HPOPS

FOR TODAY & TOMORROW

A Component Unit of

The City of Houston, Texas

Comprehensive Annual Financial Report

for the years ended June 30, 2017 and June 30, 2016

The mission of the Houston Police Officers' Pension System is to responsibly manage the System in the best interests of the members and beneficiaries so that they may have peace of mind knowing their pension benefits are secure.

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HOUSTON POLICE OFFICERS' PENSION SYSTEM

LIFE • CYCLE • PLANNING •

# HPOPS

FOR TODAY & TOMORROW

SECTION ONE

# INTRODUCTORY SECTION

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FOR TODAY & TOMORROW



Houston
Police Officers'
Pension System

602 Sawyer, Suite 300
Houston, Texas 77007
(713) 869-8734 phone
(713) 869-7657 fax
www.hpops.org

December 4, 2017

The Membership
Houston Police Officers' Pension System
Houston, Texas

The Comprehensive Annual Financial Report (CAFR) of the Houston Police Officers' Pension System (the System) for the fiscal year ended June 30, 2017 is submitted herewith. Responsibility for both the accuracy of the data, and the completeness and fairness of the presentation, rests with the management of the System. We trust that you will find this CAFR helpful in understanding your retirement system, a system that strives to provide responsible stewardship of assets contributed by the members and the City of Houston (the City). This CAFR is divided into five sections:

- Introductory Section – This section contains the administrative organization, the letter of transmittal and Chairman's report.
- Financial Section – This section contains the report of the Independent Auditor, Management's Discussion and Analysis, the financial statements of the System and certain required supplementary information.
- Investment Section – This section contains a report on investment activity, investment policies, investment results, and various investment schedules.
- Actuarial Section – This section contains the Actuary's Certification Letter and summary results of the annual actuarial valuation.
- Statistical Section – This section includes historical financial and benefits related data pertaining to the System.

The financial statements and related information included in the *Financial Section* of this report are the responsibility of the Board of Trustees and management of the System. 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 auditor, BDO, conducted an independent audit of the basic financial statements in accordance with U.S. generally accepted auditing standards. This audit is described in the *Independent Auditors' Report* found in the *Financial Section*. Management has provided the external auditors with full and unrestricted access to the System's staff to discuss their audit and related findings to facilitate independent validation of the integrity of the plan's financial reporting.

The *Financial Section* also contains *Management's Discussion and Analysis*, which serves as an introduction to and an overview of the financial statements. The System is considered a component unit of the City of Houston for financial reporting purposes and, as such, the financial statements in this report are also included in the *City of Houston's Comprehensive Annual Financial Report*.

In developing and evaluating the System's accounting system, the adequacy of internal accounting controls is a primary concern. The System's controls are designed to provide reasonable assurance regarding the safekeeping of assets and the reliability of financial records. These controls include strategic design of the System's business and accounting systems, the appropriate segregation of duties and responsibilities, sound practices in the performance of those duties, capable personnel, and the structure of the organization. There are limits to internal control, such as the cost to mitigate some risks may outweigh the risk itself, internal controls may be overridden, or collusion may thwart control design. We believe the System's internal controls are adequate and are working as designed.

The System was established in 1947, funded by a $100,000 Treasury note, and offered retiring members a pension of $75 per month. Today, the System has investments of $4.5 billion and offers a variety of pension benefits to members and their beneficiaries. Members have the option to defer their benefits, take a proportionate retirement benefit, or retire under a regular service retirement. Members also may access a disability retirement, either duty or non-duty connected.

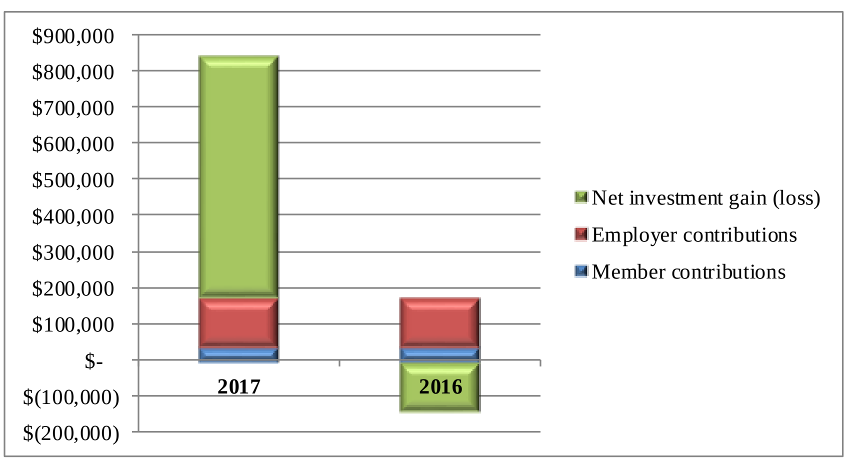
## Additions to Plan Net Position

The System relies on the contributions of members and the City of Houston, as well as income generated from investments, to provide funds needed to finance retirement and disability benefits. The agreement with the City provides for the City's contribution for fiscal year 2017 to be $133 million. Because the Funded Ratio was determined to be 79.7% in the July 1, 2015 actuarial valuation, the City incurred a contribution payable of $14.3 million, which it paid in full in fiscal year 2017. The Funded Ratio was determined to be 77.5% in the July 1, 2016 actuarial valuation. Therefore, the City would be required to pay an additional amount of $148,576 thousand in fiscal year 2018. However, the System's Governing Statute was amended July 1, 2017, by the Texas Legislature during the 85th legislature regular session which removed this requirement. For fiscal year 2018, the City's contribution is to be 31.77% of compensation. The City will also issue $750 million of pension obligation bonds, the proceeds of which are due to the System on or before March 31, 2018.

The number of active members decreased in fiscal year 2017 compared to 2016 as the number of retirements to the Houston Police Department (HPD) outpaced new hires. Contributions from members increased in fiscal 2017 as the number of active members hired or rehired after October 9, 2004 increased. These members contribute 10.25% of pay while members hired prior to October 9, 2004 contribute 9.00% of pay. The System experienced a positive investment return of 16.8% in 2017, as opposed to a negative return of (3.1)% in 2016. This increase was mainly due to strong growth in the U.S. equity markets based on improving economic data throughout the year and improvements in international markets due to decreasing political risk.

| Active members: | 2017 | 2016 | Increase (Decrease) |
|---|---|---|---|
| Fully vested | 1,814 | 2,064 | (250) |
| Nonvested: | | | |
| Hired or rehired before October 9, 2004 | 772 | 918 | (146) |
| Hired or rehired after October 9, 2004 | 2,585 | 2,292 | 293 |
| | 5,171 | 5,274 | (103) |

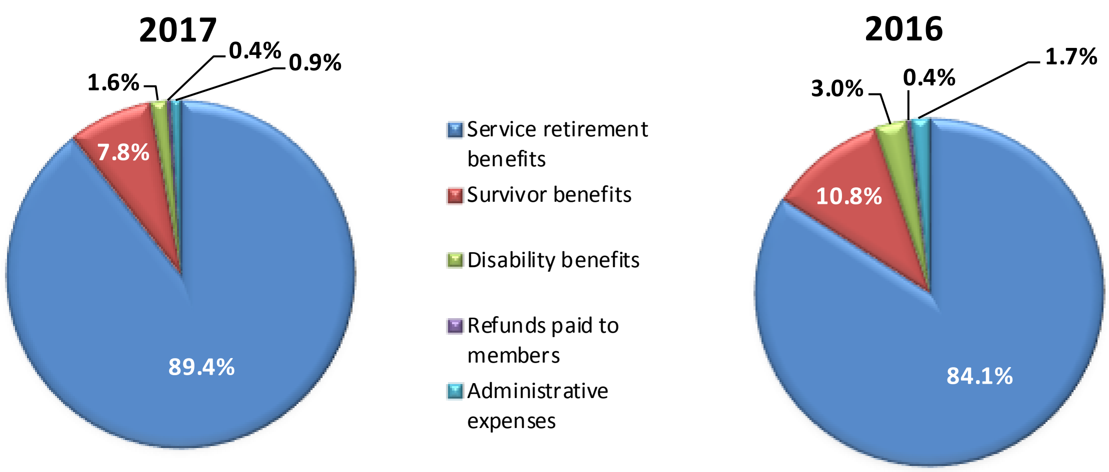
| | $000's | | Increase | Increase |
|---|---|---|---|---|
| | | | (Decrease) | (Decrease) |
| | 2017 | 2016 | Amount | Percentage |
| Member contributions | $ 40,104 | $ 39,017 | $ 1,087 | 2.8% |
| Employer contributions | 133,805 | 137,392 | (3,587) | -2.6% |
| Net investment gain (loss) | 667,476 | (135,833) | 803,309 | 591.4% |
| Total | $ 841,385 | $ 40,576 | $ 800,809 | 1973.6% |



## Deductions from Plan Net Position

The System was created to provide retirement benefits to retired Houston police officers and their dependents. Although this is still the primary purpose of the System, over the course of 70 years the System has also added survivor benefits and disability benefits. The cost of these programs includes benefit payments and refunds of contributions to terminated employees. The cost of administering the System is also paid from System assets.

| | $000's | | Increase (Decrease) Amount | Increase (Decrease) Percentage |
|---|---|---|---|---|
| | 2017 | 2016 | | |
| Service retirement benefits | $ 415,260 | $ 222,536 | $ 192,724 | 86.6% |
| Survivor benefits | 36,031 | 28,713 | 7,318 | 25.5% |
| Disability benefits | 7,442 | 7,827 | (385) | (4.9%) |
| Refunds paid to members | 1,696 | 978 | 718 | 73.4% |
| Administrative expenses | 4,238 | 4,585 | (347) | (7.6%) |
| Total | $ 464,667 | $ 264,639 | $ 200,028 | 75.6% |



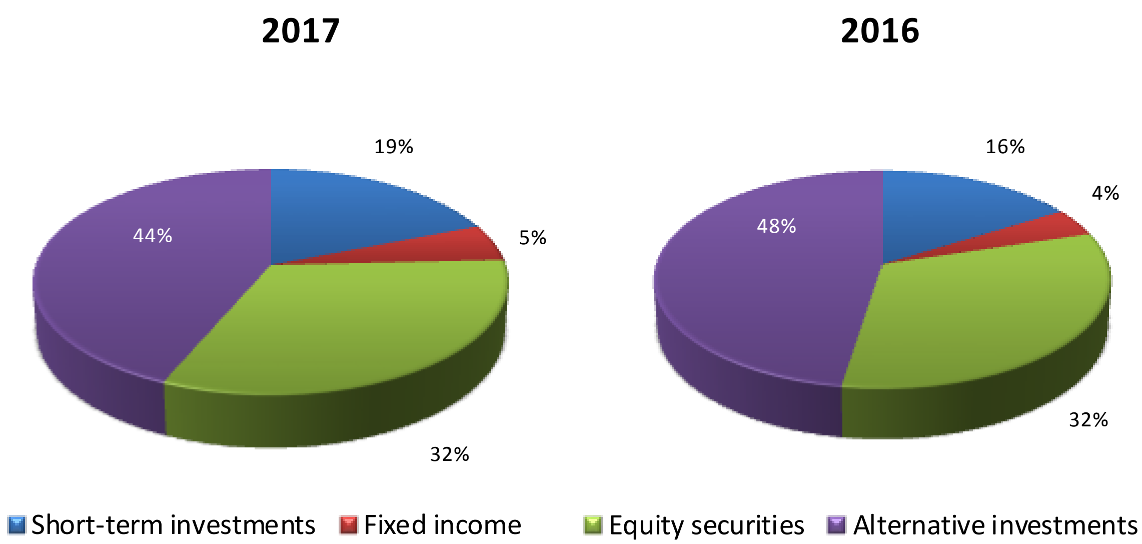

Total benefits paid, which include lump sum payments, increased in 2017 as compared to 2016 due mainly to the cost of living increase, an increase in the number of retirees, and an increase in the amount of lump sum payments. Administrative expenses decreased mainly due to the completion in the previous fiscal year of the upgrade project for the System's enterprise software system and website. For further information regarding the System's financial condition, refer to Management's Discussion and Analysis in the Financial Section of this report.

## Investments

The System invests funds entrusted to it exclusively for the benefit of its members. It avows an investment rule commonly known as the “prudent expert” rule, whereby from a procedural as well as substantive standpoint, it acts with the care, skill, prudence and diligence that a “prudent expert” acting in a similar capacity would act under similar circumstances.

The Board of Trustees believes that the System’s assets should be managed in a way that reflects the uniqueness of the System, and that the System’s assets should be diversified over a spectrum of investment vehicles. The determination of the appropriate asset mix is based on capital market assumptions that incorporate both historical and projected returns, volatility, liquidity and correlations of various asset classes.

| | $000's | | Increase (Decrease) | Increase (Decrease) |
|---|---|---|---|---|
| | 2017 | 2016 | Amount | Percentage |
| Short-term investments | $ 844,812 | $ 650,902 | $ 193,910 | 29.8% |
| Fixed income | 235,049 | 166,655 | 68,394 | 41.0% |
| Equity securities | 1,435,775 | 1,303,740 | 132,035 | 10.1% |
| Alternative investments | 1,939,049 | 1,919,630 | 19,419 | 1.0% |
| Total | $ 4,454,685 | $ 4,040,927 | $ 413,758 | 10.2% |




Fiscal year 2017 showed what a difference a year can make. Whereas fiscal year 2016 was a year of considerable uncertainty in the markets, fiscal year 2017 started with strong positive U.S. economic developments that lasted throughout most of the year, even with the uncertainty of the U.S. presidential election. Less-negative-than-expected international news led to decreasing political risk in global markets, helping global markets perform in line with U.S. markets for the first time since the financial crisis. This and improving U.S. economic data fueled positive investor sentiment, allowing the System to experience positive returns each month throughout the year.

The System's investment return was a positive 16.8% for fiscal year 2017. The System outperformed its benchmark rate of return by 2.7%, primarily due to its allocation to US equities. The System's domestic equity allocation returned 22.2%, outperforming its benchmark by 3.7%. The System's international equity allocation, returning 22.0%, outperformed its benchmark rate of return by 1.3%. The System's alternative investments in private equity outperformed its benchmark by 1.8% while the System's real estate allocation outperformed its benchmark by 3.5%.

The Board firmly believes that by maintaining a disciplined investment approach and with reasonable diversification, the System will enhance the likelihood of meeting its long-term investment goals. Further details regarding the System's investments are included in the Investment Section of this report.

## Funding

It is the System's objective to have enough money in reserve to provide members with promised benefits upon their retirement. The System's actuary conducts a periodic valuation to determine the adequacy of the current employer contribution rates, to describe the current financial condition of the System, and to analyze changes in the System's condition. An actuarial accrued liability is the liability for service already rendered by former and present employees. An actuarial accrued surplus is the excess of the System's actuarial value of assets over the actuarial accrued liability. Any liability or surplus is amortized over 30 years from the valuation date.

The most recent actuarial valuation shows the funded position of the System decreased slightly from 79.7% at July 1, 2015 to 77.5% at July 1, 2016. The actuarial accrued liability increased $307 million and the actuarial value of assets increased $111 million. As a result, the System's Unfunded Actuarial Accrued Liability increased $196 million to $1,351 million as of July 1, 2016. The increase in the Unfunded Actuarial Accrued Liability is due to a combination of factors including the increase in the actuarial value of assets less than assumed and contributions below the actuarially required amount as more fully described in the footnotes and schedules to the financial statements. Further details regarding the System's actuarial liability are included in the Actuarial Section of this report.

## Major Initiatives

During the year, the System worked diligently with the City to ensure the long-term health of the System and its ability to meet its mission. Many hours were spent working to address the System's unfunded liability through a risk sharing approach, and on July 1, 2017, the System's Governing Statue was amended in the 85th regular session of the Texas legislature. In addition to changes to member and City contributions, COLAs, and other changes, in fiscal year 2018 the System will receive $750,000,000 from the City's issuance of pension obligation bonds.

The System continues to provide a high level of service to our members. The Financial Planning and Estate Planning services allow members to meet one on one with System professional staff to discuss financial issues and work to prepare different legal documents in order to protect the member's estate. These services are free of charge and continue to be highly valued by System members.

The Member Website continues to grow and provide members and survivors more information on their benefits and provide them a self-service for standard processes. The System continues to receive positive feedback and increased participation through the Member Website.

## Professional Services

The Board of Trustees appoints professional consultants to perform services that are considered essential for the operation of the System. The independent auditor's report, issued by BDO USA, LLP, is included on page 17 of this report. The actuarial report, certified by Gabriel Roeder Smith & Company, is included on page 69. Professional service providers who provided services to the System during the year are listed on the next page.

| | |
|---|---|
| **Actuarial** | Gabriel Roeder Smith & Company |
| **Auditing** | BDO USA, LLP |
| | Bickley Prescott & Co. |
| **Consulting** | Franklin Park Associates, LLC |
| | Mercer Investment Consulting Inc. |
| **Custodian** | The Northern Trust Company |
| **Legal Service** | Burford Perry LLP |
| | IceMiller LLP |
| | Kasowitz, Benson, Torres & Friedman LLP |

| | |
|---|---|
| **Legal Service/Lobbyists** | HillCo Partners, LLC |
| | Locke Lord LLP |
| **Money Management** | AQR Capital Management LLC |
| | BlackRock Institutional Trust Company |
| | Blackstone Alternative Solutions LLC |
| | Brevan Howard Capital Management LP |
| | Bridgewater Associates, Inc. |
| | The Northern Trust Company |
| | Parametric |
| | Shenkman Capital Management, Inc. |

## 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 Police Officers' Pension System for its comprehensive annual financial report for the fiscal year ended June 30, 2016. This was the 23rd 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.

## Acknowledgements

The compilation of this report reflects the combined effort of the System's staff under the guidance of the Board of Trustees. Its goal is to provide complete and reliable information as a basis for management decisions and compliance with legal provisions as well as responsible stewardship of funds contributed by its members and the City of Houston.

We would like to take this opportunity to express our gratitude to the staff, System advisors, and to the many other people who have contributed to the successful operation of the System.

Sincerely,

Board of Trustees

Board of Trustees

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FOR TODAY & TOMORROW



**Houston Police Officers' Pension System**
*602 Sawyer, Suite 300*
*Houston, Texas 77007*
*(713) 869-8734 phone*
*(713) 869-7657 fax*
*www.hpops.org*

December 4, 2017

To the Members
Houston Police Officers' Pension System
Houston, Texas

The Houston Police Officers' Pension System (HPOPS) is pleased to bring you the fiscal year 2017 Comprehensive Annual Financial Report (CAFR). The CAFR provides a comprehensive picture of HPOPS' finances for the fiscal year ending June 30, 2017, as well as an overview of the year's highlights.

This past year was one of strong growth both here in the U.S. and globally. Domestically, markets remained strong with continuously improving U.S. economic data throughout the year despite the uncertainty of a presidential election and a second rate hike by the Federal Reserve. Pursuant to the decreasing political risk and solid economic data in global markets, U.S. and global markets performed in line for the first time in a long time. HPOPS experienced positive returns each month throughout the year, posting a positive return of 16.8% and outperforming its benchmark rate of return by 2.7%.

There were no significant changes to the System's asset allocation during the year. The recovery was further along in the U.S. markets, which provided opportunities for greater growth abroad, so HPOPS gradually increased its international holdings to capitalize on greater growth opportunities globally. Also, to protect against the event of a market correction, HPOPS has increased our fixed income exposure. HPOPS will continue to diligently maintain perspective with an ever vigilant eye on the opportunities and risks in the coming year.

The lessons learned over the past few years and our stewardship allow us to fulfill our mission to responsibly manage the System in the best interests of the members and beneficiaries so that they may have peace of mind knowing their pension benefits are secure. I wish to express appreciation to the staff and professional consultants who work so effectively to ensure the continued successful operation of HPOPS.

We at HPOPS continue to plan for the future of all of our current members as well as those members to come. We encourage you to read on to learn more about HPOPS.

Sincerely,

Terry A. Bratton
Chairman

## BOARD OF TRUSTEES AND ADMINISTRATIVE STAFF

### TRUSTEES ELECTED BY ACTIVE, INACTIVE AND RETIRED POLICE OFFICERS

TERRY BRATTON
*Chairman*

GEORGE GUERRERO
*Vice-Chairman*

J. LARRY DOSS
*Secretary*

DWAYNE READY
*Trustee*

MICHAEL J. NEWSOME
*Trustee*

### TRUSTEES BY STATE STATUTE

MELISSA DUBOWSKI
*City Treasurer*

DON A. SANDERS
*Mayor's Representative*

### POLICE PENSION OFFICE PERSONNEL

JOHN E. LAWSON
*Executive Director*

TIFFANY WILLIAMSON
*Administrative Assistant*

MICHELLE HARTSFIELD
*Receptionist*

CLARK OLINGER
*Benefits Director*

SHERYL BAINES
*Benefits Specialist*

REGINA WARD
*Benefits Specialist*

JUDY G. BAKER
*Benefits Manager*

BEVERLY LOCKETT
*Benefits Specialist*

RICHARD GABLE
*Financial Planner*

PATRICK S. FRANEY
*Chief Investment Officer*

STACEY GALO
*Investment Analyst*

NEAL WALLACH
*Investment Analyst/Strategist*

KEVIN T. O'TOOLE
*Accounting Director*

LAJUANA WINTERS
*Accountant*

ROXANNA OLIVER
*Investments Accountant & Administrator*

GREG SIMEON
*IT Director*

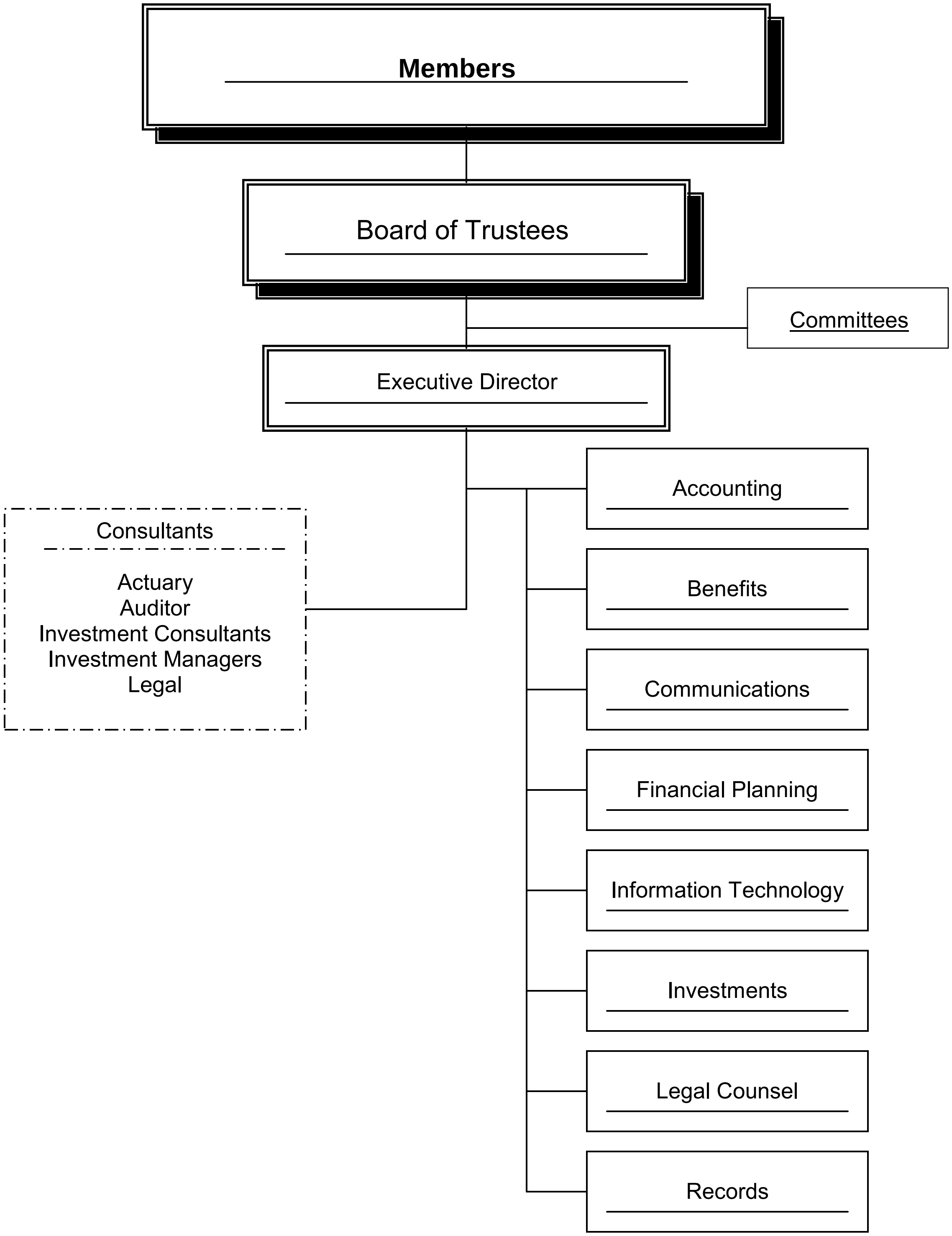
CHRISTOPHER SAUCEDA
*IT Systems Administrator*

STEPHANIE SEGURA
*Records Manager*

NICK DANG
*General Counsel*

CHRISTOPHER FLORES
*Attorney*

## ORGANIZATION CHART




See Page 54 – Summary of Investment and Professional Services for a list of Consultants

Government Finance Officers Association

# Certificate of Achievement for Excellence in Financial Reporting

Presented to

**Police Officers Pension System of the City of Houston, Texas**

For its Comprehensive Annual
Financial Report
for the Fiscal Year Ended

**June 30, 2016**

Executive Director/CEO

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SECTION TWO

# FINANCIAL SECTION


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381,948.49
2,339.93
63.50
21.14
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392.50
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2929 Allen Parkway, 20th Floor
Houston, TX 77019

## Independent Auditor's Report

The Board of Trustees
Houston Police Officers' Pension System
Houston, Texas

### *Report on the Financial Statements*

We have audited the accompanying financial statements of Houston Police Officers' Pension System (the System), a component unit of the city of Houston, Texas, which comprise the statements of fiduciary net position as of June 30, 2017 and 2016, and the related statements of changes in fiduciary net position for the years then ended, and the related notes to the financial statements.

### *Management's Responsibility for the Financial Statements*

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

### *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, 2017 and 2016, and the changes in its financial position for the years then ended, in accordance with accounting principles generally accepted in the United States of America.

***Emphasis of Matter***

The System has adopted the disclosure requirements of GASB 72, Fair Value Measurement & Application in 2016. The provisions of the additional disclosure requirements are discussed in Note 4 to the financial statements. Our opinion is not modified with respect to this matter.

***Other Matters***

*Required Supplementary Information*

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

*Other Information*

Our audits were conducted for the purpose of forming an opinion on the basic financial statements as a whole. The accompanying supplemental schedules of "Investment, Professional and Administrative Expenses" and "Summary of Investments and Professional Services" are presented for the purpose of additional analysis and are not a required part of the basic financial statements. Such 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. The information has been subjected to the auditing procedures applied in the audits 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 information is fairly stated in all material respects in relation to the basic financial statements as a whole.

BDO USA, LLP

Houston, Texas
November 7, 2017

## Management’s Discussion and Analysis
## Fiscal Year Ended June 30, 2017

The discussion and analysis of the financial performance of the Houston Police Officers’ Pension System (the System), provides an overall review of the System’s financial activities for the fiscal years ended June 30, 2017, 2016 and 2015. The intent of this discussion and analysis is to look at the System’s financial performance as a whole; readers should review the financial statements, notes to the financial statements, required supplementary information and other schedules, in order to enhance their understanding of the System’s financial performance.

### Financial Statements

These financial statements consist of the Statements of Fiduciary Net Position, Statements of Changes in Fiduciary Net Position, Notes to Financial Statements, Schedules, and other unaudited required supplementary information. The System is a single employer contributory defined benefit pension plan. The System is a component unit of the City of Houston, Texas (the City) only to the extent the System receives contributions equal to a fixed amount or percentage of the pensionable pay of active members in accordance with Article 6243g-4, Vernon’s Texas Civil Statutes (the Governing Statute), or contracts pursuant to Section 27 thereof, and as such, its reports are included in the Fiduciary Funds of the City as restricted assets.

### Financial Highlights

The System presents its financial statements solely on the accounts of the System. The accrual basis of accounting is used by the System, whereby revenues are recognized when they are earned and collection is reasonably assured, and expenses are recognized when the liability has been incurred. Investments are reported at fair value.

A summary of the Statements of Fiduciary Net Position for the System is as follows ($000’s):

| As of June 30: | **2017** | 2016 | 2015 |
|---|---|---|---|
| **Assets** | | | |
| Investments at fair value | **$ 4,454,685** | $ 4,040,927 | $ 4,277,765 |
| Invested securities lending collateral | **25,778** | 24,211 | 50,613 |
| Receivables | **5,997** | 41,949 | 31,264 |
| Cash | **104** | 304 | 352 |
| Total Assets | **4,486,564** | 4,107,391 | 4,359,994 |
| **Liabilities** | | | |
| Due for purchase of investments | **2,018** | 894 | 3,357 |
| Securities lending collateral | **25,778** | 24,211 | 50,613 |
| Accrued investment and professional fees | **1,127** | 1,172 | 878 |
| Other liabilities | **463** | 654 | 623 |
| Total Liabilities | **29,386** | 26,931 | 55,471 |
| Net position restricted for pensions | **$ 4,457,178** | $ 4,080,460 | $ 4,304,523 |

*See accompanying independent auditor's report.*

The System’s net position increased by approximately $376,718 thousand in fiscal year 2017 over 2016 after a decrease by approximately $(224,063) thousand in fiscal year 2016 over 2015. Fiscal year 2017 began strong with positive U.S. economic developments and less-negative-than-expected international news. The uncertainty of the U.S. presidential election slowed growth, but U.S. equity markets reached all-time highs after the election while international markets were driven by solid economic data. Positive investor sentiment fueled by improving U.S.

economic data and decreasing political risk helped global markets perform in line with US markets for the first time since the financial crisis, which allowed the System to experience positive returns each month throughout the year. In contrast, fiscal year 2016 was a year of considerable uncertainty in the markets. The year started with diminishing concerns about the Greek crisis but increasing concerns about China, which put a damper on world markets during the first half of the year, driving returns negative. The second half of the year saw turbulence in China, interest rate increases, a substantial drop in oil and commodities prices, and politics rattle investors and continued a decrease in returns. Even though markets bounced back in March, as investor confidence returned amid lessening fears, a stronger dollar and strengthening fundamentals in the U.S., the year ended with more uncertainty with another economic slowdown in China and the "Brexit" referendum.

The System experienced a positive investment return of 16.8% in 2017 as opposed to a negative return of (3.1)% in 2016 and a positive return of 0.8% in 2015. These rates of return calculations were prepared using a time-weighted rate of return in accordance with The CFA Institute's Global Investment Performance Standards and, as such, cannot be recalculated from the information provided herein. Changes in receivables are primarily a result of the timing of investment transactions and of the receipt of $14,284 thousand for City contributions (see Note 2 and Note 5 to the financial statements).

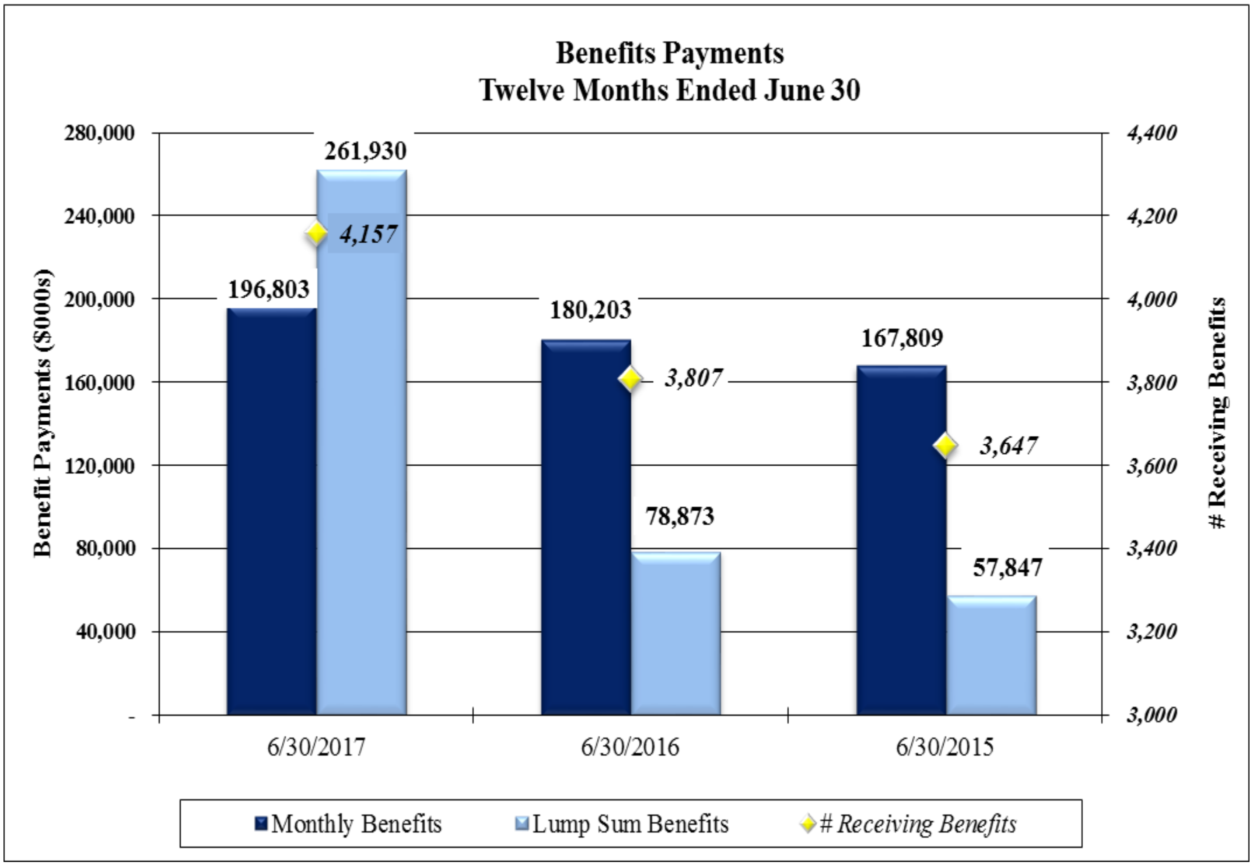
A summary of the Statements of Changes in Fiduciary Net Position for the System is as follows ($000's):

| Years ended June 30: | **2017** | 2016 | 2015 |
|---|---|---|---|
| Contributions: | | | |
| City | $ **133,805** | $ 137,392 | $ 113,665 |
| Members | **40,104** | 39,017 | 37,719 |
| Total contributions | **173,909** | 176,409 | 151,384 |
| Net income (loss) from investing activities | **667,171** | (136,018) | 35,249 |
| Net income from securities lending activities | **305** | 185 | 92 |
| Total additions | **841,385** | 40,576 | 186,725 |
| Deductions: | | | |
| Benefits paid to members | **458,733** | 259,076 | 225,656 |
| Refunds to members | **1,696** | 978 | 945 |
| Professional and administrative expenses | **4,238** | 4,585 | 3,478 |
| Total deductions | **464,667** | 264,639 | 230,079 |
| Net increase/(decrease) | **376,718** | (224,063) | (43,354) |
| Net position restricted for pensions | | | |
| Beginning of period | **4,080,460** | 4,304,523 | 4,347,877 |
| End of period | $ **4,457,178** | $ 4,080,460 | $ 4,304,523 |

*See accompanying independent auditor's report.*

The June 30, 2011 Agreement with the City requires contribution payments for fiscal year 2017 equal to a $133,000 thousand fixed payment. For fiscal year 2016, the City was contractually required to contribute a $123,000 thousand fixed payment. For fiscal year 2015, the City was contractually required to contribute a $113,000 thousand fixed payment. These contractual provisions account for the increase in City contributions for the years ended June 30, 2017; June 30, 2016; and June 30, 2015. As discussed in Note 2 to the financial statements, the contributions were paid in their entirety from the City budget in 2017, 2016, and 2015.

"Benefits paid to members" consist of both lump sum payments and monthly payments of retirement, disability, and survivor benefits. The System's benefit payment structure provides that members and survivors have the option to receive distributions from their lump sum accounts either on or after the date they begin receiving monthly benefit payments. Due to this ad hoc nature of lump sum distributions the summary results in the accompanying Statements of Changes in Fiduciary Net Position will not show any distinct trends in the "Benefits paid to members" category. The chart below compares the components of benefits paid to members for the years ended June 30, 2017, 2016, and 2015.




For each year, the annual cost of living adjustment (COLA) along with the increase in the number of benefit recipients accounts for the majority of the increase in benefit payments. Total benefits paid in 2017 increased from 2016 by approximately $199,657 thousand or 77.1% compared to an increase of approximately $33,420 thousand or 14.8% between 2015 and 2016. The increase in 2017 is due to a $16,600 thousand increase in monthly benefits and a $183,057 thousand increase in lump sum benefits compared to a $12,394 thousand increase in monthly benefits and a $21,026 thousand increase in lump sum benefits in 2016. Average monthly benefit payments were $16,400 thousand and $15,017 thousand per month for 2017 and 2016 respectively. The increase of $1,383 thousand or 9.2% in 2017 was greater than the increase of $1,033 thousand or 7.4% in 2016 while the number of members and survivors who are receiving benefits increased by 350 in 2017 and 160 in 2016.

There was a decrease of $347 thousand in professional and administrative expenses during 2017 as compared to 2016. This decrease is due mainly to the completion in the previous fiscal year of the upgrade project for the System's enterprise software system and website, resulting in a decrease in expenses of $494 thousand, and an increase of $189 thousand for actuarial services. The increase of $1,107 thousand in professional and administrative expenses during

2016 as compared to 2015 was mainly due to an increase for improvements to the System's enterprise software system, for actuarial services and for legal services discussed further in Note 7.

## System Highlights

The System's funded ratio pursuant to its most recent actuarial valuation dated July 1, 2016 was 77.5% representing an unfunded actuarial accrued liability of $1,350,934 thousand. The System's funded ratio as of July 1, 2015 was 79.7% representing an unfunded actuarial accrued liability of $1,155,510 thousand.

The System's Governing Statute was amended July 1, 2017, by the Texas Legislature during the 85th legislature regular session which will affect the benefit structure and contributions by the City and members and is discussed further in Note 10 to the financial statements.

## Contacting the System's Management

This financial report is designed to provide members and other users with a general overview of the System's finances and to show the System's accountability for the funding it receives. If you have questions about this report, you may contact the System's Executive Director at 602 Sawyer, Suite 300, Houston, TX 77007 or by phone at 713-869-8734.

# Houston Police Officers' Pension System

## Statements of Fiduciary Net Position ($000's)

| *June 30,* | | **2017** | | 2016 |
|---|---|---|---|---|
| **Assets** | | | | |
| **Investments, at fair value** (Note 3 and Note 4) | | | | |
| Short term investments | **$** | **844,812** | $ | 650,902 |
| Fixed income investments | | **235,049** | | 166,655 |
| Equity securities | | **1,435,775** | | 1,303,740 |
| Alternative investments | | **1,939,049** | | 1,919,630 |
| Total Investments | | **4,454,685** | | 4,040,927 |
| **Invested securities lending collateral** (Note 4) | | **25,778** | | 24,211 |
| **Receivables** | | | | |
| City (Note 2 and Note 5) | | **-** | | 14,284 |
| Members | | **1,516** | | 1,396 |
| Investments | | **3,196** | | 2,613 |
| Due from sale of investments | | **1,262** | | 23,643 |
| Other receivables | | **23** | | 13 |
| Total Receivables | | **5,997** | | 41,949 |
| **Cash** | | **104** | | 304 |
| Total Assets | **$** | **4,486,564** | $ | 4,107,391 |
| **Liabilities** | | | | |
| **Payables** | | | | |
| Due for purchase of investments | | **2,018** | | 894 |
| Securities lending collateral (Note 4) | | **25,778** | | 24,211 |
| Accrued investment and professional fees | | **1,127** | | 1,172 |
| Other liabilities | | **463** | | 654 |
| Total Liabilities (Note 9) | | **29,386** | | 26,931 |
| **Net position restricted for pensions** | **$** | **4,457,178** | $ | 4,080,460 |

*See accompanying independent auditor's report and notes to financial statements.*

# Houston Police Officers' Pension System

## Statements of Changes in Fiduciary Net Position ($000's)

| *Years ended June 30,* | | **2017** | | 2016 |
|---|---|---|---|---|
| **Contributions** (Note 2 and Note 5) | | | | |
| City | **$** | **133,805** | $ | 137,392 |
| Members | | **40,104** | | 39,017 |
| Total contributions | | **173,909** | | 176,409 |
| **Investment income** | | | | |
| Net appreciation (depreciation) in fair value of investments | | **632,552** | | (152,667) |
| Interest: | | | | |
| Short-term investments | | **5,574** | | 2,218 |
| Fixed income investments | | **10,215** | | 10,104 |
| Total interest income | | **15,789** | | 12,322 |
| Dividends | | **32,923** | | 18,714 |
| Total investment income (loss) | | **681,264** | | (121,631) |
| Less: investment expense | | **(14,093)** | | (14,387) |
| **Net income (loss) from investing activities** | | **667,171** | | (136,018) |
| **Securities lending activities** (Note 4) | | | | |
| Securities lending income | | **407** | | 250 |
| Securities lending expense | | **(102)** | | (65) |
| **Net income from securities lending activities** | | **305** | | 185 |
| **Total additions** | | **841,385** | | 40,576 |
| **Deductions** | | | | |
| Benefits paid to members | | **458,733** | | 259,076 |
| Refunds to members (Note 1) | | **1,696** | | 978 |
| Professional and administrative expenses | | **4,238** | | 4,585 |
| **Total deductions** | | **464,667** | | 264,639 |
| Net increase (decrease) in net position | | **376,718** | | (224,063) |
| **Net position restricted for pensions** | | | | |
| Beginning of period | | **4,080,460** | | 4,304,523 |
| End of period | **$** | **4,457,178** | $ | 4,080,460 |

*See accompanying independent auditor's report and notes to financial statements.*

## 1. Plan Description and Contribution Information

*General* – The Houston Police Officers' Pension System (the System) was created in 1947 by an act of the Fiftieth Legislature of the State of Texas, and is governed by Article 6243g-4, Vernon's Texas Civil Statutes (the Governing Statute) and contracts pursuant to Section 27 thereof. The System is a single employer contributory defined benefit pension plan covering police officers employed full time by the City of Houston (the City or the Employer) that provides for service, disability and death benefits for eligible members and their beneficiaries. The System is a local governmental plan and, therefore, is not subject to the Employee Retirement Income Security Act of 1974 (ERISA). The System is a component unit of the City only to the extent the System receives contributions equal to an amount or percentage of pay of active members in accordance with the Governing Statute.

The System's Board of Trustees in accordance with the Governing Statute is responsible for the general administration, management, and operation of the pension system, including the direction of investment and oversight of the fund's assets. The System's Board of Trustees is composed of seven members as follows: (1) the administrative head of the City or the administrative head's authorized representative; (2) three employees of the police department having membership in the pension system, elected by the active, inactive, and retired members of the pension system; (3) two retired members who are receiving pensions from the system and are not officers or employees of the City, elected by the active, inactive, and retired members of the pension system; and (4) the treasurer of the City or the person discharging the duties of the City treasurer.

At June 30, the System's membership consisted of the following:

| June 30, | 2017 | 2016 |
|---|---|---|
| Retirees and beneficiaries: | | |
| Currently receiving benefits | 4,157 | 3,807 |
| Not yet receiving benefits | 27 | 22 |
| Active members: | | |
| Fully vested | 1,814 | 2,064 |
| Nonvested: | | |
| Hired or rehired before October 9, 2004 | 772 | 918 |
| Hired or rehired after October 9, 2004 | 2,585 | 2,292 |
| Total members | 9,355 | 9,103 |

The following sections describe the benefit structure in effect at June 30, 2017 and 2016. On September 29, 2004, the System and the City entered into an agreement (the October 9, 2004 Agreement) that altered the benefit structure of the System. On June 30, 2011, the System and the City entered into an agreement (the June 30, 2011 Agreement) that altered the City payment schedule and extended the contract term which began on October 9, 2004, through June 30, 2023 and thereafter renews for one-year terms through June 30, 2040 unless either party terminates the agreement. The benefits described below include those for members hired or rehired on or before October 9, 2004 as well as benefits for members hired or rehired subsequent to October 9, 2004.

*Eligibility* – Members become eligible to receive a service pension upon retirement with 20 years of service. Members also have the option to select a Delayed Retirement, which allows for vesting after 10 years of service with a pension benefit payable at age 60. Members hired or rehired subsequent to October 9, 2004 are eligible to receive a service pension upon attaining age 55 and 10 years of service.

*Benefits* – Retirement benefits are equal to 2.75% of the member's pensionable pay for each of the member's first 20 years of service plus 2.00% of pensionable pay for each year in excess of 20 years with no maximum percentage. Members hired or rehired subsequent to October 9, 2004 accrue benefits equal to 2.25% of the member's pensionable pay for each of the member's first 20 years of service plus 2.00% of the member's pensionable pay for each year in excess of 20 years subject to a maximum of 80%. Retired members and surviving spouses are entitled to receive an additional $150 per month in order to defray group medical insurance costs.

*Pensionable Pay* - Eligible members of the System will have their retirement or DROP benefit (see below) calculated on pensionable pay, which is referred to as Final Average Pay, and is defined as the average of all pay types received by a member over the three years prior to retirement or entrance into DROP exclusive of all categories of overtime.

*Deferred Retirement Option Plan* – The Deferred Retirement Option Plan (DROP) provides for an optional method of accruing pension benefits. Generally, members with at least 20 years of service are eligible to participate in the DROP. Members hired or rehired subsequent to October 9, 2004 are not eligible to participate in DROP or Back-DROP. Upon termination of employment participating members receive their pension benefit in the form of an annuity and a lump sum benefit. The annuity is the member's pension benefit at the time of enrollment in the DROP plus any subsequent cost of living adjustments. The lump sum benefit is the accumulated balance in the member's notional DROP account which is equal to an amount calculated as if the member's annuity, employee contributions and an interest component had been deposited in a separate account in the member's name during the member's participation in DROP. Prior to October 9, 2004, 100% of a member’s contributions were credited to his or her notional DROP account. Subsequent to that date, an eligible member contributes 9.00% of pensionable pay with 8.75% of pensionable pay credited to his or her notional DROP account and the additional 0.25% credited to the System’s general fund.

A Back-DROP benefit is also available for all eligible participants. The Back-DROP option allows a DROP member to recalculate his or her DROP notional account by selecting a different entrance date than that originally selected by the member upon entrance into DROP. The Back-DROP entry date cannot be prior to the later of October 21, 1995 or the date the member attained 20 years of credited pension service.

*Cost of Living Adjustments* – Pension benefits and the monthly DROP benefits are adjusted each year equal to 80% of the increase in the Consumer Price Index for all Urban Consumers for the preceding year subject to minimum and maximum increases of 2.4 % and 8.0%, respectively.

*Disability Benefits* – Duty connected disability benefits are equal to the greater of 55% of pensionable pay or the accrued service pension. Disabled members who qualify for a Catastrophic Disability, as defined, receive a disability benefit equal to 100% of pensionable pay. Members hired or rehired subsequent to October 9, 2004 are eligible for a duty connected disability benefit equal to the greater of 45% of the member’s pensionable pay or the accrued service pension.

Members determined to be eligible for a non duty-connected disability benefit are entitled to a benefit of either 27.5% of pensionable pay, if the member has 10 or fewer credited years of service, or 2.75% per year for credited service in excess of 10 years. Members hired or rehired subsequent to October 9, 2004 are eligible for a non-duty connected disability benefit equal to the greater of 22.5% of the member’s pensionable pay or 2.25% per year for credited service equal to or in excess of 10 years up to 20 years and 2.00% per year for credited service equal to or in excess of 20 years.

*Death Benefits* – Death benefits are available to a surviving spouse, dependent children or a dependent parent in the event of the death of a member either after disability or service retirement, or prior to retirement.

*Refunds of Member Contributions* – A member with less than 20 years of credited pension service may elect to obtain a refund of member contributions upon termination of service with the Houston Police Department (HPD). This refund does not include interest. Members with at least 10 but less than 20 years of credited pension service, who terminate service with the HPD, have the option of a Delayed Retirement benefit. Members hired or rehired subsequent to October 9, 2004 are eligible for a refund of contributions until they attain age 55 and 10 years of service.

*Delayed Retirement* – A member with at least 10 but less than 20 years of credited pension service at termination of employment with the HPD has the option of either a refund of member contributions, without interest, or a Delayed Retirement benefit. The Delayed benefit is payable at age 60 and is calculated at 2.75% of pensionable pay for each year of credited pension service. Members hired or rehired subsequent to October 9, 2004 with more than 10 years of service are eligible for a Delayed Retirement payable at age 55 calculated at 2.25% of pensionable pay for each year of credited pension service.

*Supplemental Monthly Benefit* (13th check) – In years in which certain investment performance and actuarial funding requirements are met, the System issues a supplemental monthly benefit payment to retired members and a supplemental credit to DROP participants’ accounts in an amount equal to their normal monthly benefit. This benefit is not available for any year in which the System’s funded ratio is less than 120%. Members hired or rehired subsequent to October 9, 2004 are not eligible for this benefit.

*Lump Sum Benefit* – Members retiring with a service or disability benefit receive a one-time $5,000 lump sum benefit. Members hired or rehired subsequent to October 9, 2004 are not eligible for this benefit.

*Reciprocal Retirement Program* – Members who have not attained the necessary years of service for retirement are eligible to participate in the System's Reciprocal Retirement Program if they also have pension service with other City departments. This program allows members with the necessary cumulative years of service to combine their service credit with other City retirement systems and receive a proportionate retirement benefit from the System.

*Post Retirement Option Plan* – The Post Retirement Option Plan (PROP) allows retired members to have all or a portion of their monthly retirement and DROP lump sum credited to a notional account maintained by the System which accumulates interest and can be disbursed to the member under certain options as designated by the System. Surviving spouses can transfer a DROP or PROP balance to a PROP account of their own but are not eligible to credit all or a portion of their survivor benefit to a PROP account. Members hired or rehired subsequent to October 9, 2004 are not eligible for this benefit.

*Partial Lump Sum Option Plan* – The Partial Lump Sum Option Plan (PLOP) provides for an optional lump sum payment of a portion of a member's retirement benefit. A lump sum payment of not more than 20% of the actuarial value of the member's accrued pension at retirement shall be made available to persons who become active members of the System subsequent to October 9, 2004. The benefit shall be actuarially neutral. Thus, the value of the pension the member receives shall be reduced actuarially to reflect the lump sum payment.

## 2. Contributions and Reserves

Contributions – Members hired prior to October 9, 2004 are required to contribute 9.00% of pay and members hired or rehired subsequent to October 9, 2004 contribute 10.25% of pay. Contributions are made on a pre-tax basis pursuant to Governing Statutes.

In the October 9, 2004 Agreement, it was agreed that in lieu of contributions to the System made pursuant to actuarial valuations, the City will make cash payments to the System in accordance with a payment schedule as provided for in such Agreement. In the June 30, 2011 Agreement, it was agreed that for fiscal year 2017 the amount to be contributed was a $133,000 thousand fixed payment. For fiscal year 2016, the amount to be contributed was a $123,000 thousand fixed payment.

For all subsequent fiscal years, and until the funded ratio reaches 100%, City payments shall increase each fiscal year by $10,000 thousand until said 100% funding is reached. Once the System reaches a 100% funded ratio, the City will pay the actuarially required rate, but not less than 16.00% of payroll. In addition, once the Funded Ratio reaches 80%, this becomes the new floor and if it should ever decline below such 80% level, in the fiscal year next following such determination, the City shall pay such additional amounts to the System as shall be necessary to increase the Funded Ratio to 80%. The Funded Ratio was determined to be 79.7% in the July 1, 2015 actuarial valuation. Therefore, the City was required to pay an additional amount of $14,284 thousand in fiscal year 2017. The Funded Ratio was determined to be 77.5% in the July 1, 2016 actuarial valuation. Therefore, the City would be required to pay an additional amount of $148,576 thousand in fiscal year 2018. However, the System's Governing Statute was amended July 1, 2017, by the Texas Legislature during the 85th legislature regular session which removed this requirement and is discussed further in Note 10 to the financial statements.

City contributions in the Statements of Changes in Fiduciary Net Position may be greater than the contractually agreed amounts, as members are allowed to contribute accumulated sick and vacation pay to the System upon retirement and such contributions are classified as City contributions.

Pursuant to the terms of the June 30, 2011 Agreement and based on the July 1, 2016 actuarial valuation, the City contribution rates and the Actuarial Determined Contributions (ADC) are as shown in the table on the following page for the ten years ending June 30, 2027.

| ($000's)<br>Years Ended June 30, | Actuarial Determined Contribution (ADC) | Projected City Contributions<br>Annual Payment | Accrual for Funded Ratio < 80% | Total | As a Percentage of ADC | ADC as a Percentage of Pay |
|---|---|---|---|---|---|---|
| 2018 | $ 177,921 | $ 143,000 | $ 173,877 | $ 316,877 | 178.1 % | 42.1 % |
| 2019 | 180,354 | 153,000 | 177,740 | 330,740 | 183.4 | 42.1 |
| 2020 | 182,470 | 163,000 | 179,170 | 342,170 | 187.5 | 41.9 |
| 2021 | 180,076 | 173,000 | 116,326 | 289,326 | 160.7 | 40.6 |
| 2022 | 174,395 | 183,000 | 11,518 | 194,518 | 111.5 | 38.6 |
| 2023 | 173,835 | 193,000 | - | 193,000 | 111.0 | 37.7 |
| 2024 | 172,540 | 203,000 | - | 203,000 | 117.7 | 36.6 |
| 2025 | 169,963 | 213,000 | - | 213,000 | 125.3 | 35.3 |
| 2026 | 166,272 | 223,000 | - | 223,000 | 134.1 | 33.8 |
| 2027 | 161,508 | 233,000 | - | 233,000 | 144.3 | 32.1 |

The System's Governing Statute was amended July 1, 2017, by the Texas Legislature during the 85th legislature regular session which will affect the contributions by the City and is discussed further in Note 10 to the financial statements.

## 3. Summary of Significant Accounting Policies

*Basis of Presentation* – As defined by generally accepted accounting principles established by the Governmental Accounting Standards Board (GASB), the accompanying 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 service, disability and death benefits required under the terms of the Governing Statutes and amendments thereto.

*Basis of Accounting* - Basis of accounting is the method by which revenues and expenses are recognized in the accounts and are reported in the financial statements. The accrual basis of accounting is used for the System. Under the accrual basis of accounting, revenues are recognized when they are earned and collection is reasonably assured, and expenses are recognized when the liability is incurred. Member contributions are recognized in the period in which the contributions are due. Employer contributions are recognized when due and the employer has made a legally required commitment to provide the contributions. Benefits and refunds are recognized when due and payable in accordance with the terms of the Governing Statute. Dividend income is recorded on the ex-dividend date. Income from other investments is recorded when earned. Gains and losses on sales of securities are recognized on the trade date. The cost of investments sold is determined using the average cost method.

*Administrative Costs* – All administrative costs of the System are paid from the System's assets.

*Federal Income Tax* – A favorable determination that the System is qualified and exempt from Federal income taxes was received on September 24, 2014. The System’s Board of Trustees believes that the System is designed and continues to operate in compliance with the applicable requirements of the Internal Revenue Code.

*Use of Estimates* – The preparation of the System’s financial statements, in conformity with accounting principles generally accepted in the United States of America, requires management to make significant estimates and assumptions that affect the reported amounts and net plan assets at the date of the financial statements and the actuarial information included in the footnotes to the financial statements as of the benefit information date, the changes in the System’s net position during the reporting period and, when applicable, disclosures of the contingent assets and liabilities at the date of the financial statements. Actual results could differ from those estimates.

### 4. Investments

*Investment Policy* – The System's policy in regard to the allocation of invested assets is established and may be amended by the System's Board of Trustees by a majority vote of its members. It is the policy of the System's Board of Trustees to pursue an investment strategy with a view toward the long term that maximizes the return on the System's assets with acceptable target levels of leverage, loss of capital, and volatility risk through the prudent diversification of the portfolio across a broad selection of distinct asset classes. The System's investment policy discourages the use of cash equivalents, except for liquidity purposes. The following was the Board's adopted asset allocation policy as of June 30, 2017:

| Asset Class | Target Allocation |
|---|---|
| Domestic equity | 30.00 % |
| International equity | 20.00 |
| Fixed income | - |
| Credit | 12.00 |
| Alternative investments: | |
| Private equity | 17.50 |
| Real estate | 10.00 |
| Risk parity | 10.25 |
| Hedge funds | 10.00 |
| Cash | (9.75) |
| Total | 100.00 % |

*Investment Valuation* - Statutes of the State of Texas authorize the System to invest surplus funds in a manner provided by the Government Code, Title 8, Subtitle A, Subchapter C. These statutes stipulate that the governing body of the System is responsible for the management and administration of the funds of the System and shall determine the procedure it finds most efficient and beneficial for the management of the reserve fund of the System. The governing body may directly manage the investments of the System or may choose and contract for professional investment management services. Investments are reported at fair value in accordance with GASB 72, Fair Value Measurement and Application, which defines fair value, establishes a framework for measuring fair value, and establishes disclosures about fair value measurements.

GASB 72 establishes a hierarchal disclosure framework which prioritizes and ranks the level of market price observability used in measuring investments at fair value. Market price observability is impacted by a number of factors, including the type of investment and the specific characteristics of the investment. Fair value represents the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. Investments with readily available actively quoted prices or for which fair value can be measured from actively quoted prices generally will have a higher degree of market price observability and lesser degree of judgment used in measuring fair value.

Investments measured and reported at fair value are classified and disclosed in one of the following categories:

> Level 1 – Investments traded in an active market with available quoted prices for identical assets as of the reporting date.
>
> Level 2 – Investments not traded on an active market but for which observable market inputs are available for an asset, either directly or indirectly, as of the reporting date.
>
> Level 3 – Investments not traded in an active market and for which no significant observable market inputs are available as of the reporting date.

The System has established a framework to consistently measure the fair value of the System's assets and liabilities in accordance with applicable accounting, legal, and regulatory guidance. This framework has been provided by establishing valuation policy and procedures that will provide reasonable assurance that assets and liabilities are carried at fair value. In certain cases, the inputs used to measure fair value may fall into different levels of the fair value hierarchy. In such cases, an investment's level within the fair value hierarchy is based on the lowest level of input that is significant to the fair value measurement. The System's assessment of the significance of a particular input to the fair value measurement requires judgment and considers factors specific to the investment.

The following tables summarize the valuation of the System's investments in accordance with the above mentioned fair value hierarchy levels as of June 30, 2017 and 2016.

**Investments Measured at Fair Value**
**($000's)**

| | | Fair Value Measurements Using | | |
|---|---|---|---|---|
| | 6/30/2017 | Quoted Prices in Active Markets for Identical Assets (Level 1) | Significant Other Observable Inputs (Level 2) | Significant Unobservable Inputs (Level 3) |
| **Investments by fair value level** | | | | |
| Short term investments | | | | |
| US Treasury bills | $ 90,017 | $ 90,017 | $ - | $ - |
| Short term investment funds | 754,795 | - | 754,795 | - |
| Total short term investments | 844,812 | 90,017 | 754,795 | - |
| Fixed income | | | | |
| Corporate bonds | 124,099 | - | 124,099 | - |
| High yield funds | 59,640 | - | 59,640 | - |
| Total fixed income | 183,739 | - | 183,739 | - |
| Equity securities | | | | |
| Domestic equities | 258,131 | (365) | 258,496 | - |
| Total equity securities | 258,131 | (365) | 258,496 | - |
| Alternative investments | | | | |
| Private equity | | | | |
| Leveraged buyouts | 291,414 | - | - | 291,414 |
| Energy | 126,410 | - | - | 126,410 |
| Special situations | 103,426 | - | - | 103,426 |
| Private equity secondaries | 52,308 | - | - | 52,308 |
| Venture capital | 27,234 | - | - | 27,234 |
| Other alternatives | | | | |
| Real estate | 294,990 | - | - | 294,990 |
| Credit | 160,895 | - | 24,190 | 136,705 |
| Hedge funds - long/short credit | 22 | - | 22 | - |
| Hedge funds - long/short Equity | 616 | - | 616 | - |
| Total alternative investments | 1,057,315 | - | 24,828 | 1,032,487 |
| Total investments by fair value level | 2,343,997 | $ 89,652 | $ 1,221,858 | $ 1,032,487 |
| **Investments measured at the net asset value (NAV)** | | | | |
| Domestic equities commingled funds | 659,358 | | | |
| International equities commingled funds | 518,286 | | | |
| Portable alpha hedge funds | 474,501 | | | |
| Global macro hedge funds | 210,679 | | | |
| Multi-strategy hedge funds | 126,611 | | | |
| Fixed income commingled funds | 51,310 | | | |
| Long/short credit hedge funds | 45,458 | | | |
| Long/short equity hedge funds | 24,485 | | | |
| Total investments measured at the NAV | 2,110,688 | | | |
| Total investments measured at fair value | $ 4,454,685 | | | |

**Investments Measured at Fair Value**
**($000's)**

| | | Fair Value Measurements Using | | |
|---|---|---|---|---|
| | **6/30/2016** | **Quoted Prices in Active Markets for Identical Assets (Level 1)** | **Significant Other Observable Inputs (Level 2)** | **Significant Unobservable Inputs (Level 3)** |
| **Investments by fair value level** | | | | |
| Short term investments | | | | |
| US Treasury bills | $ 63,217 | $ 63,217 | $ - | $ - |
| Short term investment funds | 587,685 | - | 587,685 | - |
| Total short term investments | 650,902 | 63,217 | 587,685 | - |
| Fixed income | | | | |
| Corporate bonds | 113,471 | - | 113,471 | - |
| High yield funds | 53,184 | - | 53,184 | - |
| Total fixed income | 166,655 | - | 166,655 | - |
| Equity securities | | | | |
| Domestic equities | 445,003 | 7,287 | 437,716 | - |
| Total equity securities | 445,003 | 7,287 | 437,716 | - |
| Alternative investments | | | | |
| Private equity | | | | |
| Leveraged buyouts | 229,708 | - | - | 229,708 |
| Energy | 90,906 | - | - | 90,906 |
| Special situations | 85,218 | - | - | 85,218 |
| Private equity secondaries | 45,099 | - | - | 45,099 |
| Venture capital | 36,157 | - | - | 36,157 |
| Other alternatives | | | | |
| Real estate | 243,717 | - | - | 243,717 |
| Credit | 133,531 | - | - | 133,531 |
| Hedge funds - long/short credit | 19,491 | - | 19,491 | - |
| Hedge funds - long/short Equity | 18,197 | - | 18,197 | - |
| Total alternative investments | 902,024 | - | 37,688 | 864,336 |
| Total investments by fair value level | 2,164,584 | $ 70,504 | $ 1,229,744 | $ 864,336 |
| **Investments measured at the net asset value (NAV)** | | | | |
| International equities commingled funds | 479,638 | | | |
| Portable alpha hedge funds | 448,393 | | | |
| Domestic equities commingled funds | 379,099 | | | |
| Global macro hedge funds | 246,024 | | | |
| Multi-strategy hedge funds | 182,656 | | | |
| Long/short equity hedge funds | 55,395 | | | |
| Long/short credit hedge funds | 85,138 | | | |
| Total investments measured at the NAV | 1,876,343 | | | |
| Total investments measured at fair value | 4,040,927 | | | |

Short-term investments include funds held in short-term investment funds of the System's custodian and asset managers.

Fixed income investments include US corporate bonds, foreign securities such as dollar denominated and non-dollar denominated issues of private corporations, plus units of commingled fixed income funds of US government securities.

Equity securities consist of individual shares of equity securities plus units of commingled ETF funds of US entities.

Alternative investments consist of investments in hedge funds, real estate, and private equity. These investments are in various investment vehicles including limited partnerships and commingled funds.

The System's custodian bank provides security valuations for equity and fixed income securities utilizing vendor supplied pricing. Based upon the procedures described below, equity securities and short term investments that are valued based on quoted prices in active markets are generally classified as Level 1 while fixed income securities are generally considered to be Level 2 or Level 3 investments. Vendor supplied pricing data for equity securities is based upon the daily closing price from the primary exchange of each security while vendor supplied pricing data for fixed income securities is based upon a combination of market maker quotes, recent trade activity, and observed cash flows. To minimize the potential for inaccurate valuations, multiple price types are obtained from multiple providers and whenever possible prices are put through tolerance checks with exceptions researched and resolved on a same day basis as part of the pricing process. An integral part of the custodian's pricing process is to allow portfolio managers and interested third parties to challenge custodian provided prices which provides additional validation to the custodian's pricing. The evaluation process is handled by the custodian's internal pricing system, which automatically validates substantially all of the System's securities, leaving only exceptions and missing prices for human intervention. The rules this system applies are multi-dimensional and can be applied at a number of different levels, ranging from general to security specific in nature. Consistent with the System's valuation policy, the System's staff maintains and documents an understanding of the custodian's and underlying manager's valuation process and has implemented a program to review and evaluate the reconciliation process and the fair value estimates provided by the custodian and the investment manager.

The System's custodian values the System's investment in limited partnerships at the dollar value provided by the general partners. Based upon the procedures described below, these limited partnerships are generally considered to be Level 3 assets. The fair value of securities held by limited partnerships has been estimated by the general partners in the absence of readily ascertainable fair values. The general partners utilize valuation methods which rely on significant assumptions and inputs of the portfolio company's most recent financial information such as EBITDA and debt and the equity structure of the portfolio company. Valuations may be derived by reference to observable valuation measures for comparable companies and may be adjusted for differences between the investment and the referenced comparables. General partners also utilize relevant information such as discounted cash flow analysis, pending recent transactions and potential initial public offering values in the determination of fair value. Consistent with the System's valuation policy, the System's staff maintains and documents an understanding of the general partner's valuation process and has implemented a program to review and evaluate the fair value estimates provided by each partnership.

The System's custodian values commingled funds at the net asset value provided by the commingled fund's custodian or administrator, as is applicable. The unit values of commingled funds are calculated by the custodian or administrator by dividing the commingled fund's net asset value on the calculation date by the number of units of the commingled fund that are outstanding on the calculation date. The commingled fund's net asset value is calculated by the commingled fund's custodian or administrator by using Level 1, Level 2 or Level 3 prices, as appropriate, to value each security and/or other asset held by the commingled fund on the calculation date, pursuant to the commingled fund's valuation policy. In short, the net asset value of the commingled fund is calculated based on a compilation of primarily observable market information. The number of units of a commingled fund that are outstanding on the calculation date is derived from observable purchase and redemption activity in the commingled fund. Consistent with the System's valuation policy, the System's staff maintains and documents an understanding of the underlying fund's valuation process and has implemented a program to review and evaluate the fair value estimates provided by the commingled fund.

The valuation method for investments measured at the net asset value (NAV) per share (or its equivalent) is presented on the following tables as of June 30, 2017 and 2016.

**Investments Measured at the NAV**
**($000's)**

| | | 6/30/2017 | Unfunded Commitments | Redemption Frequency (If Currently Eligible) | Redemption Notice Period |
|---|---|---|---|---|---|
| Domestic equities commingled funds | (1) | $ 659,358 | $ - | Daily | 1 day |
| International equities commingled funds | (1) | 518,286 | - | Daily | 4 days |
| Portable alpha hedge funds | (2) | 474,501 | - | Quarterly/Semi-Annually | 60-90 days |
| Global macro hedge funds | (3) | 210,679 | - | Monthly/Quarterly | 60-90 days |
| Multi-strategy hedge funds | (4) | 126,611 | - | Various up to two years | 60-90 days |
| Fixed income commingled funds | (5) | 51,310 | - | Daily | 2 days |
| Long/short credit hedge funds | (6) | 45,458 | - | Quarterly/Annually | 60-90 days |
| Long/short equity hedge funds | (7) | 24,485 | - | Quarterly | 60-90 days |
| Total investments measured at the NAV | | $ 2,110,688 | $ - | | |

1. *Equities Commingled Funds* – This type invests in two funds, one that is invested in domestic equities and one that is invested in international equities. The fair values of the investments in this type have been determined using the NAV per share (or its equivalent) of the investments. These funds have daily liquidity.
2. *Portable Alpha Funds* - This type invests in three funds that are invested in risk parity strategies and global macro or multi-strategy hedge fund strategies. The fair values of the investments in this type have been determined using the NAV per share (or its equivalent) of the investments. These strategies generally have quarterly or semi-annual liquidity.
3. *Global Macro Hedge Funds* - This type invests in two hedge funds that take long and short positions in global equity, credit, interest rate, and currency markets. The fair values of the investments in this type have been determined using the NAV per share (or its equivalent) of the investments. These funds have monthly liquidity.
4. *Multi-Strategy Hedge Funds* - This type invests in seven hedge funds that pursue multiple strategies to diversify risks and reduce volatility. The fair values of the investments in this type have been determined using the NAV per share (or its equivalent) of the investments. One of these funds has monthly liquidity, one fund has quarterly liquidity, three funds have annual liquidity, and two funds have liquidity every two years. All of these funds are in the process of liquidation.
5. *Fixed Income Commingled Funds* – This type invests in domestic bonds. The fair value of the investment in this type has been determined using the NAV per share (or its equivalent) of the investments. These funds have daily liquidity.
6. *Long / Short Credit Hedge Funds* - This type includes investments in three hedge funds that invest both long and short primarily in U.S. credit instruments. The fair values of the investments in this type have been determined using the NAV per share (or its equivalent) of the investments. Two of these strategies have quarterly liquidity and one fund has annual liquidity. One of these funds is in the process of liquidation.
7. *Long / Short Equity Hedge Funds* - This type includes investments in one hedge fund that invests both long and short primarily in U.S. common stocks. The fair values of the investments in this type have been determined using the NAV per share (or its equivalent) of the investments. This fund generally has quarterly liquidity and is in the process of liquidation.

**Investments Measured at the NAV ($000's)**

| | | 6/30/2016 | Unfunded Commitments | Redemption Frequency (If Currently Eligible) | Redemption Notice Period |
|---|---|---|---|---|---|
| International equities commingled funds | (1) | $ 479,638 | $ - | Daily | 4 days |
| Portable alpha hedge funds | (2) | 448,393 | - | Quarterly/Semi-Annually | 60-90 days |
| Domestic equities commingled funds | (1) | 379,099 | - | Daily | 1 day |
| Global macro hedge funds | (3) | 246,024 | - | Monthly/Quarterly | 60-90 days |
| Multi-strategy hedge funds | (4) | 182,656 | 6,029 | Various up to two years | 60-90 days |
| Long/short equity hedge funds | (5) | 55,395 | - | Quarterly | 60-90 days |
| Long/short credit hedge funds | (6) | 85,138 | - | Quarterly/Annually | 60-90 days |
| Total investments measured at the NAV | | $ 1,876,343 | $ 6,029 | | |

1. *Equities Commingled Funds* – This type invests in two funds, one that is invested in domestic equities and one that is invested in international equities. The fair values of the investments in this type have been determined using the NAV per share (or its equivalent) of the investments. These funds have daily liquidity.
2. *Portable Alpha Funds* - This type invests in three funds that are invested in risk parity strategies and global macro hedge fund strategies. The fair values of the investments in this type have been determined using the NAV per share (or its equivalent) of the investments. These strategies generally have quarterly or semi-annual liquidity.
3. *Global Macro Hedge Funds* - This type invests in four hedge funds that take long and short positions in global equity, credit, interest rate, and currency markets. The fair values of the investments in this type have been determined using the NAV per share (or its equivalent) of the investments. Three of these funds have monthly liquidity and one fund has quarterly liquidity. The fund with quarterly liquidity is in the process of liquidation.
4. *Multi-Strategy Hedge Funds* - This type invests in ten hedge funds that pursue multiple strategies to diversify risks and reduce volatility. The fair values of the investments in this type have been determined using the NAV per share (or its equivalent) of the investments. Three of these funds have quarterly liquidity, one fund has semi-annual liquidity, one fund has annual liquidity, and one fund has liquidity every two years. All but one of these funds is in the process of liquidation.
5. *Long / Short Equity Hedge Funds* - This type includes investments in three hedge funds that invest both long and short primarily in U.S. common stocks. The fair values of the investments in this type have been determined using the NAV per share (or its equivalent) of the investments. These funds generally have quarterly liquidity. Three of these funds are in the process of liquidation.
6. *Long / Short Credit Hedge Funds* - This type includes investments in five hedge funds that invest both long and short primarily in U.S. credit instruments. The fair values of the investments in this type have been determined using the NAV per share (or its equivalent) of the investments. Two of these strategies have quarterly liquidity and two funds have annual liquidity. Two of these funds are in the process of liquidation.

*Concentrations* – As of both June 30, 2017 and 2016, the System did not have any single investment in any one organization which represented greater than 5% of plan net position.

*Rate of return* – For the year ended June 30, 2017, the annual money-weighted rate of return on pension plan investments, net of pension plan investment expense, was 16.8%. For the year ended June 30, 2016, the annual money-weighted rate of return on pension plan investments, net of pension plan investment expense, was (3.2)%. The money-weighted rate of return expresses investment performance, net of investment expense, adjusted for the changing amounts actually invested.

*Investment Risk* – The System's investments have been categorized to address deposit and investment risks related to custodial credit risk, credit risk, concentration of credit risk, interest rate risk, and foreign currency risk.

- *Custodial Credit Risk for Deposits and Investments* – Custodial credit risk for investments is the risk that in the event of a failure of the counterparty, the System will not be able to recover the value of the investment or collateral in possession of the counterparty. The System does not have an investment policy regarding custodial credit risk. The System considers only demand deposits as cash. As of June 30, 2017 and June 30, 2016, the System had a balance of $104 thousand and $304 thousand, respectively, on deposit at a financial institution. The Federal Depository Insurance Corporation (FDIC) covered cash on deposit up to $250 thousand at this financial institution. Therefore, as of June 30, 2017, none of the System's bank balance of $104 thousand was exposed to custodial credit risk. At June 30, 2017, the System did not have any other investments with other financial institutions subject to custodial credit risk.
- *Credit Risk* – Credit risk is the risk that the counterparty will not fulfill its obligations. As of June 30, 2017 and 2016, the System's fixed income assets that are not U.S. government guaranteed represented 91.7% and 92.3%, respectively, of the System's fixed income plus short term investments portfolio. The tables below and on the following page summarize the System's fixed income portfolio and short term investment exposure levels and credit qualities as of June 30, 2017 and 2016.

**Average Credit Quality and Exposure Levels of Non-U.S. Government Guaranteed Securities ($000's)**

| Fixed Income Security Type | Fair Value **6/30/2017** | Percent of Total | Weighted Average Credit Quality |
|---|---|---|---|
| Corporate Bonds | $ 124,099 | 12.5 | B |
| Mutual Bond Funds | 110,950 | 11.2 | BB |
| Short Term Investment Funds | 754,795 | 76.3 | Not Rated |
| Total | $ 989,844 | 100.0 | |

| Fixed Income Security Type | Fair Value **6/30/2016** | Percent of Total | Weighted Average Credit Quality |
|---|---|---|---|
| Corporate Bonds | $ 113,471 | 15.0 | B |
| Mutual Bond Funds | 53,184 | 7.1 | B |
| Short Term Investment Funds | 587,685 | 77.9 | Not Rated |
| Total | $ 754,340 | 100.0 | |

**Ratings Dispersion Detail**
**($000's)**

| Credit Rating Level **6/30/2017** | Corporate Bonds | Mutual Bond Funds | Short Term Investment Funds |
|---|---|---|---|
| BBB | $ 3,280 | $ - | $ - |
| BB | 49,877 | 59,640 | - |
| B | 57,324 | - | - |
| CCC | 11,657 | - | - |
| NR | 1,961 | 51,310 | 754,795 |
| Total | $ 124,099 | $ 110,950 | $ 754,795 |

| Credit Rating Level **6/30/2016** | Corporate Bonds | Mutual Bond Funds | Short Term Investment Funds |
|---|---|---|---|
| BBB | $ 2,722 | $ - | $ - |
| BB | 45,556 | - | - |
| B | 52,608 | 53,290 | - |
| CCC | 10,762 | - | - |
| NR | 1,823 | (106) | 587,685 |
| Total | $ 113,471 | $ 53,184 | $ 587,685 |

The System's investment policy allows investment managers full discretion in adopting investment strategies to deal with these risks. Unless otherwise provided in the individual investment manager agreement, the average quality rating of each individual fixed income portfolio on a weighted value basis shall be A-rated or higher, and no issue should have a rating below investment grade (Baa or higher). Certain managers, such as high yield managers, may be exempted from these requirements as provided for in their contracts.

Credit risk for derivative instruments held by the System results from counterparty risk, which is essentially that the counterparty will be unable to fulfill its obligations, which are then assumed by the System. Information regarding the System's credit risk related to derivatives is found under the derivatives disclosures.

Policies regarding credit risk pertaining to credit risk associated with the System's securities lending program are found under the securities lending disclosures.

- *Concentration of Credit Risk* – Concentration of credit risk is the risk of loss attributable to the magnitude of the System's investment in a single issue. The System's investment policy for each specific portfolio limits investments in any one single domestic equity issue to 15% of each portfolio at market value and for any one single international equity issue to 5% of the System's investments. For fixed income investments, the System's policy limits, by each specific portfolio, investment in any one single fixed income security to 10% of each portfolio at market value. As of both June 30, 2017 and 2016, the System did not have any single investment in any one organization which represented greater than 5% of plan net position.

- *Interest Rate Risk* – Interest rate risk is the risk that changes in interest rates will adversely affect the fair values of the System's financial instruments. This risk is managed within the portfolio using the modified duration methodology. It is widely used in the management of fixed income portfolios and estimates the sensitivity of a bond's price to interest rate changes. The System's investment policy delegates the management of interest rate risk to the individual investment managers in accordance with each manager's designated strategy. Investment managers have full discretion in adopting investment strategies to deal with these risks, and all of the System's fixed income portfolios are managed in accordance with guidelines that are specific as to the degree of interest rate risk taken. The reporting of modified duration as of June 30, 2017 and 2016, found in the tables below and on the following page quantify the interest rate risk of the System's fixed income and short term investments. Interest rate risks associated with derivative instruments are found in the derivatives disclosures of these notes.

**Modified Duration by Security Type**
**($000's)**

| Security Type **6/30/2017** | | Fair Value ($000's) | Percent of Total | Weighted Average Modified Duration (years) |
|---|---|---|---|---|
| Corporate Bonds | $ | 124,099 | 11.5 | 4.9 |
| Mutual Bond Funds | | 110,950 | 10.3 | 4.6 |
| Short Term Investment Funds | | 844,812 | 78.2 | 0.1 |
| Total | $ | 1,079,861 | 100.0 % | 1.2 |

| Security Type **6/30/2016** | | Fair Value ($000's) | Percent of Total | Weighted Average Modified Duration (years) |
|---|---|---|---|---|
| Corporate Bonds | $ | 113,471 | 13.9 | 5.3 |
| Mutual Bond Funds | | 53,184 | 6.5 | 4.4 |
| Short Term Investment Funds | | 650,902 | 79.6 | 0.0 |
| Total | $ | 817,557 | 100.0 % | 1.0 |

**Modified Duration Analysis by Security Type**
**($000's)**

| Corporate Bonds | | Fair Value **6/30/2017** | Average Modified Duration | Contribution to Modifed Duration |
|---|---|---|---|---|
| Less than 1 year | $ | 431 | 0.7 | 0.0 |
| 1 to 5 years maturities | | 39,825 | 3.3 | 1.1 |
| 5 to 10 years maturities | | 82,961 | 5.6 | 3.7 |
| Greater than 10 years maturities | | 882 | 9.3 | 0.1 |
| Total | $ | 124,099 | | 4.9 |
| Mutual Bond Funds | | | | |
| Less than 1 year | $ | 4,512 | 5.2 | 0.2 |
| 1 to 5 years maturities | | 35,889 | 5.2 | 1.5 |
| 5 to 10 years maturities | | 55,748 | 5.2 | 2.3 |
| Greater than 10 years maturities | | 14,801 | 5.2 | 0.6 |
| Total | $ | 110,950 | | 4.6 |
| Short Term Investment Funds | | | | |
| Less than 1 year | $ | 809,429 | 0.1 | 0.1 |
| 1 to 5 years maturities | | 35,383 | 0.1 | 0.0 |
| Total | $ | 844,812 | | 0.1 |

**Modified Duration Analysis by Security Type**
**($000's)**

| Corporate Bonds | | Fair Value **6/30/2016** | Average Modified Duration | Contribution to Modifed Duration |
|---|---|---|---|---|
| Less than 1 year | $ | 11 | 0.0 | 0.0 |
| 1 to 5 years maturities | | 28,691 | 3.0 | 0.7 |
| 5 to 10 years maturities | | 83,756 | 6.2 | 4.5 |
| Greater than 10 years maturities | | 1,013 | 7.4 | 0.1 |
| Total | $ | 113,471 | | 5.3 |
| Mutual Bond Funds | | | | |
| 5 to 10 years maturities | $ | 53,184 | 4.4 | 4.4 |
| Short Term Investment Funds | | | | |
| Less than 1 year | $ | 612,216 | 0.0 | 0.0 |
| 1 to 5 years maturities | | 38,686 | 0.0 | 0.0 |
| Total | $ | 650,902 | | 0.0 |

- *Foreign Currency Risk* – Foreign currency risk is the risk that changes in exchange rates will adversely impact the fair value of an investment. The books and records of the System are maintained in US dollars. Foreign currencies and non-US dollar denominated investments are translated into US dollars at the bid prices of such currencies against US dollars at each balance sheet date. Realized and unrealized gains and losses on investments which result from changes in foreign currency exchange rates have been included in the net appreciation in fair value of investments. Net realized foreign currency gains and losses resulting from changes in exchange rates include foreign currency gains and losses between trade date and settlement date of investment securities transactions, foreign currency transactions and the difference between the amounts of interest and dividends recorded on the books of the System and the amount actually received. International and global managers have the permission to use currency forward and futures contracts to hedge currency against the U.S. dollar. Currency forwards and futures used for the purpose of hedging currency shall be subject to the following guidelines: 1) net forward and futures sales of any currency may not exceed total market value of the assets denominated in that currency. This limitation does not apply to global fixed income managers and currency overlay managers if provided for in their contracts, 2) foreign currency exchange contracts with a maturity exceeding 12 months are not permitted, 3) currency options may be entered into in lieu of or in conjunction with forwards sales of currencies with the same limitations as currency forwards and futures. Cross hedging, the selling of one foreign currency for another foreign currency, which may or may not be the base currency of the portfolio, is permitted. The System's exposure to foreign currency risk in U.S. dollars as of June 30, 2017 and 2016, are shown in the table on the following pages.

**Foreign Currency Exposure by Asset Class ($000's)**
**June 30, 2017**

| Currency | Short Term Investments | Equities | Alternative Investments | Total |
|---|---|---|---|---|
| Euro | $ (109,510) | $ 202,334 | $ 8,301 | $ 101,125 |
| Canadian dollar | 28,096 | 59,465 | - | 87,561 |
| Japanese yen | (78,854) | 149,295 | - | 70,441 |
| British pound sterling | (59,261) | 122,960 | - | 63,699 |
| Australian dollar | - | 45,207 | 14,095 | 59,302 |
| Swiss franc | - | 56,772 | - | 56,772 |
| Chinese yuan renminbi | - | 53,919 | - | 53,919 |
| South Korean won | - | 30,408 | - | 30,408 |
| New Taiwan dollar | - | 25,726 | - | 25,726 |
| Hong Kong dollar | - | 21,979 | - | 21,979 |
| Swedish krona | - | 18,911 | - | 18,911 |
| Indian rupee | - | 16,832 | - | 16,832 |
| South African rand | - | 14,779 | - | 14,779 |
| Brazilian real | - | 14,526 | - | 14,526 |
| Danish krone | - | 11,450 | - | 11,450 |
| Singapore dollar | - | 8,908 | - | 8,908 |
| Mexican peso | - | 8,414 | - | 8,414 |
| Russian ruble | - | 7,164 | - | 7,164 |
| Malaysian ringgit | - | 5,716 | - | 5,716 |
| Indonesian rupiah | - | 4,889 | - | 4,889 |
| Thai baht | - | 4,515 | - | 4,515 |
| Norwegian krone | - | 4,276 | - | 4,276 |
| New Israeli shekel | - | 3,500 | - | 3,500 |
| Polish zloty | - | 2,827 | - | 2,827 |
| Turkish lira | - | 2,698 | - | 2,698 |
| Philippine peso | - | 2,605 | - | 2,605 |
| Chilean peso | - | 2,417 | - | 2,417 |
| Colombian peso | - | 1,063 | - | 1,063 |
| New Zealand dollar | - | 957 | - | 957 |
| Peruvian nuevo sol | - | 791 | - | 791 |
| United Arab Emirates dirham | - | 738 | - | 738 |
| Qatari riyal | - | 655 | - | 655 |
| Hungarian forint | - | 545 | - | 545 |
| Czech koruna | - | 361 | - | 361 |
| Egyptian pound | - | 342 | - | 342 |
| Pakistan rupee | - | 130 | - | 130 |
| Total | $ (219,529) | $ 908,077 | $ 22,396 | $ 710,944 |

**Foreign Currency Exposure by Asset Class ($000's)**
**June 30, 2016**

| Currency | Short Term Investments | Equities | Alternative Investments | Total |
|---|---|---|---|---|
| Euro | $ (111,492) | $ 223,074 | $ 11,661 | $ 123,243 |
| Japanese yen | (82,024) | 170,602 | - | 88,578 |
| British pound sterling | (72,852) | 150,957 | - | 78,105 |
| Swiss franc | - | 68,659 | - | 68,659 |
| Australian dollar | - | 51,267 | 10,525 | 61,792 |
| Canadian dollar | 1,438 | 32,909 | - | 34,347 |
| Chinese yuan renminbi | - | 26,076 | - | 26,076 |
| Hong Kong dollar | - | 24,203 | - | 24,203 |
| Swedish krona | - | 21,833 | - | 21,833 |
| South Korean won | - | 15,476 | - | 15,476 |
| New Taiwan dollar | - | 13,823 | - | 13,823 |
| Danish krone | - | 12,376 | - | 12,376 |
| Singapore dollar | - | 10,669 | - | 10,669 |
| South African rand | - | 8,628 | - | 8,628 |
| Indian rupee | - | 8,387 | - | 8,387 |
| Brazilian real | - | 8,244 | - | 8,244 |
| Mexican peso | - | 4,934 | - | 4,934 |
| Norwegian krone | - | 4,779 | - | 4,779 |
| New Israeli shekel | - | 4,489 | - | 4,489 |
| Russian ruble | - | 4,182 | - | 4,182 |
| Malaysian ringgit | - | 3,488 | - | 3,488 |
| Indonesian rupiah | - | 2,542 | - | 2,542 |
| Thai baht | - | 2,448 | - | 2,448 |
| Polish zloty | - | 1,599 | - | 1,599 |
| Turkish lira | - | 1,588 | - | 1,588 |
| Philippine peso | - | 1,487 | - | 1,487 |
| Chilean peso | - | 1,336 | - | 1,336 |
| New Zealand dollar | - | 963 | - | 963 |
| Colombian peso | - | 640 | - | 640 |
| Peruvian nuevo sol | - | 423 | - | 423 |
| Hungarian forint | - | 230 | - | 230 |
| Egyptian pound | - | 222 | - | 222 |
| Czech koruna | - | 194 | - | 194 |
| Total | $ (264,930) | $ 882,729 | $ 22,186 | $ 639,985 |

*Securities Lending Program* – The System's Board of Trustees' policies permit the System to lend securities (domestic and international equities and fixed income) to securities firms on a temporary basis through its custodian bank. The System receives fees for all loans and retains the right to all interest and dividend payments while the securities are on loan. Cash, letters of credit or various government securities having market values equal to or exceeding 102% and 105% of the value of the loaned securities for domestic and international securities, respectively, collateralize all security loan agreements. Whenever the market value of the securities on loan changes, the borrower must adjust the collateral accordingly. The System's bank pools all collateral received from securities lending transactions and invests any cash collateral. The System holds an undivided share of the collateral provided by the borrowers of the securities. At June 30, 2017 the weighted-average maturity of the collateral pool was 30 days. The relationship between the maturities of the collateral pool and the System's loans has not been determined. Cash collateral invested in the custodian bank collateral pool at June 30, 2017 and 2016, was $25,778 thousand and $24,211 thousand, respectively. The System also had non-cash collateral at June 30, 2017 and 2016, of $10,173 thousand and $884 thousand respectively, consisting of treasury securities and letters of credit. The System cannot sell or pledge the collateral unless the borrower fails to return the securities borrowed.

The market value of securities on loan at June 30, 2017 and 2016 was $35,189 thousand and $24,737 thousand, respectively. At June 30, 2017, the System had no credit risk exposure to borrowers because the amounts the System owes the borrowers, $35,951 thousand, exceeds the amounts the borrowers owe the System, $35,189 thousand.

*Derivatives* – The System's investment managers may invest in derivatives if permitted by the guidelines established by the System's Board of Trustees. The System's staff monitors guidelines and compliance. From time to time the System's investment managers will invest in equity, fixed income and short term futures contracts along with foreign currency forward contracts. No derivatives are purchased with borrowed funds.

The fair value balance of posted margin and collateral and notional amounts of derivative instruments outstanding at June 30, 2017 and 2016, classified by type, and the changes in fair value of such derivative instruments for the year then ended is shown in the tables below. The Change in Fair Value figures are reported as a component of net appreciation (depreciation) in the Statement of Changes in Fiduciary Net Position.

**Derivative Investments by Type**
**($000's)**

| | Year ending June 30, 2017 Changes in Fair Value | As of June 30, 2017 Posted Margin | Collateral Held at Custodian Bank | Collateral Held at Broker | Notional Value |
|---|---|---|---|---|---|
| Equity Futures | $ 147,599 | $ 54,388 | $ 603,968 | $ - | $ 1,005,928 |
| Currency Futures | 11,794 | 6,969 | 35,263 | - | (218,903) |
| Equity Options | 11,081 | - | 16,177 | 29,857 | (259,682) |

| | Year ending June 30, 2016 Changes in Fair Value | As of June 30, 2016 Posted Margin | Collateral Held at Custodian Bank | Collateral Held at Broker | Notional Value |
|---|---|---|---|---|---|
| Equity Futures | $ (78,661) | $ 61,726 | $ 434,294 | $ - | $ 831,091 |
| Currency Futures | (3,071) | 10,096 | 22,689 | - | 268,153 |
| Equity Options | 8,874 | - | 38,546 | - | (209,597) |

Futures are used to obtain market exposure and to take advantage of mis-pricing opportunities. When a position is taken in a futures contract, a margin is posted and the contract is subject to daily mark-to-market adjustments. For options, no margin is posted. Instead, options are purchased at a premium, which is either forfeited or recouped, depending on the gain or loss on the contract. Foreign currency contracts are used to hedge against the currency risk in the System's investments in foreign equity and fixed income securities. To liquidate the contract prior to expiration an offsetting position in the same contract must be taken.

These derivative instruments are subject to the following risks:

- *Custodial Credit Risk* – Custodial credit risk for derivative instruments is the risk that, in the event of the failure of the counterparty to a transaction, the System will not be able to recover the value of the derivative instruments or collateral securities that are in the possession of an outside party. Consistent with the System's investment policy, the System's derivative instruments were held by the counterparty that was acting as the System's agent.

- *Credit Risk* –Credit risk is the risk that the counterparty will not fulfill its obligations. The System does not have an investment policy specifically regarding credit risk for derivative instruments. The System's investment policy allows investment managers full discretion in adopting investment strategies to deal with this risk. The System's investment managers seek to control this risk through counterparty credit evaluations and approvals, counterparty credit limits, and exposure monitoring procedures.

- *Interest Rate Risk* – Interest rate risk is the risk that changes in interest rates will adversely affect the fair values of the System's derivative instruments.

- *Foreign Currency Risk* – Foreign currency risk is the risk that changes in exchange rates will adversely impact the fair value of derivative instruments. The System's exposure to foreign currency risk derives from its positions in foreign currency denominated international equity and fixed income investments as outlined in the following schedule. The System has a currency hedging program in place that hedges fifty percent of the exposure to the Euro, Pound, and Yen exposure in these investment programs. This hedging program is disclosed elsewhere in this footnote. The System's derivative instruments exposure to foreign currency risk in U.S. dollars as of June 30, 2017 and 2016, is shown in the tables below and on the following page.

**Foreign Currencey Exposure for Derivatives ($000's)**
**June 30, 2017**

| Currency | Equity Derivatives | Currency Derivatives | Total |
|---|---|---|---|
| Canadian dollar | $ 27,935 | $ 28,734 | $ 56,669 |
| Chinese yuan renminbi | 27,843 | - | 27,843 |
| Swiss franc | 25,178 | - | 25,178 |
| Australian dollar | 21,617 | - | 21,617 |
| South Korean won | 15,581 | - | 15,581 |
| New Taiwan dollar | 12,477 | - | 12,477 |
| Hong Kong dollar | 10,842 | - | 10,842 |
| Euro | 99,861 | (109,510) | (9,649) |
| Swedish krona | 8,864 | - | 8,864 |
| Indian rupee | 8,793 | - | 8,793 |
| Japanese yen | 70,793 | (78,854) | (8,061) |
| Brazilian real | 6,624 | - | 6,624 |
| South African rand | 6,509 | - | 6,509 |
| British pound sterling | 53,497 | (59,273) | (5,776) |
| Danish krone | 5,755 | - | 5,755 |
| Singapore dollar | 3,998 | - | 3,998 |
| Mexican peso | 3,684 | - | 3,684 |
| Russian ruble | 3,156 | - | 3,156 |
| Indonesian rupiah | 2,452 | - | 2,452 |
| Malaysian ringgit | 2,373 | - | 2,373 |
| Thai baht | 2,170 | - | 2,170 |
| Norwegian krone | 2,077 | - | 2,077 |
| New Israeli shekel | 1,435 | - | 1,435 |
| Polish zloty | 1,295 | - | 1,295 |
| Philippine peso | 1,180 | - | 1,180 |
| Turkish lira | 1,176 | - | 1,176 |
| Chilean peso | 1,136 | - | 1,136 |
| United Arab Emirates dirham | 738 | - | 738 |
| Qatari riyal | 655 | - | 655 |
| New Zealand dollar | 514 | - | 514 |
| Colombian peso | 449 | - | 449 |
| Peruvian nuevo sol | 368 | - | 368 |
| Hungarian forint | 325 | - | 325 |
| Czech koruna | 175 | - | 175 |
| Pakistan rupee | 130 | - | 130 |
| Egyptian pound | 129 | - | 129 |
| Total | $ 431,783 | $ (218,903) | $ 212,880 |

**Foreign Currencey Exposure for Derivatives ($000's)**
**June 30, 2016**

| Currency | Equity Derivatives | Currency Derivatives | Total |
|---|---|---|---|
| Swiss franc | $ 37,065 | $ - | $ 37,065 |
| Australian dollar | 27,676 | - | 27,676 |
| Hong Kong dollar | 13,066 | - | 13,066 |
| Swedish krona | 11,787 | - | 11,787 |
| Japanese yen | 92,099 | (82,024) | 10,075 |
| Euro | 120,601 | (111,492) | 9,109 |
| British pound sterling | 81,494 | (72,864) | 8,630 |
| Danish krone | 6,681 | - | 6,681 |
| Singapore dollar | 5,759 | - | 5,759 |
| Canadian dollar | 1,379 | 1,774 | 3,153 |
| Norwegian krone | 2,580 | - | 2,580 |
| New Israeli shekel | 2,423 | - | 2,423 |
| South Korean won | 650 | - | 650 |
| New Taiwan dollar | 574 | - | 574 |
| New Zealand dollar | 520 | - | 520 |
| South African rand | 358 | - | 358 |
| Indian rupee | 348 | - | 348 |
| Brazilian real | 342 | - | 342 |
| Mexican peso | 205 | - | 205 |
| Russian ruble | 174 | - | 174 |
| Malaysian ringgit | 145 | - | 145 |
| Indonesian rupiah | 106 | - | 106 |
| Thai baht | 103 | - | 103 |
| Polish zloty | 66 | - | 66 |
| Turkish lira | 66 | - | 66 |
| Philippine peso | 62 | - | 62 |
| Chilean peso | 55 | - | 55 |
| Colombian peso | 27 | - | 27 |
| Hungarian forint | 10 | - | 10 |
| Egyptian pound | 9 | - | 9 |
| Czech koruna | 8 | - | 8 |
| Total | $ 406,437 | $ (264,606) | $ 141,831 |

*Alternative Investments* – As of June 30, 2017 and 2016, the System was invested in various partnerships, separate accounts and commingled funds across various types of alternative investments as detailed in the table below.

| | Fair Value ($000's) | |
|---|---|---|
| Investment Type | June 30, 2017 | June 30, 2016 |
| *Private Equity* | | |
| Leveraged Buyouts | $ 291,414 | $ 229,708 |
| Energy | 126,410 | 90,906 |
| Special Situations | 103,426 | 85,218 |
| Private Equity Secondaries | 52,308 | 45,099 |
| Venture Capital | 27,234 | 36,157 |
| *Other Alternatives* | | |
| Real Estate | 294,990 | 243,717 |
| Credit | 160,895 | 133,531 |
| Hedge Funds | | |
| Portable alpha hedge funds | 474,501 | 448,393 |
| Global macro hedge funds | 210,679 | 246,024 |
| Multi-strategy hedge funds | 126,611 | 182,656 |
| Long/short credit hedge funds | 45,480 | 104,629 |
| Long/short equity hedge funds | 25,101 | 73,592 |
| | $ 1,939,049 | $ 1,919,630 |

Supplemental Information on investment and professional expenses included in Schedule II on page 54 herein does not include the investment management fees and performance fees embedded in the structure of the private equity and other limited partnership investments listed above. Rather, these fees are a component of the Net appreciation in fair value of investments in the accompanying Statement of Changes in Fiduciary Net Position.

## 5. Contributions Receivable

The June 30, 2011 Agreement with the City provided that once the Funded Ratio of the System reaches 80%, this becomes the new floor and if it should ever decline below such 80% level, in the fiscal year next following such determination, the City shall pay such additional amounts to the System as shall be necessary to increase the Funded Ratio to 80%. The Funded Ratio was determined to be 79.7% in the July 1, 2015 actuarial valuation. The contribution receivable of $14,284 thousand for fiscal year 2016 was the amount necessary to increase the Funded Ratio to 80% and was paid bi-weekly by the City in fiscal year 2017.

## 6. Deferred Retirement Option Program (DROP) Balances

The Deferred Retirement Option Plan (DROP) is an optional method of accruing pension benefits under the System's benefit structure. Members with at least 20 years of service and who were hired prior to October 9, 2004, are eligible to participate in the DROP. The lump sum benefit is the accumulated balance in the member's notional DROP account which is equal to an amount calculated as if the member's annuity, employee contributions and an interest component had been deposited in a separate account in the member's name during the member's participation in DROP. Prior to October 9, 2004, 100% of a member's contributions were credited to his or her notional DROP account. Subsequent to that date, an eligible member contributes 9.00% of pensionable pay with 8.75% of pensionable pay credited to his or her notional DROP account and the additional 0.25% credited to the System's general fund. The tables on the following page shows the change in DROP accounts during the years ended June 30, 2017 and 2016.

**DROP Activity**

| Year ended June 30, 2016 | DROP Accounts ($000's) | | DROP Participants |
|---|---|---|---|
| Balance at June 30, 2015 | $ 921,438 | Participants at June 30, 2015 | 1,991 |
| Accumulations | 189,245 | Entrants | 253 |
| Transfers to PROP | (137,929) | Withdrawals | (186) |
| Distributions | (15,431) | Participants at June 30, 2016 | 2,058 |
| Balance at June 30, 2016 | $ 957,323 | | |

| Year ended June 30, 2017 | DROP Accounts ($000's) | | DROP Participants |
|---|---|---|---|
| Balance at June 30, 2016 | $ 957,323 | Participants at June 30, 2016 | 2,058 |
| Accumulations | 155,058 | Entrants | 90 |
| Transfers to PROP | (228,259) | Withdrawals | (342) |
| Distributions | (109,051) | Participants at June 30, 2017 | 1,806 |
| Balance at June 30, 2017 | $ 775,071 | | |

The Post Retirement Option Plan (PROP) allows retired members to have all or a portion of their monthly retirement and DROP lump sum credited to a notional account maintained by the System which accumulates interest and can be disbursed to the member under certain options as designated by the System. Surviving spouses can transfer a DROP or PROP balance to a PROP account of their own but are not eligible to credit all or a portion of their survivor benefit to a PROP account. Members hired or rehired subsequent to October 9, 2004 are not eligible for this benefit. The following tables shows the change in PROP accounts during the years ended June 30, 2017 and 2016.

**PROP Activity**

| Year ended June 30, 2016 | PROP Accounts ($000's) | | PROP Participants |
|---|---|---|---|
| Balance at June 30, 2015 | $ 742,309 | Participants at June 30, 2015 | 1,422 |
| Accumulations | 52,774 | Entrants | 158 |
| Transfers from DROP | 137,929 | Withdrawals | (11) |
| Distributions | (61,580) | Participants at June 30, 2016 | 1,569 |
| Balance at June 30, 2016 | $ 871,432 | | |

| Year ended June 30, 2017 | PROP Accounts ($000's) | | PROP Participants |
|---|---|---|---|
| Balance at June 30, 2016 | $ 871,432 | Participants at June 30, 2016 | 1,569 |
| Accumulations | 49,295 | Entrants | 208 |
| Transfers from DROP | 228,259 | Withdrawals | (17) |
| Distributions | (152,781) | Participants at June 30, 2017 | 1,760 |
| Balance at June 30, 2017 | $ 996,205 | | |

The System's Governing Statute was amended July 1, 2017, by the Texas Legislature during the 85th legislature regular session which will affect DROP and PROP and is discussed further in Note 10 to the financial statements.

## 7. Net Pension Liability

The net pension liability is measured as the total pension liability, less the amount of the pension plan's fiduciary net position. The components of the net pension liability at June 30, 2017 and 2016 were as follows ($000's):

| | 6/30/2017 | 6/30/2016 |
|---|---|---|
| Total pension liability | $ 6,508,122 | $ 6,621,290 |
| Plan fiduciary net position | 4,457,178 | 4,080,460 |
| System's net pension liability | $ 2,050,944 | $ 2,540,830 |
| Plan fiduciary net position as a percentage of the total pension liability | 68.49% | 61.63% |

*Actuarial assumptions* – The total pension liability was determined by an actuarial valuation as of July 1, 2017 and July 1, 2016, using the following actuarial assumptions, applied to all periods included in the measurement:

| | |
|---|---|
| Inflation | 2.75% for both 2017 and 2016 |
| Salary Increases | 0.00% to 12.00% , plus a 2.75% inflation and productivity component for both 2017 and 2016 |
| Investment Rate of Return | 7.00% for 2017 and 8.00% for 2016, net of pension plan investment expense, including inflation |
| Mortality | Healthy retirees - The Gender-distinct RP2000 Combined Healthy Mortality Tables with Blue Collar Adjustment are used with male rates multiplied by 109% and female rates multiplied by 103%. The rates are projected on a fully generational basis by scale BB to account for future mortality improvements. |
| | Disabled males and females – The gender-distinct RP2000 Disabled Retiree Mortality Tables are used without adjustment. The rates are projected on a fully generational basis by scale BB to account for future mortality improvements. |
| | Active members - The Gender-distinct RP2000 Combined Healthy Mortality Tables with Blue Collar Adjustment are used with male rates multiplied by 54% and female rates multiplied by 51%. The rates are projected on a fully generational basis by scale BB to account for future mortality improvements. An additive factor of .0003 is applied to all active mortality rates. |

A new set of assumptions were adopted following the July 1, 2016 actuarial valuation and will be first reflected in the contribution rate determined for the fiscal year ending 2018 based on the "Final Risk Sharing Valuation Study as of June 30, 2016" dated September 25, 2017.

The long-term expected rate of return on the System's investments was determined using a building-block method in which best-estimate ranges of expected future real rates of return (expected returns, net of pension plan investment expense and inflation) 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. Best estimates of arithmetic real rates of return for each major asset class included in the pension plan's target asset allocation as of June 30, 2017 (see the discussion of the pension plan's investment policy) are summarized in the table on the following page:

| Asset Class | Long-Term Expected Real Rate of Return |
|---|---|
| Domestic equity | 2.90 % |
| International equity | 3.30 |
| Fixed income | - |
| Credit | 4.70 |
| Alternative investments: | |
| Private equity | 4.80 |
| Real estate | 4.00 |
| Risk parity | 7.60 |
| Hedge funds | 6.30 |
| Cash | (2.25) |

*Discount rate* – A single discount rate of 7.00% was used to measure the total pension liability for the June 30, 2017 measurement date. This single discount rate was based on the expected rate of return on pension plan investments of 7.00% and the current municipal bond rate was not applicable. The projection of cash flows used to determine this single discount rate assumed that plan member contributions will be made at the rate determined actuarially in the annual RSVS study which would become effective in the fiscal year beginning one year after the study date. Additionally, the first year of contributions includes an expected $750 million in Pension Obligation Bonds (POB). Based on these assumptions, the pension plan's fiduciary net position was projected to be available to make all projected future benefit payments of current plan members. Therefore, a single discount rate of 7.00% was applied to all periods of projected benefit payments to determine the total pension liability. For the June 30, 2016 measurement date, the single discount rate used was 8.00%. These changes resulted in a decrease in the total pension liability of approximately $113 million.

*Sensitivity of the net pension liability to changes in the discount rate* – The following table presents the net pension liability as of July 1, 2017, calculated using the discount rate of 7.00%, as well as what the net pension liability would be if it were calculated using a discount rate that is 1-percentage-point lower (6.00%) or 1-percentage-point higher (8.00%) than the current rate:

| **($000's)** | **1% Decrease 6.00%** | **Current Discount Rate 7.00%** | **1% Increase 8.00%** |
|---|---|---|---|
| Net pension liability | $ 2,778,925 | $ 2,050,944 | $ 1,457,116 |

## 8. Litigation

In May 2015, HPOPS, along with hundreds of other entities, was named as a defendant in a bankruptcy adversary proceeding, Official Committee of Unsecured Creditors of Motors Liquidation Co. f/k/a/ General Motors Corp. v. JPMorgan Chase Bank , N.A., 09-00504 (Bankr. S.D.N.Y. 2009). In this litigation, the Unsecured Creditors' Committee for the General Motors (GM) bankruptcy is attempting to claw back funds used to pay off a piece of GM term debt that HPOPS held in 2009. A total of $587,248 is potentially at stake, but if a clawback were ordered, JP Morgan admits that it would be obligated to reimburse HPOPS for all but $15,948 of that amount. The litigation is ongoing.

## 9. Commitments and Contingencies

As described in Note 1, there are 3,357 non-vested active members of the System who are entitled to refunds of their accumulated contributions, without interest, upon termination of employment with the City prior to being eligible for pension benefits. At June 30, 2017 and 2016, aggregate contributions from these members of the System were approximately $160,034 thousand and $153,090 thousand, respectively. The portion of these contributions that might be refunded to members who terminate prior to pension eligibility has not been determined.

At June 30, 2017 and 2016, the total accumulated lump sum benefit due to DROP members was approximately $775,071 thousand and $957,323 thousand, respectively.

At June 30, 2017 and 2016, the total accumulated lump sum benefit due to PROP participants was $996,205 thousand and $871,432 thousand, respectively.

The System has outstanding investment commitments to various limited partnerships totaling $942,205 thousand and $951,416 thousand, as of June 30, 2017 and 2016, respectively. These outstanding commitment amounts include amounts that are due for investments that may have been made on behalf of the limited partnerships prior to the balance sheet dates.

The System has a lease for the office it occupies through October 31, 2020. The monthly base rental and outstanding lease commitment is as detailed in the following chart ($000's).

| Period | Monthly Base Rent | Fiscal Year | Total Rent |
|---|---|---|---|
| May 2016 - April 2017 | $ 20 | 2018 | $ 253 |
| May 2017 - April 2018 | 21 | 2019 | 259 |
| May 2018 - April 2019 | 22 | 2020 | 265 |
| May 2019 - April 2020 | 22 | 2021 | 90 |
| May 2020 - October 2020 | 23 | Beyond 2021 | - |
| | | | $ 867 |

## 10. Subsequent Events

On July 1, 2017, the System's Governing Statue was amended in the 85th regular session of the Texas legislature referred to as Senate Bill 2190 (the "Legislation"). The Legislation's purpose is to address the System's unfunded liability through a risk sharing approach. Starting in fiscal year 2018, changes will go into effect regarding, among other changes, member and City contributions, COLAs, and allowing for the use of pension obligation bonds to reduce the unfunded liability.

The legislation requires a Final Risk Sharing Valuation Study (RSVS) as of June 30, 2016, which was completed September 25, 2017. Pursuant to the RSVS, the City contribution rates for the ten years ending June 30, 2027 are as shown in the following table.

($000's)

| Years Ended June 30, | Compensation | Employer Contribution Rate | Employer Contributions |
|---|---|---|---|
| 2018 | $ 436,000 | 31.77 % | $ 138,517 |
| 2019 | 448,000 | 31.85 | 142,688 |
| 2020 | 460,300 | 31.82 | 146,467 |
| 2021 | 472,900 | 31.84 | 150,571 |
| 2022 | 485,900 | 31.92 | 155,099 |
| 2023 | 499,300 | 31.98 | 159,676 |
| 2024 | 513,000 | 32.03 | 164,314 |
| 2025 | 527,100 | 32.07 | 169,041 |
| 2026 | 541,600 | 32.10 | 173,854 |
| 2027 | 556,500 | 32.12 | 178,748 |

On August 11, 2017, the System and the City entered into an agreement pursuant to the Legislation and allowed under Chapter 107, Texas Local Government Code, as amended (Chapter 107) for the City to fund $750,000 thousand of the System's unfunded liability through the issuance of pension obligation bonds (POB). The POB will go before the citizens of the City for a vote in November, 2017.

The proceeds of these pension obligation bonds are to be accepted by the System on or before March 31, 2018. If the City fails to deliver the proceeds of the pension obligation bonds on or before March 31, 2018, the System, pursuant to the Legislation, shall immediately rescind, prospectively, any or all benefit changes made effective under S.B. No. 2190, Acts of the 85th Legislature, Regular Session, 2017, as of the year 2017 effective date; or reestablish the deadline for delivery of the pension obligation bond proceeds, which new deadline shall be no later than May 31, 2018, reserving the right to rescind the benefit changes authorized by this subdivision if the bond proceeds are not delivered by the reestablished deadline.

If the Board rescinds benefit changes or pension obligation bond proceeds are not delivered on or before December 31, 2017, the initial risk sharing valuation study shall be prepared again and restated without assuming the delivery of the pension obligation bond proceeds, the later delivery of pension obligation bond proceeds, or the rescinded benefit changes, as applicable, and the resulting city contribution rate will become effective in the fiscal year following the completion of the restated initial risk sharing valuation study.

The System has evaluated subsequent events through November 7, 2017, the date the financial statements were available for issuance.

### Schedule of Changes in the Net Pension Liability and Related Ratios
### For Last Four Fiscal Years
### ($000's)

| Fiscal year ending June 30, | 2017 | 2016 | 2015 | 2014 |
|---|---|---|---|---|
| **Total Pension Liability** | | | | |
| Service Cost | $ 60,930 | $ 66,098 | $ 56,062 | $ 52,844 |
| Interest | 433,598 | 488,223 | 473,065 | 466,649 |
| Benefit Changes | (1,006,000) | - | - | - |
| Difference between Expected and Actual Experience | 80,023 | 10,390 | 26,706 | (41,034) |
| Assumption Changes | 778,710 | (676,151) | 664,974 | 162,849 |
| Benefit Payments | (458,733) | (259,076) | (225,656) | (211,690) |
| Refunds | (1,696) | (978) | (945) | (906) |
| **Net Change in Total Pension Liability** | (113,168) | (371,494) | 994,206 | 428,712 |
| **Total Pension Liability - Beginning** | 6,621,290 | 6,992,784 | 5,998,578 | 5,569,866 |
| **Total Pension Liability - Ending (a)** | $ 6,508,122 | $ 6,621,290 | $ 6,992,784 | $ 5,998,578 |
| **Plan Fiduciary Net Position** | | | | |
| Employer Contributions | $ 133,805 | $ 137,392 | $ 113,665 | $ 103,372 |
| Employee Contributions | 40,104 | 39,017 | 37,719 | 37,012 |
| Pension Plan Net Investment Income | 667,476 | (135,833) | 35,341 | 649,153 |
| Benefit Payments | (458,733) | (259,076) | (225,656) | (211,690) |
| Refunds | (1,696) | (978) | (945) | (906) |
| Pension Plan Administrative Expense | (4,238) | (4,585) | (3,478) | (3,439) |
| Other | - | - | - | - |
| **Net Change in Plan Fiduciary Net Position** | 376,718 | (224,063) | (43,354) | 573,502 |
| **Plan Fiduciary Net Position - Beginning** | 4,080,460 | 4,304,523 | 4,347,877 | 3,774,375 |
| **Plan Fiduciary Net Position - Ending (b)** | $ 4,457,178 | $ 4,080,460 | $ 4,304,523 | $ 4,347,877 |
| **Net Pension Liability - Ending (a) - (b)** | $ 2,050,944 | $ 2,540,830 | $ 2,688,261 | $ 1,650,701 |
| **Plan Fiduciary Net Position as a Percentage of Total Pension Liability** | 68.49% | 61.63% | 61.56% | 72.48% |
| **Covered Employee Payroll** | $ 424,300 | $ 407,058 | $ 395,360 | $ 388,756 |
| **Net Pension Liability as a Percentage of Covered Employee Payroll** | 483.37% | 624.19% | 679.95% | 424.61% |

This schedule is intended to present information for 10 years. GASB Statement 67 established the requirement for this schedule and went into effect for fiscal year ending June 30, 2014. The statement allows that if retroactive information is not presented for the full 10 years, required supplementary information should be presented for as many years for which information measured in conformity with the requirements of this Statement is available in the transition year and until 10 years of such information is available.

### Schedule of Employer Contributions for the Last Four Fiscal Years ($000's)

| Measurement Year Ending June 30, | Actuarially Determined Contribution | Actual Contribution | Contribution Deficiency (Excess) | Covered Payroll | Actual Contribution as a % of Covered Payroll |
|---|---|---|---|---|---|
| 2014 | $ 139,991 | $ 103,372 | $ 36,619 | $ 388,756 | 26.59 % |
| 2015 | 150,949 | 113,665 | 37,284 | 395,360 | 28.75 |
| 2016 | 161,154 | 137,392 | 23,762 | 407,058 | 33.75 |
| 2017 | 167,980 | 133,805 | 34,175 | 424,300 | 31.54 |

This schedule is intended to present information for 10 years. GASB Statement 67 established the requirement for this schedule and went into effect for fiscal year ending June 30, 2014. The statement allows that if retroactive information is not presented for the full 10 years, required supplementary information should be presented for as many years for which information measured in conformity with the requirements of this Statement is available in the transition year and until 10 years of such information is available.

**Notes to Schedule**

**Valuation Date:** July 1, 2017

Actuarially determined contribution rates, payable by the City, are determined in accordance with the 2016 Risk Sharing Valuation Study (RSVS) and become effective in the fiscal year beginning one year after the valuation date. Previously, actual contributions were based on the terms of the 2011 Meet and Confer Agreement. For more information regarding the actuarially determined contribution, refer to the July 1, 2017 HPOPS Valuation Report.

A new set of assumptions were adopted following the July 1, 2016 actuarial valuation and will be first reflected in the contribution rate determined for the fiscal year ending 2018 based on the "Final Risk Sharing Valuation Study as of June 30, 2016" dated September 25, 2017.

**Methods and Assumptions Used to Determine Contribution Rates:**

| | |
|---|---|
| Actuarial Cost Method | Ultimate Entry Age Normal |
| Amortization Method | Level Percentage of Payroll, 30 year closed laddered bases |
| Remaining Amortization Period | 30 years |
| Asset Valuation Method | 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 actuarial value of assets was set equal to the market value of assets as of July 1, 2016. |
| Inflation | 2.75% |
| Salary Increases | 0.00% to 12.00% , plus a 2.75% inflation and productivity component |
| Investment Rate of Return | 7.00% |
| Retirement Age | Experience-based table of rates based on age and years of service. The assumption was last updated in the July 1, 2014 valuation pursuant to an experience study of the five-year period ending June 30, 2013. |
| Mortality | Healthy retirees - The Gender-distinct RP2000 Combined Healthy Mortality Tables with Blue Collar Adjustment are used with male rates multiplied by 109% and female rates multiplied by 103%. The rates are projected on a fully generational basis by scale BB to account for future mortality improvements. |
| | Disabled males and females – The gender-distinct RP2000 Disabled Retiree Mortality Tables are used without adjustment. The rates are projected on a fully generational basis by scale BB to account for future mortality improvements. (continued on next page) |

(continued from previous page)

Active members - The Gender-distinct RP2000 Combined Healthy Mortality Tables with Blue Collar Adjustment are used with male rates multiplied by 54% and female rates multiplied by 51%. The rates are projected on a fully generational basis by scale BB to account for future mortality improvements. An additive factor of .0003 is applied to all active mortality rates.

**Schedule of Investment Returns**
**For the Last Four Fiscal Years**

| Fiscal Year Ended June 30, | Annual Money-weighted Rate of Return, net of Investment Expense |
|---|---|
| 2014 | 17.4 % |
| 2015 | 0.8 % |
| 2016 | (3.2)% |
| 2017 | 16.8 % |

This schedule is intended to present information for 10 years. GASB Statement 67 established the requirement for this schedule and went into effect for fiscal year ending June 30, 2014. The statement allows that if retroactive information is not presented for the full 10 years, required supplementary information should be presented for as many years for which information measured in conformity with the requirements of this Statement is available in the transition year and until 10 years of such information is available.

# Houston Police Officers' Pension System

## Schedule I - Investment, Professional and Administrative Expenses ($000's)

| *Year ended June 30,* | 2017 | 2016 |
|---|---|---|
| Investment services: | | |
| Custodial services | $ 242 | $ 233 |
| Money management services | 12,480 | 12,651 |
| Consulting services | 800 | 1,009 |
| Department operating expense | 571 | 494 |
| Total investment services | 14,093 | 14,387 |
| Professional services: | | |
| Actuarial services | 482 | 293 |
| Auditing services | 101 | 94 |
| Election audit services | 35 | 20 |
| Legal services | 96 | 105 |
| Lobbyist services | 393 | 384 |
| Total professional services | 1,107 | 896 |
| Administrative expenses: | | |
| Information technology | 575 | 1,077 |
| Education | 36 | 22 |
| Fiduciary insurance | 91 | 92 |
| Office rent | 245 | 208 |
| Other office costs | 2,184 | 2,290 |
| Total administrative expenses | 3,131 | 3,689 |
| | $ 18,331 | $ 18,972 |

*See accompanying independent auditor's report.*

# Houston Police Officers' Pension System

## Schedule II – Summary of Investment and Professional Services ($000's)

| *Twelve Months Ended June 30, 2017* | Official System Position | Expense | Nature of Services |
|---|---|---|---|
| Franklin Park Associates, LLC | Consultant | $ 400 | Consulting |
| Mercer Investment Consulting LLC | Consultant | 400 | Consulting |
| The Northern Trust Company | Custodian | 242 | Custodian |
| AQR Capital Management LLC | Money Manager | 2,454 | Money Management |
| BlackRock Institutional Trust | Money Manager | 352 | Money Management |
| Blackstone Alternative Solutions LLC | Money Manager | 204 | Money Management |
| Brevan Howard Capital Management LP | Money Manager | 680 | Money Management |
| Bridgewater Associates, Inc. | Money Manager | 5,970 | Money Management |
| The Northern Trust Company | Money Manager | 873 | Money Management |
| Parametric | Money Manager | 1,454 | Money Management |
| Shenkman Capital Management, Inc. | Money Manager | 493 | Money Management |
| Gabriel Roeder Smith & Co. | Actuary | 482 | Actuarial |
| BDO USA, LLP | Auditors | 101 | Auditing |
| Burford Perry LLP | Attorneys | 59 | Legal Service |
| IceMiller LLP | Attorneys | 33 | Legal Service |
| Kasowitz, Benson, Torres & Friedman LLP | Attorneys | 1 | Legal Service |
| HillCo Partners, LLC | Attorneys | 158 | Lobbyists |
| Locke Lord LLP | Attorneys | 210 | Lobbyists |
| Bickley Prescott & Co. | Consultant | 35 | Election Auditing |
| Other | Other | 28 | Other |
| Total investment and professional services | | $ 14,629 | |

*See accompanying independent auditor's report.*

SECTION THREE

# INVESTMENT SECTION



**Responsibilities of the Board of Trustees**

The primary fiduciary fiscal responsibility of the Board of Trustees is to insure that the System's assets are responsibly managed in accordance with the actuarial needs of the System, and also with sound, generally accepted financial investment procedures. The determination of the appropriate asset mix is based on capital market assumptions that incorporate historical returns, volatility and correlation of various asset classes as well as the consideration of liquidity and current and forward-looking market expectations.

The Standard of Investment for the System in making investments is commonly known as the "prudent expert" rule, whereby from a procedural as well as substantive standpoint, it acts with the care, skill, prudence and diligence that a "prudent expert" acting in a similar capacity would act under similar circumstances. The Trustees' responsibility is to invest the System's funds solely in the interest of the membership and their beneficiaries, and for the exclusive purpose of providing benefits to the membership and their beneficiaries and defraying reasonable expenses of administering the System.

**Investment Philosophy and Objectives**

The Board of Trustees believes that the System's assets should be managed in a way that reflects the uniqueness of the System and that the System's assets should be diversified over a spectrum of investment strategies. Specifically, the Board recognizes and adheres to the following philosophical positions:

- Diversification should be based upon the prudent allocation of risk rather than solely the allocation of capital.

- Asset classes are priced to have long-term expected returns above cash and their return above cash is proportional to their risk (they have similar Sharpe Ratios). Since asset classes have similar expected Sharpe Ratios, they can be made competitive through the prudent use of leverage or leverage-like techniques.

- Over the long term, the risk of owning equities has been, and should continue to be, rewarded with a somewhat greater return than that available from fixed income investments.

- Fixed income investments provide the System with an investment strategy that contributes diversification, liquidity and a predictable stream of income; and that dampens volatility in investment returns.

- Diversification into alternative investments provides the System with an opportunity to enhance returns and to achieve broader diversification of the System's assets.

**Investment Policy**

The Board of the Houston Police Officers' Pension System (HPOPS) has established an Investment Policy with the following broad guidelines and objectives.

- Establish overall financial objectives and set investment policy
- Select appropriate investment options
- Select qualified investment manager(s) and consultants
- Select a qualified custodian
- Communicate on a structured and ongoing basis with those responsible for investment results; and
- Monitor performance to assure that objectives are being met and that policy and guidelines are being followed.

This Investment Policy represents the formal document for HPOPS and is to be communicated to the appointed Investment Manager(s) and is their principal source for developing an appropriate investment strategy and, in addition, serves as the basis for these Managers' and the System's future performance evaluation.

**Investment Strategy and Performance**

The System's asset allocation strategy is reviewed periodically by the Board and is changed in anticipation of or in response to changing market conditions. The current asset allocation targets and the actual asset allocation of the System at June 30, 2017 are as follows:

| | Target % of Fund | Current Actual % of Fund | Dollars Invested (000's) |
|---|---|---|---|
| Domestic Equity | 30.0% | 32.4% | $ 1,209,856 |
| International Equity | 20.0% | 21.7% | 902,494 |
| **Total Equity** | 50.0% | 54.0% | 2,112,351 |
| Credit Strategies | 12.0% | 8.3% | 370,222 |
| Traditional Fixed Income | 0.0% | 1.2% | 51,311 |
| **Total Fixed Income** | 12.0% | 9.5% | 421,533 |
| Private Equity | 15.0% | 10.7% | 474,324 |
| Risk Parity | 10.3% | 11.2% | 499,730 |
| Hedge Funds | 10.0% | 9.7% | 432,947 |
| Real Estate | 10.0% | 6.6% | 294,491 |
| Energy | 2.5% | 2.8% | 126,410 |
| **Total Alternatives** | 47.8% | 41.0% | 1,827,902 |
| **Total Cash** | -9.8% | -4.5% | 93,344 |
| **Total Fund** | 100.0% | 100.0% | $ 4,455,129 |

The story of fiscal year 2017 was one of global growth. During the year, strong economic data releases and positive momentum fueled investor confidence. Domestic markets proved strong enough to withstand a second rate hike by the Federal Reserve in December 2016, while international monetary policy remained accommodative. The System fully participated in this risk-on environment returning 16.8%.

HPOPS outperformed its benchmark rate of return by 2.7%, due primarily to its domestic equity allocation. The domestic equity portfolio is a passive allocation that can be leveraged within a range as established by the Board. The leverage utilized in the System's public equity portfolio allowed it to outperform its benchmarks by approximately 3.7% and 1.3% in the US and Non-US markets, respectively.

There were no significant changes to the System's asset allocation during the year. The United States appeared to be further along in the economic cycle when compared to global markets; therefore the tactical tilt away from international markets that was established early in the year was gradually pared back in order to capitalize on greater growth opportunities abroad.

Additionally, given the duration of the market cycle the System initiated a fixed income position in order for the System to be protected in the event of a market correction. A further expansion of the fixed income allocation is being evaluated.

*Domestic Equity*

The U.S equity portfolio generated a 22.2% return, outperforming the 18.5% return of its benchmark, the Russell 3000. This outperformance of the System's domestic equity portfolio versus the benchmark was primarily due to the System's use of leverage within the Parametric U.S. Futures portfolio. During FY 2017 the Parametric U.S. Futures portfolio outperformed the Russell 3000 index by 6.8%.

Assets under management, annualized rates of return and fees paid to domestic equity managers for the fiscal year ending June 30, 2017 are as follows (dollars in 000's):

| Manager | Style | Assets | % Returns | Fees |
|---|---|---|---|---|
| BlackRock | S&P 500 Index | $ 659,358 | 18.4% | $ 104 |
| Parametric [1] | Russell 3000 Futures | 550,499 | 25.3% | 474 |
| | | $ 1,209,856 | | $ 578 |

[1] - See footnote 4 to the financial statements for disclosure of leverage in this strategy

*International Equity*

The System's non-U.S. equity target allocation was increased during the year in recognition of the view that the U.S. is later in the economic cycle versus developed international markets. The international equity portfolio returned 22.0%, outperforming the 20.5% return of the MSCI ACWI ex U.S. benchmark for the fiscal year. This outperformance was primarily due to the leverage in the non-U.S. futures program.

Assets under management, annualized rates of return and fees paid to international equity managers for the fiscal year ending June 30, 2017 are as follows (dollars in 000's):

| Manager | Style | Assets | % Returns | Fees |
|---|---|---|---|---|
| BlackRock | World Equity ex-US | $ 518,287 | 20.9% | $ 242 |
| Parametric | World Equity ex-US Futures[1] | 341,927 | 23.5% | 211 |
| Parametric | Currency Hedge | 42,259 | 3.9% | 136 |
| Causeway Capital | EAFE[2] | 22 | NA | - |
| | | $ 902,494 | | $ 589 |

[1] See footnote 4 to the financial statements for disclosure of leverage in this strategy.

[2] Terminated

*Credit*

HPOPS has a dedicated allocation to credit strategies designed to take advantage of perceived opportunities in the credit markets. Credit investments are segregated by HPOPS as a separate investment category with a target allocation of 12.0% of the System's total assets.

The System has reduced its allocation to high yield to 3.0% in favor of opportunistic strategies, as given where we are in the economic cycle, the structure of the illiquid credit funds appear more attractive. The opportunity set remains extensive due to reduced lending within the banking industry and we continue to believe that there is potential outperformance versus high yield resulting from the illiquidity premium. In addition, these illiquid funds should be less volatile while at the same time distributing current income.

Assets under management, annualized rates of return and fees paid to credit-oriented managers for the fiscal year ending June 30, 2017 are listed below (dollars in 000's):

| Manager | Style | Assets | % Returns | Fees |
|---|---|---|---|---|
| MacKay Shields | High Yield[1] | $ 19 | NA | $ - |
| Shenkman Capital Mgmt | High Yield | 127,896 | 11.2% | 493 |
| Northern Trust | High Yield | 59,640 | 12.4% | 225 |
| Golub BDC2 | Opportunistic Credit | 1,500 | 0.0% | 5 |
| GSO Capital Opps III | Opportunistic Credit | 4,407 | 2.7% | 31 |
| Mesa West IV | Opportunistic Credit | 3,349 | -6.5% | 188 |
| OZ RE Credit | Opportunistic Credit | 4,553 | 10.3% | 65 |
| DW Partners | Opportunistic Credit | 21,773 | 9.7% | 469 |
| Silver Point | Opportunistic Credit | 24,190 | 12.3% | 662 |
| SP Speciality Credit | Opportunistic Credit | 19,091 | 26.6% | 161 |
| OZ Structured Products II | Opportunistic Credit | 16,704 | 32.9% | 256 |
| Golub X | Opportunistic Credit | 17,914 | 9.5% | 196 |
| Monroe Capital II | Opportunistic Credit | 19,337 | 10.3% | 191 |
| Anchorage Illiquid III | Opportunistic Credit | 18,133 | 0.3% | 473 |
| Anchorage Illiquid V | Opportunistic Credit | 31,716 | 14.5% | 223 |
| | | $ 370,222 | | $ 3,638 |

[1] Terminated

*Fixed Income*

The System does not maintain a target allocation to fixed income and has not made a strategic allocation to the asset class since 2012 due to low return expectations. Given the duration of the economic recovery, high valuations and geopolitical risks in the market, the System has tactically elected to invest in a passively managed bond fund indexed to the Barclay's Aggregate.

Assets under management, annualized rates of return and fees paid to fixed income managers for the fiscal year ending June 30, 2017 are listed below (dollars in 000's):

| Manager | Style | Assets | % Returns | Fees |
|---|---|---|---|---|
| Blackrock [1] | BC US Aggregate | 51,311 | 3.2% | 6 |

[1] Funded March 10, 2017, returns are not annualized.

*Alternative Investments*

The System's alternative investment program consists of allocations to private equity, energy assets, real estate, hedge funds, and risk parity strategies. The private equity program is now managed by Franklin Park, although the portfolio still contains funds recommended by Abbott Capital who managed the asset class from 1997 – 2008, as well as funds recommended by Mercer (formerly Hammond Associates) who served as the interim manager between Abbott Capital and Franklin Park. Although the private equity program is a relatively mature strategy, it remains underfunded by approximately 4.3% due primarily to the increased allocation to the asset class and also to larger than expected distributions over the last few years. The System had investments in, or commitments to, 128 individual private equity and energy partnerships with 60 general partners as of June 30, 2017. The current allocation within this strategy is approximately 49% leveraged buyouts, 17% special situation funds, 5% venture capital, 9% secondary and 21% in energy funds. This program required $140.1 million of additional funding during fiscal 2017 while at the same time generating distributions of $129.7 million for the same period. The private equity program generated an 18.9% return for the 2017 fiscal year versus a return of 17.1% for its benchmark, the Cambridge Private Equity Index. The System's energy allocation returned 24.4%, outperforming its benchmark, the S&P 500 Energy Index by 28.5%. This extreme outperformance of the energy portfolio is due to the valuation methodology of the illiquid funds, which do not immediately reflect the trends in the public market and are less correlated.

**$ millions**

| Strategy | Number of Funds | Committed Capital | Contributed Capital | Unfunded Commitment | Distributed Capital | Remaining Value | Exposure | TVPI | Net IRR |
|---|---|---|---|---|---|---|---|---|---|
| Buyout | 70 | $ 921 | $ 679 | $ 284 | $ 736 | $ 283 | $ 569 | 1.5 | 11.0% |
| Distressed Debt | 5 | 75 | 68 | 10 | 31 | 72 | 82 | 1.5 | 17.6% |
| Growth Equity | 13 | 87 | 86 | 0 | 111 | 19 | 20 | 1.5 | 9.2% |
| Hard Assets | 14 | 240 | 154 | 101 | 62 | 123 | 224 | 1.2 | 10.5% |
| Mezzanine | 4 | 52 | 51 | 5 | 53 | 17 | 22 | 1.4 | 12.2% |
| Multi-Strategy | 11 | 226 | 98 | 131 | 82 | 66 | 197 | 1.5 | 12.1% |
| Turnaround | 3 | 45 | 24 | 23 | 16 | 13 | 36 | 1.2 | 8.6% |
| Venture Capital | 8 | 46 | 45 | 1 | 54 | 8 | 9 | 1.4 | 4.8% |
| | 128 | $ 1,691 | $ 1,205 | $ 556 | $ 1,145 | $ 601 | $ 1,159 | 1.4 | 10.6% |

▫ Remaining Value is defined as the investor's value as reported by the fund's manager.
▫ Exposure is defined as the sum of an investor's Remaining Value plus Unfunded Commitment.
▫ TVPI is the ratio of Distributed Capital plus Remaining Value to Contributed Capital.
▫ Net IRR is defined as the annualized, compound rate of return using daily draws, distributions and Remaining Value as of the Report Date, of fees and expenses, including late closing interest.
▫ Results include fully liquidated investments (if applicable).
▫ Commitments made in a foreign currency have been converted into U.S. dollars using an exchange rate as of the Report Date.

As of June 30, 2017 the market value of real estate assets comprised 6.6% of the System's total assets. The 3.4% shortfall between the target allocation and the current allocation is due to the increased target allocation during 2015, in addition to the timing and relatively immature nature of the portfolio. The System began committing to the asset class during 2007, immediately prior to the great recession. During the recession, capital was not called due to extreme market uncertainty, essentially delaying investment into the asset class for approximately two years. The System had investments in, or commitments to, 30 individual real estate partnerships with 18 general partners as of June 30, 2017. This program required $70.9 million of additional funding during fiscal 2017 while at the same time generating distributions of $50.8 million for the same period. The System's real estate portfolio returned 10.7% during fiscal year 2017, outperforming its benchmark the NCREIF Property Index by 3.5%.

**$ millions**

| Strategy | Number of Funds | Committed Capital | Contributed Capital | Unfunded Commitment | Distributed Capital | Remaining Value | Exposure | TVPI | Net IRR |
|---|---|---|---|---|---|---|---|---|---|
| Europe Diversified | 1 | $ 25 | $ 2 | $ 23 | $ - | $ 2 | $ 25 | 1.0 | na |
| Global Distressed Commercial Debt | 2 | 43 | 17 | 28 | 6 | 14 | 42 | 1.1 | 16.6% |
| Global Distressed Residential Debt | 1 | 20 | 17 | 6 | 9 | 11 | 16 | 1.2 | 16.7% |
| Global Diversified | 11 | 207 | 108 | 116 | 41 | 94 | 210 | 1.3 | 11.9% |
| US Diversified | 9 | 231 | 128 | 108 | 36 | 121 | 229 | 1.2 | 10.8% |
| US Multi-Family | 1 | 10 | 8 | 2 | 10 | 2 | 4 | 1.6 | 16.7% |
| US Office | 2 | 20 | 22 | 3 | 30 | 5 | 7 | 1.6 | 15.4% |
| US Real Estate Debt | 3 | 70 | 53 | 26 | 17 | 46 | 71 | 1.2 | 12.7% |
| | 30 | $ 625 | $ 355 | $ 311 | $ 149 | $ 294 | $ 606 | 1.3 | 12.2% |

▫ Remaining Value is defined as the investor's value as reported by the fund's manager.
▫ Exposure is defined as the sum of an investor's Remaining Value plus Unfunded Commitment.
▫ TVPI is the ratio of Distributed Capital plus Remaining Value to Contributed Capital.
▫ Net IRR is defined as the annualized, compound rate of return using daily draws, distributions and Remaining Value as of the Report Date, of fees and expenses, including late closing interest.
▫ Results include fully liquidated investments (if applicable).
▫ Commitments made in a foreign currency have been converted into U.S. dollars using an exchange rate as of the Report Date.

The target hedge fund allocation is now 10.0% and the System had $432.9 million invested as of June 30, 2017. Hedge funds generated fiscal year performance of approximately 10.7%, outperforming the HFR Fund of Funds Composite Index by 4.2%. Hedge fund performance benefited this year from rising global equity markets, low cost financing, and recovering commodity markets.

The System maintained its 10.3% allocation to risk parity during the year. Risk parity funds underperformed their benchmark, a 60% S&P 500 / 40% BC US Aggregate mix, by returning 6.1% versus 10.3%, respectively.

Assets under management, annualized rates of return and fees paid to alternative investments managers for the fiscal year ending June 30, 2017 are listed on the following page (dollars in 000's):

| Manager | Style | Assets | % Returns | Base Fee |
|---|---|---|---|---|
| Bridgewater | Risk Parity[1] | $ 175,371 | 8.0% | $ 1,812 |
| AQR | Risk Parity[1,2] | 324,360 | 5.1% | $ 2,454 |
| Bridgewater | Hedge Funds[3] | 210,679 | 15.9% | $ 4,158 |
| Mercer | Hedge Funds | 18,416 | 9.4% | $ 7,525 |
| Blackstone Opportunistic | Hedge Fund | 8,749 | 4.6% | $ 204 |
| Parametric Defensive | Option Trading | 45,877 | 11.2% | $ 575 |
| Mercer | Real Estate[4] | 294,491 | 10.7% | $ 400 |
| Franklin Park | Private Equity[5] | 474,324 | 18.9% | $ 400 |
| Franklin Park | Energy[6] | 126,410 | 24.4% | $ - |
| Elliott | Hedge Fund | 102,549 | 11.2% | $ 1,460 |
| King Street | Hedge Fund | 22,192 | 7.1% | $ 323 |
| Viking | Hedge Fund | 24,485 | 8.5% | $ 355 |
| | | $ 1,827,902 | | $ 18,988 |

[1] Risk parity plus alpha overlay.

[2] Include the Multi Strategy Fund VIII and the Multi Strategy Fund XI.

[3] Includes the Pure Alpha and Pure Alpha Major Markets funds.

[4] Fees consist of the Mercer $600 thousand annual consulting fee.

[5] Fees consist of the $400 thousand annual consulting fee.

[6] Fees included in the $400 thousand private equity consulting fee.

*Cash*

The System has a cash securitization program which was initiated in order to more closely track our strategic asset allocation through the securitization of excess cash. During September 2008, the System switched to a "government only" STIF fund at its custodian bank, thereby avoiding many of the liquidity issues experienced by many STIF funds during the credit crisis.

| **Manager** | **Style** | **Assets (000s)** | **% Returns** | **Base Fee (000s)** |
|---|---|---|---|---|
| Parametric | Cash Securitization[1] | $ 93,344 | 18.4% | $ 58 |
| | | $ 93,344 | | $ 58 |

[1] As of June 30, 2017 cash balances were securitized with 39% Domestic Equity exposure, 21% International Equity exposure and 40% unsecuritized cash.

*Securities Lending*

The System's master custodian, Northern Trust, operates the Securities Lending program on behalf of HPOPS. Securities are loaned on a short-term basis to brokers in exchange for (generally) cash collateral. Northern Trust then invests this collateral and the investment income is divided between HPOPS and Northern Trust in accordance with agreed-upon percentages.

This program generates incremental income for HPOPS but is subject to certain risks. These risks include (1) the possibility that the borrower cannot return the securities and (2) that the investments in which Northern invests the collateral lose money. This first risk is controlled by strict guidelines on which borrowers will be approved to participate in the program and daily adjustment of the collateral for changes in the market value of the securities that are out on loan. The second risk is controlled by strict quality and duration guidelines on the securities that the collateral can be invested in. In June 2008 the System switched to a "government only" collateral pool thus avoiding exposure to the liquidity issues experienced by many securities lending collateral pools during the credit crisis.

Vendors other than Northern Trust could be used for this program which could generate additional income but this is not likely without what has been determined to be an unacceptable increase in risk. Northern's participation in the Securities Lending program also allows for a reduction in custody fees.

Following is a chart of securities lending activity for the most recent three fiscal years (dollars in 000's).

| | 2017 | 2016 | 2015 |
|---|---|---|---|
| **Avg Securities on Loan** | $ 76,975 | $ 76,158 | $ 42,928 |
| **Avg Eligible Securities** | $ 486,561 | $ 543,467 | $ 284,593 |
| **% on Loan** | 15.8% | 14.0% | 15.1% |
| **HPOPS Net Earnings** | $ 305 | $ 185 | $ 92 |
| **Duration of Collateral Pool (days)** | 30 | 33 | 40 |

**Report Preparation**

This report was prepared by the Investment Department of the Houston Police Officers' Pension System.

## Compound Annualized Rates of Return by Year (%)
## Periods Ended June 30, 2017

| Year | System Total | Composite Benchmark | Domestic Equity | Russell 3000 | Int'l Equity | MSCI ACWI ex U.S. | Credit | Citigroup HY | Alternative Investments |
|---|---|---|---|---|---|---|---|---|---|
| 2 | 6.4 | 6.6 | 12.3 | 10.0 | 2.8 | 4.0 | 5.4 | 6.5 | 5.4 |
| 3 | 4.5 | 5.3 | 9.2 | 9.1 | 1.0 | 0.8 | 4.4 | 4.0 | 4.2 |
| 5 | 7.6 | 8.9 | 14.6 | 14.6 | 6.8 | 7.2 | 8.0 | 6.4 | 6.9 |
| 10 | 5.3 | 5.0 | 6.3 | 7.3 | 0.4 | 1.1 | 7.9 | 7.2 | 6.9 |

## Rates of Return by Year (%)
## Years Ended June 30th

| Year | System Total | Composite Benchmark | Domestic Equity | Russell 3000 | Int'l Equity | MSCI ACWI ex U.S. | Credit | Citigroup HY | Alternative Investments |
|---|---|---|---|---|---|---|---|---|---|
| 2013 | 7.9 | 12.1 | 21.5 | 21.5 | 11.9 | 13.6 | 13.4 | 9.2 | 4.1 |
| 2014 | 17.4 | 18.7 | 25.2 | 24.9 | 20.5 | 21.8 | 13.5 | 11.3 | 18.5 |
| 2015 | 0.8 | 3.1 | 3.2 | 7.3 | -2.5 | -5.3 | 2.4 | -0.9 | 1.9 |
| 2016 | -3.1 | -0.6 | 3.1 | 2.1 | -13.4 | -10.2 | -1.5 | 0.9 | -1.4 |
| 2017 | 16.8 | 14.1 | 22.2 | 18.5 | 22.0 | 20.5 | 12.7 | 12.3 | 12.6 |

These calculations were prepared using a time-weighted rate of return in accordance with The CFA Institute's Global Investment Performance Standards. The System's total rates of return are net of fees. All other rates of return are presented gross of fees. Though these standards do not apply to plan sponsors per se, we have used them herein for purposes of presenting investment rates of return. The Composite Benchmark returns are calculated as if the System's current asset allocation had been in place for all time periods.

## Schedule of Ten Largest Equity Holdings

*As of June 30, 2017*

| Shares | Description | Market Value ($000's) | % of Total Equity |
|---|---|---|---|
| 767,451 | Blackrock Equity Index Fd | $ 659,358 | 31.21% |
| 20,149,529 | Blackrock ACWI Ex-Us Superfund A | 518,287 | 24.54% |
| 1,163,428 | Vanguard Index Funds S&P 500 ETF | 258,351 | 12.23% |
| 36,021 | U S Auto Pts Network Inc | 116 | 0.01% |
| 9,009 | Groupon Inc | 35 | 0.00% |
| 354 | Quad/Graphics Inc | 8 | 0.00% |
| 27 | Magellan Health Inc | 2 | 0.00% |
| 31 | HealthSouth Corp | 2 | 0.00% |
| 672 | Ziff Davis Hldgs Inc | - | 0.00% |
| 522 | N Atlc Trading Inc | - | 0.00% |

## Schedule of Ten Largest Fixed Income Holdings

*As of June 30, 2017*

| Shares | Description | Market Value ($000's) | % of Total Fixed Income |
|---|---|---|---|
| 1,879,008 | NTGI COLTV Daily Hi Yield Fxd Inc Fd | $ 59,640 | 16.11% |
| 737,316 | Blackrock Us Debt Index A Fd | 51,311 | 13.86% |
| 1,200,000 | Pvtpl1 Psignode Indl Group Us Inc 6.375% 05-01-2022 | 1,254 | 0.34% |
| 1,200,000 | Pvtpl Inmarsat Fin Plc Gtd Sr Nt 144a 4.875% Due 05-15-2022/05-15-2017 | 1,218 | 0.33% |
| 980,000 | Sprint Corp Fixed 7.625% Due 02-15-2025 | 1,128 | 0.30% |
| 950,000 | Pvtpl1 Cablevision Sys Sr Nt 8 Due 04-15-2020 | 1,058 | 0.29% |
| 1,025,000 | Pvtpl Cequel Communications Hldgs I Llc / Cequ Sr Nt 144a 5.125 | 1,043 | 0.28% |
| 900,000 | Pvtpl Wavedivision Escrow / Wave 8.125 Due 09-01-2020/08-21-2012 | 932 | 0.25% |
| 790,000 | Hughes Satellite 7.625% Due 06-15-2021 | 898 | 0.24% |
| 855,000 | Teck Resources Ltd 4.75% Due 01-15-2022 | 885 | 0.24% |

A complete list of all individual holdings is available upon request.

## Schedule of Equity Trading Brokerage Commissions Paid

*For the year ended June 30, 2017*

| Brokers | Shares | Commissions | Principle | Commissions Per Share |
|---|---|---|---|---|
| Goldman Sachs | 14,120,508 | $ 11,929 | $ 247,601,000 | $ 0.001 |
| ITG Inc | 220,612 | 2,206 | 7,606,456 | 0.010 |

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SECTION FOUR

# ACTUARIAL SECTION

Gabriel Roeder Smith & Company
Consultants & Actuaries

# HOUSTON POLICE OFFICERS' PENSION SYSTEM

## ACTUARIAL VALUATION REPORT

## FOR THE YEAR BEGINNING JULY 1, 2016

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October 11, 2016

Board of Trustees
Houston Police Officers' Pension System
602 Sawyer
Suite 300
Houston, TX 77007

**Subject: Actuarial Valuation Report as of July 1, 2016**

Dear Members of the Board:

We are pleased to present our Report of the actuarial valuation of the Houston Police Officers' Pension System ("HPOPS" or "the System") for the plan year commencing July 1, 2016. This Report describes the current actuarial condition of HPOPS, determines the calculated employer contribution rate (the actuarially determined rate), and analyzes changes in this contribution rate from the prior year. Valuations are prepared annually, as of July 1st, the first day of the HPOPS' plan year.

**Financing objectives and funding policy**

Under the HPOPS statute, the employer contribution rate is determined actuarially, based on the Board's funding policy and HPOPS' governing law. The contribution rate determined by a given actuarial valuation and implemented by the Board becomes effective twelve months after the valuation date, i.e., the rates determined by this July 1, 2016 actuarial valuation will be used by the Board when determining the employer contribution rate for the year beginning July 1, 2017 and ending June 30, 2018.

Under the 2011 Meet & Confer Agreement between the Board and the City of Houston, a funding schedule was implemented resulting in a minimum $83 million employer contribution for the fiscal year ending June 30, 2012, increasing by $10 million each year thereafter until HPOPS' funded ratio reaches 100%. Therefore, under the terms of the Meet & Confer, an amount of $133 million is scheduled to be contributed for the fiscal year ending 2017.

For FY2012, the City of Houston contributed $17 million less than required under the Meet & Confer. This amount, with interest, was fully paid by the City in FY2016. For FY2013, the City contributed $8.5 million less than required which, again, was to be financed at an annual interest rate of 8.5%. This amount, with interest, was also fully paid by the City in FY2016.

In addition, once the System reaches an 80% funded status (the ratio of the actuarial value of assets to the actuarial accrued liability), the City will make additional payments in the fiscal year following a determination that the System has fallen below this 80% threshold. The funded ratio as of the June 30, 2015 actuarial valuation was 79.7% resulting in a contribution receivable from the City of $14.284 million. Finally, once the System reaches the actuarially determined rate, the City will pay the actuarially determined rate, but not less than 16.0% of payroll.

Given the above schedule under the terms of the Meet & Confer Agreement, the actual employer contribution amount for the fiscal year ending June 30, 2018 will not be set by this actuarial valuation as of July 1, 2016. Therefore, the actuarially calculated contribution rate determined by this valuation will not be contributed by the City of Houston. Based upon projected active member payroll of approximately $420 million for FY2017, the City's calculated contribution amount should be approximately $175 million. Instead, the City will only contribute $133 million for FY2017 under the terms of the above funding schedule, as detailed in the 2011 Meet & Confer Agreement. **In addition, the funded ratio remains below the 80% threshold; therefore, an additional appropriation to the System from the City of $148.576 million for FY2018 should be contributed, per the 2011 Meet & Confer Agreement.**

The contribution rate and liabilities are computed using the Projected Unit Credit (PUC) actuarial cost method. The employer contribution rate is the sum of two pieces: the employer normal cost rate and the amortization rate. The normal cost rate is determined as a percentage of active member payroll, with the employer normal cost being the difference between the total normal cost and the weighted member contribution rate. The amortization rate is determined as a level percentage of active member payroll. It is the amount required to amortize the unfunded actuarial accrued liability (UAAL) over an open period (30 years as of July 1, 2016). The amortization period is set by statute, and was modified under the Meet and Confer Agreement.

**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, 2016 is 77.5% which is a decrease from 79.7% last year primarily due to asset losses, as the return of 4.43% on the actuarial value of assets was significantly less than the assumed rate of 8.0%. The funded ratio measured on the market value of assets is a lower percentage at 67.9% as of July 1, 2016. The funded status alone may not be appropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations.

Based on the current scheduled funding policy as set forth in the 2011 Meet and Confer Agreement, the System is projected to be 100% funded in approximately 20 years, or in year 2036. This is three years shorter than the funding period determined in the prior valuation. However, this amortization schedule is based upon proportionately larger contributions in future years, again, according to the current Meet and Confer Agreement. In particular, it is assumed that the City will make additional contributions to the System in accordance with the 80% funded ratio threshold, as described above, as these additional contributions become due. Using the FY2017 City contribution level amount only, and projecting this same contribution level going forward, would calculate to a single equivalent amortization period that would not be a determinable number. If all assumptions are met, the employer normal cost as a percentage of pay will decrease to the level of the newest tier of benefits (employees hired after October 9,

2004) which is approximately 9.30% (including administrative expenses).

The calculated employer (City of Houston) contribution rate for FY 2018 is 41.74%. This rate is greater than the 39.59% rate calculated in the July 1, 2015 actuarial valuation report. This is primarily due to the loss associated with the 4.43% return on the actuarial value of assets compared to an assumed rate of 8.00%, but it also stems from the calculated contribution rate not being consistently contributed to the System by the City. Please see Table 6 under Section III of our Report for a detailed analysis of the change in the calculated employer contribution rate from the prior year to this year.

The contribution rate is determined using an actuarial value of assets rather than market value. The actuarial value of assets recognizes 20% of the difference (typically referred to as "five year smoothing") between the market value of assets and the expected actuarial value of assets, based upon the assumed valuation rate of return of 8.00% per annum. There are currently $581.7 million in asset losses being deferred that will be recognized in the future and provide some headwinds to improvement in the funded status absent future asset gains. As can be seen in Table 7 of Section III, there has been a significant increase in projected employer contributions, primarily due to the FY2016 asset experience and the resulting 80% funded ratio trigger contribution.

**Benefit provisions**

The benefit provisions reflected in this valuation are those which were in effect on July 1, 2016. There were no changes in the benefit provisions since the prior valuation. The benefit provisions are summarized in Appendix B of our Report.

**Assumptions and methods**

Actuarial assumptions and methods are set by the Board of Trustees, based upon recommendations made by the System's actuary. The assumptions used in this valuation were adopted by the Board based on the recommendations from GRS during the Actuarial Experience Investigation Study review following the July 1, 2013 actuarial valuation and were first used in the July 1, 2014 actuarial valuation. Since then, there have been no changes from the revised assumption set first adopted by the Board for the July 1, 2014 actuarial valuation.

The results of the actuarial valuation are dependent upon the actuarial assumptions used. Actual results 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 presented in our Report are intended to provide information for rational decision making.

The actuarial assumptions and methods used in this Report all comply with the actuarial standards of practice (ASOPs)and are described in Appendix A of our Report.

**Data**

Member data for retired, active and inactive members was supplied as of July 1, 2016 by the HPOPS 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. GRS is not responsible for the accuracy or completeness of the information provided to us.

Asset and all financial information as of July 1, 2016 were supplied to us by the HPOPS staff.

**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 under Section III of our Report.

**Actuarial Certification**

All of the tables contained in this actuarial valuation report and in the actuarial section of the HPOPS Comprehensive Annual Financial Report (CAFR) were prepared by Gabriel, Roeder, Smith & Company. Historical information for years prior to 2008 was prepared by the prior actuarial firm and was not subjected to our actuarial review. We certify that the information presented herein is accurate and fairly portrays the actuarial position of HPOPS as of July 1, 2016.

All of our work conforms with generally accepted actuarial principles and practices, and to 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 the Statements of the Governmental Accounting Standards Board. The undersigned are independent actuaries and consultants. All of the undersigned are Enrolled Actuaries, Members of the American Academy of Actuaries, and meet the Qualification Standards of the American Academy of Actuaries. Finally, all of the undersigned are experienced in performing valuations for large public retirement systems.

Respectfully submitted,
**Gabriel, Roeder, Smith & Company**

Mark R. Randall

Mark R. Randall, FCA, EA, MAAA
Chief Executive Officer

Joseph P. Newton, FSA, EA, MAAA
Senior Consultant

Bradley E. Stewart, ASA, EA, MAAA
Consultant

# Executive Summary

| Item | July 1, 2016 | July 1, 2015 |
|---|---|---|
| Membership (millions) | | |
| • Number of: | | |
| - Active members | 5,261 | 5,261 |
| - Retirees and beneficiaries | 3,876 | 3,698 |
| - Inactive members | 32 | 28 |
| - Total | 9,169 | 8,987 |
| • Annualized Payroll supplied by HPOPS | $ 407,058 | $ 395,360 |
| Calculated Contribution rates | | |
| • Employer | 41.74% | 39.59% |
| • Member[1] | 9.46% | 9.41% |
| Assets ($000s) | | |
| • Market value | $ 4,080,460 | $ 4,304,523 |
| • Actuarial value | 4,662,115 | 4,550,620 |
| • Estimation of return on market value | -3.2% | 0.8% |
| • Estimation of return on actuarial value | 4.4% | 6.7% |
| • Employer contribution | $ 137,392 | $ 113,665 |
| • Member contribution | $ 39,017 | $ 37,719 |
| • Ratio of actuarial value to market value | 114.3% | 105.7% |
| Actuarial Information ($000s) | | |
| • Employer normal cost % | 20.71% | 21.07% |
| • Unfunded actuarial accrued liability (UAAL) | $ 1,350,934 | $ 1,155,510 |
| • Amortization rate | 21.03% | 18.52% |
| • Funding period | 30.0 years | 30.0 years |
| • Funded ratio | 77.5% | 79.7% |
| Projected employer contribution based on calculated rate | | |
| • Fiscal year ending June 30, | 2017 | 2016 |
| • Projected payroll (millions) | $ 418.3 | $ 406.2 |
| • Projected employer contribution (millions) (actual contribution rate set by Meet & Confer) | $ 174.6 | $ 160.8 |

[1] Employee contribution rate is 9.00%. Members hired after October 9, 2004 contribute 10.25% of pay.

## Historical Solvency Test ($000)

| | Aggregated Accrued Liabilities for | | | | 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, 1995 | $ 91,687 | $ 764,518 | $ 343,543 | $ 1,168,056 | 100.0% | 100.0% | 91% |
| July 1, 1996 | 95,615 | 812,498 | 350,104 | 1,329,570 | 100.0% | 100.0% | 100% |
| July 1, 1998 | 99,298 | 1,017,723 | 432,320 | 1,518,081 | 100.0% | 100.0% | 93% |
| July 1, 1999 | 107,008 | 1,157,882 | 508,939 | 1,746,312 | 100.0% | 100.0% | 95% |
| July 1, 2000 | 111,099 | 1,324,079 | 531,225 | 2,013,491 | 100.0% | 100.0% | 100% |
| July 1, 2001 | 138,248 | 707,152 | 1,461,027 | 2,226,307 | 100.0% | 100.0% | 95% |
| July 1, 2002 | 145,255 | 718,779 | 1,729,696 | 2,337,157 | 100.0% | 100.0% | 85% |
| July 1, 2003 | 153,634 | 838,090 | 1,883,014 | 2,394,411 | 100.0% | 100.0% | 74% |
| July 1, 2004 | 153,088 | 995,841 | 2,190,295 | 2,466,070 | 100.0% | 100.0% | 60% |
| July 1, 2005 | 249,804 | 1,259,243 | 1,883,927 | 2,508,794 | 100.0% | 100.0% | 53% |
| July 1, 2006 | 262,514 | 1,421,330 | 1,949,301 | 2,681,375 | 100.0% | 100.0% | 51% |
| July 1, 2007 | 275,990 | 1,575,900 | 2,005,790 | 3,004,927 | 100.0% | 100.0% | 57% |
| July 1, 2008 | 294,678 | 1,726,121 | 2,058,165 | 3,337,612 | 100.0% | 100.0% | 64% |
| July 1, 2009 | 312,489 | 1,872,226 | 2,183,786 | 3,430,946 | 100.0% | 100.0% | 57% |
| July 1, 2010 | 149,252 | 1,998,683 | 2,084,797 | 3,526,703 | 100.0% | 100.0% | 66% |
| July 1, 2011 | 160,828 | 2,146,222 | 2,181,093 | 3,718,052 | 100.0% | 100.0% | 65% |
| July 1, 2012 | 167,739 | 2,320,239 | 2,259,195 | 3,888,504 | 100.0% | 100.0% | 62% |
| July 1, 2013 | 163,660 | 2,501,745 | 2,344,556 | 4,070,951 | 100.0% | 100.0% | 60% |
| July 1, 2014 | 162,982 | 2,834,747 | 2,366,263 | 4,342,936 | 100.0% | 100.0% | 57% |
| July 1, 2015 | 157,344 | 3,131,654 | 2,417,132 | 4,550,620 | 100.0% | 100.0% | 52% |
| July 1, 2016 | 151,259 | 3,420,083 | 2,441,707 | 4,662,115 | 100.0% | 100.0% | 45% |

Note: Dollar amounts in $000

[1] Column (3) included AAL for DROP participants until 2000, now in Column (4)

## Schedule of Funding Progress ($000)

| Date | Actuarial Value of Assets (AVA) | Actuarial Accrued Liability (AAL) | Unfunded Actuarial Accrued Liability (UAAL) (3) - (2) | Funded Ratio (2)/(3) | Annual Payroll | UAAL as % of Payroll (4)/(6) |
|---|---|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| July 1, 1995 | $ 1,168,056 | $ 1,199,748 | $ 31,692 | 97.4% | $ 182,251 | 17.4% |
| July 1, 1996 | 1,329,570 | 1,258,217 | (71,353) | 105.7% | 187,134 | (38.1%) |
| July 1, 1998 | 1,518,081 | 1,549,341 | 31,260 | 98.0% | 196,364 | 15.9% |
| July 1, 1999 * | 1,746,312 | 1,773,829 | 27,517 | 98.4% | 246,569 | 11.2% |
| July 1, 2000 | 2,013,491 | 1,966,404 | (47,087) | 102.4% | 250,691 | (18.8%) |
| July 1, 2001 | 2,226,307 | 2,306,427 | 80,120 | 96.5% | 264,226 | 30.3% |
| July 1, 2002 | 2,337,157 | 2,593,730 | 256,573 | 90.1% | 286,150 | 89.7% |
| July 1, 2003 | 2,394,411 | 2,874,738 | 480,327 | 83.3% | 300,405 | 159.9% |
| July 1, 2004 | 2,466,070 | 3,339,224 | 873,154 | 73.9% | 329,840 | 264.7% |
| July 1, 2005 | 2,508,794 | 3,392,974 | 884,180 | 73.9% | 321,057 | 275.4% |
| July 1, 2006 | 2,681,375 | 3,633,145 | 951,770 | 73.8% | 327,080 | 291.0% |
| July 1, 2007 | 3,004,927 | 3,857,680 | 852,753 | 77.9% | 336,029 | 253.8% |
| July 1, 2008 | 3,337,612 | 4,078,963 | 741,351 | 81.8% | 351,525 | 210.9% |
| July 1, 2009 | 3,430,946 | 4,368,501 | 937,556 | 78.5% | 366,924 | 255.5% |
| July 1, 2010** | 3,526,703 | 4,232,732 | 706,029 | 83.3% | 377,779 | 186.9% |
| July 1, 2011 | 3,718,052 | 4,488,142 | 770,090 | 82.8% | 388,409 | 198.3% |
| July 1, 2012 | 3,888,504 | 4,747,173 | 858,669 | 81.9% | 389,884 | 220.2% |
| July 1, 2013 | 4,070,951 | 5,009,961 | 939,010 | 81.3% | 391,957 | 239.6% |
| July 1, 2014 | 4,342,936 | 5,363,992 | 1,021,056 | 81.0% | 399,447 | 255.6% |
| July 1, 2015 | 4,550,620 | 5,706,130 | 1,155,510 | 79.7% | 406,233 | 284.4% |
| July 1, 2016 | 4,662,115 | 6,013,049 | 1,350,934 | 77.5% | 418,252 | 323.0% |

* Definition of covered payroll changed from base pay to total direct pay less overtime
** Change to Projected Unit Credit cost method.  Prior results were provided based on Entry Age Normal.

**Houston Police Officers' Pension System** **Table 17**
**Actuarial Valuation – July 1, 2016**

# Historical Active Participant Data

| Valuation Date (1) | Active Count (2) | Average Age (3) | Average Svc (4) | Covered Payroll (5) | Average Salary (6) | Percent Changes (7) |
|---|---|---|---|---|---|---|
| 1990 | 4,073 | 36.2 | N/A | $126,665[1] | $31,099 | 4.0% |
| 1992 | 4,120 | 36.8 | N/A | $143,020 | $34,714 | 11.6% |
| 1993 | 4,498 | 36.7 | N/A | $159,321 | $35,420 | 2.0% |
| 1994 | 4,705 | 36.8 | N/A | $162,143 | $34,462 | -2.7% |
| 1995 | 4,921 | 36.9 | N/A | $174,761 | $35,513 | 3.0% |
| 1996[2] | 4,395 | 35.1 | N/A | $150,903 | $34,335 | -3.3% |
| 1997 | 4,282 | 35.5 | N/A | $149,631 | $34,944 | 1.8% |
| 1998 | 4,247 | 35.9 | N/A | $153,479 | $36,138 | 3.4% |
| 1999 | 4,253 | 36.3 | N/A | $187,967[3] | $44,196[3] | 22.3%[3] |
| 2000 | 4,137 | 36.7 | N/A | $179,415 | $43,368 | -1.9% |
| 2001[4] | 5,325 | 40.2 | N/A | $264,226[5] | $49,620[5] | 14.4%[5] |
| 2002 | 5,352 | 40.7 | N/A | $286,150 | $53,466 | 7.8% |
| 2003 | 5,387 | 41.3 | N/A | $300,405 | $55,765 | 4.3% |
| 2004 | 5,225 | 41.7 | N/A | $329,840 | $63,127 | 13.2% |
| 2005 | 4,867 | 42.0 | N/A | $321,057[6] | $65,966[6] | 4.5%[6] |
| 2006 | 4,785 | 42.3 | N/A | $327,080 | $68,355 | 3.6% |
| 2007 | 4,879 | 42.1 | N/A | $336,029 | $68,873 | 0.8% |
| 2008 | 5,065 | 42.0 | 15.7 | $351,525 | $69,403 | 0.8% |
| 2009 | 5,245 | 41.8 | 15.4 | $366,924 | $69,957 | 0.8% |
| 2010 | 5,347 | 41.9 | 15.3 | $377,779 | $70,652 | 1.0% |
| 2011 | 5,312 | 42.3 | 15.7 | $388,409 | $73,119 | 3.5% |
| 2012 | 5,326 | 42.5 | 15.7 | $389,884 | $73,204 | 0.1% |
| 2013 | 5,364 | 42.6 | 15.7 | $391,957 | $73,072 | -0.2% |
| 2014 | 5,343 | 42.6 | 15.7 | $399,447 | $74,761 | 2.3% |
| 2015 | 5,261 | 42.8 | 15.9 | $406,233 | $77,216 | 3.3% |
| 2016 | 5,261 | 42.6 | 15.7 | $418,252 | $79,500 | 3.0% |

(1) Reflects the November 1, 1990 pay increase.
(2) For the July 1, 1996 to July 1, 2000 valuations, includes those participants currently accruing benefits (i.e. excludes current DROP participants).
(3) Definition of covered payroll changed from base pay to total direct pay less overtime.
(4) Beginning July 1, 2001, includes active participants eligible for DROP.
(5) Beginning July 1, 2001, the definition of total direct pay changed from the average of the last 26 pay periods to the highest bi-weekly pay period.
(6) Beginning October 9, 2004, pensionable pay is the total of the last 26 pay periods, excluding CMEPP and SOSP.

**Houston Police Officers' Pension System**
**Actuarial Valuation – July 1, 2016**

**Table 18**

## Retirees, Beneficiaries, and Disabled Participants Added to and Removed from Rolls

| Valuation July 1, | Added to Rolls Number | Added to Rolls Annual Allowances | Removed from Rolls Number | Removed from Rolls Annual Allowances | Rolls-End of Year Number | Rolls-End of Year Annual Allowances | % Increase in Annual Allowances | Average Annual Allowances |
|---|---|---|---|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| 1995 | 893 | $ 19,109 | 36 | $ 602 | 2,335 | $ 48,624 | 65.0% | $ 20,824 |
| 1996 * | 182 | 3,481 | 29 | 618 | 2,488 | 52,772 | 8.5% | 21,211 |
| 1998 | 159 | 3,483 | 28 | 589 | 2,619 | 63,957 | 21.2% | 24,420 |
| 1999 | 150 | 3,770 | 46 | 1,001 | 2,723 | 70,432 | 10.1% | 25,866 |
| 2000 | 233 | 6,421 | 36 | 857 | 2,920 | 76,401 | 8.5% | 26,165 |
| 2001 ** | 131 | 3,755 | 1,250 | 33,892 | 1,801 | 54,006 | (29.3%) | 29,987 |
| 2002 | 104 | 2,809 | 46 | 1,113 | 1,859 | 55,013 | 1.9% | 29,593 |
| 2003 | 106 | 2,967 | 47 | 1,109 | 1,918 | 61,531 | 11.8% | 32,081 |
| 2004 | 220 | 9,172 | 33 | 1,014 | 2,105 | 70,307 | 14.3% | 33,400 |
| 2005 | 353 | 15,962 | 55 | 1,776 | 2,403 | 86,933 | 23.6% | 36,177 |
| 2006 | 254 | 10,195 | 66 | 2,197 | 2,549 | 96,812 | 11.4% | 37,980 |
| 2007 | 175 | 8,056 | 49 | 1,809 | 2,717 | 105,481 | 9.0% | 38,823 |
| 2008 | 149 | 11,889 | 57 | 1,995 | 2,809 | 115,375 | 9.4% | 41,073 |
| 2009 | 154 | 9,639 | 63 | 2,275 | 2,900 | 122,738 | 6.4% | 42,324 |
| 2010 | 165 | 8,891 | 56 | 2,355 | 3,009 | 129,274 | 5.3% | 42,963 |
| 2011 | 171 | 10,567 | 59 | 2,218 | 3,121 | 137,623 | 6.5% | 44,096 |
| 2012 | 180 | 11,934 | 71 | 2,820 | 3,230 | 146,737 | 6.6% | 45,429 |
| 2013 | 183 | 11,674 | 64 | 2,345 | 3,349 | 156,066 | 6.4% | 46,601 |
| 2014 | 217 | 13,857 | 63 | 2,627 | 3,503 | 167,296 | 7.2% | 47,758 |
| 2015 | 288 | 16,132 | 65 | 2,762 | 3,726 | 180,666 | 8.0% | 48,488 |
| 2016 | 259 | 16,357 | 77 | 3,291 | 3,908 | 193,733 | 7.2% | 49,573 |

* From June 30, 1996 through June 30, 2001 includes DROP participants.
** Beginning July 1, 2001 excludes active participants eligible for DROP.

Note: Dollar amounts in $000

**Houston Police Officers' Pension System** **Table 19**
**Actuarial Valuation – July 1,2016**

# Membership Data

| | July 1, 2016 | July 1, 2015 | July 1, 2014 |
|---|---|---|---|
| | (1) | (2) | (3) |
| 1. Active members | | | |
| a. Number | 5,261 | 5,261 | 5,343 |
| b. Number in DROP | 2,057 | 1,991 | 1,920 |
| c. Total payroll | $ 418,251,694 | $ 406,232,842 | $ 399,446,734 |
| Payroll in DROP | $ 191,140,953 | $ 178,870,056 | $167,464,715 |
| d. Average salary | 79,500 | 77,216 | 74,761 |
| e. Average age | 42.6 | 42.8 | 42.6 |
| f. Average service | 15.7 | 15.9 | 15.7 |
| 2. Inactive participants | | | |
| a. Vested | 32 | 28 | 28 |
| b. Total annual benefits (deferred) | $ 785,324 | $ 780,588 | $ 741,618 |
| c. Average annual benefit | 24,541 | 27,878 | 26,486 |
| 3. Service retirees | | | |
| a. Number | 3,002 | 2,873 | 2,737 |
| b. Total annual benefits | $ 155,529,585 | $ 145,247,137 | $ 134,837,893 |
| c. Average annual benefit | 51,809 | 50,556 | 49,265 |
| d. Average age | 64.8 | 64.6 | 64.4 |
| 4. Disabled retirees | | | |
| a. Number | 161 | 154 | 148 |
| b. Total annual benefits | $ 7,221,166 | $ 6,904,802 | $ 6,420,044 |
| c. Average annual benefit | 44,852 | 44,836 | 43,379 |
| d. Average age | 56.0 | 55.5 | 54.9 |
| 5. Beneficiaries and spouses | | | |
| a. Number | 713 | 671 | 590 |
| b. Total annual benefits | $ 30,196,684 | $ 27,733,955 | $ 25,296,561 |
| c. Average annual benefit | 42,352 | 41,332 | 42,876 |
| d. Average age | 69.0 | 68.9 | 69.3 |

## Summary of Actuarial Assumptions and Methods

The following methods and assumptions were used in preparing the July 1, 2016 actuarial valuation report.

1. Valuation Date

   The valuation date is as of July 1st, the first day 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

   The actuarial valuation uses the Projected Unit Credit (PUC) 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 accrued liability (UAAL).

   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 (currently 8.00%), of each participant's expected benefit payable at retirement or death is determined, based on his/her age, service, gender 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 for 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 System on account of the present group of participants and beneficiaries.

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

   c. The normal cost is the present value of the portion of projected benefits that is attributable to service accrued in the current year. Under the PUC cost method, if actual plan experience is close to assumptions, the normal cost will increase each year for each employee as he or she approaches retirement age. However, if the age/service/gender characteristics of the active group remain relatively constant, the total normal cost can be expected to remain somewhat level as a percentage of payroll.

d. The accrued liability is the portion of the present value of projected benefits attributable to service credited prior to the valuation date. The unfunded actuarial accrued liability contributions are determined by subtracting the actuarial value of assets from the actuarial accrued liability and amortizing the result over 30 years from the valuation date.

The contribution rate determined by this valuation will not be effective until one year later, but the determination of the rate does not reflect 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. Actuarial Value of Assets

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) over 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 bases 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.

4. Economic Assumptions

a. Investment return: 8.00% per year, compounded annually, composed of an assumed 2.75% inflation rate and a 5.25% net real rate of return. This rate represents the assumed return, net of all investment expenses.

b. Cost of Living Adjustment (COLA): Monthly benefits for participants receiving payments are increased each April 1 by 80% of the increase in the Consumer Price Index for All Urban Consumers (CPI-U) for the preceding year, with a minimum of 2.40% and a maximum of 8.00%. For this valuation, the annual COLA is assumed to be 2.70%.

c. Salary increase rate: A service-related component, plus a 2.00% inflation and productivity component, as follows:

| Years of Service | Service-related Component | Total Annual Rate of Increase Including 2.00% Inflation & Productivity Component |
|---|---|---|
| (1) | (2) | (3) |
| 1 | 12.00% | 14.00% |
| 2 | 9.00% | 11.00% |
| 3 | 7.25% | 9.25% |
| 4 | 6.00% | 8.00% |
| 5 | 5.50% | 7.50% |
| 6 | 5.00% | 7.00% |
| 7 | 4.25% | 6.25% |
| 8 | 4.00% | 6.00% |
| 9 | 3.50% | 5.50% |
| 10 | 3.25% | 5.25% |
| 11 | 3.00% | 5.00% |
| 12 | 2.75% | 4.75% |
| 13 | 2.50% | 4.50% |
| 14 | 2.25% | 4.25% |
| 15 | 2.00% | 4.00% |
| 16 | 1.75% | 3.75% |
| 17 | 1.50% | 3.50% |
| 18 and Over | 0.00% | 2.00% |

d. 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.

5. Demographic Assumptions

a. Retirement Rates

| | Service | | |
|---|---|---|---|
| Age | <25 | 25 - 29 | 30+ |
| 40-49 | 4.0% | 6.0% | 10.0% |
| 50-54 | 4.0% | 6.0% | 10.0% |
| 55-59 | 6.8% | 10.2% | 17.0% |
| 60-64 | 9.6% | 14.4% | 24.0% |
| 65 + | 100.0% | 100.0% | 100.0% |

For members hired after October 9, 2004, 30% is added to the retirement rate at age 55.

b. DROP Participation

100% of eligible active participants are assumed to elect the DROP.

c. DROP Entry Date

Active members (not already in DROP) are assumed to take advantage of the DROP and enter when first eligible. Participants are assumed to elect the maximum duration for the back DROP, up to 20 years.

d. DROP Interest Credit

A minimum of 3.00% interest will be credited to existing DROP accounts with a maximum of 7.00%. If the System's actuary certifies that past service costs are fully funded, the credit may be as high as 10.00%. For this actuarial valuation, the drop interest credit is assumed to be 6.40%.

e. Withdrawal of DROP and PROP Balances

Members are assumed to withdraw balances in equal annual installments over 10 years.

f. Mortality rates (for active and retired members)

- Healthy retirees - The Gender-distinct RP-2000 Combined Healthy Mortality Tables with Blue Collar Adjustment are used with male rates multiplied by 109% and female rates multiplied by 103%. The rates are projected on a fully generational basis by scale BB to account for future mortality improvements.

- Disabled males and females – The gender-distinct RP-2000 Disabled Retiree Mortality Tables are used without adjustment. The rates are projected on a fully generational basis by scale BB to account for future mortality improvements.

- Active members - The Gender-distinct RP-2000 Combined Healthy Mortality Tables with Blue Collar Adjustment are used with male rates multiplied by 54% and female rates multiplied by 51%. The rates are projected on a fully generational basis by scale BB to account for future mortality improvements. An additive factor of .0003 is applied to all active mortality rates. All active deaths are assumed to be duty-related.

Sample rates are shown below for 2016:

| Age | Healthy Retired Males | Healthy Retired Females | Disabled Males | Disabled Females | Healthy Active Males | Healthy Active Females |
|---|---|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| 25 | 0.04% | 0.02% | 2.15% | 0.71% | 0.05% | 0.04% |
| 30 | 0.08% | 0.03% | 2.15% | 0.71% | 0.07% | 0.04% |
| 35 | 0.11% | 0.05% | 2.15% | 0.71% | 0.09% | 0.06% |
| 40 | 0.14% | 0.09% | 2.15% | 0.71% | 0.10% | 0.07% |
| 45 | 0.19% | 0.14% | 2.15% | 0.71% | 0.12% | 0.10% |
| 50 | 0.25% | 0.19% | 2.76% | 1.10% | 0.15% | 0.13% |
| 55 | 0.44% | 0.27% | 3.38% | 1.53% | 0.25% | 0.16% |
| 60 | 0.81% | 0.43% | 3.76% | 1.86% | 0.43% | 0.24% |
| 65 | 1.40% | 0.88% | 4.14% | 2.31% | 0.72% | 0.47% |
| 70 | 2.29% | 1.58% | 4.91% | 3.10% | 1.16% | 0.81% |
| 75 | 3.69% | 2.62% | 6.44% | 4.31% | 1.86% | 1.33% |
| 80 | 6.04% | 4.16% | 8.59% | 5.96% | 3.02% | 2.09% |

g. Termination Rates and Disability Rates

Termination rates (for causes other than death, disability or retirement) are a function of the member's service and are not applied after a member becomes eligible for a retirement benefit. Disability rates are age-based and not applied for members in the DROP or those members eligible to back DROP. All disabilities are assumed to be duty-related. Rates at selected ages and service levels are shown below.

| Service Based Rates of Termination | | |
|---|---|---|
| Service | Male | Female |
| 1 | 2.71% | 2.71% |
| 3 | 1.95% | 1.95% |
| 5 | 1.40% | 1.40% |
| 7 | 1.01% | 1.01% |
| 9 | 0.72% | 0.72% |
| 11 | 0.52% | 0.52% |
| 13 | 0.37% | 0.37% |
| 15 | 0.27% | 0.27% |
| 17 | 0.19% | 0.19% |
| 19 | 0.14% | 0.14% |
| 20 + | 0.10% | 0.10% |

| Age Based Rates of Disability | | |
|---|---|---|
| Age | Male | Female |
| 20 | 0.1149% | 0.1149% |
| 25 | 0.1145% | 0.1145% |
| 30 | 0.1197% | 0.1197% |
| 35 | 0.1321% | 0.1321% |
| 40 | 0.1516% | 0.1516% |
| 45 | 0.1785% | 0.1785% |
| 50 | 0.2126% | 0.2126% |
| 55 | 0.2538% | 0.2538% |
| 60 | 0.3023% | 0.3023% |

6. Other Assumptions

a. Percent married: 90% of employees are assumed to be married. (No beneficiaries other than the spouse assumed.)

b. 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.

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

d. Percent electing deferred termination benefit: 50% of vested terminating members are assumed to elect a refund rather than take a deferred benefit at age 60.

e. There will be no recoveries once disabled.

f. No surviving spouse will remarry.

g. 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.

h. Administrative expenses: Administrative expenses are accounted for as an explicit component on the normal cost rate.

i. 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.

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

k. 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.

l. Decrement relativity: Decrement rates are converted to probabilities in order to account for multiple decrements.

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

n. Benefit Service: All members are assumed to accrue one year of service each year**.** Exact fractional service is used to determine the amount of benefit payable.

7. Participant Data

Participant data was supplied in 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, gender, 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, gender, 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.

All healthy and disabled retirees are assumed to have 100% joint and survivor annuities, prorated by the 90% marriage assumption and reflecting the three year spousal age differential described above. All beneficiaries are assumed to have life annuity only benefits.

Salary supplied for the current year was based on the earnings for the year preceding the valuation date. This salary was adjusted by the salary increase rate for one year.

In fiscal years when a 27$^{th}$ pay period occurs the individual pays for employees who were employed throughout the year will be adjusted by multiplying their reported pay by the ratio of 26/27. In years that have only 26 pay periods no adjustment would be needed.

Assumptions were made to correct for missing, bad, or inconsistent data. These had no material impact on the results presented.

# Summary of Plan Provisions

**Covered Members**

All police officers sworn before September 1, 1975 are covered under Plan 1, except those who elected by December 31, 1981 to participate in Plan 3.

All police officers sworn on or after September 1, 1975, but before September 1, 1981 are covered under Plan 2, except those who elected by December 31, 1981 to participate in Plan 3 and those Plan 1.

All other police officers are covered by Plan 3, except those from Police Cadet Classes 70 and 71 who elected to pay additional contributions and transfer to Plan 1.

**Final Compensation**

Prior to November 28, 1998

Monthly base salary paid to the participant in his/her last month of service. For any participant from a position held for less than 3 years, final compensation is the average monthly base salary for the 3 years prior to retirement.

After November 28, 1998 but prior to July 1, 2001

Monthly total direct pay less overtime paid to the participant in his/her last month of service. For any participant from a position held for less than 3 years, final compensation is the average monthly base pay for the 3 years prior to retirement plus the other current components of total direct pay.

After July 1, 2001 but prior to October 9, 2004

Highest biweekly pay period (excluding overtime) during the last 26 pay periods annualized. Amounts not paid on a biweekly basis are deducted from period paid. Annual amounts are divided by 26 and added to the highest pay period, including motorcycle allowances.

After October 9, 2004

Average of the last three years of compensation (excluding exempt time, overtime and strategic officer staffing pay). This average will be phased in beginning with the pay period ending after October 9, 2004 until the new definition is fully phased in after 78 pay periods.

**Service Retirement**

Eligibility

- Sworn prior to October 9, 2004 — 20 years of service.
- Sworn on or after October 9, 2004 — Age 55 with 10 years of service.

Benefit

| | |
|---|---|
| ‣ Prior to November 1, 1955 | $75 per month plus $2 per month for each year of service in excess of 25 years. |
| ‣ After November 1, 1955 but prior to January 13, 1968 | 30% of final compensation plus 1 % of final compensation for each year of service in excess of 20 years. |
| ‣ After January 13, 1968 but prior to July 1, 1986 | Plans 1 and 2: 30% of final compensation plus 2% of final compensation for each year of service in excess of 20 years.<br>Plan 3: 2% of final compensation for each year of service up to 40 years, reduced 0.42% for each month benefit commencement precedes age 55. |
| ‣ After July 1, 1986 but prior to July 1, 1988 | 2% of final compensation for each year of service up to 40 years. |
| ‣ After July 1, 1988 but prior to September 1, 1997 | 45% of final compensation plus 2% of final compensation for each year of service in excess of 20 years; maximum 80% of final compensation. Benefit based on prior formula is payable until July 1, 1991 and recomputed benefit is payable thereafter. |
| ‣ After September 1, 1997 but prior to July 1, 2001 | 50% of final compensation plus 2% of final compensation for each year of service in excess of 20 years; maximum 80% of final compensation. |
| ‣ After July 1, 2001 but prior to October 9, 2004 | 55% of final compensation plus 2% of final compensation for service in excess of 20 years.<br>The Pension System recomputed the benefit of each person who retired before July 1, 2001. The retiree’s benefit was increased by the result of multiplying the difference between 55% and the percentage used at the time of retirement in computing the retiree’s benefit for the first 20 years of service by the base salary of the retiree at the time of retirement. Retroactive cost-of-living increases were not applied to the increased benefit. This recomputed benefit is effective for all payments on or after July 1, 2001. |

- After October 9, 2004

Participants sworn prior to October 9, 2004 will receive the highest of the following alternatives using Final Average Compensation effective after October 9, 2004, from October 9, 2004 through October 7, 2007:

1) 2.75% of Final Average Compensation for each of the first 20 years of service plus 2% of Final Average Compensation for each year of service in excess of 20 years, with a maximum of 80% of Final Average Compensation.
2) Benefit participant would have received had participant retired or entered the DROP immediately before October 9, 2004
3) Benefit calculated using a sliding average of the pay received for the pay periods elapsed since October 9, 2004.

New participants after October 9, 2004:

2.25% of Final Average Compensation for each of the first 20 years of service plus 2% of Final Average Compensation for each year of service in excess of 20 years, with a maximum of 80% of Final Average Compensation.

Additional Benefits

An extra monthly benefit of $150.00 is payable for life. Effective November 28, 1998, a $5,000 lump sum is payable upon retirement for members sworn prior to October 9, 2004.

**Terminated Vested Pension Benefit**

Eligibility

Sworn in before October 9, 2004 and more than 10 but less than 20 years of service. Termination on or after November 28, 1998.

Benefit

2.75% of final average compensation times years of service. This benefit commences at age 60 or at termination of service if later.

**Deferred Retirement Option Plan (DROP)**

Eligibility

20 years of service and sworn in prior to October 9, 2004.

Benefit

- After September 1, 1995 but prior to September 1, 1997

Eligible participants may elect to participate in the DROP until they leave active service. The member's retirement pension will be calculated based on service and earnings at the time the DROP is elected.

A notional account will be maintained for each DROP participant. This account will be credited with the following amounts while the member is participant of the DROP:

– The member's monthly retirement pension, including applicable cost-of-living adjustments,
– The member's contribution to the Pension System, limited to 8.75% of pay, and
– Investment earnings/losses at the rate of the Pension System's earnings/losses averaged over a five-year period. Effective July 1, 2001, this rate is subject to a minimum of 0%.

A benefit equal to the DROP account balance is paid at the time the member leaves active service. The payment is made as a single lump sum.

If a DROP participant suffers an on-duty disability resulting in the inability to perform his/her usual and customary duties as a police officer or dies in the line of duty, he (or his survivors) are allowed to revoke the DROP election and to receive the more generous on-duty disability or death benefits.

- After September 1, 1997 but prior to December 1, 1998

  The Pension System recomputed the benefit of each person who entered the DROP before September 1, 1997. The benefit was increased in the same manner as the retiree's benefit.

- After December 1, 1998 but prior to July 1, 2001

  The Pension System recomputed the benefit of each person who entered the DROP before December 1, 1998. The benefit was recalculated based on Total Direct Pay less overtime upon entry to the DROP. This recomputed benefit is effective for all payments on or after December 1, 1998.

- After July 1, 2001 but prior to October 9, 2004

  The Pension System recomputed the benefit of each person who entered the DROP before July 1, 2001. The member's benefit was increased by the result of multiplying the difference between 55% and the percentage used at the time of DROP entry in computing the member's benefit for the first 20 years of service by the base salary of the member at the time of DROP entry. Retroactive cost-of-living increases were applied to the increased benefit. The account balance for each participant was recomputed as if this new benefit had been effective since DROP entry.

- After October 9, 2004

  A minimum of 3.00% interest will be credited to existing DROP accounts with a maximum of 7.00%. If the actuary certifies that past service costs are fully funded, the credit may be as high as 10.00%.

| | |
|---|---|
| Benefit Recalculation | Effective July 1, 2001, monthly benefit at retirement will be recalculated to be the greater of (i) current monthly benefit, or (ii) monthly benefit based on service at DROP entry and Final Compensation at retirement date. |
| Back DROP Option | Effective on July 1, 2001, a back DROP option is available for all eligible participants. The DROP account is recalculated under the option based on what the account balance would have been had the participant elected the DROP earlier than he/she actually did. The initial DROP entry date cannot be backdated prior to September 1, 1995 or prior to 20 years of credited service, and must be on the first of the month selected. |

**Postretirement Option Plan (PROP)**

| | |
|---|---|
| Eligibility | Retired from DROP and sworn in prior to October 9, 2004. |
| Benefit | |
| ‣ After November 28, 1998 but prior to July 1, 2001 | A retired member is allowed to leave all or a portion of their DROP account in the System. These accounts are credited every calendar year with the 30-year Treasury bond rate as of June of the preceding year. |
| ‣ After July 1, 2001 | The interest rate earned on PROP accounts will be the same as the interest rate credited to DROP accounts, including a minimum credited rate of 0%. |

**Partial Lump Sum Optional Payment (PLOP)**

| | |
|---|---|
| Eligibility | Participant on or after October 9, 2004. |
| Benefit | |
| ‣ After October 9, 2004 | Up to 20% of the actuarial value of the accrued pension at retirement. |

**Disability Retirement**

| | |
|---|---|
| Eligibility | Effective July 1, 2001, a disabled participant is eligible for Disability Retirement as defined below:<br><br>– Disability is defined as “unable to perform his/her usual and customary duties as a police officer”. |

| | |
|---|---|
| Benefit | |
| ▸ Duty-connected | The service retirement benefit accrued to date of disability. . For participants before October 9, 2004, the disability benefit is 2.75% of final average pay times years of service with a minimum of 55% of final average pay. For participants after October 9, 2004, the disability benefit is 2.25% of final average pay times years of service with a minimum of 45% of final average pay. |
| Additional Benefits | For participants before October 9, 2004, an education allowance equal to 100% of final compensation less disability benefit is payable for up to four years for off-duty or duty-related disability. Proportionate members injured while on-duty as a municipal worker will receive immediate off-duty benefit upon Board approval. |

**Survivor Benefits**

| | |
|---|---|
| Eligibility | Surviving spouses and dependent children and parents of participants, including surviving spouses of retired or disabled participants who were not married at the time of retirement or disability, provided the spouse was married to the participant for at least 5 years at the time of death. |
| Benefit | |
| ▸ Prior to September 1, 1997 | If duty-connected: monthly lifetime benefit equal to 100% of final compensation at date of death.<br><br>If not duty-connected: monthly lifetime benefit equal to 100% of the service retirement benefit the participant had accrued at the time of death.<br><br>Spouse's benefit upon death after retirement: monthly lifetime benefit equal to actual benefit payable at time of death.<br><br>Dependent children's benefit if no surviving spouse: the benefit that would have been payable to the spouse is divided equally among the dependent children.<br>If there is a surviving spouse, the dependent children of Plan 1 and Plan 2 participants receive $25 per month. Dependent children include unmarried children who are under age 18, and for Plan 3, full-time students under age 22, or permanently disabled children. |

Dependent parent's income if no surviving spouse or children, but there is a dependent parent: the benefit that would have been payable to the spouse will be paid to the dependent parent.

- After September 1, 1997 but prior to July 1, 2001: The Pension System recomputed the benefit of each survivor whose original benefit was computed prior to September 1, 1997. The benefit was increased in the same manner as the retiree's benefit.

- After July 1, 2001: The Pension System recomputed the benefit of each survivor whose original benefit was computed prior to July 1, 2001. The benefit was increased in the same manner as the retiree's benefit.

Additional Benefits

Effective December 1, 1998, a $5,000 lump sum is paid upon the death of an active member who was sworn in prior to October 9, 2004.

Effective July 1, 2001, an extra monthly benefit of $150.00 is payable for life. Children receiving equivalent of the spouse's benefit do not receive this additional benefit.

## Benefit Adjustments

Cost-of-Living

- Prior to October 9, 2004: Monthly benefits for participants receiving payments are increased each April 1 by 2/3 of the increase in the Consumer Price Index for All Urban Consumers (CPI-U) for the preceding calendar year. Effective September 1, 1997 this increase is subject to a minimum of 3.0% per year compounded and a maximum increase of 8.0% per year compounded.

- After October 9, 2004: Monthly benefits for participants receiving payments are increased each April 1 by 80% of the increase in the Consumer Price Index for All Urban Consumers (CPI-U) for the preceding year, with a minimum of 2.4% and a maximum of 8%.

13th Benefit Check

Effective November 28, 1998, a 13th benefit check is paid to current retirees and DROP members when:

– The assets on the fund equal or exceed the liabilities after the 13th benefit check is paid.

– The return on investments for the preceding fiscal year exceeds 9.25%.

– The payment of the benefit will not cause the City of Houston's contribution to the System to increase.

– Effective October 9, 2004, the funded ratio of the plan must be at least 120% for the 13th check to be paid out.

| | |
|---|---|
| Service Adjustments | Effective November 28, 1998, participants with previous service with the City in non-classified positions may use that service to satisfy the service requirement of 20 years for retirement purposes only.<br><br>Effective July 1, 2001, participants who have service credit in more than one City of Houston Pension Plan may use their combined service to qualify for DROP participation.<br><br>Effective July 1, 2001, participants involuntarily transferred to the System from the Houston Municipal Employees System will receive service under this plan for years worked while serving as a City Marshall, Airport Police or Park Police. |

**Contributions**

Employee Contributions

| | |
|---|---|
| ▸ Prior to December 1, 1998 | Each participant contributes 8.75% of base salary. |
| ▸ After December 1, 1998 but before October 9, 2004 | Each participant contributes 8.75% of average total direct pay less overtime. |
| ▸ After October 9, 2004 | |
| – Members sworn in prior to October 9, 2004 | Each participant contributes 9.00% of pay. The additional 0.25% will be credited to the Plan's general fund. 8.75% of pay is used for purposes of crediting eligible DROP accounts. |
| – Others | Each participant contributes 10.25% of pay, which will be credited to the Plan's general fund. |
| Refunds | Contributions are refunded without interest. |

Employer Contribution — The City of Houston will follow the following contribution schedule:

| Fiscal Year Ending (June 30th) | City Contribution Amount |
|---|---|
| 2001 | $ 30,645,000 |
| 2002 | 32,645,000 |
| 2003 | 34,645,000 |
| 2004 | 36,645,000 |
| 2005 | 36,645,000 |
| 2006 | 16% of total compensation, with a minimum of $53,000,000 |
| 2007-2011 | $5,000,000 above the prior year's payment |
| 2012 | 83,000,000 fixed payment with any shortfall not to exceed 17,000,000* |
| 2013 | 93,000,000 fixed payment with any shortfall not to exceed 8,500,000* |
| 2014 | 103,000,000 fixed payment |

*These shortfalls were financed at 8.5% interest and paid in FYE 2016.

For all subsequent Fiscal Years, and until the Funded Ratio reaches 100%, City payments shall increase each City Fiscal Year by $10,000,000 until said 100% of funding is reached. Once the Funded Ratio has reached 100%, City payments each City Fiscal Year shall be in amounts equivalent to the greater of 16% of pay, as defined herein, or the ADC. The 2011 Meet & Confer Agreement is to remain in effect until June 30, 2023.

In addition, on the first day of City Fiscal Year 2012, once the Funded Ratio reaches 80%, if it should ever be subsequently determined that the Funded Ratio has declined below such 80%, then in the City Fiscal Year next following such determination, the City shall pay such additional amounts to the Houston Police Officers' Pension System as necessary to increase the Funded Ratio to 80%.

**Changes in Plan Provisions from the Prior Valuation**

There were no changes to the plan provisions from the prior actuarial valuation.

SECTION FIVE

# STATISTICAL SECTION



## Summary

This section of the System's comprehensive annual financial report presents detailed information as a context for understanding what the information in the financial statements, note disclosures, and required supplementary information says about the System's overall financial health. All information presented was derived from the comprehensive annual financial reports for the relevant year and/or the System's benefits administration system.

### *Financial Trends*

The **Changes in Fiduciary Net Position** schedule on page 100 shows the additions and deductions from plan net assets and the resulting changes in plan net assets for the ten years ending June 30, 2017. Contributions from members and the City have grown steadily, increasing 85% during this ten year period. While deductions from plan net assets, which are primarily for benefits paid to members, have increased 239% during this time, it should be noted that this increase is largely due to an increase in lump sum payments in fiscal year 2017. The System's investment income during this ten year period, even with losses in four of the ten years, provides 60% of additions to plan net assets.

City and member contributions to the System are external sources of the additions to plan net assets. **Contribution Rates** on page 101 show what percent the City's and the members' contributions are of payroll for the ten years ending June 30, 2017. The accompanying chart of **Contributions and Benefits Paid** compares the total contributions made and the benefits paid for the ten years ending June 30, 2017. While the growth in benefits paid exceeds the growth in contributions, under the July 1, 2017 amendment to the System's governing statute, the System will receive $750 million from pension obligation bonds in fiscal year 2018 and changes have been made to the member and City contributions, COLAs, and benefits with the purpose of addressing the System's unfunded liability through a risk sharing approach.

Contributions are not the only source from which benefits are paid. Earnings from the System's investments are the fund's internal sources of and, in most years, the largest component of additions to plan net assets. The **Investment Income** schedule on page 102 provides details of the System's net investment gain/loss for the ten years ending June 30, 2017.

**Deductions from Net Postion for Benefits and Refunds by Type** on page 103 presents a detailed view of the benefits paid to members and refunds for the ten years ending June 30, 2017, and the chart on page 104 graphically represents this data. Service retirements have historically account for the majority of benefit payments, growing over the last several years as the number of retirees has increased. Lump sum benefits are payments members and survivors receive at their discretion from their lump sum accounts either on or after the date they begin receiving monthly benefit payments, and therefore vary from year to year. In fiscal year 2017, lump sum benefits increased 232.1% over fiscal year 2016, totaling $261,930 thousand versus $196,803 thousand for service and disability retirements combined.

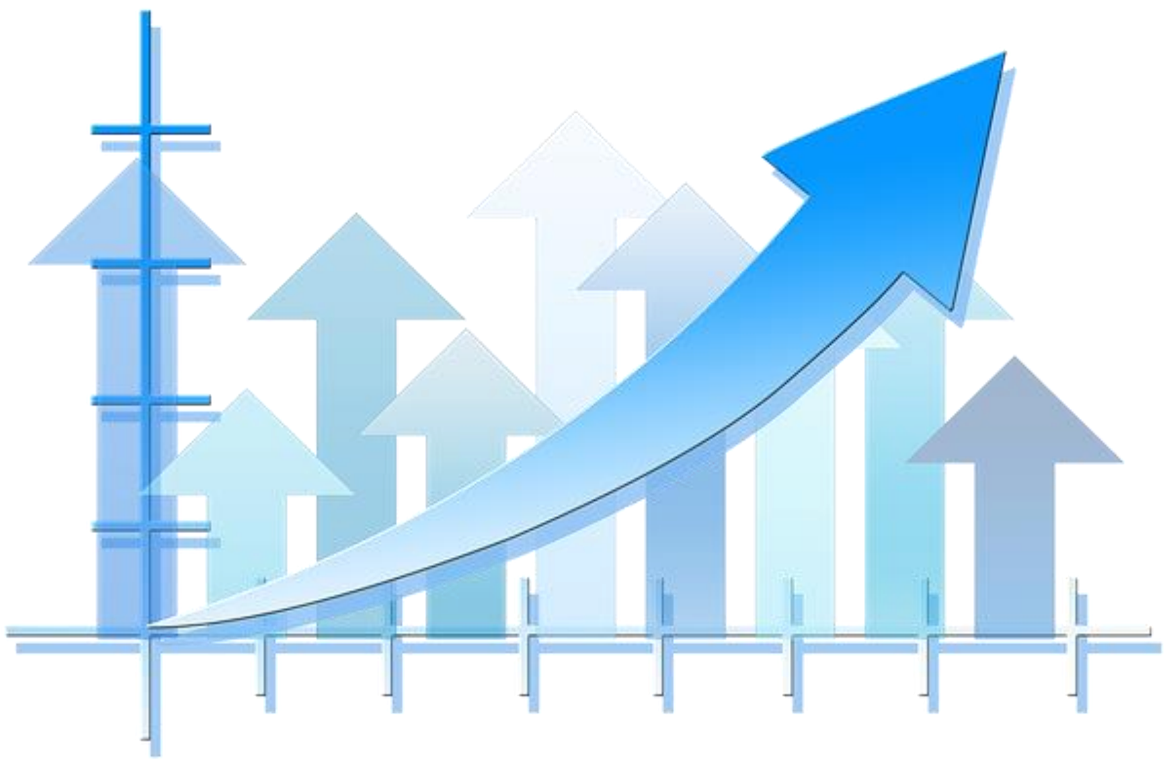
On page 105, **Valuation of Assets as a Percent of Pension Liabilities** shows the percentage of the pension liability that is funded and **Net Assets Compared to Pension Liability** compares the actuarial value of the System's assets to the actuarial accrued liability. These charts graphically represent the funding progress of the System for the ten years ending June 30, 2016. The existence of an unfunded actuarial liability does not necessarily indicate financial problems. The July 1, 2017 amendment to the System's governing statute is meant to address the System's unfunded liability through a risk sharing approach. With the $750 million from pension obligation bonds in fiscal year 2018, the changes made to the member and City contributions, COLAs, and benefits, and adequate earnings and gains provided from investments, the System is projected to improve its funded status.

### *Participant Information*

The **Membership** schedule on page 106 provides a breakdown of the plan membership for the ten years ending June 30, 2017. For fiscal year 2017, active members decreased by 103 to 5,171 and retired members and their beneficiaries increased by 350.

*Operating Information*

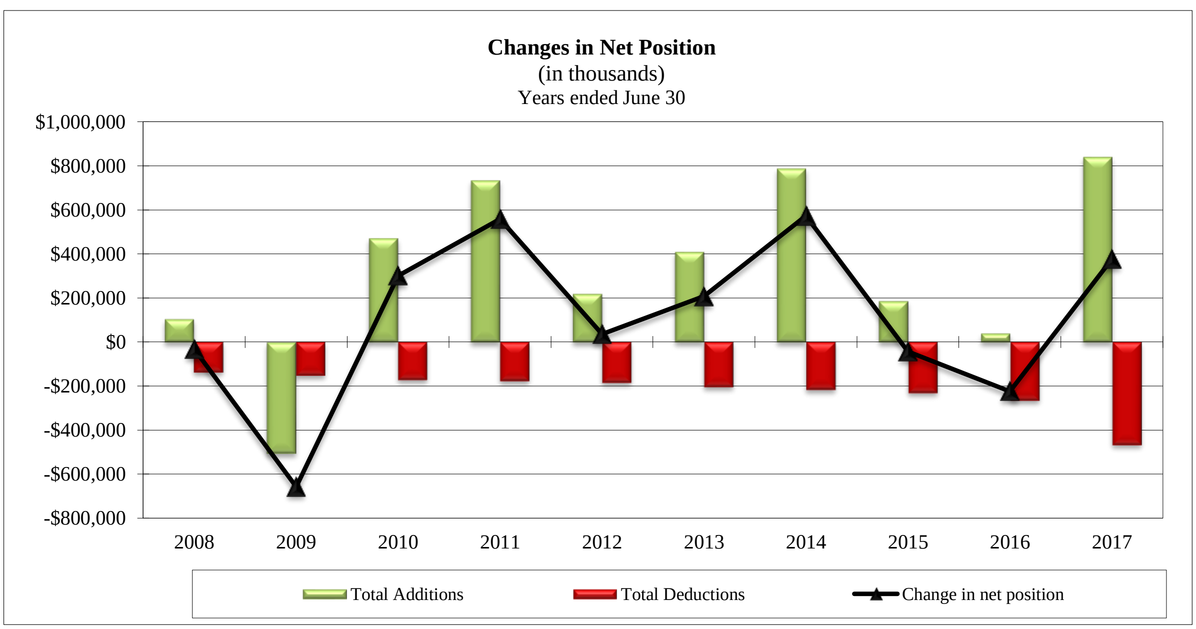
The **Pensions in Force** and **Pensions Awarded** schedules on page 107 provide the number of pensions by type, age and payment amount. The **Average Monthly Benefit Amounts by Years Credited Service** on page 108 presents the average final average salary and the number of retired members, in five-year increments of credited service, for the ten years ended June 30, 2017. The **DROP and PROP Activity** schedules on page 109 provide information about the total amount in DROP and PROP accounts and the total number of participants as well as the changes to those totals for the ten years ending June 30, 2017.



**Changes in Fiduciary Net Position**
**Previous Ten Fiscal Years**
**($000's)**

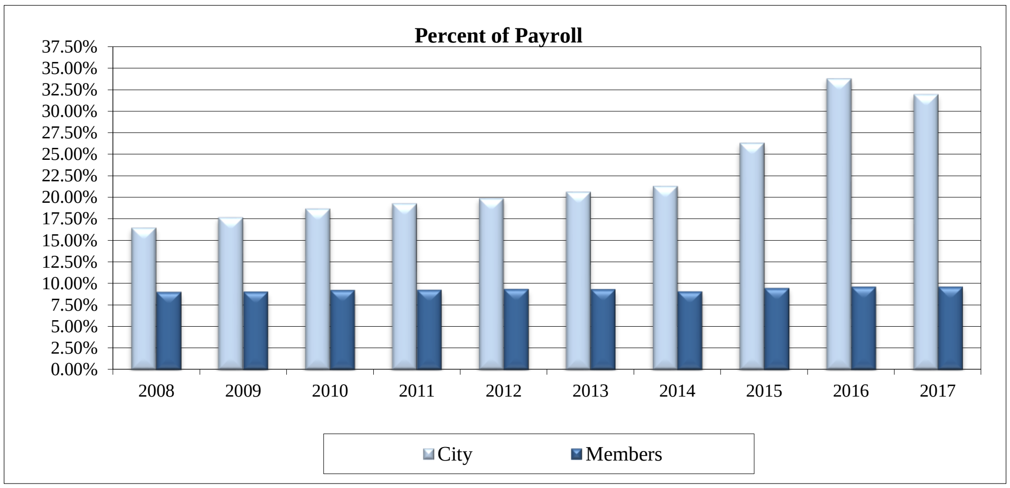
| Fiscal Year | 2008 | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|---|
| Additions | | | | | |
| City contributions | $ 63,000 | $ 68,000 | $ 73,192 | $ 78,287 | $ 83,027 |
| Members contributions | 31,003 | 32,519 | 34,218 | 35,122 | 35,151 |
| Investment income (net of expenses) | 9,350 | (607,482) | 364,650 | 621,557 | 102,095 |
| Securities lending income (net of expenses) | 2,392 | 1,427 | 473 | 449 | 485 |
| Total additions to plan net assets | 105,745 | (505,536) | 472,533 | 735,415 | 220,758 |
| Deductions: | | | | | |
| Benefits paid to members | 133,049 | 144,112 | 161,735 | 172,041 | 180,014 |
| Refunds to members | 500 | 618 | 547 | 420 | 704 |
| Professional and administrative expense | 3,564 | 7,311 | 8,945 | 4,364 | 3,689 |
| Total deductions from plan net assets | 137,113 | 152,041 | 171,227 | 176,825 | 184,407 |
| Change in net position | $ (31,368) | $ (657,577) | $ 301,306 | $ 558,590 | $ 36,351 |

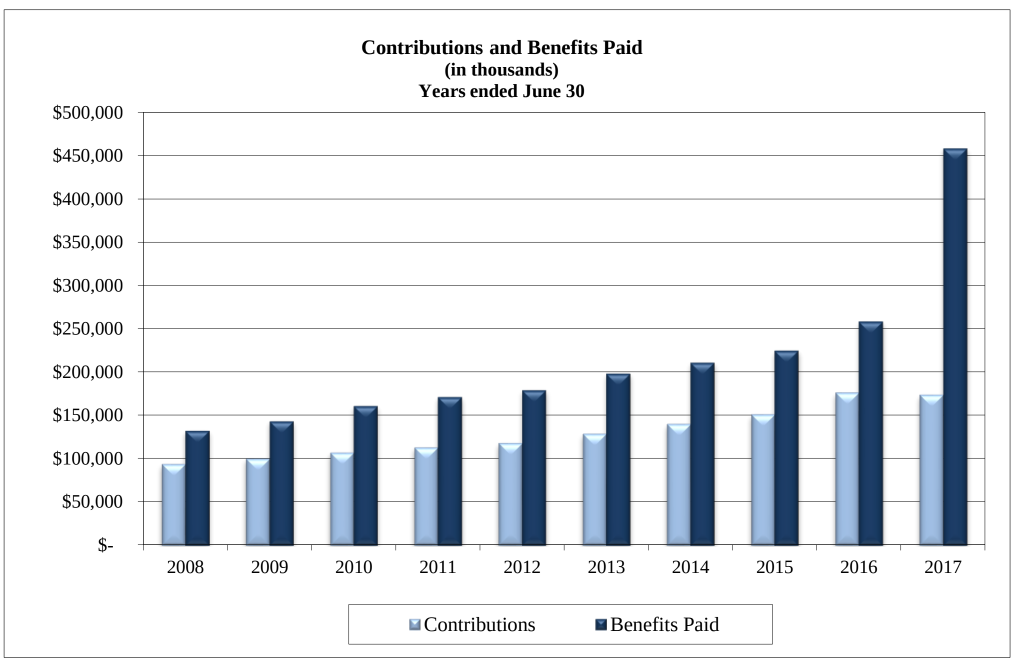
| Fiscal Year | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Additions | | | | | |
| City contributions | $ 93,392 | $ 103,372 | $ 113,665 | $ 137,392 | $ 133,805 |
| Members contributions | 35,586 | 37,012 | 37,719 | 39,017 | 40,104 |
| Investment income (net of expenses) | 281,724 | 649,022 | 35,249 | (136,018) | 667,171 |
| Securities lending income (net of expenses) | 269 | 131 | 92 | 185 | 305 |
| Total additions to plan net assets | 410,971 | 789,537 | 186,725 | 40,576 | 841,385 |
| Deductions: | | | | | |
| Benefits paid to members | 199,255 | 211,690 | 225,656 | 259,076 | 458,733 |
| Refunds to members | 641 | 906 | 945 | 978 | 1,696 |
| Professional and administrative expense | 3,668 | 3,439 | 3,478 | 4,585 | 4,238 |
| Total deductions from plan net assets | 203,564 | 216,035 | 230,079 | 264,639 | 464,667 |
| Change in net position | $ 207,407 | $ 573,502 | $ (43,354) | $ (224,063) | $ 376,718 |



**Contribution Rates**
**Previous Ten Fiscal Years**

| | Percent of Payroll | |
|---|---|---|
| Fiscal Year | City | Members |
| **2008** | 16.53% | 8.99% |
| **2009** | 17.73% | 9.02% |
| **2010** | 18.75% | 9.23% |
| **2011** | 19.34% | 9.25% |
| **2012** | 19.95% | 9.33% |
| **2013** | 20.72% | 9.30% |
| **2014** | 21.38% | 9.05% |
| **2015** | 26.37% | 9.44% |
| **2016** | 33.82% | 9.60% |
| **2017** | 31.99% | 9.59% |



**Investment Income**
**Previous Ten Fiscal Years**
**($000's)**

| Fiscal Year | 2008 | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|---|
| Investing activities | | | | | |
| Net appreciation (depreciation) in fair value of investments | $ (26,749) | $ (643,053) | $ 330,724 | $ 594,052 | $ 53,935 |
| Interest | 34,603 | 31,452 | 30,029 | 31,180 | 47,121 |
| Dividends | 19,540 | 13,170 | 16,608 | 18,998 | 19,200 |
| Other income * | 142 | 57 | 72 | 365 | 1,135 |
| Total | 27,536 | (598,374) | 377,433 | 644,595 | 121,391 |
| Less investment expense | (18,186) | (9,108) | (12,783) | (23,038) | (19,296) |
| Net income (loss) from investing activities | 9,350 | (607,482) | 364,650 | 621,557 | 102,095 |
| Securities lending activities | | | | | |
| Securities lending income | 3,189 | 1,903 | 631 | 599 | 646 |
| Securities lending expense | (797) | (476) | (158) | (150) | (161) |
| Net income from securities lending activities | 2,392 | 1,427 | 473 | 449 | 485 |
| Total investment income (loss) | 11,742 | (606,055) | 365,123 | 622,006 | 102,580 |

| Fiscal Year | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Investing activities | | | | | |
| Net appreciation (depreciation) in fair value of investments | $ 241,324 | $ 625,973 | $ 21,504 | $ (152,667) | $ 632,552 |
| Interest | 32,330 | 25,288 | 16,156 | 12,322 | 15,789 |
| Dividends | 20,238 | 18,119 | 20,714 | 18,714 | 32,923 |
| Other income * | 2,550 | 2,167 | - | - | - |
| Total | 296,442 | 671,547 | 58,374 | (121,631) | 681,264 |
| Less investment expense | (14,718) | (22,525) | (23,125) | (14,387) | (14,093) |
| Net income (loss) from investing activities | 281,724 | 649,022 | 35,249 | (136,018) | 667,171 |
| Securities lending activities | | | | | |
| Securities lending income | 359 | 175 | 123 | 250 | 407 |
| Securities lending expense | (90) | (44) | (31) | (65) | (102) |
| Net income from securities lending activities | 269 | 131 | 92 | 185 | 305 |
| Total investment income (loss) | $ 281,993 | $ 649,153 | $ 35,341 | $ (135,833) | $ 667,476 |

* The June 30, 2011 Agreement with the City allowed for a shortfall in the City's fixed payment for contributions for fiscal years 2012 and 2013, for which the City started making quarterly interest payments of $361 thousand in fiscal year 2012 and $542 thousand in fiscal year 2013 and 2014. These payments are included in Other income.

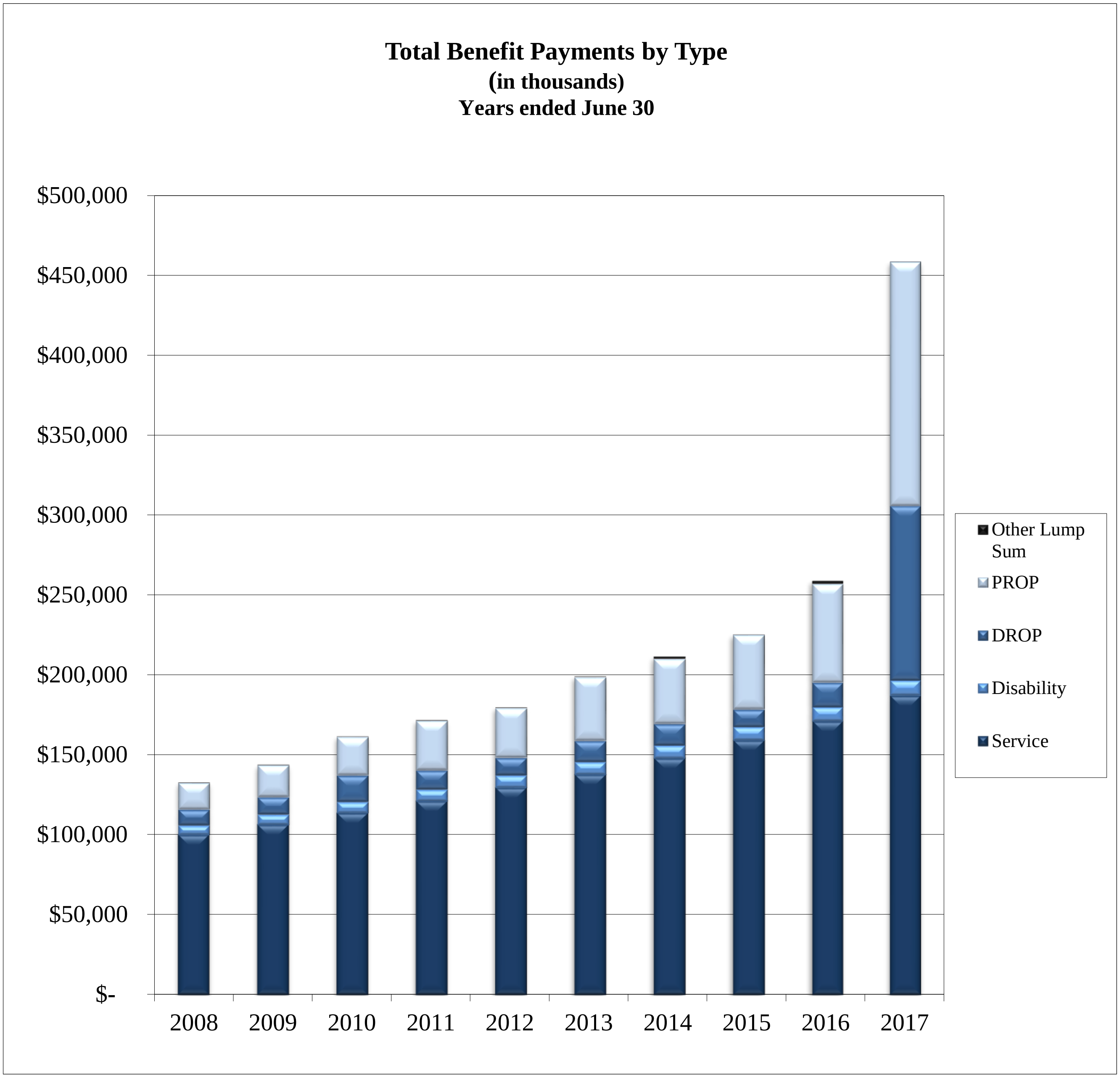
**Deductions from Net Position for Benefits and Refunds by Type**
**Previous Ten Fiscal Years**
**($000's)**

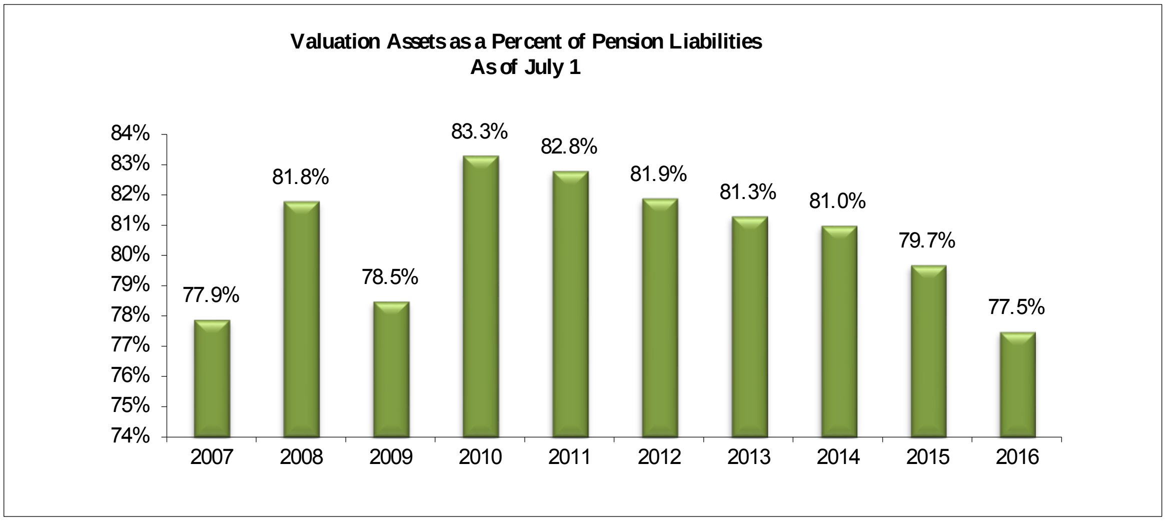
| Fiscal Year | 2008 | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|---|
| Type of Benefit | | | | | |
| Service | | | | | |
| Retirees | $ 83,925 | $ 89,226 | $ 95,198 | $ 101,854 | $ 108,886 |
| Survivors | 16,203 | 17,291 | 18,612 | 19,425 | 20,694 |
| Disability | | | | | |
| Retirees - duty | 4,154 | 4,334 | 4,675 | 4,989 | 5,218 |
| Retirees - nonduty | 371 | 444 | 516 | 493 | 538 |
| Survivors | 1,531 | 1,715 | 1,868 | 1,960 | 2,147 |
| Lump Sum | | | | | |
| DROP distributions | 9,937 | 10,889 | 16,682 | 11,941 | 11,078 |
| PROP distributions | 16,680 | 19,922 | 24,035 | 31,125 | 31,180 |
| Other * | 248 | 291 | 149 | 254 | 273 |
| Total benefits | $ 133,049 | $ 144,112 | $ 161,735 | $ 172,041 | $ 180,014 |
| Type of Refund | | | | | |
| Death | $ - | $ 3 | $ - | $ - | $ - |
| Separation | 500 | 615 | 547 | 420 | 704 |
| Total refunds | $ 500 | $ 618 | $ 547 | $ 420 | $ 704 |

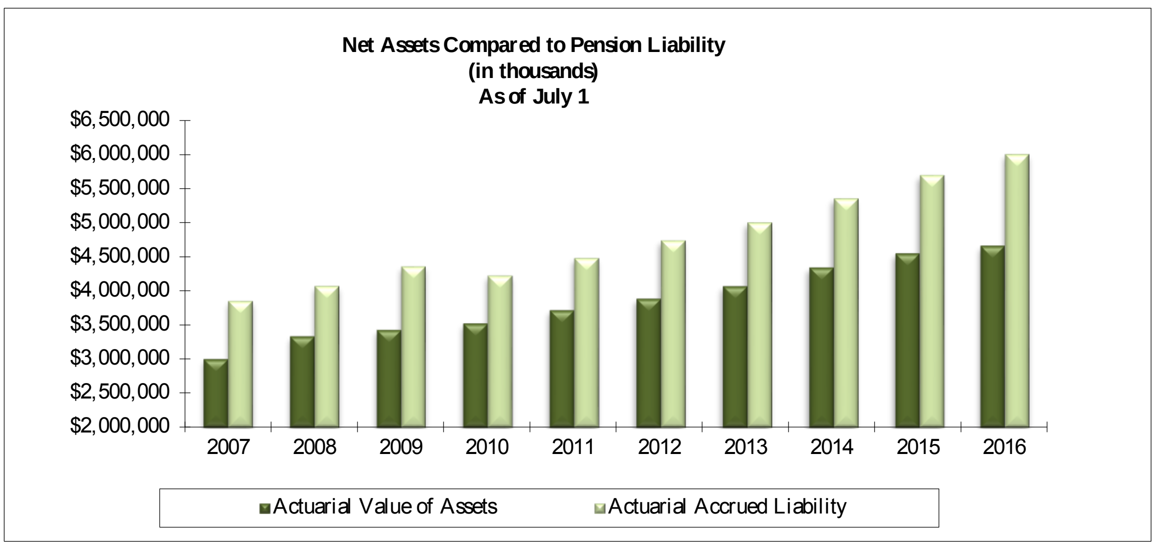
| Fiscal Year | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Type of Benefit | | | | | |
| Service | | | | | |
| Retirees | $ 116,217 | $ 125,616 | $ 135,705 | $ 145,866 | $ 159,686 |
| Survivors | 21,586 | 22,333 | 23,510 | 25,244 | 27,371 |
| Disability | | | | | |
| Retirees - duty | 5,378 | 5,517 | 5,678 | 6,119 | 6,398 |
| Retirees - nonduty | 546 | 598 | 626 | 629 | 950 |
| Survivors | 2,120 | 2,195 | 2,290 | 2,344 | 2,398 |
| Lump Sum | | | | | |
| DROP distributions | 13,334 | 13,526 | 11,054 | 15,431 | 109,051 |
| PROP distributions | 39,857 | 40,623 | 46,575 | 61,580 | 152,780 |
| Other * | 217 | 1,282 | 218 | 1,863 | 99 |
| Total benefits | $ 199,255 | $ 211,690 | $ 225,656 | $ 259,076 | $ 458,733 |
| Type of Refund | | | | | |
| Death | $ - | $ - | $ - | $ - | $ - |
| Separation | 641 | 906 | 945 | 978 | 1,696 |
| Total refunds | $ 641 | $ 906 | $ 945 | $ 978 | $ 1,696 |

* Lump Sum, Other: Under the provisions of Article 6243g-4, Vernon’s Annotated Texas Statutes (VATS), Sec. 12(b) and Sec. 15(c) a member who retires, including a member who was a DROP participant, and begins to receive a monthly service pension shall receive a one-time lump sum payment of $5,000. This benefit became effective November 23, 1998 with the first payments in 1999. All one-time lump sum payments of $5,000 are reported with the DROP distributions.

Article 6243g-4, Vernon’s Annotated Texas Statutes (VATS), Sec. 15(h) provides for the payment of an additional monthly disability benefit in the form of a lump sum to assist members retired due to disability with the costs of an education or training program. Payment of the additional monthly disability benefit occurs only after the member successfully completes each semester.


Total Benefit Payments by Type
(in thousands)
Years ended June 30
$500,000
$450,000
$400,000
$350,000
$300,000
$250,000
$200,000
$150,000
$100,000
$50,000
$-
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
Other Lump Sum
PROP
DROP
Disability
Service

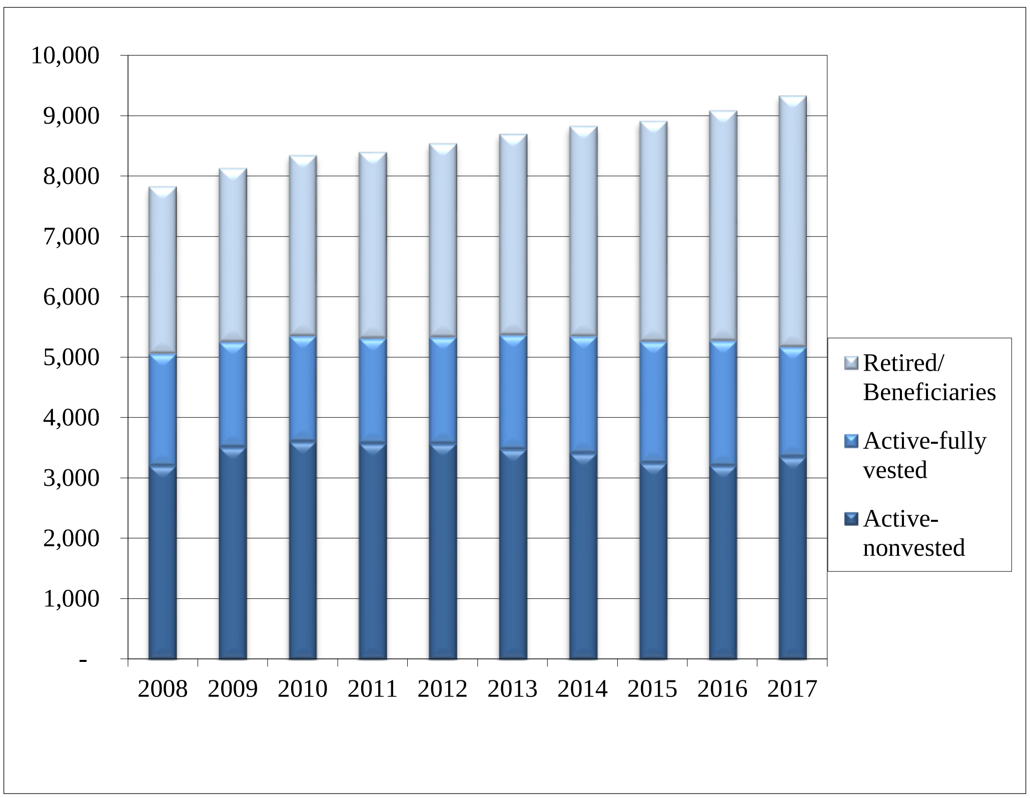



Charts through most recent actuarial valuation dated July 1, 2015.

**Membership**
**Last Ten Fiscal Years**

| Fiscal Year | Active Nonvested | Active Fully Vested | Retired/ Beneficiaries | Terminated Vested | Totals |
|---|---|---|---|---|---|
| **2008** | 3,211 | 1,849 | 2,768 | 16 | 7,844 |
| **2009** | 3,516 | 1,735 | 2,876 | 19 | 8,146 |
| **2010** | 3,609 | 1,745 | 2,989 | 20 | 8,363 |
| **2011** | 3,578 | 1,733 | 3,087 | 23 | 8,421 |
| **2012** | 3,572 | 1,758 | 3,207 | 22 | 8,559 |
| **2013** | 3,481 | 1,885 | 3,326 | 24 | 8,716 |
| **2014** | 3,416 | 1,931 | 3,477 | 24 | 8,848 |
| **2015** | 3,255 | 2,007 | 3,647 | 22 | 8,931 |
| **2016** | 3,210 | 2,064 | 3,807 | 22 | 9,103 |
| **2017** | 3,357 | 1,814 | 4,157 | 27 | 9,355 |



**Total Pensions in Force by Type and by Age**
**Year Ended June 30, 2017**

| Age on June 30, | Total | Type of Pension: Service | Type of Pension: Disability | Survivor |
|---|---|---|---|---|
| Under 40 | 31 | - | 8 | 23 |
| 40-44 | 22 | 5 | 9 | 8 |
| 45-49 | 108 | 69 | 24 | 15 |
| 50-54 | 352 | 293 | 35 | 24 |
| 55-59 | 789 | 713 | 34 | 42 |
| 60-64 | 849 | 763 | 23 | 63 |
| 65-69 | 820 | 700 | 19 | 101 |
| 70-74 | 512 | 393 | 7 | 112 |
| 75-79 | 283 | 177 | 5 | 101 |
| 80-84 | 239 | 145 | 2 | 92 |
| 85 and over | 152 | 69 | | 83 |
| Total | 4,157 | 3,327 | 166 | 664 |

**Pensions Awarded in Current Year by Type and by Age**
**Year Ended June 30, 2017**

| Age on June 30, | Total | Type of Pension: Service | Type of Pension: Disability | Survivor |
|---|---|---|---|---|
| Under 40 | 2 | - | 1 | 1 |
| 40-44 | 5 | 2 | - | 3 |
| 45-49 | 32 | 27 | 4 | 1 |
| 50-54 | 91 | 88 | - | 3 |
| 55-59 | 159 | 156 | - | 3 |
| 60-64 | 81 | 77 | - | 4 |
| 65-69 | 37 | 24 | - | 13 |
| 70-74 | 12 | 7 | - | 5 |
| 75-79 | 6 | - | - | 6 |
| 80-85 | 9 | 1 | - | 8 |
| 85 and over | 2 | - | - | 2 |
| Total | 436 | 382 | 5 | 49 |

**Pensions Awarded in Current Year by Type and by Monthly Amount**
**Year Ended June 30, 2017**

| Monthly Amount | Total | Type of Pension: Service | Type of Pension: Disability | Survivor |
|---|---|---|---|---|
| Under $1000 | - | - | - | - |
| $1000-$2000 | 2 | - | 2 | - |
| $2000-$3000 | 10 | 1 | 1 | 8 |
| $3000-$4000 | 169 | 151 | 2 | 16 |
| $4000-$5000 | 194 | 175 | - | 19 |
| $5000-$6000 | 42 | 39 | - | 3 |
| $6000 and over | 19 | 16 | - | 3 |
| Total | 436 | 382 | 5 | 49 |

**Average Monthly Benefit Amounts**
**Previous Ten Fiscal Years**

| Member Retiring During Fiscal Years | | Years Credited Service <5 | 5-10 | 10-15 | 15-20 | 20-25 | 25-30 | 30-35 | 35-40 | 40-45 | >45 | All Members |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2008 | Avg monthly benefit | $ - | $ 1,665 | $ 2,502 | $ 3,803 | $ 3,498 | $ 3,359 | $ 3,771 | $ 4,031 | $ 5,045 | $ - | $ 3,520 |
| | Avg final Avg salary | $ - | $ 4,405 | $ 5,037 | $ 6,914 | $ 5,910 | $ 3,021 | $ 6,461 | $ 6,286 | $ 6,949 | $ - | $ 6,052 |
| | Avg DROP Balance | $ - | $ 5,000 | $ 5,000 | $ 5,000 | $144,905 | $399,403 | $654,515 | $ 772,141 | $ 947,241 | $ - | $381,261 |
| | Number of retirees | - | 3 | 3 | 1 | 39 | 29 | 23 | 10 | 2 | - | 110 |
| 2009 | Avg monthly benefit | $ - | $ - | $ - | $ 3,064 | $ 3,698 | $ 3,518 | $ 3,677 | $ 4,396 | $ 4,266 | $ - | $ 3,669 |
| | Avg final Avg salary | $ - | $ - | $ - | $ 6,415 | $ 2,559 | $ 5,242 | $ 6,623 | $ 6,635 | $ 6,165 | $ - | $ 5,150 |
| | Avg DROP Balance | $ - | $ - | $ - | $ 5,000 | $221,852 | $359,788 | $720,598 | $ 980,656 | $ 969,869 | $ - | $477,574 |
| | Number of retirees | - | - | - | 2 | 29 | 50 | 36 | 8 | 3 | - | 128 |
| 2010 | Avg monthly benefit | $ - | $ - | $ 2,832 | $ 3,909 | $ 3,474 | $ 3,779 | $ 3,851 | $ 4,130 | $ 3,973 | $ - | $ 3,770 |
| | Avg final Avg salary | $ - | $ - | $ 5,149 | $ 5,888 | $ 6,016 | $ 6,382 | $ 6,932 | $ 6,895 | $ 5,871 | $ - | $ 6,457 |
| | Avg DROP Balance | $ - | $ - | $ 5,000 | $ 5,000 | $194,752 | $382,059 | $759,037 | $ 988,599 | $ 987,988 | $ - | $501,842 |
| | Number of retirees | - | - | 2 | 4 | 26 | 48 | 32 | 15 | 3 | - | 130 |
| 2011 | Avg monthly benefit | $ 926 | $ - | $ 2,562 | $ 3,009 | $ 3,679 | $ 3,929 | $ 3,640 | $ 4,062 | $ 3,941 | $ - | $ 3,816 |
| | Avg final Avg salary | $ 4,117 | $ - | $ 4,658 | $ 5,472 | $ 6,457 | $ 6,572 | $ 6,581 | $ 7,107 | $ 6,063 | $ - | $ 6,584 |
| | Avg DROP Balance | $ - | $ - | $ 5,000 | $ 5,000 | $131,819 | $442,433 | $698,025 | $1,065,857 | $1,047,127 | $ - | $536,243 |
| | Number of retirees | 1 | - | 1 | 1 | 15 | 68 | 28 | 17 | 1 | - | 132 |
| 2012 | Avg monthly benefit | $ 972 | $ 4,489 | $ - | $ 2,605 | $ 3,681 | $ 4,011 | $ 3,696 | $ 4,148 | $ 4,008 | $ 5,642 | $ 3,908 |
| | Avg final Avg salary | $ 4,320 | $ 4,489 | $ - | $ 5,920 | $ 6,606 | $ 6,844 | $ 6,663 | $ 7,047 | $ 6,047 | $ 5,961 | $ 6,726 |
| | Avg DROP Balance | $ - | $ - | $ - | $ 5,000 | $146,704 | $466,282 | $729,916 | $1,066,076 | $1,179,404 | $1,536,548 | $584,831 |
| | Number of retirees | 1 | 1 | - | 1 | 17 | 70 | 33 | 15 | 3 | 2 | 143 |
| 2013 | Avg monthly benefit | $ - | $ - | $ - | $ - | $ 3,900 | $ 4,024 | $ 4,167 | $ 4,076 | $ 3,983 | $ 5,535 | $ 4,068 |
| | Avg final Avg salary | $ - | $ - | $ - | $ - | $ 6,728 | $ 6,554 | $ 7,171 | $ 7,208 | $ 6,113 | $ 7,236 | $ 6,860 |
| | Avg DROP Balance | $ - | $ - | $ - | $ - | $ 59,940 | $514,240 | $775,272 | $1,161,766 | $1,318,435 | $1,674,363 | $653,105 |
| | Number of retirees | - | - | - | - | 19 | 58 | 43 | 23 | 2 | 1 | 146 |
| 2014 | Avg monthly benefit | $ - | $ - | $ - | $ 2,375 | $ 3,769 | $ 4,117 | $ 4,162 | $ 4,029 | $ 3,802 | $ - | $ 4,073 |
| | Avg final Avg salary | $ - | $ - | $ - | $ 5,106 | $ 6,713 | $ 6,728 | $ 6,841 | $ 7,217 | $ 6,019 | $ - | $ 6,834 |
| | Avg DROP Balance | $ - | $ - | $ - | $ 5,000 | $ 87,531 | $578,735 | $762,664 | $1,135,941 | $1,309,578 | $ - | $689,150 |
| | Number of retirees | - | - | - | 1 | 21 | 51 | 82 | 26 | 1 | - | 182 |
| 2015 | Avg monthly benefit | $ - | $ 2,069 | $ 1,246 | $ 3,454 | $ 3,811 | $ 4,022 | $ 4,286 | $ 3,994 | $ 4,346 | $ - | $ 4,092 |
| | Avg final Avg salary | $ - | $ 4,491 | $ 5,277 | $ 6,361 | $ 6,786 | $ 6,608 | $ 7,112 | $ 7,083 | $ 7,076 | $ - | $ 6,929 |
| | Avg DROP Balance | $ - | $ - | $ - | $ 5,000 | $132,108 | $524,044 | $751,329 | $1,153,557 | $1,443,545 | $ - | $685,507 |
| | Number of retirees | - | 2 | 1 | 4 | 33 | 42 | 78 | 27 | 5 | - | 192 |
| 2016 | Avg monthly benefit | $ 2,042 | $ 1,744 | $ 3,258 | $ 2,578 | $ 3,864 | $ 3,928 | $ 4,405 | $ 4,345 | $ 4,584 | $ - | $ 4,183 |
| | Avg final Avg salary | $ 4,432 | $ 3,785 | $ 5,784 | $ 6,687 | $ 6,831 | $ 6,812 | $ 7,198 | $ 7,939 | $ 8,747 | $ - | $ 7,199 |
| | Avg DROP Balance | $ - | $ - | $ - | ####### | $106,042 | $552,746 | $897,392 | $1,303,984 | $1,842,540 | $ - | $779,406 |
| | Number of retirees | 1 | 1 | 1 | 3 | 41 | 17 | 92 | 25 | 5 | - | 192 |
| 2017 | Avg monthly benefit | $ - | $ 1,254 | $ 2,514 | $ 3,723 | $ 4,015 | $ 4,130 | $ 4,470 | $ 4,434 | $ 4,475 | $ 5,943 | $ 4,355 |
| | Avg final Avg salary | $ - | $ 5,574 | $ 6,531 | $ 6,769 | $ 7,315 | $ 7,282 | $ 7,374 | $ 7,809 | $ 7,954 | $ 8,400 | $ 7,476 |
| | Avg DROP Balance | $ - | $ - | $ - | $ 5,000 | $183,834 | $428,829 | $927,025 | $1,312,229 | $1,769,362 | $2,272,697 | $899,158 |
| | Number of retirees | - | 2 | 1 | 1 | 64 | 28 | 187 | 77 | 23 | 4 | 387 |
| Ten Years Ended June 30, 2017 | | | | | | | | | | | | |
| | Avg Monthly Benefit | $ 1,314 | $ 1,800 | $ 4,522 | $ 2,501 | $ 3,981 | $ 3,879 | $ 3,911 | $ 4,060 | $ 4,013 | $ 5,799 | $ 3,921 |
| | Avg Final Avg Salary | $ 4,290 | $ 4,124 | $ 8,544 | $ 4,813 | $ 6,665 | $ 6,321 | $ 6,603 | $ 7,006 | $ 6,767 | $ 7,537 | $ 6,633 |
| | Avg DROP Balance | $ - | $ 2,222 | $ 7,222 | $ 38,702 | $158,940 | $452,998 | $766,842 | $1,095,608 | $1,394,758 | $1,976,892 | $634,178 |
| | Number of Retirees | 3 | 9 | 9 | 18 | 304 | 461 | 634 | 243 | 48 | 7 | 1,742 |

The above chart includes all Service, Proportionate and Disability retirements. It does not include Survivor benefits or pending Delayed Retirements. The DROP Balance includes $5,000 lump sum benefit.

**DROP Activity**
**(dollars in thousands)**
**Years ended June 30**

| | DROP Accounts | | | | DROP Participants | | |
|---|---|---|---|---|---|---|---|
| Fiscal Year | Accumulations | Transfers to PROP | Distributions | Total | Entrants | Withdrawals | Total |
| **2008** | $ 132,037 | $ (36,494) | $ (9,937) | $ 578,268 | 15 | (100) | 1,851 |
| **2009** | 132,351 | (50,761) | (10,889) | 648,969 | 13 | (126) | 1,738 |
| **2010** | 130,524 | (54,650) | (16,682) | 708,161 | 106 | (117) | 1,727 |
| **2011** | 129,161 | (61,234) | (11,941) | 764,147 | 128 | (112) | 1,743 |
| **2012** | 142,330 | (75,432) | (11,078) | 819,967 | 148 | (129) | 1,762 |
| **2013** | 150,662 | (89,028) | (13,334) | 868,267 | 253 | (143) | 1,872 |
| **2014** | 147,948 | (114,777) | (13,526) | 887,912 | 232 | (183) | 1,921 |
| **2015** | 172,993 | (128,413) | (11,054) | 921,438 | 256 | (186) | 1,991 |
| **2016** | 189,245 | (137,929) | (15,431) | 957,323 | 253 | (186) | 2,058 |
| **2017** | 155,058 | (228,259) | (109,051) | 775,071 | 90 | (342) | 1,806 |

**PROP Activity**
**(dollars in thousands)**
**Years ended June 30**

| | PROP Accounts | | | | PROP Participants | | |
|---|---|---|---|---|---|---|---|
| Fiscal Year | Accumulations | Transfers from DROP | Distributions | Total | Entrants | Withdrawals | Total |
| **2008** | $ 8,202 | $ 36,494 | $ (16,680) | $ 220,269 | 73 | (19) | 601 |
| **2009** | 24,721 | 50,761 | (19,922) | 275,829 | 113 | (14) | 700 |
| **2010** | 17,263 | 54,650 | (24,035) | 323,707 | 95 | (22) | 773 |
| **2011** | 19,615 | 61,234 | (31,125) | 373,431 | 115 | (29) | 859 |
| **2012** | 23,454 | 75,432 | (31,180) | 441,137 | 144 | (23) | 980 |
| **2013** | 25,364 | 89,028 | (39,857) | 515,672 | 162 | (33) | 1,109 |
| **2014** | 29,541 | 114,777 | (40,623) | 619,367 | 176 | (28) | 1,257 |
| **2015** | 41,104 | 128,413 | (46,575) | 742,309 | 176 | (11) | 1,422 |
| **2016** | 52,774 | 137,929 | (61,580) | 871,432 | 158 | (11) | 1,569 |
| **2017** | 49,295 | 228,259 | (152,781) | 996,205 | 208 | (17) | 1,760 |

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