



**BERS**

*Your Key to a  
Secure Retirement*



**Board of Education Retirement System  
of the City of New York**

*A Fiduciary Fund of the City of New York*

**Comprehensive Annual Financial Report**  
of the Qualified Pension Plan and the Tax Deferred Annuity Program

For the Years Ended June 30, 2018 and June 30, 2017





**Board of Education Retirement System  
of the City of New York**

*A Fiduciary Fund of the City of New York*

**Comprehensive Annual Financial Report**  
of the Qualified Pension Plan and the  
Tax Deferred Annuity Program

For the Fiscal Years Ended  
June 30, 2018 and June 30, 2017

*Prepared by*  
*Sanford R. Rich, Executive Director*  
*Jean-Daniel Desmornes, Director of Fiscal Operations*

**State of New York**

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*Your Retirement*

You can enjoy an A+ retirement when you become a BERS member.

*Comprehensive Annual Financial Report*

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## *Your Idea*

*You have that light bulb moment when you realize that you won't be working forever and you need a plan.*





**SANFORD R. RICH**  
EXECUTIVE DIRECTOR  
**DANIEL D. MILLER**  
DEPUTY EXECUTIVE DIRECTOR

**BOARD OF EDUCATION RETIREMENT SYSTEM  
OF THE CITY OF NEW YORK**  
65 COURT STREET – 16<sup>th</sup> FLOOR  
BROOKLYN, NEW YORK 11201- 4965

929-305-3800  
OUTSIDE NEW YORK STATE  
1-800-843-5575

December 21, 2018

Board of Trustees  
Board of Education Retirement System  
City of New York  
65 Court Street, 16<sup>th</sup> Floor  
Brooklyn, NY 11201

Ladies and Gentlemen:

I am pleased to present the Comprehensive Annual Financial Report (CAFR) of the New York City Board of Education Retirement System (BERS) for the fiscal years ended June 30, 2018 and June 30, 2017. BERS administers the BERS Qualified Pension Plan (the "QPP") and the BERS Tax Deferred Annuity Program (the "TDA Program").

The QPP is a cost sharing, multiple employer Public Employee Retirement System (PERS) that was created on August 31<sup>st</sup>, 1921. The QPP provides pension benefits to non-pedagogical employees of the Department of Education and certain other specific schools and certain employees of the New York City School Construction Authority. The QPP combines features of a defined benefit pension plan with those of a defined contribution plan and functions in accordance with existing State statutes and City laws.

The TDA Program became operational on February 1<sup>st</sup>, 1970 and is administered pursuant to the Internal Revenue Code Section 403(b) and existing State statutes and City laws. Certain members of the QPP have the option to participate in the TDA Program, which provides a means of deferring income tax payments on their voluntary tax-deferred contributions until the period after retirement or upon withdrawal of contributions. Contributions to the TDA Program are made by the members only. The TDA Program is maintained as a separate plan.

The responsibility for the accuracy of the data, and the completeness and fairness of the presentation, including all disclosures, rests with BERS. All disclosures necessary to enable the reader to gain an understanding of the system's financial activities have been included. Analysis of the changes that affected BERS fiduciary net position is presented in the Management's Discussion and Analysis section of this report.



**MAJOR LEGAL INITIATIVES - July 1, 2017 through June 30, 2018**

Chapter 71 of 2017

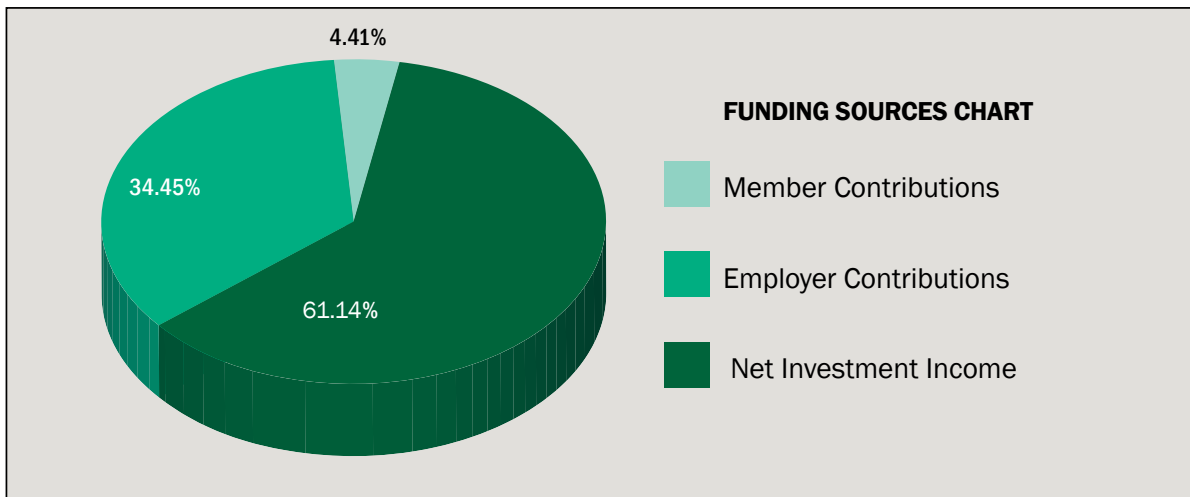
This act continues for Fiscal Year 2018, the Actuarial Interest Rate assumption of 7.00% per annum used to determine employer contributions to the New York City Pension Funds and Retirement Systems. This act also extends through Fiscal Year 2019, the interest rate of 8.25% per annum to credit interest on Tier 1 and Tier 2-member contributions and Increased-Take-Home-Pay (ITHP) Reserves.

**FUNDING**

The financial objective of the QPP is to fund members' retirement benefits during their active service. The Employer contributes amounts that, together with member contributions and investment income, would ultimately be sufficient to accumulate assets to pay benefits when due. The Office of the Actuary establishes employer contribution rates which, expressed as a percentage of annualized covered payroll, remain approximately level from year to year. An adequate funding level provides assurance and security for payment of future benefits. In fiscal year 2018, BERS sought to maintain a level of funding within the established guidelines of the Government Accounting Standards Board (GASB). As per GASB 67, a defined benefit pension plan is required to report fiduciary net position as a percentage of plan's total pension liability. Funding is discussed in detail in the notes to the financial statements and the in actuarial section of this report.

The chart below summarizes the contribution funding sources for fiscal year 2018 for the QPP.

Funding Sources		
Funds	Percentage	Contribution (In thousands)
Member Contributions	4.41%	\$ 40,846
Employer Contributions	34.45%	\$318,643
Net Investment Income	61.14%	\$565,577
<b>Total</b>	<b>100.00%</b>	<b>\$925,066</b>





Contributions to the TDA program are made on a voluntarily basis by certain members of the QPP. TDA members who elect to participate in a fixed return fund investment program accounts are credited with the statutory annual rate of interest, currently 7% for members represented by the United Federation of Teachers and 8.25% for all other members. Members can also elect to participate in a variable return fund program.

## INVESTMENTS

### Investment Summary

The System's assets are invested in two investment programs. These are the fixed return fund, which is managed by BERS, and the variable return fund consisting primarily of equity securities, which is managed by the Teachers' Retirement System (TRS).

The Board of Education Retirement System Total Fund from the fixed return program returned 10.4%, for the fiscal year ending June 2018, compared to 8.6% for the Board of Education Policy Benchmark, against which it is measured. Performance for the fiscal year ranked better than 90% of a peer group of public funds. The Fund increased in value and ended the fiscal year at \$5.99 billion (compared to \$5.3 billion last year). Over the 10-year time, the Fund remains ahead of benchmark, with a +7.7% average annual return versus +7.2% for the benchmark. The 10-year performance ranks in the top 10% of the peer group. The Fund's average annual return since 1987 is 8.9%.

As of June 2018, the variable investments excluding variable collateral security lending, held at TRS increased to \$565.82 million from \$504.89 million in FY2017, an increase of 12.07%. During FY 2018, the variable return fund performance was +10.95 % versus +15.87 % during FY2017.

### Investment Description<sup>1</sup>

Asset allocation is the percentage of fund assets that are in stocks, bonds and private market alternatives. The Trustees establish a target asset mix after considering the long-term growth prospects of a diversified portfolio of investments and the expected costs of the Plan participants' benefits. In order to participate in the broad market performance while keeping Fund expenses low, the Fund uses passive, index strategies for most of its public equity allocation. During the FY 2018, the implementation plan for the asset allocation approved during the FY2016 has progressed with additions to Private Equity, Real Estate and Infrastructure investments, while reducing U.S. equities and developed market non-U.S. equities. These are long-term commitments expected to improve the risk and return profile of the fund. The Fund's target asset mix is 50% Equity (including US and Non-US), 22% Alternative Private Markets (including Private equities, Real Estate and Infrastructure) and 28% Fixed Income. Over the long-term, which is the framework for considering the term structure of the Plans' liabilities, we expect our asset allocation will continue to meet the benefit needs while providing growth and preservation of principal.

For the fiscal year ending June 2018, the asset allocation as well as the manager selection added value. The active manager selection in US and Non-US stocks were beneficial as these managers returns were ahead their benchmarks net of fees. Domestic Equity returned 15.8% for the fiscal year ending June 30, 2018 versus an 14.8% return for the benchmark; almost all the value added was derived from the active mid cap manager. International Equity also performed strongly with a 17.5% return versus a 6.9% return for the benchmark. The Total Fixed Income return of +0.5% outperformed

<sup>1</sup> Michael Wright, Segal Marco Advisors, Report on Investment Activity

the custom benchmark return of -0.2%, most of the out-performance coming from the High Yield managers. As part of our ongoing monitoring, we review the manager contributions and the structure of the fund to achieve the expected levels of returns. The Fund's current level of diversification into alternative assets did help performance in fiscal year 2018 as the Private Equity, Real Estate and Infrastructure investments out performed fixed income and non-US public investments for the Fund. Market conditions and fund performance will continue to be closely monitored to accomplish the goal of providing the benefits as promised to participants.

### **Investment Policy**

BERS' investment policy statement, ratified by the Board of Trustees in January 2009 and amended in October 2011, in January 2013, in February 2015 and in June 2016, addresses investment objectives, investment philosophy and strategy, monitoring and evaluating performance, risk management, security lending protocol and rebalancing investment mix. The investment policy is available upon request.

### **Investment Valuation**

Investments are reported at fair value. Securities purchased pursuant to agreements to resell are carried at the contract price, exclusive of interest, at which the securities will be resold. Fair value is defined as the quoted market value on the last trading day of the period, except for the Short-Term Investment Fund (the "STIF") (a money market fund), the International Investment Funds (the "IIF") and Alternative Investment Funds (the "ALTINVF"). The IIF are private funds of publicly traded securities which are managed by various investment managers on behalf of BERS. Fair value is determined by BERS management based on information provided by the various investment managers. The investment managers determine fair value using the last available quoted price for each security owned adjusted by any contributions to or withdrawals from the fund during the period. The ALTINVF are investments for which exchange quotations are not readily available and are valued at estimated fair value as determined in good faith by the General Partner ("GP"). These investments are initially valued at cost with subsequent adjustments that reflect third party transactions, financial operating results and other factors deemed relevant by the GP. Fair value is determined by plan management based on information provided by the various GP's after review by an independent consultant and the custodian bank for the fund.

No investment in any one security represents 5% or more of BERS net position held in trust for benefits.

### **ECONOMIC AND MARKET COMMENT<sup>2</sup>**

Real US economic growth as measured by the US Gross Domestic Product (GDP) at June 30, 2018, was at a rate of 4.2% compared to a 2.6% rate at the end of the 2017 fiscal year. The steady growth in the U.S. economy has been sustained by low unemployment, a tax cut for many businesses and consumers, moderate wage growth and stable gas prices, housing costs and rents. This combination has provided a business environment that has benefited the fund. Interest rates and inflation are also important measures that affect the pension fund's performance and prospects. The US Federal Reserve Bank (the "Fed") followed through on its plans to raise interest rates in the second half of the FY. These increases were anticipated and positioned the Fed to continue its wind down of the quantitative easing started after the 2008 financial crisis. The Fed, like other Central Banks, raises interest rates to help to manage inflation expectations and to balance growth and unemployment in the economy.



**OTHER INFORMATION****Internal Control**

The Executive Director is responsible for establishing and maintaining an internal control structure designed to provide reasonable assurance that the assets of the system are safeguarded and to ensure that adequate accounting data are compiled to allow for the preparation of financial statements in conformity with generally accepted accounting principles. The system's internal control practices are designed to provide reasonable assurance that these objectives are met.

The concept of reasonable assurance recognizes that the cost of a control should not exceed the benefits likely to be derived and that the valuation of costs and benefits requires estimates and judgments by management.

**Accounting and Reporting**

This CAFR has been prepared in conformity with principles of governmental accounting and reporting, promulgated by the Governmental Accounting Standards Board (GASB), and according to guidelines adopted and published by the Government Finance Officers Association of the United States and Canada (GFOA).

The QPP as well as the TDA Program use the accrual basis of accounting where the measurement focus is on a flow of economic resources. Revenues are recognized in the accounting period in which they are earned, and expenses are recognized in the period incurred. Contributions from members are recognized when respective employers make payroll deductions from the QPP members and the TDA Program participants. Employer contributions to the QPP are recognized when due, and the employer has made a formal commitment to provide the contributions. Benefits and refunds are recognized when due and payable in accordance with the terms of governing the QPP and the TDA Program.

**Independent Audit**

The five major retirement systems of the City of New York are required to undergo an annual audit by a firm of certified public accountants, in accordance with generally accepted auditing standards. Marks Paneth LLP, whose opinion is presented in the Financial Section of this report, conducted the audit of the financial statements of BERS for the fiscal years ended June 30, 2018 and June 30, 2017. The five New York City retirement systems also undergo a five-year audit conducted by the New York State Department of Financial Services. During the fiscal year 2015, BERS went through an audit covering fiscal year 2009 through Fiscal Year 2014.

**Professional Services**

The Chief Actuary provides actuarial services for the five major pension systems maintained by the City. The Chief Actuary's actuarial report and certification are included in this annual report. The New York City Comptroller and the Teachers' Retirement System retain investment managers to assist in the execution of investment policy in accordance with statutory authority, Retirement Board decisions and standard governing fiduciary practices.

BERS went live with the new Enterprise Resource Planning software, known as the Comprehensive Pension Management System (CPMS) on May 31st, 2017. Currently, we are moving into the next phase of the project which will expand CPMS to enable members to perform transactions online and will also increase the security and stability of the system by moving to cloud-based hosting. This will be a multi-year project. The services of Vitech Systems Group Incorporated and GTJZ Consulting have been retained to guide BERS through this phase.

Additional details about the consulting and professional services are mentioned in the introductory section page 10. Details of the brokerage firms are found in the investment section page 89.

**Awards**

The GFOA awarded a Certificate of Achievement for Excellence in Financial Reporting to the BERS for its CAFR for the fiscal year ended June 30, 2017. The Certificate of Achievement is a prestigious national award, recognizing conformance with the highest standards for preparation of a state and local government finance reports. To be awarded a Certificate of Achievement, a government unit must publish an easily readable and efficiently organized comprehensive annual financial report, whose contents conform to program standards. The CAFR must satisfy both generally accepted accounting principles and applicable legal requirements.

A Certificate of Achievement is valid for a period of one year only. BERS has received a Certificate of Achievement over the last thirty-one consecutive years. We believe our current report continues to conform to the Certificate of Achievement program requirements and it will be submitted to the GFOA.

**Acknowledgments**

The dedicated service of the managers and staff of BERS made the preparation of this CAFR, on a timely basis, possible. In addition, our appreciation is extended to those members of the staffs of the Bureaus of Accountancy and Asset Management of the New York City Comptroller's Office and the Office of the Actuary who worked closely with the BERS personnel in the compilation of this report. We hope that the members of the Retirement Board, officials of the Department of Education of the City of New York, our members and the citizens of the City will find this report informative and helpful.

Respectfully submitted,



Sanford R. Rich  
Executive Director





# New York City Board of Education Retirement System

For the Fiscal Year Ended June 30, 2018

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## **BOARD OF TRUSTEES**

HON. Peter J. Calandrella  
HON. Isaac Carmignani  
HON. Richard Carranza, Chancellor  
HON. Geneal Chacon  
HON. April Chapman  
HON. T. Jose Davila  
HON. Deborah Dillingham  
HON. Benjamin Shuldiner  
HON. Michael Kraft  
HON. Vanessa Leung  
HON. Gary Linnen  
HON. John Maderich  
HON. Donald Nesbit  
HON. Lori Podvesker  
HON. Shannon Waite  
HON. Miguelina Zorrilla-Aristy

## **CO-CHAIRS**

HON. John Maderich  
HON. Raymond Orlando

## **Prepared By:**

Sanford R. Rich, Executive Director  
Jean-Daniel Desmornes, Director of Fiscal Operations

## **Actuary:**

Sherry S. Chan  
Chief Actuary

## **Custodian of the Funds:**

Scott M. Stringer  
Comptroller of the City of New York

## **Headquarters Address:**

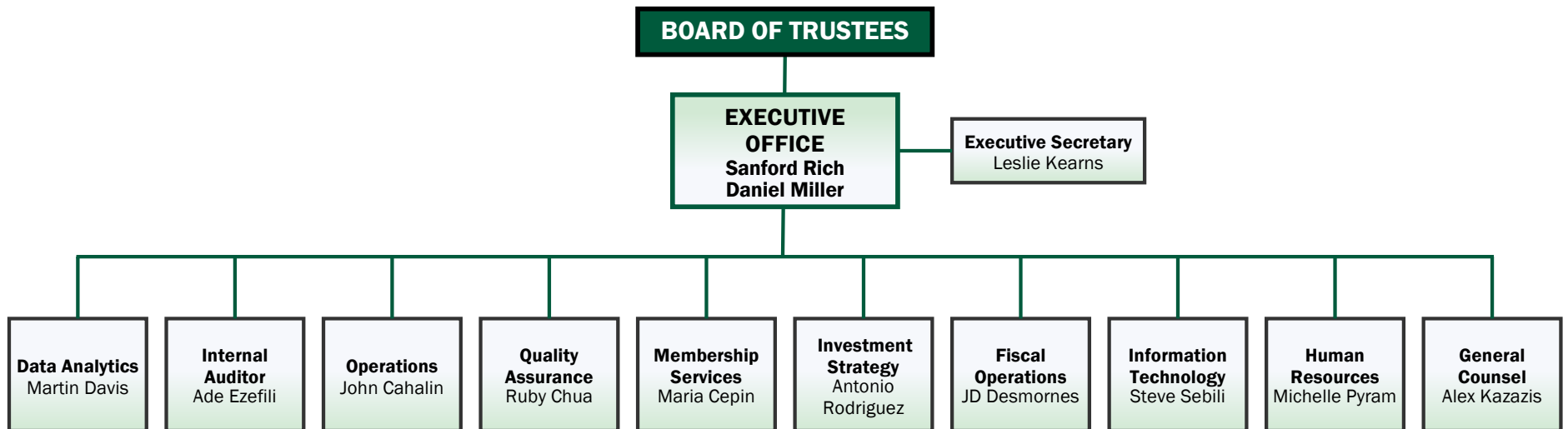
Board of Education Retirement System  
City of New York  
65 Court Street, 16<sup>th</sup> Floor  
Brooklyn, New York 11201



# New York City Board of Education Retirement System

For the Fiscal Year Ended June 30, 2018

## ORGANIZATION CHART





# New York City Board of Education Retirement System

For the Fiscal Year Ended June 30, 2018

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## CONSULTING AND PROFESSIONAL SERVICES

### Actuary

Office of the Actuary  
255 Greenwich Street, 9<sup>th</sup> Floor  
New York, NY 10007

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### Auditors

Marks Paneth, LLP  
685 Third Avenue  
New York, NY 10017

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### Custodians of Funds

Office of the Comptroller  
1 Centre Street  
New York, NY 10007

Teachers Retirement System  
55 Water Street  
New York, NY 10041

---

### Investment Consultant

Segal Marco Advisors  
333 West 34<sup>th</sup> Street  
New York, NY 10001

---

### CPMS Consultants

Gary Tunnicliffe & Jack Ziegler, LLC  
321 Union Street, #4A  
Brooklyn, NY 11231

KPMG LLP  
345 Park Avenue  
New York, NY 10154

Vitech Systems Group, Inc.  
401 Park Avenue South, 12<sup>th</sup> Floor  
New York, NY 10016

WinMill Software, Inc.  
405 Park Avenue, 16<sup>th</sup> Floor  
New York, NY 10022

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**Board of Education Retirement System**

**Qualified Pension Plan, New York**

For its Comprehensive Annual  
Financial Report  
for the Fiscal Year Ended

**June 30, 2017**

*Christopher P. Morvill*

Executive Director/CEO



# FINANCIAL

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*Your Goal*

To be financially secure during retirement.





Marks Paneth LLP  
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New York, NY 10017  
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F 212.370.3759  
markspaneth.com

**M A R K S P A N E T H**  
ACCOUNTANTS & ADVISORS

## INDEPENDENT AUDITORS' REPORT

To the Board of Trustees of the  
New York City Board of Education Retirement System:

### ***Report on the Combining Financial Statements***

We have audited the accompanying combining statements of fiduciary net position of the New York City Board of Education Retirement System Qualified Pension Plan ("QPP") and the New York City Board of Education Retirement System Tax-Deferred Annuity ("TDA") Program, which collectively comprise the New York City Board of Education Retirement System, (the "Systems"), a fiduciary fund of The City of New York, as of June 30, 2018 and 2017, and the related combining statements of changes in fiduciary net position for the years then ended, and the related notes to the combining financial statements, which collectively comprise the Systems' basic combining financial statements as listed in the table of contents.

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

Management is responsible for the preparation and fair presentation of these combining 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 the combining financial statements that are free from material misstatement, whether due to fraud or error.

### ***Auditors' Responsibility***

Our responsibility is to express opinions on these combining 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 audit to obtain reasonable assurance about whether the combining financial statements are free from material misstatement.

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

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

### ***Opinions***

In our opinion, the combining financial statements referred to above present fairly, in all material respects, the combining fiduciary net position of the Systems as of June 30, 2018 and 2017, and the changes in combining fiduciary net position for the years then ended in accordance with accounting principles generally accepted in the United States of America.



**Other Matters***Required Supplementary Information*

Accounting principles generally accepted in the United States of America require that the Management's Discussion and Analysis, Schedule 1, Schedule 2, and Schedule 3, as listed in the table of contents, be presented to supplement the basic combining financial statements. Such information, although not a part of the basic combining financial statements, is required by the Governmental Accounting Standards Board who considers it to be an essential part of the financial reporting for placing the basic combining financial statements in an appropriate operational, economic, or historical context. We have applied certain limited procedures to the required supplementary information in accordance with auditing standards generally accepted in the United States of America, which consisted of inquiries of management about the methods of preparing the information and comparing the information for consistency with management's responses to our inquiries, the basic combining financial statements, and other knowledge we obtained during our audits of the basic combining 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 Supplementary Information*

Our audits were conducted for the purpose of forming an opinion on the basic combining financial statements. The Introductory Section, Additional Supplementary Information, Investment Section, Actuarial Section, and Statistical Section, as listed in the foregoing table of contents, are presented for the purpose of additional analysis and are not a required part of the basic combining financial statements.

The Additional Supplementary Information Schedule 4, Schedule 5 and Schedule 6, as listed in the table of contents, is the responsibility of management and was derived from and relates directly to the underlying accounting and other records used to prepare the basic combining financial statements. Such information has been subjected to the auditing procedures applied in the audits of the basic combining 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 combining financial statements or to the basic combining financial statements themselves, and other additional procedures in accordance with auditing standards generally accepted in the United States of America. In our opinion, the Additional Supplementary Information is fairly stated, in all material respects, in relation to the basic combining financial statements taken as a whole.

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



October 26, 2018

(except for the Other Supplementary Information,  
as to which the date is December 21, 2018)

## Management's Discussion and Analysis (Unaudited) Years Ended June 30, 2018 and 2017

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This narrative discussion and analysis of the New York City Board of Education Retirement Systems ("BERS" or the "System") financial performance provides an overview of the System's combining financial activities for the Fiscal Years ended June 30, 2018 and 2017. It is meant to assist the reader in understanding the System's combining financial statements by providing an overall review of the combining financial activities during the years, the effects of significant changes, and a comparison of the prior years' activities and results. This discussion and analysis is intended to be read in conjunction with the System's combining financial statements. The System administers the BERS Qualified Pension Plan (the "QPP") and the BERS Tax-Deferred Annuity Program (the "TDA Program").

### OVERVIEW OF BASIC COMBINING FINANCIAL STATEMENTS

The following discussion and analysis is intended to serve as an introduction to the System's basic combining financial statements. The basic combining financial statements, which are prepared in accordance with Governmental Accounting Standards Board ("GASB") pronouncements and include the financial statements of the QPP and the TDA Program, are as follows:

- **The Combining Statements of Fiduciary Net Position**—presents the financial position of the System at fiscal year-end. It provides information about: the nature and amounts of resources with present service capacity that the System presently controls (assets); consumption of net assets by the System that is applicable to a future reporting period (deferred outflow of resources); present obligations to sacrifice resources that the System has little or no discretion to avoid (liabilities); and acquisition of net assets by the System that is applicable to a future reporting period (deferred inflow of resources) with the difference between assets/deferred outflow of resources and liabilities/deferred inflow of resources being reported as net position. Investments are shown at fair value. All other assets and liabilities are determined on an accrual basis.
- **The Combining Statements of Changes in Fiduciary Net Position**—presents the results of activities during the fiscal year. All changes affecting the assets/deferred outflow and liabilities/deferred inflow of the System are reflected on an accrual basis when the activity occurred, regardless of the timing of the related cash flows. In that regard, changes in the fair values of investments are included in the year's activity as net appreciation (depreciation) in fair value of investments.
- **The Notes to Combining Financial Statements**—provide additional information that is essential to a full understanding of the data provided in the combining financial statements. The notes present information about the System's accounting policies, significant account balances and activities, material risks, obligations, contingencies and subsequent events, if any.
- **Required Supplementary Information**—as required by GASB includes the management discussion and analysis and information presented after the notes to the combining financial statements.

**Management's Discussion and Analysis (Unaudited)**  
**Years Ended June 30, 2018 and 2017**  
**(Cont'd)**

## FINANCIAL HIGHLIGHTS

### QPP Fiduciary Net Position

During Fiscal Year 2018, QPP's net position restricted for benefits stood at \$4.67 billion, an increase of 13.99% from Fiscal year 2017. The increase in the net position during Fiscal Year 2018 was primarily due to an increase in the fair value of investments. Fair value of investments, which includes collateral from security lending, stood at \$6.45 billion, an increase of 13.14% from Fiscal year 2017. Administrative expenses decreased by 14.68% from fiscal year 2017. Member contributions stood at \$40.84 million, an increase of 2.58% from Fiscal Year 2017. Return on investments stood at 8.76%.

During Fiscal year 2017, QPP's net position restricted for benefits stood at \$4.10 billion, an increase of 20.00% from Fiscal Year 2016. The increase in the net position during Fiscal Year 2017 was primarily due higher member contributions and investment returns. Member contributions increased by 3.21% from fiscal year 2016. Return from investments increased from 3.28% in fiscal year 2016 to 15.11% in fiscal year 2017.

### QPP Fiduciary Net Position June 30, 2018, 2017, and 2016

(In thousands)

	2018	2017	2016
Assets:			
Cash	\$ 2,106	\$ 3,232	\$ 327
Receivables	149,067	155,750	166,060
Investments, at fair value	6,067,189	5,332,614	4,526,973
Collateral from securities lending	390,140	374,943	477,623
Other	206,757	160,453	124,031
Total assets	<u>6,815,259</u>	<u>6,026,992</u>	<u>5,295,014</u>
Liabilities:			
Accounts payable	34,454	13,884	6,907
Other liability	-	-	-
Payable for investment securities purchased	115,140	92,173	103,213
Accrued benefits payable	9,747	9,943	7,357
Due to the TDA Program's Fixed return fund from the System	1,592,875	1,436,478	1,283,481
Payables for securities lending	390,140	374,943	477,623
Total liabilities	<u>2,142,356</u>	<u>1,927,421</u>	<u>1,878,581</u>
Net position restricted for benefits	<u>\$ 4,672,903</u>	<u>\$ 4,099,571</u>	<u>\$ 3,416,433</u>



**Management's Discussion and Analysis (Unaudited)**  
**Years Ended June 30, 2018 and 2017**  
**(Cont'd)**

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Total receivables decreased from \$155.75 million in Fiscal year 2017 to \$149.06 million in Fiscal Year 2018, a decrease of 4.29%. Receivables for investments were at \$84.96 million in Fiscal Year 2018, a decrease of 13.90% from Fiscal Year 2017. Member loans increased by 4.39% to \$50.03 million in Fiscal Year 2018.

At the close of Fiscal Year 2017, total receivables stood at \$155.75 million, a decrease of 6.21% from Fiscal Year 2016. The decrease in the receivables was primarily caused by the decrease in the receivables for investment which went down by \$20.38 million. Also included in these receivables are QPP member's outstanding loans for Fiscal Year 2017 and Fiscal Year 2016 which were at \$47.93 million and \$46.74 million respectively.

The QPP's receivables and payables for investments are primarily generated through the timing differences between the trade and settlement dates for investment securities purchased or sold.

The account "Due to the TDA Program's Fixed return fund from the System" represents a liability to the TDA program, since the TDA Program assets are pooled with QPP assets for investment purposes. The liability for Fiscal Year 2018 stood at \$1.59 billion, an increase of 10.89% from Fiscal Year 2017. This liability includes the TDA member's account balances for deposits invested in fixed investment program.

**Management's Discussion and Analysis (Unaudited)**  
**Years Ended June 30, 2018 and 2017**  
**(Cont'd)**

### Changes in QPP Fiduciary Net Position

During Fiscal Year 2018, the QPP member contributions increased to \$40.84 million, an increase of 2.58% from Fiscal Year 2017.

#### Changes in QPP Program Fiduciary Net Position Years Ended June 30, 2018, 2017, and 2016

(In thousands)

Additions:

	2018	2017	2016
Member contributions	\$ 40,846	\$ 39,821	\$ 38,581
Employer contributions	318,643	288,233	265,532
Net investment income before securities lending transaction	561,877	856,632	160,828
Net securities lending income	3,700	5,878	3,316
TDA Program's interest income in the fixed return fund	(127,972)	(106,554)	(94,789)
Other - payments to other retirement systems & other revenues/expenses	51,024	(122,954)	(157,499)
<b>Total additions</b>	<b>848,118</b>	<b>961,056</b>	<b>215,969</b>
Deductions:			
Benefit payments and withdrawals	261,574	262,432	240,727
Administrative expenses	13,212	15,486	12,818
<b>Total deductions</b>	<b>274,786</b>	<b>277,918</b>	<b>253,545</b>
<b>Net increase (decrease) in net position</b>	<b>573,332</b>	<b>683,138</b>	<b>(37,576)</b>
Net position restricted for benefits:			
Beginning of year	4,099,571	3,416,433	3,454,009
End of year	<u>\$ 4,672,903</u>	<u>\$ 4,099,571</u>	<u>\$ 3,416,433</u>

In Fiscal Year 2017, the QPP member contributions increased to \$39.82 million, an increase of 3.21% from Fiscal Year 2016 contributions of \$38.58 million.

Employer contributions received through the QPP Program for the Fiscal Years 2018 and 2017 were at \$318.64 million and \$288.23 million, an increase of 10.55% and 8.55% respectively. The employer contributions are made on a statutory basis based on the one-year lag methodology.

The net investment income, including the security lending income decreased from \$862.51 million in Fiscal Year 2017, to \$565.57 million in Fiscal Year 2018. Return on investments decreased from 15.11% in Fiscal Year 2017 to 8.76% in Fiscal year 2018.

**Management's Discussion and Analysis (Unaudited)**  
**Years Ended June 30, 2018 and 2017**  
**(Cont'd)**

The benefit payments and withdrawals decreased from \$262.43 million in Fiscal Year 2017 to \$261.57 million in Fiscal Year 2018, a decrease of 0.33%. During Fiscal Year 2017, plan benefits payments and withdrawals increased by 9.02%, from \$240.72 million to \$262.43 million. The increase in Fiscal Years 2017 was primarily due to an increase in the pension benefits to retirees, which went up 9.46%.

Administrative expenses decreased from \$15.49 million in fiscal year 2017 to \$13.21 million in fiscal year 2018, a decrease of 14.68%.

Interest to the TDA Program's fixed return fund represents the statutory interest credited on the TDA Program member account balances. The statutory rate of interest is currently 7.00% for UFT members and 8.25% for all other members. During Fiscal Year 2018, the interest to the TDA Program's fixed return fund stood at \$127.97 million, an increase of \$21.41 million from Fiscal Year 2017. The table below displays revenue (expenses) to the System due to any surplus or deficiency between the actual rate of return on the fixed investments and the statutory rate.

**Net Investment Income (Loss) to the System from TDA Member Holdings in Fixed Return Fund:**  
**Years Ended 2018, 2017, 2016 and 2015**

<b>(In thousands)</b>	<b>2018</b>	<b>2017</b>	<b>2016</b>	<b>2015</b>
Net investment income	\$ 559,753	\$ 854,992	\$ 164,435	\$ 174,876
TDA percent of Fixed Assets (average)	25.13%	25.63%	25.03%	23.77%
Investment Income on account of TDA investment	\$ 140,661	\$ 219,121	\$ 41,165	\$ 41,568
Less: Statutory Interest to TDA	<u>(127,972)</u>	<u>(106,554)</u>	<u>(94,789)</u>	<u>(85,104)</u>
Revenue (Expense) to the System	<u>\$ 12,689</u>	<u>\$ 112,567</u>	<u>\$ (53,624)</u>	<u>\$ (43,536)</u>

**TDA Program Fiduciary Net Position**

During Fiscal Year 2018, the TDA program's net position restricted for benefits stood at \$1.96 billion, a net increase of 9.40% from Fiscal Year 2017. The increase in Fiscal Year 2018 was primarily due to increase in the member contributions and the fair value of investments. Member contributions increased from \$85.76 million to \$89.97 million, a net increase of 4.90% from Fiscal Year 2017. Fair value of TDA variable investments stood at \$518.04 million in Fiscal Year 2018, an increase of 11.85% from Fiscal Year 2017.

During Fiscal Year 2017, the TDA Program's net position restricted for benefits increased to \$1.79 billion, a net increase of \$169.61 million or 10.41% from Fiscal Year 2016. The increase in Fiscal Year 2017 was primarily due to an increase in member contributions, which went up by 10.72%.

**Management's Discussion and Analysis (Unaudited)**  
**Years Ended June 30, 2018 and 2017**  
**(Cont'd)**

**TDA Program Fiduciary Net Position**  
**June 30, 2018, 2017, and 2016**

**(In thousands)**

	<b>2018</b>	<b>2017</b>	<b>2016</b>
<b>Assets:</b>			
Cash	\$ 355	\$ 105	\$ 205
Receivables	44,831	42,281	40,455
Due to the TDA Program's Fixed return fund from the System	1,592,875	1,436,478	1,283,481
Investments, at fair value	512,426	457,248	409,776
Collateral from securities lending	5,618	5,917	15,642
Other	-	-	-
<b>Total assets</b>	<b><u>2,156,105</u></b>	<b><u>1,942,029</u></b>	<b><u>1,749,559</u></b>
<b>Liabilities:</b>			
Accounts payable	\$ -	\$ -	\$ -
Other liability	173,813	128,452	96,156
Payable for investment securities purchased	709	1,435	902
Accrued benefits payable	7,157	6,537	6,783
Payables for securities lending transactions	5,618	5,917	15,642
<b>Total liabilities</b>	<b><u>187,297</u></b>	<b><u>142,341</u></b>	<b><u>119,483</u></b>
<b>Net position restricted for benefits</b>	<b><u>\$ 1,968,808</u></b>	<b><u>\$ 1,799,688</u></b>	<b><u>\$ 1,630,076</u></b>

Receivables from QPP towards TDA program increased by 10.89% in Fiscal Year 2018, from \$1.43 billion in Fiscal year 2017 to \$1.59 billion in Fiscal Year 2018. TDA program's member loan outstanding increased from \$40.75 million in Fiscal Year 2017 to \$43.56 million in Fiscal Year 2018, an increase of 6.90% from Fiscal Year 2017.

At the end of Fiscal Year 2017, the TDA Program's fair value of variable investment including collateral security lending stood at \$463.16 million, an increase of 8.87% from Fiscal Year 2016. Receivable from QPP towards the TDA Program increased by 11.92% in Fiscal Year 2017, from \$1.28 billion for Fiscal Year 2016 to \$1.43 billion in Fiscal Year 2017.

Total receivables went from \$40.45 million in Fiscal Year 2016 to \$42.28 million at the end of Fiscal Year 2017. Included in these receivables, the TDA Program's member loans outstanding went from \$38.92 million at the close of Fiscal Year 2016 to \$40.75 million at the close of Fiscal Year 2017, a 4.72% increase.

The TDA Program's receivables and payables are primarily generated through the timing differences between the trade and settlement dates for investment securities purchased or sold within the variable return fund.



**Management's Discussion and Analysis (Unaudited)**  
**Years Ended June 30, 2018 and 2017**  
**(Cont'd)**

**Changes in TDA Program Fiduciary Net Position**

During Fiscal Year 2018, member contributions to the TDA Program increased to \$89.97 million, a 4.90% increase from \$85.77 million contribution in Fiscal Year 2017. The number of contributing members increased by 5.81%. Net investment income decreased from \$75.73 million in Fiscal Year 2017 to \$59.16 million in Fiscal Year 2018, a net decrease of \$16.57 million.

During Fiscal Year 2017, member contributions to the TDA Program increased to \$85.76 million, a 10.72% increase from the \$77.45 million contributed in Fiscal Year 2016.

**Changes in TDA Program Fiduciary Net Position**  
**June 30, 2018, 2017, and 2016**

**(In thousands)**

Additions:

	<b>2018</b>	<b>2017</b>	<b>2016</b>
Member contributions	\$ 89,972	\$ 85,765	\$ 77,459
Net investment income before securities lending transaction	59,075	75,633	855
Net securities lending income	93	106	194
TDA Program's interest income in the fixed return fund	127,972	106,554	94,789
Other - payments to other retirement systems & other revenues/expenses	(54,240)	(48,113)	(3,541)
<b>Total additions</b>	<u>222,872</u>	<u>219,945</u>	<u>169,756</u>

Deductions:

Benefit payments and withdrawals	53,668	50,208	50,189
Administrative expenses	84	125	850
<b>Total deductions</b>	<u>53,752</u>	<u>50,333</u>	<u>51,039</u>

Net increase in net position

	169,120	169,612	118,717
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Net position restricted for benefits:

Beginning of year	<u>1,799,688</u>	<u>1,630,076</u>	<u>1,511,359</u>
End of year	<u>\$ 1,968,808</u>	<u>\$ 1,799,688</u>	<u>\$ 1,630,076</u>

Benefit payments and withdrawals and administrative expenses stood at \$53.67 million. The increase was due to an increase in the death benefit payments from \$9.42 million in Fiscal Year 2017 to \$10.85 million in Fiscal Year 2018.

The benefit payments and withdrawals experienced a \$.019 million (0.04%) increase from Fiscal Year 2016 to Fiscal Year 2017.

**Management's Discussion and Analysis (Unaudited)**  
**Years Ended June 30, 2018 and 2017**  
**(Cont'd)**

### Investment Summary

Investments held by BERS' QPP and TDA Programs (which includes the fixed fund and the variable fund programs), including collateral from securities lending transactions from both programs, are listed according to their investment classification in the following table:

<b>Investment Summary (In thousands) Fair Value</b>	<b>June 30, 2018</b>	<b>June 30, 2017</b>	<b>June 30, 2016</b>
Short-term Investments	\$ 139,691	\$ 57,514	\$ 113,900
Debt Securities	1,542,859	1,111,952	890,152
U.S. Equity Securities	2,236,820	636,126	726,951
Alternative Investments	765,549	612,677	506,922
Collective Trust Funds	1,894,696	3,371,593	2,698,824
Promissory Notes	-	-	-
Collateral Securities Lending	395,758	380,860	493,265
<b>Total</b>	<b><u>\$ 6,975,373</u></b>	<b><u>\$ 6,170,722</u></b>	<b><u>\$ 5,430,014</u></b>

Because the QPP's liabilities are of a long-term nature, the assets of the QPP and the TDA Programs are invested with a long-term investment horizon. Assets are invested in a diversified portfolio of capital market securities. Investments in these assets are expected to produce higher returns but are also subject to greater volatility and may produce negative returns. The system's investments increased by 13.04% in FY 2018, 13.64% in FY 2017, increased by 3.82% in Fiscal Year 2016.

### CONTACT INFORMATION

This financial report is designed to provide a general overview of The New York City Board of Education Retirement System's finances. Questions concerning any data provided in this report or requests for additional information should be directed to the Director of Fiscal Operations, New York City Board of Education Retirement System, 65 Court Street, 16<sup>th</sup> Floor, and Brooklyn, New York 11201.

**Combining Statements of Fiduciary Net Position**  
**June 30, 2018**  
**(In thousands)**

	QPP	TDA Program	Eliminations	TOTAL
<b>ASSETS:</b>				
Cash	\$ 2,106	\$ 355	\$ -	\$ 2,461
Receivables:				
Investment securities sold	84,962	400	-	85,362
Accrued interest and dividends	13,273	862	-	14,135
Member loans	50,038	43,569	-	93,607
Other	794	-	-	794
Total receivables	<u>149,067</u>	<u>44,831</u>	<u>-</u>	<u>193,898</u>
Investments — at fair value				
Fixed return funds:				
Short-term investments:				
Commercial paper	69,031	-	-	69,031
Short-term investment fund	56,088	-	-	56,088
Discount notes	9,331	-	-	9,331
Debt securities	1,531,460	-	-	1,531,460
Equity securities	1,687,635	-	-	1,687,635
Alternative Investments	765,549	-	-	765,549
Collective Trust Funds				
International Equity	1,167,563	-	-	1,167,563
Domestic Equity	152,372	-	-	152,372
Mortgage debt security	34,966	-	-	34,966
Treasury inflation protected securities	283,241	-	-	283,241
Fixed income	256,554	-	-	256,554
Collateral from securities lending	389,554	-	-	389,554
Variable return funds:				
Short-term investments	495	4,746	-	5,241
Debt securities	1,076	10,323	-	11,399
Equities	51,828	497,357	-	549,185
Collateral from securities lending	586	5,618	-	6,204
Total investments	<u>6,457,329</u>	<u>518,044</u>	<u>-</u>	<u>6,975,373</u>
Due to the TDA Program's Fixed return fund from the System	-	1,592,875	(1,592,875)	-
Other assets	206,757	-	(173,813)	32,944
Total assets	<u>6,815,259</u>	<u>2,156,105</u>	<u>(1,766,688)</u>	<u>7,204,676</u>
<b>LIABILITIES:</b>				
Accounts payable	34,454	-	-	34,454
Other liability	-	173,813	(173,813)	-
Payable for investment securities purchased	115,140	709	-	115,849
Accrued benefits payable	9,747	7,157	-	16,904
Due to the TDA Program's Fixed return fund from the System	1,592,875	-	(1,592,875)	-
Payables for securities lending	390,140	5,618	-	395,758
Total liabilities	<u>2,142,356</u>	<u>187,297</u>	<u>(1,766,688)</u>	<u>562,965</u>
<b>NET POSITION RESTRICTED FOR BENEFITS:</b>				
Benefits to be provided by QPP Program (Qualified Pension Program)	4,672,903	-	-	4,672,903
Benefits to be provided by TDA Program	-	1,968,808	-	1,968,808
TOTAL NET POSITION RESTRICTED FOR BENEFITS:	<u>\$ 4,672,903</u>	<u>\$ 1,968,808</u>	<u>\$ -</u>	<u>\$ 6,641,711</u>

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



**Combining Statements of Fiduciary Net Position**  
**June 30, 2017**  
**(In thousands)**

	QPP	TDA Program	Eliminations	TOTAL
<b>ASSETS:</b>				
Cash	\$ 3,232	\$ 105	\$ -	\$ 3,337
Receivables:				
Investment securities sold	98,675	906	-	99,581
Accrued interest and dividends	9,080	618	-	9,698
Member loans	47,935	40,757	-	88,692
Other	60	-	-	60
Total receivables	<u>155,750</u>	<u>42,281</u>	<u>-</u>	<u>198,031</u>
Investments — at fair value				
Fixed return funds:				
Short-term investments:				
Commercial paper	21,496	-	-	21,496
Short-term investment fund	30,587	-	-	30,587
Discount notes	-	-	-	-
Debt securities	1,103,180	-	-	1,103,180
Equity securities	145,431	-	-	145,431
Alternative Investments	612,677	-	-	612,677
Collective Trust Funds				
International Equity	1,251,628	-	-	1,251,628
Domestic Equity	1,738,135	-	-	1,738,135
Mortgage debt security	30,925	-	-	30,925
Treasury Inflation protected securities	236,943	-	-	236,943
Fixed Income	113,962	-	-	113,962
Collateral from securities lending	374,326	-	-	374,326
Variable return funds:				
Short-term investments	513	4,918	-	5,431
Debt securities	828	7,944	-	8,772
Equities	46,309	444,386	-	490,695
Collateral from securities lending	617	5,917	-	6,534
Total investments	<u>5,707,557</u>	<u>463,165</u>	<u>-</u>	<u>6,170,722</u>
Due to the TDA Program's Fixed return fund from the System	-	1,436,478	(1,436,478)	-
Other assets	160,453	-	(128,452)	32,001
Total assets	<u>6,026,992</u>	<u>1,942,029</u>	<u>(1,564,930)</u>	<u>6,404,091</u>
<b>LIABILITIES:</b>				
Accounts payable	13,884	-	-	13,884
Other liability	-	128,452	(128,452)	-
Payable for investment securities purchased	92,173	1,435	-	93,608
Accrued benefits payable	9,943	6,537	-	16,480
Due to the TDA Program's Fixed return fund from the System	1,436,478	-	(1,436,478)	-
Payables for securities lending	374,943	5,917	-	380,860
Total liabilities	<u>1,927,421</u>	<u>142,341</u>	<u>(1,564,930)</u>	<u>504,832</u>
<b>NET POSITION RESTRICTED FOR BENEFITS:</b>				
Benefits to be provided by QPP Program (Qualified Pension Program)	4,099,571	-	-	4,099,571
Benefits to be provided by TDA Program	-	1,799,688	-	1,799,688
<b>TOTAL NET POSITION RESTRICTED FOR BENEFITS:</b>	<u>\$ 4,099,571</u>	<u>\$ 1,799,688</u>	<u>\$ -</u>	<u>\$ 5,899,259</u>

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

**Combining Statements of Changes in Fiduciary Net Position  
For the Year Ended June 30, 2018  
(In thousands)**

	QPP	TDA Program	TOTAL
ADDITIONS:			
Contributions			
Member contributions	\$ 40,846	\$ 89,972	\$ 130,818
Employer contributions	318,643	-	318,643
Total contributions	<u>359,489</u>	<u>89,972</u>	<u>449,461</u>
Investment income			
Interest income	75,362	3,468	78,830
Dividend income	79,629	6,655	86,284
Net appreciation in fair value of investments	426,315	49,706	476,021
Total investment income	<u>581,306</u>	<u>59,829</u>	<u>641,135</u>
Less – investment expenses	<u>(19,429)</u>	<u>(754)</u>	<u>(20,183)</u>
Net investment income, before securities lending transactions	<u>561,877</u>	<u>59,075</u>	<u>620,952</u>
Securities lending transactions			
Securities lending income	3,995	103	4,098
Securities lending fees	(295)	(10)	(305)
Net securities lending income	<u>3,700</u>	<u>93</u>	<u>3,793</u>
Net investment income	<u>565,577</u>	<u>59,168</u>	<u>624,745</u>
Other – payments to other retirement systems & other revenues/expenses	51,024	(54,240)	(3,216)
TDA Program's interest income in the fixed return fund	<u>(127,972)</u>	<u>127,972</u>	<u>-</u>
Total additions	<u>848,118</u>	<u>222,872</u>	<u>1,070,990</u>
DEDUCTIONS:			
Benefit payments and withdrawals	261,574	53,668	315,242
Administrative expenses	13,212	84	13,296
Total deductions	<u>274,786</u>	<u>53,752</u>	<u>328,538</u>
NET INCREASE IN NET POSITION	573,332	169,120	742,452
NET POSITION RESTRICTED FOR BENEFITS:			
Beginning of year	<u>4,099,571</u>	<u>1,799,688</u>	<u>5,899,259</u>
End of year	<u>\$ 4,672,903</u>	<u>\$ 1,968,808</u>	<u>\$ 6,641,711</u>

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

**Combining Statements of Changes in Fiduciary Net Position  
For the Year Ended June 30, 2017  
(In thousands)**

	QPP	TDA Program	TOTAL
<b>ADDITIONS:</b>			
Contributions			
Member contributions	\$ 39,821	\$ 85,765	\$ 125,586
Employer contributions	288,233	-	288,233
Total contributions	<u>328,054</u>	<u>85,765</u>	<u>413,819</u>
Investment income			
Interest income	54,964	3,564	58,528
Dividend income	70,610	14,810	85,420
Net appreciation in fair value of investments	760,262	58,720	818,982
Total investment income	<u>885,836</u>	<u>77,094</u>	<u>962,930</u>
Less – investment expenses	<u>(29,204)</u>	<u>(1,461)</u>	<u>(30,665)</u>
Net investment income, before securities lending transactions	<u>856,632</u>	<u>75,633</u>	<u>932,265</u>
Securities lending transactions			
Securities lending income	6,118	117	6,235
Securities lending fees	(240)	(11)	(251)
Net securities lending income	<u>5,878</u>	<u>106</u>	<u>5,984</u>
Net investment income	<u>862,510</u>	<u>75,739</u>	<u>938,249</u>
Other – payments to other retirement systems & other revenues/expenses	(122,954)	(48,113)	(171,067)
TDA Program's interest income in the fixed return fund	<u>(106,554)</u>	<u>106,554</u>	<u>-</u>
Total additions	<u>961,056</u>	<u>219,945</u>	<u>1,181,001</u>
<b>DEDUCTIONS:</b>			
Benefit payments and withdrawals	262,432	50,208	312,640
Administrative expenses	15,486	125	15,611
Total deductions	<u>277,918</u>	<u>50,333</u>	<u>328,251</u>
NET INCREASE IN NET POSITION	683,138	169,612	852,750
<b>NET POSITION RESTRICTED FOR BENEFITS:</b>			
Beginning of year	<u>3,416,433</u>	<u>1,630,076</u>	<u>5,046,509</u>
End of year	<u>\$ 4,099,571</u>	<u>\$ 1,799,688</u>	<u>\$ 5,899,259</u>

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

## Notes to Combining Financial Statements

### June 30, 2018 and 2017

#### 1. SYSTEM DESCRIPTION

The City of New York (the “City”) maintains a number of pension systems providing benefits for employees of its various agencies (as defined within New York State (“State”) statutes and City laws). The City’s five major actuarially funded pension systems are the New York City Board of Education Retirement System (“BERS” or the “System”), the New York City Employees’ Retirement System (“NYCERS”), the Teachers’ Retirement System of the City of New York (“TRS”), the New York City Police Pension Fund (“POLICE”), and the New York City Fire Pension Fund (“FIRE”). Each pension system is a separate Public Employee Retirement System (“PERS”) with a separate oversight body and is financially independent of the other.

BERS administers the BERS Qualified Pension Plan (the “QPP”) and the BERS Tax-Deferred Annuity Program (the “TDA Program”). BERS is the fiduciary for the QPP and the TDA Program, which are included under BERS in the Pension and Other Employee Benefit Trust Funds section of the City’s Comprehensive Annual Financial Report (“CAFR”).

The QPP is a cost-sharing, multiple-employer PERS. The QPP provides pension benefits for non-pedagogical employees of the Department of Education and certain other specific schools and certain employees of the New York City School Construction Authority (collectively, the “Employer”). Substantially, all Department of Education non-pedagogical permanent employees, other than members of TRS, become members of the QPP on the first day of permanent employment. Employees classified as noncompetitive, exempt or provisional by Civil Service are eligible to enroll in the QPP voluntarily. Membership date is governed by the date of filing.

The QPP functions in accordance with existing State statutes and City laws, which establish and amend the benefit terms and the employer and member contribution requirements. It combines features of a defined benefit pension plan with those of a defined contribution pension plan but is considered a defined benefit pension plan for financial reporting purposes. Contributions are made by the employer and the members.

At June 30, 2018, June 30, 2017, June 30, 2016 and June 30, 2015, the QPP membership consisted of:

	<b>2018*</b>	<b>2017</b>	<b>2016</b>	<b>2015</b>
Retirees and beneficiaries receiving benefits	18,601	17,425	16,937	16,438
Terminated vested members not receiving benefits	1,572	1,528	851	237
Other inactives**	3,523	2,618	2,629	3,972
Active members receiving salary	<u>29,484</u>	<u>25,794</u>	<u>25,864</u>	<u>24,903</u>
Total	<b><u>53,180</u></b>	<b><u>47,365</u></b>	<b><u>46,281</u></b>	<b><u>45,550</u></b>

\* Preliminary figures.

\*\* Represent members who are no longer on payroll but not otherwise classified.

BERS is a fiduciary component unit of the City and is reported and is included in the City’s Comprehensive Annual Financial Report as a Pension and Other Employee Benefit Trust fund.



**Notes to Combining Financial Statements**  
**June 30, 2018 and 2017**  
**(Cont'd)**

The TDA Program was created and is administered pursuant to the Internal Revenue Code Section 403(b) and existing State statutes and City laws. Certain members of the QPP have the option to participate in the TDA Program, which provides a means of deferring income tax payments on their voluntary tax-deferred contributions until the period after retirement or upon withdrawal of contributions. Contributions to the TDA Program are made by the members only. The TDA Program is maintained as a separate plan.

At June 30, 2018, June 30, 2017, June 30, 2016 and June 30, 2015, the TDA Program participants consisted of:

	<b>2018</b>	<b>2017</b>	<b>2016</b>	<b>2015</b>
Contributing members	17,899	16,917	16,113	15,736
Retired members with TDA balances	6,484	6,673	5,844	5,530

### Summary of Benefits

#### QPP Benefits

The State Constitution provides that pension rights of public employees are contractual and shall not be diminished or impaired. In 1973, 1976, 1983 and 2012, significant amendments made to the State Retirement and Social Security Law ("RSSL") modified certain benefits for employees joining the QPP on or after the effective date of such amendments. As such, benefits under the QPP fall into various categories based on the year when an employee joined the QPP. A brief overview follows:

- Members who joined prior to July 1, 1973 ("Tier 1") are entitled to service retirement benefits of 55% of "final salary" (as defined within State statutes and City laws) after 25 years of qualifying service and attainment of age 55, a portion of which is provided from member contributions. Additional benefits equal to a specified percentage per year of service of "final salary" are payable for years in excess of the 25-year minimum. These additional benefits are increased, where applicable, by an annuity attributable to accumulated member contributions in excess of the minimum required balance and by any benefits attributable to the Increased-Take-Home Pay ("ITHP") contributions accumulated after the 25th year of member qualifying service. ITHP represents amounts contributed by the City in lieu of members' own contributions. These amounts reduce the contributions that members would have to make to the QPP during their service and thereby increase their take-home pay. Members have the choice of waiving their ITHP reduction, which would reduce their take-home pay, but provide them with increased benefits upon retirement. Tier 1 members contribute on the basis of a normal rate of contribution which is assigned by the QPP at membership and which is dependent upon age and actuarial tables in effect at the time of membership.
- In addition, these same members could elect a service retirement benefit with no minimum service requirement which provides an annual benefit for each year of service equal to a specified percentage (as described within State statutes and City laws) of "final salary", payable upon attainment of age 55. This benefit is increased, where applicable, by an annuity attributable to the member contributions and ITHP contributions.

**Notes to Combining Financial Statements**  
**June 30, 2018 and 2017**  
**(Cont'd)**

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- For all members who enrolled in the QPP prior to July 27, 1976, (“Tier 1” and “Tier 2”), ITHP contributions made on their behalf as well as their own contributions are invested, at their election, in either the fixed return fund or the variable return fund, or 50% of such contributions in each. These investment elections can be changed every two years. The QPP guaranteed a 7.5% return on member contributions or ITHP contributions to the fixed return fund until June 30, 1982, increased the guaranteed return to 8% as of July 1, 1982, and to 8.25% as of July 1, 1988, for members who enrolled in the QPP prior to July 27, 1976 (5% on member contributions for members enrolled on or after July 27, 1976). The variable return fund includes only member contributions and ITHP contributions made on their behalf as described above and is expressed in terms of units, which are valued monthly, based on investment experience.
- Certain members of Tier 1 and Tier 2 have the right to make voluntary member contributions (“Voluntary Contributions”) in excess of their required member contributions (“Required Contributions”). The investment of the Voluntary Contributions and the Required Contributions is directed by each member. A member may invest: (1) in the QPP’s fixed return fund, which is credited with interest at the Statutory Interest Rate (currently 8.25% (7.0% for UFT members)), and/or (2) in the QPP’s variable return fund. At the time of retirement or refund of contributions, a member’s aggregate balance of actual Required Contributions and Voluntary Contributions, including the actual accumulated earnings thereon, less the outstanding balance of any member loans (“Net Actual Contributions”), may exceed (“Excess of Contributions”) or fall short of (“Deficiency of Contributions”) the member’s Expected Balance. The Expected Balance is the sum of the Required Contributions which a member should have made during his or her credited service, plus the earnings that would have accumulated thereon at the Statutory Interest rate. The amount of the member’s retirement annuity or the refund of contributions that he or she is entitled to is increased by any Excess of Contributions or reduced by any Deficiency of Contributions. The total value of active members’ Excess of Contributions, net of all Deficiencies of Contributions, is \$3.45 million and \$3.51 million, for the years ended June 30, 2018 and 2017, respectively. Actuarial estimates of the impacts of Excesses and Deficiencies are incorporated into calculation of the QPP’s net pension liability (see Note 5).
- Members who joined after July 1, 1973 and before July 27, 1976 (“Tier 2”) have provisions similar to Tier 1, except that the eligibility requirements for retirement and the salary base for benefits are different and there was a limitation on their maximum benefit. Also, certain members retiring prior to age 62 may have their benefit reduced by an age-based factor. This maximum benefit limitation was subsequently eliminated under Chapter 574 of the Laws of 2000 for all Tier 2 members who retired after December 8, 2000. Tier 2 members contribute on the basis of a normal rate of contribution which is assigned by the QPP at membership, and which is dependent upon age and actuarial tables in effect at the time of membership.
- Members who joined the QPP on or after July 27, 1976 and prior to September 1, 1983 (“Tier 3”) were originally entitled to a retirement benefit upon the completion of ten years of service at age 62. The formula for this benefit was 1.67% of “Final Average Salary” (“FAS”) per year of credited service for members with less than 20 years of service, or 2% of FAS per year of service for members with 20 to 30 years of service. Tier 3 benefits were reduced by one half of the primary Social Security benefit attributable to service with the employer and provided an annual cost-of-living escalator in pension benefits of not more than 3%. Tier 3 required member contributions of 3% of salary for a period not to exceed 30 years. After September 1, 1983,

**Notes to Combining Financial Statements**  
**June 30, 2018 and 2017**  
**(Cont'd)**

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all Tier 3 members were mandated into the Tier 4 plan. However, these members retain their Tier 3 rights. Effective October 1, 2000, Tier 4 members with Tier 3 rights, like other Tier 4 members, are not required to make contributions once the tenth anniversary of their membership date has passed, or upon completion of ten years of credited service, whichever is earlier, and are eligible for a pension upon the completion of five years of credited service at age 62.

- Members who joined the QPP on or after September 1, 1983 and prior to April 1, 2012 (“Tier 4”) are eligible for a pension upon the completion of five years of credited service at age 62. The annual benefit is 1.67% of FAS per year of service for members with less than 20 years of service, or 2% of FAS per year of service for members with 20 to 30 years of service, plus an addition of 1.5% of FAS per year of service for service in excess of 30 years of service. Tier 4 members were originally required to make contributions of 3% of salary until termination of service. As of October 1, 2000, these members are not required to make contributions after the tenth anniversary of their membership date or upon completion of ten years of credited service, whichever is earlier (Chapter 126 of Laws of 2000). Certain members retiring prior to age 62 have their benefit reduced by an age-based factor.
- Effective June 28, 1995, active Tier 2 and Tier 4 members, excluding those who hold a position represented by the recognized teacher organization for collective bargaining purposes (currently, the United Federation of Teachers or “UFT”), were eligible to enroll in an early retirement program permitting them to retire at age 55 with 25 years of credited service (“55/25”), with no age reduction factor to their retirement allowance, or at age 50 with 25 years of credited service in a physically taxing position (Chapter 96 of the Laws of 1995). Additionally, Tier 4 members in non-UFT positions who joined BERS on or after June 28, 1995 and before April 1, 2012 were mandated into an early retirement program permitting them to retire at age 57 with 5 years of credited service (“57/5”), with no age reduction factor to their retirement allowance, or at age 50 with 25 years of credited service in a physically taxing position. Participants in the 55/25 and 57/5 early retirement programs are required to remit additional contributions of 1.85%, or 3.83% for physically taxing positions.
- Effective February 27, 2008, active Tier 4 members who hold a position represented by the recognized teacher organization for collective bargaining purposes (currently, UFT) were eligible to enroll in an early retirement program permitting them to retire at age 55 with 25 years of credited service (“55/25 UFT”), with no age reduction factor to their retirement allowance (Chapter 19 of the Laws of 2008). Those choosing the age 55 retirement option are required to make additional contributions of 1.85% of salary from February 28, 2008 until June 29, 2008, or until they have accumulated 25 years of credited service, whichever is later. UFT members in eligible titles who joined after February 27, 2008, but before December 10, 2009 were automatically enrolled in the 55/27 retirement program. Participants in the 55/27 retirement may retire if they are at least age 55 as of their retirement date and have attained at least 27 years of credited service. These members are required to make additional plan contributions of 1.85% of salary until they have accumulated 27 years of credited service.

**Notes to Combining Financial Statements**  
**June 30, 2018 and 2017**  
**(Cont'd)**

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- UFT members in covered titles who joined the QPP after December 10, 2009 and prior to April 1, 2012 are covered by 55/27 UFT but are required to make contributions of 4.85% of salary until they have 27 years of credited service and contributions of 1.85% of salary thereafter (Chapter 504 of the Laws of 2009). Additionally, QPP benefits for this population vest in ten years, rather than five years, as for other Tier 4 members.
- Members who join the QPP on or after April 1, 2012 are subject to the provisions of Chapter 18 of the Laws of 2012 (“Chapter 18/12”), also known as “Tier 6”. BERS members in Tier 6 are eligible for a pension upon the completion of ten years of credited service at age 63. The annual benefit is 1.67% of FAS for the first 20 years of credited service, or 35% upon the attainment of 20 years of service plus an addition of 2% of FAS per year of service for service in excess of 20 years of service. Additionally, the FAS period is five years, rather than three, and a cap is imposed on the maximum permissible FAS. Tier 6 members are required to make Basic Member Contributions (“BMC”) until they separate from service or until they retire. The BMC rate is dependent on annual wages earned during a plan year and ranges from 3% for salaries less than \$45,000 to 6% for salaries greater than \$100,000. Tier 6 members become vested after ten years of service.
- Under all service retirement categories, annuities attributable to member contributions are reduced on an actuarial basis for any loans with unpaid balances outstanding at the date of retirement.
- Subject to certain conditions, members become fully vested as to QPP benefits upon the completion of five years of credited service, or ten years of credited service for Tier 4 55/27 UFT members who joined after December 10, 2009 and for Tier 6 members.
- The QPP provides death benefits and retirement benefits on the occurrence of accidental or ordinary disability.
- During the spring 2000 session, the State Legislature approved and the State Governor (“Governor”) signed laws that provide automatic Cost-of-Living Adjustments (“COLA”) for certain retirees and beneficiaries (Chapter 125 of the Laws of 2000). It also provides additional service credits for certain Tier 1 and Tier 2 members and reduced member contributions for certain Tier 3 and Tier 4 members (Chapter 126 of the Laws of 2000).

**TDA Program Benefits**

Contributions to the TDA Program are made by the participants only and are voluntary. In order to contribute to the TDA Program, certain active members of the QPP are required to submit a salary reduction agreement and TDA enrollment request. A participant may elect to exclude an amount of his or her compensation from current taxable income (within the maximum allowed by the Internal Revenue Service) by contributing it to the TDA Program. The basic contribution limit, as of 2018 is \$18,500 certain participants are permitted to make additional contributions, based on age or years of service. The additional contribution limit for 2018 is \$6,000. Additionally, participants can elect to invest their contributions in either the fixed return fund or the variable return fund.



**Notes to Combining Financial Statements**  
**June 30, 2018 and 2017**  
**(Cont'd)**

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Benefits provided under the TDA Program are derived from participants' accumulated contributions and earnings on those contributions. No contributions are provided by the employer.

A participant may withdraw all or part of the balance of his or her account at the time of retirement, termination of employment, or under certain hardship conditions. Beginning January 1, 1989, the tax laws restricted withdrawals of TDA contributions and accumulated earnings thereon for reasons other than retirement or termination.

Contributions made after December 31, 1988, and investment earnings credited after that date, may only be withdrawn by active participants upon attainment of age 59½ or for reasons of hardship (as defined by Internal Revenue Service regulations). Hardship withdrawals are limited to contributions only.

Contributions made on or before December 31, 1989, and earnings credited on or before that date, may be withdrawn by active participants even before age 59½. A member who has received a withdrawal may not contribute to the TDA Program for the remainder of the current year.

If a member dies in active service or after retirement while his or her TDA account is in deferral, the full value of his or her account at the date of death is paid to the member's beneficiary(ies) or estate.

When a member resigns before attaining vested rights under the QPP, he or she may withdraw the value of his or her TDA Program account or leave the funds in the account for a period of up to five years after the date of resignation. If a member resigns after attaining vested rights under the QPP, he or she may leave his or her funds in the TDA Program account, accruing earnings until reaching the age at which minimum distributions are required by IRS regulations. Once a member withdraws from the QPP, participation in the TDA Program will cease, and the member will receive a refund of the value of his or her account in the TDA Program.

When a TDA Program participant applies to retire from the QPP and has a positive TDA Program account balance, the participant has three options:

- a. The participant may withdraw the total balance, either by receiving it as a taxable distribution or by rolling it over into an Individual Retirement Account (IRA);
- b. The participant may defer distribution of the account; or
- c. The participant may elect to receive the balance of the account as a life annuity. The available benefit options depend on the member's Tier.

**Notes to Combining Financial Statements**  
**June 30, 2018 and 2017**  
**(Cont'd)**

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**2. SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES AND SYSTEM ASSET MATTERS**

**Basis of Accounting**—The QPP as well as the TDA Program use the accrual basis of accounting where the measurement focus is on a flow of economic resources. Revenues are recognized in the accounting period in which they are earned and expenses are recognized in the period incurred. Contributions from members are recognized when respective employers make payroll deductions from the QPP's members and the TDA Program participants. Employer contributions to the QPP are recognized when due and the employer has made a formal commitment to provide the contributions. Benefits and refunds are recognized when due and payable in accordance with the terms of governing the QPP and the TDA Program.

**Investment Valuation**—Investments are reported at fair value. Securities purchased pursuant to agreements to resell are carried at the contract price, exclusive of interest, at which the securities will be resold. Fair value is defined as the quoted market value on the last trading day of the period, except for the Short-Term Investment fund ("STIF") (a money market fund), International Investment funds ("IIF") and Alternative Investment funds ("ALTINVF"). The IIF are private funds of publicly traded securities which are managed by various investment managers on behalf of BERS. Fair value is determined by BERS management based on information provided by the various investment managers. The investment managers determine fair value using the last available quoted price for each security owned adjusted by any contributions to or withdrawals from the fund during the period. The ALTINVF are investments for which exchange quotations are not readily available and are valued at estimated fair value as determined in good faith by the General Partner ("GP"). These investments are initially valued at cost with subsequent adjustments that reflect third party transactions, financial operating results and other factors deemed relevant by the GP. Fair value is determined by BERS management based on information provided by the various GP's after review by an independent consultant and the custodian bank for the fund.

Purchases and sales of securities are reflected on the trade date. Dividend income is recorded on the ex-dividend date. Interest income is recorded as earned on an accrual basis.

No investment in any one security represents 5% or more of QPP's net position restricted for benefits.

**Investment Programs**—The System's assets are invested in two investment programs. These are the fixed return fund, which is managed by BERS and the variable return fund (consisting primarily of equity securities), which is managed by TRS.

Under the fixed return program, members' TDA Program accounts are credited with the statutory rate of interest, currently 7% for UFT members and 8.25% for all other members. TDA Program members and certain Tier 1 and 2 QPP members may transfer their balances between the fixed return fund and the variable investment fund on a quarterly basis.

The QPP's assets within the variable return fund are co-invested with those assets of the TDA Program that are earmarked for the variable return fund. These financial statements reflect the QPP investment activity in the fixed return fund; as well as the variable return fund.

**Notes to Combining Financial Statements**  
**June 30, 2018 and 2017**  
**(Cont'd)**

**Income Taxes**—Income earned by the QPP and the TDA Program is not subject to federal income tax until it is normally distributed. Other taxes apply in case of premature distributions.

**Accounts Payable**—Accounts payable is principally comprised of amounts owed by BERS for overdrawn bank balances. BERS's practice is to fully invest cash balances in most bank accounts on a daily basis. Overdrawn balances result primarily from outstanding benefit checks that are presented to the banks for payment on a daily basis and these balances are routinely settled each day.

**Interest (to) from TDA Program's Fixed Return Fund**—The statutory interest credited on TDA Program member account balances invested in the fixed return fund is reported as the "Interest (to) from TDA Program's Fixed Return Fund."

**Securities Lending Transactions**—State statutes and Board policies permit the System to lend its investments to broker-dealers and other entities for collateral, for the same securities in the future with a simultaneous agreement to return the collateral in the form of cash, treasury and U.S. Government securities. The Systems' agent lends the following types of securities: short term securities, common stocks, longterm corporate bonds, U.S. Government and U.S. Government agency bonds, asset-backed securities, and international equities and bonds held in collective investment funds. In return, the System receives collateral in the form of cash, U.S. Treasury and U.S. Government agency securities at 102% to 105% of the principal plus accrued interest for reinvestment. At June 30, 2018 and 2017, management believes that the System had no credit risk exposure to borrowers because the amounts the System owed the borrowers equaled or exceeded the amounts the borrowers owed the System. The contracts with the System's Custodian require the Securities Lending Agent to Indemnify the System. In the situation when a borrower goes into default, the Agent will liquidate the collateral to purchase replacement securities. Any shortfall before the replacement securities cost and the collateral value is covered by the Agent. All Securities loans can be terminated on demand within a period specified in each agreement by either the System or the borrowers. Cash collateral is invested by the securities lending agent using approved Lender's Investment guidelines.

The securities lending program in which the System participates only allows pledging or selling securities in the case of borrower default.

GASB Statement No. 28, *Accounting and Financial Reporting for Securities Lending Transactions*, requires that securities loaned as assets and related liabilities be reported in the statements of fiduciary net position. Cash received as collateral on securities lending transactions and investments made with that cash are reported as assets. Securities received as collateral are also reported as assets if the government entity has the ability to pledge or sell them without a borrower default. Accordingly, the System recorded the investments purchased with the cash collateral as collateral from securities lending with a corresponding liability for securities lending. Securities on loan are carried at market value, the values reported by the QPP as of June 30, 2018 and 2017 are \$400.62 million and \$366.54 million, respectively. As of net position date, the maturities of the investments made with cash collateral on average exceed the maturities of the securities loans by approximately 24.95 days.



**Notes to Combining Financial Statements**  
**June 30, 2018 and 2017**  
**(Cont'd)**

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GASB Statement No. 72, *Fair Value Measurement and Application*. GASB 72 requires the System to use valuation techniques which are appropriate under the circumstances and are a market approach, a cost approach or income approach. GASB 72 establishes a hierarchy of inputs used to measure fair value consisting of three levels. Level 1 inputs are quoted prices in active markets for identical assets or liabilities. Level 2 inputs are inputs, other than quoted prices included within Level 1 that are observable for the asset or liability, either directly or indirectly. Level 3 inputs are unobservable inputs, and typically reflect management's estimates of assumptions that market participants would use in pricing the asset or liability. GASB 72 also contains note disclosure requirements regarding the hierarchy of valuation inputs and valuation techniques that was used for the fair value measurements.

### **3. INVESTMENTS AND DEPOSITS**

The Comptroller of the City of New York (the "Comptroller") acts as an investment advisor to BERS. In addition, BERS employs an independent investment consultant as an investment advisor. BERS utilizes several investment managers to manage the longterm debt and equity portfolios. The managers are regularly reviewed, with regard to both their investment performance and their adherence to investment guidelines.

The BERS investment policy statement was ratified by the Board of Trustees in January 2009 and amended in October 2011, January 2013, February 2015 and June 2016. It addresses investment objectives, investment philosophy and strategy, monitoring and evaluating performance, risk management, security lending protocol and rebalancing investment mix. Assets may be invested in fixed income, equity and other vehicles as permitted by New York State RSSL § 176-178(a) and Banking Law § 235, the New York City Administrative Code and the Legal Investments for New York Savings Banks list as published by the New York State Banking Department. However, investments up to 25% of total System assets may be made in instruments not expressly permitted by the RSSL.

The System does not possess an investment risk policy statement, nor does it actively manage its assets to specified risk targets. Rather, investment risk management is an inherent function of the System's asset allocation process. QPP and TDA Program assets are diversified over a broad range of asset classes and encompass multiple investment strategies aimed at limiting concentration risk.

State Street Bank and Trust Company is the primary custodian for the fixed return fund. The variable return fund assets are held in custody at Chase Bank.

Cash deposits are insured by the Federal Deposit Insurance Corporation for up to \$250,000 per member of the System and are, therefore, fully insured.

**Notes to Combining Financial Statements**  
**June 30, 2018 and 2017**  
**(Cont'd)**

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**Concentration of Credit Risk**—The System does not have any investments in any one entity that represent 5% or more of the System's net position restricted for benefits.

The legal requirements for the System's investments are as follows:

- a. Fixed income, equity and other investments may be made as permitted by New York State RSSL §§ 176-178(a) and Banking Law § 235, the New York City Administrative Code, and the Legal Investments for New York Savings Banks list as published by The New York State Banking Department, subject to Note 3(b).
- b. Investments up to 25% of total pension fund assets may be made in instruments not expressly permitted by the State RSSL.

The information reflected in the credit ratings and in the years to maturity is derived from the Custodian's Risk and Performance Analytics Reporting System. Such information is prepared as a result of the Custodian's Risk Management Analysis.

**Notes to Combining Financial Statements**  
**For the Years Ended June 30, 2018 and 2017**  
**(Cont'd)**

**Credit Risk**—Portfolios other than U.S. Government and related portfolios have credit rating limitations. The quality ratings of investments of the fixed return fund, by percentage of the rated portfolio, as described by nationally recognized statistical rating organizations, at June 30, 2018 and 2017 are as follows:

Investment Type Fixed Funds June 30, 2018	Moody's Quality																			
	Aaa	Aa1	Aa2	Aa3	A1	A2	A3	Baa1	Baa2	Baa3	Ba1	Ba2	Ba3	B1	B2	B3	Caa & Below	NR	Total	
U.S. Government	63.21%	0.03%	0.06%	0.01%	0.00%	0.01%	0.04%	0.00%	0.07%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.49%	63.92%	
Corporate bonds	1.00	0.17	0.17	0.36	0.74	0.79	1.45	1.81	1.95	1.78	1.48	1.60	2.90	2.58	2.29	2.26	2.02	3.63	28.98	
Short-term:																				
Commercial Paper	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.27	3.27
Pooled fund	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.83	3.83
Discount notes and T-bills	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Portfolio	<u>64.21%</u>	<u>0.20%</u>	<u>0.23%</u>	<u>0.37%</u>	<u>0.74%</u>	<u>0.80%</u>	<u>1.49%</u>	<u>1.81%</u>	<u>2.02%</u>	<u>1.78%</u>	<u>1.48%</u>	<u>1.60%</u>	<u>2.90%</u>	<u>2.58%</u>	<u>2.29%</u>	<u>2.26%</u>	<u>2.02%</u>	<u>11.22%</u>	<u>100.00%</u>	

Investment Type Fixed Funds June 30, 2017	Moody's Quality																			
	Aaa	Aa1	Aa2	Aa3	A1	A2	A3	Baa1	Baa2	Baa3	Ba1	Ba2	Ba3	B1	B2	B3	Caa & Below	NR	Total	
U.S. Government	36.79%	0.05%	0.03%	0.02%	-%	0.02%	0.13%	-%	0.15%	0.04%	-%	-%	-%	-%	-%	-%	-%	14.60%	51.83%	
Corporate bonds	1.18	0.71	0.62	0.76	2.25	1.69	2.97	4.50	3.71	3.45	2.28	1.25	4.33	2.85	2.50	3.58	3.21	2.29	44.13	
Short-term:																				
Commercial Paper	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.52	1.52
Pooled Fund	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.17	2.17
Discount notes and T-bills	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.35	0.35
Portfolio	<u>37.97%</u>	<u>0.76%</u>	<u>0.65%</u>	<u>0.78%</u>	<u>2.25%</u>	<u>1.71%</u>	<u>3.10%</u>	<u>4.50%</u>	<u>3.86%</u>	<u>3.49%</u>	<u>2.28%</u>	<u>1.25%</u>	<u>4.33%</u>	<u>2.85%</u>	<u>2.50%</u>	<u>3.58%</u>	<u>3.21%</u>	<u>20.93%</u>	<u>100.00%</u>	

**Notes to Combining Financial Statements**  
**June 30, 2018 and 2017**  
**(Cont'd)**

The quality ratings of investments of the variable return fund, by percentage of the rated portfolio, as described by nationally recognized statistical rating organizations, at June 30, 2018 and 2017, are as follows:

Investment Type Variable Funds June 30, 2018	Moody's Quality																			Total
	Aaa	Aa1	Aa2	Aa3	A1	A2	A3	Baa1	Baa2	Baa3	Ba1	Ba2	Ba3	B1	B2	B3	Caa1	Caa2	NR	
U.S. Government	-%	-%	-%	-%	-%	-%	-%	-%	-%	-%	-%	-%	-%	-%	-%	-%	-%	-%	0.54%	0.54%
Corporate bond	-	-	-	-	-	0.98	0.18	-	0.31	0.46	-	0.29	1.27	0.25	-	0.49	0.39	-	46.40	51.02
Yankee bonds	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Municipal bonds	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
U.S. Agencies	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Short-term:																				
Money Market	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	48.33	48.33
Cash Equivalent	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.11	0.11
Portfolio	<u>0.00%</u>	<u>0.00%</u>	<u>0.00%</u>	<u>0.00%</u>	<u>0.00%</u>	<u>0.98%</u>	<u>0.18%</u>	<u>0.00%</u>	<u>0.31%</u>	<u>0.46%</u>	<u>0.00%</u>	<u>0.29%</u>	<u>1.27%</u>	<u>0.25%</u>	<u>0.00%</u>	<u>0.49%</u>	<u>0.39%</u>	<u>0.00%</u>	<u>95.38%</u>	<u>100.00%</u>

Investment Type Variable Funds June 30, 2017	Moody's Quality																			Total
	Aaa	Aa1	Aa2	Aa3	A1	A2	A3	Baa1	Baa2	Baa3	Ba1	Ba2	Ba3	B1	B2	B3	Caa1	Caa2	NR	
U.S. Government	-%	-%	-%	-%	-%	-%	-%	-%	-%	-%	-%	-%	-%	-%	-%	-%	-%	-%	-%	-%
Corporate bonds	1.45	0.93	0.68	0.66	3.39	2.15	3.71	3.78	2.20	3.21	0.29	1.10	0.60	0.16	0.60	0.26	-	0.06	27.80	53.03
Yankee bonds	1.33	-	0.07	-	-	-	-	-	-	0.24	-	-	-	-	-	-	-	-	-	1.64
Municipal bonds	0.02	0.22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.24
U.S. Agencies	0.78	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.78
Short-term:																				
Money Market	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	44.31	44.31
Cash Equivalent	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Portfolio	<u>3.58%</u>	<u>1.15%</u>	<u>0.75%</u>	<u>0.66%</u>	<u>3.39%</u>	<u>2.15%</u>	<u>3.71%</u>	<u>3.78%</u>	<u>2.20%</u>	<u>3.45%</u>	<u>0.29%</u>	<u>1.10%</u>	<u>0.60%</u>	<u>0.16%</u>	<u>0.60%</u>	<u>0.26%</u>	<u>0.00%</u>	<u>0.06%</u>	<u>72.11%</u>	<u>100.00%</u>



**Notes to Combining Financial Statements**  
**June 30, 2018 and 2017**  
**(Cont'd)**

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

Consistent with the System's investment policy, the investments are held by the System's custodian and registered in the System's name.

All of the System's deposits are insured and are collateralized by securities held by a financial institution separate from the System's depository financial institution.

All of the System's securities are held by the System's custodial bank in the System's name.

**Interest Rate Risk**—Interest rate risk is the risk that the fair value of investments could be adversely affected by the change in interest rates. Duration limits are used to control the portfolios exposure to interest rate changes. In the investment grade core Fixed Income portfolios duration is limited to a range of one year shorter than the benchmark duration to 0.75 years longer than the duration of the benchmark indices. Duration range is a measure of the overall portfolio, while statements of the stated maturity reflect the specific maturities of the individual securities held. The System has no formal risk policy. The lengths of investment maturities for fixed return fund (in years), as shown by the percent of the rated portfolio, at June 30, 2018 and 2017 are as follows:

Years to Maturity Investment Type June 30, 2018	Investment Maturities				
	Fair Value	Less Than One Year	One to Five Years	Six to Ten Years	More Than Ten Years
U.S Government	63.92%	0.84%	28.84%	16.38%	17.86%
Corporate Bonds	28.98	0.68	10.65	11.83	5.82
Short-term:					
Commercial Paper	3.27	3.27	-	-	-
STIF	3.83	3.83	-	-	-
Portfolio	<u>100.00%</u>	<u>8.62%</u>	<u>39.49%</u>	<u>28.21%</u>	<u>23.68%</u>

Years to Maturity Investment Type June 30, 2017	Investment Maturities				
	Fair Value	Less Than One Year	One to Five Years	Six to Ten Years	More Than Ten Years
U.S Government	51.83%	0.20%	14.24%	14.56%	23.01%
Corporate Bonds	44.13	1.38	14.87	16.00	11.28
Short-term:					
Commercial Paper	1.52	1.52	-	-	-
STIF	2.17	2.17	-	-	-
Discount Notes, US Gov. & T-Bills	0.35	0.35	-	-	-
Portfolio	<u>100.00%</u>	<u>5.44%</u>	<u>29.11%</u>	<u>31.16%</u>	<u>34.29%</u>

**Notes to Combining Financial Statements**  
**June 30, 2018 and 2017**  
**(Cont'd)**

The lengths of investment maturities (in years) of the variable return fund, as shown by the percent of the rated portfolio, at June 30, 2018 and 2017 are as follows:

Years to Maturity Investment Type June 30, 2018	Investment Maturities				
	Fair Value	Less Than One Year	One to Five Years	Six to Ten Years	More Than Ten Years
U.S. Government	0.54%	0.54%	0.00%	0.00%	0.00%
Corporate bonds	51.02	2.89	27.60	15.20	5.33
Yankee Bonds	-	-	-	-	-
Municipal Bonds	-	-	-	-	-
U.S. Agencies	-	-	-	-	-
Short-term:					
Money Market	48.33	48.33	-	-	-
Cash Equivalent	0.11	0.11	-	-	-
Portfolio	100.00%	51.87%	27.60%	15.20%	5.33%

Years to Maturity Investment Type June 30, 2017	Investment Maturities				
	Fair Value	Less Than One Year	One to Five Years	Six to Ten Years	More Than Ten Years
U.S. Government	21.19%	0.73%	19.34%	1.12%	0.00%
Corporate bonds	41.79	3.75	28.81	4.93	4.30
Yankee Bonds	1.29	-	1.29	-	-
Municipal Bonds	0.19	-	0.19	-	-
U.S. Agencies	0.62	-	0.62	-	-
Short-term:					
Money Market	34.92	34.92	-	-	-
Cash Equivalent	-	-	-	-	-
Portfolio	100.00%	39.40%	50.25%	6.05%	4.30%

**Notes to Combining Financial Statements**  
**June 30, 2018 and 2017**  
**(Cont'd)**

**Foreign Currency Risk**—Foreign currency risk is the risk that changes in the exchange rates will adversely impact the fair value of an investment. Currency risk is present in underlying portfolios that invest in foreign stock and/or bonds. The currency markets have proven to be good diversifiers in a total portfolio context; therefore, the System has numerous managers that invest globally. In general, currency exposure is viewed as a benefit for its diversification reasons and not as an inherent risk within the portfolio. The System has no formal risk policy.

In addition, the System has investments in foreign stocks and/or bonds denominated in foreign currencies. The System's foreign currency exposures as of June 30, 2018 and 2017 in the fixed return fund are as follows (amounts in thousands of U.S. dollars):

<b>Trade Currency</b>	<b>June 30, 2018</b>	<b>June 30, 2017</b>
Euro Currency	\$ 263,722	\$ 237,420
Hong Kong dollar	162,239	138,877
Japanese Yen	128,349	140,072
British Pnd sterling	112,793	113,439
South Korean won	80,477	79,634
Swiss Franc	51,079	58,996
Indian Rupee	46,999	49,722
New Taiwan dollar	44,247	46,490
South African rand	31,233	27,466
Brazilian Real	29,791	24,417
Swedish Krona	25,835	38,247
Thailand Baht	21,747	22,460
Danish Krone	20,724	21,164
Singapore Dollar	20,155	20,315
Turkish Lira	17,399	18,072
Norwegian Krone	16,844	14,219
Canadian Dollar	16,616	15,059
Indonesian Rupiah	14,414	13,619
Malaysian Ringgit	14,363	12,789
Australian Dollar	14,004	10,332
Polish Zloty	9,865	8,641
Mexican Nuevo peso	4,864	9,106
Qatari Rial	4,638	3,466
Philippine Peso	2,017	2,344
Chilean Peso	1,998	1,524
Uae Dirham	1,550	1,304
Colombian Peso	1,462	1,461
Israeli Shekel	1,406	2,306
Hungarian Forint	931	684
Renminbi Yuan	504	82
Czech Koruna	456	391
Egyptian Pound	428	519
Peruvian Nouveau sol	221	151
New Zealand dollar	113	2,250
Pakistan Rupee	108	179
Moroccan Dirham	1	1
<b>Total</b>	<b><u>\$1,163,592</u></b>	<b><u>\$1,137,218</u></b>

**Notes to Combining Financial Statements**  
**June 30, 2018 and 2017**  
**(Cont'd)**

The foreign currency exposures of the variable return funds as of June 30, 2018 and 2017 are as follows (amounts in thousands of U.S. dollars):

<b>Trade Currency</b>	<b>June 30, 2018</b>	<b>June 30, 2017</b>
Euro Currency	\$ 29,135	\$ 7,211
Japanese Yen	20,342	3,859
British Pnd sterling	16,378	3,762
Swiss Franc	7,540	2,465
Australian Dollar	5,287	699
Hong Kong dollar	3,118	793
South Korean won	2,814	3,040
Indonesian Rupiah	1,965	1,894
Swedish Krona	1,933	198
Taiwan Dollar	1,571	1,829
Danish Krone	1,463	399
Singapore Dollar	1,391	587
South African rand	1,073	849
Canadian Dollar	866	1,160
Norwegian Krone	792	265
Thailand Baht	654	515
Brazilian Real	589	540
Malaysian Ringgit	472	450
Turkish Lira	369	429
Mexican Nuevo peso	254	276
Indian Rupee	236	113
Israeli Shekel	229	96
New Zealand dollar	162	32
Polish Zloty	138	78
Uae Dirham	88	75
Hungarian Forint	80	-
Chilean Peso	73	32
Philippine Peso	69	70
Egyptian Pound	8	3
Czech Koruna	4	4
<b>Total</b>	<b>\$ 99,093</b>	<b>\$ 31,723</b>



**Notes to Combining Financial Statements**  
**June 30, 2018 and 2017**  
**(Cont'd)**

**Securities Lending Transactions:** *Credit Risk*— The quality ratings of investments held as collateral for Securities Lending are as follows:

Investment Type and Fair Value - Fixed Return Fund Securities Lending Transactions (In thousands) June 30, 2018	Moody's Quality											Total
	Aaa	Aa	A1	A2	A3	Baa	Ba	B	Caa	Ca	NR	
U.S. Government	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Corporate bonds	-	-	-	-	-	-	-	-	-	-	-	-
Yankee bonds	-	-	-	-	-	-	-	-	-	-	-	-
Short-term:												
Reverse Repurchase Agreements	-	-	-	10,968	72,442	102,100	-	-	-	-	153,184	338,694
Money Market	11,560	-	-	-	-	-	-	-	-	-	-	11,560
Bank Notes	-	-	-	-	-	-	-	-	-	-	1,649	1,649
Cash or Cash Equivalent	-	-	37,651	-	-	-	-	-	-	-	-	37,651
Uninvested	-	-	-	-	-	-	-	-	-	-	-	-
<b>Total</b>	<b>\$ 11,560</b>	<b>\$ -</b>	<b>\$ 37,651</b>	<b>\$ 10,968</b>	<b>\$ 72,442</b>	<b>\$ 102,100</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 154,833</b>	<b>\$ 389,554</b>
Percentage of securities lending portfolio	2.97%	0.00%	9.66%	2.81%	18.60%	26.21%	0.00%	0.00%	0.00%	0.00%	39.75%	100.00%

Investment Type and Fair Value - Fixed Return Fund Securities Lending Transactions (In thousands) June 30, 2017	Moody's Quality											Total
	Aaa	Aa	A1	A2	A3	Baa	Ba	B	Caa	Ca	NR	
U.S. Government	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Corporate bonds	-	-	-	-	-	-	-	-	-	-	-	-
Yankee bonds	-	-	-	-	-	-	-	-	-	-	-	-
Short-term:												
Reverse Repurchase Agreements	-	86,747	-	54,093	28,220	55,000	-	-	-	-	117,967	342,027
Money Market	-	-	-	-	-	-	-	-	-	-	-	-
Bank Notes	-	-	-	-	-	-	-	-	-	-	-	-
Cash or Cash Equivalent	-	-	31,972	-	-	-	-	-	-	-	-	31,972
Uninvested	-	-	-	-	-	-	-	-	-	-	327	327
<b>Total</b>	<b>\$ -</b>	<b>\$ 86,747</b>	<b>\$ 31,972</b>	<b>\$ 54,093</b>	<b>\$ 28,220</b>	<b>\$ 55,000</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 118,294</b>	<b>\$ 374,326</b>
Percentage of securities lending portfolio	0.00%	23.17%	8.54%	14.45%	7.54%	14.69%	0.00%	0.00%	0.00%	0.00%	31.61%	100.00%

**Notes to Combining Financial Statements**  
**June 30, 2018 and 2017**  
**(Cont'd)**

Investment Type and Fair Value Variable Return Fund Securities Lending Transactions (In thousands) June 30, 2018	Moody's Quality																		Total
	Aaa	Aa1	Aa2	Aa3	A1	A2	A3	Baa1	Baa2	Baa3	Ba1	Ba2	Ba3	B1	B2	B3	Caa	NR	
U.S. Government	\$ 842	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 842
Corporate bonds	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Yankee bonds	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Short-term:																			
Repurchase Agreements	1,237	-	-	-	-	-	727	-	-	-	-	-	-	-	-	-	-	-	3,398
Uninvested	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Total</b>	<b>\$ 2,079</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 727</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 3,398</b>
<b>By Percent</b>	<b>33.51%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>11.72%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>54.77%</b>

Investment Type and Fair Value Variable Return Fund Securities Lending Transactions (In thousands) June 30, 2017	Moody's Quality																		Total
	Aaa	Aa1	Aa2	Aa3	A1	A2	A3	Baa1	Baa2	Baa3	Ba1	Ba2	Ba3	B1	B2	B3	Caa	NR	
U.S. Government	\$ 1,384	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 116	\$ 1,500
Corporate bonds	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Yankee bonds	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Short-term:																			
Repurchase Agreements	4,558	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	476
Uninvested	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Total</b>	<b>\$ 5,942</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 592</b>	<b>\$ 6,534</b>
<b>By Percent</b>	<b>90.94%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>9.06%</b>

**Notes to Combining Financial Statements**  
**June 30, 2018 and 2017**  
**(Cont'd)**

**Interest Rate Risk**—The lengths of investment maturities (in years) of the collateral for Securities Lending are as follows:

Years to Maturity Fixed Return Fund (In thousands) June 30, 2018	Investment Maturities (in years)				
	Fair Value	Less than One Year	One to Five Years	Six to Ten Years	More than Ten Years
U.S. Government	\$ -	\$ -	\$ -	\$ -	\$ -
Corporate Bonds	-	-	-	-	-
Yankee Bonds	-	-	-	-	-
Short-term					
Repurchase Agreements	-	-	-	-	-
Reverse Repurchase Agreements	338,694	338,694	-	-	-
Certificate of Deposits	-	-	-	-	-
Commercial Paper	-	-	-	-	-
Money Market	11,560	11,560	-	-	-
Bank Notes	1,649	1,649	-	-	-
US Treasury	-	-	-	-	-
US Agency	-	-	-	-	-
Time Deposit	-	-	-	-	-
Cash or Cash Equivalent	37,651	37,651	-	-	-
Uninvested	-	-	-	-	-
Total	<u>\$ 389,554</u>	<u>\$ 389,554</u>	<u>\$ -</u>	<u>\$ -</u>	<u>\$ -</u>
By Percent	<u>100.00%</u>	<u>100.00%</u>	<u>0.00%</u>	<u>0.00%</u>	<u>0.00%</u>

**Notes to Combining Financial Statements**  
**June 30, 2018 and 2017**  
**(Cont'd)**

Years to Maturity Fixed Return Fund (In thousands) June 30, 2017	Investment Maturities (in years)				
	Fair Value	Less than One Year	One to Five Years	Six to Ten Years	More than Ten Years
U.S. Government	\$ -	\$ -	\$ -	\$ -	\$ -
Corporate Bonds	-	-	-	-	-
Yankee Bonds	-	-	-	-	-
Short-term					
Repurchase Agreements	-	-	-	-	-
Reverse Repurchase Agreements	342,027	342,027	-	-	-
Certificate of Deposits	-	-	-	-	-
Commercial Paper	-	-	-	-	-
Money Market	-	-	-	-	-
Bank Notes	-	-	-	-	-
US Treasury	-	-	-	-	-
US Agency	-	-	-	-	-
Time Deposit	-	-	-	-	-
Cash or Cash Equivalent	31,972	31,972	-	-	-
Uninvested	<u>327</u>	<u>327</u>	<u>-</u>	<u>-</u>	<u>-</u>
Total	<u>\$ 374,326</u>	<u>\$ 374,326</u>	<u>\$ -</u>	<u>\$ -</u>	<u>\$ -</u>
By Percent	<u>100.00%</u>	<u>100.00%</u>	<u>0.00%</u>	<u>0.00%</u>	<u>0.00%</u>



**Notes to Combining Financial Statements**  
**June 30, 2018 and 2017**  
**(Cont'd)**

Years to Maturity Variable Return Fund (In thousands) June 30, 2018	Investment Maturities (in years)				
	Fair Value	Less than One Year	One to Five Years	Six to Ten Years	More than Ten Years
U.S. Government	\$ 842	\$ 249	\$ 431	\$ 76	\$ 86
Corporate Bonds	-	-	-	-	-
Yankee Bonds	-	-	-	-	-
Short Term					
Repurchase Agreements	5,362	5,362	-	-	-
Reverse Repurchase Agreements	-	-	-	-	-
Certificate of Deposits	-	-	-	-	-
Commercial Paper	-	-	-	-	-
Money Market	-	-	-	-	-
Bank Notes	-	-	-	-	-
US Treasury	-	-	-	-	-
US Agency	-	-	-	-	-
Time Deposit	-	-	-	-	-
Cash or Cash Equivalent	-	-	-	-	-
Uninvested	-	-	-	-	-
Total	<u>\$ 6,204</u>	<u>\$ 5,611</u>	<u>\$ 431</u>	<u>\$ 76</u>	<u>\$ 86</u>
By Percent	<u>100.00%</u>	<u>90.43%</u>	<u>6.95%</u>	<u>1.23%</u>	<u>1.39%</u>

**Notes to Combining Financial Statements**  
**June 30, 2018 and 2017**  
**(Cont'd)**

Years to Maturity Variable Return Fund (In thousands) June 30, 2017	Investment Maturities (in years)				
	Fair Value	Less than One Year	One to Five Years	Six to Ten Years	More than Ten Years
U.S. Government	\$ 1,500	\$ 208	\$ 598	\$ 377	\$ 317
Corporate Bonds	-	-	-	-	-
Yankee Bonds	-	-	-	-	-
Short Term					
Repurchase Agreements	5,034	5,034	-	-	-
Reverse Repurchase Agreements	-	-	-	-	-
Certificate of Deposits	-	-	-	-	-
Commercial Paper	-	-	-	-	-
Money Market	-	-	-	-	-
Bank Notes	-	-	-	-	-
US Treasury	-	-	-	-	-
US Agency	-	-	-	-	-
Time Deposit	-	-	-	-	-
Cash or Cash Equivalent	-	-	-	-	-
Uninvested	-	-	-	-	-
Total	<u>\$ 6,534</u>	<u>\$ 5,242</u>	<u>\$ 598</u>	<u>\$ 377</u>	<u>\$ 317</u>
By Percent	<u>100.00%</u>	<u>80.22%</u>	<u>9.15%</u>	<u>5.77%</u>	<u>4.86%</u>

For the years ended June 30, 2018 and 2017, the annual money-weighted rate of return on the System's fixed return fund investments, net of investment expense on the System's fixed return fund, was 10.31% and 15.33%. The money-weighted rate of return expresses investment performance, net of investment expense adjusted for the changing amounts invested.

In Fiscal Year 2015, the System adopted GASB Statement No. 72 ("GASB 72"), *Fair Value Measurement and Application*. GASB 72 was issued to address accounting and financial reporting issues related to fair value measurements.

**Notes to Combining Financial Statements**  
**June 30, 2018 and 2017**  
**(Cont'd)**

The System categorizes its fair value measurements within the fair value hierarchy established by GAAP. The hierarchy is based on the valuation inputs used to measure the fair value of the asset. Level 1 inputs are quoted prices in active markets for identical assets; Level 2 inputs are significant other observable inputs; Level 3 inputs are significant unobservable inputs. The System has the following recurring fair value measurements as of June 30, 2018 and June 30, 2017:

Fixed Return Funds GASB 72 Disclosure (In thousands)	June 30, 2018			
	Level 1	Level 2	Level 3	QPP Total
INVESTMENTS – At fair value				
Short-term investments				
Commercial paper	\$ -	\$ 69,031	\$ -	\$ 69,031
Short-term investment fund	-	56,088	-	56,088
U.S. Govt, Discount notes & T-Bills	3,699	5,632	-	9,331
Debt securities				
Bank loans	-	5,691	-	5,691
Corporate and Other	-	455,064	-	455,064
Mortgage debt securities	-	193,178	-	193,178
U.S. Government and Agency	-	877,527	-	877,527
Equity securities	1,687,625	11	-	1,687,636
Alternative investments	-	-	765,549	765,549
Collective Pooled funds				
Bank Loans	-	113,634	-	113,634
Corporate and Other	-	142,920	-	142,920
Domestic equity	151,429	-	943	152,372
International equity	1,167,550	-	13	1,167,563
Mortgage debt securities	-	9,777	25,189	34,966
Treasury inflation protected securities	-	283,241	-	283,241
	<u>\$ 3,010,303</u>	<u>\$2,211,794</u>	<u>\$ 791,694</u>	<u>\$ 6,013,791</u>

Fixed Return Funds GASB 72 Disclosure (In thousands)	June 30, 2017			
	Level 1	Level 2	Level 3	QPP Total
INVESTMENTS – At fair value				
Short-term investments				
Commercial paper	\$ -	\$ 21,496	\$ -	\$ 21,496
Short-term investment fund	-	30,587	-	30,587
U.S. Govt, Discount notes & T-Bills	-	-	-	-
Debt securities				
U.S. Government and Agency	-	595,874	-	595,874
Corporate and other	-	501,718	5,588	507,306
Equity securities	145,421	10	-	145,431
Alternative Investments	-	-	612,677	612,677
Collective trust funds				
International equity	1,251,481	-	147	1,251,628
Domestic equity	1,738,135	-	-	1,738,135
Mortgage debt security	-	6,135	24,790	30,925
Treasury inflation protected securities	-	236,943	-	236,943
Fixed income	-	5,254	108,708	113,962
	<u>\$ 3,135,037</u>	<u>\$1,398,017</u>	<u>\$ 751,910</u>	<u>\$5,284,964</u>

**Note:** Collective Trust Funds are reported using NAV

**Notes to Combining Financial Statements**  
**June 30, 2018 and 2017**  
**(Cont'd)**

**Equity and Fixed Income Securities**—Equity securities classified in Level 1 of the fair value hierarchy are valued using prices quoted in active markets issued by pricing vendors for these securities. Debt and equity securities classified in Level 2 of the fair value hierarchy are valued using prices determined by the use of matrix pricing techniques maintained by the various pricing vendors for these securities. Matrix pricing is used to value securities based on the securities' relationship to benchmark quoted prices. Debt and equity securities classified in Level 3 of the fair value are securities whose stated market price is unobservable by the market place; many of these securities are priced by the issuers or industry groups for these securities. Fair value is defined as the quoted market value on the last trading day of the period. These prices are obtained from various pricing sources by our custodian bank. Collective Trust funds are reported using NAV. The Debt and equity securities held in Collective Trust Funds are held in those funds on behalf of the pension system and there is no restriction on the use and or liquidation of those assets for the exclusive benefit of the funds participants.

**Alternative Investments**—Alternative investments include private equity, real estate, opportunistic fixed income and infrastructure investments. These are investments for which exchange quotations are not readily available and are valued at estimated fair value, as determined in good faith by the General Partner (“GP”). These investments are initially valued at cost with subsequent adjustments that reflect third party transactions, financial operating results and other factors deemed relevant by the GP. The assets in our alternative investment program are classified as Level 3 assets. A more detailed explanation of the Level 3 valuation methodologies follows:

Investments in non-public equity securities are valued by the GP using one or more valuation methodologies outlined in Accounting Standard Codification (“ASC”) 820, depending upon the availability of data required by each methodology. In some cases, the GP may use multiple approaches to estimate a valuation range. For the immediate time period following a transaction, the determination of fair value for equity securities, in which no liquid trading market exists, can generally be approximated based on the transaction price (absent any significant developments). Thereafter, or in the interim, if significant developments relating to such portfolio company or industry occur which may suggest a material change in value, the GP should value each investment by applying generally accepted valuation methods including: (1) the market approach (such as market transaction and comparable public company multiples, which are based on a measurement of the company's historical and projected financial performance with typical metrics including enterprise value/latest 12 months EBITDA or projected fiscal year EBITDA) or (2) the income or discounted cash flow approach.

In the market approach, valuation multiples that are relevant to the industry and company in the investments held should be considered and relied upon. Valuation multiples should be assessed and may be adjusted on a go-forward basis based on the business risk associated with the subject company in which the investment is held. In addition, the implied entry multiples should be considered as benchmarks in valuing unlisted equity. In circumstances where no financial performance metrics are available, the GP should rely on other non-financial related metrics applicable to relevant progress from the original investment date to the valuation date. In the income or discounted cash flow approach, forecasted cash flows that may be generated by the subject company are discounted to present value at an appropriate discount rate. These methodologies can be utilized to determine an enterprise value (“Enterprise Valuation Methodologies”) from which net debt is subtracted to estimate equity value.



**Notes to Combining Financial Statements**  
**June 30, 2018 and 2017**  
**(Cont'd)**

The determination of fair value using these methodologies should take into consideration a range of factors, including but not limited to, the price at which the investment was acquired, the nature of the investment, local market conditions, trading values on public exchanges for comparable securities, current and projected operating performance and financing transactions subsequent to the acquisition of the investment. Because of the subjective nature of estimated fair value of the private investments, such value may differ significantly from the values that would have been used had a ready market existed for these investments. These financial instruments have been classified as Level 3 in the fair value hierarchy.

Certain alternative investments have additional future commitments. Others have redemption notice requirements and redemption restrictions. Management does not believe these commitments, notice requirements and redemptions restrictions have a material effect on the fair value of the portfolio of investments.

Variable Return Funds GASB 72 Disclosure (In thousands)	June 30, 2018			
	Level 1	Level 2	Level 3	Total
Variable Return Funds:				
Short-term Investments	\$ -	\$ 5,241	\$ -	\$ 5,241
Debt Securities	-	11,399	-	11,399
Equities	536,582	12,544	59	549,185
Total	<u>\$ 536,582</u>	<u>\$ 29,184</u>	<u>\$ 59</u>	<u>\$ 565,825</u>

Variable Return Funds GASB 72 Disclosure (In thousands)	June 30, 2017			
	Level 1	Level 2	Level 3	Total
Variable Return Funds:				
Short-term Investments	\$ -	\$ 5,431	\$ -	\$ 5,431
Debt Securities	-	8,703	69	8,772
Equities	411,141	79,551	3	490,695
Total	<u>\$ 411,141</u>	<u>\$ 93,685</u>	<u>\$ 72</u>	<u>\$ 504,898</u>

Level One – Valued using prices quoted in active markets

Level Two – Valued using a matrix pricing technique: based on relationship to benchmark quoted prices

Level Three – Valued using discounted cash flow techniques

#### 4. CONTRIBUTIONS AND ACTUARIAL ASSUMPTIONS

The financial objective of the QPP is to fund members' retirement benefits during their active service and to establish employer contribution rates which, expressed as a percentage of annualized covered payroll, will remain approximately level from year to year. The employer contributes amounts that, together with Member Contributions and investment income, would ultimately be sufficient to accumulate assets to pay benefits when due.

Contributions to the TDA program are made on a voluntary basis by certain members of the QPP.

**Notes to Combining Financial Statements**  
**June 30, 2018 and 2017**  
**(Cont'd)**

### Member Contributions

- Members who joined the QPP prior to July 1, 1973 (“Tier 1”) contribute on the basis of a normal rate of contribution which is assigned by the QPP at membership, and which is dependent upon age and actuarial tables in effect at the time of membership. Tier 1 members can also make Increased Take Home Pay (“ITHP”) contributions, for which they can receive an additional annuity after retirement.
- Members who joined after July 1, 1973 and before July 27, 1976 (“Tier 2”) also contribute on the basis of a normal rate of contribution which is assigned by the QPP at membership, and which is dependent upon age and actuarial tables in effect at the time of membership. Note that the actuarial tables are different in Tier 2. Tier 2 members can also make ITHP contributions, for which they can receive an additional annuity after retirement.
- Members who joined after July 27, 1976 and before April 1, 2012 (“Tier 4”) contribute 3% of salary until the earlier of the 10th anniversary of their membership date, or upon the completion of 10 years of credited service. Certain Tier 4 members are enrolled in special early retirement plans and must therefore also make Additional Member Contributions (“AMC”), depending on the specific plan.
- Members who joined on or after April 1, 2012 (“Tier 6”) are required to make Basic Member Contributions (“BMC”) until they separate from service or until they retire. The BMC rate is dependent on annual wages earned during a plan year and ranges from 3% for salaries less than \$45,000 to 6% for salaries greater than \$100,000. Certain Tier 6 members are enrolled in special early retirement plans and must therefore also make Additional Member Contributions (“AMC”), depending on the specific plan.

**Employer Contributions**—Statutorily-required contributions (“Statutory Contributions”) to the QPP, determined by the System’s Chief Actuary of the Office of the Actuary (the “Actuary”) in accordance with State statutes and City laws, are generally funded by the employer within the appropriate fiscal year.

### 5. QPP NET PENSION LIABILITY

The components of the net pension liability of the Employers at June 30, 2018 and 2017 were as follows:

	(In thousands)	
	2018	2017
Total pension liability	\$ 5,174,287	\$ 5,073,339
Fiduciary net position*	<u>4,672,903</u>	<u>4,099,571</u>
Employers’ net pension liability	<u>\$ 501,384</u>	<u>\$ 973,768</u>
Fiduciary net position as a percentage of the total pension liability	<u>90.31%</u>	<u>80.81%</u>

\* Such amounts represent the preliminary System’s fiduciary net position and may differ from the final System’s fiduciary net position.

**Notes to Combining Financial Statements**  
**June 30, 2018 and 2017**  
**(Cont'd)**

**Actuarial Methods and Assumptions**—The total pension liability as of June 30, 2018 and 2017 were determined by actuarial valuations as of June 30, 2016 and June 30, 2015, respectively, that were rolled forward to develop the total pension liability to the respective fiscal year end. The following actuarial assumptions were applied to all periods included in the measurement:

Projected Salary Increases*	In general, merit and promotion increases plus assumed general wage increases of 3.0% per annum.
Investment Rate of Return*	7.0% per annum, net of investment expenses.
COLAs*	1.5% per annum for Auto COLA 2.5% per annum for escalation.

\* Developed assuming a long-term Consumer Price Inflation assumption of 2.5% per annum.

Mortality tables for Service and Disability pensioners were developed from an experience study of the QPP. The mortality tables for beneficiaries were also developed from an experience review.

Pursuant to Section 96 of the New York City Charter, studies of the actuarial assumptions used to value liabilities of the five actuarially-funded New York City Retirement Systems (“NYCRS”) are conducted every two years.

**Expected Rate of Return on Investments**—The long-term expected rate of return on QPP investments was determined using a building-block method in which best-estimate ranges of expected real rates of return (i.e., expected returns, net of QPP investment expenses 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 real rates of return by the target asset allocation percentage and by adding expected inflation. The target asset allocation and best estimates of arithmetic real rates of return for each major asset class are summarized in the following table:

Asset Class	Target Asset Allocation	Long-Term Expected Real Rate of Return
U.S. public market equities	30%	6.3%
International public market equities	13	7.0
Emerging public market equities	7	9.5
Private market equities	9	10.4
Fixed income (Core, TIPS, Opportunistic)	28	2.2
Alternatives (Real assets, Hedge funds)	13	5.5
Total	<u>100%</u>	

**Notes to Combining Financial Statements**  
**June 30, 2018 and 2017**  
**(Cont'd)**

**Discount Rate**—The discount rate used to measure the total pension liability was 7%. The projection of cash flows used to determine the discount rate assumed that employee contributions will be made at the rates applicable to the current Tier for each member and that Employer contributions will be made at rates as determined by the Actuary. Based on those assumptions, the QPP's fiduciary net position was projected to be available to make all projected future benefit payments of current active and nonactive QPP members. Therefore, the longterm expected rate of return on QPP investments was applied to all periods of projected benefit payments to determine the total pension liability.

The following presents the net pension liability of the Employers, calculated using the discount rate of 7.0%, as well as what the Employers' net pension liability would be if it were calculated using a discount rate that is 1-percentage-point lower (6.0 percent) or 1 percentage point higher (8.0 percent) than the current rate:

	(In thousands)		
	1% Decrease (6%)	Discount Rate (7%)	1% Increase (8%)
Employers' net pension liability June 30, 2018	\$1,142,066	\$501,384	\$(43,968)

## 6. MEMBER LOANS

Members of the QPP are permitted to borrow up to 75% of their employee contribution account balances, including accumulated interest, subject to the limitations of Section 72 of the Internal Revenue Code. The balance of QPP member loans receivable at June 30, 2018 and 2017 is \$50.03 million and \$47.93 million, respectively. When a member withdraws from the QPP with an outstanding QPP loan balance, this outstanding QPP loan balance will be deducted from the refund of the member's contribution balance. When a member retires with an outstanding QPP loan balance, the member's retirement benefit will be reduced by the actuarial value of the amount of the outstanding QPP loan balance, unless this balance is paid off.

Members of the TDA Program are permitted to borrow up to 75% of their TDA Program account balances, including accumulated interest, subject to the limitations of Section 72 of the Internal Revenue Code. The balance of TDA Program member loans receivable at June 30, 2018 and 2017 is \$43.56 million and \$40.75 million, respectively.

## 7. RELATED PARTIES

The Comptroller has been appointed by law as custodian for the assets of the QPP and the TDA Program. QPP fixed return fund securities are held by certain banks under custodial agreements with the Comptroller. The Comptroller also provides cash receipt and cash disbursement services to the System. Actuarial services are provided to the System by the New York City Office of the Actuary. The City's Corporation Counsel provides legal services to the System. Other administrative services are also provided by the City. Costs of \$1.48 million and

## Notes to Combining Financial Statements

### June 30, 2018 and 2017

#### (Cont'd)

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\$1.32 million were incurred on behalf of the System by other City agencies, primarily the Comptroller's Office for 2018 and 2017, respectively. The fixed return fund assets of the QPP are co-invested with those of the TDA Program. The variable return fund assets of the QPP are co-invested with those of the TDA Program and TRS (see Note 2). TRS holds the assets of the variable return fund.

#### 8. ADMINISTRATIVE EXPENSES

In Fiscal Years 2018 and 2017, as per Chapter 307 of the New York State Laws of 2002, The Plan provided BERS with Corpus funding for administrative expenses in the amount of \$13.30 million and \$15.61 million, respectively.

#### 9. CONTINGENT LIABILITIES AND OTHER MATTERS

**Contingent Liabilities**—The System has claims pending against it and has been named as a defendant in lawsuits and also has certain other contingent liabilities. Management of the System, on the advice of legal counsel, believes that such proceedings and contingencies will not have a material effect on the net position of the System or changes in the net position of the System. Under the existing State statutes and City laws that govern the functioning of the System, increases in the obligations of the System to members and beneficiaries ordinarily result in increases in the obligations of the New York City Board of Education to the System.

**Actuarial Audit**—Pursuant to Section 96 of the New York City Charter, studies of the actuarial assumptions used to value liabilities of the five actuarially-funded New York City Retirement Systems ("NYCRS") are conducted every two years.

Refer to Note 5 for the results of the most recent actuarial audits for the QPP.

**Revised Actuarial Assumptions and Methods**—In accordance with the ACNY and with appropriate practice, the Boards of Trustees of the five actuarially-funded NYCRS are to periodically review and adopt actuarial assumptions as proposed by the Actuary for use in the determination of Employer Contributions.

#### **New York State Legislation (only significant laws since Fiscal Year 2012 included)**

Chapter 18 of the Laws of 2012 ("Chapter 18/12") placed certain limitations on the Tier 3 and Tier 4 benefits available to participants hired on and after April 1, 2012 in most New York State PERS, including BERS. These changes are sometimes referred to as Tier 6.

Chapter 3 of the Laws of 2013 ("Chapter 3/13") implemented changes in the actuarial procedures for determining Employer Contributions beginning Fiscal Year 2012. In particular, Chapter 3/13 continued the One-Year Lag Methodology ("OYLM"), employed the Entry Age Actuarial Cost Method ("EAACM"), established an Actuarial Interest Rate ("AIR") assumption of 7.0% per annum, net of investment expenses, and defined the amortization of Unfunded Actuarial Accrued Liabilities ("UAAL").



**Notes to Combining Financial Statements**  
**June 30, 2018 and 2017**  
**(Cont'd)**

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Chapter 489 of the Laws of 2013 extended the Notice of Participation filing deadline to September 11, 2014 for vested members to file a sworn statement indicating participation in the World Trade Center Rescue, Recovery and Clean-up Operations.

Chapter 427 of the Laws of 2014 (“Chapter 427/14”) provides non-contributory retirement service credit for members called to active military duty on or after September 11, 2001 and prior to January 1, 2006 who did not receive their full salary from a participating employer and is otherwise eligible to receive retirement service credit for such service. Such member would not be required to make member contributions to receive such credit.

Chapter 510 of the Laws of 2015 (“Chapter 510/15”) clarifies for Tier 6 the definition of multiple employers for the purpose of exclusion of wages and changes the plan year for contributions from plan year April 1 to March 31 to plan year January 1 to December 31.

Chapter 41 of the Laws of 2016 was enacted on May 31, 2016. This amendment removes the specified periods of time, medal requirements, and theaters of operation in which military service would had to have been rendered for a service purchase pursuant to New York State Retirement and Social Security Law (“RSSL”) § 1000. Accordingly, for a member to be eligible to purchase service credit pursuant to RSSL § 1000 for pre-membership military service, the member need only have been honorably discharged from the military; all other requirements of RSSL § 1000 remain the same. This law is not retroactive and does not permit retired members to purchase service credit.

Chapter 326 of the Laws of 2016, enacted on September 11, 2016, extends the deadline to file a Notice of Participation in the World Trade Center Rescue, Recovery and Clean-up Operations to September 11, 2018. Proper filing of a Notice of Participation is a requirement for a member to be eligible for a World Trade Center disability or death benefit.

Chapter 438 of the Laws of 2016, enacted on November 14, 2016, amends Retirement and Social Security Law Section 43 to eliminate restrictions upon transferring between public retirement systems.

Chapter 71 of the Laws of 2017, enacted on June 29, 2017, continues for Fiscal Year 2018, the Actuarial Interest Rate assumption of 7.0% per annum used to determine employer contributions to the New York City Pension Funds and Retirement Systems. This act also extends through Fiscal Year 2018, the interest rate of 8.25% per annum to credit interest on Tier 1 and Tier 2 member contributions and Increased-Take-Home-Pay (ITHP) Reserves.

**Required Supplementary Information (Unaudited)**  
**Qualified Pension Plan**  
**Schedule 1**

**SCHEDULE OF CHANGES IN THE EMPLOYERS' NET PENSION LIABILITY AND RELATED RATIOS**  
(In thousands)

	2018	2017	2016	2015	2014
Total pension liability:					
Service cost	\$ 176,110	\$ 168,625	\$ 153,107	\$ 147,898	\$ 142,687
Interest	350,999	346,510	320,315	299,592	288,162
Change of benefit terms	-	-	-	-	-
Differences between expected and actual experience	(164,587)	19,938	(75,907)	50,148	-
Changes of assumptions	-	-	183,677	-	-
Benefit payments and withdrawals	(261,574)	(262,432)	(240,727)	(223,244)	(214,315)
Net change in total pension liability	100,948	272,641	340,465	274,394	216,534
Total pension liability—beginning	5,073,339	4,800,698	4,460,233	4,185,839	3,969,305
Total pension liability—ending (a)	5,174,287	5,073,339	4,800,698	4,460,233	4,185,839
Plan fiduciary net position:					
Employer contributions	318,643	288,233	265,532	258,099	214,590
Member contributions	40,846	39,821	38,581	39,564	37,193
Net investment income	565,577	862,510	164,144	177,166	875,453
Payment of interest on TDA program fixed return funds	(127,972)	(106,554)	(94,789)	(85,104)	(206,615)
Benefit payments and withdrawals	(261,574)	(262,432)	(240,727)	(223,244)	(214,315)
Administrative expenses	(13,212)	(15,486)	(12,818)	(10,956)	(9,776)
Other	51,024	(122,954)	(157,499)	(52,021)	(70,916)
Net change in plan fiduciary net position	573,332	683,138	(37,576)	103,504	625,614
Plan fiduciary net position—beginning	4,099,571	3,416,433	3,454,009	3,350,505	2,653,652
Plan fiduciary net position—ending (b)	4,672,903	4,099,571	3,416,433	3,454,009	3,279,266
BERS' net pension liability—ending (a)-(b)	<b>\$ 501,384</b>	<b>\$ 973,768</b>	<b>\$ 1,384,265</b>	<b>\$ 1,006,224</b>	<b>\$ 906,573</b>
Plan fiduciary net position as a percentage of the total pension liability	90.31 %	80.81 %	71.17 %	77.44 %	78.34 %
Covered payroll <sup>1</sup>	\$ 1,102,184	\$ 1,052,171	\$ 1,008,056	\$ 1,016,822	\$ 989,168
City's net pension liability as percentage of covered payroll	45.49 %	92.55 %	137.32 %	98.96 %	91.65 %

Additionally in accordance with GASB No. 67, Paragraph 50, such information was not readily available for periods prior to 2014.

<sup>1</sup> Projected Employee Payroll at Time 1.0 under One-Year Lag Methodology.

See Independent Auditors' Report.

**Required Supplementary Information (Unaudited)**  
**Qualified Pension Plan**  
**Schedule 2**

**SCHEDULE OF EMPLOYERS' CONTRIBUTIONS**  
**(In thousands)**

	<b>2018</b>	<b>2017</b>	<b>2016</b>	<b>2015</b>	<b>2014</b>	<b>2013</b>	<b>2012</b>	<b>2011</b>	<b>2010</b>	<b>2009</b>
Actuarially determined contribution	\$ 318,643	\$ 288,233	\$ 265,532	\$ 258,099	\$ 214,590	\$ 196,246	\$ 213,651	\$ 180,191	\$ 147,349	\$ 134,225
Contributions in relation to the actuarially determined contribution	<u>318,643</u>	<u>288,233</u>	<u>265,532</u>	<u>258,099</u>	<u>214,590</u>	<u>196,246</u>	<u>213,651</u>	<u>180,191</u>	<u>147,349</u>	<u>134,225</u>
Contribution deficiency (excess)	<u>\$ -</u>	<u>\$ -</u>	<u>\$ -</u>	<u>\$ -</u>	<u>\$ -</u>	<u>\$ -</u>	<u>\$ -</u>	<u>\$ -</u>	<u>\$ -</u>	<u>\$ -</u>
Covered payroll	<u>\$1,102,184</u>	<u>\$1,052,171</u>	<u>\$1,008,056</u>	<u>\$1,016,822</u>	<u>\$ 989,168</u>	<u>\$ 886,186</u>	<u>\$ 879,476</u>	<u>\$ 880,656</u>	<u>\$ 826,782</u>	<u>\$ 755,516</u>
Contributions as a percentage of covered-employee payroll	<u>28.91 %</u>	<u>27.39 %</u>	<u>26.34 %</u>	<u>25.38 %</u>	<u>21.69 %</u>	<u>22.15 %</u>	<u>24.29 %</u>	<u>20.46 %</u>	<u>17.82 %</u>	<u>17.77 %</u>

See Independent Auditors' Report.

**Required Supplementary Information (Unaudited)  
Qualified Pension Plan  
Schedule 2 (Cont'd)**

**Required Supplementary Information (Unaudited)  
Qualified Pension Plan  
Schedule 2 (Cont'd)**

**NOTES TO SCHEDULE OF EMPLOYERS' CONTRIBUTIONS**

The above actuarially determined contributions were developed using a One-Year Lag Methodology, under which the actuarial valuation determines the employer contribution for the second following fiscal year (e.g. Fiscal Year 2018 contributions were determined using an actuarial valuation as of June 30, 2016). The methods and assumptions used to determine the actuarially determined contributions are as follows:

<p><sup>1</sup> Under this actuarial cost method, the Initial Liability was reestablished as of June 30, 1999, by the Entry Age Actuarial Cost Method but with the unfunded actuarial accrued liability (UAAL) not less than \$0.</p>	<p>The financial results using this Frozen Initial Liability Actuarial Cost Method are the same as those that would be produced using the Aggregate Actuarial Cost Method.</p>	<p><sup>2</sup> In conjunction with Chapter 85 of the Laws of 2000, there is an amortization method. However, the June 30, 1999 UAAL for the QPP equaled \$0 and no amortization period was required.</p>	<p><sup>3</sup> Developed using a long-term Consumer Price Inflation assumption of 2.5% per year.</p>	<p><sup>4</sup> As of June 30, 2014 (Lag) valuation, the AAV is constrained to be no more than 20% of Market Value.</p>
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Valuation Dates	June 30, 2016	June 30, 2015	June 30, 2014	June 30, 2013	June 30, 2012	June 30, 2011	June 30, 2010	June 30, 2009– June 30, 2007
<b>Actuarial cost method</b>	Entry Age	Entry Age	Entry Age	Entry Age	Entry Age	Entry Age	Entry Age	Frozen Initial Liability <sup>1</sup>
<b>Amortization method for unfunded actuarial accrued liabilities:</b>								
<b>Initial unfunded</b>	Increasing dollar	Increasing dollar	Increasing dollar	Increasing dollar	Increasing dollar	Increasing dollar	Increasing dollar	NA <sup>2</sup>
<b>Post-2010 unfundeds</b>	Level dollar	Level dollar	Level dollar	Level dollar	Level dollar	Level dollar	Level dollar	NA <sup>2</sup>
<b>Remaining amortization period:</b>								
<b>Initial unfunded</b>	16 years (closed)	17 years (closed)	18 years (closed)	19 years (closed)	20 years (closed)	21 years (closed)	22 years (closed)	NA <sup>2</sup>
<b>2010 ERI</b>	0 year (closed)	1 year (closed)	2 years (closed)	3 years (closed)	4 years (closed)	5 years (closed)		
<b>2011 Actuarial gain/loss</b>	10 years (closed)	11 years (closed)	12 years (closed)	13 years (closed)	14 years (closed)	15 years (closed)	NA	NA <sup>2</sup>
<b>2012 Actuarial gain/loss</b>	11 years (closed)	12 years (closed)	13 years (closed)	14 years (closed)	15 years (closed)	NA	NA	NA <sup>2</sup>
<b>2013 Actuarial gain/loss</b>	12 years (closed)	13 years (closed)	14 years (closed)	15 years (closed)	NA	NA	NA	NA <sup>2</sup>
<b>2014 Actuarial gain/loss</b>	13 years (closed)	14 years (closed)	15 years (closed)	NA	NA	NA	NA	NA <sup>2</sup>
<b>2015 Actuarial gain/loss</b>	14 years (closed)	15 years (closed)	NA	NA	NA	NA	NA	NA <sup>2</sup>
<b>2016 Actuarial gain/loss</b>	15 years (closed)	NA	NA	NA	NA	NA	NA	NA <sup>2</sup>
<b>Actuarial Asset Valuation (AAV) method 3</b>	Modified six-year moving average of market values with a "Market Value Restart" as of June 30, 2011. The June 30, 2010 AAV is defined to recognize Fiscal Year 2010 investment performance.	Modified six-year moving average of market values with a "Market Value Restart" as of June 30, 2011. The June 30, 2010 AAV is defined to recognize Fiscal Year 2010 investment performance.	Modified six-year moving average of market values with a "Market Value Restart" as of June 30, 2011. The June 30, 2010 AAV is defined to recognize Fiscal Year 2010 investment performance.	Modified six-year moving average of market values with a "Market Value Restart" as of June 30, 2011. The June 30, 2010 AAV is defined to recognize Fiscal Year 2011 investment performance.	Modified six-year moving average of market values with a "Market Value Restart" as of June 30, 2011. The June 30, 2010 AAV is defined to recognize Fiscal Year 2011 investment performance.	Modified six-year moving average of market values with a "Market Value Restart" as of June 30, 2011. The June 30, 2010 AAV is defined to recognize Fiscal Year 2011 investment performance.	Modified six-year moving average of market values with a "Market Value Restart" as of June 30, 2011. The June 30, 2010 AAV is defined to recognize Fiscal Year 2011 investment performance.	Modified six-year moving average of market values with a "Market Value Restart" as of June 30, 1999.
<b>Actuarial assumptions:</b>								
<b>Assumed rate of return<sup>4</sup></b>	7.0% per annum, net of investment expenses	7.0% per annum, net of investment expenses	7.0% per annum, net of investment expenses	7.0% per annum, net of investment expenses	7.0% per annum, net of investment expenses	7.0% per annum, net of investment expenses	7.0% per annum, net of investment expenses	8.0% per annum, gross of investment expenses
<b>Post-retirement mortality</b>	Tables adopted by Board of Trustees during Fiscal Year 2016	Tables adopted by Board of Trustees during Fiscal Year 2016	Tables adopted by Board of Trustees during Fiscal Year 2016	Tables adopted by Board of Trustees during Fiscal Year 2012	Tables adopted by Board of Trustees during Fiscal Year 2012	Tables adopted by Board of Trustees during Fiscal Year 2012	Tables adopted by Board of Trustees during Fiscal Year 2012	Tables adopted by Board of Trustees during Fiscal Year 2006
<b>Active service: withdrawal, death, disability, service retirement</b>	Tables adopted by Board of Trustees during Fiscal Year 2012	Tables adopted by Board of Trustees during Fiscal Year 2012	Tables adopted by Board of Trustees during Fiscal Year 2012	Tables adopted by Board of Trustees during Fiscal Year 2012	Tables adopted by Board of Trustees during Fiscal Year 2012	Tables adopted by Board of Trustees during Fiscal Year 2012	Tables adopted by Board of Trustees during Fiscal Year 2012	Tables adopted by Board of Trustees during Fiscal Year 2006 <sup>4</sup>
<b>Salary increases<sup>4</sup></b>	In general, merit and promotion increases plus assumed general increases of 3.0% per year.	In general, merit and promotion increases plus assumed general increases of 3.0% per year.	In general, merit and promotion increases plus assumed general increases of 3.0% per year.	In general, merit and promotion increases plus assumed general increases of 3.0% per year.	In general, merit and promotion increases plus assumed general increases of 3.0% per year.	In general, merit and promotion increases plus assumed general increases of 3.0% per year.	In general, merit and promotion increases plus assumed general increases of 3.0% per year.	In general, merit and promotion increases plus assumed general increases of 3.0% per year.
<b>Cost-of-living adjustments<sup>4</sup></b>	1.5% per annum for Auto COLA. 2.5% per annum for Escalation.	1.5% per annum for Auto COLA. 2.5% per annum for Escalation.	1.5% per annum for Auto COLA. 2.5% per annum for Escalation.	1.5% per annum for Auto COLA. 2.5% per annum for Escalation.	1.5% per annum for Auto COLA. 2.5% per annum for Escalation.	1.5% per annum for Auto COLA. 2.5% per annum for Escalation.	1.5% per annum for Auto COLA. 2.5% per annum for Escalation.	1.3% per annum

See Independent Auditors' Report.

**Required Supplementary Information (Unaudited)**  
**Qualified Pension Plan**  
**Schedule 3**

**SCHEDULE OF INVESTMENT RETURNS**

The following table displays annual money-weighted rate of return from fixed investments for each of the past five fiscal years:

<b>Fiscal Year Ended</b>	<b>Money-Weighted Rate of Return</b>
June 30, 2018	10.31%
June 30, 2017	15.33%
June 30, 2016	0.20%
June 30, 2015	3.15%
June 30, 2014	19.51%

**Note:** In accordance with GASB No. 67, paragraph 50. Such information was not readily available for periods prior to 2014.

See Independent Auditors' Report.





**Additional Supplementary Information**  
**Qualified Pension Plan and Tax Deferred Annuity Program | Fiscal Year Ended June 30, 2018**  
**Schedule 4**

**SCHEDULE OF INVESTMENT EXPENSES**

<b>FUND MANAGER</b>	<b>CATEGORY</b>	<b>AMOUNT (IN \$)</b>
<b>1 Fixed Investment Expenses (net)</b>		
Acof V	Alternative Inv Equity	200,484.40
American Securities	Alternative Inv Equity	49,892.00
Apax Partners LLP	Alternative Inv Equity	35,084.17
Apollo Investment Fund VIII	Alternative Inv Equity	406,782.80
Ardian - ASF VII	Alternative Inv Equity	(54,384.00)
BC Partner X	Alternative Inv Equity	151,897.59
BC- Prtners X- SC Partners	Alternative Inv Equity	7,338.22
Bridge Point Advisors LTD	Alternative Inv Equity	24,470.28
Bridgepoint Advisers Limited	Alternative Inv Equity	100,855.94
Capital Partner III	Alternative Inv Equity	25,723.15
Carlye Ptnrs VI	Alternative Inv Equity	180,872.00
Carlyle VI Co-Invest	Alternative Inv Equity	2,359.00
Centerbridge Capital LP	Alternative Inv Equity	57,432.00
Crestview	Alternative Inv Equity	323,335.00
Crestview III SC	Alternative Inv Equity	18,380.00
CVC Capital Ptnrs VI	Alternative Inv Equity	386,606.26
EQT AB VII	Alternative Inv Equity	284,303.67
FTV Capital V	Alternative Inv Equity	73,850.00
ICV Partner IV	Alternative Inv Equity	57,396.00
KKR Americas Fund XII	Alternative Inv Equity	55,521.00
Leonard Green VII	Alternative Inv Equity	24,137.16
Lexington Cap III	Alternative Inv Equity	576,385.00
Long Star RE V	Alternative Inv Equity	(72,913.86)
Mesirow Financial Pre Eq V	Alternative Inv Equity	214,834.92
Mesirow Partnership Fund III	Alternative Inv Equity	4,318.00
Mesirow Partnership Fund IV	Alternative Inv Equity	2,815.00
Mill City Capital	Alternative Inv Equity	11,008.26
New Mainstream Capital	Alternative Inv Equity	13,216.73
NMS Fund III	Alternative Inv Equity	18,516.99
NYC- BERS- Platinum	Alternative Inv Equity	35,582.00
Patriot Financial Partner III	Alternative Inv Equity	(2,955.16)
Platinum Eq Cap Ptnrs	Alternative Inv Equity	276,154.00
Siris Capital Group, LLC	Alternative Inv Equity	33,581.00
Stellex Partners	Alternative Inv Equity	56,323.00
The Raine Group	Alternative Inv Equity	99,997.00
Valor Equity Partners	Alternative Inv Equity	57,153.00
Valor IV	Alternative Inv Equity	124,057.00
Vista Equity Partners	Alternative Inv Equity	538,889.00
Vista Equity Partners	Alternative Inv Equity	227,537.00
Warburg Pincus	Alternative Inv Equity	105,909.52
Warburg Pincus PE XI	Alternative Inv Equity	953,181.00
Warburg Pincus XII	Alternative Inv Equity	64,267.00
Webster Capital Mgmt LLC	Alternative Inv Equity	34,672.00
Welsh Carson Anderson & Stowe XII	Alternative Inv Equity	235,240.74
Actis GP LLP	Alternative Inv Real Estate	158,402.00
ASF VII Infastructure Ardian	Alternative Inv Real Estate	110,158.00
Axium Can Country FD	Alternative Inv Real Estate	23,812.97
Axium US Country Fund	Alternative Inv Real Estate	17,160.00
Blackstone	Alternative Inv Real Estate	263,787.00
Blackstone Real Estate	Alternative Inv Real Estate	216,694.00
Brookfield Asset Management	Alternative Inv Real Estate	112,429.65
Brookfield Infastructure Fund	Alternative Inv Real Estate	107,482.44
Brookfield Stra Re Ptnrs	Alternative Inv Real Estate	129,099.00

**Additional Supplementary Information**  
**Qualified Pension Plan and Tax Deferred Annuity Program | Fiscal Year Ended June 30, 2018**  
**Schedule 4 (Cont'd)**

**SCHEDULE OF INVESTMENT EXPENSES (CONT'D)**

<b>FUND MANAGER</b>	<b>CATEGORY</b>	<b>AMOUNT (IN \$)</b>
Caryle Realty Partners	Alternative Invst Real Estate	522,950.00
Clarion Partner LLP	Alternative Invst Real Estate	125,717.00
Divco Fund V Advisor, LLC	Alternative Invst Real Estate	160,219.00
Dra Advisors LLC- G & I Fund IX	Alternative Invst Real Estate	75,888.00
ELG Credit Management	Alternative Invst Real Estate	17,333.04
Emmes Am Co	Alternative Invst Real Estate	104,873.13
EQT INF III	Alternative Invst Real Estate	304,579.57
First Reserve Energy	Alternative Invst Real Estate	324,130.00
Franklin Temp Pr Re FD	Alternative Invst Real Estate	69,719.65
Global Infrastructure Mgmt LLC	Alternative Invst Real Estate	288,729.00
Hudson Sep Ac	Alternative Invst Real Estate	60,572.25
Jamestown Premier Funds	Alternative Invst Real Estate	29,653.28
KKR	Alternative Invst Real Estate	18,213.00
KKR RE PTNR America II	Alternative Invst Real Estate	9,414.00
KKR Recop AGG I	Alternative Invst Real Estate	26,665.00
Pramerica Fund Mgmt	Alternative Invst Real Estate	5,352.43
PW Real Estate Fund III LP	Alternative Invst Real Estate	545.84
RFM - NYCSRS Sandy LLC	Alternative Invst Real Estate	139,684.04
Tristian European Property Inv	Alternative Invst Real Estate	616.76
UBS Trumbell Property	Alternative Invst Real Estate	389,732.75
Westbrook Re Fund X Co- Invest	Alternative Invst Real Estate	164,575.00
Altravue Capital	Equity	7,936.99
Blackrock Institution Trust	Equity	7,149.61
Bowling Portfolio Mgmt	Equity	8,625.07
Bridge City Capital	Equity	10,633.45
Dean Capital Mgmt	Equity	10,738.13
Essex Investment Mgmt	Equity	9,676.75
FIS Huber Capital Management	Equity	249.30
FIS - Rice Hall SCG	Equity	1,385.02
Lisanti Capital Growth	Equity	2,191.02
NYC-BOE-LEG-Transition	Equity	208.89
Pacific View Asset Mgmt	Equity	4,668.65
PIM Martin Invst Mgmt	Equity	157.58
SSGA Russell Top 200	Equity	51,264.12
Wellington Mgmt MCC	Equity	442,046.64
Cash Account	Fail Float	10,054.79
Blackrock	Fixed Income	82,648.02
Loomis Sayles & Company	Fixed Income	403,458.01
Prudential	Fixed Income	117,274.36
Security Lending	Fixed Income	346,252.57
Shenkman	Fixed Income	478,530.23
State Street	Fixed Income	146,224.37
State Street	Fixed Income	18,308.69
Taplin Canida	Fixed Income	121,107.36
Acadian	Intl Equity	2,339,123.91
Ativo Capital Mgmt	Intl Equity	39,647.65
Ballie Group Trust	Intl Equity	1,153,359.21
Cony EAFE Rebal	Intl Equity	35.73
Cony Group Trust	Intl Equity	536,211.14
FIS - Aubrey EM	Intl Equity	26,445.09
FIS - Algert EAFE SC	Intl Equity	15,176.51
FIS - Change Global EM	Intl Equity	60,530.81
Fis - Denali EAFE	Intl Equity	52,993.00

**Additional Supplementary Information**  
**Qualified Pension Plan and Tax Deferred Annuity Program | Fiscal Year Ended June 30, 2018**  
**Schedule 4 (Cont'd)**

**SCHEDULE OF INVESTMENT EXPENSES (CONT'D)**

<b>FUND MANAGER</b>	<b>CATEGORY</b>	<b>AMOUNT (IN \$)</b>
FIS - Dundas EAFE	Intl Equity	50,098.55
FIS - Metis EAFE	Intl Equity	26,613.42
FIS - Osmosis EAFE	Intl Equity	39,248.02
Morgan Stanley - ACWI	Intl Equity	34,759.57
Sprucegrove	Intl Equity	1,085,968.30
Blackrock R1000 Growth	Mutual Fund Equity	26,154.35
Blackrock R1000 Value	Mutual Fund Equity	24,754.01
Blackrock R2000 Growth	Mutual Fund Equity	3,738.60
Blackrock R2000 Value	Mutual Fund Equity	3,268.32
Barings LLC	Mutual Fund Fixed Income	388,197.74
Cony GT EM Blackrock	Mutual Fund Fixed Income	479,015.52
Afl-Cio Hsg Inv Trust	Mutual Fund Mortgage	64,520.91
ETI - ACS MK	Mutual Fund Mortgage	16,589.56
State Street TIPS MTA	TIPS	13,052.60
		<b><u>\$ 18,758,585.72</u></b>
<b>Legal Fees</b>		
Bryan Cave LLP		3,514.99
Cox Castle Nicholson LLP		5,504.39
Day Pitney		13,339.60
Foley and Lardner LLP		4,882.12
Foster Pepper PLLC		7,857.89
Hitchcock Law Firm PLLC		600.00
Morgan Lewis Bockius		21,804.12
Morris Nichols Arsht Tunnell LLP		240.00
Pillsbury Winthrop Shaw Pittman LLP		861.29
Reinhart Boerner Van Dueren		1,543.85
Seward Kissel LLP		635.63
Squire Patton Boggs (US) LLP		3,270.56
	Sub total	<b><u>\$ 64,054.44</u></b>
<b>Consultant Fees</b>		
Courtland Partners		13,773.69
Ernst and Young LLP		1,710.08
Hamilton Lane Advisors		257,250.00
Mercer		1,473.65
MSCI - ESG Research LLC		563.07
MSCI Barra LLC		28,760.46
Pricewaterhouse Coopers Taiwan		369.08
S&P Trucost Limited		508.63
Segal Rogercasey		190,000.00
Stepstone Group LLC		13,921.00
Townsend Holdings		19,471.53
	Sub total	<b><u>\$ 527,801.19</u></b>
<b>2</b>	<b>Variable Investment Expenses</b>	
	Qualified Pension Plan	<b>\$ 78,605.89</b>
	Tax-Deferred Annuity	<b>\$ 754,313.45</b>
	<b>Investment Expenses FY 2018</b>	<b><u>\$ 20,183,360.69</u></b>

**Additional Supplementary Information**  
**Qualified Pension Plan and Tax Deferred Annuity Program | Fiscal Year Ended June 30, 2018**  
**Schedule 5**

---

**SCHEDULE OF ADMINISTRATIVE EXPENSES**

<b>EXPENSE TYPE</b>	<b>AMOUNT (In \$)</b>
<b>1</b> <u>ADMINISTRATIVE EXPENSES (QPP):</u>	
Consumable Supplies and Materials	149,045
Contractual Services	1,523,836
Furniture and Equipment	123,927
General Services	199,468
Salaries paid to Plan Personnel	11,215,840
Sub-Total	<u>\$ 13,212,116</u>
<b>2</b> <u>ADMINISTRATIVE EXPENSES (TDA):</u>	
Contractual Services	84,770
Sub-Total	<u>\$ 84,770</u>
<b>3</b> <u>MISCELLANEOUS EXPENSES:</u>	
Related Parties Administrative Expenses (Adm expenses made by the Comptroller on our behalf. Charged on investment)	Sub-Total
	<u>\$ 1,483,963</u>
<b>Total Administrative Expenses for FY 2018</b>	<u><u>\$ 14,780,849</u></u>

**Additional Supplementary Information**  
**Qualified Pension Plan and Tax Deferred Annuity Program | Fiscal Year Ended June 30, 2018**  
**Schedule 6**

**SCHEDULE OF DIRECT PAYMENTS TO CONSULTANTS**

<b>INDIVIDUAL OR FIRM NAME</b>	<b>NATURE OF SERVICES</b>	<b>AMOUNT (In \$)</b>
<b>Segal Marco Advisors</b> 333 West 34th Street New York, NY 10001	Investment Consultants	\$ 190,000
<b>Gary Tunnicliffe &amp; Jack Ziegler, LLC</b> 321 Union Street, #4A Brooklyn, NY 11231	CPMS Consultants*	753,436
<b>KPMG</b> 345 Park Avenue New York, NY 10154	CPMS Consultants*	617,314
<b>Vitech Systems Group, Inc.</b> 401 Park Avenue South, 12th Floor New York, NY 10016	CPMS Consultants*	4,661,007
<b>Winmill Software</b> 405 Park Avenue, 16th Floor New York, NY 10022	CPMS Consultants*	193,440
<b>Total Consulting Fees for FY 2018</b>		<u><u>\$ 6,415,197</u></u>

\* CPMS - Comprehensive Pension Management System



# INVESTMENT

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*Your Strategy*  
To join BERS and make the right moves towards your retirement.





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## Qualified Pension Plan and Tax Deferred Annuity Program

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### INTRODUCTION

The investment section presents the following:

- 1 Investment report for FY 2018, prepared by Segel Marco Advisors, investment consultant for BERS.
- 2 The investment schedules following the investment report supplement the investment information presented in the financial section and the investment report as presented by the investment consultant.

Schedules are presented for the following categories

- a Asset Pie: focusing on the current fiscal year asset composition
- b Asset Allocation: Presents 10 year comparison of the invested assets
- c Investment Summary
- d Consolidated investment performance
- e Investment Holdings
- f Management fees and brokers commission

### BASIS OF PRESENTATION

Investments are reported at fair value. Securities purchased pursuant to agreements to resell are carried at their contract price, exclusive of interest, at which the securities will be resold. Fair value is defined as the quoted market value on the last trading day of the period, except for the collective trust funds. Collective trust funds are valued at NAV. Fair value is determined by BERS management based on information provided by the various GP's after review by an independent consultant and the custodian bank for the fund.



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Michael C. Wright  
Senior Vice President  
mwright@segalmarco.com

**To:** New York City Board of Education Retirement System (BERS)  
**From:** Michael C. Wright  
**Date:** October 31, 2018  
**Re:** Report of Investment Activity for Fiscal Year 2018

Dear Members of the New York City Board of Education Retirement System:

**Fund Summary of investment performance**

The Board of Education Retirement System (BERS) Total Fund returned +10.4%, net of fees, for the Fiscal Year (FY) ending June 2018 compared to + 8.6% for the BERS Policy Benchmark<sup>1</sup>, against which it is measured. Performance for the FY ranked better than 90% of a peer group of public funds. The Fund increased in value and ended the fiscal year at \$5.99 billion (compared to \$5.3 billion last year). The one year performance was very good. It is important to note that a pension fund is a long-term investment established to pay for participants' benefits. Over the long term, the expected return used for the actuarial valuation is 7%. Over the 10-year time period ending June 2018, the Fund remains ahead of its benchmarks, with a + 7.7% average annual return versus +7.2% for the benchmark. The 10-year performance also ranks in the top 10% of peers. The Fund's average annual return since 1987 is 8.9%.

**Economic and Market Comment**

There are a series of factors to consider about the economy and market for pension fund investing. The change in the US Gross Domestic Product (GDP) is a useful measure of the growth and strength of the US economy which supports pension fund performance. Real US economic growth as measured by the GDP at June 30, 2018, was at a rate of 4.2% compared to a 2.6% rate at the end of the 2017 fiscal year. The steady growth in the U.S. economy has been sustained by low unemployment, a tax cut for many businesses and consumers, moderate wage growth and stable gas prices, housing costs and rents. This combination has provided a business environment that has benefitted the fund. Interest rates and inflation are also important measures that affect the pension fund's performance and prospects. The US Federal Reserve Bank (the "Fed") followed through on its plans to raise interest rates in the second half of the FY. These increases were anticipated and positioned the Fed to continue its wind down of the quantitative easing started after the 2008 financial crisis. The Fed, like other Central Banks, raises interest rates to help to manage inflation expectations and to balance growth and unemployment in the economy. Indeed inflation has remained historically low, about at the Fed's target of 2%.

<sup>1</sup> The Board of Education Policy Benchmark is a custom index representing the weighted average return of the benchmarks for each major investment program in the Fund. The Policy Benchmark as of 6/30 consisted of: 34.7% Russell 3000, 14.6% MSCI EAFE, 6.7% MSCI Emerging Markets, 5.91% Russell 3000 + 300 bps, 5.6% NFI ODCE Net + 100 bps, 1.2% Infrastructure index, 18.6% fixed income, 4.7% Barclays Capital US TIPS, 6.0% Citigroup BB&B Index, and 2.0% Credit Suisse Leveraged Loan Index.

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New York City Board of Education Retirement System (BERS)  
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Page 2

The fund is diversified across US and non US markets. In the first half of 2018, the strength of the US dollar based on the strong US economy and rising rates, reduced the returns for US funds holding non US investments. Non US investments have also been affected negatively by announcements by the US and UK to drop out of multilateral trade deals and negotiate new bilateral pacts. In the UK, the decision to leave the European Common Market was announced during the fiscal year and has hurt their growth rate compared to other economies. Emerging markets experienced the most turmoil as higher US interest rates made their debt repayments more expensive and the prospect of less trade with the US hurt their stock markets. China and Brazil had been major drivers in positive emerging market returns until the last year. In the last year, China experienced a slowdown in GDP growth to 6.7%, still very good compared to others but a concern to investors considering the trade problems with the US and the political problems that China faces. Other major emerging markets have not fared anywhere near as well, Brazil, emerging from a recession in 2017, barely had a .3% quarter as measured by GDP.

While rising rates resulted in small losses on bonds in both the US and non US markets, US and Non US stock returns were positive through June of 2017. The US stock market, as measured by the benchmark Russell 3000 index returned 14.8% for the Fiscal Year 2018. This follows the 18.5% return last year. Caution and experience informs us that those are very high returns compared to history and are unlikely to continue at those levels over the long term. International Developed Market stocks returned 7.7% and Emerging Market stocks returned + 8.2 %, more in line history and expectations. Fixed income investments rewarded a tolerance for risk with the High Yield, below investment grade, bond index, returning +2.4%. The investment grade index returned -.5%, reflecting both quality concerns in mortgages and corporate bonds and greater sensitivity to the interest rate increases. Supporting the case for diversification, the less liquid, private markets also had superior returns. Pension fund investors such as the BERS fund have long term horizons over which benefits will be paid. They can make investments where the invested capital is not needed over the 3 to 5 year period. Private market investments are not similarly affected by short term interest rates and inflation and did well in FY 2018. The Real Estate benchmark returned + 8.6% and a Private Equity benchmark returned +17.2%.

### **Fund Description**

Asset allocation is the percentage of fund assets that are in stocks, bonds and private market alternatives. The fund's allocation continued to be a major contributor to the total return in the most recent FY. The Trustees establish a target asset mix after considering the long-term growth prospects of a diversified portfolio of investments and the expected costs of the Plan participants' benefits. In order to participate in the broad market performance while keeping Fund expenses low, the Fund uses passive, index strategies for the majority of its public equity allocation. During the 2018 FY, the implementation plan for the asset allocation approved during the 2016 FY has progressed with additions to Private Equity, Real Estate and Infrastructure investments, while reducing U.S. equities and developed market non-U.S. equities. These are long-term commitments expected to improve the risk and return profile of the fund. The Fund's target asset mix is 50%70% Public Equity (including US and Non US), 22% Alternative Private Markets(including Private Equity, Real Estate and Infrastructure) and 28% Fixed Income. Over the long-term, which is the framework for considering the term structure of the Plans' liabilities, we expect our asset allocation will continue to meet the benefit needs while providing growth and preservation of principal. As shown above, since initiating the new allocation, reducing fixed income in favor of private market alternatives has added substantial value.

For the FY ending June 2018, the asset allocation as well as the manager selection added value. The active manager selection in US and Non US stocks was beneficial as these managers returns were ahead their benchmarks net of fees. Domestic Equity returned 15.8% for the FY ending June 30, 2018 versus a 14.8%

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New York City Board of Education Retirement System (BERS)  
Report on Investment Activity  
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Page 3

return for the benchmark; almost all of the value added was derived from the active mid cap US stock manager. International developed equity also performed strongly with a 17.5% return versus a 6.9% return for the benchmark. The Total Fixed Income return of +0.5% outperformed the custom benchmark return of -0.2%, most of the outperformance coming from the High Yield managers. As part of our ongoing monitoring, we review the manager contributions and the structure of the fund in order to achieve the expected levels of returns. The Fund's current level of diversification into alternative assets did help performance in FY 2018 as the Private Equity, Real Estate and Infrastructure investments out performed fixed income and non US public investments for the Fund.

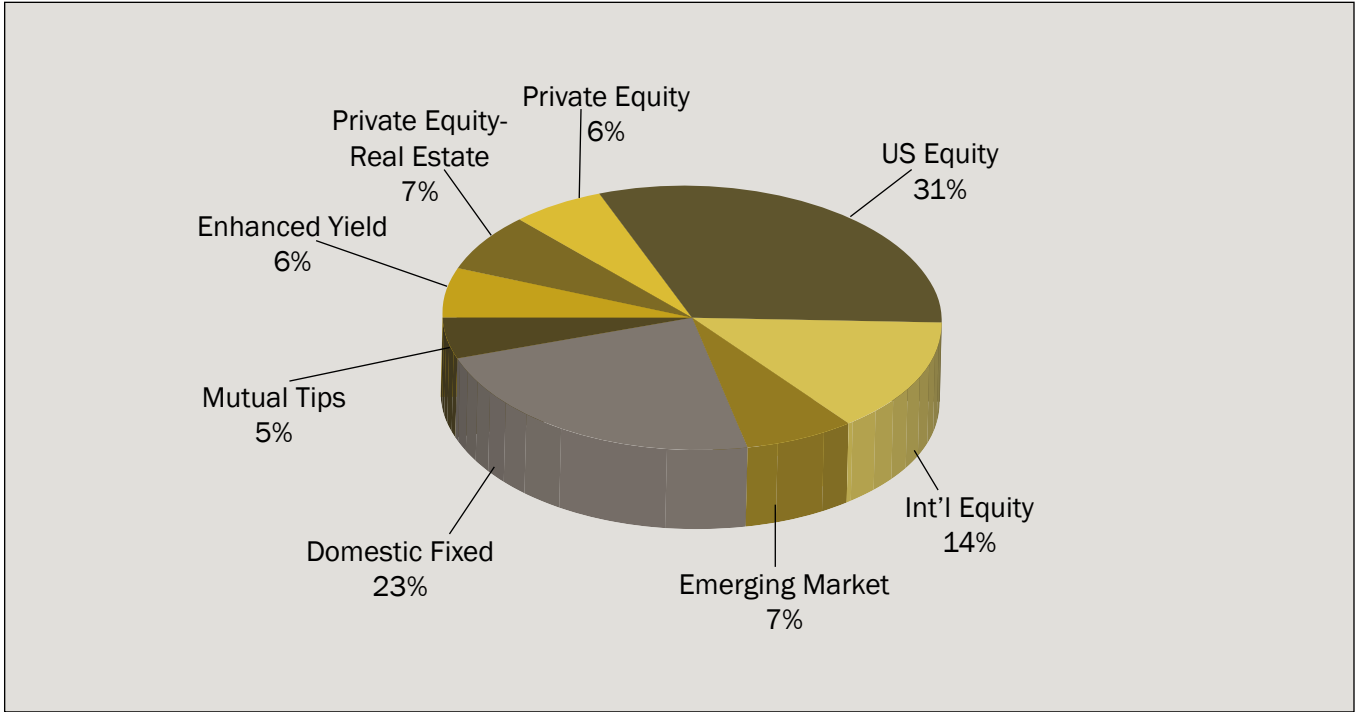
Market conditions and fund performance will continue to be closely monitored to accomplish the goal of providing the benefits as promised to participants.

Sincerely,



Michael Wright

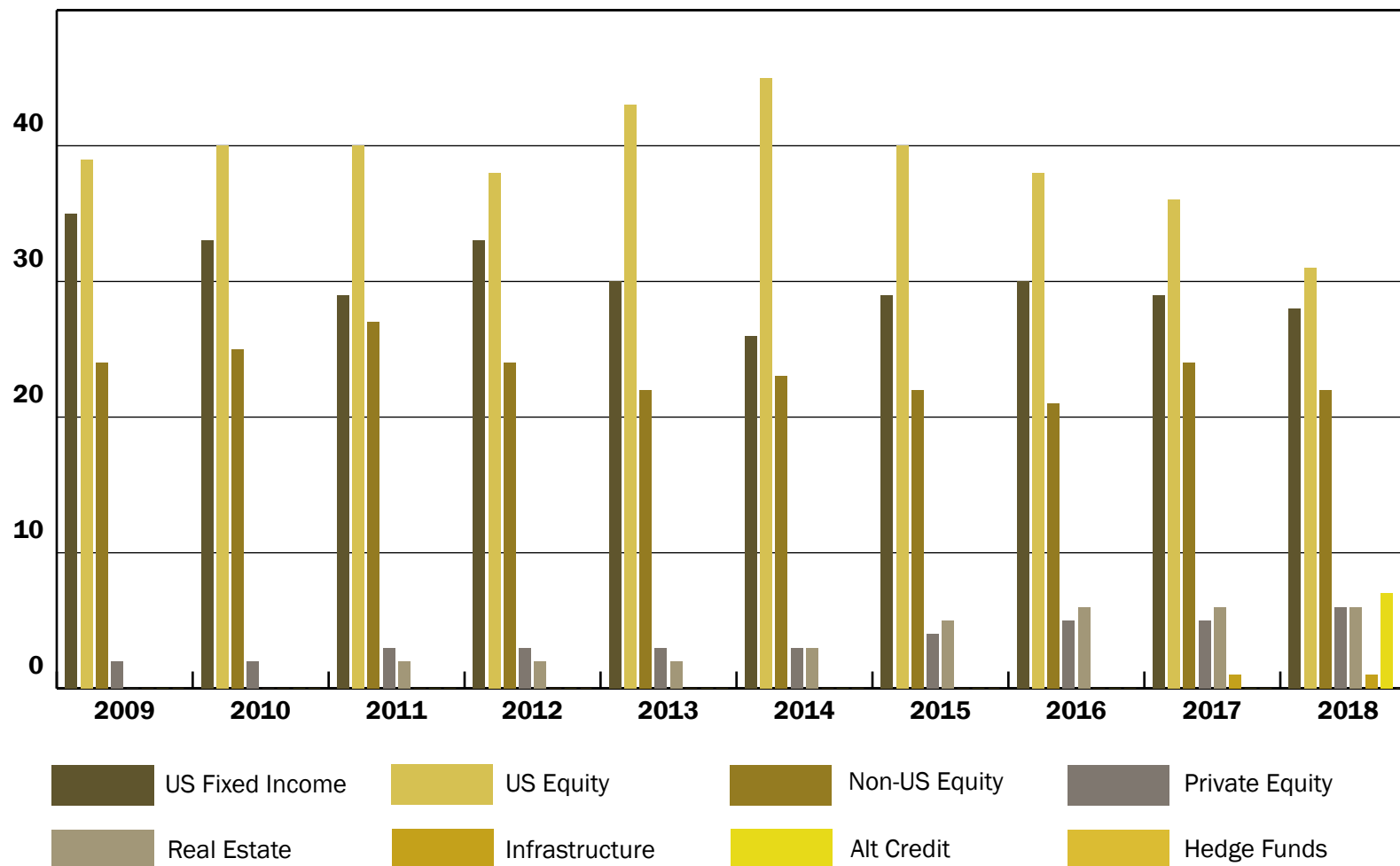
**Qualified Pension Plan and Tax Deferred Annuity Program  
Asset Allocation (Fixed)  
Fiscal Year Ended June 30, 2018**



Years	US Equity	Int'l Equity	Emerging Market	Domestic Fixed	Mutual TIPS	Enhanced Yield	Private Equity-Real Estate & Infrastructure	Private Equity
6/30/2009	34.28	20.48	11.00	26.06	2.73	3.94	0.00	1.51
6/30/2010	36.22	21.67	8.46	25.27	2.72	3.66	0.00	2.00
6/30/2011	39.97	21.51	5.37	22.63	2.62	3.43	1.66	2.81
6/30/2012	37.79	19.03	4.48	24.81	2.46	6.00	2.15	3.28
6/30/2013	42.90	17.59	4.56	20.01	3.91	5.60	2.39	3.04
6/30/2014	44.72	18.27	4.67	16.69	3.38	6.19	2.83	3.25
6/30/2015	40.15	17.06	4.94	20.67	3.16	5.48	4.47	4.07
6/30/2016	37.00	17.00	5.00	19.50	5.00	5.50	6.03	4.97
6/30/2017	36.49	12.76	7.98	20.37	4.81	6.00	6.58	5.01
6/30/2018	30.74	14.24	7.54	22.87	4.73	7.11	6.86	5.91

**Qualified Pension Plan and Tax Deferred Annuity Program**  
**Asset Allocation (Fixed) | Fiscal Years Ended June 30, 2009 - June 30, 2018**

% of  
Portfolio  
50



**Qualified Pension Plan and Tax Deferred Annuity Program  
Investment Summary (Fixed and Variable) | Fiscal Year Ended June 30, 2018  
(In thousands)**

<u>Type of Investments</u>	<u>Fair Value</u>	<u>Percentages</u>
<b>Short Term Investments</b>	<b>\$ 139,691</b>	<b>2.00 %</b>
<b>Debt Securities</b>	<b>1,542,859</b>	<b>22.12</b>
<b>Promissory Notes</b>	<b>-</b>	<b>-</b>
<b>Domestic Equity</b>	<b>2,236,820</b>	<b>32.07</b>
<b>Alternative Investments</b>	<b>765,549</b>	<b>10.98</b>
<b>Collective Trust Funds</b>		
International Equity	1,167,563	16.74
Domestic Equity	152,372	2.18
Mortgage Debt Security	34,966	0.50
Treasury Inflation-Protected Securities	283,241	4.06
Fixed Income	256,554	3.68
<b>Total Collective Trust Funds</b>	<b>1,894,696</b>	<b>27.16</b>
<b>Collateral From Securities Lending</b>	<b>395,758</b>	<b>5.67</b>
<b>Total Investments</b>	<b>\$ 6,975,373</b>	<b>100.00 %</b>

**Qualified Pension Plan and Tax Deferred Annuity Program**  
**Schedule of Investment Returns (Fixed) | Annualized Investment Results (Unaudited)**  
**Fiscal Year Ended June 30, 2018**

	3 Mos Apr-18 Jun-18 %	6 Mos Jan-18 Jun-18 %	1 Yr Jul-17 Jun-18 %	3 Yrs Jul-15 Jun-18 %	5 Yrs Jul-12 Jun-17 %	10 Yrs Jul-07 Jun-17 %
<b>Domestic Equity</b>	4.61	4.15	15.84	11.77	13.51	10.34
Russell 3000 Index	3.89	3.22	14.78	11.58	13.29	10.23
<b>International Equity</b>	-0.57	1.01	16.53	9.56	9.78	6.04
MSCI ACWI Ex US IMI Net	-0.77	-2.57	7.56	5.14	6.58	2.91
<b>Active Emerging Markets</b>	-10.66	-8.36	6.03	6.03	6.78	2.07
MSCI Emerging Markets	-7.96	-6.66	8.20	5.60	5.01	2.26
<b>Private Equity</b>	3.42	8.80	19.00	14.45	17.20	10.78
Russell 3K + 300bps	0.09	7.21	17.19	13.51	16.21	13.73
<b>Private Equity Real Estate and Infrastructure</b>						
<b>Real Estate</b>	2.32	6.43	13.28	13.32	12.61	-
NCREIF NFI-ODCE NET + 100 BP	2.06	4.33	8.54	9.45	11.12	-
<b>Infrastructure</b>	2.26	7.11	19.95	15.06	-	-
CPI + 4%	1.55	3.19	6.91	5.90	-	-
<b>Total Fixed Income</b>	0.26	-0.94	0.86	2.79	3.34	5.27
<b>Fixed Income - Structured</b>	-0.11	-1.91	-0.50	2.15	2.91	4.67
NYC- CORE PLUS Five	-0.28	-2.08	-0.48	2.10	2.77	4.38
<b>Short-term Investments</b>	0.46	0.82	1.42	0.87	0.76	0.89
<b>Total Portfolio</b>	0.81	1.38	10.37	8.43	9.66	7.68
BERS's Policy Benchmark	0.92	0.70	8.63	7.46	8.72	7.18

Yield data were obtained from the NYCBERS Performance Overview as of June 30, 2018.

These returns are calculated using a time weighted rate of return based on the market value of the portfolio, for time periods greater than one year the returns are annualized.



**Qualified Pension Plan and Tax Deferred Annuity Program  
List of 50 Largest Equity Holdings (Fixed)  
Fiscal Year Ended June 30, 2018**

NAME OF EQUITY HOLDINGS	COST	FAIR VALUE
1 APPLE INC	\$ 55,175,708	\$ 58,665,802
2 MICROSOFT CORP	44,964,786	48,147,417
3 AMAZON.COM INC	39,569,627	44,475,267
4 FACEBOOK INC A	26,484,632	29,729,017
5 BERKSHIRE HATHAWAY INC CL B	25,304,651	23,245,764
6 JPMORGAN CHASE & CO	24,547,625	22,718,101
7 EXXON MOBIL CORP	20,167,460	22,545,828
8 ALPHABET INC CL C	21,473,722	21,858,930
9 ALPHABET INC CL A	21,171,980	21,762,879
10 JOHNSON & JOHNSON	22,455,898	20,961,121
11 BANK OF AMERICA CORP	18,938,875	17,150,824
12 WELLS FARGO & CO	15,520,338	15,687,136
13 CHEVRON CORP	14,032,705	15,499,307
14 VISA INC CLASS A SHARES	13,977,788	15,232,280
15 UNITEDHEALTH GROUP INC	13,822,302	15,084,730
16 AT&T INC	16,717,222	15,013,865
17 INTEL CORP	15,082,921	14,924,036
18 HOME DEPOT INC	13,057,459	14,460,422
19 PFIZER INC	13,452,379	13,542,344
20 VERIZON COMMUNICATIONS INC	12,735,143	13,391,516
21 CISCO SYSTEMS INC	13,594,129	13,350,402
22 PROCTER & GAMBLE CO/THE	12,669,472	12,649,935
23 BOEING CO/THE	11,556,714	11,862,292
24 MASTERCARD INC	10,515,048	11,636,342
25 CITIGROUP INC	11,729,173	10,990,071
26 COCA COLA CO	10,672,336	10,814,209
27 MERCK & CO. INC.	9,457,870	10,518,339
28 NETFLIX INC	8,287,533	10,516,941
29 WALT DISNEY CO	9,761,902	10,068,573
30 ISHARES RUSSELL 1000 ETF	10,075,805	10,020,953
31 PEPSICO INC	10,062,285	9,944,839
32 DOWDUPONT INC	9,849,940	9,860,973
33 COMCAST CORP CLASS A	10,322,777	9,656,639
34 ABBVIE INC	10,851,014	9,477,169
35 NVIDIA CORP	8,961,096	8,861,481
36 INTL BUSINESS MACHINES CORP	9,147,980	8,250,403
37 ORACLE CORP	9,181,836	8,144,711
38 PHILIP MORRIS INTERNATIONAL	10,208,833	8,069,882
39 MCDONALD S CORP	8,094,973	7,926,164
40 WALMART INC	7,994,382	7,886,138
41 AMGEN INC	7,732,481	7,864,088
42 ADOBE SYSTEMS INC	6,883,416	7,732,922
43 GENERAL ELECTRIC CO	7,720,006	7,554,339
44 MEDTRONIC PLC	7,012,099	7,466,219
45 3M CO	8,438,139	7,305,000
46 UNION PACIFIC CORP	6,708,570	7,030,587
47 TEXAS INSTRUMENTS INC	6,704,874	6,948,396
48 ALTRIA GROUP INC	7,615,605	6,924,802
49 HONEYWELL INTERNATIONAL INC	7,111,558	6,920,594
50 ACCENTURE PLC CL A	6,496,205	6,758,230

NOTE: Full listing of holdings can be obtained at  
NYC Board of Education Retirement System  
65 Court Street, 16<sup>th</sup> Floor, Brooklyn, NY 11201

**Qualified Pension Plan and Tax Deferred Annuity Program**  
**List of 50 Largest Bond Holdings (Fixed)**  
**Fiscal Year Ended June 30, 2018**

<b>NAME OF BOND HOLDINGS</b>	<b>PAR VALUE</b>	<b>FAIR VALUE</b>
1 US TREASURY N/B 02/27 2.25	\$ 41,250,000	\$ 39,363,225
2 US TREASURY N/B 05/24 2.5	39,860,800	39,234,985
3 US TREASURY N/B 05/24 2	32,250,000	30,866,798
4 US TREASURY N/B 02/39 3.5	16,000,000	17,431,200
5 US TREASURY N/B 08/23 2.5	16,000,000	15,811,840
6 US TREASURY N/B 08/44 3.125	15,000,000	15,402,600
7 US TREASURY N/B 05/47 3	15,000,000	15,043,950
8 GNMA II TBA 30 YR 4 JUMBOS	14,102,000	14,453,422
9 US TREASURY N/B 02/45 2.5	15,545,000	14,173,309
10 US TREASURY N/B 08/24 2.375	14,005,000	13,671,821
11 US TREASURY N/B 05/46 2.5	14,250,000	12,948,548
12 US TREASURY N/B 05/25 2.875	12,000,000	12,045,960
13 US TREASURY N/B 05/44 3.375	10,000,000	10,716,800
14 US TREASURY N/B 08/46 2.25	12,000,000	10,335,000
15 US TREASURY N/B 02/28 2.75	10,000,000	9,914,500
16 US TREASURY N/B 10/19 1.5	9,750,000	9,628,905
17 US TREASURY N/B 02/25 2	10,000,000	9,510,600
18 GNMA II TBA 30 YR 3.5 JUMBOS	9,369,100	9,405,171
19 US TREASURY N/B 05/27 2.375	9,400,000	9,052,294
20 US TREASURY N/B 02/20 1.375	9,000,000	8,833,680
21 US TREASURY N/B 04/20 2.375	8,500,000	8,478,070
22 US TREASURY N/B 05/20 1.5	8,500,000	8,335,950
23 US TREASURY N/B 03/20 1.375	8,500,000	8,334,675
24 US TREASURY N/B 04/20 1.375	8,250,000	8,081,123
25 US TREASURY N/B 11/47 2.75	8,375,000	7,991,593
26 US TREASURY N/B 03/21 1.25	8,250,000	7,954,155
27 US TREASURY N/B 01/20 1.25	8,000,000	7,846,880
28 US TREASURY N/B 12/20 1.75	8,000,000	7,837,840
29 US TREASURY N/B 02/20 3.625	7,600,000	7,734,216
30 US TREASURY N/B 05/42 3	7,500,000	7,545,675
31 US TREASURY N/B 02/21 3.625	7,250,000	7,434,948
32 FNMA TBA 30 YR 3.5 SINGLE FAMILY MORTGAGE	7,318,868	7,284,469
33 US TREASURY N/B 05/20 2.5	7,250,000	7,246,593
34 US TREASURY N/B 04/21 2.375	7,250,000	7,203,528
35 FHLMC TBA 30 YR 3 GOLD SINGLE FAMILY	7,378,000	7,140,945
36 US TREASURY N/B 09/19 0.875	7,250,000	7,116,890
37 US TREASURY N/B 05/20 1.375	7,250,000	7,093,400
38 US TREASURY N/B 11/20 2.625	7,000,000	7,006,860
39 US TREASURY N/B 05/21 2.625	7,000,000	7,000,560
40 US TREASURY N/B 09/19 1.375	7,000,000	6,908,930
41 US TREASURY N/B 12/19 1.375	7,000,000	6,890,380
42 US TREASURY N/B 01/20 1.375	7,000,000	6,882,120
43 US TREASURY N/B 02/20 1.375	7,000,000	6,875,050
44 US TREASURY N/B 10/19 1	7,000,000	6,872,320
45 US TREASURY N/B 11/19 1	7,000,000	6,862,450
46 US TREASURY N/B 05/21 3.125	6,750,000	6,843,083
47 GNMA II POOL MA3521 G2 03/46 FIXED 3.5	6,793,629	6,834,798
48 US TREASURY N/B 05/25 2.125	7,140,000	6,832,337
49 US TREASURY N/B 11/19 3.375	6,750,000	6,831,203
50 US TREASURY N/B 04/20 1.125	7,000,000	6,825,840

NOTE: Full listing of holdings can be obtained at  
 NYC Board of Education Retirement System  
 65 Court Street, 16<sup>th</sup> Floor, Brooklyn, NY 11201

**Qualified Pension Plan and Tax Deferred Annuity Program  
List of 50 Largest International Equity Holdings (Fixed)  
Fiscal Year Ended June 30, 2018**

<b>NAME OF INT'L EQUITY HOLDINGS</b>	<b>COST</b>	<b>FAIR VALUE</b>
1 TENCENT HOLDINGS LTD	\$ 15,305,424	\$ 29,279,377
2 SAMSUNG ELECTRONICS CO LTD	12,314,040	24,979,344
3 ALIBABA GROUP HOLDING SP ADR	9,858,551	18,201,057
4 AIA GROUP LTD	10,581,263	18,022,747
5 ASML HOLDING NV	7,910,753	16,733,697
6 FERRARI NV	4,403,899	16,647,180
7 KERING	4,311,037	12,704,026
8 BAIDU INC SPON ADR	6,900,577	12,678,533
9 CHINA CONSTRUCTION BANK (HK)	10,569,602	12,339,934
10 SOFTBANK GROUP CORP	9,502,406	11,970,498
11 INDUSTRIA DE DISENO TEXTIL	6,951,752	11,272,075
12 CIE FINANCIERE RICHEMONT REG	7,555,628	10,860,733
13 ZALANDO SE	5,971,819	10,607,578
14 M3 INC	4,970,627	10,166,757
15 IND & COMM BK OF CHINA (HK)	8,187,892	9,912,849
16 FIAT CHRYSLER AUTOMOBILES NV	2,264,643	9,861,203
17 TOTAL SA	7,438,682	9,440,963
18 SK HYNIX INC	4,651,841	9,142,413
19 ROYAL DUTCH SHELL PLC B SHS	7,341,490	8,568,819
20 SWATCH GROUP AG/THE BR	6,715,273	8,522,650
21 L'OREAL	4,750,076	8,496,936
22 UNITED OVERSEAS BANK LTD	6,746,788	8,308,484
23 ROLLS ROYCE HOLDINGS PLC	7,539,375	8,215,644
24 BANK OF CHINA LTD (HK)	7,326,779	7,968,080
25 TAL EDUCATION GROUP ADR	4,132,423	7,502,548
26 AMBU A/S B	2,237,447	6,947,218
27 NOVARTIS AG REG	5,721,457	6,858,668
28 HSBC HOLDINGS PLC	7,560,542	6,808,708
29 BASF SE	6,716,413	6,786,186
30 ANGLO AMERICAN PLC	4,947,163	6,561,367
31 SBERBANK PJSC SPONSORED ADR	4,777,183	6,244,731
32 TESCO PLC	8,328,862	6,230,563
33 AIR LIQUIDE SA	4,585,805	6,196,188
34 SPOTIFY TECHNOLOGY SA	5,807,723	6,161,118
35 BANCO SANTANDER SA	8,493,439	6,096,493
36 SAMSUNG ELECTR GDR	3,067,257	6,031,534
37 CRH PLC	3,588,375	6,017,084
38 TRAVIS PERKINS PLC	6,584,177	5,990,415
39 BHP BILLITON PLC	5,286,837	5,928,136
40 KINNEVIK AB B	6,258,880	5,787,899
41 SVENSKA HANDELSBANKEN A SHS	5,967,555	5,668,573
42 PTT PCL/FOREIGN	3,907,630	5,642,462
43 SMC CORP	2,660,598	5,625,288
44 DENSO CORP	4,384,211	5,621,434
45 BAYERISCHE MOTOREN WERKE AG	4,792,012	5,589,797
46 LAFARGEHOLCIM LTD REG	6,876,632	5,526,502
47 LLOYDS BANKING GROUP PLC	6,817,672	5,517,780
48 DIAGEO PLC	4,237,355	5,502,359
49 FIRSTRAND LTD	3,727,985	5,482,345
50 WIX.COM LTD	3,499,089	5,427,249

NOTE: Full listing of holdings can be obtained at  
NYC Board of Education Retirement System  
65 Court Street, 16<sup>th</sup> Floor, Brooklyn, NY 11201

**Qualified Pension Plan and Tax Deferred Annuity Program**  
**List of 50 Largest Europe Australasia Far East Investment Holdings (Fixed)**  
**Fiscal Year Ended June 30, 2018**

<b>NAME OF EUROPE AUSTRALASIA FAR EAST INVESTMENT HOLDINGS</b>	<b>COST</b>	<b>FAIR VALUE</b>
1 TENCENT HOLDINGS LTD	\$ 15,305,424	\$ 29,279,377
2 AIA GROUP LTD	10,581,263	18,022,747
3 ASML HOLDING NV	7,910,753	16,733,697
4 FERRARI NV	4,403,899	16,647,180
5 KERING	4,311,037	12,704,026
6 CHINA CONSTRUCTION BANK (HK)	10,569,602	12,339,934
7 SOFTBANK GROUP CORP	9,502,406	11,970,498
8 INDUSTRIA DE DISENO TEXTIL	6,951,752	11,272,075
9 CIE FINANCIERE RICHEMONT REG	7,555,628	10,860,733
10 ZALANDO SE	5,971,819	10,607,578
11 M3 INC	4,970,627	10,166,757
12 IND & COMM BK OF CHINA (HK)	8,187,892	9,912,849
13 FIAT CHRYSLER AUTOMOBILES NV	2,264,643	9,861,203
14 TOTAL SA	7,438,682	9,440,963
15 ROYAL DUTCH SHELL PLC B SHS	7,341,490	8,568,819
16 SWATCH GROUP AG/THE BR	6,715,273	8,522,650
17 L'OREAL	4,750,076	8,496,936
18 UNITED OVERSEAS BANK LTD	6,746,788	8,308,484
19 ROLLS ROYCE HOLDINGS PLC	7,539,375	8,215,644
20 BANK OF CHINA LTD (HK)	7,326,779	7,968,080
21 AMBU A/S B	2,237,447	6,947,218
22 NOVARTIS AG REG	5,721,457	6,858,668
23 HSBC HOLDINGS PLC	7,560,542	6,808,708
24 BASF SE	6,716,413	6,786,186
25 ANGLO AMERICAN PLC	4,947,163	6,561,367
26 SBERBANK PJSC SPONSORED ADR	4,777,183	6,244,731
27 TESCO PLC	8,328,862	6,230,563
28 AIR LIQUIDE SA	4,585,805	6,196,188
29 BANCO SANTANDER SA	8,493,439	6,096,493
30 CRH PLC	3,588,375	6,017,084
31 TRAVIS PERKINS PLC	6,584,177	5,990,415
32 BHP BILLITON PLC	5,286,837	5,928,136
33 KINNEVIK AB B	6,258,880	5,787,899
34 SVENSKA HANDELSBANKEN A SHS	5,967,555	5,668,573
35 SMC CORP	2,660,598	5,625,288
36 DENSO CORP	4,384,211	5,621,434
37 BAYERISCHE MOTOREN WERKE AG	4,792,012	5,589,797
38 LAFARGEHOLCIM LTD REG	6,876,632	5,526,502
39 LLOYDS BANKING GROUP PLC	6,817,672	5,517,780
40 DIAGEO PLC	4,237,355	5,502,359
41 HONDA MOTOR CO LTD	6,118,094	5,321,227
42 BOSKALIS WESTMINSTER	6,790,038	5,300,735
43 TGS NOPEC GEOPHYSICAL CO ASA	3,991,335	5,239,249
44 JARDINE MATHESON HLDGS LTD	5,105,190	5,224,648
45 CHINA MOBILE LTD	6,037,596	5,177,023
46 ATLAS COPCO AB A SHS	2,839,535	5,136,028
47 SYSMEX CORP	3,671,155	5,129,434
48 YARA INTERNATIONAL ASA	4,950,823	5,117,817
49 NIDEC CORP	3,615,437	5,043,918
50 UMICORE	3,870,901	4,997,888

NOTE: Full listing of holdings can be obtained at  
 NYC Board of Education Retirement System  
 65 Court Street, 16<sup>th</sup> Floor, Brooklyn, NY 11201

**Qualified Pension Plan and Tax Deferred Annuity Program**  
**List of 50 Largest Emerging Market Investment Holdings (Fixed)**  
**Fiscal Year Ended June 30, 2018**

NAME OF EMERGING MARKET INVESTMENT HOLDINGS	COST	FAIR VALUE
1 SAMSUNG ELECTRONICS CO LTD	\$ 12,314,040	\$ 24,979,344
2 SK HYNIX INC	4,651,841	9,142,413
3 PTT PCL/FOREIGN	3,907,630	5,642,462
4 FIRSTRAND LTD	3,727,985	5,482,345
5 HON HAI PRECISION INDUSTRY	4,079,462	5,012,373
6 TENAGA NASIONAL BHD	3,359,949	5,012,357
7 GAIL INDIA LTD	3,316,235	4,828,908
8 LG ELECTRONICS INC	3,598,917	4,806,628
9 SASOL LTD	4,707,171	4,603,614
10 HINDALCO INDUSTRIES LTD	2,806,042	4,567,087
11 TAIWAN SEMICONDUCTOR MANUFACTURING CO., Ltd	2,511,873	4,514,548
12 TELEKOMUNIKASI INDONESIA PER	4,257,289	4,343,729
13 POSCO	3,300,126	3,972,184
14 NASPERS LTD N SHS	2,306,424	3,912,969
15 FUBON FINANCIAL HOLDING CO	2,113,804	3,653,325
16 PUBLIC BANK BERHAD	2,997,200	3,585,235
17 STATE BANK OF INDIA	2,877,990	3,518,092
18 POLSKI KONCERN NAFTOWY ORLEN	2,179,589	3,341,732
19 TURK HAVA YOLLARI AO	2,761,304	2,960,506
20 STANDARD BANK GROUP LTD	2,419,067	2,875,076
21 TIGER BRANDS LTD	3,077,158	2,850,816
22 HINDUSTAN PETROLEUM CORP	1,964,326	2,839,608
23 INDIAN OIL CORP LTD	2,045,103	2,796,221
24 BRASKEM SA	1,580,889	2,634,884
25 INFOSYS LTD	2,328,412	2,585,961
26 SK INNOVATION CO LTD	1,615,194	2,541,996
27 VALE SA	2,714,025	2,541,496
28 MAGAZINE LUIZA SA	606,368	2,478,860
29 PTT GLOBAL CHEMICAL	2,437,344	2,468,276
30 UNITED MICROELECTRONICS CORP	1,790,042	2,415,249
31 KIA MOTORS CORP	3,518,460	2,349,469
32 BANK NEGARA INDONESIA PERSER	2,072,563	2,301,738
33 AU OPTRONICS CORP	2,009,312	2,146,983
34 PEGATRON CORP	1,803,177	2,144,061
35 HCL TECHNOLOGIES LTD	1,408,681	2,126,494
36 THANACHART CAPITAL FOREIGN	1,569,006	2,016,743
37 UNITED TRACTORS TBK PT	1,695,971	1,989,303
38 INNOLUX CORP	2,804,130	1,930,793
39 WOORI BANK	1,398,968	1,878,506
40 LOTTE CHEMICAL CORP	1,418,154	1,875,984
41 LG UPLUS CORP	1,786,750	1,871,273
42 KOC HOLDING AS	2,663,250	1,857,911
43 TATA CONSULTANCY SVCS LTD	1,510,850	1,846,289
44 SUZANO PAPEL E CELULOSE SA	890,746	1,796,494
45 KRUNG THAI BANK PUB CO-FOREI	1,571,143	1,721,230
46 HANWHA CORPORATION	2,159,784	1,711,314
47 EREGLI DEMIR VE CELIK FABRIK	1,721,635	1,699,790
48 HDFC BANK LIMITED FOREIGN	1,615,879	1,631,645
49 CD PROJEKT SA	549,250	1,591,973
50 TURKIYE GARANTI BANKASI	2,246,409	1,583,670

NOTE: Full listing of holdings can be obtained at  
 NYC Board of Education Retirement System  
 65 Court Street, 16<sup>th</sup> Floor, Brooklyn, NY 11201



**Qualified Pension Plan and Tax Deferred Annuity Program  
List of Largest Treasury Inflation Protected Securities Holdings  
Fiscal Year Ended June 30, 2018**

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<b>NAME OF TREASURY INFLATION PROTECTED SECURITIES HOLDINGS</b>	<b>COST</b>	<b>FAIR VALUE</b>
1 TIPS STATE STREET	\$ 289,807,003	\$ 283,241,347

NOTE: Full listing of holdings can be obtained at  
NYC Board of Education Retirement System  
65 Court Street, 16<sup>th</sup> Floor, Brooklyn, NY 11201

**Qualified Pension Plan and Tax Deferred Annuity Program**  
**List of 50 Largest Economically Targeted Investment Holdings (Fixed)**  
**Fiscal Year Ended June 30, 2018**

NAME OF ECONOMICALLY TARGETED INVESTMENTS	COST	FAIR VALUE
1 AFL CIO HOUSING INV TRUST	\$ 16,330,877	\$ 15,857,450
2 JPM CHASE- PPAR	562,712	594,290
3 THE COMMUNITY PRESERVATION GROUP	398,581	408,865
4 FED HM LN PC POOL V83308	408,584	392,382
5 JPM CHASE- PPAR	368,132	345,373
6 BOA BANK OF AMERICA PPAR	331,271	342,951
7 FED HM LN PC POOL V83296	343,088	329,934
8 LIIF LOW INCOME INVESTMENT FUND	279,827	290,552
9 JPM CHASE- PPAR	279,270	277,046
10 CCD CITIBANK NA PPAR	255,862	253,125
11 BOA BANK OF AMERICA PPAR	268,334	249,835
12 BOA BANK OF AMERICA PPAR	248,974	231,754
13 FNMA POOL AU1707	227,437	225,080
14 THE COMMUNITY PRESERVATION GROUP	213,124	222,565
15 FED HM LN PC POOL V83439	224,654	214,681
16 FNMA POOL AW0982	211,932	206,988
17 LIIF LOW INCOME INVESTMENT FUND	227,136	206,497
18 CCD CITIBANK NA PPAR	208,348	204,691
19 JPM CHASE- PPAR	192,268	204,533
20 FNMA POOL 466026	206,993	196,455
21 JPM CHASE- PPAR	203,392	190,209
22 FNMA POOL AU7004	182,481	176,979
23 JPM CHASE- PPAR	164,545	170,418
24 FNMA POOL BD7053	170,349	165,897
25 LIIF LOW INCOME INVESTMENT FUND	171,354	162,566
26 COMMUNITY PRESERVATION CORP. C	164,935	156,282
27 JPM CHASE- PPAR	160,903	155,461
28 FNMA POOL AV0680	158,740	155,460
29 FNMA POOL AW3604	160,142	154,125
30 FNMA POOL BD5029	159,751	153,957
31 FED HM LN PC POOL V83640	159,266	153,376
32 FNMA POOL AU6719	156,375	153,120
33 FNMA POOL BJ0093	151,159	144,700
34 GOVERNMENT NATIONAL MORTGAGE ASSOCIATION	149,097	144,442
35 FED HM LN PC POOL V83639	144,827	139,495
36 FNMA POOL AB7800	147,256	138,847
37 FNMA POOL BJ0087	143,045	136,941
38 FNMA POOL BH5749	141,993	136,325
39 FNMA POOL BJ3831	137,582	132,950
40 FED HM LN PC POOL V83562	136,355	131,543
41 FNMA POOL AW6468	135,523	131,493
42 FNMA POOL AV7745	133,840	131,423
43 FED HM LN PC POOL V83779	134,979	130,044
44 FED HM LN PC POOL V83778	134,223	128,989
45 FNMA POOL BC4728	138,445	128,879
46 FNMA POOL BJ5487	127,185	127,497
47 JPM CHASE- PPAR	123,472	123,740
48 FED HM LN PC POOL V83561	126,532	122,299
49 GOVERNMENT NATIONAL MORTGAGE ASSOCIATION	126,515	122,263
50 CCD CITIBANK NA PPAR	112,224	121,256

NOTE: Full listing of holdings can be obtained at  
 NYC Board of Education Retirement System  
 65 Court Street, 16<sup>th</sup> Floor, Brooklyn, NY 11201

**Qualified Pension Plan and Tax Deferred Annuity Program**  
**List of 50 Largest Domestic Equity Holdings (“Variable A” Program)**  
**Fiscal Year Ended June 30, 2018**

<b>NAME OF DOMESTIC EQUITY HOLDINGS “VARIABLE A” PROGRAM</b>	<b>COST</b>	<b>FAIR VALUE</b>
1 APPLE INC	\$ 3,432,967	\$ 11,100,228
2 MICROSOFT CORP	4,304,288	9,613,834
3 ALPHABET INC	3,899,866	8,720,317
4 BLACKROCK GLOBAL ALLOCATION FUND INC	8,770,466	8,498,167
5 AMAZON.COM INC	1,954,668	8,202,212
6 FPA CRESCENT FUND	7,068,369	7,667,697
7 FACEBOOK INC	2,547,535	6,080,043
8 BERKSHIRE HATHAWAY INC	3,281,492	4,958,569
9 UNITEDHEALTH GROUP INC	1,651,096	4,585,690
10 JPMORGAN CHASE & CO	2,582,785	4,468,056
11 EXXON MOBIL CORP	4,073,110	4,262,015
12 JOHNSON & JOHNSON	2,848,686	4,008,440
13 BANK OF AMERICA CORP	3,900,296	3,613,066
14 PFIZER INC	2,560,447	3,266,327
15 COMCAST CORP	2,384,512	3,219,297
16 INTEL CORP	1,589,065	2,961,713
17 CITIGROUP INC	3,637,033	2,933,575
18 AT&T INC	2,854,894	2,927,752
19 CHEVRON CORP	2,050,224	2,901,430
20 WELLS FARGO & CO	2,726,390	2,892,969
21 VISA INC	949,774	2,819,111
22 AMGEN INC	1,812,938	2,802,478
23 MERCK & CO INC	2,309,334	2,795,830
24 PROCTER & GAMBLE CO/THE	2,553,490	2,715,070
25 HOME DEPOT INC/THE	1,052,718	2,679,650
26 VERIZON COMMUNICATIONS INC	2,171,676	2,570,077
27 CISCO SYSTEMS INC	1,625,588	2,474,719
28 PEPSICO INC	1,780,953	2,362,356
29 THERMO FISHER SCIENTIFIC INC	1,273,239	2,256,061
30 MASTERCARD INC	672,311	2,242,936
31 BOEING CO/THE	773,369	2,210,798
32 COCA-COLA CO/THE	1,578,286	2,125,623
33 BROADCOM INC	1,028,034	2,101,083
34 WALT DISNEY CO/THE	1,260,288	2,087,764
35 GMO INTERNATIONAL EQUITY FUND	2,038,282	2,063,926
36 BIOGEN INC	1,626,435	2,057,134
37 WALMART INC	1,454,676	1,950,595
38 NETFLIX INC	317,797	1,927,644
39 MEDTRONIC PLC	1,242,892	1,894,922
40 ORACLE CORP	1,263,866	1,818,770
41 DOWDUPONT INC	1,241,950	1,817,450
42 PHILIP MORRIS INTERNATIONAL INC	1,542,359	1,778,934
43 ABBVIE INC	764,944	1,744,454
44 ABBOTT LABORATORIES	875,632	1,657,590
45 NVIDIA CORP	469,694	1,634,037
46 MCDONALD’S CORP	814,600	1,570,371
47 INTERNATIONAL BUSINESS MACHINES CORP	1,352,294	1,521,946
48 GMO CORE PLUS BOND FUND	1,505,493	1,454,159
49 ADOBE SYSTEMS INC	416,566	1,449,442
50 ALTRIA GROUP INC	996,551	1,433,457

NOTE: Full listing of holdings can be obtained at  
 NYC Board of Education Retirement System  
 65 Court Street, 16<sup>th</sup> Floor, Brooklyn, NY 11201

**Qualified Pension Plan and Tax Deferred Annuity Program  
Schedule of Investment Management Fees (Fixed)  
Fiscal Year Ended June 30, 2018**

<b>FUND MANAGER</b>	<b>CATEGORY</b>	<b>ASSETS UNDER MANAGEMENT (in \$)</b>	<b>MANAGEMENT FEES (in \$)</b>
AMERICAN SECURITIES PARTNERS VII	ALTERNATIVE	5,052,592	28,241.00
APAX PARTNERS IX	ALTERNATIVE	6,030,966	21,290.16
APOLLO INVESTMENT FUND VIII	ALTERNATIVE	17,641,471	76,699.23
ASF VII	ALTERNATIVE	3,529,990	(54,384.00)
ACOF V	ALTERNATIVE	3,102,375	139,307.52
BC PARTNERS	ALTERNATIVE	2,560,514	118,351.28
BRIDGEPOINT EUROPE V	ALTERNATIVE	6,183,678	99,936.94
CAPITAL PARTNERS III	ALTERNATIVE	216,513	20,876.29
CENTERBRIDGE CAPITAL LP	ALTERNATIVE	1,350,755	31,919.00
CRESTVIEW PTNR III	ALTERNATIVE	6,088,984	230,197.00
CVC CAPITAL PTNRS VI	ALTERNATIVE	15,182,310	232,547.37
EQT PARTNERS VII AB	ALTERNATIVE	12,151,990	264,415.48
FTV CAPITAL V	ALTERNATIVE	1,184,371	62,650.00
ICV PARTNERS IV	ALTERNATIVE	189,081	57,396.00
GREEN EQUITY INVESTORS VII	ALTERNATIVE	3,566,432	20,844.16
LEXINGTON CAP VIII	ALTERNATIVE	11,361,886	138,667.00
MESIROW FINANCIAL PR EQ V	ALTERNATIVE	37,979,578	192,908.00
MILL CITY CAPITAL II	ALTERNATIVE	711,754	11,008.26
NEW MAINSTREAM CAPITAL II	ALTERNATIVE	1,091,541	6,472.66
NMS CAPITAL II	ALTERNATIVE	227,745	12,124.00
PATRIOT FINANCIAL PARTNERS III	ALTERNATIVE	260,050	(781.25)
PLATINUM IV	ALTERNATIVE	5,593,988	5,078.00
SIRIS PARTNERS III	ALTERNATIVE	2,680,919	25,080.00
STELLEX CAPITAL MANAGEMENT LP	ALTERNATIVE	1,634,644	34,895.00
RAINE PARTNERS II	ALTERNATIVE	1,987,330	90,000.00
VALOR EQUITY III	ALTERNATIVE	3,801,561	44,985.00
VALOR IV	ALTERNATIVE	1,461,168	76,089.00
VISTA EQUITY V	ALTERNATIVE	32,643,899	364,448.00
VISTA VI	ALTERNATIVE	12,683,139	214,342.00
WARBURG PINCUS	ALTERNATIVE	1,315,125	53,977.00
WARBURG PINCUS XII	ALTERNATIVE	12,505,431	75,250.00
WARBURG PINCUS XI	ALTERNATIVE	23,047,866	53,867.00
WEBSTER CAPITAL MANAGEMENT, LLC	ALTERNATIVE	2,419,937	30,735.33
WELSH CARSON ANDERSON & STOWE XII	ALTERNATIVE	6,550,229	178,212.69
ACTIS ENERGY IV	ALTERNATIVE-REAL ASSET	3,017,001	74,810.00
ARDIAN	ALTERNATIVE-REAL ASSET	604,694	134,466.00
BROOKFIELD ASSET MANAGEMENT	ALTERNATIVE-REAL ASSET	2,358,547	98,500.00
EQT VII, LP	ALTERNATIVE-REAL ASSET	4,001,055	245,583.54
FIRST RESERVE ENERGY INF GP	ALTERNATIVE-REAL ASSET	8,211,510	117,081.00
GLOBAL INFRASTRUCTURE MGMT LLC	ALTERNATIVE-REAL ASSET	6,129,791	33,095.00
BROOKFIELD STRA RE PTNRS	ALTERNATIVE-REAL ESTATE	10,595,776	45,956.87

**Qualified Pension Plan and Tax Deferred Annuity Program  
Schedule of Investment Management Fees (Fixed)  
Fiscal Year Ended June 30, 2018 (Cont'd)**

<b>FUND MANAGER</b>	<b>CATEGORY</b>	<b>ASSETS UNDER MANAGEMENT (in \$)</b>	<b>MANAGEMENT FEES (in \$)</b>
CARLYLE REALTY VII	ALTERNATIVE-REAL ESTATE	16,796,158	177,592.00
DIVCO FUND V ADVISOR, LLC	ALTERNATIVE-REAL ESTATE	3,595,723	143,370.00
FRANKLIN TEMPLETON FD	ALTERNATIVE-REAL ESTATE	7,681,613	59,830.03
UBS TRUMBULL PROPERTY FD	ALTERNATIVE-REAL ESTATE	80,587,085	389,732.75
LEGATO CAPITAL MANAGEMENT LLC	EQUITY	11,530,975	54,662.62
BLACKROCK INSTITUTIONAL TRUST	EQUITY	1,124,791,663	7,027.76
SSGA	EQUITY	391,140,396	51,264.12
WELLINGTON MANAGEMENT COMPANY	EQUITY	159,349,426	442,046.64
BLACKROCK MORTGAGES	FIXED INCOME	196,243,360	79,447.44
LOOMIS, SAYLES & COMPANY, LP	FIXED INCOME	7,052,375	403,458.01
PRUDENTIAL	FIXED INCOME	114,917,425	106,021.36
SHENKMAN CAPITAL MANAGEMENT	FIXED INCOME	133,854,727	475,561.16
STATE STREET	FIXED INCOME	364,966,171	146,224.37
SSGA 1-3 TREASURY INDEX	FIXED INCOME	498,690,390	18,308.69
TAPLIN CANIDA & HABACHT	FIXED INCOME	92,330,130	109,127.31
ACADIA MTA	INTERNATIONAL EQUITY	107,975,284	383,301.79
ACADIAN MTA EM	INTERNATIONAL EQUITY	314,316,881	1,135,470.24
ALGERT GLOBAL	INTERNATIONAL EQUITY	3,086,491	11,098.67
ATIVO CAPITAL MANAGEMENT	INTERNATIONAL EQUITY	8,697,240	29,970.98
AUBREY CAPITAL MANAGEMENT	INTERNATIONAL EQUITY	5,659,324	19,641.25
BAILLIE GIFFORD MTA	INTERNATIONAL EQUITY	314,730,577	869,565.53
CHANGE GLOBAL INVESTMENTS	INTERNATIONAL EQUITY	7,956,465	30,451.08
DENALI ADVISORS	INTERNATIONAL EQUITY	10,384,256	37,287.50
DUNDAS GLOBAL INVESTORS	INTERNATIONAL EQUITY	10,914,467	36,750.06
METIS GLOBAL PARTNERS	INTERNATIONAL EQUITY	5,921,472	21,156.60
MORGAN STANLEY	INTERNATIONAL EQUITY	49,827,224	30,307.05
OSMOSIS INVESTMENT MANAGEMENT	INTERNATIONAL EQUITY	8,547,409	29,431.63
SPRUCEGROVE MTA	INTERNATIONAL EQUITY	319,546,204	696,216.72
BR R1000 GROWTH MTA	MUTUAL FUND EQUITY	774,379	25,195.26
BR R1000 VALUE MTA	MUTUAL FUND EQUITY	1,293,289	24,183.66
BR R2000 GROWTH MTA	MUTUAL FUND EQUITY	75,905,603	3,459.39
BR R2000 VALUE MTA	MUTUAL FUND EQUITY	74,399,119	2,938.86
BARINGS LLC	MUTUAL FUND FIXED INCOME	119,491,358	388,197.74
CONY GT EM BLACKROCK	MUTUAL FUND FIXED INCOME	137,062,415	63,899.59
SSGA MTA	MUTUAL FUND FIXED INCOME	283,241,347	13,019.01
ACS/RBC	MUTUAL FUND MORTGAGE	9,802,434	16,589.56
AFL-CIO HSG INV TRUST	MUTUAL FUND MORTGAGE	15,857,450	64,510.23



**Qualified Pension Plan and Tax Deferred Annuity Program  
Schedule of Payments of Commissions to Brokers (Fixed)  
Fiscal Year Ended June 30, 2018**

<b>INDIVIDUAL OR BROKERAGE FIRM</b>	<b># OF SHARES</b>	<b>COMMISSION PAID (in \$)</b>	<b>COMMISSION PER SHARE (in \$)</b>
ABEL NOSER CORP	7,675	383.75	0.050
ALLEN & COMPANY LLC	4,100	82.00	0.020
ARQAAM CAPITAL LIMITED	101	3.69	0.037
BANCO ITAU SA	48,510	909.35	0.019
BANCO SANTANDER (BRASIL) S.A.	53,200	1,174.92	0.022
BANK J.VONTOBEL UND CO. AG	19,883	1,115.42	0.056
BANK OF AMERICA MERRILL LYNCH SECUR INC	5,930	112.73	0.019
BANKHAUS HERMANN LAMPE	21,707	551.17	0.025
BARCLAYS CAPITAL	143,977	1,079.36	0.007
BARCLAYS CAPITAL INC./LE	200,955	2,171.41	0.011
BARCLAYS CAPITAL LE	3,069	92.07	0.030
BARRINGTON RESEARCH ASSOCIATES	1,783	53.49	0.030
BLOOMBERG TRADEBOOK LLC	49,083	1,022.08	0.021
BMO CAPITAL MARKETS	19,471	595.07	0.031
BNP PARIBAS SECURITIES SERVICES	17,315	82.44	0.005
BNP PARIBAS SECURITIES SERVICES AUSTR BR	900	26.01	0.029
BNP PARIBAS SECURITIES SERVICES SA	464,969	3,553.03	0.008
BNP PARIBAS SECURITIES SERVICES, FRANCE	598,307	2,754.68	0.005
BRADESCO S.A. CTVM	496,767	3,706.30	0.007
BTG PACTUAL CHILE S.A. CORREDORES DE BOL	2,731	70.15	0.026
BTIG, LLC	47,110	1,521.77	0.032
BURKE AND QUICK PARTNERS LLC	1,569	54.93	0.035
CABRERA CAPITAL MARKETS LLC	8,448	110.34	0.013
CANACCORD GENUITY INC.	9,655	291.47	0.030
CANADIAN IMPERIAL BANK OF COMMERCE	23,944	442.43	0.018
CANTOR FITZGERALD & CO.	26,468	446.07	0.017
CARNEGIE A S	17,453	1,031.72	0.059
CESKA SPORITELNA	14,665	1,093.73	0.075
CHEEVERS & CO. INC.	107,693	1,076.93	0.010
CHINA INTERNATIONAL CAPITAL CO	17,298	418.12	0.024
CITIBANK MEXICO	62,921	113.42	0.002
CITIBANK OF COLOMBIA	3,356	70.21	0.021
CITIGROUP GLBL MARKTET KOERA SECS LTD	20,036	195.30	0.010
CITIGROUP GLOBAL MARKETS INC	1,276,312	8,503.77	0.007
CITIGROUP GLOBAL MARKETS INC.	2,536,914	1,259.96	0.000
CITIGROUP GLOBAL MARKETS INDIA	44,589	320.06	0.007
CITIGROUP GLOBAL MARKETS LIMITED	293,513	817.37	0.003
CITIGROUP GLOBAL MARKETS TAIWAN	2,243,245	2,095.00	0.001

**Qualified Pension Plan and Tax Deferred Annuity Program  
Schedule of Payments of Commissions to Brokers (Fixed)  
Fiscal Year Ended June 30, 2018 (Cont'd)**

<b>INDIVIDUAL OR BROKERAGE FIRM</b>	<b># OF SHARES</b>	<b>COMMISSION PAID (in \$)</b>	<b>COMMISSION PER SHARE (in \$)</b>
CLSA AUSTRALIA PTY LTD	268,748	274.17	0.001
CLSA SECURITIES KOREA LTD.	10,664	472.83	0.044
CLSA SECURITIES MALAYSIA SDN BHD	551,919	276.71	0.001
CLSA SINGAPORE PTE LTD.	617,413	4,609.45	0.007
COMMERZBANK CAPITAL MARKETS CORPORATION	6,751	101.31	0.015
CONVENCAO S/A CORRETORA DE VALORES	540,738	3,186.45	0.006
CONVERGEX LLC	37,696	565.98	0.015
CORNERSTONE MACRO LLC	390	19.50	0.050
COWEN AND COMPANY, LLC	48,719	1,099.51	0.023
COWEN EXECUTION SERVICES LLC	2,725,467	17,086.41	0.006
CRAIG - HALLUM	3,187	116.51	0.037
CREDIBOLSA SOCIEDAD AGENTE	60,983	57.70	0.001
CREDICORP CAPITAL COLOMBIA S.A.	8,753	147.86	0.017
CREDIT AGRICOLE CIB	287	5.74	0.020
CREDIT LYONNAIS SECURITIES (USA) INC	152,568	836.35	0.005
CREDIT LYONNAIS SECURITIES INDIA	1,435,367	19,975.28	0.014
CREDIT LYONNAIS SECURITIES(ASIA)	7,946,409	8,826.03	0.001
CREDIT SUISSE FIRST BOSTON	3,685,661	3,031.45	0.001
CREDIT SUISSE FIRST BOSTON (EUROPE)	153	5.93	0.039
CREDIT SUISSE LONDON BRANCH (GFX)	8,889	26.89	0.003
CREDIT SUISSE SECS INDIA PRIVATE LTD	1,285,377	1,586.31	0.001
CREDIT SUISSE SECURITIES (EUROPE) LTD	4,212,757	14,304.46	0.003
CREDIT SUISSE SECURITIES (USA) LLC	11,941,736	19,151.82	0.002
CREST DEPOSITORY LIMITED	21,561	48.63	0.002
CS FIRST BOSTON (HONG KONG) LIMITED	5,500	68.11	0.012
DAIWA SECURITIES AMERICA INC	264,758	3,388.13	0.013
DAIWA SECURITIES CAPITAL MARKETS CO LTD	12,814	466.59	0.036
DAIWA SECURITIES COMPANY LTD	7,501	471.21	0.063
DANARESKA SECURITIES, PT	4,937,442	548.95	0.000
DAVIDSON D.A. & COMPANY INC.	200	7.00	0.035
DAVY STOCKBROKERS	35,110	802.71	0.023
DBS VICKERS (HONG KONG) LIMITED	17,782	359.46	0.020
DBS VICKERS SECURITIES (SINGAPORE)	146,867	600.27	0.004
DEUTSCHE BANK AG LONDON	441,102	360.70	0.001
DEUTSCHE BANK SECURITIES INC	2,746,576	10,255.87	0.004
DEUTSCHE SECURITIES ASIA LIMITED	428,813	845.31	0.002
DOUGHERTY & COMPANY LLC	1,734	52.02	0.030
DSP MERRILL LYNCH LTD	20,432	137.39	0.007

**Qualified Pension Plan and Tax Deferred Annuity Program  
Schedule of Payments of Commissions to Brokers (Fixed)  
Fiscal Year Ended June 30, 2018 (Cont'd)**

<b>INDIVIDUAL OR BROKERAGE FIRM</b>	<b># OF SHARES</b>	<b>COMMISSION PAID (in \$)</b>	<b>COMMISSION PER SHARE (in \$)</b>
EUROCLEAR BANK S.A / N.V	1,735	11.42	0.007
FBR CAPITAL MARKETS & CO.	16,740	418.13	0.025
FIDELITY CAPITAL MARKETS	8,289	163.22	0.020
FIDELITY CLEARING CANADA ULC	141,791	2,835.81	0.020
FINANCIAL BROKERAGE GROUP (FBG)	40,031	54.96	0.001
FLOW CORRETORA DE MERCADORIAS LTDA.	22,553	608.34	0.027
GOLDMAN SACHS (ASIA) L.L.C.	1,019,145	963.49	0.001
GOLDMAN SACHS (ASIA) LLC	59,913	699.42	0.012
GOLDMAN SACHS (INDIA)	161,753	1,920.24	0.012
GOLDMAN SACHS & CO	4,067,443	12,257.49	0.003
GOLDMAN SACHS & CO INTL.	22,814	89.49	0.004
GOLDMAN SACHS DO BRASIL CORRETORA	120,274	1,614.27	0.013
GOLDMAN SACHS INTERNATIONAL	4,905,555	4,976.61	0.001
GREEN STREET TRADING, LLC	2,100	55.00	0.026
GUGGENHEIM CAPITAL MARKETS LLC	30,177	662.61	0.022
HEIGHT SECURITIES, LLC	7,569	151.38	0.020
HONGKONG AND SHANGHAI BANKING CORPORATIO	214,553	82.95	0.000
HSBC BANK PLC	1,002,269	6,235.09	0.006
HSBC BANK USA	3,666	37.55	0.010
HSBC SECURITIES (USA) INC.	5,068,241	6,368.61	0.001
HSBC SECURITIES INDIA HOLDINGS	12,797	85.55	0.007
ICAP DO BRASIL DTVM LTDA	27,905	143.83	0.005
ICBCFS LLC	1,744,036	7,638.45	0.004
ICICI BROKERAGE SERVICES	1,891,195	14,949.57	0.008
IM TRUST S.A. CORREDORES DE BOLSA	82,018	53.44	0.001
INDUSTRIAL&COMMERCIAL BNK OF CHNA FS LLC	3,938	78.76	0.020
INSTINET	91,019	870.71	0.010
INSTINET AUSTRALIA CLEARING SRVC PTY LTD	313,156	545.62	0.002
INSTINET LLC	2,205,044	9,004.99	0.004
INSTINET PACIFIC LIMITED	19,109,623	7,793.69	0.000
INSTINET SINGAPORE SERVICES PT	714,409	828.42	0.001
INSTINET U.K. LTD	5,179,217	24,799.45	0.005
INTERFUND TRANSFER	428	4.95	0.012
INVESTEC BANK PLC	25,544	482.74	0.019
INVESTMENT TECHNOLOGY GROUP INC.	140,500	2,416.57	0.017
INVESTMENT TECHNOLOGY GROUP LTD	858,262	8,706.52	0.010
ISI GROUP INC	88,531	1,284.66	0.015
ITG AUSTRALIA LTD.	2,799,095	8,188.15	0.003

**Qualified Pension Plan and Tax Deferred Annuity Program  
Schedule of Payments of Commissions to Brokers (Fixed)  
Fiscal Year Ended June 30, 2018 (Cont'd)**

<b>INDIVIDUAL OR BROKERAGE FIRM</b>	<b># OF SHARES</b>	<b>COMMISSION PAID (in \$)</b>	<b>COMMISSION PER SHARE (in \$)</b>
ITG CANADA	24,467	186.76	0.008
ITG INC	28,838	162.27	0.006
ITG INC.	56,290	307.94	0.005
JP MORGAN INDIA PRIVATE LTD	12,309	40.24	0.003
JP MORGAN SECURITIES INC	1,263,149	1,959.59	0.002
JP MORGAN SECURITIES	11,539	7.76	0.001
JP MORGAN CLEARING CORP.	1,765,202	7,496.12	0.004
JP MORGAN SECURITIES (TAIWAN) LTD	364,763	272.89	0.001
JP MORGAN SECURITIES LLC	122,471	2,356.72	0.019
JP MORGAN SECURITIES (FAR EAST) LTD SEOUL	59,933	354.67	0.006
JANNEY MONTGOMERY, SCOTT INC	3,969	94.05	0.024
JEFFERIES & COMPANY INC	169,345	5,729.71	0.034
JEFFERIES HONG KONG LIMITED	770,713	199.15	0.000
JEFFERIES INTERNATIONAL LTD	200,791	1,271.43	0.006
JM FINANCIAL INSTITUTIONAL SECURITIES PR	49,063	612.10	0.012
JMP SECURITIES	3,350	105.31	0.031
JOH. BERENBERG, GOSSLER & CO. KG	66,787	2,431.95	0.036
JONESTRADING INSTITUTIONAL SERVICES LLC	48,856	1,142.38	0.023
JONESTRADING INSTITUTIONAL SERVICES, LLC	102,971	213.90	0.002
JP MORGAN SECURITIES AUSTRALIA LTD	97,435	216.54	0.002
JP MORGAN SECURITIES PLC	243,418	1,766.25	0.007
JP MORGAN SECURITIES SINGAPORE	1,103,181	286.01	0.000
JP MORGAN SECURITIES (ASIA PACIFIC) LTD	4,652,175	2,698.12	0.001
KCG AMERICAS LLC	62,526	372.99	0.006
KEEFE BRUYETTE & WOODS INC	9,295	328.77	0.035
KEYBANC CAPITAL MARKETS INC	7,648	285.17	0.037
KING, CL, & ASSOCIATES, INC	7,118	352.52	0.050
LARRAIN VIAL	77,460	101.12	0.001
LEERINK PARTNERS LLC	6,225	254.36	0.041
LEK SECURITIES CORP	860	17.20	0.020
LIQUIDNET CANADA INC	2,850	97.30	0.034
LIQUIDNET INC	156,021	1,770.28	0.011
LOGBOW SECURITIES LLC	700	24.50	0.035
LOOP CAPITAL MARKETS	2,455,115	15,299.99	0.006
LOOP CAPITAL MARKETS LLC	101,206	1,730.13	0.017
LUMINEX TRADING AND ANALYTICS	1,717	4.30	0.003
LUMINEX TRADING AND ANALYTICS LLC	3,288	32.88	0.010
MACQUARIE BANK LIMITED	3,414,290	1,671.07	0.000

**Qualified Pension Plan and Tax Deferred Annuity Program  
Schedule of Payments of Commissions to Brokers (Fixed)  
Fiscal Year Ended June 30, 2018 (Cont'd)**

<b>INDIVIDUAL OR BROKERAGE FIRM</b>	<b># OF SHARES</b>	<b>COMMISSION PAID (in \$)</b>	<b>COMMISSION PER SHARE (in \$)</b>
MACQUARIE CAPITAL (USA) INC	54,074	475.49	0.009
MACQUARIE SEC NZ LTD	7,690	10.08	0.001
MACQUARIE SECURITIES (USA) INC	3,615	115.95	0.032
MACQUARIE SECURITIES KOREA LIMITED	69,808	778.53	0.011
MAINFIRST BANK DE	25,965	437.75	0.017
MERRILL LYNCH	2,450	122.50	0.050
MERRILL LYNCH AND CO INC	34,189	451.16	0.013
MERRILL LYNCH CANADA INC	2,100	19.96	0.010
MERRILL LYNCH INTERNATIONAL	7,086,915	7,920.63	0.001
MERRILL LYNCH PIERCE FENNER AND SMITH	352,797	3,872.26	0.011
MERRILL LYNCH PROFESSIONAL CLEARING CORP	6,724	235.35	0.035
MERRILL LYNCH, PIERCE, FENNER & SMITH INC.	2,336,394	8,947.18	0.004
MIZUHO SECURITIES USA INC.	1,921	67.42	0.035
MKM PARTNERS LLC	2,988	104.58	0.035
MORGAN STANLEY AND CO INTERNATIONAL	116,246	2,179.08	0.019
MORGAN STANLEY AND CO. INTERNATIONAL	2,398,615	2,128.30	0.001
MORGAN STANLEY CO INCORPORATED	5,372,683	21,759.90	0.004
MORGAN STANLEY INDIA COMPANY PVT LTD	516,165	2,569.67	0.005
MORGAN STANLEY TAIWAN LIMITED	50,339	59.65	0.001
MOTILAL OSWAL SECURITIES LIMITED	7,501	277.67	0.037
NATIONAL FINANCIAL SERVICES CORPORATION	38,547	192.73	0.005
NEEDHAM AND COMPANY LLC	3,707	132.67	0.036
NH INVESTMENT AND SECURITIES CO., LTD.	60,516	1,985.85	0.033
NOMURA FINANCIAL ADVISORY & SEC INDIA	225,781	1,550.57	0.007
NOMURA SECURITIES CO LTD	110,733	51.17	0.000
NORDEA BANK AB (PUBL), FINNISH BRANCH	9,800	408.94	0.042
NORTHLAND SECURITIES INC.	4,727	146.39	0.031
OLIVETREE USA LLC	2,178	43.56	0.020
OPPENHEIMER & CO. INC.	8,762	299.21	0.034
PAVILION GLOBAL MARKETS LTD	109,628	966.39	0.009
PENSERRA SECURITIES	118,324	1,183.24	0.010
PENSERRA SECURITIES LLC	192,206	2,297.86	0.012
PERSHING LLC	606,416	4,317.48	0.007
PERSHING SECURITIES LIMITED	36,016	616.77	0.017
PIPER JAFFRAY	5,691	172.16	0.030
PIPER JAFFRAY & CO.	13,749	432.07	0.031
PT. MANDIRI SEKURITAS	971,520	117.73	0.000
R.B.C. DOMINION SECURITIES CORPORATION	347	2.08	0.006



**Qualified Pension Plan and Tax Deferred Annuity Program  
Schedule of Payments of Commissions to Brokers (Fixed)  
Fiscal Year Ended June 30, 2018 (Cont'd)**

<b>INDIVIDUAL OR BROKERAGE FIRM</b>	<b># OF SHARES</b>	<b>COMMISSION PAID (in \$)</b>	<b>COMMISSION PER SHARE (in \$)</b>
RAYMOND JAMES & ASSOCIATES	900	31.50	0.035
RAYMOND JAMES AND ASSOCIATES	16,820	1,397.76	0.083
RAYMOND JAMES AND ASSOCIATES INC	26,807	865.01	0.032
RBC CAPITAL MARKETS, LLC	158,741	2,213.01	0.014
RBC DOMINION SECURITIES INC.	71,187	1,501.74	0.021
REDBURN (EUROPE) LIMITED	92,100	2,234.85	0.024
ROBERT W. BAIRD CO.INCORPORATED	90,424	2,565.04	0.028
ROYAL BANK OF CANADA EUROPE LTD	15,548	774.48	0.050
SANDLER ONEILL AND PARTNERS L.P.	2,653	68.75	0.026
SANFORD C. BERNSTEIN CO LLC	89,539	729.18	0.008
SANFORD C. BERNSTEIN AND CO. LLC	308,978	486.56	0.002
SANFORD C. BERNSTEIN LTD	327,897	2,629.42	0.008
SANTANDER SECURITIES SERVICES, S.A	73,822	477.18	0.006
SCOTIA CAPITAL (USA) INC	5,305	141.77	0.027
SCOTIA CORREDORA DE BOLSA	137,188	101.93	0.001
SEAPORT GROUP SECURITIES, LLC	1,420	21.35	0.015
SG AMERICAS SECURITIES LLC	984,211	3,569.05	0.004
SG ASIA SECURITIES (INOIA) PVT LTD	852,569	2,755.72	0.003
SG SECURITIES (LONDON) LTD.	3,952,355	3,498.35	0.001
SG SECURITIES HK	20,300,549	6,584.87	0.000
SHENYIN WANGUO SECURITIES (HK) LTD	407,380	359.88	0.001
SIDOTI & COMPANY LLC	2,907	66.75	0.023
SMBC NIKKO CAPITAL MARKETS LIMITED	61,575	572.96	0.009
SOCIETE GENERALE LONDON BRANCH	3,478,726	12,778.23	0.004
STATE STREET GLOBAL MARKETS	64	1.28	0.020
STATE STREET GLOBAL MARKETS, LLC	3,363	122.91	0.037
STEPHENS, INC.	10,398	348.10	0.033
STIFEL NICOLAUS & CO INC	35,677	1,191.48	0.033
STIFEL NICOLAUS EUROPE LIMITED	149	1.49	0.010
STRATEGAS SECURITIES LLC	1,973	59.19	0.030
SUNTRUST CAPITAL MARKETS, INC.	7,310	250.29	0.034
TELSEY ADVISORY GROUP LLC	3,385	169.25	0.050
THE FIG GROUP, LLC	35,900	327.60	0.009
THE HONGKONG AND SHANGHAI BANK	5,708	82.49	0.014
TULLET & TOKYO SECS	110	2.20	0.020
TULLETT PREBON FINANCIAL SERVICES LLC	396	7.92	0.020
UBS AG	1,689,189	4,438.79	0.003
UBS LIMITED	2,290,917	12,870.43	0.006

**Qualified Pension Plan and Tax Deferred Annuity Program  
Schedule of Payments of Commissions to Brokers (Fixed)  
Fiscal Year Ended June 30, 2018 (Cont'd)**

<b>INDIVIDUAL OR BROKERAGE FIRM</b>	<b># OF SHARES</b>	<b>COMMISSION PAID (in \$)</b>	<b>COMMISSION PER SHARE (in \$)</b>
UBS SECURITIES ASIA LTD	4,015,362	2,708.60	0.001
UBS SECURITIES CANADA INC	93,752	633.50	0.007
UBS SECURITIES INDIA PRIVATE LTD	223,986	994.39	0.004
UBS SECURITIES LLC	903,200	4,591.03	0.005
UBS SECURITIES PTE. LTD	677,141	473.48	0.001
UBS SECURITIES PTE. LTD., SEOUL	33,626	175.67	0.005
VALORES BANCOLOMBIA	6,382,700	87.92	0.000
VIRTU AMERICAS LLC	56,025	1,548.88	0.028
WALL STREET ACCESS	22,349	154.25	0.007
WARBURG DILLON READ (NEW ZEALAND)	7,110	12.83	0.002
WEDBUSH MORGAN SECURITIES INC	1,630	40.75	0.025
WEEDEN & CO.	265,025	2,571.95	0.010
WELLS FARGO SECURITIES LLC	15,047	95.23	0.006
WELLS FARGO SECURITIES, LLC	22,457	698.54	0.031
WILLIAM BLAIR & COMPANY L.L.C	27,252	1,022.38	0.038
WILLIAMS CAPITAL GROUP LP (THE)	82,870	524.49	0.006
WOLFE TRAHAN SECURITIES	8,314	239.18	0.029
XP INVESTIMENTOS CCTVM SA	1,205,053	7,808.28	0.006



# ACTUARIAL

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- Schedule of Retirees and Beneficiaries 111
- Schedule of Statutory vs. Actuarial Contributions 112
- Funded Status based on Entry Age Normal Cost Method 113
- Comparative Summary of Accrued Liabilities Funded by Actuarial Value of Assets 114
- Summary of Plan Provisions - Contributions 116

## *Your Actions*

To add steady contributions to your BERS retirement account.







## OFFICE OF THE ACTUARY

255 GREENWICH STREET • 9<sup>TH</sup> FLOOR  
 NEW YORK, NY 10007  
 (212) 442-5775 • FAX: (212) 442-5777

**SHERRY S. CHAN**  
 CHIEF ACTUARY

December 3, 2018

Board of Trustees  
 New York City Board of Education Retirement System  
 65 Court Street  
 Brooklyn, NY 11201

Re: Actuarial Information for the Comprehensive Annual Financial Report (CAFR) for the  
 Fiscal Year Ended June 30, 2018

Dear Members of the Board of Trustees:

The financial objective of the New York City Board of Education Retirement System - Qualified Pension Plan (BERS-QPP or the Plan) is to fund members' retirement benefits during their active service and to establish employer normal contribution rates that, expressed as a percentage of active member annualized covered payroll, would remain approximately level over the future working lifetimes of those active members and, together with member contributions and investment income, are intended to ultimately be sufficient to accumulate assets to pay benefits when due.

An actuarial valuation of the Plan is performed annually as of the second June 30 preceding each fiscal year to determine the Employer Contributions to be paid for that fiscal year (i.e. June 30, 2016 (Lag) actuarial valuation to determine Fiscal Year 2018 Employer Contributions (the Actuarial Contributions)).

The funding policy of the City of New York (the City) is to contribute statutorily-required contributions (Statutory Contributions) and these contributions are generally funded by the City within the appropriate fiscal year.

For Fiscal Year 2018, the Actuarial Contributions to BERS, are equal to those recommended by the Actuary of the New York City Pension Funds and Retirement Systems (the Actuary) and represent the Statutory Contributions.

During June 2012 the Governmental Accounting Standards Board (GASB) released two new accounting standards for public pension plans, Statement No. 67 (GASB67) and Statement No. 68 (GASB68), collectively "GASB67/68."

On September 28, 2018, the Actuary published the, "GASB 67/68 Report for the City of New York and the New York City Retirement Systems For Fiscal Year Ended June 30, 2018" (the

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New York City Board of Education Retirement System  
December 3, 2018  
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Fiscal Year 2018 GASB67/68 Report). Appendix C of The Fiscal Year 2018 GASB67/68 Report contains information developed in accordance with GASB67 for BERS.

### **Actuarial Assumptions and Methods**

The Actuary issued a Report entitled “Proposed Changes in Actuarial Assumptions and Methods for Determining Employer Contributions for Fiscal Years Beginning on and after July 1, 2011 for the New York City Board of Education Retirement System,” dated February 10, 2012. Components of the Actuary’s proposed changes required the enactment of legislation by the New York State Legislature and the Governor.

The Board of Trustees of BERS adopted those changes that require Board approval during Fiscal Year 2012. The New York State Legislature and the Governor enacted Chapter 3 of the Laws of 2013 (Chapter 3/13) to provide for those changes in actuarial assumptions and methods that require legislation, including the Actuarial Interest Rate (AIR) assumption of 7.0% per annum, net of investment expenses. Together, this package of actuarial assumptions and methods is referred to as the “2012 A&M.”

In Fiscal Year 2016, the Actuary proposed and the Board of Trustees adopted, revised post-retirement mortality assumptions for use in determining employer contributions beginning in Fiscal Year 2016. In addition, beginning in Fiscal Year 2016, the Actuary revised the Actuarial Asset Valuation Method by constraining the Actuarial Value of Assets to be no more than 20% from the Market Value of Assets. The 2012 A&M reflecting these revisions is referred to herein as the “2016 A&M.”

The “Summary of Actuarial Assumptions and Methods in Effect for the June 30, 2016 (Lag) Actuarial Valuation” provided later in this Actuarial Section of the CAFR presents the 2016 A&M. Beginning with the June 30, 2016 (Lag) actuarial valuation, a cost is added to each year’s Normal Cost for providing a guaranteed 8.25% return on the TDA Fixed Fund for non-UFT members. All other actuarial assumptions and methods are the same as those used in the prior year. These actuarial assumptions and methods (2016 A&M) used for funding purposes meet the parameters set forth by the Actuarial Standards of Practice (ASOPs).

### **Benefits and Census Data**

A summary of the benefits applicable to Plan members included in the June 30, 2016 (Lag) actuarial valuation is shown earlier in the Financial Section of the CAFR. There were no changes in any of the plan provisions since the prior year.

Census data is submitted by the Plan’s administrative staff and by the employers’ payroll facilities and is reviewed by the Office of the Actuary (OA) for consistency and reasonability.



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December 3, 2018  
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A summary of the census data used in the June 30, 2016 (Lag) actuarial valuation is included in this CAFR. A summary of the census data used in the June 30, 2015 (Lag) actuarial valuation of the Plan is available in the Fiscal Year 2017 CAFR.

### **Funded Status**

The Funded Status of the Plan is usually expressed by the relationship of Assets to Liabilities.

With respect to the Funded Status of the Plan, included in the Actuarial Section of the CAFR is a schedule of Funded Status based on the Entry Age Normal cost method (Table 10).

Also included in the Actuarial Section of the CAFR is a Solvency Test (i.e. Comparative Summary of Accrued Liabilities Funded by Actuarial Value of Assets) (Table 11), as prescribed by the Government Finance Officers Association (GFOA). This Solvency Test represents an alternative approach to describing progress toward funding objectives.

### **Presentation Style and Sources of Information**

The actuarial information herein is being presented in a manner believed to be consistent with the requirements of the GFOA and, where applicable, with GASB67.

The following items in the Actuarial Section of the CAFR were prepared by the OA:

- Summary of Actuarial Assumptions and Methods in Effect for the June 30, 2016 (Lag) Actuarial Valuation.
- Active Member Valuation Data.
- Summary of Plan Membership.
- Retirees and Beneficiaries Added to and Removed from Rolls.
- Statutory vs. Actuarial Contributions.
- Funded Status Based on Entry Age Normal Cost Method.
- Comparative Summary of Accrued Liabilities Funded by Actuarial Value of Assets - Solvency Test.
- Contributions.

Some items in the Financial Section and Statistical Section of the CAFR were also prepared by the OA.

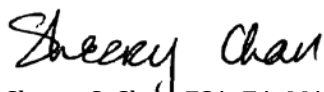
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New York City Board of Education Retirement System  
December 3, 2018  
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If you have any questions about any of the information in this Actuarial Section or any of the actuarial information presented elsewhere in this CAFR, please do not hesitate to contact Mr. Michael J. Samet, Mr. Edward Hue, or me.

### **Acknowledgment of Qualification**

I, Sherry S. Chan, am the Chief Actuary for, and independent of, the New York City Retirement Systems and Pension Funds. I am a Fellow of the Society of Actuaries, an Enrolled Actuary under the Employee Retirement Income and Security Act of 1974 (ERISA), a Member of the American Academy of Actuaries, and a Fellow of the Conference of Consulting Actuaries. I meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein. To the best of my knowledge, the results contained herein have been prepared in accordance with generally accepted actuarial principles and procedures and with the Actuarial Standards of Practice issued by the Actuarial Standards Board.

Respectfully submitted,



Sherry S. Chan, FSA, EA, MAAA, FCA  
Chief Actuary

SSC/eh

Att.

cc: Mr. Jean-Daniel Desmornes – New York City Board of Education Retirement System  
Mr. Edward Hue – New York City Office of the Actuary  
Mr. Michael Hunter – New York City Office of the Actuary  
Ms. Marlene Markoe-Boyd – New York City Office of the Actuary  
Mr. Sanford Rich – New York City Board of Education Retirement System  
Mr. Sam Rumley – New York City Office of the Actuary  
Mr. Michael Samet – New York City Office of the Actuary  
Keith Snow, Esq. – New York City Office of the Actuary

**Qualified Pension Plan  
Summary of Actuarial Assumptions and Methods  
In Effect For The June 30, 2016 (Lag) Actuarial Valuation**

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1. Pursuant to Section 96 of the New York City Charter, studies of the actuarial assumptions used to value liabilities of the five actuarially-funded New York City Retirement Systems (NYCRS) are conducted every two years.

Also, in accordance with the Administrative Code of the City of New York (ACCNYS), the Boards of Trustees of the five actuarially-funded NYCRS are to periodically review and adopt actuarial assumptions as proposed by the Actuary for use in the determination of Employer Contributions.

The Actuary issued a Report entitled "Proposed Changes in Actuarial Assumptions and Methods for Determining Employer Contributions for Fiscal Years Beginning on and After July 1, 2011 for the New York City Board of Education Retirement System," dated February 10, 2012. Components of the Actuary's proposed changes required the enactment of legislation by the New York State Legislature and the Governor.

The Board of Trustees adopted those changes that require Board approval during Fiscal Year 2012. The New York State Legislature and the Governor enacted Chapter 3 of the Laws of 2013 (Chapter 3/13) to provide for those changes in actuarial assumptions and methods that require legislation, including the Actuarial Interest Rate (AIR) assumption of 7.0% per annum, net of investment expenses. Together, this package of actuarial assumptions and methods is referred to as the "2012 A&M."

In Fiscal Year 2016, the Actuary proposed, and the Board of Trustees adopted, revised post-retirement mortality assumptions for use in determining employer contributions beginning in Fiscal Year 2016. In addition, beginning in Fiscal Year 2016, the Actuary revised the Actuarial Asset Valuation Method by constraining the Actuarial Value of Assets to be no more than 20% from the Market Value of Assets. The 2012 A&M reflecting these revisions is referred to herein as the "2016 A&M."

Beginning with the June 30, 2016 (Lag) actuarial valuation, a cost is added to each year's Normal Cost for providing a guaranteed 8.25% return on the TDA Fixed Fund for non-UFT members. All other actuarial assumptions and methods in effect for the June 30, 2016 (Lag) actuarial valuation are unchanged from those used in the June 30, 2015 (Lag) actuarial valuation.

2. The investment rate of return assumption is 7.0% per annum, net of investment expenses (4.0% per annum for benefits payable under the Variable Annuity Program).
3. The mortality tables for service and disability pensioners are based primarily on the experience of BERS (the Base Tables) and the application of Mortality Improvement Scale MP-2015, published by the Society of Actuaries in October 2015. Sample probabilities are shown in Table 1a. Mortality tables for beneficiaries were also developed from experience review and application of Mortality Improvement Scale MP-2015. Sample probabilities are shown in Table 1b.

**Qualified Pension Plan  
Summary of Actuarial Assumptions and Methods  
In Effect For The June 30, 2016 (Lag) Actuarial Valuation (Cont'd)**

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4. Active Service tables are used to estimate various withdrawals from Active Service. Sample probabilities are shown in Table 2 for members withdrawing from Active Service due to Death or Disability, in Table 3 for members withdrawing for Other Than Death, Disability, or Service Retirement, and in Table 4 for members withdrawing from Active Service after eligibility for Service Retirement.
5. A Salary Scale is used to estimate salaries at termination, retirement, or death. Sample percentage increases are shown in Table 5. The Salary Scale includes a General Wage Increase (GWI) assumption of 3.0% per annum.
6. The economic assumptions (i.e. the assumed investment return rate, GWI rate, and Cost-of-Living Adjustments (COLA)) were developed assuming a long-term Consumer Price Inflation (CPI) assumption of 2.5% per annum. The assumption is 1.5% per annum for Auto COLA and 2.5% per annum for escalation.
7. The valuation assumes a closed group of members.
8. Beginning with the June 30, 2010 (Lag) actuarial valuation, the Entry Age Normal (EAN) cost method of funding is used by the Plan's Actuary to calculate Employer Contributions.

Under this method, the Present Value (PV) of Future Benefits (PVFB) of each individual included in the actuarial valuation is allocated on a level basis over the earnings between the age a member enters the plan and the assumed exit age(s). The employer portion of this PVFB allocated to a valuation year is the Normal Cost. The portion of this PVFB not provided for at a valuation date by the PV of Future Employer Normal Costs or future member contributions is the Actuarial Accrued Liability (AAL).

The excess, if any, of the AAL over the Actuarial Value of Assets (AVA) is the Unfunded Actuarial Accrued Liability (UAAL).

Under this method, actuarial gains and losses, as they occur, reduce and increase the UAAL, respectively, and are explicitly identified and amortized.

Increases or decreases in obligations due to benefit changes, actuarial assumption changes, and actuarial method changes are also explicitly identified and amortized.

**Qualified Pension Plan  
Summary of Actuarial Assumptions and Methods  
In Effect For The June 30, 2016 (Lag) Actuarial Valuation (Cont'd)**

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9. One-Year Lag Methodology (Lag or OYLM) uses a June 30, XX-2 valuation date to determine Fiscal Year XX Employer Contributions.

The June 30, 2016 (Lag) actuarial valuation uses a June 30, 2016 valuation date to determine Fiscal Year 2018 Employer Contributions.

This methodology requires adjustments to determine the Fiscal Year 2018 Employer Contributions:

- a. Present Value of Future Salary (PVFS): The PVFS at June 30, 2016 is reduced by the value of salary projected to be paid during Fiscal Year 2017.
  - b. Salary for Determining Employer Contributions: Salary used to determine the employer normal contribution is the salary projected to be paid during Fiscal Year 2018 to members on payroll at June 30, 2016.
  - c. UAAL Payments: For determining the UAAL payments for Fiscal Year 2018, and to be consistent with OYLM, the UAAL as of June 30, 2016 is adjusted by the discounted value of employer normal contributions paid during Fiscal Year 2017 and the discounted value of the administrative expenses reimbursed during Fiscal Years 2017 and 2018.
10. The Actuary reset the AVA to the Market Value of Assets (MVA) as of June 30, 2011.

Beginning with the June 30, 2012 (Lag) actuarial valuation, the Actuarial Asset Valuation Method (AAVM) recognizes investment returns greater or less than expected over a period of six years.

In accordance with this AAVM, actual Unexpected Investment Returns (UIR) are phased into the AVA at rates of 15%, 15%, 15%, 15%, 20%, and 20% per year, respectively, (i.e. cumulative rates of 15%, 30%, 45%, 60%, 80%, and 100%).

Beginning with the June 30, 2014 (Lag) actuarial valuation, the AVA is constrained to be within a 20% corridor of the MVA.

11. The PVFB as of June 30, 2016, used to determine Fiscal Year 2018 Employer Contributions, includes estimates of liabilities for:
- a. World Trade Center Disability Benefits.
  - b. World Trade Center Death Benefits.



**Qualified Pension Plan  
Summary of Actuarial Assumptions and Methods  
In Effect For The June 30, 2016 (Lag) Actuarial Valuation (Cont'd)**

**Table 1A  
DEATHS AMONG SERVICE AND DISABILITY PENSIONERS  
Percentage of Pensioners Dying within the Next Year**

Age	Service Pensioners		Disability Pensioners	
	Males	Females	Males	Females
40	0.0904%	0.0562%	1.2066%	1.3234%
45	0.2804	0.0959	1.2754	1.4104
50	0.5295	0.2026	1.5428	1.7023
55	0.8487	0.3315	2.0415	1.8296
60	1.0077	0.4863	2.3940	1.8935
65	1.2541	0.6344	2.5325	2.0583
70	1.8046	1.0245	2.9173	2.3880
75	2.4945	1.7046	3.7013	3.1340
80	4.3235	2.8882	5.0435	4.3005
85	7.0982	4.8743	7.1126	6.3187
90	11.0906	8.3524	11.1060	10.8829
95	19.9770	15.0888	19.9937	18.3147
100	30.7448	21.2257	30.7448	22.1222
105	36.9822	27.2744	36.9822	27.2744
110	96.4196	96.4583	96.4196	96.4583
115	100.0000	100.0000	100.0000	100.0000

Society of Actuaries Mortality Improvement Scale MP-2015 is applied to these rates.

**Table 1B  
DEATHS AMONG BENEFICIARIES  
Percentage of Beneficiaries Dying within the Next Year**

Age	Males	Females
40	0.0904%	0.0674%
45	0.2524	0.1151
50	0.3971	0.2431
55	0.8014	0.4420
60	1.0706	0.7296
65	1.4334	0.9970
70	1.9248	1.3660
75	2.8272	2.1592
80	5.1881	3.6583
85	7.9854	6.0929
90	13.8632	10.4405
95	22.2136	17.6157
100	30.7448	21.2423
105	36.9822	27.2744
110	96.4196	96.4583
115	100.0000	100.0000

Society of Actuaries Mortality Improvement Scale MP-2015 is applied to these rates.

**Qualified Pension Plan  
Summary of Actuarial Assumptions and Methods  
In Effect For The June 30, 2016 (Lag) Actuarial Valuation (Cont'd)**

Table 2

**WITHDRAWALS FROM ACTIVE SERVICE (DUE TO DEATH OR DISABILITY)****Percentage of Active Members Separating within the Next Year**

Age	Accidental Disability		Ordinary Disability		Death	
	Males	Females	Males	Females	Males	Females
20	0.04%	0.02%	0.20%	0.20%	0.040%	0.030%
25	0.04	0.02	0.20	0.20	0.040	0.030
30	0.04	0.02	0.20	0.20	0.060	0.040
35	0.04	0.02	0.30	0.20	0.080	0.050
40	0.04	0.02	0.40	0.25	0.100	0.060
45	0.04	0.02	0.50	0.30	0.150	0.100
50	0.04	0.02	0.60	0.50	0.200	0.150
55	0.04	0.02	0.70	0.70	0.300	0.200
60	0.04	0.02	0.70	0.70	0.400	0.250
65	0.04	0.02	0.70	0.70	0.500	0.300
70 <sup>1</sup>	NA	NA	NA	NA	NA	NA

<sup>1</sup> Assumed to retire for service immediately at age 70.

Table 3

**WITHDRAWALS FOR OTHER THAN DEATH, DISABILITY OR SERVICE RETIREMENT****Percentage of Active Members Withdrawing within the Next Year**

Years of Service	Probability of Withdrawal	
	Males	Females
0	6.00%	4.00%
5	4.00	3.00
10	2.50	2.00
15	1.50	1.50
20	1.00	1.00
25	1.00	1.00

**Qualified Pension Plan  
Summary of Actuarial Assumptions and Methods  
In Effect For The June 30, 2016 (Lag) Actuarial Valuation (Cont'd)**

Table 4

**WITHDRAWALS FROM ACTIVE SERVICE (AFTER ELIGIBILITY FOR SERVICE RETIREMENT)****Percentage of Eligible Active Members Retiring Within the Next Year**

Age	Reduced Benefits <sup>1</sup>	Unreduced Benefits					
		Members not Electing Optional Retirement Program <sup>2</sup>			Members Electing Optional Retirement Program <sup>2</sup>		
		Years of Service Since First Eligibility			Years of Service Since First Eligibility		
		0-1	1-2	2+	0-1	1-2	2+
50	0.00%	20.00%	15.00%	10.00%	40.00%	20.00%	15.00%
55	2.00	20.00	15.00	10.00	40.00	20.00	15.00
60	4.00	20.00	15.00	10.00	40.00	20.00	15.00
65	0.00	30.00	25.00	20.00	60.00	25.00	25.00
70	NA	100.00	100.00	100.00	100.00	100.00	100.00

<sup>1</sup> Applicable to members whose benefits will be reduced upon retiring prior to the date eligible for unreduced Service Retirement.

<sup>2</sup> Optional Retirement Programs such as under Chapter 96 of the Laws of 1995 or Chapter 19 of the Laws of 2008.

**Qualified Pension Plan  
Summary of Actuarial Assumptions and Methods  
In Effect For The June 30, 2016 (Lag) Actuarial Valuation (Cont'd)**

**Table 5  
SALARY SCALE**

<b>Years of Service</b>	<b>Assumed Annual Percentage Increases Within the Next Year<sup>1</sup></b>
0	9.00%
5	5.00
10	4.50
15	4.50
20	4.25
25	4.00
30	4.00
35	4.00
40	4.00

<sup>1</sup> Salary Scale includes a General Wage Increase assumption of 3.0% per annum.

**Qualified Pension Plan  
Schedule of Active Member Valuation Data**

Table 6

**ACTIVE MEMBER VALUATION DATA**

<b>Valuation Date</b>	<b>Number</b>	<b>Annual Payroll</b>	<b>Annual Average Salary</b>	<b>Percentage Increase (Decrease) in Average Salary</b>
6/30/07 (Lag)	21,947	\$ 777,626,307	\$35,432	9.1 %
6/30/08 (Lag)	22,729	852,105,791	37,490	5.8
6/30/09 (Lag)	23,303	910,609,483	39,077	4.2
6/30/10 (Lag) <sup>1</sup>	23,324	912,290,136	39,114	0.1
6/30/11 (Lag)	23,131	920,369,154	39,789	1.7
6/30/12 (Lag)	27,840	1,018,895,365	36,598	(8.0)
6/30/13 (Lag)	25,848	1,051,571,168	40,683	11.2
6/30/14 (Lag)	25,182	1,045,187,738	41,505	2.0
6/30/15 (Lag)	24,903	1,093,962,316	43,929	5.8
6/30/16 (Lag)	25,864	1,149,019,892	44,425	1.1

<sup>1</sup> Beginning with the June 30, 2010 (Lag) actuarial valuation, the annualized covered payroll is based on revised actuarial assumptions.





**Qualified Pension Plan  
Summary of Plan Membership**

**SUMMARY OF PLAN MEMBERSHIP**

As of the June 30, 2016 (Lag) and June 30, 2015 (Lag) actuarial valuations, the Plan's Membership consisted of:

**Table 7**

**SUMMARY OF PLAN MEMBERSHIP**

<b>Group</b>	<b>June 30, 2016 (Lag)</b>	<b>June30, 2015 (Lag)</b>
Retirees and beneficiaries currently receiving benefits	16,937	16,438
Terminated vested members not yet receiving benefits	851	237
Other Inactives <sup>1</sup>	2,629	3,972
Active members	<u>25,864</u>	<u>24,903</u>
Total	<u><u>46,281</u></u>	<u><u>45,550</u></u>

<sup>1</sup> Represents members who are no longer on payroll but not otherwise classified.



**Qualified Pension Plan  
Schedule of Retirees and Beneficiaries**

**Table 8  
RETIRES AND BENEFICIARIES ADDED TO AND REMOVED FROM ROLLS**

Year Ended	Added to Rolls		Removed from Rolls		Rolls End of Year		% Increase In Annual Allowances	Average Annual Allowances
	Number	Annual Allowances <sup>1</sup>	Number	Annual Allowances	Number	Annual Allowances <sup>2</sup>		
6/30/07	958	\$10,886,720	540	\$3,850,151	12,991	\$149,322,720	4.9%	\$11,494
6/30/08	667	8,148,653	462	4,350,475	13,196	153,120,898	2.5	11,604
6/30/09	936	10,879,798	491	4,135,086	13,641	159,865,610	4.4	11,719
6/30/10	850	10,705,737	522	4,700,094	13,969	165,871,253	3.8	11,874
6/30/11	901	14,977,636	471	4,325,573	14,399	176,523,316	6.4	12,259
6/30/12	1,053	16,201,746	578	6,211,198	14,874	186,513,864	5.7	12,540
6/30/13	1,110	16,977,455	529	4,957,022	15,455	198,534,297	6.4	12,846
6/30/14	1,094	13,701,890	554	5,306,812	15,995	206,929,375	4.2	12,937
6/30/15	1,002	16,482,509	559	4,979,621	16,438	218,432,263	5.6	13,288
6/30/16	1,075	14,412,852	576	5,776,541	16,937	227,068,574	4.0	13,407

<sup>1</sup> Balancing Item – Amounts shown include changes due to benefit finalization, changes in benefit type (e.g., Service to Accident Disability), COLA increases, and other changes.

<sup>2</sup> Allowances shown are those used in the actuarial valuation as of the Year Ended date and are not adjusted for anticipated changes due to finalization of benefit calculation or contract settlements.

**Qualified Pension Plan  
Schedule of Statutory vs Actuarial Contributions**

Table 9

**STATUTORY VS. ACTUARIAL CONTRIBUTIONS**

<b>Fiscal Year Ended</b>	<b>Statutory Contribution<sup>(1)</sup></b>	<b>Actuarial Contribution</b>	<b>Employer Rate of Contribution<sup>(2)</sup></b>
6/30/09	\$134,224,615	\$134,224,615	17.8%
6/30/10	147,348,563	147,348,563	17.8
6/30/11	180,191,397	180,191,397	20.5
6/30/12	213,650,880	213,650,880	24.3
6/30/13	196,245,777	196,245,777	22.1
6/30/14	214,589,565	214,589,565	21.7
6/30/15	258,099,327	258,099,327	25.4
6/30/16	265,532,032	265,532,032	26.3
6/30/17	288,233,217	288,233,217	27.4
6/30/18	318,643,334	318,643,334	28.9

<sup>1</sup> Represents total employer contributions accrued for fiscal year.

<sup>2</sup> The Employer Rate of Contribution equals the Statutory Contribution as a percentage of the salaries of members who were on payroll or projected to be on payroll (under One-Year Lag Methodology) as of the preceding June 30 and adjusted, where applicable, to be consistent with collective bargaining agreements estimated to be achieved.

**Qualified Pension Plan  
Funded Status Based on Entry Age Normal Cost Method**

**FUNDED STATUS BASED ON ENTRY AGE NORMAL COST METHOD**

Prior to the June 30, 2010 (Lag) Actuarial Valuation, the Frozen Initial Liability (FIL) cost method was used to develop the funding requirements for the Plan. Under this method, following establishment of any Initial Unfunded Actuarial Accrued Liabilities (UAAL), actuarial gains and losses are financed over the working lifetimes of active participants and are not identified as separate UAAL.

The funding status and funding progress information provided in this Schedule has been prepared using the Entry Age Normal (EAN) cost method where the Present Value (PV) of any obligations of the Plan not provided by the PV of Future Contributions (Employer and Employee), as determined under the EAN cost method, equals the Actuarial Accrued Liability (AAL). Under the EAN cost method, the UAAL equals the AAL minus the Actuarial Value of Assets.

Table 10

**FUNDED STATUS BASED ON ENTRY AGE NORMAL COST METHOD**

(Dollar Amounts in Thousands)

Actuarial Valuation Date	Actuarial Value of Assets (a)	Entry Age Actuarial Accrued Liability (AAL) (b)	Entry Age Unfunded AAL (UAAL) (b-a)	Funded Ratio (a/b)	Covered Payroll (c)	UAAL as a Percentage of Covered Payroll ((b-a)/ c)
June 30, 2007 (Lag)	\$1,983,714	\$2,591,773	\$ 608,059	76.5%	\$777,626	78.2%
June 30, 2008 (Lag)	2,084,116	2,721,629	637,513	76.6	852,106	74.8
June 30, 2009 (Lag)	1,963,719	2,858,115	894,396	68.7	910,609	98.2
June 30, 2010 (Lag) <sup>1</sup>	2,056,452	3,558,251	1,501,799	57.8	912,290	164.6
June 30, 2011 (Lag) <sup>1</sup>	2,323,629	3,681,694	1,358,065	63.1	920,369	147.6
June 30, 2012 (Lag) <sup>1</sup>	2,371,613	3,763,130	1,391,517	63.0	1,018,895	136.6
June 30, 2013 (Lag) <sup>1</sup>	2,277,791	4,015,080	1,737,289	56.7	1,051,571	165.2
June 30, 2014 (Lag) <sup>1</sup>	2,632,922	4,335,746	1,702,824	60.7	1,045,188	162.9
June 30, 2015 (Lag) <sup>1</sup>	2,772,466	4,585,781	1,813,315	60.5	1,093,962	165.8
June 30, 2016 (Lag) <sup>1</sup>	2,858,737	4,767,760	1,909,023	60.0	1,149,020	166.1

This schedule is based on actuarial assumptions used for determining Employer Contributions.

<sup>1</sup> Reflects revised actuarial assumptions and methods based on experience review, including an AIR assumptions of 7.0% per annum, net of investment expenses.

**Qualified Pension Plan  
Comparative Summary of Accrued Liabilities  
Funded by Actuarial Value of Assets**

**Table 11**  
**SOLVENCY TEST**  
**(Dollar Amounts in Thousands)**

As of June 30	Accrued Liabilities For			Actuarial Value of Assets (D)	Percentage of Accrued Liabilities Funded by Actuarial Value of Assets		
	Accumulated Member Contributions (A)	Current Retirees and Beneficiaries (B)	Active Members' Employer Financed Portion (C)		(A)	(B)	(C)
2007 (Lag)	\$319,153	\$1,233,708	\$ 839,993	\$1,983,714	100%	100%	51%
2008 (Lag)	337,821	1,262,046	904,890	2,084,116	100	100	54
2009 (Lag)	359,122	1,303,453	965,681	1,963,719	100	100	31
2010 (Lag)	388,082	1,627,094	1,306,868	2,056,452	100	100	3
2011 (Lag)	409,625	1,714,099	1,319,938	2,323,629	100	100	15
2012 (Lag)	434,215	1,804,626	1,283,582	2,371,613	100	100	10
2013 (Lag)	469,312	1,918,824	1,372,542	2,277,791	100	94	0
2014 (Lag)	504,619	2,080,400	1,475,008	2,632,922	100	100	3
2015 (Lag)	527,781	2,200,281	1,569,097	2,772,466	100	100	3
2016 (Lag)	557,473	2,273,411	1,638,262	2,858,737	100	100	2

See following "SOLVENCY TEST - NOTES."



**Qualified Pension Plan  
Comparative Summary of Accrued Liabilities  
Funded by Actuarial Value of Assets**

---

**SOLVENCY TEST - NOTES**

The ultimate test of financial soundness in a retirement system is its ability to pay all of its promised benefits when due. The retirement system's progress in accumulating assets to pay all promised benefits can be measured by comparing the Actuarial Value of Assets of the retirement system with the Accrued Liabilities for:

- a. Accumulated Member Contributions;
- b. Current Retirees and Beneficiaries; and
- c. Active Members' Employer Financed Portion.

The Accrued Liabilities are the PV of projected benefits produced by the projected benefit attribution approach prorated on service. The Accrued Liabilities were calculated in accordance with Governmental Accounting Standards Board Statement No. 5 (GASB 5).

This comparative summary allocated assets as if they were priority groups, somewhat similar to (but not identical to) the priority categories of Section 4044 of the Employee Retirement Income Security Act of 1974 (ERISA).

The values in the table are dependent upon census data, benefit levels (which have changed on occasion over the past years), and the actuarial assumptions and methods employed at each valuation date. The two most recent changes in assumptions and methods occurred in the June 30, 2014 (Lag) valuation used to compute Employer Contributions for Fiscal Year 2016 and in the June 30, 2010 (Lag) valuation used to compute Employer Contributions for Fiscal Year 2012. These underlying bases can be found within the Comprehensive Annual Financial Report for each respective year.

To fully evaluate trends in financial soundness, changes in assumptions need to be evaluated. Beginning with the June 30, 2010 (Lag) actuarial valuations, the Actuarial Interest Rate assumption equals 7.0% per annum, net of investment expenses, and the General Wage Increase assumption equals 3.0% per annum. Prior to the June 30, 2010 (Lag) actuarial valuation, the Actuarial Interest Rate assumption was 8.0% per annum, gross of expenses.

## Qualified Pension Plan Summary of Plan Provisions - Contributions

---

### CONTRIBUTIONS

The benefits of the system are financed by employee and employer contributions and from investment earnings of the System.

#### A. MEMBER CONTRIBUTIONS

A member of Article 15 who joins BERS on or after April 1, 2012 (Tier 6) is required to contribute between 3.0% and 6.0% of salary, depending on salary level, for all years of service. Tier 6 members in the Automotive or Special Officers Programs also contribute Additional Member Contributions (AMC).

A Tier 4 member of Article 15 (Coordinated Retirement Plan) who joined BERS on or before March 31, 2012 is mandated to contribute 3% of salary during all years of coverage. Effective October 1, 2000, these members are not required to make contributions after the 10th anniversary of their membership date or completion of ten years of credited service, whichever is earlier. For those who elected or were mandated into an Optional Retirement Plan or Special Officers Plan, AMC are required.

A member who joined prior to July 27, 1976 contributes by salary deductions on the basis of a normal rate of contribution which is assigned by the System at the time he or she elects his or her plan. The normal contribution rate, which is dependent upon the member's age and plan, as well as the tables in effect for such purpose at the time he or she became a member, is determined to provide approximately one-third of the benefit on account of the first 25 years of service.

In the plans which permit retirement for service at age 55, the normal contribution rate is calculated to provide an annuity equal to 1% of final salary for each year of service at the earliest age for service retirement. For such plans, the normal contribution rate for members who enter at age 55 or over is the rate applicable to a member entering at age 54.

Member contributions are accumulated with interest on individually maintained ledger accounts. Except under Article 15, upon retirement, the amount to his or her credit (i.e. accumulated deductions) is used to purchase an annuity on the basis of the tables adopted by the Board of Trustees. Upon death in service, the accumulated deductions are paid to the beneficiary.

**Qualified Pension Plan  
Summary of Plan Provisions - Contributions  
(Cont'd)**

Beginning July 1, 1960, on a year to year basis, the normal contribution rates of members who joined before July 27, 1976 were reduced by an increased-take-home-pay rate equal to two and one-half percentage points and equal to five percentage points beginning July 1, 1961. Between July 1, 1968 and December 31, 1975, an increased-take-home-pay rate of four percentage points was effective for all members. On January 1, 1976, an increased-take-home-pay rate of two percentage points became effective for all members. Following is a table showing the effective periods and increased-take-home-pay rate.

<b><u>Period</u></b>	<b><u>Increased-Take-Home-Pay Rate</u></b>
07-01-1960 to 06-30-1961	2.5%
07-01-1961 to 06-30-1968	5%
07-01-1968 to 12-31-1975	4%
01-01-1976 and after	2% for non-Article 14 & 15 Members 0% for Article 14 & 15 Members

At present the reduction is two percentage points for members other than members in the Coordinated Retirement Plan. In general, the retirement and death benefits payable to or on account of members are supplemented by the reserve for increased-take-home-pay, accumulated from City contributions equal to the increased-take-home-pay rate times salary so that in general, the total benefit is equal to the benefit which would have been paid if the members' rates of contribution had not been reduced. However, the reserve for increased-take-home-pay is not payable upon death of a member who joins after June 30, 1973.

**B. EMPLOYER CONTRIBUTIONS**

The Entry Age Normal cost method of funding is utilized by the Plan's Actuary to calculate the contributions required of the employers.

Employer contributions are accrued by the Plan and are funded by the employers on a current basis.



# STATISTICAL

- Introduction 121
- Schedule of Revenue by Source - QPP 122
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- Schedule of Refunds by Type - QPP 126
- Schedule of Changes in Net Position - QPP 128
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- Schedule of Annual Average Benefit Payment Amounts - QPP 139
- Schedule of Participating Employers - QPP 140



## *Your Success*

*Growth over time will allow you to reap the rewards of your pension benefits.*



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## Qualified Pension Plan and Tax Deferred Annuity Program Statistical Section

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### INTRODUCTION:

The Statistical section presents three sets of data. The first group of data is comprised of six (6) schedules and accompanying graphs that provide a comparative horizontal base of the financials over a ten-year spread for the QPP and four year spread for the TDA. The second group of data offers an analysis of the BERS benefit payments based on demographic information. The third and final group gives a comparative analysis of the contributors based on their salary and their provenance.

The schedules and graphs of the first group are:

- (A) Revenue by source for the QPP
- (B) Expenses by type for the QPP
- (C) Refunds by type for the QPP
- (D) Schedule of changes in QPP net position
- (E) Schedule of changes in TDA net position
- (F) Benefit expenses by type for the QPP

The second group of data is comprised of the following: QPP

- (A) Age and service retirement
- (B) Ordinary disability retirement
- (C) Accidental disability retirement
- (D) Accidental death retirement
- (E) Other beneficiaries
- (G) All pensioners and beneficiaries

The third group of data is comprised of the following: QPP

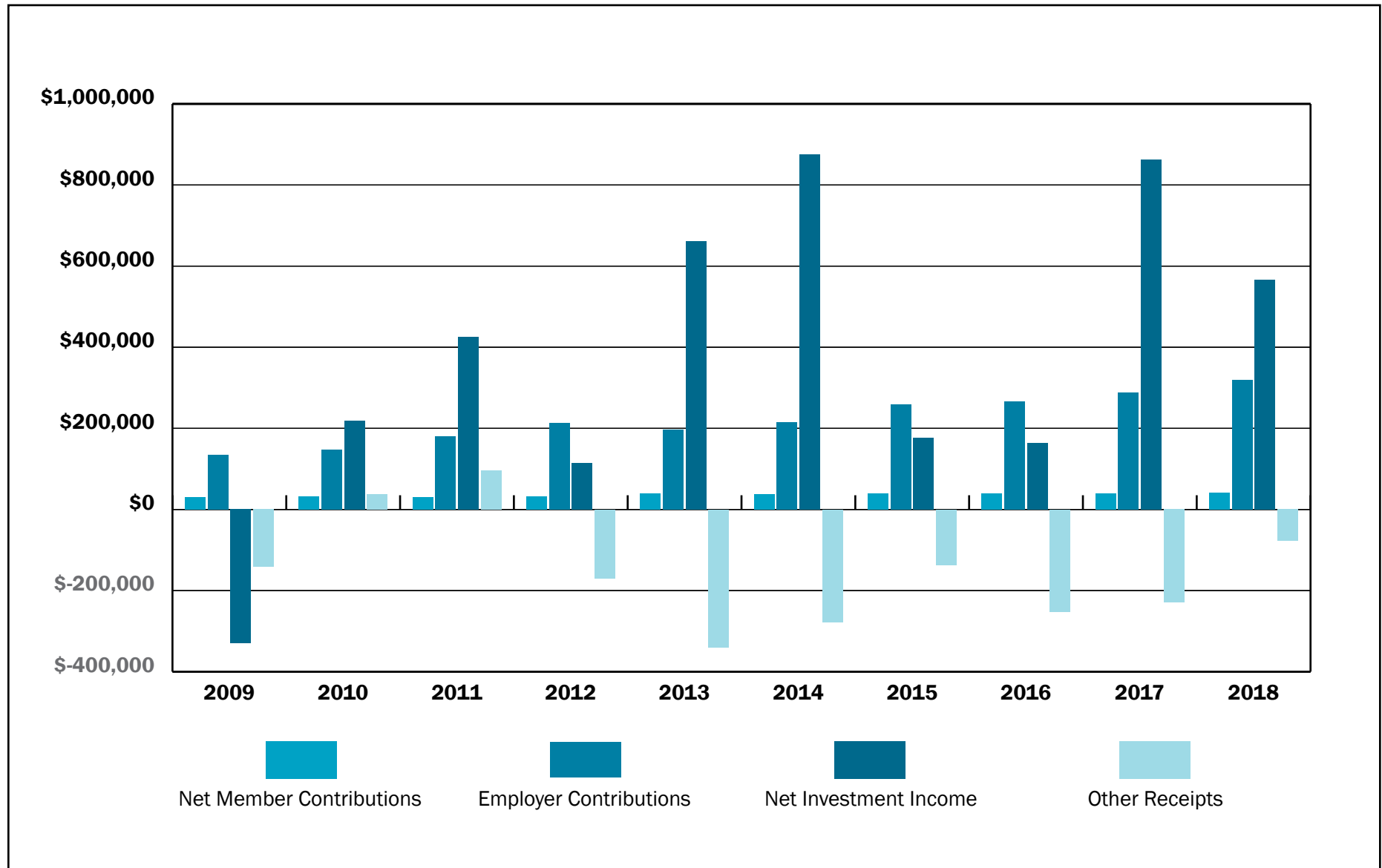
- (A) Summary of activities by Age and Service
- (B) Average annual benefit payments
- (C) Participating Employers

**Qualified Pension Plan  
Schedule of Revenue by Source  
(In thousands)**

Fiscal Year Ended June 30	Net Member Contributions	Employer Contributions	Net Investment Income	Other Receipts	Total	Employer Contributions as % of Payroll
2009	\$30,971	\$134,225	(\$329,365)	(\$141,090)	<b>(\$305,259)</b>	17.3
2010	\$31,361	\$147,349	\$218,872	\$38,232	<b>\$435,814</b>	17.3
2011	\$31,008	\$180,191	\$425,690	\$95,958	<b>\$732,847</b>	19.8
2012	\$32,866	\$213,651	\$113,738	(\$170,091)	<b>\$190,164</b>	23.4
2013	\$39,056	\$196,246	\$660,827	(\$340,057)	<b>\$556,072</b>	21.3
2014	\$37,193	\$214,590	\$875,453	(\$277,531)	<b>\$849,705</b>	21.1
2015	\$39,564	\$258,099	\$177,166	(\$137,125)	<b>\$337,704</b>	24.5
2016	\$38,581	\$265,532	\$164,144	(\$252,288)	<b>\$215,969</b>	25.4
2017	\$39,821	\$288,233	\$862,510	(\$229,508)	<b>\$961,056</b>	26.3
2018	\$40,846	\$318,643	\$565,577	(\$76,948)	<b>\$848,118</b>	27.7

The table offers a horizontal comparison base for the revenue sources of the Plan for the past 10 years. It particularly highlights the impact of employer contributions that have steadily increased over these years.

**Qualified Pension Plan  
Schedule of Revenue by Source  
(In thousands)**

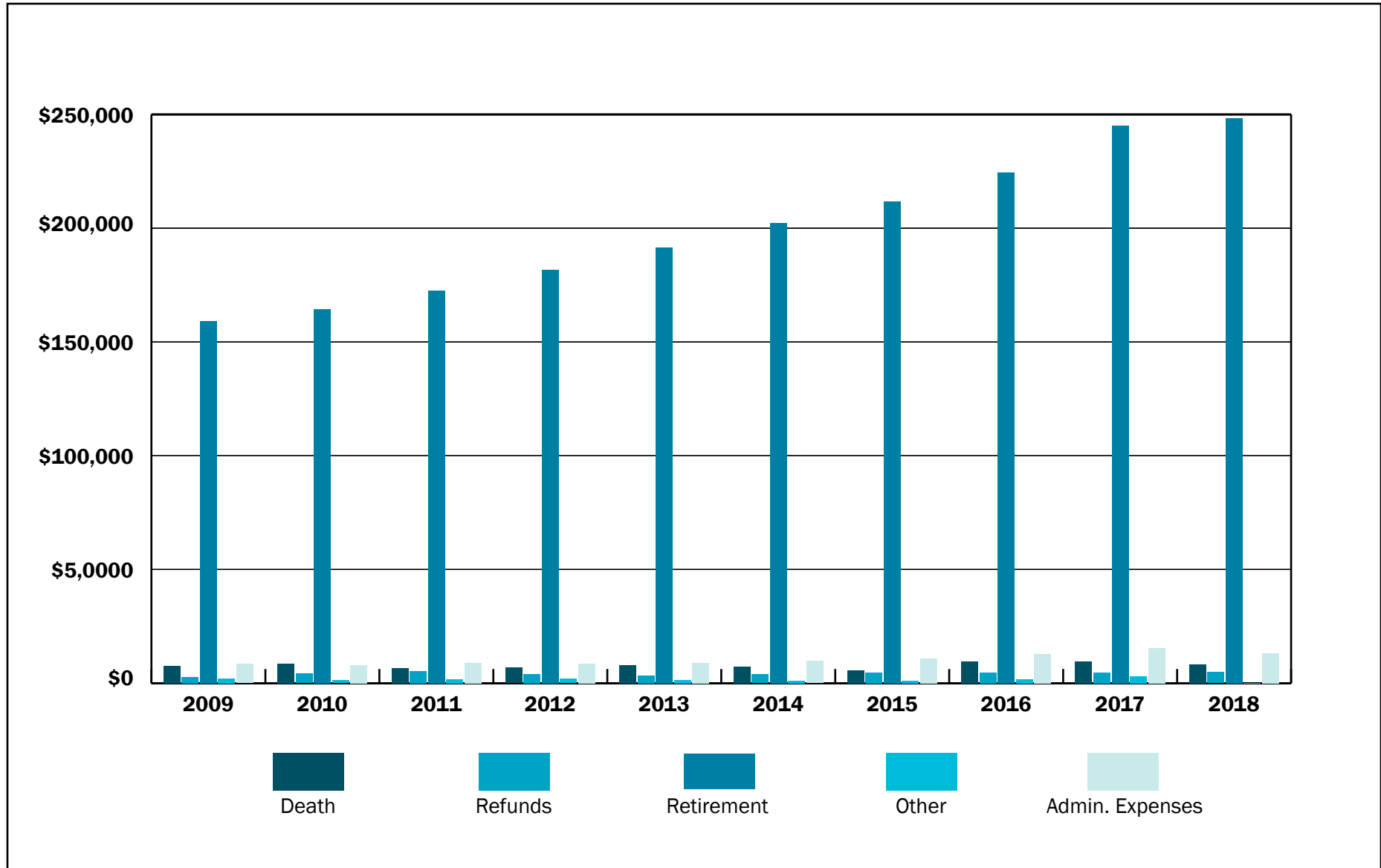


**Qualified Pension Plan  
Schedule of Expenses by Type  
(In thousands)**

Fiscal Year Ended June 30	Benefit Payments				Administrative Expenses	Total
	Death	Refund	Retirement	Other		
2009	\$7,544	\$2,768	\$159,262	\$2,018	\$8,413	<b>\$180,006</b>
2010	\$8,548	\$4,207	\$164,362	\$1,296	\$8,047	<b>\$186,460</b>
2011	\$6,686	\$5,237	\$172,680	\$1,662	\$8,892	<b>\$195,158</b>
2012	\$6,827	\$4,009	\$181,735	\$1,936	\$8,687	<b>\$203,194</b>
2013	\$7,858	\$3,360	\$191,463	\$1,412	\$8,927	<b>\$213,020</b>
2014	\$7,274	\$3,827	\$202,233	\$981	\$9,776	<b>\$224,091</b>
2015	\$5,765	\$4,614	\$211,693	\$1,172	\$10,956	<b>\$234,200</b>
2016	\$9,580	\$4,750	\$224,639	\$1,758	\$12,818	<b>\$253,545</b>
2017	\$9,570	\$4,687	\$245,066	\$3,109	\$15,486	<b>\$277,918</b>
2018	\$8,208	\$4,808	\$248,429	\$130	\$13,212	<b>\$274,786</b>

The table offers a horizontal comparison base for the expense groups of the Plan for the past 10 years.

**Qualified Pension Plan  
Schedule of Expenses by Type  
(In thousands)**



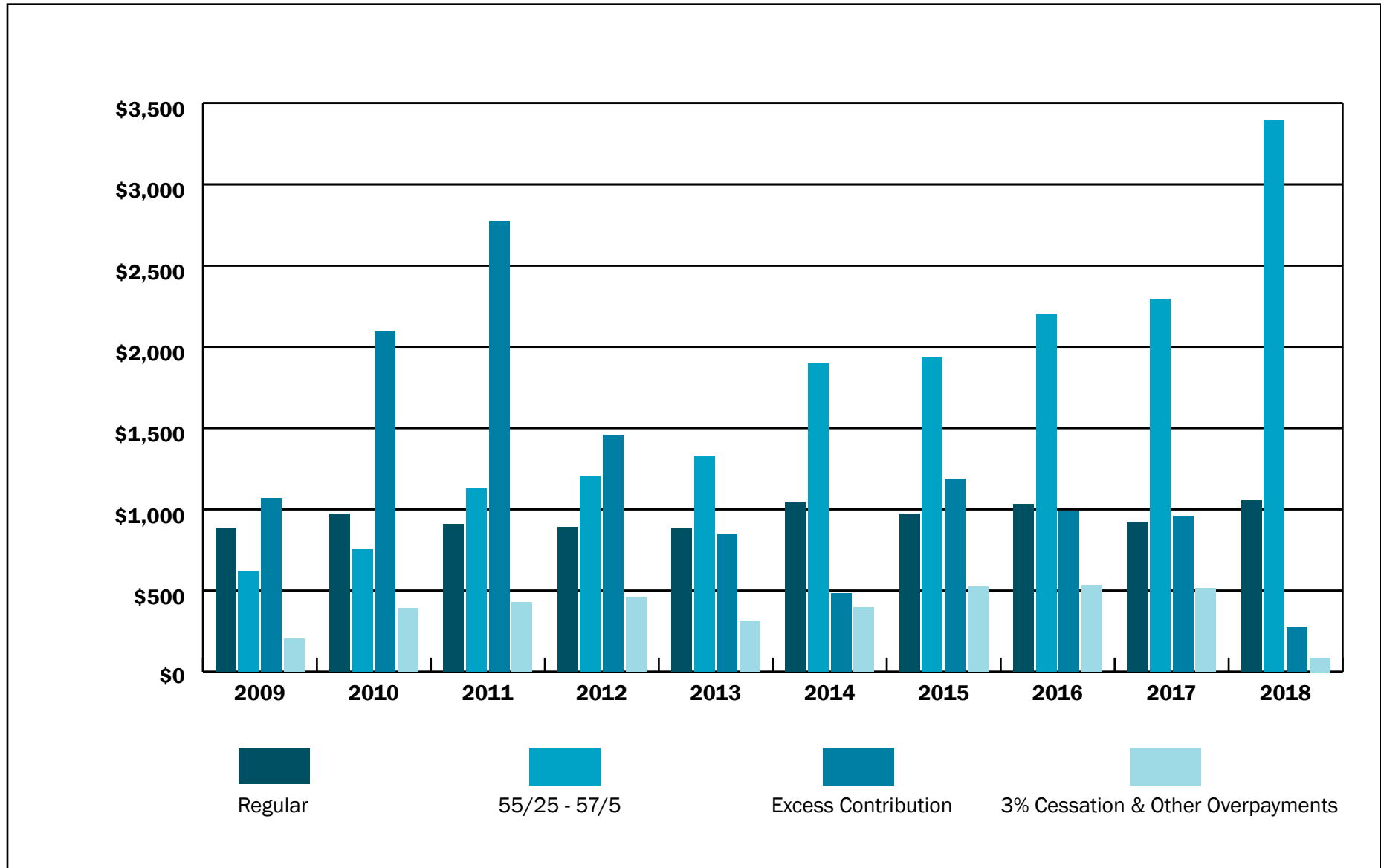


**Qualified Pension Plan  
Schedule of Refunds by Type  
(In thousands)**

Fiscal Year Ended June 30	Refunds				Total
	Regular Resignation	Add. Pension 55/25 - 57/5	Excess Contribution	3% Cessation & Other Overpayments	
2009	\$879	\$620	\$1,067	\$202	<b>\$2,768</b>
2010	\$971	\$754	\$2,092	\$390	<b>\$4,207</b>
2011	\$909	\$1,129	\$2,772	\$427	<b>\$5,237</b>
2012	\$888	\$1,206	\$1,456	\$459	<b>\$4,009</b>
2013	\$880	\$1,322	\$846	\$312	<b>\$3,360</b>
2014	\$1,047	\$1,899	\$484	\$397	<b>\$3,827</b>
2015	\$973	\$1,933	\$1,186	\$522	<b>\$4,614</b>
2016	\$1,033	\$2,198	\$986	\$533	<b>\$4,750</b>
2017	\$920	\$2,295	\$957	\$515	<b>\$4,687</b>
2018	\$1,053	\$3,397	\$271	\$87	<b>\$4,808</b>

The table offers a horizontal comparison base for the refund segment of the expense groups of the Plan for the past 10 years.

**Qualified Pension Plan  
Schedule of Refunds by Type  
(In thousands)**

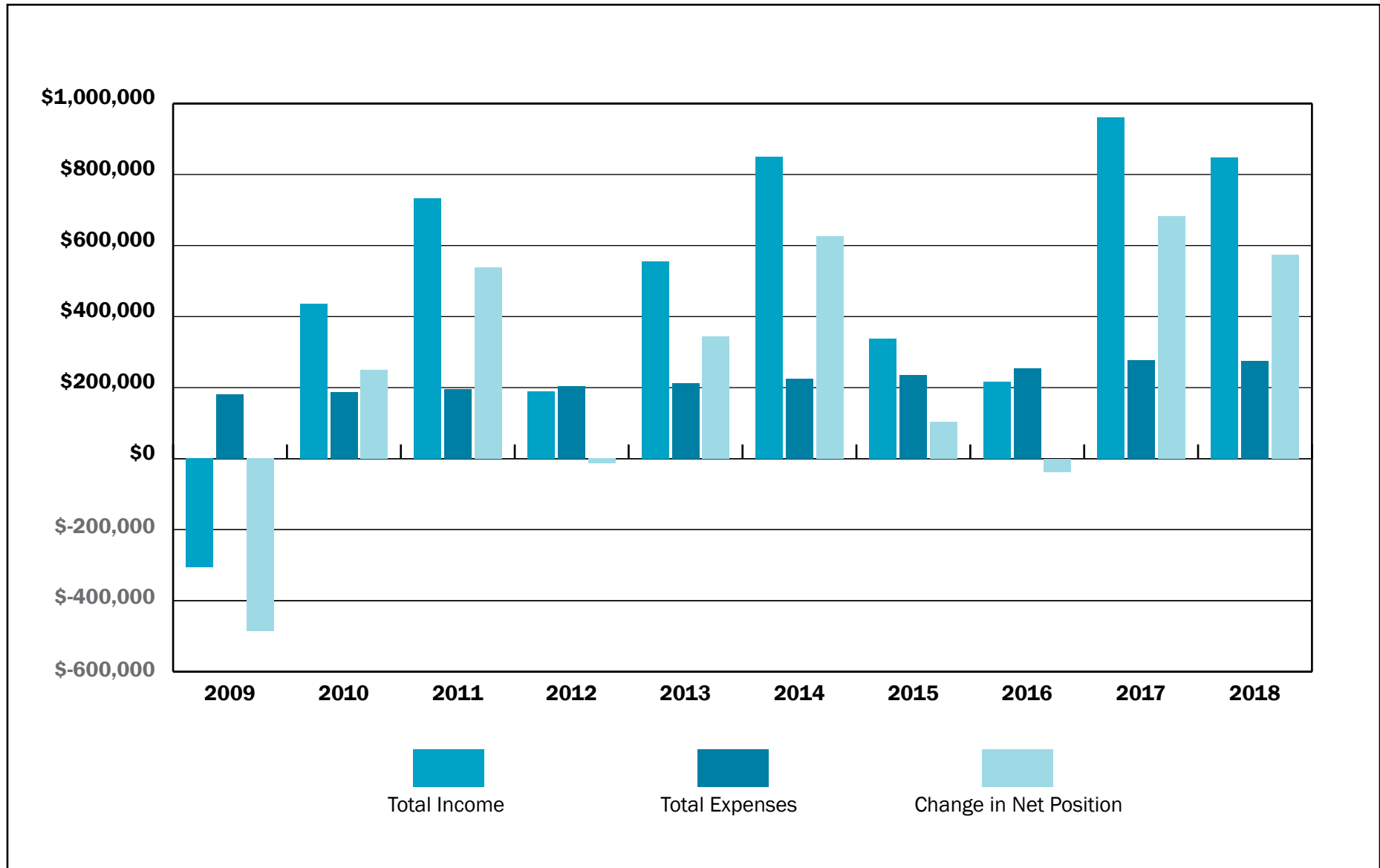


**Qualified Pension Plan  
Schedule of Changes in Net Position  
(In thousands)**

Year Ended	Member Contributions	Employer Contributions	Net Investment Income	Other Receipts	Total Income	Benefit Payments				Administrative Expenses	Total Expenses	Change in Net Position
						Death	Refund	Retirement	Other			
2009	\$30,971	\$134,225	(\$329,365)	(\$141,090)	<b>(\$305,259)</b>	\$7,544	\$2,768	\$159,262	\$2,018	\$8,413	<b>\$180,006</b>	(\$485,265)
2010	\$31,361	\$147,349	\$218,872	\$38,232	<b>\$435,814</b>	\$8,548	\$4,207	\$164,362	\$1,296	\$8,047	<b>\$186,460</b>	\$249,354
2011	\$31,008	\$180,191	\$425,690	\$95,958	<b>\$732,847</b>	\$6,686	\$5,237	\$172,680	\$1,662	\$8,892	<b>\$195,158</b>	\$537,689
2012	\$32,866	\$213,651	\$113,738	(\$170,091)	<b>\$190,164</b>	\$6,827	\$4,009	\$181,735	\$1,936	\$8,687	<b>\$203,194</b>	(\$13,030)
2013	\$39,056	\$196,246	\$660,827	(\$340,057)	<b>\$556,072</b>	\$7,858	\$3,360	\$191,463	\$1,412	\$8,927	<b>\$213,020</b>	\$343,052
2014	\$37,193	\$214,590	\$875,453	(\$277,531)	<b>\$849,705</b>	\$7,274	\$3,827	\$202,233	\$981	\$9,776	<b>\$224,091</b>	\$625,614
2015	\$39,564	\$258,099	\$177,166	(\$137,125)	<b>\$337,704</b>	\$5,765	\$4,614	\$211,693	\$1,172	\$10,956	<b>\$234,200</b>	\$103,504
2016	\$38,581	\$265,532	\$164,144	(\$252,288)	<b>\$215,969</b>	\$9,580	\$4,750	\$224,639	\$1,758	\$12,818	<b>\$253,545</b>	(\$37,576)
2017	\$39,821	\$288,233	\$862,510	(\$229,508)	<b>\$961,056</b>	\$9,570	\$4,687	\$245,066	\$3,109	\$15,486	<b>\$277,918</b>	\$683,138
2018	\$40,846	\$318,643	\$565,577	(\$76,948)	<b>\$848,118</b>	\$8,208	\$4,808	\$248,429	\$130	\$13,212	<b>\$274,786</b>	\$573,332

The table offers a 10 year horizontal comparison base for the operations of the BERS.

**Qualified Pension Plan  
Schedule of Changes in Net Position  
(In thousands)**



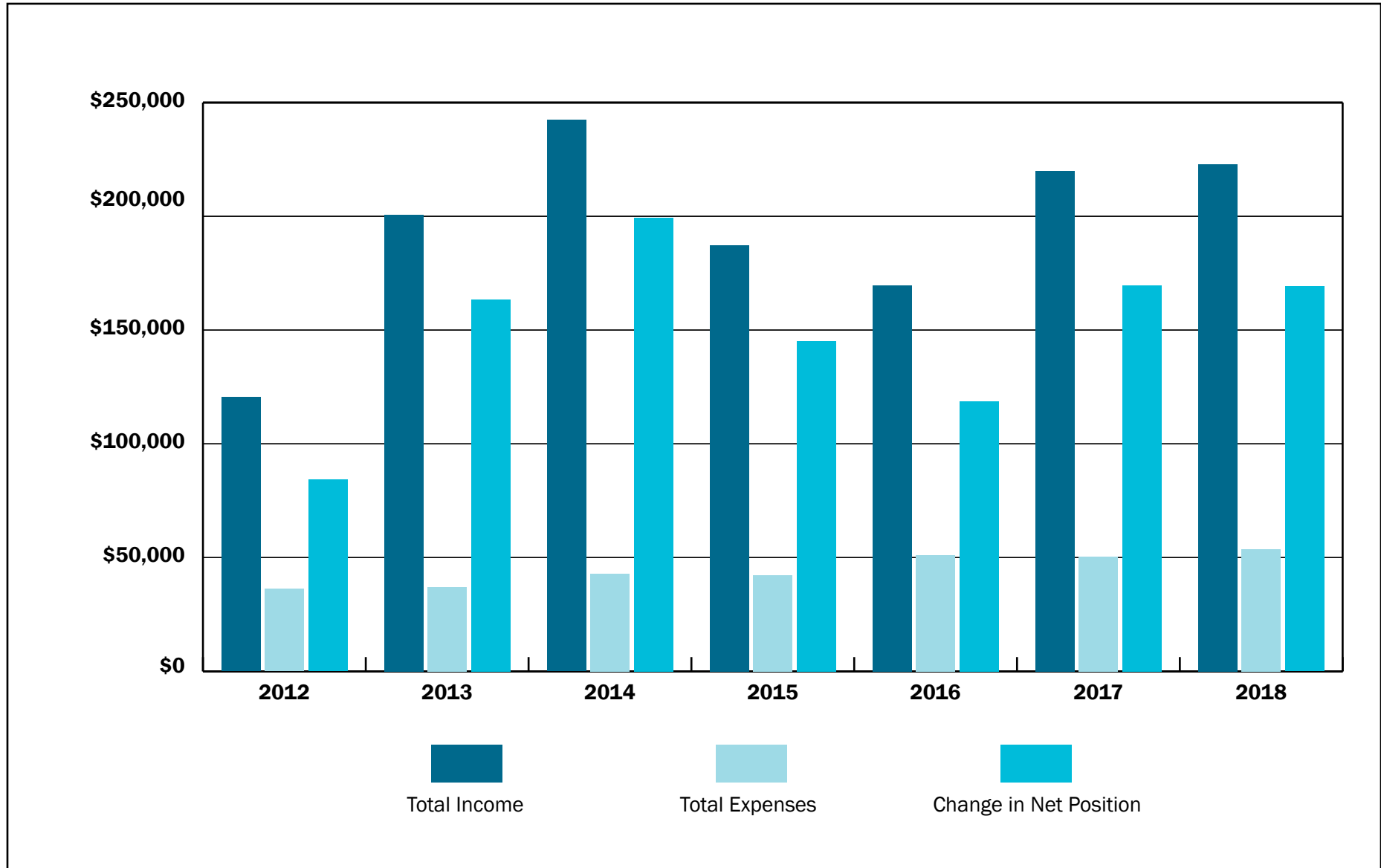
**Tax Deferred Annuity Program**  
**Schedule of Changes in Net Position**  
(In thousands)

Year Ended	Participant Contributions	Net Investment Income	Other Receipts	Transfer of Investment Income	Total Income	Benefit Payments				Administrative Expenses	Total Expenses	Change in Net Position
						Death	Refund	Retirement	Other			
2012	\$59,024	\$6,468	\$26,593	\$28,396	<b>\$120,481</b>	\$8,272	\$25,146	\$325	\$68	\$2,445	<b>\$36,256</b>	\$84,225
2013	\$61,550	\$62,134	(\$86,810)	\$163,756	<b>\$200,630</b>	\$6,523	\$27,802	\$301	\$31	\$2,455	<b>\$37,112</b>	\$163,518
2014	\$63,767	\$82,223	(\$110,273)	\$206,615	<b>\$242,332</b>	\$9,242	\$30,755	\$354	\$59	\$2,531	<b>\$42,941</b>	\$199,391
2015	\$74,890	\$22,950	\$4,448	\$85,104	<b>\$187,392</b>	\$4,133	\$34,707	\$370	\$12	\$3,033	<b>\$42,255</b>	\$145,137
2016	\$77,459	\$1,049	(\$3,541)	\$94,789	<b>\$169,756</b>	\$13,292	\$36,467	\$351	\$80	\$850	<b>\$51,039</b>	\$118,717
2017	\$85,765	\$75,739	(\$48,113)	\$106,554	<b>\$219,945</b>	\$9,415	\$40,371	\$323	\$99	\$125	<b>\$50,333</b>	\$169,612
2018	\$89,972	\$59,168	(\$54,240)	\$127,972	<b>\$222,872</b>	\$10,851	\$42,427	\$338	\$52	\$84	<b>\$53,752</b>	\$169,120

The table offers a 7 year horizontal comparison base for the operations of the BERS TDA Program.



**Tax Deferred Annuity Program  
Schedule of Changes in Net Position  
(In thousands)**



**Qualified Pension Plan**  
**Schedule of Benefit Expenses by Type**  
(In thousands)

Fiscal Year Ended June 30	Age and Service Retirement Benefits	Disability Retirement Benefits		Lump Sum Payments		Total
		Duty	Non-Duty	Death In Service	Survivors	
2009	\$153,124	\$1,980	\$4,158	\$6,188	\$1,356	<b>\$166,806</b>
2010	\$157,760	\$2,130	\$4,472	\$6,887	\$1,661	<b>\$172,910</b>
2011	\$165,580	\$2,291	\$4,810	\$5,328	\$1,357	<b>\$179,366</b>
2012	\$174,099	\$2,464	\$5,173	\$5,035	\$1,791	<b>\$188,562</b>
2013	\$183,250	\$2,649	\$5,564	\$5,890	\$1,968	<b>\$199,321</b>
2014	\$193,400	\$2,849	\$5,984	\$4,768	\$2,506	<b>\$209,507</b>
2015	\$202,193	\$3,065	\$6,435	\$3,642	\$2,124	<b>\$217,459</b>
2016	\$214,422	\$3,296	\$6,921	\$7,094	\$2,486	<b>\$234,219</b>
2017	\$234,057	\$3,551	\$7,458	\$6,571	\$2,999	<b>\$254,636</b>
2018	\$236,588	\$3,820	\$8,021	\$5,165	\$3,043	<b>\$256,637</b>

The table offers a horizontal comparison base for the benefit segment of the expense groups of the Plan across the past 10 years.

**Qualified Pension Plan  
Schedule of Retired Members by Type of Benefits**

**AGE AND SERVICE RETIREMENT**

Age of Retirants	Men		Women	
	Number of Retirants	Average Annual Allowance	Number of Retirants	Average Annual Allowance
49 & UNDER	0	\$0	2	\$13,874
50 - 54	10	44,180	5	27,650
55 - 59	90	28,553	273	11,241
60 - 64	343	31,458	1253	12,465
65 - 69	631	28,960	2606	11,025
70 - 74	585	28,498	2577	10,500
75 - 79	465	28,240	1997	8,955
80 - 84	379	25,396	1429	8,522
85 - 89	258	24,843	1149	7,997
90 & OVER	143	23,744	839	7,808
<b>TOTALS</b>	<b>2,904</b>	<b>\$27,999</b>	<b>12,130</b>	<b>\$9,929</b>

**ORDINARY DISABILITY (NON-DUTY) RETIREMENT**

Age of Retirants	Men		Women	
	Number of Retirants	Average Annual Allowance	Number of Retirants	Average Annual Allowance
49 & UNDER	2	\$16,407	17	\$15,741
50 - 54	22	19,784	37	12,588
55 - 59	43	16,913	98	11,402
60 - 64	57	16,569	151	11,208
65 - 69	43	16,556	175	9,975
70 - 74	33	15,238	131	9,641
75 - 79	14	12,595	69	9,158
80 - 84	7	14,414	18	8,386
85 - 89	7	14,132	9	9,863
90 & OVER	2	15,784	2	9,235
<b>TOTALS</b>	<b>230</b>	<b>\$16,358</b>	<b>707</b>	<b>\$10,526</b>

NOTE: This schedule is based on 2016 data (LAG)

**Qualified Pension Plan**  
**Schedule of Retired Members by Type of Benefits**  
**(Cont'd)**

**ACCIDENTAL DISABILITY (DUTY) RETIREMENT**

Age of Retirants	Men		Women	
	Number of Retirants	Average Annual Allowance	Number of Retirants	Average Annual Allowance
49 & UNDER	0	\$0	3	\$7,583
50 - 54	5	26,354	4	9,301
55 - 59	9	15,877	15	11,233
60 - 64	7	17,025	20	15,941
65 - 69	9	15,347	25	9,442
70 - 74	8	19,666	13	7,074
75 - 79	8	26,142	14	7,085
80 - 84	3	25,794	11	7,195
85 - 89	3	34,860	4	6,368
90 & OVER	3	19,959	4	6,998
<b>TOTALS</b>	<b>55</b>	<b>\$20,732</b>	<b>113</b>	<b>\$9,797</b>

**ACCIDENTAL DEATH (DUTY) RETIREMENT**

Age of Retirants	Men		Women	
	Number of Retirants	Average Annual Allowance	Number of Retirants	Average Annual Allowance
49 & UNDER	0	\$0	0	\$0
50 - 54	0	0	0	0
55 - 59	1	6,028	0	0
60 - 64	0	0	0	0
65 - 69	0	0	0	0
70 - 74	0	0	0	0
75 - 79	0	0	0	0
80 - 84	1	9,205	0	0
85 - 89	0	0	0	0
90 & OVER	0	0	0	0
<b>TOTALS</b>	<b>2</b>	<b>\$7,662</b>	<b>0</b>	<b>\$0</b>

NOTE: This schedule is based on 2016 data (LAG)

Qualified Pension Plan  
Schedule of Retired Members by Type of Benefits  
(Cont'd)

## OTHER BENEFICIARIES

Age of Retirants	Men		Women	
	Number of Retirants	Average Annual Allowance	Number of Retirants	Average Annual Allowance
49 & UNDER	24	\$7,713	42	\$9,470
50 - 54	10	3,515	23	7,331
55 - 59	12	3,470	20	11,265
60 - 64	12	11,244	37	11,110
65 - 69	21	8,403	59	16,059
70 - 74	26	8,739	62	16,050
75 - 79	22	8,281	95	22,356
80 - 84	20	9,025	100	20,290
85 - 89	22	11,744	92	16,697
90 & OVER	11	13,065	86	16,866
<b>TOTALS</b>	<b>180</b>	<b>\$8,696</b>	<b>616</b>	<b>\$16,696</b>

## ALL PENSIONERS AND BENEFICIARIES

Age of Retirants	Men		Women	
	Number of Retirants	Average Annual Allowance	Number of Retirants	Average Annual Allowance
49 & UNDER	26	\$8,382	64	\$11,185
50 - 54	47	22,212	69	11,737
55 - 59	155	22,501	406	11,281
60 - 64	419	28,613	1,461	12,349
65 - 69	704	27,415	2,865	11,050
70 - 74	652	26,931	2,783	10,567
75 - 79	509	26,914	2,175	9,535
80 - 84	410	24,374	1,558	9,266
85 - 89	290	23,694	1,254	8,643
90 & OVER	159	22,833	931	8,645
<b>TOTALS</b>	<b>3,371</b>	<b>\$26,043</b>	<b>13,566</b>	<b>\$10,267</b>

NOTE: This schedule is based on 2016 data (LAG)



**Qualified Pension Plan**  
**Schedule of Active Members by Age and Service**  
**Male**

**DATA USED IN THE JUNE 30, 2016 (LAG) ACTUARIAL VALUATION**  
**FOR DETERMINING FISCAL YEAR 2018 EMPLOYER CONTRIBUTIONS**

Age \ Svc	Under 5	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 & Up	All Years
<b>Number:</b>										
UNDER 20	1	0	0	0	0	0	0	0	0	1
20 TO 24	64	0	0	0	0	0	0	0	0	64
25 TO 29	278	24	2	0	0	0	0	0	0	304
30 TO 34	382	114	13	1	0	0	0	0	0	510
35 TO 39	333	156	97	22	0	0	0	0	0	608
40 TO 44	274	205	190	80	14	0	0	0	0	763
45 TO 49	289	175	214	138	57	18	0	0	0	891
50 TO 54	310	172	198	149	87	91	13	2	0	1,022
55 TO 59	250	162	150	174	108	136	60	9	1	1,050
60 TO 64	131	104	107	103	58	88	53	24	5	673
65 TO 69	55	46	62	37	18	17	12	13	9	269
70 & UP	26	33	32	22	6	16	9	0	2	146
<b>TOTAL</b>	<b>2,393</b>	<b>1,191</b>	<b>1,065</b>	<b>726</b>	<b>348</b>	<b>366</b>	<b>147</b>	<b>48</b>	<b>17</b>	<b>6,301</b>

<b>Salaries (In thousands):</b>										
UNDER 20	27	0	0	0	0	0	0	0	0	27
20 TO 24	2,163	0	0	0	0	0	0	0	0	2,163
25 TO 29	11,735	1,056	115	0	0	0	0	0	0	12,906
30 TO 34	17,948	6,404	738	27	0	0	0	0	0	25,117
35 TO 39	16,916	10,784	6,468	1,211	0	0	0	0	0	35,380
40 TO 44	14,022	14,837	14,796	5,484	861	0	0	0	0	50,000
45 TO 49	13,580	11,511	17,324	9,972	4,544	1,096	0	0	0	58,027
50 TO 54	14,428	11,601	14,522	11,234	6,819	7,916	1,009	159	0	67,688
55 TO 59	10,802	9,740	10,761	12,554	7,875	12,649	5,318	946	129	70,775
60 TO 64	6,228	6,368	7,471	7,077	4,574	7,680	4,888	2,466	461	47,214
65 TO 69	1,885	2,377	3,220	2,479	1,368	1,558	1,213	1,454	922	16,475
70 & UP	917	1,411	1,446	1,173	508	1,105	722	0	174	7,457
<b>TOTAL *</b>	<b>110,651</b>	<b>76,089</b>	<b>76,861</b>	<b>51,211</b>	<b>26,550</b>	<b>32,003</b>	<b>13,149</b>	<b>5,025</b>	<b>1,686</b>	<b>393,227</b>

<b>Average Salaries: **</b>										
UNDER 20	26,711	0	0	0	0	0	0	0	0	26,711
20 TO 24	33,800	0	0	0	0	0	0	0	0	33,800
25 TO 29	42,213	44,003	57,271	0	0	0	0	0	0	42,453
30 TO 34	46,983	56,180	56,800	26,562	0	0	0	0	0	49,249
35 TO 39	50,799	69,131	66,681	55,060	0	0	0	0	0	58,190
40 TO 44	51,177	72,375	77,873	68,545	61,488	0	0	0	0	65,530
45 TO 49	46,989	65,777	80,953	72,264	79,713	60,879	0	0	0	65,125
50 TO 54	46,543	67,445	73,344	75,396	78,377	86,986	77,639	79,317	0	66,231
55 TO 59	43,209	60,121	71,741	72,149	72,921	93,009	88,628	105,160	129,350	67,405
60 TO 64	47,542	61,235	69,819	68,711	78,868	87,277	92,222	102,765	92,194	70,155
65 TO 69	34,266	51,673	51,937	67,003	76,022	91,625	101,059	111,837	102,394	61,245
70 & UP	35,256	42,760	45,202	53,326	84,725	69,039	80,222	0	87,159	51,073
<b>TOTAL</b>	<b>46,239</b>	<b>63,887</b>	<b>72,170</b>	<b>70,539</b>	<b>76,293</b>	<b>87,441</b>	<b>89,452</b>	<b>104,694</b>	<b>99,187</b>	<b>62,407</b>

NOTE: Age is last birthday. Service is completed years.

\* Total may not add up due to rounding.

\*\* Average based on unrounded salary.

Qualified Pension Plan  
Schedule of Active Members by Age and Service  
Female

**DATA USED IN THE JUNE 30, 2016 (LAG) ACTUARIAL VALUATION  
FOR DETERMINING FISCAL YEAR 2018 EMPLOYER CONTRIBUTIONS**

Age \ Svc	Under 5	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 & Up	All Years
<b>Number:</b>										
UNDER 20	1	0	0	0	0	0	0	0	0	1
20 TO 24	79	1	0	0	0	0	0	0	0	80
25 TO 29	555	33	0	0	0	0	0	0	0	588
30 TO 34	751	205	37	2	0	0	0	0	0	995
35 TO 39	778	398	229	33	1	0	0	0	0	1,439
40 TO 44	822	440	350	171	23	0	0	0	0	1,806
45 TO 49	1,061	588	473	328	81	28	3	0	0	2,562
50 TO 54	1,095	819	821	612	172	91	34	3	0	3,647
55 TO 59	832	717	815	906	305	150	82	19	0	3,826
60 TO 64	474	458	613	732	299	197	60	32	16	2,881
65 TO 69	170	156	234	301	178	118	27	13	11	1,208
70 & UP	63	55	84	114	95	88	21	4	6	530
<b>TOTAL</b>	<b>6,681</b>	<b>3,870</b>	<b>3,656</b>	<b>3,199</b>	<b>1,154</b>	<b>672</b>	<b>227</b>	<b>71</b>	<b>33</b>	<b>19,563</b>

**Salaries (In thousands):**

UNDER 20	49	0	0	0	0	0	0	0	0	49
20 TO 24	2,763	40	0	0	0	0	0	0	0	2,803
25 TO 29	26,620	1,626	0	0	0	0	0	0	0	28,247
30 TO 34	37,553	12,808	1,951	62	0	0	0	0	0	52,374
35 TO 39	34,706	23,665	14,337	1,574	91	0	0	0	0	74,373
40 TO 44	30,046	20,858	19,963	9,880	1,353	0	0	0	0	82,101
45 TO 49	34,096	23,214	19,702	14,341	4,744	1,552	260	0	0	97,909
50 TO 54	33,117	28,329	29,403	22,758	8,172	5,435	2,457	155	0	129,826
55 TO 59	24,245	24,980	27,908	31,085	11,642	7,173	5,835	1,383	0	134,251
60 TO 64	14,143	15,556	21,230	24,028	10,947	7,984	3,803	2,172	1,035	100,898
65 TO 69	4,342	4,554	7,741	9,012	5,840	4,280	1,324	653	775	38,521
70 & UP	1,530	1,545	2,071	3,106	2,322	2,561	729	257	319	14,440
<b>TOTAL *</b>	<b>243,211</b>	<b>157,177</b>	<b>144,306</b>	<b>115,847</b>	<b>45,112</b>	<b>28,985</b>	<b>14,407</b>	<b>4,619</b>	<b>2,129</b>	<b>755,793</b>

**Average Salaries: \*\***

UNDER 20	48,696	0	0	0	0	0	0	0	0	48,696
20 TO 24	34,975	40,322	0	0	0	0	0	0	0	35,041
25 TO 29	47,965	49,279	0	0	0	0	0	0	0	48,039
30 TO 34	50,004	62,479	52,718	31,121	0	0	0	0	0	52,637
35 TO 39	44,610	59,460	62,608	47,682	91,089	0	0	0	0	51,684
40 TO 44	36,552	47,404	57,038	57,777	58,841	0	0	0	0	45,460
45 TO 49	32,136	39,479	41,654	43,724	58,571	55,430	86,612	0	0	38,216
50 TO 54	30,244	34,590	35,813	37,186	47,511	59,724	72,267	51,523	0	35,598
55 TO 59	29,141	34,840	34,242	34,311	38,172	47,819	71,155	72,777	0	35,089
60 TO 64	29,837	33,965	34,633	32,826	36,611	40,529	63,377	67,862	64,716	35,022
65 TO 69	25,541	29,194	33,083	29,940	32,809	36,269	49,019	50,237	70,481	31,889
70 & UP	24,291	28,094	24,654	27,243	24,447	29,102	34,728	64,190	53,083	27,245
<b>TOTAL</b>	<b>36,403</b>	<b>40,614</b>	<b>39,471</b>	<b>36,213</b>	<b>39,092</b>	<b>43,132</b>	<b>63,467</b>	<b>65,053</b>	<b>64,523</b>	<b>38,634</b>

NOTE: Age is last birthday. Service is completed years.

\* Total may not add up due to rounding.

\*\* Average based on unrounded salary.

**Qualified Pension Plan  
Schedule of Active Members by Age and Service  
Male and Female**

**DATA USED IN THE JUNE 30, 2016 (LAG) ACTUARIAL VALUATION  
FOR DETERMINING FISCAL YEAR 2018 EMPLOYER CONTRIBUTIONS**

Age \ Svc	Under 5	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 & Up	All Years
<b>Number:</b>										
UNDER 20	2	0	0	0	0	0	0	0	0	2
20 TO 24	143	1	0	0	0	0	0	0	0	144
25 TO 29	833	57	2	0	0	0	0	0	0	892
30 TO 34	1,133	319	50	3	0	0	0	0	0	1,505
35 TO 39	1,111	554	326	55	1	0	0	0	0	2,047
40 TO 44	1,096	645	540	251	37	0	0	0	0	2,569
45 TO 49	1,350	763	687	466	138	46	3	0	0	3,453
50 TO 54	1,405	991	1,019	761	259	182	47	5	0	4,669
55 TO 59	1,082	879	965	1,080	413	286	142	28	1	4,876
60 TO 64	605	562	720	835	357	285	113	56	21	3,554
65 TO 69	225	202	296	338	196	135	39	26	20	1,477
70 & UP	89	88	116	136	101	104	30	4	8	676
<b>TOTAL</b>	<b>9,074</b>	<b>5,061</b>	<b>4,721</b>	<b>3,925</b>	<b>1,502</b>	<b>1,038</b>	<b>374</b>	<b>119</b>	<b>50</b>	<b>25,864</b>

<b>Salaries (In thousands):</b>										
UNDER 20	75	0	0	0	0	0	0	0	0	75
20 TO 24	4,926	40	0	0	0	0	0	0	0	4,967
25 TO 29	38,356	2,682	115	0	0	0	0	0	0	41,152
30 TO 34	55,501	19,213	2,689	89	0	0	0	0	0	77,491
35 TO 39	51,622	34,449	20,805	2,785	91	0	0	0	0	109,753
40 TO 44	44,068	35,695	34,759	15,363	2,214	0	0	0	0	132,100
45 TO 49	47,676	34,725	37,026	24,314	9,288	2,648	260	0	0	155,936
50 TO 54	47,546	39,930	43,925	33,992	14,991	13,351	3,466	313	0	197,514
55 TO 59	35,047	34,720	38,669	43,639	19,518	19,822	11,152	2,329	129	205,026
60 TO 64	20,371	21,924	28,701	31,106	15,521	15,664	8,690	4,638	1,496	148,112
65 TO 69	6,227	6,931	10,961	11,491	7,208	5,837	2,536	2,107	1,697	54,996
70 & UP	2,447	2,956	3,517	4,279	2,831	3,666	1,451	257	493	21,897
<b>TOTAL *</b>	<b>353,862</b>	<b>233,266</b>	<b>221,168</b>	<b>167,058</b>	<b>71,662</b>	<b>60,988</b>	<b>27,557</b>	<b>9,644</b>	<b>3,815</b>	<b>1,149,020</b>

<b>Average Salaries: **</b>										
UNDER 20	37,704	0	0	0	0	0	0	0	0	37,704
20 TO 24	34,449	40,322	0	0	0	0	0	0	0	34,490
25 TO 29	46,045	47,058	57,271	0	0	0	0	0	0	46,135
30 TO 34	48,986	60,228	53,780	29,601	0	0	0	0	0	51,489
35 TO 39	46,465	62,183	63,820	50,633	91,089	0	0	0	0	53,617
40 TO 44	40,208	55,341	64,369	61,209	59,843	0	0	0	0	51,421
45 TO 49	35,315	45,511	53,895	52,176	67,304	57,562	86,612	0	0	45,160
50 TO 54	33,840	40,293	43,106	44,668	57,879	73,355	73,753	62,640	0	42,303
55 TO 59	32,391	39,499	40,071	40,407	47,259	69,308	78,538	83,186	129,350	42,048
60 TO 64	33,671	39,012	39,862	37,252	43,476	54,963	76,906	82,820	71,258	41,675
65 TO 69	27,674	34,313	37,032	33,997	36,778	43,240	65,031	81,037	84,842	37,235
70 & UP	27,494	33,594	30,322	31,463	28,028	35,246	48,376	64,190	61,602	32,392
<b>TOTAL</b>	<b>38,997</b>	<b>46,091</b>	<b>46,848</b>	<b>42,563</b>	<b>47,711</b>	<b>58,755</b>	<b>73,681</b>	<b>81,042</b>	<b>76,309</b>	<b>44,425</b>

NOTE: Age is last birthday. Service is completed years.

\* Total may not add up due to rounding.

\*\* Average based on unrounded salary.

## Qualified Pension Plan Schedule of Annual Average Benefit Payment Amounts

Fiscal Year Ended June 30	Service Retirement Benefits			Ordinary (Non-Duty) Disability Benefits			Accidental (Duty) Disability Benefits			Survivor Benefits		
	Number	Average Annual Allowance	Average Monthly Allowance	Number	Average Annual Allowance	Average Monthly Allowance	Number	Average Annual Allowance	Average Monthly Allowance	Number	Average Annual Allowance	Average Monthly Allowance
2007 (Lag)	11,618	\$11,440	\$953	565	\$10,031	\$836	141	\$12,354	\$1,030	667	\$13,497	\$1,125
2008 (Lag)	11,820	\$11,556	\$963	575	\$10,278	\$857	133	\$12,614	\$1,051	668	\$13,382	\$1,115
2009 (Lag)	12,176	\$11,665	\$972	627	\$10,547	\$879	118	\$13,036	\$1,086	720	\$13,448	\$1,121
2010 (Lag)	12,435	\$11,844	\$987	671	\$10,655	\$888	133	\$12,700	\$1,058	730	\$13,356	\$1,113
2011 (Lag)	12,841	\$12,244	\$1,020	698	\$10,975	\$915	138	\$12,559	\$1,047	722	\$13,724	\$1,144
2012 (Lag)	13,218	\$12,520	\$1,043	731	\$11,393	\$949	148	\$12,490	\$1,041	777	\$13,969	\$1,164
2013 (Lag)	13,662	\$12,811	\$1,068	795	\$11,620	\$968	153	\$12,809	\$1,067	845	\$14,579	\$1,215
2014(Lag)	14,150	\$12,932	\$1,078	853	\$11,680	\$973	156	\$12,268	\$1,022	836	\$14,435	\$1,203
2015(Lag)	14,572	\$13,303	\$1,109	890	\$12,208	\$1,017	159	\$12,341	\$1,028	817	\$14,391	\$1,199
2016(Lag)	15,034	\$13,420	\$1,118	937	\$11,957	\$996	168	\$13,377	\$1,115	798	\$14,869	\$1,239

**Qualified Pension Plan  
Schedule of Participating Employers  
As Of June 30, 2016 (Lag)**

Employer	As of June 30, 2016 (Lag)		As of June 30, 2007	
	Number of Employees	Annual Payroll	Number of Employees	Annual Payroll
<b>NYC Department of Education*</b>	25,252	\$ 1,088,310,805	21,524	\$ 740,469,124
<b>NYC School Construction Authority</b>	595	\$ 60,061,504	403	\$ 36,121,167
<b>Charter Schools</b>				
<b>Beginning with Children</b>	1	\$ 50,535	6	\$ 155,201
<b>KIPP Academy</b>	0	\$ -	6	\$ 489,456
<b>Renaissance</b>	16	\$ 597,048	8	\$ 391,359
<b>TOTAL</b>	<b>25,864</b>	<b>\$ 1,149,019,892</b>	<b>21,947</b>	<b>\$ 777,626,307</b>

\* A limited (de minimis) number of these employees have been reported as employed by employers other than those listed in the table. For actuarial valuation purposes, these employees are included with the NYC Department of Education pending confirmation of status.

\* The Final 2018 Employer Contribution for the Beginning with Children Charter School was included with Department of Education as a result of its closure in 2016.







**Board of Education Retirement System**

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