100%. The funded status alone is not appropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations.

As of July 1, 2018, HMEPS' AVA and AAL were $2.87 billion and $4.98 billion, respectively, resulting in a funded ratio of 57.7%. This is higher than the funded ratio as of July 1, 2017, which was 56.4%. This change is primarily the result of positive investment performance.

A historical perspective of the System's funding levels is presented in the following graph.



MARKET ENVIRONMENT

Fiscal year 2019 began with strong macroeconomic indicators pointing toward a positive economic environment. The U.S. economy continued its expansion with GDP growing in the sustainable 2-3% range. For the first half of the fiscal year, the Federal Reserve maintained its policy of gradual interest rate hikes with two rate increases. By March 2019, with the target Fed Funds rate at 2.25-2.50%, the Federal Reserve signaled a pause in rate increases, observing that inflation had declined and that "the economy is in a good place." Meanwhile, uncertainty regarding ongoing trade negotiations between the U.S. and China introduced volatility to equity markets. The Wilshire 5000 declined 14.3% in the quarter ending December 31, 2018, only to rebound 14.1% in the subsequent quarter.

U.S. equity markets emerged from volatility during the fiscal year with the Wilshire 5000 index gaining 9.1%. The Wilshire 5000's gain marked the tenth consecutive positive fiscal year for the index since the credit crisis of 2008-2009. Growth stocks once again outperformed value stocks during the fiscal year, and larger capitalization stocks tended to do better than smaller stocks.

During the first quarter of the fiscal year, the U.S. Dollar appreciated against a number of foreign currencies, but the U.S. Dollar experienced mixed performance throughout Fiscal Year 2019. Concern about trade tensions dominated headlines throughout the fiscal year, but international stock markets were able to generate very modest gains. Concerns about weakening in Eurozone and U.K. manufacturing sectors weighed on international stocks as did lackluster consumption and capital spending in Japan. International equities as represented by the MSCI ACWI ex-U.S. (net) Index were up 3.0% during FY 2019.

Investment grade fixed income securities generated positive returns in fiscal year 2019. The Treasury yield curve flattened during the fiscal year with the 30-year Treasury declining about 60 basis points. Yield spreads for corporate and high yield bonds tightened even though spreads began the fiscal year at low levels in historical terms. These factors provided the catalyst for good returns for fixed income securities. Investment grade bonds as represented by the Barclay's U.S. Aggregate bond index posted positive returns (7.9%) for the fiscal year. High yield bonds as represented by the Merrill Lynch High Yield Master Trust II Index were likewise up 7.6% for the fiscal year.

Among the alternative asset classes, Real Estate and Private Equity returned 7.7% and 14.1% respectively in FY 2019. Strong real estate fundraising, low interest rates, and healthy job growth led to positive returns in real estate. Inexpensive credit and near record levels of available capital contributed to higher valuations, leading to another good year in Private Equity.

Overall, the System's investments returned 7.2% for fiscal year 2019. Through the efforts of the Board of Trustees, the System's investment portfolio is more broadly diversified than most public pension plans and exhibits less volatility, particularly during extreme market events. During the 10-year period ending June 30, 2019, the system's annualized return was 9.7%.

MAJOR CURRENT AND FUTURE INITIATIVES

MEMBER SERVICES

The Benefits Division has continued its effort to provide information relating to pension benefits by holding seminars at City departments and individual benefit meetings at HMEPS. In FY 2019, HMEPS:

- Responded to continued demand for the Outreach Program, which reaches hundreds of members with individual and group sessions provided by our benefits counselors and our Certified Financial Planner. This past year, these staff members conducted 213 individual counseling sessions and hosted 12 joint presentations for various City departments as well as new employee orientations for the benefit of 1,390 attendees.
- Conducted 140 one-on-one counseling sessions between the HMEPS financial counselor and participants in addition to numerous presentations in the field with the Benefits Division.
- Processed 2,100 benefit applications, including retirements, the Deferred Retirement Option Plan, survivor benefits, refunds, and lump-sum payments.

- Participated in the Spring and Fall Financial Retirement Educational Event, an annual event co-sponsored by the System that help City of Houston employees better plan for their financial futures.

INVESTMENTS

The System's strategic asset allocation policy is designed to manage risk by diversifying among public and private asset classes. In order to develop a strategic asset allocation policy, risk-return assumptions and correlations for asset classes are examined taking into account current and forecasted economic conditions. The current strategic asset allocation policy has been in place since October 2017.

The target allocation to Global Equity is 32.5%. The target allocation to Fixed Income is 10%, while Real Estate is 12.5%, Private Credit is 5%, and Private Equity is 17%. The target allocation of the Absolute Return asset class is 8%, and the target allocation for the Inflation-Linked asset class is 15%. During fiscal year 2019, the System rebalanced its portfolio to move closer to these strategic asset allocation policy targets. With the help of the System's alternative investment consultant, Cliffwater LLC, the System committed to nine private equity partnerships, three private real estate partnerships, and two private real asset (inflation-linked asset class) partnerships.

The System's investment portfolio closed its 2019 fiscal year at $3.1 billion. The total investment return for the fiscal year was 7.2%. The System's investment performance was 9.7%, 6.8% and 9.7% for the past three-, five- and ten-year periods. Compared to similar investment portfolios (Wilshire TUCS Master Trusts – Public Universe), the fund posts above median investment returns over both long and short time periods. The best performing asset classes for fiscal year 2019 were Private Equity (+14.1%) and Private Credit (+8.8%).

In the upcoming fiscal year, the System will continue to work with consultants Wilshire Associates and Cliffwater LLC to identify attractive public and private market investments consistent with the strategic asset allocation policy.

BOARD GOVERNANCE

During FY 2019, the Board's membership did not change. Appointed Board members serve three-year terms, with the current term scheduled to expire in July 2020 absent an earlier vacancy and appointment. Elected Board members serve staggered four-year terms, with elections for two active members and one retiree occurring every even-numbered year. The next Board election will occur in 2020.

CERTIFICATE OF ACHIEVEMENT

The Government Finance Officers Association of the United States and Canada (GFOA) awarded a Certificate of Achievement for Excellence in Financial Reporting to the Houston Municipal Employees Pension System for its comprehensive annual financial report for the fiscal year ended June 30, 2018. This was the 25th consecutive year that the System has achieved this prestigious award. In order to be awarded a Certificate of Achievement, a government unit must publish an easily readable and efficiently organized comprehensive annual financial report. 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 comprehensive annual financial report 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.

ACKNOWLEDGEMENT

This CAFR was prepared through the combined efforts of the System staff and was subject to the scrutiny of the Board. It is intended to provide information to its user that may be a basis for a general understanding of the System. This CAFR is being forwarded to the City of Houston, the Texas Pension Review Board, the GFOA, and other interested parties who may from time to time request it.

In Closing…

A core purpose of the System is to help provide for the financial security of its participants when they are eligible to receive benefits. Municipal public sector employees are vital to providing and maintaining important city services for Houston residents, workers and visitors. Quality employees are attracted to and retained by the public sector in part by the security and benefits offered by a sound pension system. The System is proud to serve the dedicated municipal employees who have made tremendous contributions to Houston and its citizens.

Sincerely,

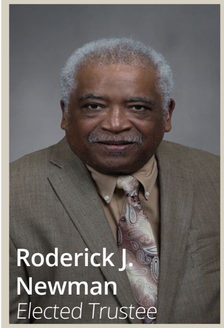
Sherry Mose
Chairman

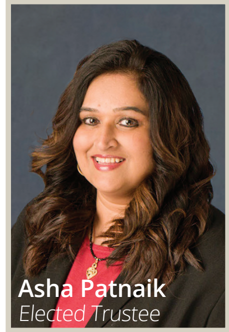
David L. Long
Executive Director


Sherry Mose
Chairman


Roy W. Sanchez
Vice Chairman


Lonnie Vara
Secretary


Roderick J. Newman
Elected Trustee


Asha Patnaik
Elected Trustee


Lenard Polk
Elected Trustee

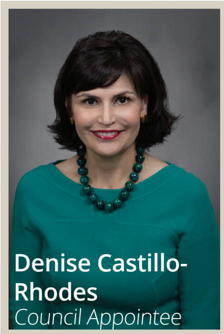
BOARD OF TRUSTEES


Barbara Chelette
Appointed Trustee


Edward J. Hamb II
Controller Appointee


David Donnelly
Mayoral Appointee


Adrian Patterson
Council Appointee


Denise Castillo-Rhodes
Council Appointee


David L. Long
Executive Director

BOARD COMMITTEES

- Audit Committee
- Budget and Oversight Committee
- Disability Committee
- External Affairs Committee
- Investment Committee
- Personnel and Procedures Committee

ADMINISTRATIVE ORGANIZATION

EXECUTIVE DIRECTOR

GENERAL COUNSEL

CHIEF INVESTMENT OFFICER

- Investment Managers' Services
- Market Research
- Performance Measurement

MEMBER SERVICES

- Benefit Administration Services
- Communications
- Financial Counseling
- Member Services

OPERATIONS

- Accounting
- Financial Reporting
- Records
- Technology Support

For more information on investment professionals who provide services to HMEPS, refer to the *Other Supplementary Information* on page 55 and *the Schedule of Fees and Commissions Paid* table on page 67.

CERTIFICATE OF ACHIEVEMENT FOR EXCELLENCE IN FINANCIAL REPORTING

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A Certificate of Achievement is valid for a period of one year only. We believe our current comprehensive annual financial report continues to meet the Certificate of Achievement program requirements and we are submitting it to GFOA to determine eligibility for another certificate.

PROFESSIONAL CONSULTANTS (FY 2019)

ACTUARY
Gabriel, Roeder, Smith & Company

AUDITOR
Weaver and Tidwell, L.L.P.

BOARD MEDICAL ADVISOR
Charles Schuhmacher, M.D.

COMMUNICATION SERVICES
LT Communications, L.L.C.
KLM Public Affairs, LLC

GOVERNMENTAL REPRESENTATION
Harris Law Firm, P.C.
HillCo Partners, L.L.C.
Locke Lord L.L.P.

INVESTMENT CONSULTANTS
Cliffwater, L.L.C.
Wilshire Associates, Inc.

INVESTMENT PERFORMANCE ANALYSIS
Cliffwater, L.L.C.
Wilshire Associates, Inc.

LEGAL COUNSEL
Baker Botts, L.L.P.
DLA Piper L.L.P
Jackson Walker, L.L.P.
Locke Lord L.L.P.

MASTER CUSTODIAN/TRUSTEE
State Street Bank and Trust Company

OTHER POSTEMPLOYMENT BENEFITS
US Bank
HighMark Capital Management
Public Agency Retirement Services

INVESTMENT MANAGERS (FY 2019)

ABSOLUTE RETURN
Anchorage Capital Group LLC
Angelo, Gordon & Co.
Brevan Howard US LLC
Brigade Capital Management
Davidson Kempner Capital Management, LLC
Graham Capital Management L.P.
Highland Capital Management
MKP Capital Management, LLC
Och-Ziff Capital Management Group
Samlyn Capital, LLC
Scopia PX LLC
Soroban Capital Partners, LLC

FIXED INCOME
Alliance Bernstein Institutional Investments
BlackRock, Inc.
DDJ Capital Management, L.L.C.
GMO LLC
Loomis, Sayles & Co.
Pugh Capital Management
Smith Graham & Co.
Whippoorwill Associates, Inc.

INFLATION-LINKED
BlackRock, Inc.
Cohen & Steers
EnCap Investments LP
Enervest, Ltd
Global Forest Partners, L.P.
NGP Energy Capital
Oaktree Capital Management
Quantum Energy Partners
Riverstone Holdings
Salient Partners
Taurus Funds Management
Tillridge Global Agribusiness
The Carlyle Group
Tortoise Capital Advisors

GLOBAL EQUITY
Ariel Investments
Ballie Gifford & Co
BlackRock, Inc.
DePrince, Race & Zollo, Inc.
Globeflex Capital
INTECH Investment Management, L.L.C.
Neumeier Investment Counsel, L.L.C.
OFI Institutional Management
PanAgora Asset Management, Inc.
State Street Global Advisors
T. Rowe Price Associates

PRIVATE CREDIT
Angelo, Gordon & Co
DRC Capital
Mesa West Capital
Summit Capital

PRIVATE EQUITY
Adams Street Partners
Anchorage Capital Group LLC
Brera Capital Partners, L.L.C.
Brockway Moran & Partners, Inc.
Carrick Capital Management LLC
Centerbridge Capital Partners
Clearlake Capital Partners
TrueBridge Capital Partners
GTCR Management LC
Goldman, Sachs & Co.
HarbourVest Partners, L.L.C.
Hellman & Friedman, L.L.C.
ICV Partners, L.P.
J.W. Childs Associates, L.P.
JMI Equity
Lexington Partners, Inc.
Matlin Patterson Global Advisors
New Enterprise Associates
New Mainstream Capital
Oaktree Capital Management
Onex Corporation
Pacven Walden Management Co., Ltd.
Pegasus Investors, L.P.
Pharos Capital Partners, L.L.C.
Platinum Equity Capital Partners
Siris Capital Group
Summit Partners
Sun Capital Partners, Inc.
Technology Crossover Ventures
The Carlyle Group
The Jordan Company, L.P.
Valor Equity Partners
Vista Equity Partners
Wayzata Investment Partners, LLC

REAL ESTATE
Aetos Capital Real Estate LP
Aermont Capital
Angelo, Gordon & Co.
Artemis Real Estate Partners
Crow Holdings Capital
Fortress Investment Group, L.L.C.
GEM Realty Capital
IC Berkeley Partners
Kildare Partners
Lone Star U.S. Acquisitions, L.L.C.
Long Wharf Real Estate Partners
Morgan Stanley Asset Management, Inc.
Orion Capital Managers, LLP
Prime Storage Group
State Street Global Advisors
Starwood Capital Group Global LP

FINANCIAL

- SECTION 2 -

EDUCATING
ENRICHING
EMPOWERING

HMEPS

HOUSTON MUNICIPAL EMPLOYEES PENSION SYSTEM

weaver
Assurance • Tax • Advisory

Austin | Conroe | Dallas | Fort Worth | Houston
Los Angeles | Midland | New York City | San Antonio

Independent Auditor's Report

To the Board of Trustees of the
Houston Municipal Employees Pension System

Report on the Financial Statements

We have audited the accompanying financial statements of the Houston Municipal Employees Pension System (the System), which comprise the statements of fiduciary net position as of June 30, 2019 and 2018, and the related statements of changes in fiduciary net position for the fiscal years then ended and notes to the basic financial statements.

Management's Responsibility for the Financial Statements

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

Auditor's Responsibility

Our responsibility is to express an opinion on these financial statements based on our audits. We conducted our audits in accordance with auditing standards generally accepted in the United States of America. Those standards require that we plan and perform the audits to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to 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 opinion.

Opinion

In our opinion, the financial statements referred to above present fairly, in all material respects, the financial position of the System as of June 30, 2019 and 2018, and the respective changes in financial position for the fiscal years then ended in accordance with accounting principles generally accepted in the United States of America.

The Board of Trustees of the
Houston Municipal Employees Pension System

Other Matters

Required Supplemental Information

Accounting principles generally accepted in the United States of America require that the Management's Discussion and Analysis (MD&A) and the Schedules of Changes in Net Pension Liability and Related Ratios, Net Pension Liability, Contributions, Investment Returns, and Changes in Total Other Post Employment Benefits Liability and Related Ratios be presented to supplement the financial statements. Such information, although not a part of the financial statements, is required by the Governmental Accounting Standards Board, who considers it to be an essential part of financial reporting for placing the financial statements in an appropriate operational, economic, or historical context. We have applied certain limited procedures to the required supplemental 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 financial statements, and other knowledge we obtained during our audits of the 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.

Supplemental and Other Information

Our audits were conducted for the purpose of forming opinion on the financial statements that collectively comprise the System's basic financial statements. The Other Supplemental Information and the Introductory, Investment, Actuarial and Statistical Sections, as listed in the Table of Contents, are presented for the purpose of additional analysis and are not a required part of the basic financial statements.

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

The Introductory, Investment, Actuarial and Statistical Sections have not been subjected to the auditing procedures applied in the audits of the basic financial statements, and accordingly, we do not express an opinion or provide any assurance on them.

Weaver and Tidwell, L.L.P.

WEAVER AND TIDWELL, L.L.P.

Houston, Texas
September 26, 2019

Weaver and Tidwell, L.L.P.
24 Greenway Plaza, Suite 1800 | Houston, Texas 77046
Main: 713.850.8787 | Fax: 713.850.1673
CPAs AND ADVISORS | WEAVER.COM

The Board of Trustees (the Board) of the Houston Municipal Employees Pension System (the System) is pleased to provide this overview and analysis of the financial performance and activities of the System for the fiscal years ended June 30, 2019 and 2018. We encourage the readers to consider the information presented here in conjunction with the basic financial statements.

OVERVIEW OF THE FINANCIAL STATEMENTS

The discussion and analysis is intended to serve as an introduction to the System's financial statements. The financial section consists of (1) System's Basic Financial Statements, (2) Notes to Basic Financial Statements, and (3) Supplemental Information. The year-end financials for fiscal years 2019 and 2018 Notes to the Basic Financial Statements, and the Required Supplemental Information and Other Supplemental Information in this report were prepared in conformity with generally accepted accounting principles established by the Governmental Accounting Standards Board (GASB).

SYSTEM'S BASIC FINANCIAL STATEMENTS

There are two basic financial statements presented herewith. The Statements of Fiduciary Net Position as of June 30, 2019 and 2018 indicate the net position available to meet future payments and give a snapshot at a particular point in time. The Statements of Changes in Fiduciary Net Position for the fiscal years ended June 30, 2019 and 2018 provide a view of the fiscal year's additions to and deductions from the System.

NOTES TO BASIC FINANCIAL STATEMENTS

The notes are an integral part of the basic financial statements and provide additional background information that is essential for a complete understanding of the data provided in the System's financial statements. The Notes to the Basic Financial Statements can be found on pages 23 to 47 of this report.

SUPPLEMENTAL INFORMATION

The required supplemental information consists of:

Schedule 1 – Schedule of Changes in Net Pension Liability and Related Ratios – Information about the components of the net pension liability and related ratios includes the pension plan's fiduciary net position as a percentage of the total pension liability, and the net pension liability as a percentage of covered payroll. It should be noted though that actuarial information is based upon assumptions about future events, and therefore, the figures presented are estimates.

Schedule 2 – Schedule of Net Pension Liability – This schedule provides the historical liability of employers for benefits provided through a defined benefit pension plan.

Schedule 3 – Schedule of Contributions – Details the actuarially determined contribution calculated for employers, actual contributions, covered payroll, and actual contributions as a percentage of payroll.

Schedule 4 – Schedule of Investment Returns – A 10-year schedule presenting the annual money-weighted rate of return on pension plan investments for each fiscal year.

Schedule 5 – Schedule of Changes in Total OPEB Liability and Related Ratios – These are calculations made by the System's actuary that provide actuarial information that contributes to the understanding of the changes in the actuarial funding of and the funded status of the OPEB over a number of years. It should be noted that actuarial information is based upon assumptions about future events, and therefore, the figures presented are estimates.

The other supplemental information consists of:

Schedule 6 – Investment Summary – This lists the System's investments by type presented both at cost and fair market value.

Schedule 7 – Investment Expenses, Professional Services and Administration Expenses – This provides additional information for purposes of a more detailed analysis.

Schedule 8 – Details of Investment Expenses and Professional Services – This provides additional information for purposes of a more detailed analysis.

COMPARATIVE FINANCIAL STATEMENTS

Below is a condensed and comparative summary of major classes of Fiduciary Net Position at fair value. (In thousands of dollars)

	June 30, 2019	June 30, 2018	June 30, 2017
Assets			(Restated)
Cash and cash equivalents	$ 11,797	$ 31,377	$ 7,917
Investments	3,073,932	2,959,795	2,594,843
Receivables on asset sales	7,581	6,059	4,751
Contribution receivable - City of Houston	12,962	7,751	7,363
Other receivables	5,531	4,493	3,661
Collateral on securities lending	60,246	49,472	47,371
Furniture, fixtures and equipment, net	184	133	178
Total assets	3,172,233	3,059,080	2,666,084
Liabilities			
Payables on asset purchase	7,030	9,149	9,784
Accrued liabilities	3,958	11,520	10,871
Collateral on securities lending	60,246	49,472	47,371
Total liabilities	71,234	70,141	68,026
Deferred inflows of resources	-	75	-
Net position restricted for pensions	$ 3,100,999	$ 2,988,864	$ 2,598,058

Below is a comparative summary of Statements of Changes in Fiduciary Net Position available for pension benefits. (In thousands of dollars)

	Fiscal Year 2019	Fiscal Year 2018	Fiscal Year 2017
Additions			(Restated)
Contributions	$ 208,797	$ 449,467	$ 198,459
Investment and interest income, net	200,445	231,815	290,911
Other income	710	701	1,272
Total additions	409,952	681,983	490,642
Deductions			
Benefits paid	291,060	283,928	280,456
Contribution refunds	1,394	807	718
Administrative expenses and professional fees	5,363	6,442	6,827
Total deductions	297,817	291,177	288,001
Net increase in net position	112,135	390,806	202,641
Net position restricted for pensions			
Beginning of year	2,988,864	2,598,058	2,400,024
End of year, as previously stated			2,602,665
Prior years adjustments for OPEB			4,607
End of year	$ 3,100,999	$ 2,988,864	$ 2,598,058

FINANCIAL HIGHLIGHTS (IN THOUSANDS OF DOLLARS, UNLESS OTHERWISE NOTED)

CONTRIBUTIONS

For fiscal year 2019, employee contributions increased by $4,632 or 16.6% to $32,537, compared to $27,905 in fiscal year 2018. Fiscal year 2018 employee contributions represented an increase of $12,003 or 75.5% over fiscal year 2017. The increases in fiscal years 2019 and 2018 were primarily the result of Senate Bill 2190 of the 85th Texas Legislature ("SB 2190") which increased contributions by all active participants.

Also as a result of SB 2190, beginning in fiscal year 2018, the City is required to contribute the "Total City Contribution" to the System, which consists of the sum of (a) an actuarially determined percentage of payroll ("City Contribution Rate") multiplied by actual payroll and (b) a fixed dollar amount ("City Contribution Amount"). In fiscal year 2019, the City Contribution Rate was 8.27% of payroll, and the City Contribution Amount was $127,441, for a Total City Contribution of $176,261.

In addition to these ongoing employer contributions, SB 2190 required a one-time contribution of $250 million in Pension Obligation Bond proceeds ("POB proceeds") to the System. This payment was made during fiscal year 2018.

The System received cash contributions from the City of Houston (the City) of $176,261, $421,562 and $182,558 (which are net of contributions to the replacement benefit plan of $1,847, $2,148 and $1,801) for fiscal years 2019, 2018 and 2017, respectively.

BENEFIT PAYMENTS

Total benefit payments were $291,060, $283,928 and $280,456 in fiscal years 2019, 2018 and 2017, respectively. The increases in total benefit payments for these years were 2.5%, 1.2% and 10.8%, respectively.

Refunds amounted to $1,394, an increase of 72.7%, in fiscal year 2019 over fiscal year 2018. Refunds were $807 and $718 in fiscal years 2018 and 2017, respectively.

Monthly recurring benefits represented 88.3% ($256,926) of total benefit payments in fiscal year 2019. This compares with 87.1% ($247,225) and 84.1% (235,832) in fiscal years 2018 and 2017, respectively. Monthly recurring benefits increased 3.9%, 4.8% and 5.4%, respectively, in fiscal years 2019, 2018 and 2017.

Distributions to Deferred Retirement Option Plan (DROP) participants represented 11.6% ($33,687) of total benefit payments in fiscal year 2019. This compares with 12.8% ($36,478) and 15.8% ($44,724) in fiscal years 2018 and 2017, respectively. DROP distributions decreased 7.7%, decreased 17.6% and increased 51.6%, respectively, in fiscal years 2019, 2018 and 2017.

DROP distributions in fiscal year 2019 can be broken down into $32,186 in lump sum payments and $1,501 in monthly distributions. In 2018, the breakdown was $34,698 in lump sum payments and $1,780 in monthly distributions. In 2017, the breakdown was $42,492 (lump sum) and $1,782 (monthly).

Total benefit payments exceeded total employee and employer contributions by $82,263 in 2019. Total employee and employer contributions exceeded benefit payments in fiscal year 2018 by $165,539. Total benefit payments exceeded total employee and employer contributions by $81,996 in 2017.

ACCOUNTING AND ADMINISTRATION

Costs of administering the benefit programs of the System, including professional fees, decreased to $5,363 for fiscal year 2019 from $6,442 for fiscal year 2018, down 16.8%. Fiscal year 2018 administrative expenses were down 5.6% versus fiscal year 2017. Both decreases were mainly due to a reduction in costs of staff and benefits and in professional services expenses.

The System capitalizes expenditures for furniture, fixtures and equipment in accordance with Governmental Accounting Standards Board Statement No. 34, Basic Financial Statements – and Management's Discussion and Analysis – for State and Local Governments, as amended.

Furniture, fixtures and equipment, net of accumulated depreciation, as of fiscal year ends 2019, 2018, and 2017 were $184, $133, and $178, respectively.

ACTUARIAL VALUATIONS AND FUNDING

The funded ratio is a standard measure of a plan's funded status representing the ratio of the actuarial value of assets to the actuarial accrued liability. The funded ratio as of the last actuarial report, July 1, 2018, is 57.7%, compared to 56.4% on July 1, 2017, and 55.5% on July 1, 2016. As of July 1, 2018, the Systems' unfunded actuarial accrued liability was $2.107 billion. In determining contribution rates, an actuarial value of assets is used rather than a market value of assets, with the actuarial value of assets (AVA) based on smoothed returns. This "smoothing method" is intended to help reduce the volatility of the contribution rates from year to year. The method used to compute the AVA takes the difference between the actual market value of assets and the expected actuarial value of assets (based on the assumed 7.0% investment return rate), and establishes a base each year which is equal to this difference less any unrecognized bases from prior years. If the current year's base is of opposite sign from the prior years' bases then it is offset dollar for dollar against the prior years' bases (oldest bases first) until either the prior years' bases or the current year's base is reduced to zero. Any remaining bases are then recognized over the remaining period for the base (5 less the number of years between the base year and the valuation year) in equal dollar amounts.

INVESTMENTS

The net investment and interest income of the System was $200,445 during fiscal year 2019, a decrease of $31,370 from fiscal year 2018's income of $231,815. The investment and interest income of the System consists of:

	Fiscal Year 2019	Fiscal Year 2018	Dollar Change	Fiscal Year 2018	Fiscal Year 2017	Dollar Change
Interest	$ 15,881	$ 10,530	$ 5,351	$ 10,530	$ 21,741	$ (11,211)
Dividends	28,780	19,974	8,806	19,974	19,455	519
Earnings from limited partnerships and real estate trusts	1,605	5	1,600	5	5,102	(5,097)
Realized gain/(loss) on investments	27,788	92,478	(64,690)	92,478	39,151	53,327
Change in unrealized gain/(loss) on investments	134,138	116,195	17,943	116,195	212,501	(96,306)
Net proceeds from lending securities	272	301	(29)	301	352	(51)
Less: cost of investment services	(8,019)	(7,668)	(351)	(7,668)	(7,391)	(277)
Net investment and interest income(loss)	$ 200,445	$ 231,815	$ (31,370)	$ 231,815	$ 290,911	$ (59,096)

The System's gross rate of return on investments during fiscal year 2019 was 7.2% compared with the fiscal year 2018 rate of return of 9.3%. The decrease in the rate of return was due primarily to the downturn in equity markets near the end of the fiscal year.

- Fiscal year 2019 saw increased volatility in global equity due to concerns about the impact of a trade war and indications of a downturn in the global economy. Nevertheless, domestic equities (Wilshire 5000) ended the year with a gain of 9.1%, and international equities (MSCI All Country World ex-US - net) recorded a gain of 1.29%.
- Both high yield bonds and investment grade bonds did well in the fiscal year. High yield bonds as represented by the ICE BofAML US High Yield Master II Total Return returned 7.6%, while high quality investment grade bonds ended the year with a gain of 7.9%. Real Estate had another year of good performance, as the NCREIF Property Index returned 6.5% in fiscal year 2019.

- At June 30, 2019, the Systems' total pension liability was $5.24 billion. The System's Fiduciary Net Position was $3.10 billion leaving a Net Pension Liability of $2.14 billion. The Plan's Fiduciary Net Position as a percentage of total pension liability was 59.22%.
- The Fiduciary Net Position of $3.10 billion increased by $112 million or 3.8% during fiscal year 2019 due primarily to strong investment returns. This compares to an increase of $391 million or 15.1% in the Fiduciary Net Position during fiscal year 2018.

INVESTMENT REVIEW

The System's investment portfolio closed its 2019 fiscal year at $3.1 billion, up from $3.0 billion at the beginning of the year. The total gross investment return for the fiscal year was 7.2%. The System's performance, including the total fund, each asset class and their corresponding benchmark(s), for fiscal year 2019 and the trailing three, five, and ten-year periods are listed in Table 1 on page 19.

Relative to its peer group (Wilshire TUCS Master Trusts – Public) the fund continues to post attractive investment returns over the long term, with returns in the first quartile over the trailing fifteen, five and three-year period.

The best performing asset classes for fiscal year 2019 were Private Equity, up 14.1% and Private Credit, up 8.8%. For fiscal year 2018, Real Estate and Private Equity were the top two performing asset classes. The benefits of a well-diversified asset allocation are evidenced by the System's ability to perform very competitively over multi-year periods where different asset classes drive overall returns. For the past three-year period, Private Equity has been the best performing asset class with a return of 15.8%. For the past ten year period, Domestic Equity was the System's best performing asset class, with a return of 14.3%.

The System continuously monitors the actual allocation with the goal of moving it toward the target. The Target Allocation and Actual Asset Allocation charts below reflect the System's target and actual asset allocation mix as of June 30, 2019.

Asset Class	***Target Allocation***	***Actual Allocation***
Global Equity	32.5%	32.3%
Private Equity	17.0%	22.9%
Fixed Income	10.0%	13.5%
Private Credit	5.0%	1.1%
Real Estate	12.5%	10.6%
Absolute Return	8.0%	4.7%
Inflation Linked	15.0%	14.0%
Cash/Liquidation	-	0.9%
Total	100.0%	100.0%

TABLE 1

Periods Ended June 30, 2019

	Assets		Performance			
	($Millions)	(%)	1-year	3-year	5-year	10-year
Total Global Equity	**999.9**	**32.3**	**6.0%**	**10.7%**	**6.7%**	**-.-%**
Global Equity Policy[1]			6.7%	10.8%	6.8%	-.-%
Global Low Volatility Equity	**248.9**	**8.1**	**13.6%**	**9.3%**	**6.7%**	**-.-%**
MSCI ACWI Min Vol (Net)			13.0%	8.8%	6.8%	-.-%
Domestic Equity	**357.6**	**11.6**	**5.5%**	**13.0%**	**9.3%**	**14.3%**
Wilshire 5000			9.1%	14.0%	10.3%	14.7%
International Equity	**393.5**	**12.7**	**2.1%**	**9.5%**	**2.5%**	**6.7%**
MSCI ACWI ex-US (Net)			1.3%	9.4%	2.2%	6.5%
Global Fixed Income	**415.9**	**13.5**	**6.8%**	**5.3%**	**4.1%**	**6.8%**
Global Fixed Income Policy[2]			7.8%	4.9%	3.9%	6.6%
Real Estate	**327.4**	**10.6**	**7.7%**	**8.9%**	**10.1%**	**7.6%**
NCREIF Property			6.5%	6.9%	8.8%	9.3%
Private Equity	**706.5**	**22.9**	**14.1%**	**15.8%**	**12.9%**	**13.6%**
S&P 500 + 3%			13.4%	17.2%	13.7%	17.7%
Absolute Return	**146.4**	**4.7**	**3.3%**	**5.0%**	**2.0%**	**6.3%**
Custom Benchmark[3]			6.5%	5.8%	5.2%	4.8%
Inflation Linked	**432.9**	**14.0**	**2.1%**	**5.3%**	**-1.4%**	**5.6%**
Custom Benchmark[4]			5.7%	6.1%	5.5%	5.7%
Private Credit	**34.8**	**1.1**	**8.8%**	**-.-%**	**-.-%**	**-.-%**
Custom Benchmark			4.2%	-.-%	-.-%	-.-%
Cash	**21.6**	**0.7**	**2.1%**	**1.1%**	**1.3%**	**1.8%**
Total Fund	**3,091.1**	**100.0**	**7.2%**	**9.7%**	**6.8%**	**9.7%**
Policy Index			8.0%	9.4%	7.4%	10.4%
TUCS Ranking (6/30/19)[5]			31 (124)	24 (118)	25 (110)	40 (102)

1 *Global Equity Policy: 3Q13 - Present: 75% MSCI All-Country World IMI (Net), 25% MSCI All-Country World Minimum Volatility Index (Net).*
2 *Global Fixed Income Policy: 1Q04 - Present: 50% Barclays US Aggregate Bond Index, 50% ML High Yield Master II.*
3 *Absolute Return Custom Benchmark: 2Q11 - Present: Libor 3-Month Yield + 4% annually; Prior to 2Q11: Libor 3-Month Yield + 5% annually.*
4 *Inflation-Linked Assets Custom Benchmark: 2Q11 - Present: CPI + 4% annually; Prior to 2Q11: CPI + 5% annually.*
5 *Wilshire TUCS: total returns of all public DB plans, as of date noted; ranking is based on percentile within universe. Number in parentheses is number of observations for period.*

SECURITIES LENDING PROGRAM

The System's securities lending program obtains additional income by lending securities to broker dealers and banks. During the years ended June 30, 2019 and 2018, the System's custodian lent the System's securities and received cash, securities issued or guaranteed by the United States government, and irrevocable bank letters of credit as collateral. The Board and the borrowers maintained the right to terminate all securities lending transactions on demand. The cash collateral received on each loan was invested in a collective investment pool.

LIMITED PARTNERSHIP COMMITMENT

The System's investments in limited partnerships are included in the first table appearing in Note 9 on page 34. In connection with those investments, the System has remaining commitments as of June 30, 2019, 2018, and 2017 of approximately $960 million, $872 million, and $725 million, respectively, pursuant to terms of the respective limited partnerships.

OTHER COMMENTS

ACTUARIAL VALUATION

In compliance with the System's policy, an actuarial valuation along with an experience study will be performed by the System's actuary. Under SB 2190, experience studies comparing plan assumptions against plan experience will be performed at least once every four years effective 2021.

CONTACTING THE SYSTEM'S FINANCIAL MANAGEMENT

This financial report is designed to provide our participants, business partners, and other stakeholders with a general overview of the System's financial activities. Questions about this report should be directed to the Executive Director of the Houston Municipal Employees Pension System at 1201 Louisiana, Suite 900, Houston, Texas 77002.

STATEMENTS OF FIDUCIARY NET POSITION

Years Ended June 30, 2019 and 2018 *(in whole dollars)*

	2019		2018
	Pension Plan	OPEB Trust	Pension Plan
Assets			
Cash and cash equivalents	$ 11,796,817	$ 223,030	$ 31,377,585
Receivables			
Contribution receivable - City of Houston	12,961,715	-	7,751,408
Receivables on asset sales	6,492,984	-	3,966,451
Receivables on foreign exchanges	1,088,014	-	2,092,990
Other receivables	5,530,867	82,040	4,492,668
Total receivables	26,073,580	82,040	18,303,517
Investments, at fair value			
Short-term investment funds (valued at cost)	44,271,926	-	61,456,739
Government securities	100,318,852	-	69,614,794
Corporate bonds	198,302,026	-	198,328,385
Capital stocks	805,238,023	-	683,339,878
Commingled funds	646,384,175	8,163,057	787,745,946
Real estate	259,725,223	-	230,983,496
Alternative investments	1,019,691,808	-	928,325,587
Total investments	3,073,932,033	8,163,057	2,959,794,825
Net OPEB asset	-	1,752,422	-
Collateral on securities lending arrangements	60,245,598	-	49,471,751
Furniture, fixtures and equipment, net	184,720	-	132,786
Total assets	3,172,232,748	10,220,549	3,059,080,464
Deferred outflows of resources - related to HMEPS OPEB	-	98,241	-
Liabilities			
Payables on asset purchases	5,940,534	-	7,050,805
Payables on foreign exchanges	1,089,273	-	2,098,408
Accrued liabilities	3,958,278	1,482	3,242,257
Total OPEB liability	-	-	8,277,557
Collateral on securities lending arrangements	60,245,598	-	49,471,751
Total liabilities	71,233,683	1,482	70,140,778
Deferred inflows of resources - related to HMEPS OPEB	-	1,925,779	75,408
Net position restricted for pensions and other post-employment benefits	$3,100,999,065	$ 8,391,529	$2,988,864,278

See accompanying notes to financial statements

STATEMENTS OF CHANGES IN FIDUCIARY NET POSITION

Years Ended June 30, 2019 and 2018 *(in whole dollars)*

	2019		2018
	Pension Plan	OPEB Trust	Pension Plan
Additions			
Contributions			
Employer	$ 176,261,043	$ 8,473,008	$ 421,561,725
Participants	32,536,529	-	27,904,931
Total contributions	208,797,572	8,473,008	449,466,656
Other income	709,841	-	701,079
Investment income			
Interest on bonds and deposits	15,880,554	28,971	10,530,217
Dividends	28,779,950	5,187	19,974,256
Earnings from limited partnerships and real estate trusts	1,604,545	-	4,966
Net appreciation on investments	161,925,989	81,296	208,672,351
Total investment income	208,191,038	115,454	239,181,790
Proceeds from lending securities	1,309,207	-	918,260
Less costs of securities lending	(1,036,723)	-	(617,170)
Net proceeds from lending securities	272,484	-	301,090
Less investment expenses	(8,018,947)	(1,482)	(7,667,752)
Total investment income	200,444,575	113,972	231,815,128
Total additions to plan net position	409,951,988	8,586,980	681,982,863
Deductions			
Benefits paid to participants	291,060,500	195,451	283,928,131
Contribution refunds to participants	1,393,772	-	806,722
Professional services	663,634	-	667,785
Administration expenses	4,699,295	-	5,774,175
Total deductions	297,817,201	195,451	291,176,813
Net increase in net position	112,134,787	8,391,529	390,806,050
Net position restricted for pensions and other post-employment benefits			
Beginning of year	2,988,864,278	-	2,598,058,228
End of year	$ 3,100,999,065	$ 8,391,529	$ 2,988,864,278

See accompanying notes to financial statments

NOTE 1 – DESCRIPTION OF PLAN

The Houston Municipal Employees Pension System (the System) was created under Chapter 358, Acts of the 48th Texas Legislature, Regular Session, 1943 (Article 6243g, Vernon's Texas Civil Statutes) and reenacted and continued under HB1573, 77th Texas Legislature, Article 6243h, Vernon's Texas Civil Statutes (the Pension Statute), as amended. The System is a cost-sharing multiple-employer defined benefit pension plan with two participating employers covering all municipal employees, except police officers and firefighters (other than certain police officers in the System as authorized by the Pension Statute), employed full time by the City of Houston, Texas (the City), elected City Officials, and the full time employees of the System (collectively referred to as participants). The System includes three contributory groups (Groups A, B and D) and provides for service, disability and death benefits for eligible participants. The System's plan net position is used to pay benefits for eligible participants of Group A, Group B, and Group D. The System is a governmental plan and therefore is not subject to the Employee Retirement Income Security Act of 1974. The System is governed by a Board of Trustees (the Board) consisting of eleven trustees – four elected by the active plan members, two elected by the retired plan members, one appointed by the mayor of the city, one appointed by the controller of the city, one appointed by the elected trustees, and two appointed by the governing body of the city. The appointed trustees must have expertise in at least one of the following areas: accounting, finance, pension, investment or actuarial science. The System can only be terminated or amended by an act of the Legislature of the State of Texas or by an agreement between the City and the Board pursuant to the Pension Statute.

PARTICIPATION

Participants newly hired on or after January 1, 2008 automatically become members of Group D.

Participants hired before September 1, 1981 participate in Group A, unless they elected before December 1, 1981 or after May 1, 1996 to transfer to Group B. Participants hired or rehired after September 1, 1981 but before September 1, 1999, may make a one-time irrevocable election to participate in Group A; otherwise, they participate in Group B. Participants hired or rehired on or after September 1, 1999 and before January 1, 2008 participate in Group A; except that Executive Officials of the City and the Executive Director of the System (Executive Officials) participated in Group C. Effective January 1, 2005, the Executive Officials of the City and the Executive Director of the System automatically became Group A members pursuant to the First Amendment to Meet and Confer Agreement, dated December 21, 2004.

The most recent actuarial report shows the following System participants as of July 1, 2018:

	2018	2017
Retirees and beneficiaries currently receiving benefits	10,834	10,601
Former employees - vested but not yet receiving benefits	3,457	3,409
Former employees - non-vested	2,587	2,167
Vested active participants	7,745	7,791
Non-vested active participants	4,135	4,275
Total participants	28,758	28,243

RETIREMENT ELIGIBILITY

Effective January 1, 2008, new employees participate in Group D with:

- Normal retirement eligibility of age 62 and 5 years of credited service:
- Option to elect an early reduced retirement benefit.

A former employee who is rehired as an employee by the City or by the System on or after January 1, 2008 is a member of the group in which the employee participated at the time of the employee's immediately preceding separation from service.

For those participants in Group A and Group B employed effective January 1, 2005, a participant who terminates employment with the City or the System is eligible for a normal retirement pension beginning on the member's effective retirement date after the date the member completes at least five years of credited services and attains:

- 62 years of age, or
- A combination of years of age and years of credited service, including parts of years, the sum of which equals the number 75, provided the participant is at least 50 years of age, or
- Any combination of age and credited service that when added together equal 70 or more, provided that the member, prior to January 1, 2005 completed at least 5 years of credited service and attained a combination of age and credited service that when added together equal 68 or more.

PENSION BENEFITS

Pension benefits are based on a participant's average monthly salary and years of credited service, as defined in the Pension Statute. The maximum normal retirement pension is 90.0% of the participant's average monthly salary.

As a result of SB 2190, pension benefits are increased annually by a Cost of Living Adjustment (COLA) equal to a calculated percentage of the original benefit amount, not compounded, for all persons receiving a pension or survivor benefit as of January 1 of the year in which the increase is made (except for Group D members who terminated employment prior to July 1, 2017 who do not receive COLAs). The amount of the COLA is the rolling five-year net investment return minus 5.0%, and then multiplied by 50.0%, but not less than 0% or more than 2.0%.

A participant who is eligible to receive a deferred benefit may elect to receive his or her pension benefit in an early lump sum distribution if the actuarial present value of the participant's benefit is less than $20,000 on the date of termination. Early lump-sum distributions are subject to approval by the Board.

DISABILITY BENEFITS

Service-connected disability benefits for covered participants are based on the participant's normal accrued benefit, but are not less than 20.0% of the participant's average monthly salary. There is no minimum credited service requirement to qualify for service-connected disability benefits.

Participants with at least five years of credited service who become disabled may qualify for a non-service connected disability allowance equal to the participant's normal accrued pension benefit.

SURVIVOR BENEFITS

Survivor benefits are provided for a member's surviving spouse and/or dependent children. A deceased member must have had at least five years of credited service at the time of his or her death to qualify for survivor benefits unless death was caused by a service-connected incident as defined by the Pension Statute. For a Group D member, eligibility for survivor benefits for a death that occurs while actively employed is determined in the same manner as for Group A and Group B. For a death that occurs after the Group D member's termination of employment, the payment of a death benefit depends on whether the participant elected an optional annuity.

A Group D participant with at least five years of credited service has the option to elect an actuarially equivalent amount under one of three joint annuity options in lieu of a normal benefit with no survivor benefit. If a Group D participant with at least five years of credited service elects a normal benefit, no death or survivor benefit is payable. If a Group D participant with at least five years of credited service makes no optional annuity election and dies prior to retirement, the surviving spouse is eligible to receive an amount equal to the amount that would have been paid if the participant had elected a 50.0% joint and survivor annuity and named the surviving spouse as the designated beneficiary.

Effective July 1, 2011, eligible unmarried Group A and Group B members who terminate service on or after June 30, 2011 have the option to select a joint and survivor (J&S) annuity option in lieu of a normal benefit.

The optional annuity election, which was already available to vested Group D members and vested Group B members who separated from service prior to September 1997, allows eligible participants to elect to take a reduced pension and provide an annuity (50.0% J&S, 100.0% J&S, or 10-year Guarantee) to a designated annuitant.

In order to qualify for survivor benefits other than under an annuity option, a surviving spouse must have been married to the deceased participant at the time the participant's employment with the City or System was terminated and at the time of the participant's death. To qualify for benefits, a child must be the unmarried natural or legally adopted dependent child of the deceased participant at the time of the participant's death and (a) must be under age 21 or (b) have been totally and permanently disabled before age 18 and before the participant's termination of employment. Dependent benefits are payable to the legal guardian of the dependent(s) unless the dependent is at least 18 years of age.

DEFERRED RETIREMENT OPTION PLAN (DROP)

A Group A or Group B participant who is eligible to retire, except that he or she has not retired and remains a full-time employee of the City, or the System, or has been separated from service for not more than thirty calendar days, may elect to participate in the Deferred Retirement Option Plan (DROP). The DROP provides that a monthly amount (monthly DROP credit) will be credited to a notional account (DROP Account). Beginning January 1, 2018 interest is credited to the DROP Account at a rate equal to half of the System's rolling five-year net investment return, but not less than 2.5% or more than 7.5%. Interest is compounded at an interval approved by the Board. The first day of DROP participation is the DROP Entry Date. The day a participant's fully executed DROP election is accepted by the System is the DROP Election Date. Normal pension benefits cease to accrue on the DROP Entry Date, except that all Cost of Living Adjustments (COLA) noted previously apply to DROP participants who are active employees under the Pension Statute. As a result of SB 2190, beginning in 2018, DROP participants who are active employees receive the COLA if the employee is at least age 62 on January 1 of that year.

Effective January 1, 2005, a participant's election to participate in DROP cannot establish a DROP entry date that occurs prior to the date of the System's receipt of the member's request to participate in DROP. The monthly DROP credit is based on the participant's years of credited service and average monthly salary as of DROP Entry Date, and benefit accrual rates in effect on DROP Election Date.

DROP participation terminates when a DROP participant's employment with the City, or the System, terminates. The balance of the participant's notional DROP account (DROP Benefit) at the time of such termination is an amount equal to the sum of a participant's monthly DROP credits and interest accrued on such amount up to the time the participant's employment terminates. A DROP Benefit is subject to approval by the Board. A DROP participant eligible to receive a DROP Benefit distribution may elect to receive the distribution in a lump-sum, partial distribution, in substantially equal periodic payments over a period of time approved by the Board, or in a combination of a lump-sum followed by substantially equal periodic payments over a period of time approved by the Board until the balance of the DROP Benefit is depleted. The DROP Benefit is not available to a DROP participant until such participant's employment with the City or the System has terminated and the participant has made a DROP distribution election.

Group D participants do not participate in DROP.

GROUP D CASH BALANCE PLAN

In addition to the required Group D member contributions, Group D members contribute an additional 1% of salary to a notional cash balance account beginning in calendar year 2018. On separation from service, if a Group D participant has less than one year of service while contributing to the account, the participant is eligible to receive only a distribution of the contributions credited to the account, without interest. If the participant has at least one year of contributions to the account, the participant is eligible to receive a distribution of contributions credited to the account, including interest.

The Group D Cash Balance interest rate is equal to half of the System's rolling five-year net investment return, with a minimum of 2.5% and maximum of 7.5%.

REFUNDS OF PARTICIPANT CONTRIBUTIONS (BESIDES THE GROUP D CASH BALANCE PLAN)

All participants who terminate employment prior to being approved for retirement may request a refund of their accumulated employee contributions, if any, without interest, in lieu of a pension or in the event the participant has fewer than five years of credited service.

NOTE 2 – SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

BASIS OF PRESENTATION

The accompanying basic financial statements are presented in accordance with generally accepted accounting principles established by the Governmental Accounting Standards Board (GASB), which designates the accounting principles and financial reporting standards applicable to state and local governmental units. The accompanying basic financial statements include solely the accounts of the System, which include all programs, activities and functions relating to the accumulation and investment of the assets and related income necessary to provide the pension benefits required by the governing statutes and amendments thereto.

BASIS OF ACCOUNTING

The economic resources basis of accounting is the method by which revenues and expenses are recognized in the accounts and reported in the basic financial statements. The accompanying basic financial statements are presented on the accrual basis of accounting. Under the accrual basis of accounting, revenues, which include investment and other income, are recognized when they are earned and collection is reasonably assured, and expenses are recognized when the liability is incurred. Accrued income, when deemed not collectible, is charged to operations.

Participant and employer contributions are recognized as revenues in the period in which they are due pursuant to the Pension Statute and formal recommitments. Benefits and refunds are recognized when due and payable in accordance with the terms of the Pension Statute.

REPORTING ENTITY

The System is a component unit of the City. Therefore, its basic financial statements and required supplemental information are included in the City's Comprehensive Annual Financial Report.

INVESTMENT VALUATION AND INCOME RECOGNITION

Investments are reported at fair value. Securities traded on a national or international exchange are valued at the last reported sales price at current exchange rates. The fair value of limited partnerships and real estate trusts are based on the System's valuation of estimates and assumptions from information and representations provided by the respective general partners, in the absence of readily ascertainable market values. Short-term investments are carried at amortized cost, which approximates fair value.

Purchases and sales of investments and forward foreign exchange contracts are recorded on the trade date. Gains or losses on the forward foreign exchange contracts are recognized when the contract is complete. Dividend income is recorded on the ex-dividend date. Interest and income from other investments are recorded when earned. Net appreciation/depreciation on investments represents realized gains and losses on sales of investments during the year and the change in the fair value of investments between years.

FURNITURE, FIXTURES AND EQUIPMENT

Furniture, fixtures and equipment are recorded at cost less accumulated depreciation and amortization. Depreciation and amortization expense is computed using the straight-line method over the estimated useful lives of the related assets ranging from three to ten years. Any gain or loss on the retirement of assets is recognized currently. Maintenance and repairs are charged to expense while expenditures for improvements greater than or equal to $5,000 are capitalized.

COMPENSATED EMPLOYEE ABSENCES

The System employees earn paid leave (vacation and sick leave) based on years of service and may accumulate them subject to certain limitations and be paid upon termination or resignation from the System. The amount paid is determined based on the departing employee's regular rate of pay at separation. Compensated employee absences (vacation, compensatory time off, annual leave and sick leave) are accrued as an expense and liability in the basic financial statements at their most current rate.

USE OF ESTIMATES

The preparation of financial statements in conformity with accounting principles generally accepted in the United States of America requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities at the date of the basic financial statements and the reported amounts of additions and deductions during the reporting period. Accordingly, actual results could differ from those estimates.

INCOME TAX STATUS

The System obtained its latest determination letter on April 14, 2017, in which the Internal Revenue Service stated that the System is in compliance with the applicable requirements of the Internal Revenue Code. The System has been amended since receiving the determination letter. However, the System's management and Board believe that the System is currently designed and being operated in compliance with the applicable requirements of the Internal Revenue Code.

COSTS OF ADMINISTERING THE SYSTEM

The costs of administering the System are paid by the System from current earnings pursuant to an annual fiscal budget adopted by the Board.

NEW ACCOUNTING PRONOUNCEMENTS

GASB Statement No. 87, *Leases.* The primary objective of this statement is to increase the usefulness of governments' financial statements by requiring recognition of certain lease assets and liabilities for leases that previously were classified as operating leases and recognized as inflows of resources or outflows of resources based on the payment provisions of the contract. Under this statement, a lessee is required to recognize a lease liability and an intangible right-to-use lease asset, and a lessor is required to recognize a lease receivable and a deferred inflow of resources. The effective date of this standard is for reporting periods beginning after December 15, 2019. The System is evaluating this statement with the plan of implementing for the FY 2021 annual report.

GASB Statement No. 88, *Certain Disclosures related to Debt, including Direct Borrowings and Direct Placements.* The primary objective of this Statement is to improve the information that is disclosed in notes to government financial statements related to debt, including direct borrowings and direct placements. The System has no debt obligations under the scope of this statement, therefore, this statement does not apply.

GASB Statement No. 89, *Accounting for Interest Cost Incurred before the End of a Construction Period.* The objectives of this statement are to enhance the relevance and comparability of information about capital assets and the cost of borrowing for a reporting period and to simplify accounting for interest cost incurred before the end of a construction period. The System has determined that the requirements of this statement does not apply.

GASB Statement No. 90, *Majority Equity Interests.* The primary objectives of this statement are to improve the consistency and comparability of reporting a government's majority equity interest in a legally separate organization and to improve the relevance of financial statement information to certain component units. All of the Systems' equity interests meet the definition of an investment, therefore this statement does not apply.

RECLASSIFICATIONS

Certain reclassifications have been made to the fiscal year 2018 financial statements to conform to the fiscal year 2019 financial statement presentation. These reclassifications had no effect on changes in fiduciary net position.

NOTE 3 - CONTRIBUTIONS AND FUNDING POLICY

All active participants are required to contribute to the System. Effective July 2017, Group A participants contribute 7% of salary, Group B participants contribute 2% of salary, and Group D participants contribute 2% of salary. Effective July 2018, Group A and Group B participants contribute 8% and 4% respectively.

Beginning in January of 2018, Group D participants contributed an additional 1% of salary (see discussion of Cash Balance Plan on page 25).

As a result of SB 2190, beginning in fiscal year 2018, the City is required to contribute the "Total City Contribution" to the system, which consists of the sum of (a) an actuarially determined percentage of payroll ("City Contribution Rate") multiplied by actual payroll and (b) a fixed dollar amount ("City Contribution Amount") which is based on the Unfunded Actuarial Accrued Liability (UAAL) as of July 1, 2016 ("Legacy Liability"). The Legacy Liability payment is amortized over 30 years, beginning on July 1, 2017 and grows at 2.75% per year regardless of the actual payroll growth rate.

In fiscal year 2019, the City Contribution Rate was 8.27% of payroll, and the City Contribution Amount was $127,441,192. In fiscal year 2018, the City Contribution Rate was 8.17% of payroll and the City Contribution Amount was $124,030,357. In fiscal year 2017 the required city contribution was 27.36% of payroll.

Also, SB 2190 required a one-time payment of $250 million to the System in Pension Obligation Bond proceeds during fiscal year 2018.

Historical contribution trend information is provided as required supplementary information on page 51.

NOTE 4 – NET PENSION LIABILITY

The Total Pension Liability as of June 30, 2019 is based on the actuarial valuation date of July 1, 2018, and rolled-forward using generally accepted actuarial principles. The net pension liability is measured as the total pension liability, less the amount of the pension plan's fiduciary net position. In actuarial terms, this will be the accrued liability less the market value of asset.

The Schedule of Net Pension Liability presents multi-year trend information (beginning with fiscal year 2014) about whether the plan fiduciary net positions are increasing or decreasing over time relative to the total pension liability. In addition to the table below, this information is presented as a required schedule in the Required Supplemental Information section beginning on page 49.

FY Ending June 30	*Total Pension Liability*	*Fiduciary Net Position*	*Net Pension Liability*	*Fiduciary Net Position as a % of Pension Liability*
2014	$ 4,366,635,542	$ 2,464,438,877	$ 1,902,196,665	56.44%
2015	4,531,179,075	2,456,543,559	2,074,635,516	54.21%
2016	5,034,389,959	2,400,023,240	2,634,366,719	47.67%
2017	4,959,510,179	2,602,664,718	2,356,845,461	52.48%
2018	5,113,358,193	2,988,864,278	2,124,493,915	58.45%
2019	5,236,133,181	3,100,999,065	2,135,134,116	59.22%

Actuarial valuation of the System involves estimates and assumptions about events in the future. Amounts determined regarding the net pension liability are subject to revision as actual results are compared with past expectations and new estimates are made regarding the future. The last experience study was performed in 2015 based on the July 1, 2014 valuation. Several assumptions were statutorily changed under SB 2190, effective July 1, 2017. A summary of the actuarial assumptions as of the latest actuarial valuation is shown below.

VALUATION DATE: JULY 1, 2018

Methods and Assumptions Used to Determine Contribution Rates:

Actuarial Cost Method	Entry Age Normal
Asset Valuation Method	5 year smoothed market, direct offset of deferred gains or losses
Inflation	2.25%
Salary Increases	3.00% to 5.25% including inflation
Investment Rate of Return	7.00%

Retirement Age	Experience-based table of rates that are specific to the type of eligibility condition. Last updated for the 2015 valuation pursuant to an experience study of the period 2009 – 2014.
Mortality	RP-2000 Mortality Table scaled by 125% for males and 112% for females. The rates are then projected on a fully generational basis by scale BB.
Note	The actuarially determined contribution includes the Legacy Liability payment as specified by the January 1, 2016 Risk Sharing Valuation and a calculated employer rate equal to the normal cost and the amortization of any new unfunded liabilities over a closed 30 year period from the valuation date the liability base was created.

SENSITIVITY OF NET PENSION LIABILITY TO THE SINGLE DISCOUNT RATE ASSUMPTION

A single discount rate of 7.0% was used to measure the total pension liability. This single discount rate was based on the statutory rate of return of 7.0% under SB 2190. This rate of return on pension plan investments was applied to all periods of projected benefit payments to determine the total pension liability.

The table below illustrates the sensitivity of the net pension liability to changes in the discount rate. In particular, the table presents the plan's net pension liability if it were calculated using a single discount rate that is 1-percentage-point lower or 1-percentage point higher than the single discount rate.

1% Decrease *6.00%*	Current Single Rate Assumption *7.00%*	1% Increase *8.00%*
$ 2,700,999,569	$ 2,135,134,116	$ 1,662,159,801

NOTE 5 – DEFERRED RETIREMENT OPTION PLAN (DROP) BALANCES

The DROP provides that a monthly amount (monthly DROP credit) will be credited to a notional account (DROP Account) for eligible DROP participants. A DROP Benefit is subject to approval by the System's Board. The DROP Benefit is not available to a DROP participant until such participant's employment with the City or the System has terminated and the participant has made a DROP distribution election. For a more detailed description of DROP terms, see Note 1.

DROP balances for all active and inactive participants totaled $621.5 million in fiscal year 2019, and $570.9 million in fiscal year 2018.

NOTE 6 – CASH AND CASH EQUIVALENTS

For cash deposits and cash equivalents, Custodial Credit Risk is the risk that in the event of a bank failure, the System's deposits may not be returned to it. The System's deposits are held by State Street Bank and Trust Company. As of June 30, 2019 and 2018, the System had fair value cash balances of $11,556,462 and $31,193,296, respectively. Management believes that the System's credit risk exposure is mitigated by the financial strength of the banking institution in which the deposits are held.

NOTE 7 – DEFERRED COMPENSATION PLAN

The System offers its employees a deferred compensation plan (DCP) created in accordance with Internal Revenue Code Section 457. The DCP, available to all full-time employees of the System, permits employees to defer a portion of their salary until future years. Distributions from the DCP are not available to employees until termination, retirement, death or unforeseeable emergency. The DCP has a third party administrator, Empower Retirement, formerly Great-West Retirement Services, and the cost of administration and funding is borne by the DCP participants. Amounts deferred are held in trust by Empower Retirement and, since the System has no fiduciary responsibility for the DCP, these amounts are not reflected in the accompanying financial statements in accordance with GASB Statement No. 32, *Accounting and Financial Reporting for Internal Revenue Code Section 457 Deferred Compensation Plans.*

NOTE 8 – POSTEMPLOYMENT BENEFITS OTHER THAN PENSIONS (OPEB)

GENERAL INFORMATION ABOUT THE OPEB

The OPEB Plan is a single employer plan and is administered by the System.

Article 6243h, Tex. Rev. Civ. Stats., Sec. 3(f), authorizes the pension board to establish and amend employee benefit terms and financing requirements.

The OPEB Trust was established during FY 2019.

BENEFITS PROVIDED

Retired employees of the System are eligible to receive full retiree health care benefits, which include medical, prescription, dental and life insurance. An eligible retired employee is a person who has at least five (5) years of full-time service with the System and meets at least one of the conditions:

- Has retired due to disability.
- Age 62 or greater.
- Years of full-time service plus age is greater than or equal to 70.
- Employee is eligible to begin receiving a retirement pension within 5 years after the employee's termination of employment.

Spouses of retired employees are eligible to receive retiree health care benefits. Surviving spouses of deceased retired members have the option to elect COBRA coverage for up to 36 months.

Eligible children of the System's retired employees may receive retiree health care benefits. Eligible children include a natural child, a stepchild, an adopted child, a foster child or a child recognized under a medical child support order. The child must be under age 26 (except in the case of a disabled child). For the Preferred Provider Organization plan (PPO), the eligible retiree pays 25% of the retiree health insurance premium and the System pays the remaining 75% of retiree health care coverage. For the High Deductible Health Plan (HDHP), the retiree pays the lesser of: (1) the HDHP premium minus the net cost to the System of the PPO premium (PPO premium – PPO retiree contribution); or (2) 12.5% of the HDHP premium.

If an employee does not enter retirement directly after termination, the employee must be eligible to begin receiving a retirement pension within five (5) years of termination of the System employment in order to be eligible for retiree health insurance. If the employee elects to continue coverage as a retiree within the 5-year window prior to receiving a retirement pension, the employee must pay 100% of the total premium owed until the earlier of the date the retiree reaches normal retirement eligibility or the date the retiree discontinues coverage.

The System employees and dependents retiring with retiree health care benefits are eligible for dental benefits.

Retired employees are insured for up to $5,000 of Life Insurance. All other insurance under the policy, including Dependent Life Insurance, if any, ends on the last day of active employment.

Retirees can continue coverage under the System's Plan until covered by Medicare, when the System's Plan becomes secondary. The premium for coverage continues at the same level as pre-Medicare.

SUMMARY OF MEMBERSHIP INFORMATION

The following table provides a summary of the number of participants in the plan as of June 30, 2019:

Inactive Plan Members or Beneficiaries Currently Receiving Benefits	14
Inactive Plan Members Entitled to But Not Yet Receiving Benefits	0
Active Plan Members	25
Total Plan Members	39

CONTRIBUTIONS

The employer contributions are established by the System. The System's current intention is to contribute the plan's normal cost plus an amount necessary to amortize any unfunded actuarial accrued liability (UAAL) over a period of 10 years. Employees are not required to contribute to the plan.

OPEB TRUST INVESTMENTS

All OPEB Trust investments are held in the Public Agencies Retirement Services (PARS) Post-Retirement Health Care Plan Trust by its trustee, US Bank. The Trustee is contracted to manage the portfolio in accordance with the Trust documents as approved by the Board. The trust investment strategy mandates a diversified portfolio in real estate, fixed income securities, and equity securities.

Custodial Credit Risk. As of June 30, 2019, all investments are registered in the name of the Houston Municipal Employees Pension System PARS Post-Retirement Health Care Plan Trust under a master trust custodial agreement.

Credit Risk of Debt Securities. The OPEB Trust investments as of June 30, 2019 are shown below:

	NAV	Rating	Percentage of OPEB Plan Fiduciary Net Position
Fixed Income Mutual Funds			
Ishares Core US Agg Bond	$ 2,445,246	N/A	29.1%
Vanguard ST Invt Grade	609,473	N/A	7.3%
	$ 3,054,719		
Equity Mutual Funds			
Ishares Core SP 500	$ 1,518,552	N/A	18.1%
Ishares SP 500 Growth	595,435	N/A	7.1%
Ishares SP 500 Value	598,587	N/A	7.1%
Ishares MSCI EAFE	577,635	N/A	6.9%
Vanguard FTSE Emerging Markets	420,877	N/A	5.0%
Other Equity Mutual Funds[1]	1,397,252	N/A	16.7%
	$ 5,108,338		
Total	$ 8,163,057		

The fair values of these mutual fund investments have been determined using the Net Asset Value (NAV) provided by the administrator. They may have active or passive strategies in publicly traded income securities. Mutual funds usually have higher liquidity than other investment strategies valued at NAV.

Concentration of Credit Risk. As of June 30, 2019, the OPEB Trust's investments were all registered in the Trust's name.

Interest Rate Risk. The OPEB Trust does not have a formal policy limiting investment maturities.

NET OPEB LIABILITY

The System's net OPEB Liability was measured as of June 30, 2019, and the total OPEB liability used to calculate the net OPEB liability was determined by an actuarial valuation as of that date.

ACTUARIAL ASSUMPTIONS AND METHODS

Valuation Date: June 30, 2019
Methods and Assumptions:
Actuarial Cost Method: Individual Entry Age Normal

1 *No individual holding exceeds 5% of Fiduciary Net Position.*

Discount Rate	6.00% as of June 30, 2019
Inflation	2.25%
Salary Increases	3.00% to 5.25%, including inflation
Demographic Assumptions	Based on the experience study covering the five-year period ending June 30, 2014 as conducted for the pension plan.
Mortality	Gender-distinct RP-2000 Combined Healthy Mortality Tables with Blue Collar Adjustment. Male rates are multiplied by 125% and female rates are multiplied by 112%. The rates are projected on a fully generational basis by Scale BB to account for future mortality improvements.
Health Care Trend Rates	Initial rate of 7.10% declining to an ultimate rate of 4.00% after 15 years.
Cadillac Tax	The liabilities were increased by 10% to reflect the anticipated impact of the excise tax.
Participation Rate	It was assumed that 100% of eligible retirees would choose to maintain their retiree health care benefits through HMEPS. Furthermore, 70% were assumed to elect two-person coverage.
Other Information: Notes	The discount rate changed from 3.62% as of June 30, 2018 to 6.00% as of June 30, 2019. The Health Care Trend assumptions were slightly updated to better reflect the plan's anticipated experience.

The long-term expected rate of return on OPEB plan investments was determined using a building-block method in which best-estimate ranges of future real rates of return are developed for each major asset class. These ranges are 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 by adding expected inflation. The target allocation and best estimates of arithmetic real rates of return for each major asset class are summarized in the following table:

ASSET ALLOCATION

Asset Class	***Target Allocation***	***Long-Term Expected Real Rate of Return***
Domestic Equity - Large Cap	32.00%	4.95%
Domestic Equity - Small/Mid Cap	15.00%	5.71%
Non-US Equity - Developed	7.00%	5.24%
Non-US Equity - Emerging	4.00%	6.35%
US Corporate Bonds - Core	33.75%	1.99%
US Corporate Bonds - High Yield	1.25%	3.35%
US Treasuries (Cash Equivalents)	5.00%	0.58%
Real Estate	2.00%	4.19%
Total	100.00%	

Discount Rate. Projected benefit payments are required to be discounted to their actuarial present values using a Discount Rate that reflects (1) a long-term expected rate of return on OPEB plan investments (to the extent that the plan's fiduciary net position is projected to be sufficient to pay benefits), and (2) tax-exempt municipal bond rate based on an index of 20-year general obligation bonds with an average AA credit rating as of the measurement date (to the extent that the contributions for use with the long-term expected rate of return are not met).

For purposes of this valuation, the expected rate of return on OPEB plan investments is 6.00%; the municipal bond rate is 3.13% (based on the daily rate closest to but not later than the measurement date of the Fidelity "20-Year Municipal GO AA Index"); and the resulting Single Discount Rate is 6.00%.

SCHEDULE OF CHANGES IN NET OPEB LIABILITY FISCAL YEAR ENDING JUNE 30, 2019:

	Total OPEB Liability	Plan Fiduciary Net Position	Net OPEB Liability (Asset)
Beginning balance	$ 8,277,557	$ -	$ 8,277,557
Service cost	300,656	-	300,656
Interest on the total OPEB liability	301,552	-	301,552
Changes of benefit terms	-	-	-
Difference between expected and actual experience	117,646	-	117,646
Changes of assumptions	(2,162,853)	-	(2,162,853)
Employer contributions	-	8,473,008	(8,473,008)
Net investment income	-	113,972	(113,972)
Benefit payments	(195,451)	(195,451)	-
Administrative expense	-	-	-
Other	-	-	-
Net changes	(1,638,450)	8,391,529	(10,029,979)
Ending balance	$ 6,639,107	$ 8,391,529	$ (1,752,422)

Ending balances are as of the measurement date, June 30, 2019.

Sensitivity of Net OPEB Liability to the Single Discount Rate Assumption. Regarding the sensitivity of the net OPEB liability to changes in the Single Discount Rate, the following presents the plans net OPEB liability, calculated using a Single Discount Rate of 6.00%, as well as what the plan's net OPEB liability would be if it were calculated using a Single Discount Rate that is one percent lower or one percent higher:

1% Decrease *5.00%*	Current Single Discount Rate Assumption *6.00%*	1% Increase *7.00%*
($ 793,370)	($ 1,752,422)	($ 2,536,622)

Sensitivity of Net OPEB Liability to the Healthcare Cost Trend Rate Assumption. Regarding the sensitivity of the net OPEB liability to changes in the healthcare cost trend rates, the following presents the plan's net OPEB liability, calculated using the assumed trend rates as well as what the plan's net OPEB liability would be if it were calculated using a trend rate that is one percent lower or one percent higher:

1% Decrease *5.00%*	Current Healthcare Cost *6.00%*	1% Increase *7.00%*
($ 2,618,692)	($ 1,752,422)	($ 674,926)

BALANCES OF DEFERRED OUTFLOWS AND DEFERRED INFLOWS OF RESOURCES RELATED TO OPEB

	Deferred Outflows	Deferred Inflows
Difference between expected and actual experience, liability	$ 98,241	$ 10,004
Changes in assumptions	0	1,857,708
Difference between expected and actual experience, assets	0	58,067
Total	$ 98,241	$ 1,925,779

DEFERRED OUTFLOWS AND DEFERRED INFLOWS TO BE RECOGNIZED IN FUTURE OPEB EXPENSE

Year Ending June 30	Net Deferred Outflows (Inflows)
2020	$ (365,661)
2021	(365,661)
2022	(365,661)
2023	(365,660)
2024	(343,776)
Thereafter	(21,119)
Total	$ (1,827,538)

NOTE 9 – INVESTMENTS

Portions of the System's investments are classified as security investments. A security is a transferable financial instrument that evidences ownership or creditorship. Investments in commingled funds, limited partnerships, real estate trusts, and loans and mortgages are investments that are evidenced by contracts rather than securities. The fair values of the System's investments at June 30 are presented by type:

	2019	2018
Short-term investment funds	$ 44,271,926	$ 61,456,739
Government securities	100,318,852	69,614,794
Corporate bonds	198,302,026	198,328,385
Capital stocks	805,238,023	683,339,878
Commingled funds	646,384,175	787,745,946
Real estate	259,725,223	230,983,496
Alternative investments	1,019,691,808	928,325,587
Total investments	$ 3,073,932,033	$ 2,959,794,825

RATE OF RETURN

For the fiscal year ended June 30, 2019, the annual money-weighted rate of return on pension plan investments, net of pension plan investment expenses, was 6.2% vs. 8.7% at June 30, 2018. The money-weighted rate of return expresses investment performance, net of investment expense, adjusted for the changing amounts actually invested. In comparison to the money-weighted rate of return of 6.2% the gross time-weighted return is 7.2% and appears in Table 1 on page 19. The two approaches are slightly different methods of calculating investment returns.

INVESTMENT POLICY

The Board has the authority to establish the investment policy and the asset allocation policy. The general investment objective is to obtain a reasonable long-term total return consistent with the degree of risk assumed while emphasizing the preservation of capital. The allocation is 32.5% to Global Equity, 10.0% to Fixed Income, 12.5% to Real Estate, 15.0% to Inflation Linked, 17.0% to Private Equity, 8.0% to Absolute Return and 5.0% to Private Credit. For the System's actual allocation, see the table on page 18.

EXPECTED RETURN ARITHMETIC BASIS (%)

Asset Class	Target Weight	Real Return Arithmetic Basis	Long Term Expected Portfolio Return
Global Equity	32.5	6.1	2.0
Private Equity	17.0	10.0	1.7
Core Fixed Income	5.0	1.8	0.1
High Yield	5.0	3.6	0.2
Private Credit	5.0	3.4	0.2
Real Estate	12.5	5.9	0.7
Absolute Return	8.0	4.3	0.3
Inflation Linked	15.0	7.3	1.1
	100.0		6.3
Inflation			1.7
Expected Arithmetic Nominal Return			8.0

These returns are developed on a 10-year forward-looking basis, using historical risk and correlation adjusted to recent trends. Return expectations represent a passive investment in the asset class and do not reflect value added from active management. An optimizer is used to generate an efficient frontier using these estimates; the efficient frontier represents the asset class distribution which would generate the maximum return for a given level of risk.

THE MASTER CUSTODIAN

The System's Board, in accordance with the power and authority conferred under the Texas Statutes, engaged State Street Bank and Trust Company (Custodian) as custodian of the assets of the System, and in said capacity, the Custodian is a fiduciary of the System's assets with respect to its discretionary duties including safekeeping of the System's assets. The Custodian has established and maintains a custodial account to hold, or direct its agents to hold, for the account of the System all assets that the Board shall from time to time deposit with the Custodian. All rights, title and interest in and to the System's assets shall at all times be vested in the System.

In holding System assets, the Custodian shall act with the same care, skill, prudence and diligence under the prevailing circumstances that a prudent person acting in like capacity and familiar with matters of this type would use in the conduct of an enterprise with a like character and with like aims.

Further, the Custodian shall hold, manage and administer the System's assets for the exclusive purpose of providing the benefits to the members and the qualified survivors of the System.

The Board shall manage the investment program of the System in compliance with all applicable Federal and State statutes and regulations concerning the investment of pension assets. The Board has adopted an Investment Policy Statement to set forth the factors involved in the management of investment assets for the System and which is made part of every investment management agreement.

CUSTODIAL RISK

For an investment, custodial risk is the risk that, in the event of the failure of the counterparty, the System will not be able to recover the value of its investment or collateral securities that are in the possession of an outside party. Investment securities are exposed to custodial risk if the securities are uninsured, are not registered in the name of the System, and are held by either the counterparty or the counterparty's trust department or agent but not in the System's name.

CONCENTRATION RISK

The allocation of assets among various asset classes is set by the Board. For major asset classes (e.g., global equity, fixed income, real estate, private equity, inflation-linked, absolute return and private credit), the System will further diversify by employing managers with demonstrated skills in complementary areas of expertise. The managers retained will utilize varied investment approaches, but, when combined will exhibit characteristics that are similar, but not identical, to the asset class proxy utilized in the strategic asset allocation plan. The Investment Policy Statement of the System provides that no public market investment manager shall have more than 20.0% (at market value) of the System's assets.

REPRESENTATIVE GUIDELINES BY TYPE OF INVESTMENT ARE AS FOLLOWS:

US Equity Managers

- A manager's portfolio shall contain a minimum of twenty-five issues.
- No more than 5.0% of the manager's portfolio at market shall be invested in American Depository Receipts (ADRs).
- No individual holding in a manager's portfolio may constitute more than 5.0% of the outstanding shares of an issuer.
- No individual holding may constitute more than 5.0% of a manager's portfolio at cost or 10.0% at market.
- Short sales, purchases on margin, non-negotiable or otherwise restricted securities are prohibited, other than where expressly permitted.
- While there are no restrictions on cash, a manager must notify the System if the cash position exceeds 10.0%.

International Equity Managers

- No more than 5.0% at cost and 10.0% at market value of a manager's portfolio shall be invested in the securities of any one issuer.
- No more than 30.0% of the assets of a manager's portfolio (at market value) shall be invested in any one country with the exception of Japan.
- While there are no restrictions on cash, a manager must notify the System if the cash position exceeds 10.0%.
- Forward foreign currency exchange contracts will be limited as follows:
  a) Forward and future exchange contracts of any currency may be used to hedge up to 100.0% of the currency exposure of the portfolio in aggregate or the currency exposure to any single country,
  b) Foreign exchange contracts with a maturity exceeding 12 months may not be made, and
  c) Currency options may be entered into in lieu of or in conjunction with forward sales of currencies. The same effective limitations specified in (a) and (b) above will apply to currency options.

Fixed Income Managers

- No more than 10.0% of a manager's portfolio at market shall be invested in the securities of any single issuer, with the exception of the U.S. government and its agencies.

As of June 30, 2019, across all asset classes, the System held one security with a market value over 5.0% of the System's fiduciary net position. The security, BlackRock MSCI ACWI Minimum Volatility Index, had a fair value of $249 million, representing 8.1% of the System's portfolio as of June 30, 2019. This investment also exceeded the 5% threshold last year.

INTEREST RATE RISK

The System invests in fixed income securities including, but not limited to, investments representing instruments with an obligated fixed rate of interest including public and private debentures, mortgages, investments in life insurance general accounts and guaranteed investment contracts, with maturities greater than one year, and options/futures. Instruments may have an investment grade or non-investment grade rating. Purchases and sales, investment selection and implementation of investment strategies are delegated to the discretion of the investment manager, subject to compliance with its management agreement and the Investment Policy Statement.

Interest rate risk is the risk that changes in interest rates will adversely affect the fair value of the investment. Duration is a measure of a debt investment's exposure to fair value changes arising from changes in interest rates. It uses the present value of cash flows, weighted for those cash flows as a percentage of the investment's full price. The greater the duration of a bond, or a portfolio of bonds, the greater its price volatility will be in response to a change in interest rates and vice-versa. Duration is the measure of a bond price's sensitivity to a 100-basis point change in interest rates. The duration of the System's debt securities is managed by the active managers.

At June 30, 2019, the following table shows the System's investments by type, amount and the effective duration rate.

	Effective Duration	Domestic	International	Fair Value
Collateralized mortgage obligations	5.30	$ 9,811,982	$ -	$ 9,811,982
Convertible bonds	4.10	4,532,655	-	4,532,655
Corporate bonds	5.10	127,176,103	13,826,440	141,002,543
GNMA/FNMA/FHLMC	3.40	36,152,524	-	36,152,524
Municipal	6.40	2,431,904	-	2,431,904
Government issues	5.70	49,080,501	12,653,923	61,734,424
Misc. receivable (auto/credit card)	1.60	10,123,212	-	10,123,212
Other ABS	2.50	2,244,740	-	2,244,740
Bank Loan[1]	N/A	30,586,891	-	30,586,891
Total		$ 272,140,512	$ 26,480,363	$ 298,620,875

At June 30, 2018, the following table shows the System's investments by type, amount and the effective duration rate.

	Effective Duration	Domestic	International	Fair Value
Collateralized mortgage obligations	4.25	$ 9,351,951	$ -	$ 9,351,951
Convertible bonds	4.41	5,869,508	-	5,869,508
Corporate bonds	4.71	139,384,230	301,871	139,686,101
GNMA/FNMA/FHLMC	3.27	31,194,186	-	31,194,186
Municipal	7.50	1,586,994	-	1,586,994
Government issues	7.69	34,723,210	2,110,404	36,833,614
Misc. receivable (auto/credit card)	1.75	11,839,350	-	11,839,350
Other ABS	1.42	2,501,870	-	2,501,870
Bank Loan[1]	N/A	29,079,605	-	29,079,605
Total		$ 265,530,904	$ 2,412,275	$ 267,943,179

CREDIT RISK

The quality ratings of investments in fixed income securities are set forth in the Investment Policy Statement as follows:

- All issues purchased by investment grade fixed income managers must be of investment grade quality Baa (Moody's) or BBB (S&P) unless expressly authorized by the Board, in which case a

1 *The bank loan market, or "leveraged loan" market as it is sometimes known, comprises debt with below investment grade credit ratings. Bank loans generally rank senior to the company's other debt, and offer higher credit ratings, and less risk than high yield bonds. Bank loans typically use floating rather than fixed interest rates. Companies often access this market to fund leveraged buyouts.*

minimum B rating shall apply, with a maximum limit of non-investment grade credits of 20.0% at market.

- For global opportunistic fixed income/high yield securities, more than 50.0% of a manager's portfolio at market shall be invested in non-investment grade fixed income securities, i.e. those with ratings of BA1 (Moody's), BB+ (Standard & Poor's), or lower, or unrated bonds, including but not limited to corporate bonds, convertible bonds, and preferred stocks.

The quality ratings of investments in fixed income securities as described by nationally recognized statistical rating organizations at June 30, 2019 are as follows:

QUALITY RATING	ASSET BACKED SECURITIES	CORP BONDS & BANK LOANS	CMO	US GOV'T AGENCIES	GOV'T ISSUES	MUNICIPALS	TOTAL	% OF HOLDINGS
AAA	$ 6,216,960	$ -	$ 1,375,061	$ -	$ 204,960	$ 1,512,192	$ 9,309,173	0.30%
AA	866,983	-	-	-	997,286	919,712	2,783,981	0.09%
A	202,318	16,936,221	-	-	2,314,931	-	19,453,470	0.63%
BBB	-	37,597,855	-	-	-	-	37,597,855	1.22%
BB	-	27,077,574	-	-	-	-	27,077,574	0.88%
B	-	27,845,346	-	-	-	-	27,845,346	0.91%
CCC	-	24,516,015	-	-	-	-	24,516,015	0.80%
C	-	2,210,300	-	-	-	-	2,210,300	0.07%
D	-	102,350	-	-	-	-	102,350	0.00%
NA*	5,081,691	39,836,428	8,436,921	36,152,524	58,217,247	-	147,724,811	4.81%
TOTAL FIXED INCOME SECURITIES	$ 12,367,952	$ 176,122,089	$ 9,811,982	$ 36,152,524	$ 61,734,424	$ 2,431,904	$ 298,620,875	9.71%
OTHER INVESTMENTS							$ 2,775,311,158	90.29%
TOTAL INVESTMENTS							$ 3,073,932,033	100.00%

*NA = Not Available

The quality ratings of investments in fixed income securities as described by nationally recognized statistical rating organizations at June 30, 2018 are as follows:

QUALITY RATING	ASSET BACKED SECURITIES	CORP BONDS & BANK LOANS	CMO	US GOV'T AGENCIES	GOV'T ISSUES	MUNICIPALS	TOTAL	% OF HOLDINGS
AAA	$ 6,536,369	$ 322,467	$ 1,201,286	$ -	$ -	$ 683,505	$ 8,743,627	0.30%
AA	2,007,069	1,250,204	-	-	435,842	903,489	4,596,604	0.15%
A	520,409	13,568,761	-	-	1,991,792	-	16,080,962	0.54%
BBB	270,224	34,518,460	-	-	-	-	34,788,684	1.18%
BB	-	21,093,900	-	-	-	-	21,093,900	0.71%
B	-	29,900,558	-	-	118,612	-	30,019,170	1.01%
CCC	-	31,854,902	-	-	-	-	31,854,902	1.08%
CC	-	964,700	-	-	-	-	964,700	0.03%
C	-	872,355	-	-	-	-	872,355	0.03%
NA*	5,007,149	40,288,907	8,150,665	31,194,186	34,287,368	-	118,928,275	4.02%
TOTAL FIXED INCOME SECURITIES	$ 14,341,220	$ 174,635,214	$ 9,351,951	$ 31,194,186	$ 36,833,614	$ 1,586,994	$ 267,943,179	9.05%
OTHER INVESTMENTS							$ 2,691,851,646	90.95%
TOTAL INVESTMENTS							$ 2,959,794,825	100.00%

*NA = Not Available

FOREIGN CURRENCY RISK

International securities investment managers are expected to maintain diversified portfolios by sector and by issuer using the System's Investment Policy Statement.

Foreign currency risk is the risk that changes in exchange rates will adversely affect the fair value of an investment or a deposit. The System has an indirect exposure to foreign currency fluctuation as of June 30, 2019 and June 30, 2018 as follows:

	2019 Fair Value	2018 Fair Value
Australian Dollar	$ 11,456,152	$ 2,684,534
Brazilian Real	1,524,828	430,669
Canadian Dollar	12,041,517	5,683,507
Danish Krone	3,432,444	4,794,324
Euro Currency	102,071,240	74,994,092
Hong Kong Dollar	14,414,580	1,185,944
Hungarian Forint	467,026	-
Indonesian Rupiah	1,723,091	-
Japanese Yen	40,949,958	14,052,158
Malaysian Ringgit	754,701	-
Mexican Peso	1,973,101	1,991,792
New Israeli Sheqel	319,498	-
New Taiwan Dollar	654,218	-
Norwegian Krone	307,338	-
Philippine Peso	284,071	-
Polish Zloty	338,146	-
Pound Sterling	30,587,326	18,078,959
Singapore Dollar	1,842,899	-
South African Rand	5,655,662	1,806,020
South Korean Won	2,786,437	28
Swedish Krona	9,871,169	2,854,501
Swiss Franc	20,590,302	13,718,888
Thailand Baht	1,638,860	1,043,489
Turkish Lira	69,447	-
	$ 265,754,009	$ 143,318,906

Schedule 8 on page 58 lists the System's investment and professional service providers.

SECURITIES LENDING

The System is authorized under its Investment Policy Statement to participate in a securities lending program through its agent and Custodian. Under this program, for an agreed upon fee, System-owned investments are loaned to a borrowing financial institution. During the years ended June 30, 2019 and 2018, the Custodian lent the System's securities and received cash and securities issued or guaranteed by the United States government as collateral. The cash collateral received on each loan is invested together with the cash collateral of other lenders, in a collective investment pool comprised of a liquidity pool and a duration pool. As of June 30, 2019, and June 30, 2018, the liquidity pool had an average duration for USD collateral of 22.56 and 27.21 days, and an average weighted final maturity of 105.37 and 113.66 days, respectively. As of June 30, 2019 and 2018, the duration pool for USD collateral had an average duration of 19.89 and 19.63 days, respectively, and an average weighted final maturity of 1,696 and 1,666 days, respectively. Because the loans were terminable at will, their duration did not generally match the duration of the investments made with cash collateral.

Borrowers are required to deliver collateral for each loan equal to: (i) in the case of loaned securities denominated in United States dollars or whose primary trading market was located in the United States or sovereign debt issued by foreign governments, 102.0% of the market value of the loaned securities; and (ii) in the case of loaned securities not denominated in United States dollars or whose primary trading market was not located in the United States, 105.0% of the market value of the loaned securities. The Custodian does not have the ability to pledge or sell securities delivered for collateral, absent a borrower's default. The Board and the borrowers maintained the right to terminate all securities lending transactions on demand.

On March 26, 2009, the Board amended its securities lending agreement with its Custodian to clarify responsibilities regarding borrower defaults. The amendment requires that if at the time of a default by a borrower, the Custodian shall indemnify the System against the failure of the borrower to return the loaned securities by purchasing a number of replacement securities equal to the number of such unreturned loaned securities, to the extent that such replacement securities are available on the open market. To the extent that such proceeds are insufficient or the collateral is unavailable, the purchase of replacement securities shall be made at the Custodian's expense. If replacement securities are unavailable, the Custodian will credit to the System's account an amount equal to the market value of the unreturned loaned securities for which replacement securities are not purchased. The Board also approved a motion limiting the System's securities lending program utilization level (on-loan balance as a percentage of lendable assets) at 33.5%.

At year-end, the System had no credit risk exposure to borrowers because the amount of collateral received exceeded the value of securities on loan. The cash collateral held and the fair value of securities on loan as of June 30, 2019 (USD) was $60,245,598 and $69,845,210, respectively and $49,471,751 and $54,835,672 as of June 30, 2018, respectively.

The fair values of the underlying securities lent as of June 30, are as follows:

	2019				2018			
	Collateral Received			Fair Value of Cash and Securities on Loan	Collateral Received			Fair Value of Cash and Securities on Loan
	Cash	Securities	Total		Cash	Securities	Total	
Domestic Bond and Equities	$ 56,319,504	$ 11,008,330	$ 67,327,834	$ 63,321,606	$ 44,563,363	$ 6,605,301	$ 51,168,664	$ 48,753,062
International Equities	3,926,094	-	3,926,094	6,523,604	4,908,388	-	4,908,388	6,082,610
Total	$ 60,245,598	$ 11,008,330	$ 71,253,928	$ 69,845,210	$ 49,471,751	$ 6,605,301	$ 56,077,052	$ 54,835,672

Because the Custodian does not have the ability to pledge or sell securities delivered for collateral, absent a borrower's default, the securities collateral received are not shown on the Statements of Fiduciary Net Position.

DERIVATIVE INVESTING

The System's investment managers may invest in derivatives if permitted by the guidelines established by the System's Board. Derivatives are generally defined as contracts whose values depend on, or are derived from, the value of an underlying asset, reference rate or index. Short options positions will generally be hedged with cash, cash equivalents, current portfolio security holdings, or other options or futures positions.

During fiscal year 2019, the System recognized a loss of $1,472 compared to a 2018 recognized loss of $208,780 related to derivatives.

The System's investment guidelines allow fixed income managers to hold stock rights and warrants acquired as a result of reorganization. Domestic equity managers may use index futures as a cash flow hedge. None of the System's domestic investment managers held rights and warrants on behalf of the System during fiscal year 2019. Two managers held such rights in fiscal year 2018.

Two of the System's international investment managers during fiscal year 2019, and one in fiscal year 2018, held foreign exchange forwards and stock rights and warrants to mitigate the risk associated with the investments.

As of June 30, 2019 and 2018, the System held derivatives with a notional value of $384,428 and $25,000 and a fair value of $489,896 and $478,949, respectively.

The following is a summary of derivatives held directly by the System:

Fair Value	*2019*		*2018*	
Classification	Amount	Notional	Amount	Notional
Long Term Instruments	$ (2,356)	$ 351,154	$ -	$ -
Common Stock	13,003	8,274	-	-
Common Stock	478,949	25,000	478,949	25,000
Totals	$ 489,596		$ 478,949	

CHANGES IN FAIR VALUE

Investment Derivatives	*Classification*	*2019*	*2018*
FX Forwards	Investment Revenue	$ (894)	$ -
Rights	Investment Revenue	(578)	-
Warrants	Investment Revenue	-	(208,780)
Totals		$ (1,472)	$ (208,780)

In addition to the above, the System has exposure to derivatives through its investments in hedge funds, reported in alternative investments in the financial statements.

FORWARD FOREIGN EXCHANGE CONTRACTS

A currency forward is a contractual agreement between two parties to pay or receive specific amounts of foreign currency at a future date in exchange for another currency at an agreed upon exchange rate. Forward commitments are not standardized and carry credit risk due to the possible nonperformance by one of the counter-parties. The maximum potential loss is the aggregate face value in U.S. dollars at the time the contract was opened; however, the likelihood of such loss is remote. No such losses occurred during fiscal years 2019 and 2018. Forwards are usually traded over-the-counter. These transactions are entered into in order to hedge risks from exposure to foreign currency rate fluctuation and to facilitate trade settlement of foreign security transactions. Forwards carry market risk resulting from adverse fluctuations in foreign exchange rates. Recognition of realized gain or loss depends on whether the currency exchange rate has moved favorably or unfavorably to the contract holder upon termination of the contract. Prior to termination of the contract, the System records the unrealized currency transaction gain or loss based on the applicable forward exchange rates.

MORTGAGE-BACKED SECURITIES

A mortgage-backed security depends on the underlying pool of mortgage loans to provide the cash flow to make principal and interest payments on the security. A decline in interest rates can result in prepayments, called contraction risk. This risk occurs as mortgages are pre-paid or refinanced which reduces the expected return of the security. If interest rates rise, the likelihood of prepayments decreases, resulting in extension risk. Since loans in a pool underlying a security are being prepaid at a slower rate, investors are unable to capitalize on higher interest rates because their investments are locked in at a lower rate for a longer period of time. A collateralized mortgage obligation (CMO) is a type of mortgage-backed security that creates separate pools of pass-through rates for different classes of bondholders with varying maturities, called tranches. The repayments from the pool of pass-through securities are used to retire the bonds in the order specified by the bonds' prospectus.

The System may invest in mortgage-backed securities to enhance fixed-income returns. The mortgage-backed securities are subject to credit risk, in that the borrower may be unable to meet its obligations.

FAIR VALUE MEASUREMENT

GASB Statement No. 72, *Fair Value Measurement and Application*, specifies a hierarchy of valuation classifications based on whether the inputs to the valuation techniques used in each valuation classification are observable or unobservable. These classifications are summarized in three broad levels listed 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 and significant value-drivers are observable.
- Level 3: Valuations derived from valuation techniques in which significant inputs or significant value-drivers are unobservable.

Inputs used to measure fair value might fall in different levels of the fair value hierarchy, in which case the System defaults to the lowest level input that is significant to the fair value measurement in its entirety. These levels are not necessarily an indication of the risk or liquidity associated with the investments.

The following table presents fair value measurements as of June 30, 2019 (in thousands of dollars), as further explained below:

	Level 1	Level 2	Level 3	Total
Equities				
Limited Partnership Units	$ 137,357	$ -	$ -	$ 137,357
Common Stock	623,610	-	4,720	628,330
Other	40,645	-	104	40,749
Fixed Income				
Corporate Bonds	-	138,403	2,600	141,003
Other	-	152,835	4,783	157,618
Warrants	-	-	479	479
Total	$ 801,612	$ 291,238	$ 12,686	$ 1,105,536
Short Term Investment Funds measured at amortized cost				44,272
Investments Held at NAV				1,924,124
Total Investments				$ 3,073,932

The following table presents fair value measurements as of June 30, 2018 (in thousands of dollars), as further explained below:

	Level 1	Level 2	Level 3	Total
Equities				
Limited Partnership Units	$ 190,929	$ -	$ -	$ 190,929
Common Stock	460,747	-	6,516	467,263
Other	24,584	-	140	24,724
Fixed Income				
Corporate Bonds	-	133,577	6,508	140,085
Other	-	125,091	2,768	127,859
Warrants	-	-	479	479
Total	$ 676,260	$ 258,668	$ 16,411	$ 951,399
Short Term Investment Funds measured at amortized cost				61,456
Investments held at NAV				1,947,000
Total Investments				$ 2,959,795

Level 1 Limited Partnership investments consist of Master Limited Partnerships that are publicly traded and listed on a national securities exchange.

Level 1 Common Stock investments are valued using exchange listed prices or broker quotes in active markets.

Level 1 "Other" Equity investments are valued using exchange listed prices or broker quotes in active markets.

Level 2 Corporate Bonds are valued using evaluated prices which are based on a compilation of primarily observable market information or a broker quote in an inactive market.

Level 2 "Other" Fixed Income investments are valued using evaluated prices which are based on a compilation of primarily observable market information or a broker quote in an inactive market. The valuation of convertible securities may be imputed based on the conversion ratio or other security specific information or broker quotes in a non-active market.

Level 3 investments in all categories are securities in which no indications are available, and the company's financials and other market indicators are used to calculate valuation. These include common stocks and bonds of companies undergoing reorganization, tradable bank loans and similar instruments.

The following table presents investments measured at Net Asset Value as of June 30, 2019 (in thousands of dollars):

	NAV	Unfunded Commitments	Redemption Frequency	Redemption Notice Period
Real Estate Limited Partnerships	$ 259,725	$ 333,257	Not Applicable	Not Applicable
Event Driven Hedge Funds	14,066	-	Quarterly	65-90 Days
Global Macro Hedge Funds	34,963	-	Quarterly or Monthly	30-90 Days
Equity Long / Short Hedge Funds	33,453	-	Quarterly or Semiannually	45-90 Days
Credit Hedge Funds	27,797	-	Quarterly or Annually	60-90 Days
Multi-Strategy Hedge Funds	36,157	-	Annually	45-90 Days
Private Equity Funds	873,255	626,278	Not Applicable	Not Applicable
Common Collective Trusts	644,708	-	Typically Daily	Less than 1 month
TOTAL	$ 1,924,124	$ 959,535		

The following table presents investments measured at Net Asset Value as of June 30, 2018 (in thousands of dollars):

	NAV	Unfunded Commitments	Redemption Frequency	Redemption Notice Period
Real Estate Limited Partnerships	$ 230,921	$ 304,181	Not Applicable	Not Applicable
Event Driven Hedge Funds	13,497	-	Quarterly	65-90 Days
Global Macro Hedge Funds	49,412	-	Quarterly or Monthly	30-90 Days
Equity Long / Short Hedge Funds	44,000	-	Quarterly or Semiannually	45-90 Days
Credit Hedge Funds	27,917	-	Quarterly or Annually	60-90 Days
Multi-Strategy Hedge Funds	35,004	-	Annually	45-90 Days
Private Equity Funds	758,558	567,408	Not Applicable	Not Applicable
Common Collective Trusts	787,691	-	Typically Daily	Less than 1 month
TOTAL	$ 1,947,000	$ 871,589		

Real Estate Limited Partnerships. This category includes investments in 36 limited partnerships that own direct real estate and real estate related debt instruments. Investments in Real Estate Limited Partnerships are diversified by property type, geographic location, and capital structure. The fair values of Real Estate Limited Partnership investments have been determined using the NAV of the System's interest in the partnership provided by the General Partner. Real Estate Limited Partnerships cannot be redeemed because they are private market investments. Distributions from Real Estate Limited Partnerships are determined by the General Partner. Real Estate Limited Partnerships typically have 10-year terms.

Event Driven Hedge Funds. This category consists of one hedge fund. Event Driven Hedge Funds seek to add value by exploiting pricing inefficiencies that may occur before or after a corporate event such as a bankruptcy, merger, acquisition or spinoff. Event Driven managers may invest in announced corporate events, or the manager may anticipate a corporate event and position the portfolio accordingly. Event Driven Hedge Fund managers may invest in either debt or equity positions, and often hedge out market risk. The fair values of Event Driven Hedge Fund investments have been determined using the NAV provided by the administrator of the hedge fund. The System's Event Driven Hedge fund has quarterly liquidity.

Global Macro Hedge Funds. This category includes investments in two hedge funds. Global Macro Hedge Funds invest in long and short positions in a wide variety of assets including equities, fixed income, currencies, commodities, and futures. Global Macro Hedge Fund managers seek to add value by accurately anticipating overall macroeconomic trends in various countries. The fair values of Global Macro Hedge Fund investments have been determined using the NAV provided by the administrator of the hedge fund. One of HMEPS' Global Macro managers has monthly liquidity, and one has quarterly liquidity.

Equity Long / Short Hedge Funds. This category includes investments in two hedge funds. Equity Long / Short Hedge Funds employ a strategy that involves taking long positions in stocks that are expected to increase in value and short positions in stocks that are expected to decrease in value. Equity Long / Short Hedge Funds will often short stock market indexes in order to lessen total market risk. The fair values of Equity Long / Short Hedge Fund investments have been determined using the NAV provided by the administrator of the hedge fund. One of HMEPS' Equity Long / Short managers has quarterly liquidity, and one has semiannual liquidity.

Credit Hedge Funds. This category includes investments in two hedge funds. Credit Hedge Fund managers look for relative value between senior and junior securities of the same issuer. They will also trade securities of equivalent credit quality from different corporate issues, or different tranches in complex capital structures such as mortgage-backed securities or collateralized loan obligations. Credit Hedge Funds typically focus on credit rather than interest rates. Many managers will sell short interest rate futures or Treasury bonds to hedge their interest rate exposure. The fair values of Credit Hedge Fund investments have been determined using the NAV provided by the administrator of the hedge fund. One of the System's credit hedge funds has quarterly liquidity; the other has annual liquidity.

Multi Strategy Hedge Funds. This category includes investments in two hedge funds. Multi Strategy Hedge Funds may employ any combination of the hedge fund strategies listed above. The fair values of Multi Strategy Hedge Fund investments have been determined using the NAV provided by the administrator of the hedge fund. Both of HMEPS' Multi Strategy fund investments have annual liquidity.

Private Equity Limited Partnerships. This category includes investments in 101 limited partnerships that own equity in privately held companies including equity in energy and commodity investments. Investments in Private Equity Limited Partnerships are diversified by industry sector, geographic location, and capital structure. The fair values of the Private Equity Limited Partnership investments have been determined using the NAV of the System's interest in the partnership provided by the General Partner. Private Equity Limited Partnerships cannot be redeemed because they are private market investments. Distributions from Private Equity Limited Partnerships are determined by the General Partner. Private Equity Limited Partnerships typically have at least 10-year terms.

Common Collective Trusts. This category includes investments in 10 common collective trusts. Common Collective Trusts may have active or passive strategies in publicly traded equity and fixed income securities. The fair values of Common Collective Trust investments have been determined using the NAV provided by the administrator of the common collective trust. Common Collective Trusts usually have higher liquidity than other investment strategies valued at NAV.

NOTE 10 – FURNITURE, FIXTURES AND EQUIPMENT

Furniture, fixtures and equipment are comprised as follows at June 30:

	2019	2018
Office furniture and equipment	$ 74,392	$ 74,392
Computer equipment	923,088	843,157
Leasehold improvements	163,234	163,234
	1,160,714	1,080,783
Less: Accumulated depreciation and amortization	(975,994)	(947,997)
	$ 184,720	$ 132,786

Depreciation expense for fiscal years 2019 and 2018 are $27,997 and $52,504, respectively.

NOTE 11 – COMMITMENTS

As described in Note 1, certain participants of the System are eligible to receive, upon request, a refund of their accumulated contributions, without interest, upon termination of employment with the City or System prior to being eligible for pension benefits. As of June 30, 2019 and 2018, aggregate contributions for these eligible participants of the System were $193,322,756 and $176,288,209, respectively. In addition, terminated Group D members who have contributed to the Group D Cash Balance Plan are eligible to receive, upon request, the balance in their Cash Balance account. The Cash Balance account distribution includes interest if the member had paid into the Cash Balance account for at least one year.

The System's investments in limited partnerships and real estate trusts are included in the first table appearing in Note 9. In connection with those investments, the System has remaining commitments as of June 30, 2019 and 2018 of approximately $960 million and $872 million, respectively, pursuant to terms of the respective limited partnerships and real estate trusts.

The System leased office facilities under a five-year lease, ending October 31, 2016, and extended the term of the lease by ten years, ending October 31, 2026. This lease agreement began with a base rent of $14 per square foot for the first eighteen months. Subsequently, the rent is $23.50 per square foot for 12 months, increasing by $0.50 per square foot per year for the remainder of the term.

The payments under the lease will be:

Year Ending June 30,	Amount
2020	$ 467,438
2021	476,849
2022	486,261
2023	495,672
2024	505,084
Thereafter	1,214,084
Total	$ 3,645,388

Additional amounts are assessed for use of common areas, utilities and maintenance. Total rental expense, including these assessments, amounted to approximately $728,414 and $707,595 during the years ended June 30, 2019 and 2018, respectively.

The System has other annual and/or monthly lease services for copiers, miscellaneous office equipment, and offsite storage totaling approximately $53,265 and $55,430 for fiscal years 2019 and 2018, respectively. Each of these contracts contains a cancellation provision.

NOTE 12 – RISKS AND UNCERTAINTIES

The System invests in various investment securities. Investment securities are exposed to various risks such as interest rate, market, foreign currency, liquidity and credit risks. Due to the level of risk associated with certain investment securities, it is at least reasonably possible that changes in the value of investment securities will occur in the near term and that such change could materially affect the amounts reported in the statements of fiduciary net position.

The City's contribution rates are made, and the actuarial information included in the Notes and Schedules 1, 2 and 3 are based, on certain assumptions pertaining to interest rates, inflation rates and participant demographics, all of which are subject to change. Due to uncertainties inherent in the estimations and assumptions process, it is at least reasonably possible that changes in these estimates and assumptions in the near term could be material to the basic financial statements.

NOTE 13 – CONTINGENCIES

On March 20, 2015, the Texas Supreme Court in the *Klumb v. Houston Municipal Employees Pension System* case issued a decision confirming the authority of HMEPS's Board to determine that persons employed by Houston First Corporation ("HFC"), Houston First Foundation ("HFF"), and CCSI, Inc. ("CCSI") constitute employees of the City of Houston for purposes of membership in HMEPS's pension plan. Following unsuccessful attempts by HMEPS to obtain compliance by the City with the Texas Supreme Court's ruling and its statutory duties to provide information and pay contributions into the plan for HFC, HFF, and CCSI employees, HMEPS filed *Houston Municipal Employees Pension System v. City of Houston et al.*, No. 2016-35252, in the 333rd Judicial District Court of Harris County, Texas against the City and its representatives. The lawsuit seeks, among other things, writs of mandamus compelling the City and its representatives to provide payroll and other information regarding the HFC, HFF, and CCSI employees and to make the contributions and pick up payments owed for those employees. On September 17, 2015, the City filed a counterclaim and third-party claim against HMEPS and its Board alleging breach of agreement, violation of unspecified statutory provisions, and inverse condemnation. The City also subsequently filed a Plea to Jurisdiction, alleging that the court does not have jurisdiction to hear HMEPS' causes of action. HMEPS and its Board deny the City has any viable claims, and that such claims are barred by, among other things, the Klumb decision. On October 9, 2015, a hearing was held in the 333rd district court on the City's Plea to the Jurisdiction and HMEPS's motions for summary judgment. Following arguments of counsel, the court denied the City's Plea to the Jurisdiction. The City immediately appealed before the court could hear HMEPS's motions for summary judgment. The appeal was assigned to the Fourteenth Court of Appeals.

On November 22, 2016, the Fourteenth Court of Appeals reversed and rendered in part, remanded in part and affirmed in part the trial court's denial of the Plea to the Jurisdiction. The court of appeals reversed that the City representatives are legally obligated under an ultra vires cause of action to make contributions different than the Statute as modified by the Meet and Confer Agreement between HMEPS and the City. HMEPS filed a Motion for Rehearing on the last point. The City also filed a Motion for Rehearing on the court of appeals' decision. The Court of Appeals denied both motions for rehearing.

HMEPS filed a Petition for Review with the Texas Supreme Court on whether HMEPS can maintain an ultra vires action against the City and its officials for their failure to pay pension contributions according to the rates and groups specified by the Meet and Confer Agreement. The City filed its own Petition for Review seeking reversal of the court of appeals' ruling that the City is subject to ultra vires actions for making contributions and providing employee information under the Statute and for enforcement of the Texas Public Information Act. The Texas Supreme Court granted the dueling Petitions for Review and then heard oral arguments on March 20, 2018. On June 8, 2018, the Court affirmed the Court of Appeals rulings in denying the City's review and reversed the Court of Appeals as to HMEPS ability to bring ultra vires claims against the City for its failure to make contribution payments for the HFC, HFF and CCSI employees. The Court also found the City is not immune as to these claims. The City did not seek rehearing.

Upon remand to the trial court, HMEPS and its Board updated and re-filed a motion for summary judgment. The City then filed a second plea to the jurisdiction. On October 12, 2018, the trial court denied the City and its officials' second plea to the jurisdiction, rendered judgment for HMEPS on its mandamus claims compelling the City and its officials to provide pension payments and information for the HFC, HFF, and CCSI employees, and severed HMEPS's claim for attorneys' fees into a separate lawsuit. The City and its officials filed a notice of appeal appealing the trial court's rulings, including the severance, which was assigned to the Fourteenth Court of Appeals (the "Original Action"). The City and its officials then filed a petition for mandamus, seeking review of the severance; this petition was also assigned to the Fourteenth Court of Appeals (the "Mandamus Action"). The parties have agreed to partially settle the dispute, which has resulted in the dismissal of the severed action in the trial court and the Mandamus Action. The parties have further agreed to abate the Original Action so that they can consider resolving the remainder of the dispute.

NOTE 14 – SUBSEQUENT EVENTS

Management has evaluated subsequent events through September 26, 2019, the date the financial statements were available to be issued.

Required Supplemental Information (Unaudited)

SCHEDULE 1: SCHEDULE OF CHANGES IN NET PENSION LIABILITY AND RELATED RATIOS

Fiscal year ending June 30,	***2019***	***2018***	***2017***	***2016***	***2015***	***2014***
Total Pension Liability						
Service Cost	$ 77,175,080	$ 78,148,819	$ 75,960,564	$ 68,968,481	$ 59,465,512	$ 61,480,204
Interest on the Total Pension Liability	349,592,612	341,276,247	331,166,519	379,781,300	363,639,884	348,418,895
Benefit Changes	-	-	(724,683,000)	-	-	-
Difference between Expected and Actual Experience	(11,538,432)	19,157,801	(38,387,084)	(16,194,133)	(22,057,834)	-
Assumption Changes	-	-	562,237,000	324,938,905	-	-
Benefit Payments	291,060,500)	(283,928,131)	(280,455,603)	(253,178,363)	(234,954,625)	(221,925,083)
Refunds	(1,393,772)	(806,722)	(718,176)	(1,105,306)	(1,549,404)	(1,213,474)
Net Change in Total Pension Liability	122,774,988	153,848,014	(74,879,780)	503,210,884	164,543,533	186,760,542
Total Pension Liability - Beginning	5,113,358,193	4,959,510,179	5,034,389,959	4,531,179,075	4,366,635,542	4,179,875,000
Total Pension Liability - Ending (a)	$ 5,236,133,181	$ 5,113,358,193	$ 4,959,510,179	$ 5,034,389,959	$ 4,531,179,075	$ 4,366,635,542
Plan Fiduciary Net Position						
Employer Contributions	$ 176,261,043	$ 421,561,725	$ 182,557,829	$ 159,958,607	$ 145,007,059	$ 128,274,419
Employee Contributions	32,536,529	27,904,931	15,901,600	15,873,664	16,198,216	16,579,600
Pension Plan net Investment Income	200,444,575	231,815,128	290,910,717	27,639,567	73,370,310	352,522,858
Benefit Payments	(291,060,500)	(283,928,131)	(280,455,603)	(253,178,363)	(234,954,625)	(221,925,083)
Refunds	(1,393,772)	(806,722)	(718,176)	(1,105,306)	(1,549,404)	(1,213,474)
Pension Plan Administrative Expense	(5,362,929)	(6,441,960)	(6,826,559)	(7,360,139)	(7,007,422)	(6,414,668)
Other	709,841	(3,905,411)	1,271,670	1,651,651	1,040,548	-
Net Change in Plan Fiduciary Net Position	112,134,787	386,199,560	202,641,478	(56,520,319)	(7,895,318)	267,823,652
Plan Fiduciary Net Position - Beginning	2,988,864,278	2,602,664,718	2,400,023,240	2,456,543,559	2,464,438,877	2,196,615,225
Plan Fiduciary Net Position - Ending (b)	$ 3,100,999,065	$ 2,988,864,278	$ 2,602,664,718	$ 2,400,023,240	$ 2,456,543,559	$ 2,464,438,877
Net Pension Liability - Ending (a) - (b)	2,135,134,116	2,124,493,915	2,356,845,461	2,634,366,719	2,074,635,516	1,902,196,665
Plan Fiduciary Net Position as a Percentage of Total Pension Liability	59.22%	58.45%	52.48%	47.67%	54.21%	56.44%
Covered Payroll	$ 614,451,273	$ 611,493,104	$ 604,895,264	$ 640,528,652	$ 624,205,549	$ 598,245,952
Net Pension Liability as a Percentage of Covered Payroll	347.49%	347.43%	389.63%	411.28%	332.36%	317.96%

See accompanying independent auditor's report.

See accompanying note to required supplemental schedules.

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

SCHEDULE 2: SCHEDULE OF NET PENSION LIABILITY

FY Ending June 30	Total Pension Liability	Fiduciary Net Position	Net Pension Liability	Fiduciary Net Position as a % of Pension Liability	Covered Payroll[1]	Net Pension Liability as a % of Covered Payroll
2014	$ 4,366,635,542	$ 2,464,438,877	$ 1,902,196,665	56.44%	$ 598,245,952	317.96%
2015	4,531,179,075	2,456,543,559	2,074,635,516	54.21%	624,205,549	332.36%
2016	5,034,389,959	2,400,023,240	2,634,366,719	47.67%	640,528,652	411.28%
2017	4,959,510,179	2,602,664,718	2,356,845,461	52.48%	604,895,264	386.63%
2018	5,113,358,193	2,988,864,278	2,124,496,915	58.45%	611,493,104	347.43%
2019	5,236,133,181	3,100,999,065	2,135,134,116	59.22%	614,451,273	347.49%

1 The covered payroll reported prior to fiscal year 2014 is based on pensionable pay. With the adoption of GASB Statement No. 67, GASB changed the definition of Covered Payroll to be total gross compensation. The Covered Payroll for fiscal year 2014- 2016 used this new definition. In 2017, GASB amended GASB 67/68 to change the definition of covered payroll to pensionable pay. Therefore, beginning in fiscal year 2017 the covered payroll shown is pensionable pay.

See accompanying independent auditor's report.

See accompanying note to required supplemental schedules.

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

SCHEDULE 3: SCHEDULE OF CONTRIBUTIONS

FY Ending June 30,	Actuarially Determined Contribution	Actual Contribution	Contribution Deficiency (Excess)	Covered Payroll[1]	Actual Contribution as a % of Covered Payroll[2]
2007	$ 106,568,897	$ 70,264,721	$ 36,304,176	$ 448,925,000	15.65%
2008	116,281,212	73,271,799	43,009,413	483,815,000	15.14%
2009	102,257,047	76,837,216	25,419,831	539,023,000	14.25%
2010	107,535,744	82,052,013	25,483,731	550,709,000	14.90%
2011	107,472,679	87,284,737	20,187,942	544,665,000	16.03%
2012	122,465,396	97,161,723	25,303,673	534,394,000	18.18%
2013	124,317,102	111,858,885	12,458,217	549,971,000	20.34%
2014	144,953,327	128,274,419	16,678,908	598,245,952	21.44%
2015	155,299,296	145,007,059	10,292,237	624,205,549	23.23%
2016	162,229,984	159,958,607	2,271,377	640,528,652	24.97%
2017	184,732,840	182,557,829	2,175,011	604,895,264	30.18%
2018	423,989,344[3]	421,561,725[3]	2,427,619	611,493,104	68.94%
2019	178,256,312	176,261,043	1,995,269	614,451,273	28.69%

1 *The covered payroll reported prior to fiscal year 2014 is based on pensionable pay. With the adoption of GASB 67/68, GASB changed the definition of Covered Payroll to be total gross compensation. The Covered Payroll for fiscal year 2014-2016 used this definition. In 2017, GASB amended GASB 67/68 to change the definition of Covered Payroll to pensionable pay. Therefore, beginning fiscal year 2017 the Covered Payroll shown is pensionable pay.*

2 *The Actual Contribution as a % of Covered Payroll did not correspond to the funding requirements of the Amended and Restated Meet and Confer Agreement in effect through June 30, 2017, and was not be used for funding purposes.*

3 *The Actuarially Determined Contribution, the Actual Contribution and the Actual Contribution as a % of Covered Payroll calculation includes the Pension Obligation Bond proceeds of $250 million.*

See accompanying independent auditor's report.

Notes to Required Supplemental Information for Schedules 1, 2 and 3 (Unaudited)

Note to Schedules 1 and 2 – The total pension liability contained in this schedule was provided by the System's retained actuary, Gabriel, Roeder, Smith & Company. The net pension liability is measured as the total pension liability less the amount of the fiduciary net position of the System.

Note to Schedule 3 – The required employer contributions and percent of those contributions actually made are presented in the schedule. The information presented was used in the actuarial valuation for purposes of determining the actuarially determined contribution rate. The assumptions and methods used for this actuarial valuation were recommended by the actuary and adopted by the Board. Additional information as of the latest actuarial valuation is presented in the table below.

Valuation Date: July 1, 2018

Notes: Actuarially determined contribution rates are calculated as of July 1, which is 12 months prior to the beginning of the fiscal year in which they are contributed. The assumptions shown below apply to the ADEC for fiscal year 2018 which was determined by the July 1, 2017 actuarial valuation. These assumptions are the same as those used to determine the Net Pension Liability as of June 30, 2019.

Methods and Assumptions Used to Determine Contribution Rates:

Actuarial cost method	Entry Age Normal
Amortization method	Level Percentage of Payroll, Open (see notes)
Remaining amortization period	29 years
Asset valuation method	5 Year smoothed market, direct offset of deferred gains and losses
Inflation	2.25%
Salary increases	3.00% to 5.25% including inflation
Investment rate of return	7.00%
Retirement age	Experience-based table of rates that are specific to the type of eligibility condition. Last updated for the 2015 valuation pursuant to an experience study of the period 2009 – 2014.
Mortality	RP-2000 Mortality Table scaled by 125% for males and 112% for females. The rates are then projected on a fully generational basis by scale BB.
Other Information:	
Note:	The actuarially determined contribution includes the Legacy Liability payment as specified by the January 1, 2016 Risk Sharing Valuation and a calculated employer rate equal to the normal cost and the amortization of any new unfunded liabilities over a closed 30 year period from the valuation date the liability base was created.

SCHEDULE 4: SCHEDULE OF INVESTMENT RETURNS

FY Ending June 30,	Annual Return[1]
2019	6.20%
2018	8.72%
2017	12.18%
2016	0.90%
2015	3.47%
2014	16.42%

1 Annual money-weighted rate of return, net of investment fees.

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

SCHEDULE 5: SCHEDULE OF CHANGES IN TOTAL OPEB LIABILITY AND RELATED RATIOS

Fiscal Year Ending June 30,	*2019*	*2018*
Total OPEB liability		
Service cost	$ 300,656	$ 358,166
Interest on the total OPEB liability	301,552	283,797
Changes of benefit terms	-	-
Difference between expected and actual experience	117,646	(14,484)
Changes of assumptions	(2,162,853)	(74,720)
Benefit payments	(195,451)	(135,914)
Net change in total OPEB liability (asset)	(1,638,450)	416,845
Total OPEB liability - beginning	8,277,557	7,860,712
Total OPEB liability - ending (a)	$ 6,639,107	$ 8,277,557
Plan fiduciary net position		
Employer contributions	$ 8,473,008	$ 135,914
Non employer contributing entities contributions	-	-
Employee contributions	-	-
OPEB plan net investment income	113,972	-
Benefit payments	(195,451)	(135,914)
OPEB plan administrative expense	-	-
Other	-	-
Net change in plan fiduciary net position	8,391,529	-
Plan fiduciary net position - beginning	-	-
Plan fiduciary net position - ending (b)	$ 8,391,529	$ -
Net OPEB liability (asset) - ending (a) - (b)	$ (1,752,422)	$ 8,277,557
Plan fiduciary net position as a percentage of total OPEB liability	126.40%	N/A
Covered-employee payroll	$ 1,968,659	$ 2,104,735
Net OPEB liability (asset) as a percentage of covered-employee payroll	(89.02)%	393.28%

Notes to Schedule: For 2019, changes of assumptions reflect the change in the discount rate from 3.62% to 6.00% and a slightly updated healthcare trend assumption.

Other Supplemental Information

SCHEDULE 6: INVESTMENT SUMMARY

	June 30, 2019		
	Cost	**Fair Value**	**Unrealized Appreciation (Depreciation)**
Fixed income:			
Government securities	$ 99,061,759	$ 100,318,852	$ 1,257,093
Corporate bonds	198,015,107	198,302,026	286,919
Total fixed income	297,076,866	298,620,878	1,544,012
Short-term investment funds	44,271,926	44,271,926	-
Capital stocks	757,977,131	805,238,023	47,260,892
Commingled funds	467,371,303	646,384,175	179,012,872
Real assets	182,622,179	259,725,223	77,103,044
Alternative investments	685,149,661	1,019,691,808	334,542,147
Total investments	$ 2,434,469,066	$ 3,073,932,033	$ 639,462,967

	June 30, 2018		
	Cost	**Fair Value**	**Unrealized Appreciation (Depreciation)**
Fixed income:			
Government securities	$ 72,625,935	$ 69,614,794	$ (3,011,141)
Corporate bonds	202,359,471	198,328,385	(4,031,086)
Total fixed income	274,985,406	267,943,179	(7,042,227)
Short-term investment funds	61,456,739	61,456,739	-
Capital stocks	611,555,820	683,339,878	71,784,058
Commingled funds	641,379,899	787,745,946	146,366,047
Real assets	205,760,545	230,983,496	25,222,951
Alternative investments	655,784,557	928,325,587	272,541,030
Total investments	$ 2,450,922,966	$ 2,959,794,825	$ 508,871,859

SCHEDULE 7: INVESTMENT EXPENSES, PROFESSIONAL SERVICES, AND ADMINISTRATION EXPENSES

	2019	2018
Investment Expenses:		
Custodial services*	$ 368,000	$ 370,305
Investment management services*	5,699,195	5,382,277
Consulting services*	834,000	834,000
Legal services*	69,525	53,657
Other investment expenses	1,048,227	1,027,513
Total investment expenses	$ 8,018,947	$ 7,667,752
Professional services:		
Actuarial services*	$ 90,988	$ 109,785
Auditing and professional services*	50,250	53,512
Legal services*	118,721	102,488
Medical services*	12,000	12,000
Other professional services*	391,675	390,000
Total professional services	$ 663,634	$ 667,785
Administration expenses:		
Office costs	$ 658,373	$ 645,093
Insurance costs	194,415	174,139
Costs of staff and benefits	3,113,155	4,098,922
Costs of equipment and supplies	615,779	724,622
Depreciation and amortization	27,997	52,504
Costs of continuing education	89,576	78,895
Total administration expenses	$ 4,699,295	$ 5,774,175

*See details on the next page.

See accompanying independent auditor's report.

SCHEDULE 8: SUMMARY OF COSTS OF INVESTMENT AND PROFESSIONAL SERVICES

Years Ended June 30, 2019 and 2018

Investment Expenses

	2019	2018
Investment Manager Fees		
Ariel Investments, LLC	$ 227,565	$ 241,704
Baillie Gifford Overseas Ltd.	100,036	-
Baring Asset Management	-	162,655
BlackRock (formerly Barclays)	334,035	345,747
Cohen & Steers Capital Management, Inc.	126,674	46,229
DDJ Capital Management, LLC	430,581	470,098
DePrince, Race and Zollo, Inc.	289,454	274,287
Enhanced Investment (INTECH)	250,751	255,699
Global Forest Partners, LP/UBS Timber Investors	56,267	56,525
Globeflex Capital, LP	57,153	-
Loomis, Sayles and Company, LP	409,019	400,716
Neumeier Investment Counsel, LLC	693,924	692,155
OFI Institutional (Now Invesco)	564,260	614,381
Panagora Asset Management	171,142	183,248
Pugh Capital Management	185,562	168,082
Salient Capital Advisors, LLC	488,932	176,116
Smith Graham & Company	227,809	335,745
State Street Global Advisors	244,856	205,666
T. Rowe Price Associates, Inc	96,962	-
Tortoise Capital Advisors	744,213	734,493
UBS Global Asset (formerly Brinson Partners)	-	18,731
	$ 5,699,195	$ 5,382,277
Custodial Services		
State Street Bank and Trust Company	$ 368,000	$ 370,305
Investment Consulting Fees		
Wilshire Associates, Incorporated	$ 284,000	$ 284,000
Cliffwater LLC	550,000	550,000
	$ 834,000	$ 834,000
Legal Services (Investment)		
DLA Piper LLP	$ 7,793	$ -
Locke Lord LLP	61,732	53,657
	$ 69,525	$ 53,657

Professional Services

	2019	2018
Actuary		
Gabriel, Roeder, Smith & Co.	$ 90,988	$ 109,785
Auditing and Professional Services		
McConnell & Jones, LLP	$ -	$ 2,992
Weaver and Tidwell LLP	50,250	50,520
	$ 50,250	$ 53,512
Legal Services		
Baker Botts, LLP	$ 116,373	$ 74,423
Jackson Walker LLP	2,114	18,101
Smyser Kaplan & Veselka, LLP	234	9,964
	$ 118,721	$ 102,488
Medical Services		
Charles Schumacher, M.D.	$ 12,000	$ 12,000
Other Professional Services		
Harris Law Firm	$ 24,000	$ 30,000
HillCo Partners, LLC	102,000	102,000
KLM Public Affairs, LLC	15,000	-
Locke Lord LLP	210,000	210,000
LT Communications	24,000	48,000
Pearl Meyer & Partners	16,675	-
	$ 391,675	$ 390,000

See accompanying independent auditor's report.

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INVESTMENTS

- SECTION 3 -

YOUR EFFORTS CREATE A BETTER FUTURE FOR EVERYONE

HMEPS
HOUSTON MUNICIPAL EMPLOYEES PENSION SYSTEM

The Board of Trustees ("Board") of the Houston Municipal Employees Pension System ("System") has adopted an Investment Policy Statement ("IPS") as a framework for the investment of the System's assets. The authority to amend the IPS rests solely with the Board. The following provides an overview of the IPS.

PURPOSE

The IPS assists the Board in its role as fiduciary for the System's investments by: a) specifying the Board's expectations, objectives and guidelines for the System, b) clarifying the responsibilities of the Board, the staff, the consultants and vendors, c) setting forth an investment structure for managing the portfolio, d) encouraging effective communications, and e) establishing criteria to select, remove, monitor and evaluate performance of money managers and vendors on a regular basis.

INVESTMENT OBJECTIVES

The investment objective of the total portfolio is to produce an annualized investment return over the long term that exceeds the actuarial return rate assumption for the System. This will help the Board to achieve its overall objective of providing adequate retirement benefits to the members of the System.

The System's investment performance is compared to a policy portfolio comprised of market indices, which are consistent with the overall investment policy. The policy portfolio reflects a passive implementation of the target investment policy. Effective October 1, 2017, the Board approved an updated asset allocation for the System's investment portfolio, along with an updated policy portfolio.

The System's investment performance is also evaluated by comparing it to a group of its public fund peers. The public pension fund universe used for comparative purposes is the Wilshire TUCS Master Trusts – Public Universe.

ASSET ALLOCATION

The System's asset allocation provides an efficient mix of assets that is designed to provide a return profile that is consistent with the System's long-term portfolio risk and return objectives. The Board periodically undertakes strategic studies to address the appropriateness of asset classes to be considered for inclusion in the target asset allocation, and to define the targeted percentage to each asset class to achieve the desired level of diversification.

The System's current asset allocation, included in Table 1, became effective October 1, 2017.

DIVERSIFICATION

The System invests in seven major asset classes (Global Equities, Fixed Income, Real Estate, Private Credit, Private Equity, Inflation-Linked, and Absolute Return) as a method to maximize overall fund diversification. Further, the System engages the services of numerous professional investment managers and invests in private partnerships and other private entities. The managers retained are expected to utilize varied investment approaches that, when combined, will exhibit return characteristics that are similar to the asset class proxy utilized in the strategic asset allocation plan. As of June 30, 2019, the System utilized 83 investment managers/funds, several of which have multiple mandates. Cash inflows and outflows are directed within the targeted asset class to the various managers/funds so that actual characteristics of the portfolio will be consistent with the strategic plan. No investment manager is permitted to have more than 20% of the fair value of the System's assets.

REBALANCING

The IPS requires a periodic adjustment, or rebalancing, of assets be made to ensure conformance with policy target levels. Such rebalancing is necessary to reflect sizable cash flows and performance imbalances among the various asset classes that may occur over time. During fiscal year 2019, Staff directed the rebalancing of assets within the asset allocation targets in response to market dynamics and the System's liquidity needs.

INVESTMENT MANAGER GUIDELINES – PUBLIC MARKETS

Investment managers are subject to guidelines and objectives incorporated in the investment management agreements entered into by the Board and the respective investment managers. Investment managers are expected to perform their fiduciary duties as prudent people skilled in such matters and, further, are expected to comply with all applicable State and Federal statutes governing the investment of retirement funds. Within the context of the guidelines, investment managers have full discretion with respect to the purchase and sale of individual securities and portfolio weightings. Portfolios are to be managed in a manner similar to other portfolios within an organization with similar guidelines and performance objectives.

The Board requires that all investment managers seek best execution for all trades ordered on behalf of the System.

MANAGER EVALUATION

Managers of portfolios are evaluated quarterly against predetermined benchmarks such as an appropriate market index or a comparable peer group. All public market managers are required to provide written reports to HMEPS outlining actions taken within their respective portfolios and the portfolio's investment performance. In addition, System personnel and professional consultants engaged by the Board monitor managers' performance, material changes in the managers' organization and conformity with their guidelines and objectives.

Managers that do not meet expectations will be placed on probation (for public market managers) or watchlist (for private market funds). Staff and the consultant will increase monitoring of these managers/funds, evaluating factors such as changes in the assets in the portfolio, changes in investment style, peer universe ranking and others.

INVESTMENT PERFORMANCE EVALUATION

The Board reviews System investment performance on a periodic basis to evaluate conformity to the goals and objectives established in the strategic plan. The Board recognizes that financial markets from time to time may not support attainment of those goals and objectives. During such times, progress toward conformity is evaluated by comparing the System's performance to the policy portfolio and to the Wilshire TUCS Master Trusts – Public Universe. Investment results are calculated using a time-weighted rate of return.

PROXY VOTING

The Board authorizes each investment manager to vote all proxies relating to securities held on behalf of the System. Each manager is expected to promptly vote all proxies and related actions in a manner consistent with the long-term best interests of the System and its participants and beneficiaries. Each investment manager is required to keep detailed records of all voting of proxies and related actions and to comply with all related regulatory obligations. The System's management staff periodically reviews each investment manager's policies and actions with respect to proxy voting.

INVESTMENT RESULTS

LONG-TERM RESULTS

The 10-year period ended June 30, 2019 has been a period of consistent growth for equity markets. The System performed well, generating double digit positive returns in five of the past ten fiscal years. Additionally, the System outperformed its peer group in seven of those ten years. The System's 5-year annualized return is 6.8%. The 10-year return stands at 9.7%.

As shown in the investment results (Table 2), HMEPS' total fund performance compares favorably to the median public fund, as represented by the Wilshire TUCS Master Trusts – Public Universe.

FISCAL YEAR 2019 RESULTS

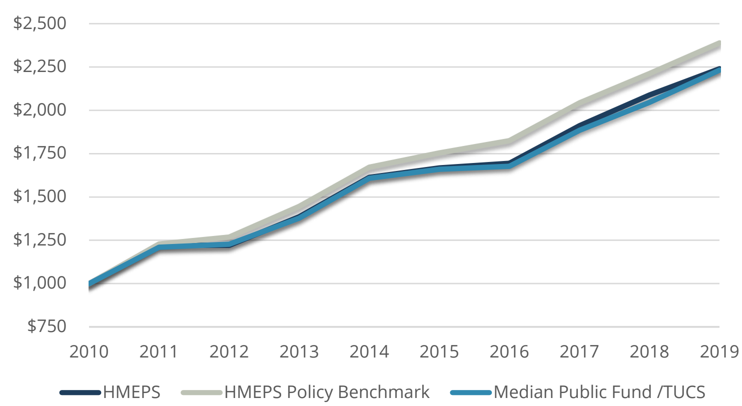
For the fiscal year ended June 30, 2019, the System returned 7.2%, exceeding the return of the median fund in the Wilshire TUCS Master Trusts – Public Universe of 6.6%.

The Investment Section was written by Chief Investment Officer Gregory Brunt, CFA, Investment Manager Douglas Wynkoop, CFA, and Financial Analyst Jumana Aumir, CFA.

SCHEDULE OF ASSET ALLOCATION
Table 1

	Allocation		Investment Performance			
Asset Class	Target	Actual	1 Yr.	3 Yrs.	5 Yrs.	10 Yrs.
Global Equity[1]	32.5%	32.3%	6.0%	10.7%	6.7%	n/a
MSCI All Country World IMI			4.6	11.4	6.0	n/a
MSCI All Country World Min Volatility			13.0	8.8	8.9	n/a
Fixed Income	10.0	13.5	6.8	5.3	4.1	6.8
Barclays Aggregate Index			7.9	2.3	3.0	3.9
Merrill Lynch High Yield Master II Index			7.6	7.5	4.7	9.2
Private Credit	5.0	1.1	8.8	n/a	n/a	n/a
CSFB Leveraged Loan Index			4.2	n/a	n/a	n/a
Private Equity[2]	17.0	22.9	14.1	15.8	12.9	13.6
S&P 500 Index + 3%			13.4	17.2	13.7	17.7
Real Estate[3]	12.5	10.6	7.7	8.9	10.1	7.6
NCREIF Property Index			6.5	6.9	8.8	9.3
Inflation-Linked	15.0	14.0	2.1	5.3	-1.4	5.6
CPI + 4%[4]			5.7	6.1	5.5	5.7
Absolute Return	8.0	4.7	3.3	5.0	2.0	6.3
LIBOR + 4%[5]			6.5	5.8	5.2	4.8
Cash	-	0.7	n/a	n/a	n/a	n/a
Total Portfolio	100.0	100.0	7.2	9.7	6.8	9.7
Policy Benchmark			8.0	9.4	7.4	10.4
Median of Wilshire Public Fund Universe/TUCS			6.6	8.9	6.1	9.4

ILLUSTRATION OF GROWTH OF $1000
Table 2



1 *The Global Equity Policy: 3Q13 -Present: 75% MSCI All-Country World IMI (Net), 25% MSCI All-Country World Minimum Volatility Index (Net).*
2 *Beginning October 1, 2008, Private Equity is separate from Absolute Return. Prior returns were combined in the Private Equity composite.*
3 *Beginning October 1, 2008, Real Estate is separate from Inflation-Linked. Prior returns were combined in the Real Estate composite.*
4 *Inflation Linked Assets Custom Benchmark: 2Q11-Present: CPI + 4% annually; Prior to 2Q11: CPI + 5% annually.*
5 *Absolute Return Benchmark: 2Q11 - Present: Libor 3-Month Yield + 4% annually; Prior to 2Q11: Libor 3-Month Yield + 5% annually.*

SCHEDULE OF TOP INVESTMENTS

SCHEDULE OF TOP PUBLIC EQUITY INVESTMENTS AS OF JUNE 30, 2019*

Name of Investment	Fair Value of Investment	Percent of Portfolio
BlackRock MSCI ACWI MIC Index	$ 248,868,966	8.1%
State Street Global Advisors REIT Index	114,087,511	3.7%
BlackRock ACWI ex-US Index	74,950,961	2.4%
Blackrock Equity Index Fund A	38,266,331	1.2%
State Street Global Advisord Global Natural Resources	33,591,085	1.1%
Blackrock MSCI Emerging Markets Free Fund	32,975,574	1.1%
Plains All American Pipeline	12,277,440	0.4%
Enterprise Products Partners	12,144,108	0.4%
Energy Transfer LP	11,727,218	0.4%
Magellan Midstream Partners	10,497,472	0.3%

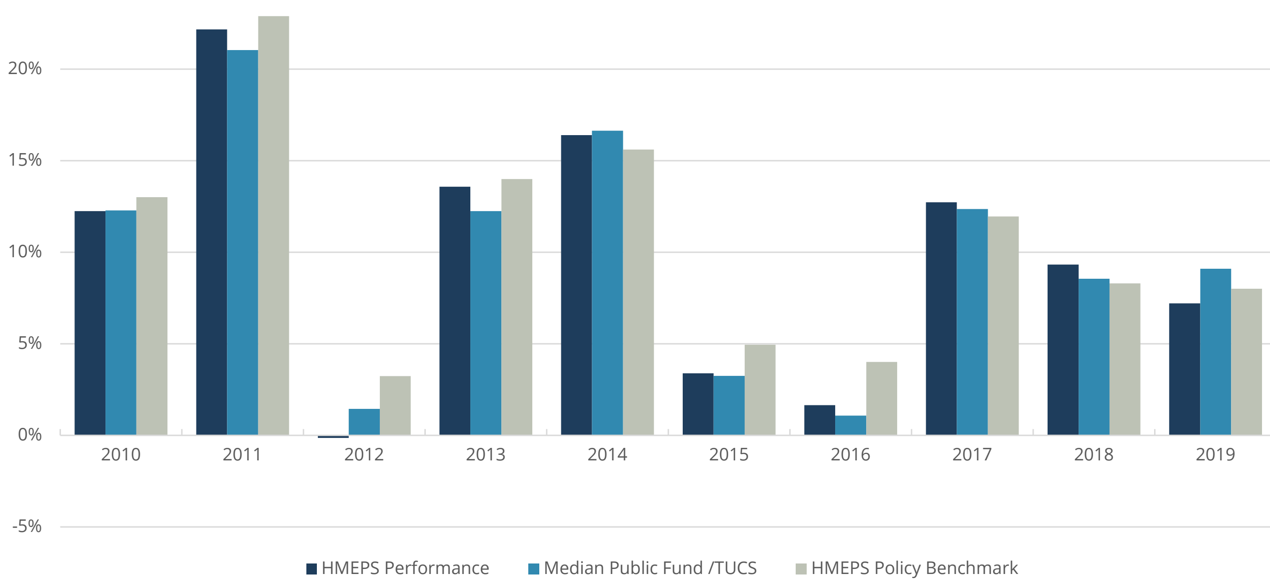
SCHEDULE OF TOP DEBT INVESTMENTS AS OF JUNE 30, 2019*

BlackRock U.S. Debt Index (Barclays Aggregate)	$ 60,018,172	2.0%
GMO Emerging Country Debt	20,777,671	0.7%
Alliance Bernstein Emerging Market	19,440,190	0.6%
US Treasury 08/19 0.0	7,979,326	0.3%
US Treasury 08/19 0.0	4,989,194	0.1%
US Treasury 11/19 0.0	4,147,552	0.1%
US Treasury 09/19 0.0	3,601,066	0.1%
US Treasury N/B 04/21 2.375	3,464,849	0.1%
US Treasury N/B 08/25 2	3,185,193	0.1%
US Treasury N/B 11/23 2.75	3,105,249	0.1%

** A complete list of the System's holdings is available at the System's office by appointment.*

PERFORMANCE BY FISCAL YEAR

Last Ten Years



COMPARISON OF INVESTMENT RETURNS - YEARS ENDED JUNE 30

(Calculated based on a time-weighted rate of return based on the market rate of return)

Period ending 06-30	HMEPS Total Fund	HMEPS Policy Portfolio	Median of Wilshire Public Fund Universe/ TUCS	HMEPS Global Equity	MSCI ACWI IMI	MSCI ACWI Min Vol	HMEPS Fixed Income	Barclays Capital Aggregate Bond Index	Merrill Lynch High Yield Master II Index	HMEPS Private Equity	S&P 500 Index	HMEPS Real Estate	NCREIF Property Index	HMEPS Inflation-Linked	Consumer Price Index	HMEPS Absolute Return	LIBOR
2010	12.24%	13.00%	14.71%	n/a	n/a	n/a	17.00%	9.50%	27.53%	16.82%	14.43%	-9.52%	-1.48%	21.52%	1.05%	23.39%	0.34%
2011	22.17%	22.89%	21.19%	n/a	n/a	n/a	9.33%	3.90%	15.40%	22.54%	30.68%	10.92%	16.73%	39.72%	3.56%	13.94%	0.33%
2012	-0.14%	3.23%	1.25%	n/a	n/a	n/a	6.31%	7.48%	6.51%	11.00%	5.44%	3.78%	12.00%	-21.96%	1.66%	-0.86%	0.46%
2013	13.58%	13.99%	12.27%	n/a	n/a	n/a	5.99%	-0.69%	9.57%	7.85%	20.59%	12.80%	10.73%	14.52%	1.75%	10.87%	0.31%
2014	16.39%	15.61%	16.83%	21.92%	20.92%	13.84%	9.22%	4.37%	11.80%	14.31%	24.61%	9.11%	11.21%	22.33%	2.07%	7.28%	0.24%
2015	3.38%	4.96%	3.38%	2.22%	0.81%	6.59%	1.13%	1.86%	-0.55%	10.36%	7.42%	10.88%	12.96%	-9.14%	0.12%	2.65%	0.25%
2016	1.65%	4.02%	1.07%	-0.31%	-3.87%	11.55%	3.33%	6.00%	1.71%	7.05%	3.99%	12.95%	10.64%	-12.18%	1.01%	-6.92%	0.51%
2017	12.73%	11.95%	12.41%	16.34%	19.01%	6.05%	7.80%	-0.31%	12.75%	16.02%	17.90%	9.15%	6.98%	8.24%	1.63%	7.13%	1.02%
2018	9.33%	8.29%	8.45%	9.81%	11.14%	7.33%	1.50%	-0.40%	2.49%	17.22%	14.38%	9.87%	7.20%	5.78%	2.87%	4.65%	1.36%
2019	7.22%	7.97%	6.62%	6.05%	4.56%	13.00%	6.77%	7.87%	7.60%	14.05%	10.42%	7.68%	6.50%	2.05%	1.65%	3.27%	2.55%
3 Yrs.	9.74%	9.39%	8.89%	10.65%	11.41%	8.75%	5.32%	2.31%	7.53%	15.75%	14.19%	8.90%	6.89%	5.33%	2.05%	5.00%	1.79%
5 Yrs.	6.79%	7.40%	6.07%	6.66%	6.03%	8.87%	4.07%	2.95%	4.69%	12.88%	10.71%	10.09%	8.83%	-1.39%	1.45%	2.04%	1.22%
10 Yrs.	9.65%	10.42%	9.39%	n/a	10.32%	11.39%	6.75%	3.90%	9.22%	13.63%	14.70%	7.56%	9.25%	5.64%	1.73%	6.25%	0.77%

SCHEDULE OF FEES AND COMMISSIONS PAID
In Fiscal Year 2019

Broker Name	Number of Shares	Commissions ($)	Cents/Share
Barclays Capital	754,765	13,370	1.77
BMO Nesbitt Burns Trading Corp.	7,414,501	2,946	0.04
BNP Paribas Securities Services	450,996	4,493	1.00
BOFA Securities Inc.	1,356,783	13,424	0.99
Capital Institutional Svcs Inc. Equities	5,293,550	18,604	0.35
Citigroup Global Markets	1,108,052	18,140	1.64
CLSA Singapore	393,199	2,420	0.62
Cowen And Company, LLC	168,876	5,708	3.38
Credit Suisse Securities	603,190	10,962	1.82
Davidson D.A. + Company Inc.	54,450	2,178	4.00
Deutsche Bank Securities Inc.	2,539,463	8,722	0.34
Exane S.A.	140,469	2,636	1.88
Fidelity Clearing	136,000	3,037	2.23
Goldman Sachs + Co.	631,107	7,166	1.14
Guzman And Company	222,287	3,260	1.47
HSBC Securities	314,182	2,096	0.67
Instinet LLC	8,883,288	31,889	0.36
J P Morgan Securities Inc.	2,950,335	26,738	0.91
Jefferies + Company Inc.	873,199	11,757	1.35
Jeffries International Ltd.	590,296	2,415	0.41
Maxim Group	567,399	12,699	2.24
Merrill Lynch And Co Inc.	184,176	2,939	1.60
Morgan Stanley Co Incorporated	4,382,899	27,110	0.62
National Financial Services Corp.	132,930	3,108	2.34
Piper Jaffray	66,025	2,641	4.00
Raymond James And Associates	149,994	3,334	2.22
Rbc Capital Markets	465,377	11,910	2.56
Redburn Limited	101,988	2,617	2.57
Robert W.Baird Co.Incorporate	149,732	3,711	2.48
Rosenblatt Securities LLC	166,771	3,339	2.00
Sanford C. Bernstein Ltd.	611,830	3,782	0.62
Smbc Nikko Capital Markets	398,300	2,481	0.62
Societe Generale	728,097	4,485	0.62
Stifel Nicolaus + Co Inc.	121,819	4,718	3.87
UBS AG	6,575,860	64,427	0.98
Weeden + Co.	187,247	3,016	1.61
Wells Fargo Securities LLC	528,223	8,769	1.66
Others	7,461,192	69,588	0.93
Total	57,858,847	426,636	0.74

SCHEDULE OF FEES AND COMMISSIONS PAID CONT.

In Fiscal Year 2019

	2019	2018
Public Market Investments		
Global Equity	$ 2,785	$ 2,724
Fixed Income	1,174	1,259
Inflation Linked	1,416	1,024
Other Public Market	324	297
Non-Public Market (Invoiced)	0	75
Grand Total	$ 5,699	$ 5,379
Custodian Bank		
State Street Bank & Trust Company	368	370
Consultant Services		
Wilshire Associates, Inc.	284	284
Cliffwater LLC	550	550
Legal Services	70	53
Other Investment Expenses	1,048	1,027
Total Investment Expenses	$ 8,019	$ 7,667

Note: Dollar amount in $000

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ACTUARIAL

- SECTION 4 -

EVERY ACTION CONTRIBUTES TO THE BIGGER PICTURE

HMEPS

HOUSTON MUNICIPAL EMPLOYEES PENSION SYSTEM

P: 800.521.0498 | F: 763.432.5842 | www.grsconsulting.com

November 27, 2018

Board of Trustees
Houston Municipal Employees Pension System 1201 Louisiana
Suite 900
Houston, TX 77002

Subject: Actuarial Valuation as of July 1, 2018 with RSVS

Dear Members of the Board:

This actuarial valuation, which includes the Risk Sharing Valuation Study (RSVS, or sometimes referred to as the actuarial valuation or valuation in the report) describes the current actuarial condition of the Houston Municipal Employees Pension System (HMEPS), determines the City Contribution Rate, and analyzes changes in this calculated contribution rate. The results presented herein may not be applicable for other purposes. Valuations are prepared annually, as of July 1, the first day of the HMEPS plan year. This report was prepared at the request of the Board and is intended for use by the HMEPS staff and those designated or approved by the Board. This report may be provided to parties other than HMEPS staff only in its entirety and only with the permission of the Board, or as required by law.

FINANCING OBJECTIVES AND FUNDING POLICY

Based on the changes to the HMEPS statute (revised statute), the employer contribution is now comprised of two pieces. The first piece is the amortization of the Legacy Liability as of July 1, 2016 determined as part of the July 1, 2016 Initial Risk Sharing Valuation Study (Initial RSVS). The Legacy Liability is amortized over a 30-year period beginning on July 1, 2017. These amortization payments are fixed and grow at the assumed payroll growth rate of 2.75%. The second part of the contribution is the City Contribution Rate determined by the valuation. The City Contribution Rate becomes effective twelve months after the valuation date, i.e., the rate determined by this July 1, 2018 actuarial valuation will be used by the Board when establishing the City Contribution Rate for the year beginning July 1, 2019 and ending June 30, 2020.

The contribution rate for fiscal year 2018 was determined by the July 1, 2016 actuarial valuation. In addition to the Legacy Liability payment of $124,030,357, the City contributed 8.17% of payroll in fiscal year 2018. The contribution rate for fiscal year 2019 was determined by the July 1, 2017 actuarial valuation. The City will contribute a Legacy Liability payment of $127,441,192 and 8.27% of payroll in fiscal year 2019.

5605 North MacArthur Boulevard | Suite 870 | Irving, Texas 75038-2631

Based on the revised statute, the City contribution rate for FY 2020 is 8.32% of pay, which is estimated to be $53.7 million based on an estimated payroll of $645.6 million. The City contribution amount for FY 2020 for the Legacy Liability amortization payment as determined in the Initial RSVS is $130.9 million.

Each future valuation will establish either a liability gain layer or a liability loss layer. These layers will represent unexpected increases/decreases in the unfunded actuarial accrued liability (after subtracting out any remaining Legacy Liability or any remaining prior years' liability layers). Liability loss bases will be amortized over a 30-year period beginning one year after the valuation date.

Liability gain bases will be amortized over the same period as the largest liability loss base, or 30 years if there is no liability loss base. All bases are amortized using a level percentage of payroll amortization method. This year a liability gain layer of $36.4 million is being established. It will be amortized over the same remaining amortization period as the Legacy Liability (twenty-eight years).

The contribution rate and liabilities are computed using the Entry Age Normal actuarial cost method. The employer contribution is the sum of two pieces: the Legacy Liability amortization payment (City Contribution Amount), and the City Contribution Rate. The City Contribution Rate is comprised of two pieces: (i) the employer normal cost rate and (ii) the amortization of the liability gain/loss layers. Both the normal cost rate and the amortization of the liability gain/loss layers are determined as a level percentage of pay. Except as discussed above, each liability gain/loss layer is amortized over a 30-year period beginning one year after the valuation date for which the layer was established. The amortization rate is adjusted for the one-year deferral in contribution rates.

PROGRESS TOWARD REALIZATION OF FINANCING OBJECTIVES

The funded ratio (the ratio of the actuarial value of assets to the actuarial accrued liability) is a standard measure of a plan's funded status. In the absence of benefit improvements, it should increase over time, until it reaches 100%. The funded ratio as of July 1, 2018 is 57.7%. This is an increase from the 56.4% funded ratio from the prior year's valuation. However, the funded status alone is not appropriate for assessing the need for or the amount of future contributions and is not appropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations.

The calculated City Contribution Rate for FY 2020 is 7.95%. However, because the System is less than 90% funded, the actual City Contribution Rate for FY 2020 will be the corridor midpoint of 8.32% of payroll as shown on page 2 of the Risk Sharing Valuation section of the valuation report. This rate is five basis points greater than the prior year rate as established in the Initial RSVS. Please see Table 6 for a detailed analysis of the change in the calculated employer contribution
Board of Trustees

rate from the prior year to this year. This rate does not include the separate contribution for the Legacy Liability amortization payment discussed above.

PLAN EXPERIENCE

As part of each valuation, we examine the System's experience relative to the assumptions. The aggregate results of these analyses are disclosed in Tables 5 & 6. This past fiscal year the System had an experience liability gain of approximately $14.5 million and an experience gain on the actuarial value of assets of approximately $34.9 million. The gain on the actuarial value of assets was due to the partial recognition of this year's and the prior year's investment performance. The liability gain was mostly offset due to the cost of living adjustment (COLA) payable in 2019 being higher than assumed (1.61% versus the 1% assumption). The COLA is based on the 5-year average return on the market value of assets.

BENEFIT PROVISIONS

The benefit provisions reflected in this valuation are those in effect following the passage and signing into law of SB 2190 in 2017. These changes were reflected in the prior valuation and there have been no changes to the benefit provisions since the prior valuation.

The benefit provisions are summarized in Appendix B.

ASSUMPTIONS AND METHODS

Except as noted below, the actuarial assumptions and methods are set by the Board of Trustees, based upon recommendations made by the plan's actuary and the current assumptions were adopted by the Board in 2016 following a regularly scheduled experience study. The rationale for the current assumptions is included in that report, dated February 25, 2016.

As part of the legislation enacting the benefit changes, the investment return assumption (7.0%) was set into the revised statute (Article 6243h, Vernon's Texas Civil Statutes). This assumption is now considered a prescribed assumption under the actuarial standards of practice. With the lowering of the investment return assumption from 8.0% to 7.0% it was appropriate to make changes to other economic assumptions that are correlated with the investment return assumption. In particular, the inflation assumption was decreased from 2.50% to 2.25% and corresponding decreases in the salary increase assumptions and payroll growth assumptions were also made. These changes were all reflected in the prior actuarial valuation. There have been no changes to the actuarial assumptions since the prior valuation.

The actuarial assumptions represent estimates of future experience and are not market measures. The results of the actuarial valuation are dependent on the actuarial assumptions used. Actual results (and future measures) can and almost certainly will differ, as actual experience deviates from the assumptions. Even seemingly minor changes in the assumptions can materially change the liabilities, calculated contribution rates and funding periods. The actuarial calculations are intended to provide information for rational decision making.

This report does not include a more robust assessment of the risks of future experience not meeting the actuarial assumptions. Additional assessment of risks was outside the scope of this assignment.

All assumptions and methods are described in Appendix A.

GASB 67

The System was required to begin complying with Governmental Accounting Standards Board Statement No. 67 with the fiscal year ending June 30, 2014. The GASB No. 67 information for the fiscal year ending June 30, 2018 was provided to HMEPS in a separate report dated September 12, 2018 and is not contained in this report.

DATA

Member data for retired, active and inactive members was supplied as of July 1, 2018 by the HMEPS staff. We did not audit this data, but we did apply a number of tests to the data, and we concluded that it was reasonable and consistent with the prior year's data.

Asset information as of July 1, 2018 was taken from the audited Financial Statements for the Year Ended June 30, 2018.

CERTIFICATION

We were asked to determine if an unanticipated actuarial cost occurred in the administration of the Deferred Retirement Option Plan (DROP). It is our opinion that the administration of the DROP had no material unanticipated actuarial costs during the prior fiscal year.

All of the tables contained in this actuarial valuation report were prepared by Gabriel, Roeder, Smith & Company. The trend data schedules shown in the Notes section of the HMEPS Financial Statements are based on our valuation reports, but were prepared by HMEPS staff. We certify that the information presented herein is accurate and fairly portrays the actuarial position of HMEPS as of July 1, 2018.

All of our work conforms with generally accepted actuarial principles and practices, and the Actuarial Standards of Practice issued by the Actuarial Standards Board. In our opinion, our calculations also comply with the requirements of state law and, where applicable, the Internal Revenue Code, ERISA, and the Statements of the Governmental Accounting Standards Board. The undersigned are independent actuaries and consultants. Mr. Newton is an Enrolled Actuary and also a Member of the American Academy of Actuaries, and meets the Qualification Standards of the American Academy of Actuaries. Both of the undersigned are experienced in performing valuations for large public retirement systems.

Sincerely,
Gabriel, Roeder, Smith & Company

Joseph P. Newton, FSA, EA, MAAA
Pension Market Leader and Actuary

Lewis Ward
Consultant

Table of Contents

Section I

Risk Sharing Valuation Study

RSVS Discussion

The purpose of the Risk Sharing Valuation Study (RSVS) is to determine the City Contribution Rate for the fiscal year beginning one year after the valuation date.

The first exhibit in this section shows the RSVS Corridor which was created from the Initial RSVS. Column 3 shows the Corridor Midpoint for each fiscal year. Columns 2 and 4 show the Corridor Minimum and Corridor Maximum respectively. Column 5 shows the actual City Contribution Rate for the fiscal year. As shown on the table the actual City Contribution Rate for FY 2020 is 8.32% of pay.

The next exhibit shows the individual pieces and total calculated City Contribution Rate. As shown on the table the calculated City Contribution Rate from this valuation is 7.95% of pay. Because The System is less than 90% funded, the actual City Contribution Rate will be set equal to the Corridor Midpoint of 8.32% of pay.

The third exhibit shows the Liability Gain/Loss Layers established by each RSVS. Columns 2 and 3 show the original liability layer and any remaining liability layer respectively. Column 4 is the payment on that particular layer for the fiscal year beginning one year after the valuation date. The payment is determined using a level percentage of payroll and the remaining amortization period as shown in column 5. The payments reflect the one year delay between the determination of the payment and the beginning of the fiscal year in which the payment is made. The dollar amounts of the payments are summed and then converted to a percentage of payroll based on the projected payroll for the fiscal year beginning one year after the valuation date. As shown on the table the current year's payment is negative which means it is a credit toward the contribution rate. The credit is determined to be 0.37% of projected payroll.

The next exhibit is the Legacy Liability schedule. This table shows the amortization schedule of the Legacy Liability for each of the 30 years over which it is scheduled to be paid. Column 2 shows the remaining Legacy Liability as of that measurement date while Column 3 shows the payment on the Legacy Liability for the fiscal year beginning one year after the valuation date.

The unfunded actuarial accrued liability is equal to the sum of the Remaining Layer column on the Liability Gain/Loss Layers exhibit and the Remaining Legacy Liability column as of the valuation date.

Risk Sharing Valuation - Corridor

Fiscal Year Ending	Corridor Minimum	Corridor Midpoint	Corridor Maximum	Actual City Contribution Rate
(1)	(2)	(3)	(4)	(5)
June 30, 2018	3.17%	8.17%	13.17%	8.17%
June 30, 2019	3.27%	8.27%	13.27%	8.27%
June 30, 2020	3.32%	8.32%	13.32%	8.32%
June 30, 2021	3.36%	8.36%	13.36%	
June 30, 2022	3.41%	8.41%	13.41%	
June 30, 2023	3.44%	8.44%	13.44%	
June 30, 2024	3.48%	8.48%	13.48%	
June 30, 2025	3.51%	8.51%	13.51%	
June 30, 2026	3.54%	8.54%	13.54%	
June 30, 2027	3.57%	8.57%	13.57%	
June 30, 2028	3.59%	8.59%	13.59%	
June 30, 2029	3.61%	8.61%	13.61%	
June 30, 2030	3.63%	8.63%	13.63%	
June 30, 2031	3.65%	8.65%	13.65%	
June 30, 2032	3.67%	8.67%	13.67%	
June 30, 2033	3.69%	8.69%	13.69%	
June 30, 2034	3.70%	8.70%	13.70%	
June 30, 2035	3.71%	8.71%	13.71%	
June 30, 2036	3.72%	8.72%	13.72%	
June 30, 2037	3.73%	8.73%	13.73%	
June 30, 2038	3.74%	8.74%	13.74%	
June 30, 2039	3.74%	8.74%	13.74%	
June 30, 2040	3.75%	8.75%	13.75%	
June 30, 2041	3.76%	8.76%	13.76%	
June 30, 2042	3.77%	8.77%	13.77%	
June 30, 2043	3.78%	8.78%	13.78%	
June 30, 2044	3.79%	8.79%	13.79%	
June 30, 2045	3.79%	8.79%	13.79%	
June 30, 2046	3.80%	8.80%	13.80%	
June 30, 2047	3.81%	8.81%	13.81%	

Risk Sharing Valuation – Calculated City Contribution Rate

Fiscal Year Ending	Normal Employer Cost	Amortization Payment	Calculated City Contribution Rate
(1)	(2)	(3)	(4)
June 30, 2018	8.17%	0.00%	8.17%
June 30, 2019	8.27%	0.00%	8.27%
June 30, 2020	8.32%	-0.37%	7.95%

Risk Sharing Valuation - Liability (Gain)/Loss Layers

Valuation Year Base Established	Original Layer	Remaining Layer	Year's Payment[1]	Remaining Payments
(1)	(2)	(3)	(4)	(5)
July 1, 2018	$ (36,414,848)	$ (36,414,848)	$ (2,359,351)	28
July 1, 2017	(388,530)	(415,727)	$ (25,387)	28
Total		$ (36,830,575)	$ (2,384,738)	
Projected Payroll for Fiscal Year +1			$ 645,587,666	
Amortization Payments as % of Projected Pay			-0.37%	
Single Equivalent Amortization Period from the Valuation Date[2]			29.0	

1 This is the payment to be made for the fiscal year beginning one year after the valuation date.
2 The single equivalent amortization period includes all liability layers including the Legacy Liability.

Risk Sharing Valuation – Legacy Liability

Fiscal Year End	Remaining Legacy Liability	Current Year's Payment[1]
(1)	(2)	(3)
June 30, 2017	$ 2,123,880,499	$ 124,030,357
June 30, 2018	2,144,254,135	127,441,192
June 30, 2019	2,162,525,731	130,945,824
June 30, 2020	2,178,451,118	134,546,835
June 30, 2021	2,191,766,369	138,246,872
June 30, 2022	2,202,186,338	142,048,661
June 30, 2023	2,209,403,104	145,955,000
June 30, 2024	2,213,084,295	149,968,762
June 30, 2025	2,212,871,302	154,092,903
June 30, 2026	2,208,377,355	158,330,458
June 30, 2027	2,199,185,471	162,684,546
June 30, 2028	2,184,846,251	167,158,371
June 30, 2029	2,164,875,526	171,755,226
June 30, 2030	2,138,751,826	176,478,494
June 30, 2031	2,105,913,679	181,331,653
June 30, 2032	2,065,756,717	186,318,273
June 30, 2033	2,017,630,566	191,442,026
June 30, 2034	1,960,835,534	196,706,682
June 30, 2035	1,894,619,048	202,116,115
June 30, 2036	1,818,171,846	207,674,309
June 30, 2037	1,730,623,900	213,385,352
June 30, 2038	1,631,040,048	219,253,449
June 30, 2039	1,518,415,320	225,282,919
June 30, 2040	1,391,669,929	231,478,199
June 30, 2041	1,249,643,912	237,843,850
June 30, 2042	1,091,091,395	244,384,556
June 30, 2043	914,674,442	251,105,131
June 30, 2044	718,956,486	258,010,522
June 30, 2045	502,395,281	265,105,812
June 30, 2046	263,335,367	272,396,221
June 30, 2047	-	-

1 Contribution amount for fiscal year that begins one year after valuation date

Section II

Discussion

Executive Summary

Item	July 1, 2018	July 1, 2017
Membership		
• Number of:		
-Active members	11,880[1]	12,066[1]
-Retirees and beneficiaries	10,834	10,601
-Inactive members	6,044	5,576
-Total	28,758	28,243
• Covered payroll (annualized)	$ 624,266	$ 623,577
City Contribution rates	8.32%[2]	8.27%[2]
Assets		
• Market value	$ 2,988,864	$ 2,602,665
• Actuarial value	2,874,585	2,742,539[3]
• Estimation of return on market value	8.7%	12.4%
• Estimation of return on actuarial value	8.3%	8.1%
• Employer contribution	$ 421,563	$ 182,557
• Member contribution	$ 27,905	$ 15,902
• Ratio of actuarial value to market value	96.2%	105.4%
• External cash flow as % of market value assets	5.3%	-3.4%
Actuarial Information		
• Unfunded actuarial accrued liability (UAAL)	$ 2,107,424	$ 2,123,492
• GASB funded ratio	57.7%	56.4%
• Employer normal cost %	8.32%	8.27%
• Amortization rate[4]	-0.37%	0.00%
• Calculated City Contribution Rate	7.95%	8.27%
Estimated Total City Contribution for Fiscal Year	2020	2019
• Estimated City Contribution Rate Payment	$ 53,712,894	$ 52,814,036
• Legacy Liability Payment (City Contribution Amount)	$ 130,945,824	$ 127,441,192
• Total	$ 184,658,718	$ 180,255,228

Note: Dollar amounts in $000, unless otherwise noted

1 Counts include an additional 170 Group D members.
2 This rate is the City Contribution Rate determined in accordance with the State statute.
3 AVA includes a receivable of $250 million in POB proceeds discounted from December 31, 2017.
4 See Risk Sharing Valuation - Liability (Gain)/Loss Layers table for determination of rate.

Contribution Requirement

- The Executive Summary shows the estimated total City Contribution for fiscal year 2020
  - Comprised of the known Legacy Liability payment (City Contribution Amount) of $130.9 million, and
  - City Contribution Rate times estimated payroll of $645.6 million = $53.7 million
- The calculated City Contribution Rates shown on the Executive Summary are calculated rates for the twelve-month period beginning one year after the valuation date, based on statute
- Table 6 reconciles the calculated City Contribution Rates from the prior valuation to the current valuation
- Legacy Liability is $2,144 million as of July 1, 2018
  - Schedule of Legacy Liability contribution amounts shown in RSVS section

Amortization of liability gain/loss layers are as follows

- Liability loss layers are amortized over a 30-year funding period beginning one year after the valuation date using level percentage of payroll amortization based on 2.75% payroll growth rate
- Liability gain layers are amortized over the remaining period of the largest liability loss layer (if no loss layer exists then over a 30-year funding period beginning one year after the valuation date) using level percentage of payroll amortization based on 2.75% payroll growth rate
- Amortization payment for layers is the sum of all payments divided by the projected payroll for the fiscal year beginning one year after the valuation date
- No future growth in the number of active members is taken into account

Calculation of Contribution Rates

The funds available to pay benefits come from two sources, contributions and investment income on those contributions (the majority of the funds available to pay benefits come from investment income). HMEPS receives contributions from two sources, employer contributions and member contributions. The employer contribution is comprised of two pieces. The first piece is a fixed dollar amount to amortize the Legacy Liability as of July 1, 2016 over a 30-year beginning on July 1, 2017. The second piece is the City Contribution Rate.

As shown in Table 1, the Calculated City Contribution Rate has two components:

- The employer normal cost percentage (NC%)
- The amortization percentage (Liability Layers%)

The NC% is the theoretical amount which would be required to pay the members' benefits, based on the plan provisions for new employees, if this amount had been contributed from each member's entry date and if the fund's experience exactly followed the actuarial assumptions. This is the amount it should cost to provide the benefits for an average new member. The employer NC% includes a provision for administrative expenses and is net of member contributions. The NC% is shown in Table 4.

The actuarial accrued liability (AAL) is the difference between (i) the actuarial present value of all future benefits for all current participants of the fund, including active, inactive and retired members, and (ii) the actuarial present value of future normal costs. Thus the AAL represents the liability associated with past years. The unfunded actuarial accrued liability (UAAL) is the difference between the AAL and the actuarial value of assets (AVA). It is the shortfall/excess between the liability associated with prior years (the AAL) and the assets actually accumulated (the AVA). This shortfall/excess can arise from several sources, including actuarial gains and losses which are caused by differences between actual experience and the plan's assumptions, changes to the plan's actuarial assumptions, and amendments to the benefit provisions.

As of July 1, 2016, the UAAL was partitioned off into the Legacy Liability which has its own amortization schedule. For all valuations after July 1, 2016, any unexpected gains or losses will be set up as new liability gain/loss layers. These layers will be amortized over 30 years (see previous discussion for liability gain layers) using level percentage of payroll amortization beginning on the July 1st one year after the valuation date the layer is determined. The sum of any such layers' payments will be aggregated and converted to a percentage of projected payroll for the fiscal year beginning one year after the valuation date. This percentage is the Liability Layers' %.

In addition to these two pieces, the City Contribution Rate also includes a provision for administrative expenses which is equal to 1.25% of payroll as of July 1, 2018. The maximum addition to the City Contribution Rate for administrative expenses is 1.25%, unless the City agrees to a higher rate.

Calculation of Contribution Rates (Continued)

If the addition to the City Contribution Rate for administrative expenses is capped at 1.25%, then administrative expenses in excess of 1.25% of payroll (if any) will become part of the next year's liability gain/loss layer.

The calculated City Contribution Rate necessary to meet the funding policy specified by statute for the twelve-month period beginning July 1, 2019 is 7.95%. Since the System is less than 90% funded and the calculated City Contribution rate is less than the Corridor Midpoint, the actual City Contribution Rate will be the Corridor Midpoint of 8.32% of projected payroll. Therefore, the FY 2020 City Contribution is estimated to be approximately $184.6 million. The contribution is comprised of the fixed Legacy Liability payment of $130.9 million and the estimated payment of $53.7 based on the City Contribution Rate of 8.32% and a projected FY 2020 payroll of $645.6 million.

Financial Data and Experience

As of July 1, 2018, HMEPS has a total market value of about $2.99 billion. Financial information was gathered from the audited financial statements as of June 30, 2018.

This report includes a number of exhibits related to plan assets. Table 8 shows how the total market value is distributed among the various classes of investments. Current investment policy allocates 52.5% of invested assets to equities, 15% of invested assets to fixed income, and 32.5% of invested assets to alternative investments including real estate.

Table 9 shows a reconciliation of the market values between the beginning and end of FY2018.

As shown on Table 11, the dollar-weighted return net of investment expenses for FY2018 was 8.68%.

In determining the contribution rates and funded status of the System, an actuarial value of assets (AVA) is used, rather than the market value of assets. This "smoothing method" is intended to help reduce the volatility of the contribution rates from year to year. The method used to compute the AVA takes the difference between the actual market value of assets and the expected actuarial value of assets (based on the prior year's assumed investment return rate), and establishes a base each year which is equal to this difference less any unrecognized bases from prior years. If the current year's base is of opposite sign from the prior years' bases then it is offset dollar for dollar against the prior years' bases (oldest bases first) until either the prior years' bases or the current year's base is reduced to zero. Any remaining bases are then recognized over the remaining period for the base (5 less the number of years between the base year and the valuation year) in equal dollar amounts.

However, as part of the legislation enacted by the 2017 Legislature, all prior years' bases have been fully recognized as of July 1, 2016. In other words, the actuarial value of assets has been "marked to market" as of that date. Therefore, there are only two "smoothing" bases included in the determination of the actuarial value of assets in this valuation.

The development of the AVA is shown on Table 10. The AVA as of the valuation date is $2.87 billion. The AVA is 96.2% of the MVA, compared to 96.1% last year.

In addition to the market return, Table 11 also shows the return on the actuarial value of assets for HMEPS. For FY2018, this return was 8.30%. Because this is greater than the assumed 7.0% investment return, an actuarial gain occurred decreasing the unfunded actuarial accrued liabilities of the plan. Table 12 shows a summary of market and actuarial return rates in recent years.

Member Data

Member data as of July 1, 2018 was supplied electronically by HMEPS staff. While we did not audit this data, we did perform various tests to ensure that it was internally consistent, consistent with the prior year's data, and was reasonable overall.

Tables 15 and 16 show the summaries of certain historical data, including membership statistics. Table 17 shows the number of members by category (active, inactive, retired, etc.). Tables 18(a-d) show the active member statistics by Group and in total.

The number of active members decreased from 12,066 to 11,880, a 1.5% decrease. Note that the active member count includes 170 employees of HFC, HFF and CCSI for which incomplete information has been provided. These members are all assumed to be in Group D and to have the average group D profile.

The total annualized salaries shown on Table 2 and on the statistical tables is the amount that was supplied by HMEPS, annualized or adjusted for number of hours reported if necessary. For the cost calculations, the pays were adjusted in accordance with the actuarial assumptions to reflect one year's salary increase. The annualized salaries for active members increased 2.5% over last year.

We also show the projected payroll in Item 2 of Table 2. This is the payroll used for determining the expected amortization payments (amortization percentage) on liability (gain)/loss layers. The projected pay is determined by summing all pensionable pay for the just ended fiscal year for anyone who received pensionable pay during the year (actives, terminated members, retirees, etc.) and increasing this sum by the payroll growth rate. We believe this provides a better expectation of the upcoming year's actual payroll than the annualized salaries described above.

The overall trend in payroll is less significant than in prior years due to the creation of the Legacy Liability. The payments to amortize the Legacy Liability were determined in a manner that is consistent with the payroll growth assumption, but those payment amounts are now fixed and will be contributed whether payroll grows slower or faster than assumed. The current and future liability gain/loss layers will be amortized using level percentage of payroll amortization. Because the methodology used in amortizing these layers assumes a growing payroll into the future, if the payroll does not grow at the assumed 2.75% a year on average, the amortization payments (as a percentage of pay) will need to increase in order to keep the contribution dollars that amortize the UAAL growing at 2.75%. However, these layers are expected to be much smaller in magnitude than the Legacy Liability and therefore, the impact of the payroll growing slower or faster than expected is anticipated to be much less for many years into the future.

Benefit Provisions

SB 2190 passed by the 2017 Legislature made a few but very significant changes to the benefit provisions of HMEPS. All of these changes were reflected in the July 1, 2016 valuation. However, the changes were significant enough that we have shown them again in this year's valuation as a reminder.

Prior to the legislation members hired prior to January 1, 2005 were eligible for a cost of living adjustment (COLA) each year equal to 3% of their base benefit. Members hired on or after January 1, 2005 and prior to January 1, 2008 were eligible for a COLA based on 2% of their base benefit. Group D members were not eligible for any COLA. Effective with the 2018 COLA, all current and future retirees and their eligible survivors (except as noted below) will be eligible for the same COLA. The COLA will be equal to 50% of the average five-year net investment return rate less five percentage points, with a minimum of 0% and a maximum of 2%. Group D members who are entitled to an annuity but who terminated employment prior to the effective date of the 2017 legislation will not be eligible for any COLA.

Active members in DROP will not be eligible for a COLA on their DROP account until they have attained the age of 62 as of January 1 of the year in which the increase is made.

The member contributions for all groups have changed. The Group A member contribution rate increased from 5.0% of pay to 8.0% of pay. The Group B member contribution rate increased from no contributions to 4% of pay. The Group D member contribution rate increased from no contributions to 3% of pay. One-third of the Group D member contribution rate is attributed to a notional cash balance account. The contribution increases for Groups A and B were phased-in over a two year period.

The interest credit rate on DROP accounts and the notional cash balance accounts will be based on 50% of the five-year average of the net rate of return on the market value of assets, but not less than 2.5% or more than 7.5%.

Survivor benefits:

- Effective July 1, 2017, if an active Group A, Group B or Group D member with at least 5 years of credited service dies while still in service with the City (off-duty death), the spousal survivor benefit will be 80% of the normal accrued pension, payable immediately, provided that the spouse was married to the participant for at least one continuous year as of the date of death. If such spouse was married less than one continuous year as of the date of death, the survivor benefit is 50% of the normal accrued pension.
- Effective July 1, 2017, if a Group A or Group B retiree dies, the spousal survivor benefit will be 80% of the retirement benefit being received by the retiree at the time of death, payable immediately, provided that the spouse was married to the retiree at the time of death and for at least one continuous year as of the date of separation from service (the marriage requirement applies for separations from service on or after July 1, 2017). If such spouse was married less than one continuous year as of the date of separation from service (the marriage requirement applies for separations from service on or after July 1, 2017), the spousal survivor

Benefit Provisions (Continued)

benefit is 50% of the retirement benefit being received by the retiree at the time of death.

- Effective July 1, 2017, if a Group A or Group B deferred participant (not yet receiving a pension benefit) dies, the spousal survivor benefit is 50% of the normal accrued pension, payable at the participant's eligibility date. However, the surviving spouse can elect an earlier actuarially equivalent benefit.
- Effective July 1, 2017, if an active Group A, Group B or Group D member dies from a service-related (on-duty) death, the spousal survivor benefit is 80% of the participant's final average salary, payable immediately.

This valuation reflects all benefits offered to members.

There have been no changes to the benefit provisions since the prior valuation.

Appendix B of our Report includes a summary of the benefit provisions for HMEPS.

Actuarial Methods and Assumptions

Except as noted below, the actuarial assumptions and methods are set by the Board of Trustees, based upon recommendations made by the plan's actuary. Except as noted below, the Board adopted the actuarial assumptions used in this valuation in connection with an actuarial experience study performed by GRS. Please see our report dated February 25, 2016 for a complete description of the changes in assumptions and for the rationale behind the current assumption set. These assumptions were used beginning with the July 1, 2015 valuation. It is anticipated that the next experience study will be conducted during the fall of 2021.

As part of the legislation enacting the benefit changes, the investment return assumption (7.0%) was set into statute (Article 6243h, Vernon's Texas Civil Statutes). In addition the actuarial cost method was also set into statute. This assumption and method are now considered prescribed assumptions and methods under the actuarial standards of practice.

Liabilities are determined using the Entry Age Normal actuarial cost method. The assumed investment return rate is 7.00%.

With the lowering of the investment return assumption from 8.0% to 7.0% it was appropriate to make changes to other economic assumptions that are correlated with the investment return assumption. In particular, we recommended and the Board adopted a decrease in the inflation assumption from 2.50% to 2.25% and the corresponding decreases in the salary increase assumptions and payroll growth assumptions. These changes were reflected in the July 1, 2016 actuarial valuation.

There have been no changes in the actuarial assumptions and methods since the prior valuation. Please see Appendix A of our Report for a complete description of these assumptions.

Funding Progress

As you are aware, the Governmental Accounting Standards Board Statements (GASB) that apply to the System have changed. In prior years, GASB Statement No. 25 applied to the System. Beginning with the 2014 fiscal year GASB Statement No. 67 applies to the System. The GASB No. 67 disclosure information has been provided in a separate report.

Although GASB No. 25 no longer applies to HMEPS, there are certain schedules from GASB No. 25 which we believe provide useful information and therefore we are continuing to include these in our report.

In particular, we are continuing to show the Schedule of Funding Progress (Table 14).

Summary and Closing Comments

This year's valuation should be seen as a positive. At this point in the amortization schedule (amortization period of 30 years as of last valuation), the UAAL is expected to increase year over year due to contribution payments not covering all interest charges. As a result of continued good investment performance the System's UAAL decreased compared to the prior year when an increase was expected. Based on the impact of compound interest, small gains at this point in the process can have a profound impact down the line.

The System's funded status increased from 56.4% to 57.7%.

The calculated City Contribution Rate is less than the normal cost and less than the Corridor Midpoint. However, because the System is less than 90% funded the City Contribution Rate is set equal to the Corridor Midpoint determined by the Initial RSVS at 8.32% of pay.

There was an actuarial liability experience gain, but it was mostly offset due to a higher than assumed cost of living adjustment (to be paid in 2019). There was also an actuarial gain on assets due to better than expected investment performance for the two prior years. Note that this is exactly how this type of COLA provision is designed to work (better than expected investment performance pays for the additional COLA). The liability gain layer established with this valuation and the prior valuation produce an annual amortization credit of 0.37%.

Given the plan's contribution policy, if all actuarial assumptions are met (including the assumption of the plan earning 7.00% on the actuarial valuation of assets), it is expected that:

a. The employer normal cost as a percentage of pay will remain relatively level over time (upward drift will likely occur due to generational mortality),

b. The funded ratio will increase slowly,

c. The UAAL will grow in nominal dollars until the amortization period on the Legacy Liability is reduced to approximately 20 years, at which point the UAAL will begin to decrease and be expected to be fully amortized by the July 1, 2047 valuation, or 29 years from the current July 1, 2018 valuation date.

Section III

Supporting Exhibits

Table 1
Summary of Cost Items

	Valuation as of July 1, 2018		Valuation as of July 1, 2017	
	Cost Item	Cost as % of Pay	Cost Item	Cost as % of Pay
	(1)	(2)	(3)	(4)
1. Participants				
a. Actives	11,880		12,066	
b. Retirees	8,614		8,376	
c. Disabled retirees	298		323	
d. Beneficiaries	1,922		1,902	
e. Inactive, deferred vested	3,457		3,409	
f. Inactive, nonvested	2,587		2,167	
g. Total	28,758		28,243	
2. Covered payroll	$ 624,266		$ 623,577	
3. Averages for active members				
a. Average age	47.5		47.3	
b. Average years of service	11.3		11.1	
c. Average pay ($)	$ 52,548		$ 51,681	
4. Present value of future pay	$ 4,576,847		$ 4,588,360	
5. Employer normal cost rate	8.32%		8.27%	
6. Present value of future benefits	$ 5,515,462	883.5%	$ 5,400,319	866.0%
7. Present value of future normal costs	$ 533,454	85.5%	$ 534,288	85.7%
8. Actuarial accrued liability (6 - 7)	$ 4,982,008	798.1%	$ 4,866,031	780.3%
9. Present actuarial assets	$ 2,874,585	460.5%	$ 2,742,539	439.8%
10. Unfunded actuarial accrued liability (UAAL) (8 - 9)	$ 2,107,424	337.6%	$ 2,123,492	340.5%
11. Calculated City Contribution Rate				
a. Employer normal cost	8.32%		8.27%	
b. Amortization charge[1]	-0.37%		0.00%	
c. Total	7.95%		8.27%	
12. City Contribution Rate[2]	8.32%		8.27%	
13. Average estimated return				
a. Based on market value	8.68%		12.41%	
b. Based on actuarial value	8.30%		8.08%	
14. Funded ratio (9 ÷ 8)	57.7%		56.4%	
15. Legacy Liability payment for fiscal year beginning one year after valuation date	$ 130,946		$ 127,441	

Note: Dollar amounts in $000

1 This is the layered amortization payment excluding the Legacy Liability payment
2 This is the payment to be made for the fiscal year beginning one year after the valuation date.

Table 2
Calculation of Annual Required Contribution Rate

		July 1, 2018 (1)	July 1, 2017 (2)
1.	Annualized salaries on valuation date	$ 624,266	$ 623,577
2.	Projected payroll for upcoming fiscal year[1]	$ 628,309	$ 621,530
3.	Present value of future pay	$ 4,576,847	$ 4,588,360
4.	Employer normal cost rate	8.32%	8.27%
5.	Actuarial accrued liability for active members		
	a. Present value of future benefits for active members	$ 2,422,265	$ 2,407,217
	b. Less: present value of future normal costs	(437,574)	(437,302)
	c. Less: present value of additional employee contributions[2]	(95,880)	(96,986)
	d. Actuarial accrued liability	$ 1,888,811	$ 1,872,929
6.	Total actuarial accrued liability for:		
	a. Retirees and beneficiaries	$ 2,909,411	$ 2,815,696
	b. Inactive participants	$ 183,786	177,406
	c. Active members (Item 5d)	$ 1,888,811	1,872,929
	d. Total	$ 4,982,008	$ 4,866,031
7.	Actuarial value of assets	$ 2,874,585[3]	$ 2,742,539[3]
8.	Unfunded actuarial accrued liability (UAAL) (Item 6d - Item 7)	$ 2,107,424	$ 2,123,492

Note: Dollar amounts in $000

1 The projected payroll is the actual pay received for the just completed fiscal year (including pay for any member who received pay during the year: i.e. active, terminated, retired, etc.). This pay is then increased by the payroll growth rate.
2 Additional employee contributions in excess of the 3.00% employee rate used to determine the normal cost.
3 Actuarial value of assets marked to market at July 1, 2016. Includes receivable of $250 million Pension Obligation Bonds proceeds to be received by December 31, 2017.

Table 3
Actuarial Present Value of Future Benefits

		July 1, 2018	July 1, 2017
		(1)	(2)
1.	Active members		
	a. Retirement benefits	$ 2,188,774	$ 2,171,049
	b. Deferred termination benefits	132,068	136,208
	c. Refunds	13,821	12,973
	d. Death benefits	76,470	75,283
	e. Disability benefits	11,132	11,704
	f. Total	$ 2,422,265	$ 2,407,217
2.	Members in Pay Status		
	a. Service retirements	$ 2,589,528	$ 2,502,522
	b. Disability retirements	33,702	36,073
	c. Beneficiaries	286,181	277,101
	d. Total	$ 2,909,411	$ 2,815,696
3.	Inactive members		
	a. Vested terminations	$ 179,900	$ 173,698
	b. Nonvested terminations	3,886	3,708
	c. Total	$ 183,786	$ 177,406
4.	Total actuarial present value of future benefits	$ 5,515,462	$ 5,400,319

Note: Dollar amounts in $000

Table 4
Analysis of Normal Cost

		July 1, 2018	July 1, 2017
		(1)	(2)
1.	Gross normal cost rate		
	a. Retirement benefits	7.49%	7.44%
	b. Deferred termination benefits	1.41%	1.41%
	c. Refunds	0.61%	0.61%
	d. Disability benefits	0.13%	0.13%
	e. Death benefits	0.43%	0.43%
	f. Administrative expenses	1.25%	1.25%
	g. Total	11.32%	11.27%
2.	Employee Contribution rate[1]	3.00%	3.00%
3.	Employer Normal Cost (including Administrative Expenses)	8.32%	8.27%

1 Normal cost is determined using Ultimate Entry Age method. Therefore, Employee Contribution rate is the rate for a Group D new hire.

Table 5
Calculation of Total Actuarial Gain or Loss

1.	Unfunded actuarial accrued liability (UAAL) as of July 1, 2017	$	2,123,492
2.	Total normal cost and administrative expense for year		77,274
3.	Employer and Employee Contributions during year ending June 30, 2018		(199,468)
4.	Interest on UAAL for one year		148,644
5.	Interest on Item 2 and Item 3 for one-half year		(4,204)
6.	Expected UAAL as of July 1, 2018 (1+2+3+4+5)	$	2,145,738
7.	Actual UAAL as of July 1, 2018	$	2,107,423
8.	Actuarial gain/(loss) for the period (6 - 7)	$	38,315
	SOURCE OF GAINS/(LOSSES)		
9.	Asset gain/(loss) (See Table 10)	$	34,933
10.	Plan changes		0
11.	Assumption changes		0
12.	Method change		0
13.	Next Year's COLA different than assumed		(11,082)
14.	Liability experience gain/(loss) for the period		14,464
15.	Actuarial gain/(loss) for the period	$	38,315

Note: Dollar amounts in $000

Table 6
Change in Calculated Contribution Rate Since the Prior Valuation

1.	Calculated City Contribution Rate as of July 1, 2017		8.27%
2.	Change in Contribution Rate During Year		
a.	Change in Employer Normal Cost	0.05%	
b.	Recognition of prior years' asset (gains)	(0.25%)	
c.	Actuarial gain from current year asset performance	(0.10%)	
d.	Actuarial loss from COLA	0.11%	
e.	Actuarial gain from liability sources	(0.13%)	
f.	Effect of projected payroll growing slower than expected	0.00%	
g.	Change in Actuarial Assumptions and Methods	0.00%	
h.	Total Change		(0.32%)
	Calculated City Contribution Rate as of July 1, 2018		7.95%

Table 7
Near Term Outlook

Valuation as of July 1,	Unfunded Actuarial Accrued Liability (UAAL, in 000s)	Funded Ratio	Calculated City Contribution Rate[1]	Corridor Midpoint	Actuarial Value of Fund (in 000s)	For Fiscal Year Ending June 30,	Estimated Payroll	Employer Contributions	Employee Contributions	Benefit Payments[2]	Net External Cash Flow
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
2018	$ 2,107,422	57.7%	7.95%	8.27%	$ 2,874,585	2019	$ 628,309	$ 179,402	$ 26,149	$ 321,843	$ (116,292)
2019	2,123,441	58.2%	7.97%	8.32%	2,955,513	2020	645,588	184,659	32,378	341,821	(124,784)
2020	2,136,764	58.7%	8.00%	8.36%	3,033,321	2021	663,341	190,002	31,981	360,918	(138,936)
2021	2,147,230	59.1%	7.99%	8.41%	3,101,937	2022	681,583	195,568	31,604	379,981	(152,808)
2022	2,154,391	59.5%	8.00%	8.44%	3,161,007	2023	700,327	201,156	31,249	399,206	(166,800)
2023	2,158,117	59.8%	7.99%	8.48%	3,209,738	2024	719,586	206,976	30,932	417,902	(179,994)
2024	2,157,911	60.1%	7.99%	8.51%	3,248,232	2025	739,374	212,890	30,659	436,249	(192,701)
2025	2,153,529	60.3%	7.98%	8.54%	3,276,277	2026	759,707	218,972	30,429	453,997	(204,596)
2026	2,144,489	60.6%	7.98%	8.57%	3,293,981	2027	780,599	225,228	30,252	424,213	(168,733)
2027	2,130,421	61.1%	7.96%	8.59%	3,350,021	2028	802,066	231,582	30,115	433,449	(171,752)
2028	2,110,853	61.7%	7.94%	8.61%	3,406,860	2029	824,122	238,115	30,028	439,805	(171,661)

These projections are based on the HMEPS statute as amended by SB 2190 of the 2017 Legislature.

1 Actual City Contribution Rate will be set to Corridor Midpoint i f Fund i s less than 90% funded. Contribution rate goes into effect 12 months after the valuation date
2 Includes refunds taken by terminating members and plan administrative expenses Note: Dollar amounts in $000.

Table 8
Statement of Plan Net Assets

	July 1, 2018 (1)	July 1, 2017 (2)
A. ASSETS		
1. Current Assets		
a. Cash and short term investments		
1) Cash on hand	$ 31,378	$ 7,917
2) Short term investments	61,457	54,126
b. Accounts Receivable		
1) Sale of investments	3,966	4,303
2) Other	14,337	11,472
c. Total Current Assets	$ 111,138	$ 77,818
2. Long Term Investments		
a. US. Government securities	$ 69,615	$ 72,675
b. Corporate bonds	198,328	202,121
c. Capital stocks	683,340	629,846
d. Commingled Funds	787,746	564,659
e. LP's, real estate trusts, loans and mortgages	1,159,309	1,071,415
f. Total long term investments	$ 2,898,338	$ 2,540,718
3. Other Assets		
a. Collateral on securities lending	$ 49,472	$ 47,371
b. Furniture, fixtures and equipment, net	133	178
c. Total other assets	$ 49,605	$ 47,549
4. Total Assets	$ 3,059,080	$ 2,666,084
B. LIABILITIES		
1. Current Liabilities		
a. Amounts due on asset purchases	$ 9,149	$ 9,784
b. Accrued liabilities	11,520	6,265
c. Collateral on securities lending	49,472	47,371
2. Total Liabilities	70,141	63,420
3. Deferred inflows of resources	75	0
Net Assets Held in Trust	$ 2,988,864	$ 2,602,665
C. TARGET ASSET ALLOCATION FOR CASH & LONG TERM INVESTMENTS		
1. Cash	0.0%	0.0%
2. Fixed Income	15.0%	15.0%
3. Real Estate	10.0%	10.0%
4. Private Equity	17.5%	17.5%
5. Global Equity	35.0%	35.0%
6. Inflation-Linked Asset Class	12.5%	12.5%
7. Absolute Return	10.0%	10.0%
8. Total	100.0%	100.0%

Note: Dollar amounts in $000

Columns may not add due to rounding

Table 9
Reconciliation of Plan Net Assets

		Year Ending	
		June 30, 2018	June 30, 2017
		(1)	(2)
1.	Market value of assets at beginning of year	$ 2,602,665	$ 2,400,023
a.	Prior year adjustment	(4,606)	0
b.	Restated Market value	$ 2,598,058	$ 2,400,023
2.	Revenue for the year		
a.	Contributions		
i.	Member contributions	$ 27,905	$ 15,902
ii.	Employer contributions (see note)	421,563	182,557
iii.	Total	$ 449,468	$ 198,459
b.	Net investment income		
i.	Interest	$ 10,530	$ 21,741
ii.	Dividends	19,974	19,455
iii.	Earnings from LP's and real estate trusts	5	5,102
iv.	Net appreciation (depreciation) on investments	208,672	251,652
v.	Net proceeds from lending securities	301	353
vi.	Less investment expenses	(7,668)	(7,391)
vii.	Other	701	1,272
c.	Total revenue	$ 681,983	$ 490,643
3.	Expenditures for the year		
a.	Refunds	$ 807	$ 718
b.	Benefit payments	283,928	280,456
c.	Administrative and miscellaneous expenses	6,442	6,827
d.	Total expenditures	$ 291,177	$ 288,001
4.	Increase in net assets (Item 2c - Item 3d)	$ 390,806	$ 202,642
5.	Market value of assets at end of year (Item 1 + Item 4)	$ 2,988,864	$ 2,602,665

Note: Dollar amounts in $000

Columns may not add due to rounding

Table 10
Development of Actuarial Value of Assets

		July 1, 2018
1.	Actuarial value of assets at beginning of year	$ 2,742,539
2.	Net new investments	
	a. Contributions 1	$ 199,468
	b. Benefits and refunds paid	(284,735)
	c. Administrative Expenses	(6,442)
	d. Subtotal	(91,709)
3.	Assumed investment return rate for fiscal year	7.00%
4.	Assumed investment income for fiscal year	$ 188,822
5.	Expected actuarial value at end of year (1+ 2 + 4)[1]	$ 2,839,652
6.	Market value of assets at end of year	$ 2,988,864
7.	Difference (6 - 5)	$ 149,212

8. Development of amounts to be recognized as of July 1, 2018:

Fiscal Year End	Remaining Deferrals of Excess (Shortfall) of Investment Income	Offsetting of Gains/(Losses)	Net Deferrals Remaining	Years Remaining	Recognized for this valuation	Remaining after this valuation
	(1)	(2)	(3) = (1) + (2)	(4)	(5) = (3) / (4)	(6) = (3) - (5)
2014	$ 0	$ 0	$ 0	1	$ 0	$ 0
2015	0	0	0	2	0	0
2016	0	0	0	3	0	0
2017	101,810	0	101,810	4	25,453	76,357
2018	47,402	0	47,402	5	9,480	37,922
Total	$ 149,212	$ 0	$ 149,212		$ 34,933	$ 114,279

9.	Final actuarial value of plan net assets, end of year (Item 6 - Item 8 Column 6)	$ 2,874,585
10.	Asset gain (loss) for year (Item 9 - Item 5)	$ 34,933
11.	Asset gain (loss) as % of actual actuarial assets	1.22%
12.	Ratio of actuarial value to market value	96.2%

Notes: Remaining deferrals in Column (1) for prior years are from last year's report column (6) of Table 10. The number in the current year is the difference between the remaining deferrals for prior years and the total Excess/(Shortfall) return shown in Item 7. Column 2 is a direct offset of the current year's excess/(shortfall) return against prior years' excess/(shortfall) of the opposite type.

1 Total employer and member contributions excluding $250 million pension obligation bonds proceeds

Table 11
Estimation of Investment Return Yield (Net of Expenses)

Item	July 1, 2018	July 1, 2017
(1)	(2)	(3)
A. Market value yield		
1. Beginning of year net market assets	$ 2,598,058	$ 2,400,023
2. Net Investment income (net of investment expenses)	232,515	292,184
3. End of year market assets	2,988,864	2,602,665
4. Estimated market value yield	8.68%	12.41%
B. Actuarial value yield		
1. Beginning of year actuarial assets	$ 2,742,539	$ 2,400,023
2. Net Investment income (net of investment expenses)	223,755	190,374
3. End of year actuarial assets	2,874,585	2,500,855[1]
4. Estimated actuarial value yield	8.30%	8.08%

Note: Dollar amounts in $000

1 Reflects actuarial value of assets prior to recognition of Pension Obligation Bond receivable

Table 12
History of Investment Returns

For Fiscal Year Ending	Market Value	Actuarial Value
(1)	(2)	(3)
June 30, 2005	12.85%	4.12%
June 30, 2006	16.41%	8.95%
June 30, 2007	17.85%	21.51%
June 30, 2008	(0.25%)	8.97%
June 30, 2009	(20.14%)	2.60%
June 30, 2010	11.21%	3.54%
June 30, 2011	21.56%	6.27%
June 30, 2012	(0.89%)	4.46%
June 30, 2013	13.02%	5.39%
June 30, 2014	16.04%	7.95%
June 30, 2015	2.78%	6.82%
June 30, 2016	1.21%	(3.81%)
June 30, 2017	12.41%	8.08%
June 30, 2018	8.68%	8.30%
Average Compound Return - last 5 years	8.08%	5.36%
Average Compound Return - last 10 years	5.96%	4.90%

Note: Investment returns are estimations made by the actuary. Prior to June 30, 2016 these are dollar-weighted returns net of administrative and investment expenses. Beginning with June 30, 2016 the returns are net of investment expenses only.

Table 13
Historical Solvency Test

	Aggregated Accrued Liabilities for				Portions of Accrued Liabilities Covered by Reported Assets		
Valuation Date	Active Members Contributions	Retirees Beneficiaries and Vested Terminations[1]	Members (City Financed Portion)	Actuarial Value of Assets	(5)/(2)	[(5)-(2)]/(3)	[(5)-(2)-(3)]/(4)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
July 1, 1999	$ 33,985	$ 599,270	$ 706,678	$ 1,222,240	100.0%	100.0%	83%
July 1, 2000	38,292	646,611	824,470	1,376,020	100.0%	100.0%	84%
July 1, 2001	36,449	804,901	1,114,456	1,490,179	100.0%	100.0%	58%
July 1, 2002	35,888	893,568	1,585,733	1,519,717	100.0%	100.0%	37%
July 1, 2003	44,388	1,115,801	2,118,063	1,510,264	100.0%	100.0%	17%
July 1, 2004	62,062	1,355,157	1,216,599	1,501,235	100.0%	100.0%	7%
July 1, 2005	48,150	1,577,345	1,099,777	1,777,656	100.0%	100.0%	14%
July 1, 2006	58,043	1,729,863	1,106,389	1,867,293	100.0%	100.0%	7%
July 1, 2007	69,544	1,824,992	1,234,178	2,193,745	100.0%	100.0%	24%
July 1, 2008	81,182	1,904,333	1,310,855	2,310,384	100.0%	100.0%	25%
July 1, 2009	95,268	1,974,714	1,381,428	2,284,442	100.0%	100.0%	16%
July 1, 2010	107,421	2,058,813	1,466,236	2,273,142	100.0%	100.0%	7%
July 1, 2011	118,202	2,154,959	1,517,167	2,328,804	100.0%	100.0%	4%
July 1, 2012	124,848	2,312,548	1,529,468	2,344,128	100.0%	96.0%	0%
July 1, 2013	132,238	2,431,950	1,565,395	2,382,585	100.0%	92.5%	0%
July 1, 2014	139,203	2,538,225	1,611,151	2,490,521	100.0%	92.6%	0%
July 1, 2015	143,097	2,832,860	1,789,762	2,582,510	100.0%	86.1%	0%
July 1, 2016	146,407	2,894,489	1,694,103	2,625,896[2]	100.0%	85.7%	0%
July 1, 2017	149,190	2,993,101	1,723,740	2,742,539[2]	100.0%	86.6%	0%
July 1, 2018	162,180	3,093,196	1,726,632	2,874,585	100.0%	87.7%	0%

Note: Dollar amounts in $000

1 Column (3) included AAL for DROP participants until 2003, thereafter in Column (4)

2 Actuarial value of assets includes $250 million in future pension obligation bond proceeds as a receivable.

Table 14
Schedule of Funding Progress

Date	Actuarial Value of Assets (AVA)	Actuarial Accrued Liability (AAL)	Unfunded Actuarial Accrued Liability (UAAL) (3) - (2)	Funded Ratio (2)/(3)	Annualized Salaries	UAAL as % of Salaries (4)/(6)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
July 1, 1999	$ 1,222,240	$ 1,339,933	$ 117,693	91.2%	$ 407,733	28.9%
July 1, 2000	1,376,020	1,509,373	133,353	91.2%	432,604	30.8%
July 1, 2001	1,490,179	1,955,806	465,627	76.2%	418,234	111.3%
July 1, 2002	1,519,717	2,515,189	995,472	60.4%	399,794	249.0%
July 1, 2003	1,510,264	3,278,251	1,767,987	46.1%	390,314	453.0%
July 1, 2004	1,501,235	2,633,817	1,132,582	57.0%	366,190	309.3%
July 1, 2005	1,777,656	2,725,272	947,616	65.2%	404,565	234.2%
July 1, 2006	1,867,293	2,894,295	1,027,002	64.5%	422,496	243.1%
July 1, 2007	2,193,745	3,128,713	934,968	70.1%	448,925	208.3%
July 1, 2008	2,310,384	3,296,370	985,986	70.1%	483,815	203.8%
July 1, 2009	2,284,442	3,451,410	1,166,968	66.2%	539,023	216.5%
July 1, 2010	2,273,142	3,632,470	1,359,328	62.6%	550,709	246.8%
July 1, 2011	2,328,804	3,790,328	1,461,524	61.4%	544,665	268.3%
July 1, 2012	2,344,128	3,966,864	1,622,736	59.1%	534,394	303.7%
July 1, 2013	2,382,585	4,129,583	1,746,998	57.7%	549,971	317.7%
July 1, 2014	2,490,521	4,288,579	1,798,058	58.1%	568,992	316.0%
July 1, 2015	2,582,510	4,765,719	2,183,209	54.2%	584,025	373.8%
July 1, 2016	2,625,896	4,734,999	2,109,103	55.5%	608,210	346.8%
July 1, 2017	2,742,539	4,866,031	2,123,492	56.4%	623,577	340.5%
July 1, 2018	2,874,585	4,982,008	2,107,424	57.7%	624,266	337.6%

Note: Dollar amounts in $000

Table 15
Historical Active Participant Data

Valuation Date	Active Count	Average Age	Average Svc	Annualized Salaries	Average Salary	Percent Changes
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1991	12,488	40.3	N/A	$284,914	$22,815	6.2%
1992	12,913	40.5	N/A	$314,686	$24,370	6.8%
1993	13,112	40.9	N/A	$340,249	$25,949	6.5%
1994	14,027	40.9	N/A	$366,561	$26,133	0.7%
1995	14,364	41.3	N/A	$378,511	$26,351	0.8%
1996	14,067	41.8	N/A	$367,610	$26,133	(0.8%)
1998[1]	13,764	42.8	9.8	$394,919	$28,692	9.8%
1999[1]	13,286	42.9	9.8	$396,617	$29,852	4.0%
2000[1]	13,126	43.7	10.3	$421,591	$32,119	7.6%
2001[1]	12,928	43.9	10.3	$413,021	$31,948	(0.5%)
2002	12,527	44.7	11	$399,794	$31,915	(0.1%)
2003	12,120	45.2	11.2	$390,314	$32,204	0.9%
2004	11,856	45.1	10.3	$366,190	$30,886	(4.1%)
2005[2]	11,974	44.8	9.6	$404,565	$33,787	9.4%
2006	12,145	44.8	9.3	$422,496	$34,788	3.0%
2007	12,376	45.2	9.3	$448,925	$36,274	4.3%
2008	12,653	45.2	9.3	$483,815	$38,237	5.4%
2009	13,333	45.1	9.2	$539,023	$40,428	5.7%
2010	12,913	45.8	10.0	$550,709	$42,648	5.5%
2011	12,345	46.5	10.6	$544,665	$44,120	3.5%
2012	11,670	46.8	11.1	$534,394	$45,792	3.8%
2013	11,781	46.9	11.1	$549,971	$46,683	1.9%
2014	11,949	46.9	11.1	$568,992	$47,618	2.0%
2015	11,827	47.1	11.2	$584,025	$49,381	3.7%
2016	12,103	47.1	11.1	$608,210	$50,253	1.8%
2017	12,066	47.3	11.1	$623,577	$51,681	2.8%
2018	11,880	47.5	11.3	$624,266	$52,548	1.7%

Note: Dollar amounts in $000

1 Excludes DROP participants
2 Beginning with the 2005 valuation, a change in methodology now annualizes payroll for new entrants. If the methodology had not been changed, the covered payroll for 2005 would have been $376,208,345 and the average payroll would have been $31,419.

Table 16
Retirees, Beneficiaries, and Disabled Participants Added to and Removed from Rolls

	Added to Rolls		Removed from Rolls		Rolls-End of Year			
Valuation July 1,	Number	Annual Allowances	Number	Annual Allowances	Number	Annual Allowances	% Increase in Annual Allowances	Average Annual Allowances
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1999	432	$ 2,131	303	$ 1,515	4,999	$ 46,732	7.7%	$ 9,348
2000	360	3,412	255	1,380	5,104	49,970	6.9%	9,790
2001	652	8,937	299	1,030	5,457	57,877	15.8%	10,606
2002	777	15,061	306	2,476	5,928	72,256	24.8%	12,189
2003	598	11,497	311	1,873	6,215	84,519	17.0%	13,599
2004	942	25,189	279	2,624	6,878	107,084	26.7%	15,569
2005	861	18,054	216	1,926	7,523	123,212	15.1%	16,378
2006	654	14,722	397	2,246	7,780	135,688	10.1%	17,441
2007	440	10,280	249	3,007	7,971	142,961	5.4%	17,935
2008	464	11,052	280	3,420	8,155	150,592	5.3%	18,466
2009	474	11,430	289	3,667	8,340	158,356	5.2%	18,988
2010	476	12,040	290	3,938	8,526	166,458	5.1%	19,524
2011	502	13,202	311	4,451	8,717	175,210	5.3%	20,100
2012	654	16,299	293	3,993	9,078	187,515	7.0%	20,656
2013	695	15,566	346	5,051	9,427	198,030	5.6%	21,007
2014	619	15,370	361	5,717	9,685	207,683	4.9%	21,444
2015	771	17,334	433	5,534	10,023	219,484	5.7%	21,898
2016	590	17,295	324	5,842	10,289	230,937	5.2%	22,445
2017	659	19,402	347	6,285	10,601	244,054	5.7%	23,022
2018	607	19,691	374	9,929	10,834	253,816	4.0%	23,428

Note: Dollar amounts in $000

Table 17
Membership Data

		July 1, 2018	July 1, 2017	July 1, 2016
		(1)	(2)	(3)
1.	Active members			
	a. Number	11,880*	12,066*	12,103
	b. Number vested	7,745	7,791	7,966
	c. Annualized salaries	$ 624,266,000	$ 623,577,000	$ 608,210,000
	d. Average salary	52,548	51,681	50,253
	e. Average age	47.5	47.3	47.1
	f. Average service	11.3	11.1	11.1
2.	Inactive participants			
	a. Vested	3,457	3,409	3,432
	b. Total annual benefits (deferred)	$ 24,477,164	$ 23,476,620	$ 24,273,639
	c. Average annual benefit	7,080	6,887	7,073
	d. Nonvested	2,587	2,167	2,174
3.	Service retirees			
	a. Number	8,614	8,376	8,084
	b. Total annual benefits	$ 218,548,693	$ 209,754,055	$ 198,363,966
	c. Average annual benefit	25,371	25,042	24,538
	d. Average age	69.5	69.5	68.5
4.	Disabled retirees			
	a. Number	298	323	336
	b. Total annual benefits	$ 3,369,633	$ 3,533,621	$ 3,560,156
	c. Average annual benefit	11,307	10,940	10,596
	d. Average age	66.8	66.8	64.8
5.	Beneficiaries and spouses			
	a. Number	1,922	1,902	1,869
	b. Total annual benefits	$ 31,897,751	$ 30,766,682	$ 29,012,963
	c. Average annual benefit	16,596	16,176	15,523
	d. Average age	69.0	69.7	67.8

* Counts include the additional 170 Group D members.

Table 18a
Distribution of Group A Active Members by Age and by Years of Service

Attained Age	0 No. & Avg. Comp.	1 No. & Avg. Comp.	2 No. & Avg. Comp.	3 No. & Avg. Comp.	4 No. & Avg. Comp.	5-9 No. & Avg. Comp.	10-14 No. & Avg. Comp.	15-19 No. & Avg. Comp.	20-24 No. & Avg. Comp.	25-29 No. & Avg. Comp.	30-34 No. & Avg. Comp.	35 & Over No. & Avg. Comp.	Total No. & Avg. Comp.
Under 25													
25-29							2						2
							$47,955						$47,955
30-34	4	2	4	2	1	9	83	1					106
	$36,660	$53,435	$48,547	$42,578	$58,510	$44,424	$44,943	$56,659					$45,076
35-39	8	7	8	5	7	19	288	56	1				399
	$39,295	$36,418	$52,655	$59,313	$58,926	$45,695	$55,692	$49,794	$38,750				$53,720
40-44	6	7	3	6	1	23	290	106	25				467
	$45,181	$45,418	$63,398	$46,710	$46,717	$51,301	$55,709	$55,578	$54,102				$55,001
45-49	4	5	8	3	7	23	329	176	106	47	1		709
	$39,858	$58,348	$39,510	$44,387	$46,339	$51,983	$57,953	$54,130	$61,266	$58,072	$65,728		$56,845
50-54	4	8	10	6	5	28	343	178	150	131	35	1	899
	$62,983	$43,394	$47,206	$37,634	$46,555	$52,750	$55,802	$55,950	$62,447	$60,958	$58,463	$57,824	$57,355
55-59	4	1	8	3	9	35	369	215	168	144	74	34	1,064
	$98,031	$33,301	$47,294	$43,347	$47,969	$62,969	$54,955	$55,109	$59,987	$61,487	$63,975	$66,408	$57,914
60-64	1	4	3	2	4	15	263	131	124	105	49	37	738
	$40,768	$73,799	$63,807	$35,391	$43,394	$67,906	$55,214	$52,083	$56,796	$66,165	$68,019	$69,644	$58,312
65 & Over		1		1		6	166	83	65	45	25	12	404
		$91,187		$49,483		$68,009	$58,477	$62,675	$64,755	$67,462	$74,120	$88,631	$63,414
Total	31	35	44	28	34	158	2,133	946	639	472	184	84	4,788
	$50,849	$49,666	$49,171	$45,402	$49,417	$55,387	$55,665	$55,070	$60,379	$62,610	$65,391	$70,906	$57,254

Average:	Age:	52.65	Number of participants:	Fully vested:	4,616	Males:	2,806
	Service:	16.93		Not Vested:	172	Females:	1,982

Note: A former Group A employee who is rehired on or after January 1, 2008 is still a Group A employee.

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Table 18b
Distribution of Group B Active Members by Age and by Years of Service

Attained Age	0 No. & Avg. Comp.	1 No. & Avg. Comp.	2 No. & Avg. Comp.	3 No. & Avg. Comp.	4 No. & Avg. Comp.	5-9 No. & Avg. Comp.	10-14 No. & Avg. Comp.	15-19 No. & Avg. Comp.	20-24 No. & Avg. Comp.	25-29 No. & Avg. Comp.	30-34 No. & Avg. Comp.	35 & Over No. & Avg. Comp.	Total No. & Avg. Comp.
Under 25													
25-29													
30-34													
35-39				2				3	2				7
				$40,529				$54,877	$57,668				$51,575
40-44			1		1	3	2	19	41				67
			$105,102		$67,974	$61,818	$46,031	$47,691	$48,262				$49,783
45-49	2	4	5	2	4	11	1	26	112	36			203
	$38,210	$33,790	$42,561	$39,437	$33,415	$46,624	$35,797	$48,881	$53,264	$53,211			$50,924
50-54	3	2	1	2	2	10	4	24	133	117	26	1	325
	$41,863	$101,369	$36,504	$60,767	$44,408	$50,269	$42,744	$46,467	$50,154	$55,377	$53,003	$63,149	$52,169
55-59		3	2	3	2	23	2	26	88	84	31	22	286
		$62,019	$37,295	$48,852	$77,865	$54,744	$43,025	$47,622	$52,004	$51,727	$54,395	$51,196	$52,029
60-64			1	2	2	9	2	20	60	61	16	17	190
			$48,318	$49,005	$43,899	$61,531	$45,303	$55,136	$53,030	$55,618	$61,723	$55,994	$55,238
65 & Over	1	1			4	5	2	9	44	45	6	3	120
		$145,808			$50,763	$54,800	$108,119	$54,415	$52,635	$53,106	$84,140	$53,227	$56,272
Total	6	10	10	11	15	61	13	127	480	343	79	43	1,198
	$42,598	$66,976	$47,732	$47,821	$49,135	$53,900	$53,210	$49,508	$51,675	$54,001	$57,680	$53,513	$52,685

Average:	Age: 54.92	Number of participants:	Fully vested: 1,146	Males: 569
	Service: 23.01		Not Vested: 52	Females: 629

Note: A former Group B employee who is rehired on or after January 1, 2008 is still a Group B employee.

Table 18c
Distribution of Group D Active Members by Age and by Years of Service

Attained Age	0 No. & Avg. Comp.	1 No. & Avg. Comp.	2 No. & Avg. Comp.	3 No. & Avg. Comp.	4 No. & Avg. Comp.	5-9 No. & Avg. Comp.	10-14 No. & Avg. Comp.	15-19 No. & Avg. Comp.	20-24 No. & Avg. Comp.	25-29 No. & Avg. Comp.	30-34 No. & Avg. Comp.	35 & Over No. & Avg. Comp.	Total No. & Avg. Comp.
Under 25	68	56	32	14	10	4							184
	$33,944	$34,965	$34,581	$35,378	$35,847	$37,466							$34,655
25-29	190	147	127	87	87	104	3						745
	$38,462	$38,885	$38,070	$40,555	$40,661	$39,251	$62,227						$39,186
30-34	160	135	162	113	100	263	33						966
	$44,741	$41,336	$45,217	$46,376	$46,856	$45,844	$47,560						$45,152
35-39	126	105	112	103	113	286	51						896
	$44,802	$50,889	$47,483	$50,799	$49,657	$52,043	$50,432						$49,784
40-44	94	94	78	87	75	193	53						674
	$44,121	$48,954	$47,654	$53,466	$49,770	$57,364	$56,116						$51,774
45-49	86	75	90	78	70	221	41						661
	$46,798	$50,961	$51,843	$51,373	$51,294	$53,685	$51,132						$51,545
50-54	79	77	69	62	59	190	49						585
	$47,964	$45,867	$46,667	$57,044	$48,854	$53,409	$51,831						$50,680
55-59	57	55	78	49	49	163	38						489
	$58,442	$52,549	$51,511	$56,913	$48,561	$56,679	$56,672						$54,805
60-64	26	28	43	38	38	148	28						349
	$54,045	$48,375	$47,574	$53,365	$60,475	$58,750	$51,898						$55,242
65 & Over	9	12	5	15	19	91	24						175
	$85,456	$60,717	$69,809	$45,817	$58,776	$57,440	$57,204						$58,576
Total	895	784	796	646	620	1,663	320						5,724
	$44,566	$45,315	$45,980	$49,838	$48,698	$52,566	$52,869						$48,696

Average: Age: 41.81 Service: 4.24

Number of participants: Fully vested: 1,983 Not Vested: 3,741

Males: 3,217 Females: 2,507

Note: An additional 170 Group D members are not shown in this table because we did not receive sufficient data to categorize the members.

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Table 18d
Distribution of All Active Members by Age and by Years of Service

Attained Age	0 No. & Avg. Comp.	1 No. & Avg. Comp.	2 No. & Avg. Comp.	3 No. & Avg. Comp.	4 No. & Avg. Comp.	5-9 No. & Avg. Comp.	10-14 No. & Avg. Comp.	15-19 No. & Avg. Comp.	20-24 No. & Avg. Comp.	25-29 No. & Avg. Comp.	30-34 No. & Avg. Comp.	35 & Over No. & Avg. Comp.	Total No. & Avg. Comp.
Under 25	68	56	32	14	10	4							184
	$33,944	$34,965	$34,581	$35,378	$35,847	$37,466							$34,655
25-29	190	147	127	87	87	104	5						747
	$38,462	$38,885	$38,070	$40,555	$40,661	$39,251	$56,518						$39,209
30-34	164	137	166	115	101	272	116	1					1,072
	$44,544	$41,512	$45,297	$46,310	$46,972	$45,797	$45,687	$56,659					$45,144
35-39	134	112	120	110	120	305	339	59	3				1,302
	$44,473	$49,985	$47,828	$51,000	$50,198	$51,648	$54,901	$50,052	$51,362				$51,000
40-44	100	101	82	93	77	219	345	125	66				1,208
	$44,185	$48,709	$48,931	$53,030	$49,967	$56,788	$55,715	$54,379	$50,474				$52,911
45-49	92	84	103	83	81	255	371	202	218	83	1		1,573
	$46,309	$50,583	$50,435	$50,832	$49,983	$53,227	$57,139	$53,455	$57,155	$55,964	$65,728		$53,854
50-54	86	87	80	70	66	228	396	202	283	248	61	2	1,809
	$48,450	$46,915	$46,608	$55,487	$48,545	$53,190	$55,179	$54,823	$56,670	$58,325	$56,136	$60,487	$54,265
55-59	61	59	88	55	60	221	409	241	256	228	105	56	1,839
	$61,038	$52,704	$50,804	$55,734	$49,449	$57,474	$55,056	$54,302	$57,243	$57,891	$61,147	$60,432	$56,172
60-64	27	32	47	42	44	172	293	151	184	166	65	54	1,277
	$53,553	$51,553	$48,626	$52,301	$58,169	$59,694	$54,830	$52,487	$55,568	$62,289	$66,469	$65,347	$57,016
65 & Over	10	14	5	16	23	102	192	92	109	90	31	15	699
	$82,268	$68,971	$69,809	$46,046	$57,383	$57,932	$58,835	$61,867	$59,862	$60,284	$76,059	$81,550	$60,977
Total	932	829	850	685	669	1,882	2,466	1,073	1,119	815	263	127	11,710
	$44,762	$45,760	$46,166	$49,625	$48,744	$52,846	$55,290	$54,411	$56,646	$58,987	$63,075	$65,017	$52,604

Average:	Age:	47.50	Number of participants:	Fully vested:	7,745	Males:	6,592
	Service:	11.25		Not Vested:	3,965	Females:	5,118

Note: An additional 170 Group D members are not shown in this table because we did not receive sufficient data to categorize the members.

GRS Retirement Consulting

APPENDIX A

SUMMARY OF ACTUARIAL ASSUMPTIONS AND METHODS

APPENDIX A

Summary of Actuarial Assumptions and Methods

The following methods and assumptions were used in preparing the July 1, 2018, actuarial valuation. Most of these assumptions were adopted by the Board effective for the July 1, 2015 valuation.

Several economic assumptions were adopted effective July 1, 2016 to reflect the investment return assumption becoming a prescribed assumption under state statute.

1. Valuation Date

   The valuation date is July 1st of each plan year. This is the date as of which the actuarial present value of future benefits and the actuarial value of assets are determined.

2. Actuarial Cost Method (Prescribed Method under Actuarial Standards of Practice)

   The actuarial valuation uses the Entry Age Normal actuarial cost method. Under this method, the employer contribution rate is the sum of (i) the employer normal cost rate, and (ii) a rate that will amortize the unfunded actuarial liability.

   a. The valuation is prepared on the projected benefit basis, under which the present value, at the investment return rate assumed to be earned in the future (7.0 percent), of each participant's expected benefit payable at retirement or death is determined, based on his/her age, service, sex and compensation. The calculations take into account the probability of a participant's death or termination of employment prior to becoming eligible for a benefit, as well as the possibility of his/her terminating with a service, disability, or survivor's benefit. Future salary increases are also anticipated. The present value of the expected benefits payable on account of the active participants is added to the present value of the expected future payments to retired participants and beneficiaries to obtain the present value of all expected benefits payable from the Plan on account of the present group of participants and beneficiaries.

   b. The employer contributions required to support the benefits of the Plan are determined using a level funding approach, and consist of a normal cost contribution and an accrued liability contribution.

   c. The normal contribution is determined using the "entry age normal" method. Under this cost method, a calculation is made to determine the average uniform and constant percentage rate of employer contribution which, if applied to the compensation of each participant during the entire period of his/her anticipated covered service, would be required to meet the cost of all benefits payable on his behalf based on the benefits provisions for new employees hired on or after the valuation date.

   d. The actuarial accrued liability (AAL) for each member is the difference between their present value of future benefits (PVFB), based on the tier of benefits that apply to the member, and their present value of future normal costs determined using the normal cost rate described in item c above. For inactive and retired members their AAL is equal to their PVFB.

e. The Legacy Liability payments were established in the Initial RSVS valuation. Each subsequent valuation a liability (gain)/loss layer is established that is the difference between the sum of (i) the remaining Legacy Liability and (ii) the remaining liability (gain)/loss layers, and the unfunded accrued liability. The amortization payment for each liability (gain)/loss layer is determined by amortizing the layer over 30 years with the first payment made one year after the valuation in which the layer was established.

The contribution rate determined by this valuation will not be effective until one year later and the determination of the rate reflects this deferral. It is assumed that there will be no change in the employer normal cost rate due to the deferral, and it is assumed that payments are made uniformly throughout the year.

3. <u>Actuarial Value of Assets</u>

The actuarial value of assets is equal to the market value of assets less a five-year phase in of the excess (shortfall) between expected investment return and actual income. The actual calculation is based on the difference between actual market value and the expected actuarial value of assets each year, and recognizes the cumulative excess return (or shortfall) at a minimum rate of 20% per year. Each year a base is set up to reflect this difference. If the current year's base is of opposite sign to the deferred bases then it is offset dollar for dollar against the deferred bases. Any remaining bases are then recognized over the remaining period for the base (5 less the number of years between the base year and the valuation year). This is intended to ensure the smoothed value of assets will converge towards the market value in a reasonable amount of time.

Expected earnings are determined using the assumed investment return rate and the beginning of year actuarial value of assets (adjusted for receipts and disbursements during the year). The returns are computed net of investment expenses.

The actuarial value of assets was marked to market value as of July 1, 2016 by recognizing all deferred investment shortfalls on that date. The method described above begin again with the 2017 valuation.

4. Economic Assumptions

a. Investment return: 7.00% per year, compounded annually, composed of an assumed 2.25% inflation rate and a 4.75% net real rate of return. This rate represents the assumed return, net of all investment expenses.

b. Salary increase rate: A 2.25% inflation component, plus a 0.75% general increase, plus a service-related component as follows:

Years of Service	Service-related Component	Total Annual Rate of Increase Including 2.25% Inflation Component and 0.75% General Increase Rate
(1)	(2)	(3)
1	2.25%	5.25%
2	2.25	5.25
3	2.75	5.75
4	2.25	5.25
5	1.75	4.75
6	1.50	4.50
7	1.25	4.25
8	1.00	4.00
9	0.75	3.75
10-24	0.50	3.50
25+	0.00	3.00

c. Payroll growth rate: In the amortization of the unfunded actuarial accrued liability, payroll is assumed to increase 2.75% per year. This increase rate is solely due to the effect of inflation on salaries, with no allowance for future membership growth.

The investment return assumption is established in statute at 7.0% and therefore is considered a prescribed assumption under the Actuarial Standards of Practice.

5. Demographic Assumptions

a. Retirement Rates

	Expected Retirements per 100 Lives			
	Group A & B Members		Group D Members	
Age	Males	Females	Males	Females
(1)	(2)	(3)	(4)	(5)
45-49	15	12	0	0
50-54	10	11	3	3
55	10	11	4	4
56	10	11	5	5
57	10	11	6	6
58	10	11	7	7
59	10	11	8	8
60	12	11	10	10
61	14	11	13	13
62	16	20	35	35
63	18	18	25	18
64	20	12	18	20
65	20	22	20	20
66-69	20	20	20	19
70-74	20	25	20	19
75+	100	100	100	100

b. DROP Participation

65% of eligible members are assumed to enter DROP.

c. DROP Entry Date

Those active members (not already in DROP) are assumed to enter DROP when first eligible. For members who have already entered DROP, the actual DROP entry date supplied in the data is used.

d. DROP Interest Credit

Interest is credited as 50% of the average five-year investment return, with a minimum of 2.5% and a maximum of 7.5%. Assumed to be 4.00% per year.

e. Mortality rates (active members)

Based on the Retired Pensioners 2000 Mortality Table (combined). Rates are scaled by 90% for male and 80% for female. 90% of the rates are assumed to be for non- service related deaths and 10% for service related deaths.

Sample rates are shown below:

Age	Rates			
	Non- service related Male	Non- service related Female	Service related Male	Service related Female
20	0.000279	0.000138	0.000031	0.000015
25	0.000305	0.000149	0.000034	0.000017
30	0.000360	0.000190	0.000040	0.000021
35	0.000626	0.000342	0.000070	0.000038
40	0.000874	0.000508	0.000097	0.000056
45	0.001221	0.000809	0.000136	0.000090
50	0.001732	0.001207	0.000192	0.000134
55	0.002935	0.001956	0.000326	0.000217
60	0.005465	0.003640	0.000607	0.000404
65	0.010317	0.006988	0.001146	0.000776
70	0.017987	0.012054	0.001999	0.001339
75	0.030646	0.020236	0.003405	0.002248

Mortality rates (retired members and beneficiaries):

Healthy Retirees and beneficiaries: Gender-distinct RP2000 Combined Healthy Mortality Tables with Blue Collar Adjustment. Male rates are multiplied by 125% and female rates are multiplied by 112%. The rates are projected on a fully generational basis by scale BB to account for future mortality improvements.

Disabled Retirees: Gender-distinct RP2000 Combined Healthy Mortality Tables with Blue Collar Adjustment. Male rates are multiplied by 125% and female rates are multiplied by 112%. The rates are projected on a fully generational basis by scale BB to account for future mortality improvements. Rates are set-forward five years. A minimum rate of 0.04 is applied to male and 0.03 to female.

Sample rates are shown below:

Attained Age in 2014	Rates			
	Healthy Male	Healthy Female	Disabled Male	Disabled Female
45	0.002149	0.001489	0.040000	0.030000
50	0.002891	0.002108	0.040000	0.030000
55	0.005029	0.002918	0.040000	0.030000
60	0.009369	0.004815	0.040000	0.030000
65	0.016403	0.009835	0.040000	0.030000
70	0.027069	0.017625	0.043632	0.030000
75	0.043632	0.029215	0.071367	0.046301
80	0.071367	0.046301	0.116414	0.078599
85	0.116414	0.078599	0.194603	0.131126
90	0.194603	0.131126	0.298126	0.198245
95	0.298126	0.198245	0.412954	0.255008
100	0.412954	0.255008	0.497358	0.328290

f. Termination Rates and Disability Rates

Termination rates (for causes other than death, disability or retirement):

Termination rates are a function of the member's age and service. Termination rates are not applied after a member becomes eligible for a retirement benefit. Rates at selected ages are shown below.

Probability of Decrement Due to Withdrawal – Male Members
Years of Service

Age	0	1	2	3	4	5	6	7	8	9	10+
20	0.3244	0.2682	0.2300	0.2060	0.1926	0.1824	0.1617	0.1507	0.1400	0.1278	0.0541
30	0.2585	0.2146	0.1808	0.1563	0.1396	0.1275	0.1143	0.1057	0.0985	0.0919	0.0449
40	0.2003	0.1645	0.1351	0.1124	0.0954	0.0832	0.0750	0.0683	0.0634	0.0603	0.0357
50	0.1559	0.1258	0.1013	0.0824	0.0681	0.0577	0.0510	0.0454	0.0411	0.0383	0.0265
60	0.1341	0.1083	0.0887	0.0740	0.0634	0.0557	0.0469	0.0407	0.0344	0.0277	0.0173

Probability of Decrement Due to Withdrawal – Female Members
Years of Service

Age	0	1	2	3	4	5	6	7	8	9	10+
20	0.2811	0.2574	0.2344	0.2123	0.1912	0.1711	0.1506	0.1282	0.1040	0.0784	0.1385
30	0.2155	0.1943	0.1736	0.1539	0.1356	0.1188	0.1032	0.0879	0.0730	0.0585	0.0795
40	0.1688	0.1460	0.1250	0.1063	0.0903	0.0770	0.0664	0.0581	0.0517	0.0472	0.0367
50	0.1510	0.1223	0.0984	0.0791	0.0645	0.0544	0.0481	0.0452	0.0453	0.0481	0.0339
60	0.1794	0.1373	0.1049	0.0812	0.0653	0.0570	0.0540	0.0552	0.0601	0.0682	0.0339

Rates of Decrement Due to Disability

Age	Males	Females	Service-related Males	Service-related Females
20	0.000004	0.000006	0.000000	0.000001
25	0.000009	0.000013	0.000001	0.000002
30	0.000073	0.000065	0.000005	0.000008
35	0.000318	0.000102	0.000022	0.000013
40	0.000650	0.000234	0.000045	0.000029
45	0.001259	0.000528	0.000087	0.000066
50	0.002195	0.001256	0.000151	0.000157
55	0.003171	0.002021	0.000219	0.000253
60	0.004188	0.002436	0.000289	0.000305

Rates of disability are reduced to zero once a member becomes eligible for retirement.

6. Other Assumptions

a. Projected payroll for contribution purposes: The aggregate projected payroll for the fiscal year following the valuation date is calculated by increasing the actual payroll paid during the previous fiscal year to all members (actives, terminated and retired) by the payroll growth rate and multiplying by the ratio of current active members to the average number of active members during the previous fiscal year.

b. Percent married: 70% of employees are assumed to be married. (No beneficiaries other than the spouse assumed). The 70% assumption is intended to provide sufficient margin to cover the costs of any surviving children benefits.

c. Age difference: Male members are assumed to be three years older than their spouses, and female members are assumed to be three years younger than their spouses.

d. Percent electing annuity on death (when eligible): All of the spouses of vested, married participants are assumed to elect an annuity.

e. Percent electing deferred termination benefit: Vested terminating members are assumed to elect a refund or a deferred benefit, whichever is more valuable at the time of termination.

f. There will be no recoveries once disabled.

g. No surviving spouse will remarry.

h. Assumed age for commencement of deferred benefits: Members electing to receive a deferred benefit are assumed to commence receipt at the first age at which unreduced benefits are available.

i. Administrative expenses: The administrative expenses of the plan are added into the employer contribution rate as a percentage of payroll.

j. Pay increase timing: Beginning of (fiscal) year. This is equivalent to assuming that reported pays represent amounts paid to members during the year ended on the valuation date.

k. Decrement timing: Decrements of all types are assumed to occur mid-year.

l. Eligibility testing: Eligibility for benefits is determined based upon the age nearest birthday and service nearest whole year on the date the decrement is assumed to occur.

m. Decrement relativity: Decrement rates are used directly from the experience study, without adjustment for multiple decrement table effects.

n. Incidence of Contributions: Contributions are assumed to be received continuously throughout the year based upon the computed percent of payroll shown in this report, and the actual payroll payable at the time contributions are made.

o. Benefit Service: All members are assumed to accrue 1 year of service each year. Fractional service is used to determine the amount of benefit payable.

p. Retiree DROP Balances Payout Duration: It is assumed that retirees will receive their DROP balances in equal installments over the eight years following retirement.

q. COLA is assumed to be 1.00% per year for almost all members effective 7/1/2017. Group D members who terminated prior to the effective date of the 2017 legislation are not eligible for a COLA.

7. <u>Participant Data</u>

Participant data was supplied on electronic files. There were separate files for (i) active members, (ii) inactive members, and (iii) members and beneficiaries receiving benefits.

The data for active members included birth date, sex, most recent hire date, salary paid during last fiscal year, hours worked by the employee, and employee contribution amounts. For retired members and beneficiaries, the data included date of birth, sex, amount of monthly benefit, and date of retirement. Also included was the member's Group and for members participating in DROP, their account balances and monthly DROP income.

Most healthy and disabled retirees are assumed to have an 80% joint and survivor form of payment (a small group of retirees is only eligible for a 50% joint and survivor annuity), prorated by the 70% marriage assumption and reflecting the 3 year spousal age differential.

All non-children beneficiaries are assumed to have life only benefits and all children beneficiaries' annuities are assumed to stop at age 21.

Salary for the prior fiscal year as well as an annualized rate of pay is provided in the data. The annualized rate increased by one-year's salary increase is the rate of pay the member is assumed to earn in the upcoming fiscal year.

Except as noted below, assumptions were made to correct for missing, or inconsistent data. These had no material impact on the results presented.

We received salary information on City of Houston employees employed by HFC, HFF, and CCSI. Where we had additional information because of prior HMEPS service, we added the salary information and treated the records as active employees. For the 170 records where we had no additional information, we assumed these records were Group D members and we grossed up the Group D liabilities and payroll to reflect these additions.

8. Group Transfers

We assume no current Group B members will transfer to Group A.

9. Change in Assumptions Since Prior Valuation

There have been no changes in the actuarial assumptions and methods since the prior valuation.

Appendix B

Summary of Plan Provisions

APPENDIX B

Summary of Plan Provisions

The provisions summarized in this section apply to persons who are members (active employees). Former members may have been covered under different plan provisions, depending on their dates of separation from service.

1. Covered Members

   Any person who is a participant of Group A, under the original act.

   Persons who became employees of the City of Houston after September 1, 1981 and prior to September 1, 1999, and elected officials of the City of Houston who assumed office after September 1, 1981 and prior to September 1, 1999, participate in Group B, but may make an irrevocable election to participate in Group A instead.

   Persons who become employees of the City and persons who are elected as City officials after September 1, 1999 and prior to January 1, 2008 become members of Group A. Certain persons who were or became a Director of a City Department, Chief Administrative Officer, or Executive Director of HMEPS on or after September 1, 1999 and prior to January 1, 2005 participate in Group C. Effective January 1, 2005, all Group C participation ceased and all Group C participants became Group A participants. Accruals earned by Group C participants prior to January 1, 2005 are retained, but all future accruals are based on the Group A formulas.

   All future references to Group C participants in this appendix are intended to reflect this change in the Group C status.

   Covered employees newly hired on or after January 1, 2008 will be members of Group D.

   A former employee who is rehired on or after January 1, 2008 is a member of the group in which such employee participated at the time of his/her immediately preceding separation from service.

2. Monthly Final Average Salary (FAS)

   The sum of the seventy-eight highest biweekly salaries paid to a member during his period of credited service, divided by thirty-six. Salary includes base pay, longevity pay, and any shift differential pay. If there are fewer than seventy-eight biweekly salaries, the FAS is determined by multiplying the average of all biweekly salaries paid to the member during the period of credited service by 26 and dividing the product by 12.

3. Credited Service

   All services and work performed by an employee, including prior service. For members of Group A and former Group C, all services and work performed after September 1, 1943 must have been accompanied by corresponding contributions to HMEPS by the employee or legally authorized repayments must have been made. The contribution requirement applies to all Group B and Group D members effective with the first full pay period on or after July 1, 2017. Credited service for former participants in Group C means the number of years of eligible service after the executive official's effective date of participation in Group C. A former Group C member receives two times the number of actual years of credited service in Group C solely for the purpose of fulfilling the eligibility requirements in Group C.

If former Group D and pre-1997 Group B members who forfeited their previous non-contributory credited service are rehired they will regain a year of forfeited non-contributory credited service for each year of service earned upon reemployment.

4. Normal Retirement

a. Eligibility

For participants in Group A or Group B, or, a former Group C member who became a Group A member as of January 1, 2005, the earliest of:

(i) age 62 and 5 years of Credited Service

(ii) 5 years of Credited Service, and age plus years of Credited Service equal 70 or more, provided that, prior to January 1, 2005, the participant had at least five years of credited service and the combination of age and years of credited service was equal to or greater than 68.

(iii) 5 years of Credited Service, and age plus years of Credited Service equal 75 or more with minimum age 50.

For participants in Group D

Age 62 and 5 years of Credited Service

b. Benefit

Prior to January 1, 2005:

Group A: 3.25% of FAS for each of the first 10 years of Credited Service plus 3.50% of FAS for Credited Service greater than 10 years but less than 20 years plus 4.25% of FAS for each year of Credited Service greater than 20 years (excludes period of DROP participation). Maximum benefit is 90% of FAS for all future retirees.

Group B: 1.75% of FAS for each of the first 10 years of Credited Service plus 2.00% of FAS for Credited Service greater than 10 years but less than 20 years, plus 2.75% of FAS for each year of Credited Service greater than 20 years (excludes period of DROP participation). Maximum benefit is 90% of FAS for all future retirees.

Group C: Double the rate for Group A

All accruals after January 1, 2005:

All accruals under the prior multipliers were frozen as of January 1, 2005 and the following benefit multipliers apply to service on or after that date:

Group A: 2.50% of FAS for each of the first 20 years of Credited Service plus 3.25% of FAS for each year of Credited Service greater than 20 years (excludes period of DROP participation). Maximum benefit is 90% of FAS for all future retirees.

Group B: 1.75% of FAS for each of the first 10 years of Credited Service plus 2.00% of FAS for Credited Service greater than 10 years but less than 20 years, plus 2.50% of FAS for each year of Credited Service greater than 20 years (excludes period of DROP participation).Maximum benefit is 90% of FAS for all future retirees.

Group D: 1.80% of FAS for each of the first 25 years of Credited Service, plus 1.00% of FAS for each year of Credited Service greater than 25 years. Maximum benefit is 90% of FAS for all future retirees.

5. Early Retirement (Group D only)

a.	Eligibility	(i)	at least ten years of Credited Service; or
		(ii)	at least five years of Credited Service and a combination of age and service equals or is greater than 75.
b.	Benefit	Accrued normal retirement benefit reduced by 0.25% for each month you are less than age 62.	

6. Vested Pension

a.	Eligibility	5 years of Credited Service.
b.	Benefit	Group A and Group C: Either the accrued normal retirement benefit with payments beginning at the normal retirement eligibility date or a refund of employee contributions, if any, without interest. Group B and Group D: Accrued normal retirement benefit payable at the normal retirement eligibility date. If the actuarial present value of a pension is less than $20,000, a terminated participant who is not eligible to begin receiving a pension may request an early lump sum distribution of the pension. Such early lump sum distribution is irrevocable. Credited Service associated therewith can be reinstated after reemployment and pursuant to the rules of the plan.

7. Withdrawal Benefit

If a nonvested contributory member withdraws from service with less than 5 years, a refund of the member's contributions is made without interest, upon request.

8. Service-Connected Disability Retirement

a.	Eligibility	Any age
b.	Benefit	Current:

Group A: Accrued normal retirement benefit, but not less than 20% of final monthly salary at time of disability plus 1% of final monthly salary per year of Credited Service, to a maximum of 40% of final monthly salary.

Group B and Group D: Accrued normal retirement benefit, but not less than 20% of final monthly salary at time of disability.

After July 1, 2017:

Accrued normal retirement benefit, but not less than 20% of final monthly salary at time of disability plus 1% of final monthly salary per year of Credited Service, to a maximum of 40% of final monthly salary.

9. Non-service-Connected Disability Retirement

a.	Eligibility	5 years of Credited Service.
b.	Benefit	Accrued normal retirement benefit payable immediately

10. Pre-retirement Survivor Benefits

A. Service-connected

a.	Eligibility	Any age or Credited Service
b.	Benefit	Current:

If there is a surviving spouse, 100% of FAS payable to the spouse. 10% of FAS is payable to each qualifying dependent to a maximum of 20% for all dependents. Surviving spouse's benefit will be reduced by the amount of dependent benefits. If no surviving spouse, dependent benefits are 50% of the amount a surviving spouse would have received for each dependent to a maximum of 100% for all dependents in the aggregate.

Effective July 1, 2017:

If there is a surviving spouse, the spousal survivor benefit is 80% of the participant's final average salary, payable immediately.

B. Non service-connected

a. Eligibility 5 years of Credited Service

b. Benefit Current:

<u>Benefits for survivorship of vested Group D members after January 1, 2008:</u>

Death of active employee: If there is a surviving spouse, 100% of accrued pension is payable to the spouse. 10% of accrued pension is payable to each qualifying dependent to a maximum of 20% for all dependents. Surviving spouse's benefit will be reduced by the amount of dependent benefits. If no surviving spouse, dependent benefits are 50% of the amount a surviving spouse would have received for each dependent to a maximum of 100% for all dependents in the aggregate.

Death of terminated vested employee (not yet retired): If participant selected Optional Annuity then benefit will be paid based on selected option. If the participant did not select an optional annuity then if there is a surviving spouse the participant will be deemed to have selected the 50% J&S Optional Annuity. If the participant did not select an Optional Annuity and there is no surviving spouse then no benefit is payable.

<u>For all other Groups on or after August 1, 2001:</u>

If there is a surviving spouse, 100% of accrued normal retirement benefit payable to the spouse and 10% of accrued normal retirement benefit to each qualifying dependent to a maximum of 20% for all dependents in the aggregate. The surviving spouse's benefit will be reduced by dependent benefits, if any. If there is no surviving spouse, each dependent will receive 50% of the benefit a surviving spouse would have received subject to a maximum of 100% of a surviving spouse's benefit for all dependents in the aggregate.

Effective July 1, 2017:

If an active Group A, Group B or Group D member with at least 5 years of credited service dies while still in service with the City (off-duty death), the spousal survivor benefit will be 80% of the normal accrued pension, payable immediately, provided that the spouse was married to the participant for at least one continuous year as of the date of death. If such spouse was married less than one continuous year as of the date of death, the survivor benefit is 50% of the normal accrued pension.

If a Group A or Group B deferred participant (not yet receiving a pension benefit) dies, the spousal survivor benefit is 50% of the normal accrued pension, payable at the participant's eligibility date. However, the surviving spouse can elect an earlier actuarially equivalent benefit.

11. <u>Postretirement Survivor Benefits</u>

<u>All Groups except Option-Eligible Participants Prior to June 30, 2017:</u>

If there is a surviving spouse, 100% of the retirement benefit the deceased retiree was receiving at the time of death payable to the spouse and 10% of that retirement benefit payable to each qualifying dependent to a maximum of 20% for all dependents. The surviving spouse's benefit will be reduced by dependent benefits, if any. If there is no surviving spouse, each dependent will receive 50% of the benefit a surviving spouse would have received subject to 100% of a surviving spouse's benefit for all dependents in the aggregate.

<u>All Groups except Option-Eligible Participants On or After July 1, 2017:</u>

If there is a surviving spouse, 80% of the retirement benefit the deceased retiree was receiving at the time of death payable immediately, provided that the spouse was married to the retiree at the time of death and for at least one continuous year as of the date of separation from service (the marriage requirement applies for separations from service on or after July 1, 2017). If such spouse was married less than one continuous year as of the date of separation from service (the marriage requirement applies for separations from service on or after July 1, 2017), the spousal survivor benefit is 50% of the retirement benefit being received by the retiree at the time of death.

<u>Option-Eligible Participants:</u>

Life only to the retiree. Option-Eligible Participants may elect other options based on actuarial factors.

All Group D members, Group A & B members who terminate after June 30, 2011 eligible for a normal retirement benefits and who are not married at their termination of service, and Group B members who terminated prior to September 1, 1997 and who are eligible for a normal retirement benefit are Option-Eligible Participants.

12. Benefit Adjustments

Prior to June 30, 2017:

Each year, effective February 1, monthly benefits will be increased 3.0%, not compounded, for all retirees and survivors. This will affect all members currently in payment status and members who enter payment status in the future. For members hired on or after January 1, 2005 future increases will be 2.0%, not compounded. However, pre-2005 retirees who are rehired will receive a 3% COLA on their subsequent benefit instead. No COLA for Group D members.

On or after July 1, 2017:

COLAs are calculated as half of the average five-year investment return less five percentage points, with a minimum of 0% and a maximum of 2%, not compounded. Group D retirees, who terminated after the effective date of the 2017 Legislation, will receive COLAs in the future. For employees who are participating in DROP, COLAs will be delayed until the earlier of their age at retirement or age 62 as of January 1 of the year in which the increase is made.

13. Contribution Rates. (all rates occur as of the first full pay period on or after the applicable effective date)

a. Members — Effective July 1, 2017, 7% of salary for Group A members, 2% of salary for Group B members and 2% of salary for Group D members. For Group D, beginning January 1, 2018, in addition to the 2%, employees contribute 1% to a notional account that will be credited with the DROP Credit interest. Effective July 1, 2018, the total contribution increases to 8% of salary for Group A members and 4% of salary for Group B members.

b. City — Beginning in 1993, the rate required to fund the Retirement Fund on an actuarial reserve basis. However, effective September 1, 1999, the minimum contribution rate is equal to the greater of 10% of covered payroll or twice the contribution rate a Group A member is required to make by statute. Under the ARM&CA between the Board and the City of Houston, the City will contribute the greater of $108.5 million or 21.36% of payroll in fiscal year 2013. Contributions in future fiscal years increase by the greater of $10 million or 2% of payroll over the prior year's rate until such time that the City's contribution rate equals the actuarially determined contribution rate.

Effective July 1, 2017, the City's contribution obligation is set by state statute as described in the RSVS Section.

14. Deferred Retirement Option

a. Eligibility — Participants (other than Group D) who are eligible to retire but who have not retired and who remain in service with the City may participate in the DROP.

b. Monthly DROP Credit

An amount equal to the accrued normal retirement benefit as of the effective date of DROP participation. The Monthly DROP Credit is credited to a notional account (DROP Account) on the last calendar day each month.

c. DROP Credit Interest

Interest is credited to the DROP Account at the beginning of each day based on the DROP Account balance at the end of the previous day and posted monthly on the last calendar day of each month. Effective July 1, 2017, the annual interest rate effective beginning January 1 each year is half of the average five-year investment return, not less than 2.50% and not greater than 7.5%. The assumed DROP Credit interest is 4.00%.

d. DROP Credits-COLA

On or after July 1, 2017:

COLAs will not be given if the DROP participant is younger than age 62. When the DROP participant attains at least age 62 as of January 1 of the year of the increase, COLAs are calculated as half of the average five-year investment return less five percentage points, with a minimum of 0% and a maximum of 2%, not compounded.

Between January 1, 2005 and December 31, 2016

The Monthly DROP Credit for participants who entered the DROP effective on or before January 1 of the then current year will be increased effective February 1 each year by 3.0%, not compounded.

The Monthly DROP Credit for Group A and Group B participants who were first hired on or after January 1, 2005 who entered the DROP effective on or before January 1 of the then current year will be increased effective February 1 each year by 2.0%, not compounded.

e. DROP Account Balance

The sum of a participant's Monthly DROP (DROP Benefit) Credits, Monthly DROP Credit Adjustments, applicable interest, and employee contributions as applicable.

15. DROP Benefit Pay-out A terminated DROP participant may elect to:

a. Receive the entire DROP Account Balance in a lump sum.

b. Receive the DROP Account Balance in periodic payments as approved by the Pension Board.

c. Receive a portion of the DROP Account balance in a lump sum and the remainder in periodic payments as approved by the Pension Board.

d. Receive a partial payment of not less than $1,000, no more than once each ninety (90) days.

e. Defer election of a payout option until a future date.

16. Post DROP Retirement The Final Pension is the accrued normal retirement benefit as of the effective date of DROP participation, increased with COLAs since DROP entry.

Changes in Plan Provisions Since Prior Year

There have been no changes to the benefit provisions of the System since the prior valuation.

STATISTICAL

- SECTION 5 -

YOUR IMPRINT IS AT THE HEART OF THE CITY

HMEPS

HOUSTON MUNICIPAL EMPLOYEES PENSION SYSTEM

INTRODUCTION

The Statistical section of the Comprehensive Annual Financial Report presents detailed information related to the System's financial statements. The schedules within the Statistical section are classified as Financial Trends and Participant Information. All information was derived from audited annual financials and/or our benefit administration system, and/or the annual actuarial valuations.

FINANCIAL TRENDS

The Changes in Fiduciary Net Position schedule shows the additions and deductions from fiduciary net position and the resulting changes in fiduciary net position for the ten years ending June 30, 2019.

Additions to Fiduciary Net Position include city and member contributions to the System which are external sources of additions to plan net positions. Additions also include earnings from the System's investment activity and are the System's internal sources of, and typically the larger component of, additions to plan net positions.

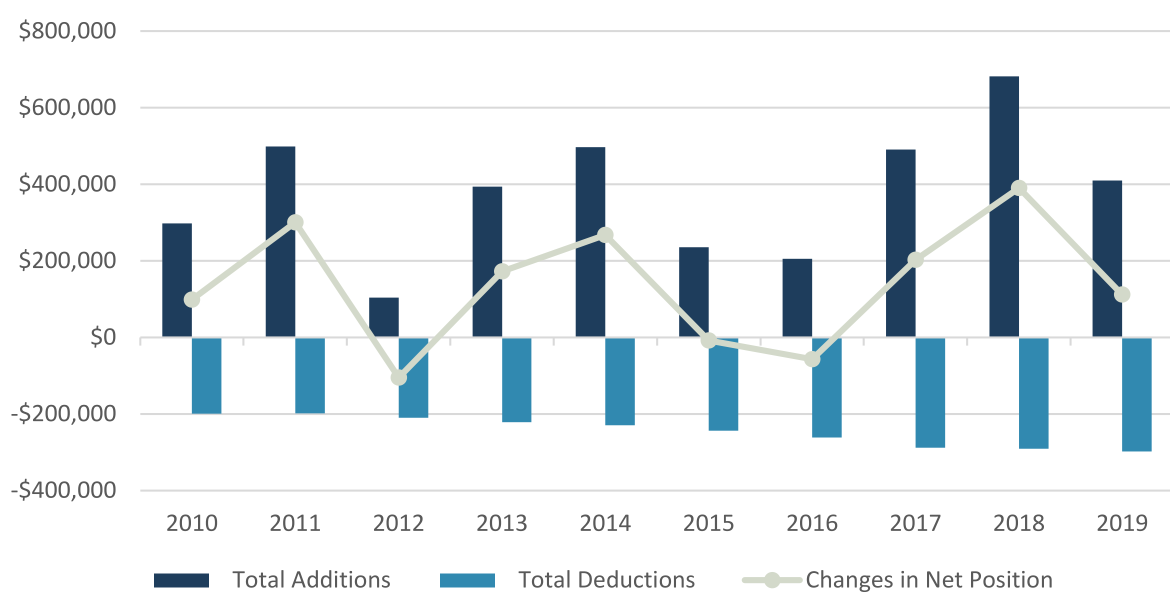
Deductions from Fiduciary Position are primarily comprised of benefit payments and refunds paid to participants.

OPERATING INFORMATION

Participant data for the last ten years ending June 30, 2019 can be found starting on page 144 and includes several schedules regarding benefit payments to participants and participant demographics.

CHART OF CHANGES IN FIDUCIARY NET POSITION (IN $000)

YEARS ENDED JUNE 30



SCHEDULE OF CHANGES IN FIDUCIARY NET POSITION
Financial Trends

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Additions (Reductions)										
Employer contributions	$ 82,052	$ 87,285	$ 97,161	$ 111,859	$ 128,274	$ 145,007	$ 159,958	$ 182,558	$ 421,562	$ 176,261
Member contributions	19,736	19,326	18,473	17,041	16,580	16,198	15,874	15,901	27,905	32,536
Investment income (loss)	195,433	391,095	(11,963)	263,891	351,792	73,854	27,988	290,911	231,815	200,445
Other income	557	1,185	654	1,246	730	557	1,303	1,272	701	710
Total additions (reductions) to net position	297,778	498,891	104,325	394,037	497,376	235,616	205,123	490,642	681,983	409,952
Deductions										
Benefit payments	191,048	189,199	200,014	213,178	221,925	234,955	253,179	280,456	283,928	291,060
Refund of contributions	1,285	1,620	2,206	1,266	1,213	1,549	1,105	718	807	1,394
Professional services fees	805	1,103	1,048	871	597	822	1,021	805	656	664
Cost of administration	6,290	6,020	6,264	6,341	5,818	6,185	6,339	6,021	5,786	4,699
Total deductions to net position	199,428	197,942	209,532	221,656	229,553	243,511	261,644	288,000	291,177	297,817
Changes in fiduciary net position	$ 98,350	$ 300,949	$ (105,207)	$ 172,381	$ 267,823	$ (7,895)	$ (56,521)	$ 202,642	$ 390,806	$ 112,135

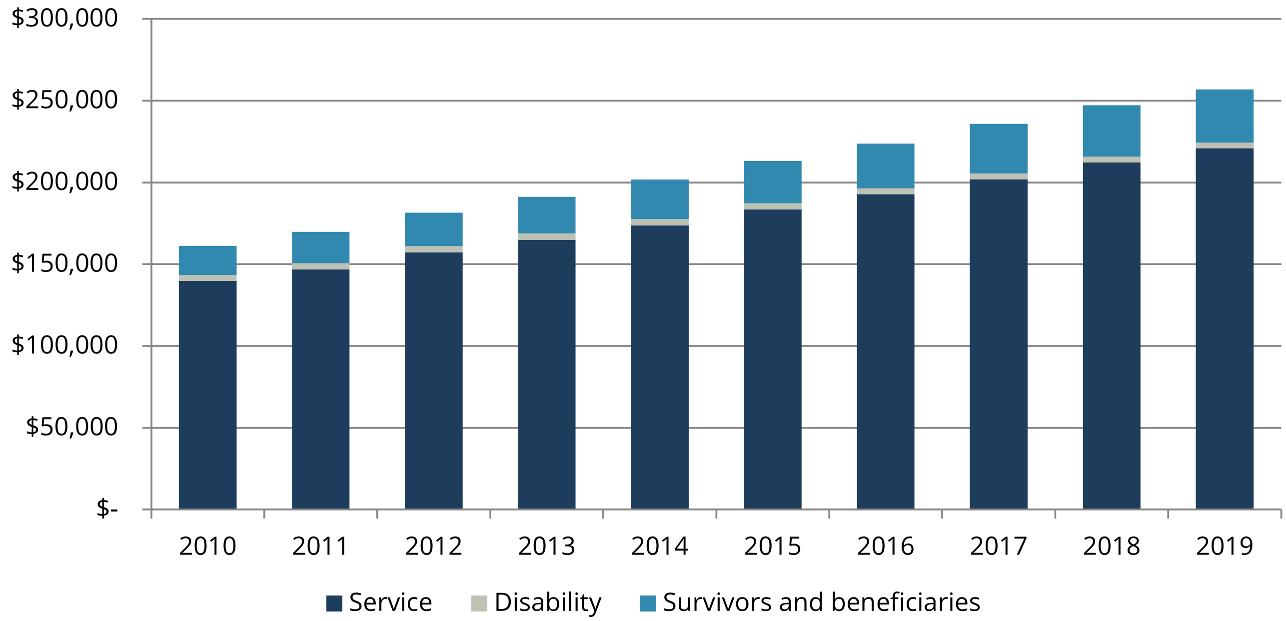
SCHEDULE OF BENEFIT PARTICIPANTS AND ANNUITIES BY TYPE

Ten Years Ended June 30 (in $000) | Operating Information

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Participants by Benefit Type										
Service	6,482	6,663	7,031	7,258	7,522	7,821	8,084	8,376	8,616	8,855
Disability	404	398	391	387	373	350	336	323	298	289
Survivors and beneficiaries	1,640	1,656	1,656	1,782	1,827	1,854	1,893	1,902	1,918	1,955
Total Annuity Count	8,526	8,717	9,078	9,427	9,722	10,025	10,313	10,601	10,832	11,099
Inactive Eligible Participants	2,815	3,178	3,237	3,298	3,305	3,202	3,432	3,409	3,457	3,597
Total Eligible for Benefits	11,341	11,895	12,315	12,725	13,027	13,227	13,745	14,010	14,289	14,696
Benefit Payments by Type										
Service	$ 139,779	$ 146,863	$ 157,214	$ 164,924	$ 173,749	$ 183,613	$ 192,759	$ 201,890	$ 212,243	$ 220,871
Disability	3,650	3,698	3,769	3,864	3,808	3,722	3,626	3,613	3,462	3,350
Survivors and beneficiaries	17,724	19,174	20,533	22,383	24,262	25,777	27,346	30,329	31,521	32,705
Total Annuity Payments	161,153	169,735	181,516	191,171	201,819	213,112	223,731	235,832	247,226	256,926
Lump Sum Payments	641	449	156	200	177	201	252	351	224	402
Hybrid-Cash Balance										44
DROP Payments	29,254	19,015	18,342	21,807	19,929	21,641	29,195	44,274	36,478	33,687
Total Other Benefit Payments	29,895	19,464	18,498	22,007	20,106	21,842	29,447	44,625	36,702	34,133
Total Benefit Payments	$ 191,048	$ 189,199	$ 200,014	$ 213,178	$ 221,925	$ 234,954	$ 253,178	$ 280,457	$ 283,928	$ 291,059
Refunds of Contribution	$1,285	$1,620	$2,206	$1,266	$1,213	$1,549	$1,105	$718	$807	$1,394
Average Benefit Payments by Type										
Service	$ 21,564	$ 22,042	$ 22,360	$ 22,723	$ 23,099	$ 23,477	$ 23,845	$ 24,103	$ 24,634	$ 24,943
Disability	9,035	9,291	9,639	9,984	10,209	10,634	10,792	11,186	11,617	11,592
Survivors and beneficiaries	10,807	11,579	12,399	12,561	13,280	13,903	14,446	15,946	16,434	16,729

CHART OF BENEFIT PAYMENTS BY TYPE (IN $000)

Years Ended June 30



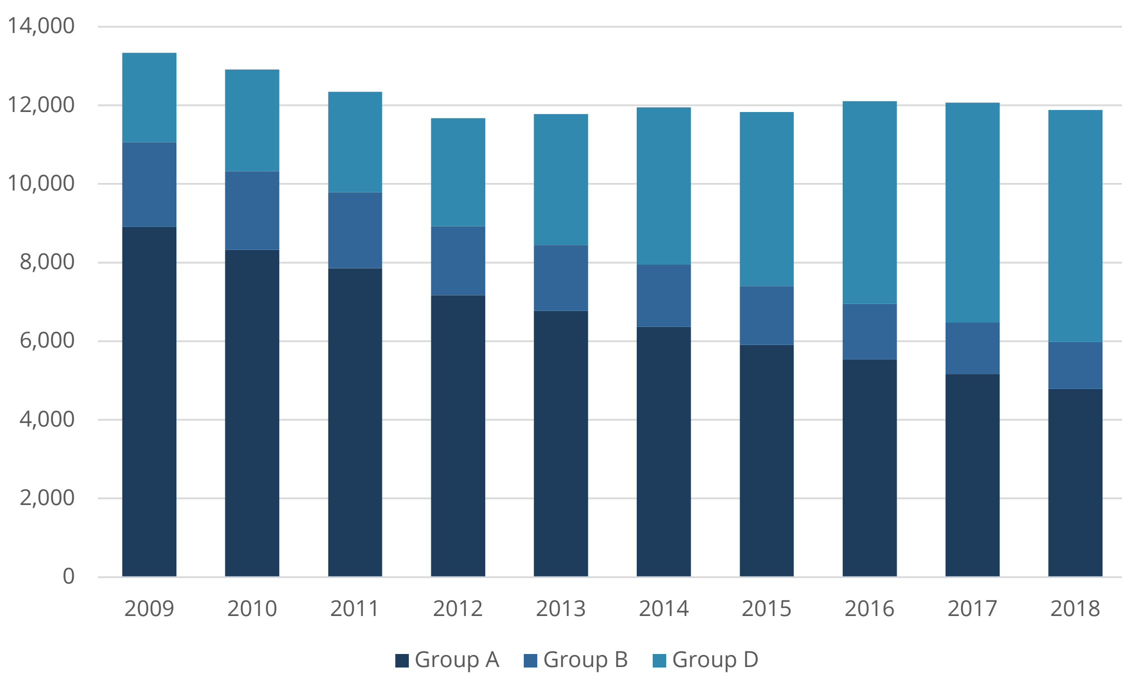
SCHEDULE OF BENEFIT RECIPIENTS BY TYPE AND AGE

Year Ended June 30, 2019

Age on June 30,	Service	Disability	Survivors and Beneficiaries	Total
Under 40	0	0	7	7
40 - 44	0	1	97	98
45 - 49	0	5	24	29
50 - 54	96	14	55	165
55 - 59	662	33	138	833
60 - 64	1672	60	225	1957
65 - 69	2285	56	287	2628
70 - 74	1939	43	289	2271
75 - 79	1127	44	302	1473
80 - 84	633	23	232	888
85 & Over	441	10	299	750
Total	8855	289	1955	11099

HISTORICAL ACTIVE PARTICIPANT DATA

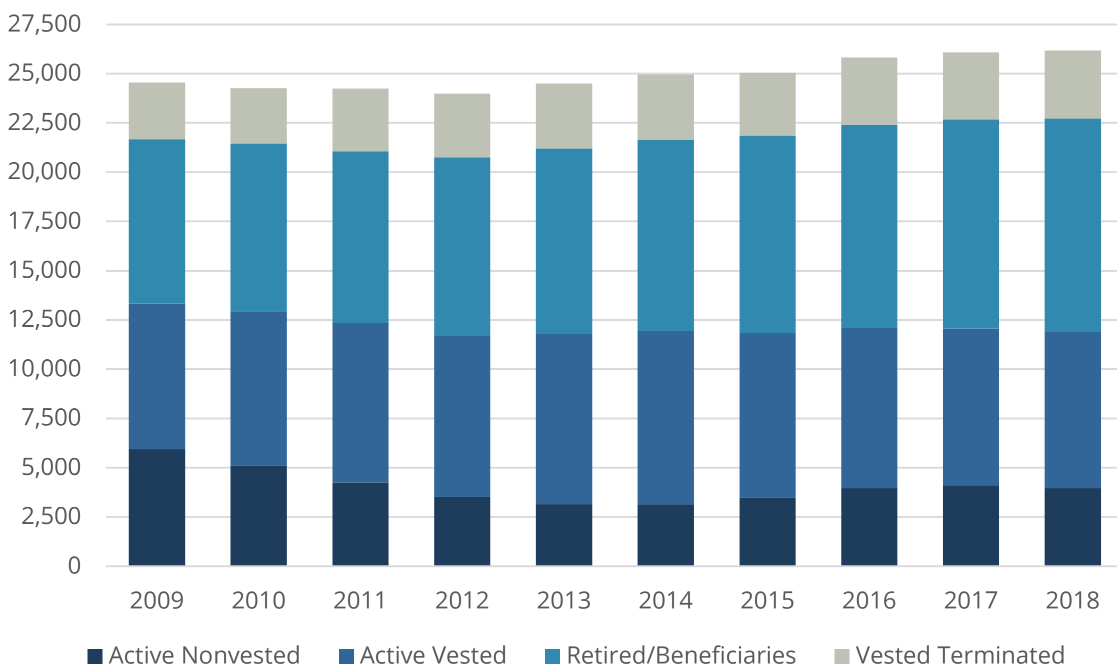
	Active Vested/Nonvested						
Fiscal Year	Group A	Group B	Group D	Number of Participants	Annual Payroll ($000)	Average Salary ($)	% Salary Increase
2009	8,906	2,153	2,274	13,333	539,023	40,428	5.7
2010	8,323	1,999	2,591	12,913	550,709	42,648	5.5
2011	7,857	1,932	2,556	12,345	544,665	44,120	3.5
2012	7,167	1,759	2,744	11,670	534,394	45,792	3.8
2013	6,777	1,666	3,338	11,781	549,971	46,683	1.9
2014	6,366	1,590	3,993	11,949	568,992	47,618	2.0
2015	5,911	1,489	4,427	11,827	584,025	49,381	3.7
2016	5,537	1,417	5,149	12,103	608,210	50,253	1.8
2017	5,165	1,312	5,589	12,066	623,577	51,681	2.8
2018	4,788	1,198	5,894	11,880	624,266	52,548	1.7



2019 final numbers were not available at publication.

HISTORICAL TOTAL MEMBERSHIP DATA AND BAR CHART

Fiscal Year	Active Nonvested	Active Vested	Retired/ Beneficiaries	Vested Terminated	Totals
2009	5,941	7,392	8,340	2,884	24,557
2010	5,101	7,812	8,526	2,815	24,254
2011	4,237	8,108	8,717	3,178	24,240
2012	3,512	8,158	9,078	3,237	23,985
2013	3,154	8,627	9,427	3,298	24,506
2014	3,131	8,818	9,685	3,313	24,947
2015	3,475	8,352	10,023	3,202	25,052
2016	3,967	8,136	10,289	3,432	25,824
2017	4,105	7,961	10,601	3,409	26,076
2018	3,965	7,915	10,834	3,457	26,171



2019 final numbers were not available at publication.

AVERAGE BENEFIT PAYMENTS BY YEARS OF CREDITED SERVICE

Members Retiring During Fiscal Years		Years of Credited Service						
		5-10	11-15	16-20	21-25	26-30	30+	All Members
2010	Average monthly benefit	$ 572	$ 1,107	$ 1,579	$ 2,631	$ 3,309	$ -	$ 1,579
	Average monthly salary	$ 3,512	$ 3,478	$ 3,796	$ 4,154	$ 4,342	$ -	$ 3,769
	Average DROP balance	$ 66,061	$ 87,798	$ 174,978	$ 244,143	$ 312,750	$ -	$ 181,870
	Number of DROP retirees	21	30	34	44	21	-	150
	Number of retirees	84	81	76	64	32	-	337
2011	Average monthly benefit	$ 593	$ 925	$ 1,611	$ 2,378	$ 2,310	$ 2,789	$ 1,486
	Average monthly salary	$ 3,474	$ 3,247	$ 3,578	$ 3,794	$ 3,266	$ 3,996	$ 3,505
	Average DROP balance	$ 52,041	$ 97,571	$ 181,686	$ 241,297	$ 249,370	$ 320,514	$ 182,068
	Number of DROP retirees	15	27	42	50	15	2	151
	Number of retirees	82	91	97	83	35	7	395
2012	Average monthly benefit	$ 548	$ 972	$ 1,463	$ 2,097	$ 2,775	$ 2,279	$ 1,476
	Average monthly salary	$ 3,319	$ 3,114	$ 3,483	$ 3,544	$ 3,789	$ 3,123	$ 3,413
	Average DROP balance	$ 28,933	$ 97,805	$ 109,125	$ 172,352	$ 135,562	$ -	$ 121,920
	Number of DROP retirees	19	53	81	72	33	-	258
	Number of retirees	97	124	148	120	58	6	553
2013	Average monthly benefit	$ 577	$ 1,083	$ 1,524	$ 2,406	$ 2,492	$ 2,936	$ 1,450
	Average monthly salary	$ 3,660	$ 3,565	$ 3,503	$ 3,877	$ 3,573	$ 4,000	$ 3,648
	Average DROP balance	$ 33,482	$ 96,989	$ 163,551	$ 196,720	$ 70,570	$ 37,305	$ 137,474
	Number of DROP retirees	17	44	59	52	13	2	187
	Number of retirees	110	114	113	84	31	12	461
2014	Average monthly benefit	$ 582	$ 1,082	$ 1,523	$ 2,283	$ 2,695	$ 3,424	$ 1,395
	Average monthly salary	$ 3,229	$ 3,238	$ 3,505	$ 3,741	$ 3,625	$ 4,402	$ 3,423
	Average DROP balance	$ 92,531	$ 118,155	$ 119,035	$ 276,187	$ 131,517	$ 104,467	$ 153,977
	Number of DROP retirees	23	46	72	51	27	1	220
	Number of retirees	126	116	123	78	35	4	482
2015	Average monthly benefit	$ 625	$ 1,158	$ 1,871	$ 2,412	$ 2,950	$ 2,762	$ 1,636
	Average monthly salary	$ 3,365	$ 3,586	$ 3,756	$ 3,791	$ 3,847	$ 3,330	$ 3,639
	Average DROP balance	$ 55,711	$ 112,360	$ 172,535	$ 186,044	$ 136,625	$ 97,841	$ 153,083
	Number of DROP retirees	19	47	93	78	24	4	265
	Number of retirees	109	107	131	109	29	7	492
2016	Average monthly benefit	$ 674	$ 1,039	$ 1,972	$ 2,802	$ 3,627	$ 2,915	$ 1,807
	Average monthly salary	$ 3,973	$ 3,278	$ 3,983	$ 3,957	$ 4,477	$ 3,466	$ 3,846
	Average DROP balance	$ 52,494	$ 72,536	$ 158,655	$ 318,208	$ 253,977	$ 165,445	$ 194,300
	Number of DROP retirees	22	36	91	78	22	8	257
	Number of retirees	100	96	124	101	29	12	462
2017	Average monthly benefit	$ 727	$ 1,176	$ 1,753	$ 2,696	$ 2,989	$ 4,408	$ 1,867
	Average monthly salary	$ 4,131	$ 3,481	$ 3,673	$ 4,110	$ 3,947	$ 4,999	$ 3,883
	Average DROP balance	$ 73,002	$ 75,610	$ 126,681	$ 231,788	$ 238,546	$ 268,657	$ 172,994
	Number of DROP retirees	17	44	89	116	37	9	312
	Number of retirees	95	118	121	145	47	12	538
2018	Average monthly benefit	$ 630	$ 1,223	$ 1,909	$ 3,070	$ 3,149	$ 3,788	$ 1,860
	Average monthly salary	$ 3,832	$ 3,880	$ 3,960	$ 4,633	$ 4,121	$ 4,167	$ 4,070
	Average DROP balance	$ 66,220	$ 82,362	$ 166,913	$ 257,733	$ 229,513	$ 194,307	$ 178,656
	Number of DROP retirees	30	39	76	81	29	9	264
	Number of retirees	95	120	116	98	37	11	477
2019	Average monthly benefit	$ 650	$ 1,133	$ 1,894	$ 2,428	$ 2,863	$ 3,135	$ 1,714
	Average monthly salary	$ 3,953	$ 3,631	$ 3,947	$ 4,035	$ 4,217	$ 3,958	$ 3,910
	Average DROP balance	$ 61,302	$ 122,503	$ 168,807	$ 189,182	$ 178,161	$ 150,946	$ 163,574
	Number of DROP retirees	13	43	92	90	29	9	276
	Number of retirees	85	121	132	110	36	12	496
10 Years Ended 6/30/2019	Average monthly benefit	$ 618	$ 1,090	$ 1,710	$ 2,520	$ 2,916	$ 2,844	$ 1,627
	Average monthly salary	$ 3,645	$ 3,450	$ 3,718	$ 3,964	$ 3,920	$ 3,544	$ 3,711
	Average DROP balance	$ 58,178	$ 96,369	$ 154,197	$ 231,365	$ 193,659	$ 133,948	$ 163,992
	Avg Number of DROP retirees	20	41	73	71	25	4	234
	Average Number of retirees	98	109	118	99	37	8	469
	Total number of retirees	983	1,088	1,181	992	369	83	4,693

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