

# Comprehensive Annual Financial Report

**Fiscal Years Ended June 30, 2019 and June 30, 2018**



**Teachers' Retirement System of the City of New York**  
**A Fiduciary Fund of the City of New York**

**TEACHERS' RETIREMENT SYSTEM OF THE CITY OF NEW YORK**  
**A FIDUCIARY FUND OF THE CITY OF NEW YORK**

**COMPREHENSIVE ANNUAL FINANCIAL REPORT**  
**FOR FISCAL YEARS ENDED JUNE 30, 2019 AND JUNE 30, 2018**

Prepared by Accounting Units for the

**QUALIFIED PENSION PLAN**  
**and**  
**TAX-DEFERRED ANNUITY PROGRAM**

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**Ms. SHERRY S. CHAN**

Chief Actuary

**TEACHERS' RETIREMENT SYSTEM OF THE CITY OF NEW YORK**

55 Water Street, New York, NY 10041

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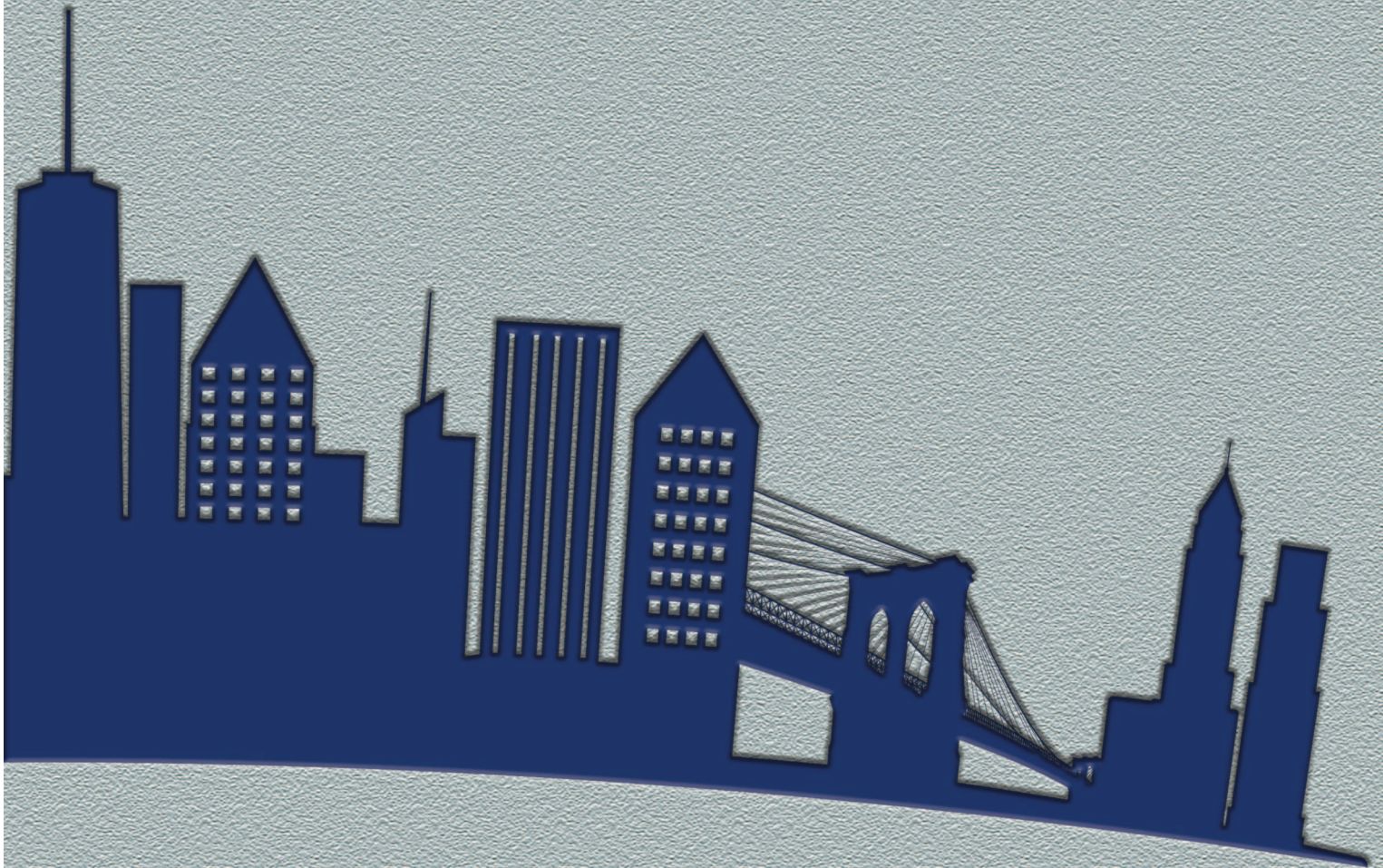
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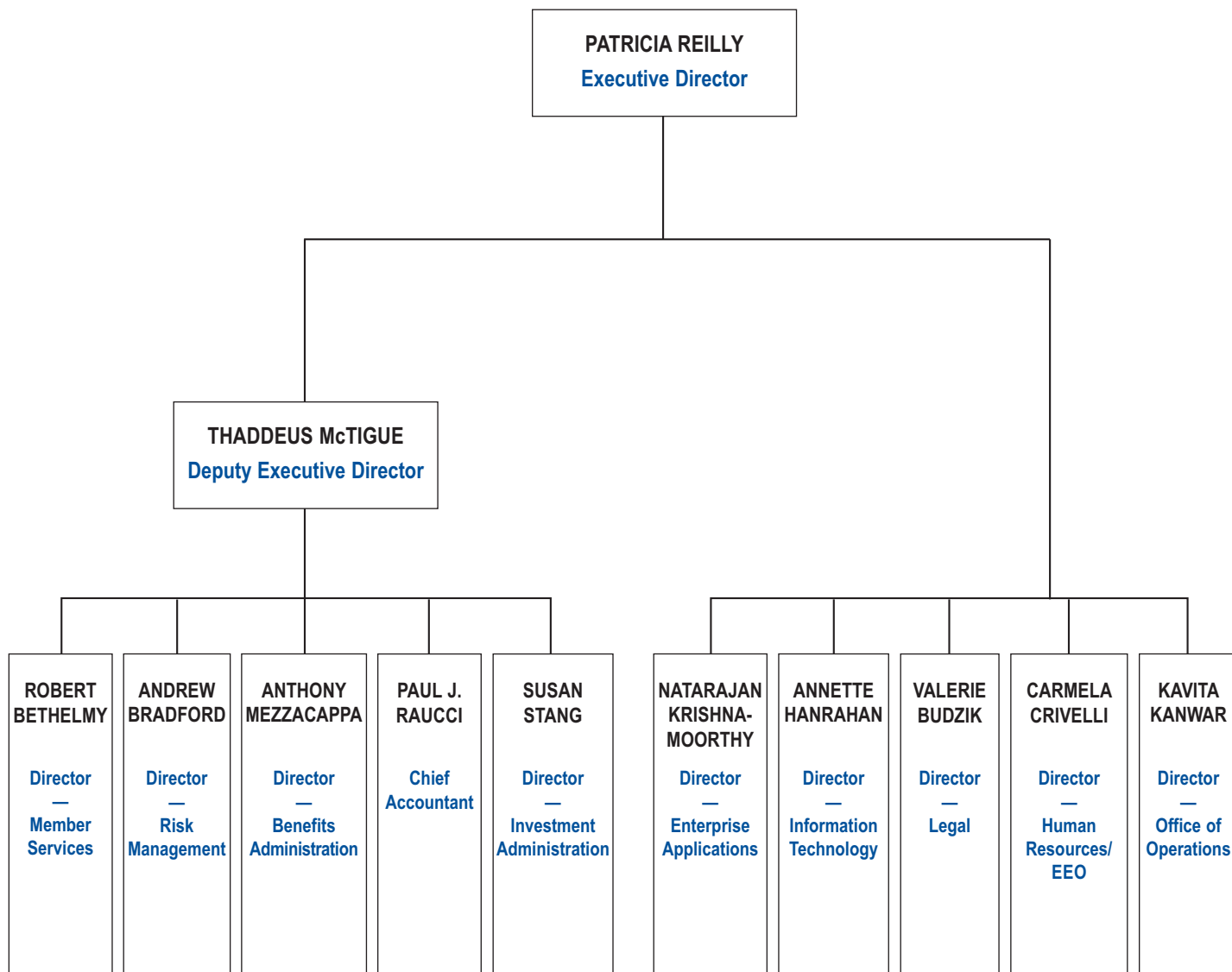
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# INTRODUCTION



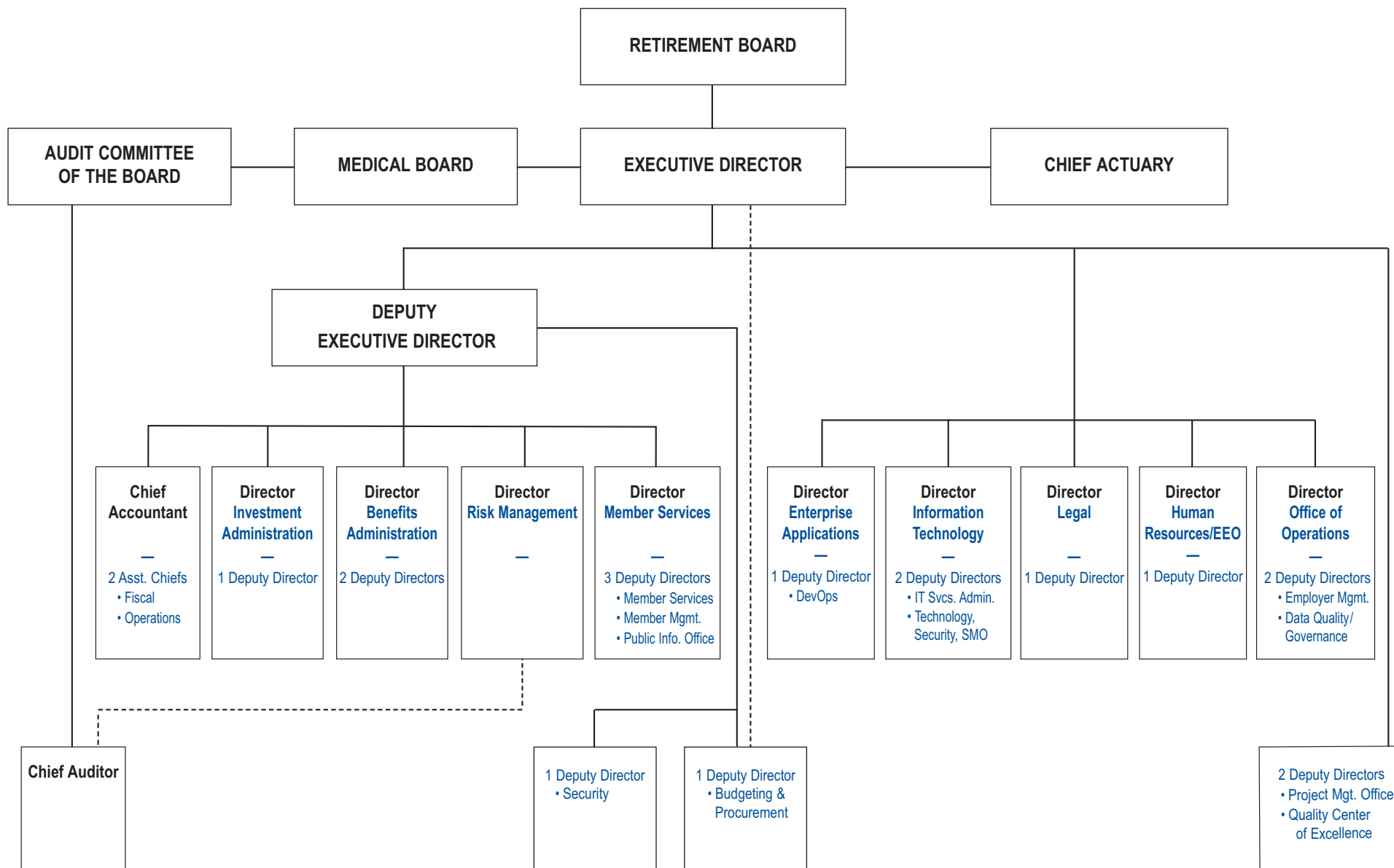
# PRINCIPAL OFFICIALS

as of June 30, 2019



# ORGANIZATION CHART

as of June 30, 2019





Government Finance Officers Association

**Certificate of  
Achievement  
for Excellence  
in Financial  
Reporting**

Presented to

**Teachers' Retirement System  
of the City of New York  
New York**

For its Comprehensive Annual  
Financial Report  
for the Fiscal Year Ended

**June 30, 2018**

*Christopher P. Morill*

Executive Director/CEO



**December 20, 2019**

Dear Members of the Board of Trustees:

We are pleased to present the Comprehensive Annual Financial Report of the Teachers' Retirement System of the City of New York (TRS) for the fiscal year ended June 30, 2019.

TRS was established as of August 1, 1917 under Chapter 303 of the Laws of 1917 and is governed by the Administrative Code of the City of New York and the New York State Retirement and Social Security Law.

TRS' pension plan became a tax-qualified retirement plan under Section 401(a) of the Internal Revenue Code (IRC) and is now known as our Qualified Pension Plan (QPP). The QPP is a cost-sharing, multiple employer defined-benefit pension plan. The QPP provides pension benefits to all the teachers and administrative personnel employed by the Department of Education and certain employees of New York City Charter Schools and the City University of New York.

TRS' Tax-Deferred Annuity (TDA) Program was established and is administered pursuant to IRC Section 403(b) and NYC Administrative Code section 13-582, and became effective February 1, 1970. The TDA Program is a voluntary defined-contribution savings option available to TRS members.

### **Member Profile**

Our programs impact approximately 210,000 in-service members, retirees, and beneficiaries. Our membership includes individuals of varying ages, membership tiers, and employment status. And although many TRS members are currently in active service, over 40% of them have retired. As of June 30, 2019, there were approximately 124,000 in-service members and approximately 87,000 retired members and beneficiaries receiving monthly benefits.

### **Participating Employers**

The participating employers that share the cost of the defined-benefit QPP plan are the New York City Department of Education (DOE), City University of New York (CUNY), and certain New York City Charter Schools that offer TRS benefits to their employees. Employees who become TRS members may participate in the TDA Program in addition to the QPP.

### **Initiatives**

During this fiscal year, TRS implemented the next phase of our ongoing modernization initiative: We introduced online options for many common payments to TRS; members can choose to pay by "e-check" from a bank account, or by debit or credit card. We also launched an online portal for beneficiaries to file death benefit claims and elect payment methods. We also completed much of the development work for the next phase of the project, related to pension payroll.

In our efforts to increase member awareness and engagement, we also added Instagram to our menu of social media offerings. Additionally, the Agency announced plans to enhance our lineup of investment options in the upcoming fiscal year.

## Financial Statements

The financial statements and notes along with Management's Discussion and Analysis in this report present and analyze the changes in TRS fiduciary net position for the fiscal year ended June 30, 2019. Since markets are dynamic and fluid, any judgment of the financial statements should also consider current market conditions.

## Funding

The Qualified Pension Plan's (QPP) funding objective is to meet long-term benefit promises through employer and member contributions, together with investment earnings. Annual funding by employer contributions is determined through an actuarial valuation of all liabilities to the QPP with adjustments to allow for an incremental phase-in of newly assumed actuarial liabilities. As such, employer contributions have been increasing steadily in line with current membership liabilities.

The QPP's funding ratios are also developed as part of the QPP's actuarial valuation. The funding ratios are determined at specific points in time, are usually expressed in various relationships of assets to obligations, and, over time, can provide insight into the long-term financial trend of the QPP.

One measure of the QPP's funded status, the ratio of Actuarial Asset Value to the Entry Age Normal Actuarial Accrued Liability, determined as of June 30, 2017, is 63.8%. Please refer to the report's Actuarial Section for a detailed discussion of the Plan's measures of funded status.

Under Governmental Accounting Standards Board (GASB) Statement No. 67, Financial Reporting for Pension Plans, a defined-benefit pension plan is also required to report fiduciary net position as a percentage of the plan's total pension liability. This method reports assets at current fair value and, as such, is more sensitive to market volatility. As of June 30, 2019, the Qualified Pension Plan's fiduciary net position represents 79.1% of the QPP's total pension liability.

Funds needed to finance the QPP's long-term benefit are accumulated through the collection of employer and member contributions and through income from investments. Primary expenses include benefit and survivor payments as well as investment and administrative expenses, and refunds of contributions to terminated employees. An overview of revenue and expenses, as well as asset and liability information, is provided in the Management's Discussion and Analysis portion of the Financial Section.

## Management Responsibility for Financial Reporting and Internal Controls

The financial statements were prepared in accordance with accounting principles generally accepted in the United States of America and GASB pronouncements. Management is responsible for the integrity and fairness of the information presented in the financial statements, including data that, out of necessity, is based on estimates and judgments. Management is also responsible for establishing and maintaining an effective internal control structure. A system of internal controls provides reasonable, but not absolute, assurance that assets are properly safeguarded and that financial statements are reliable. The concept of reasonable assurance recognizes that first, the cost of a control should not exceed the benefits likely to be derived, and second, the valuation of the cost and benefits requires estimates and judgments by management. We believe that the internal controls currently in place support this purpose, and that the financial statements, accompanying schedules, and statistical tables are fairly presented in all material respects.

## Investments

Assets of the QPP and the TDA Program are invested together in the following investment funds: the Pension Fund, the Diversified Equity Fund, the Balanced Fund (formerly the Bond Fund), the International Equity Fund, the Inflation Protection Fund, and the Socially Responsive Equity Fund. The performance summary for Fiscal Year 2019 follows:

Rate of Return by Fund—Fiscal Year 2019		
Fund	ROR	Gross vs. Net Returns
Pension	7.54%	Net of Fees
Variable Fund	ROR	Gross vs. Net Returns
Diversified Equity Fund	7.10%	Net of Fees
Balanced Fund	5.12%	Net of Fees
International Equity Fund	2.35%	Net of Fees
Inflation Protection Fund	1.85%	Net of Fees
Socially Responsive Equity Fund	3.40%	Net of Fees

For Funds other than the Pension Fund, members' accounts are valued on a monthly basis based on unit values. The unit values are based on each Fund's closing market value as of the end of the preceding month and are comparable to shares in mutual funds. TRS members who invest in these variable-return funds purchase units with their contributions.

The following table showing July unit values for 2019 and 2018 was based on the performance of the variable-return funds as of June 30. In addition to the changes in unit values, members' accounts are credited with a 4% increment factor increasing the number of units they hold, and their accounts are similarly discounted to offset this increase.

Unit Values for Fiscal Years 2019 and 2018		
Variable Fund	Unit Value July 2019	Unit Value July 2018
Diversified Equity Fund	\$98.450	\$95.605
Balanced Fund	\$16.248	\$16.076
International Equity Fund	\$10.756	\$10.930
Inflation Protection Fund	\$10.079	\$10.292
Socially Responsive Equity Fund	\$17.608	\$17.711

The Administrative Code of the City of New York authorizes the investments of plan assets subject to the terms, conditions, limitations, and restrictions imposed by law. The New York State Retirement and Social Security Law and the Administrative Code establish the criteria for permissible equity investments. Plan assets are diversified over a range of investments, and multiple investment strategies are used to limit risk. Details concerning the criteria for TRS' investments may be found in the Notes to the Financial Statements. A detailed discussion of TRS' investment strategies, asset classes, and yield information is provided in the report's Investment Section.

## Actuarial Reports

The Actuarial Section contains the Actuary's certification letter, the actuary's statements, a summary of actuarial assumptions, and the actuarial tables. The actuarial valuation provides a picture of the overall funding health of the QPP.

## Statistical Reports

Past and current data are contained in this section. The section includes tables that reflect the net position and demographic characteristics of the QPP and the TDA Program. Also captured in the tables, when applicable, is information comparing ten years of data. This look back shows overall trends in our programs and membership demographics that help to accurately forecast our future ability to meet our members' retirement needs.

## Independent Audit & Professional Services

State statutes require an annual audit by independent certified public accountants. TRS' auditor, Marks Paneth LLP, provides an Independent Auditor's Report on the financial statements and schedules in the Financial Section of this Report.

Investment professionals are appointed under the direction of the Teachers' Retirement Board. Investment administration services for the TRSNYC Pension Fund are provided by the New York City Office of the Comptroller. Investment administration services for TRS's Variable-Return Funds are performed by TRS. The Office of the Comptroller and TRS hire consultants and other investment professionals to perform additional investment services. The Summary of Investment Managers and Fee and the Schedule of Payments of Commissions to Brokers, can be found starting on pages 100 and 107, respectively.

Primary legal services to TRS are provided by the City's Corporation Counsel and Groom Law Group.

Actuarial services are provided by the Office of the Actuary of the City of New York, which is employed by the City's five major pension systems.

## Awards

The Government Finance Officers Association of the United States and Canada (GFOA) awarded a Certificate of Achievement for Excellence in Financial Reporting to TRS for its Comprehensive Annual Financial Report for the Fiscal Year ended June 30, 2018. This was the 31st consecutive year that TRS was accorded this prestigious award. In order to be awarded a Certificate of Achievement, a government must publish an easily readable and efficiently organized Comprehensive Annual Financial Report. This report must satisfy both the generally accepted accounting principles and the applicable legal requirements.

A Certificate of Achievement is valid for a period of one year only. We believe that our current comprehensive annual financial report continues to meet the Certificate of Achievement Program's requirements, and we are submitting it to the GFOA for its consideration.

## Acknowledgements

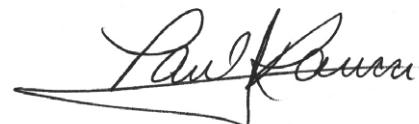
The compilation of the Report reflects the efforts of the TRS staff under the leadership of the Board of Trustees. It is intended to provide complete and reliable information as a basis for making management decisions, as a means of determining compliance with legal provisions, and as a means for determining responsible stewardship for the assets contributed by the members and their employers.

Finally, we would like to take this opportunity to express our gratitude to the staff, the advisors, and the many people who have worked diligently to ensure the successful operation of TRS.

Sincerely,



Patricia M. Reilly  
Executive Director



Paul J. Raucci  
Chief Accountant

## SUMMARY OF PLAN PROVISIONS

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## SUMMARY OF PLAN PROVISIONS

TRS' principal benefit provisions correspond to the tier structure established by applicable New York State Law<sup>1</sup>.

### Tiers III, IV, VI

Members with a date of membership of July 27, 1976 or later are covered by the following provisions:

#### SERVICE RETIREMENT

##### **Normal Service Retirement**

###### **Eligibility:**

A member is eligible to retire at age 62 (age 63 for Tier VI) with immediate payability after 5 or more years of service (10 or more years of service for Tier VI and for members represented by the UFT, joining after December 10, 2009 under the 55/27 plan).

Current members as of February 27, 2008 (excluding CUNY employees) were provided a 180-day period during which they were allowed to join a plan that permitted them to retire at age 55 and later with immediate payability and without reduction after 25 years of service, provided they pay an additional 1.85% of future pay, subject to contribution obligations.

After February 27, 2008, new members (excluding CUNY employees) are eligible to retire at age 55 and later with immediate payability and without reduction after 27 years of service and are required to pay an additional 1.85% of future pay, subject to contribution obligations.

After December 10, 2009, new members in a position represented by the UFT under the 55/27 retirement program 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.

After March 31, 2012, new Tier VI members are required to make contributions in amounts ranging from 3% to 6% per annum, based on annual wages earned during a "plan year," originally defined as April 1 to March 31, but amended to January 1 to December 31 as of January 1, 2016.<sup>2</sup>

###### **Benefits:**

- (1) For a member with fewer than 20 years of service, the benefit is  $1/60$  times FAS<sup>3</sup> multiplied by years of service.
- (2) For a member with at least 20 (Tier VI) but fewer than 30 years of service (Tier III/IV), the benefit is  $1/50$  times FAS multiplied by years of service (Tier III/IV) or 35% plus 2% times FAS multiplied by each additional year exceeding 20 years of service (Tier VI).
- (3) For a member with 30 or more years of service, the benefit is  $1/50$  times FAS for each of the first 30 years of service plus  $3/200$  times FAS for each additional year (Tier III/IV).

##### **Early Service Retirement**

###### **Eligibility:**

A member is eligible to retire at age 55 or later with immediate payability, after 5 or more years of service (10 or more years for Tier VI and for members represented by the UFT joining on or after December 10, 2009 under the 55/27 plan).

<sup>1</sup> Chapter 274 of the Laws of 1970 (Tiers I/II), as restricted by RSSL Article 11; RSSL Articles 14 and 15 (Tiers III/IV); Chapter 18 of the Laws of 2012 (Tier VI).

<sup>2</sup> For the first three plan years of membership, TRS uses projected annual earnings provided by the employer(s) to determine the contribution rates. For the fourth plan year of membership and each plan year thereafter, TRS uses the actual wages earned two plan years prior to the current plan year.

<sup>3</sup> Final Average Salary (FAS) is the average earned during any three consecutive years (any five consecutive years for Tier VI) providing the highest average salary. However, if salary earned during any year included in the three-year period (five-year period for Tier VI) exceeds the average of the previous two years by more than 10%, the amount in excess of 10% will be excluded.

**Benefits:**

The pension is calculated similarly to the pension of a Normal Service Retirement, but it is reduced as follows:

- (1) For a Tier III/IV member who retires prior to age 62 with less than 30 years of service and is not a member of an Age 55 Plan, his/her pension for service is reduced by 0.5% for each of the first 24 months that the payability date precedes age 62, and by 0.25% for each additional month.
- (2) A Tier III/IV member with 30 or more years of service receives no reduction in benefits because of early retirement.
- (3) For a Tier VI member who retires prior to age 63, the retirement allowance is reduced by 6.5% per year.

***Deferred Vested Benefit***

**Eligibility:**

A member who has 5 or more years of credited service upon termination of employment (10 or more years under Tier VI, and for members represented by the UFT under the 55/27 plan who joined on or after December 10, 2009) is entitled to a deferred vested benefit payable at age 55 or later. A member who elects payability before age 62 (age 63 for Tier VI) will receive a reduced benefit unless they have 30 years of service under Tier III/IV or meet the eligibility requirements of their retirement plan.

**Benefits:**

The benefit formulas are the same as those set forth under a Normal Service Retirement and an Early Service Retirement.

**DISABILITY RETIREMENTS**

***Ordinary Disability Retirement***

**Eligibility:**

A member is eligible for Ordinary Disability Retirement benefits if (s)he has completed 10 or more years of service and is incapacitated for performance of gainful employment. If the disability is judged to be the result of an accident in the performance of duty, the 10-year requirement is waived.

**Benefits:**

The benefit is the greater of: (a) 1/3 of FAS (2/3 of FAS for a member if the disability is judged to be the result of an accident in the performance of duty); or (b) 1/60 times FAS multiplied by the credited service.

A lump-sum disability benefit equals the in-service death benefit amount for members with:

- (a) a terminal illness with a life expectancy of one year or less; or (b) a medical condition of a long, continued, and indefinite duration requiring extraordinary care and treatment, regardless of life expectancy.

***Accident Disability Retirement***

**Eligibility:**

A member is entitled to an accident disability retirement allowance upon the occurrence of a disability caused by an accident in the actual performance of duty.

**Benefits:**

The retirement allowance will consist of a pension equal to two-thirds (60% under Tier III) of FAS.

## DEATH BENEFITS

### *Ordinary Death Benefits*

#### **Benefits:**

For members joining TRS after January 1, 2001, Death Benefit #2 below would be payable if a member dies before retirement. For members joining prior to that date, the greater of the two death benefits described below would be payable.

#### **Death Benefit 1:**

This benefit provides one month's salary for each year of service up to a maximum of three years' salary. If the member would have been eligible to receive an unreduced retirement allowance at the time of his/her death, the benefit is a lump sum that is actuarially equivalent to the retirement allowance which would have been payable had the member retired on the day before his/her death, if greater.

#### **Death Benefit 2:**

This benefit provides one year's salary for each year of service up to a maximum of three years' salary after three years of service. The benefits reduce after age 60 at the rate of 5% per year, to a maximum reduction of 50% of the benefit in effect at age 60.

A benefit is also payable upon death after retirement and is expressed as follows:

- If death occurs in the first year after retirement, 50% of the benefit in force immediately before retirement.
- If death occurs in the second year following retirement, 25% of the benefit in force immediately before retirement.
- If death occurs subsequently, 10% of the benefit in force at age 60 or immediately before retirement if retirement was earlier than age 60.

If retirement occurs after age 60, the minimum death benefit payable after retirement is 10% of the death benefit in force at age 60.

The death benefit for a vested member with at least 10 years of credited service, who died while inactive before retirement, is equal to 50% of the death benefit that would have been payable had the member died on their last day of active service, in addition to a refund of the member contributions.

The Rules and Regulations adopted by the Teachers' Retirement Board in accordance with Chapter 581 of the Laws of 1970 provide that the first \$50,000 of each benefit on account of death in active service is payable from the Group Term Life Insurance Plan. Only the amount in excess of \$50,000, if any, is payable by TRS.

#### **Beneficiaries:**

The latest named beneficiary, duly designated with TRS, will receive the death benefits. If there is no eligible beneficiary on file, the benefits will be paid to the member's estate.

### *Accidental Death Benefits*

#### **Eligibility:**

A beneficiary is entitled to the benefit if the member died before the effective date of retirement as a natural and proximate result of an accident sustained in the performance of duty, and if the accident was not caused by the member's willful negligence.

#### **Benefits:**

The latest named beneficiary, duly designated with TRS, will receive the death benefits. The beneficiary receives a benefit equal to 50% of the wages the member earned during the last year of actual service.

If there is no eligible beneficiary on file, the benefits will be paid to the member's estate.

## **Tiers I, II**

Members with a date of membership before July 27, 1976 are covered by the following provisions:

### **SERVICE RETIREMENT**

#### ***Twenty-Year Pension Plan***

##### **Eligibility:**

- (1) A Tier I member who elects the Twenty-Year Pension Plan is eligible to retire after having completed 20 years of service, with benefits to begin on the latter of: a) the day they cease active employment, b) age 55, or c) the date they could have completed 25 years of service had they remained active. Regardless of the number of years of service, such a member who has elected the Twenty-Year Pension Plan and who is at least 55 years of age may retire with benefits payable immediately by canceling his/her election of the Twenty-Year Pension Plan, thereby becoming eligible for the benefits under the Age-55-Increased-Benefits Pension Plan.
- (2) A member who joined TRS under Tier II must also have rendered five years of continuous service immediately prior to retiring and must have attained age 55.

##### **Benefits:**

The service retirement allowance for a Tier I member is the sum of the following:

- (1) 0% of the average salary<sup>4</sup>, reduced by an annuity which is the actuarial equivalent of the minimum accumulation<sup>5</sup>;
- (2) an annuity which is the actuarial equivalent of the accumulated contributions; and
- (3) for service in excess of 20 years, (a) a pension for Increased-Take-Home-Pay,<sup>6</sup> which is the actuarial equivalent of the Reserve for Increased-Take-Home-Pay credited in such years, and (b) 1.2% of the average salary for each such year prior to July 1, 1970 and 1.7% of the average salary for each such year beginning on that date.

If a Tier II member retires prior to age 62 with less than 30 years of service, his/her pension for service is reduced by 0.5% for each of the first 24 months that the payability date precedes age 62, and by 0.25% for each additional month.

Current Tier II members as of February 27, 2008 (excluding CUNY employees) were provided a 180-day period during which they were allowed to join a plan that permitted them to retire at age 55 and later with immediate payability and without reduction after 25 years of service, provided they pay an additional 1.85% of future pay.

#### ***Age-55-Increased-Benefits Pension Plan***

##### **Eligibility:**

- (1) A Tier I member who either elects the Age-55-Increased-Benefits Pension Plan or cancels his/her election of the Twenty-Year Pension Plan may retire after having attained age 55 with benefits payable immediately upon retirement.
- (2) A Tier II member must have rendered five years of continuous service immediately prior to retiring and must have attained age 55.

<sup>4</sup>For a Tier I member, salary earnable in the last year of the most recent three-year period during which (s)he held no more than one position, or the average annual salary earnable in any five consecutive years designated by the member. For a Tier II member, the average salary earned during any three consecutive years which provides the highest salary. However, if salary earned during any year included in the three-year period exceeds the average of the previous two years by more than 20%, the amount in excess of 20% will be excluded.

<sup>5</sup>The difference between (1) the amount of required contributions during the member's first 20 years of city service, accumulated with interest to the member's payability date, and (2) the amount of the reserve for Increased-Take-Home-Pay on the date such period of 20 years is completed.

<sup>6</sup>Increased-Take-Home-Pay consists of special contributions made by the employer at 2.5%, 5%, or 8% of salary, with applicable interest.

**Benefits:**

The service retirement allowance consists of a pension for service, a pension for Increased-Take-Home-Pay, and an annuity.

The pension for service is equal to 1.2% of the average salary multiplied by years of service prior to July 1, 1970, plus 1.53% of the average salary multiplied by years of service after June 30, 1970.

The pension for Increased-Take-Home-Pay is the actuarial equivalent of the Reserve for Increased-Take-Home-Pay, and the annuity is the actuarial equivalent of the member's accumulated deductions.

If a Tier II member retires prior to age 62 with less than 30 years of service, his/her pension for service is reduced by 0.5% for each of the first 24 months that the payability date precedes age 62, and by 0.25% for each additional month.

Current Tier II members as of February 27, 2008 (excluding CUNY employees) were provided a 180-day period during which they were allowed to join a plan that permitted them to retire at age 55 and later with immediate payability and without reduction after 25 years of service, provided they pay an additional 1.85% of future pay.

**VESTED DEFERRED RETIREMENT ALLOWANCE****Eligibility:**

A member who either resigns or is dismissed from service would receive a benefit equal to his/her accumulated deductions. However, a member who is eligible for benefits under the Age-55-Increased-Benefits Pension Plan and who has at least 5 years of service immediately preceding resignation may instead elect to receive a deferred vested allowance.

**Benefits:**

This allowance is computed in the same manner as the retirement allowance for service retirement under the Age-55-Increased-Benefits Pension Plan, except that the allowance is deferred to age 55. Should a member who elected to receive a vested deferred retirement allowance and who had 10 years of service die before the attainment of age 55, the death benefit is 1/2 of the Ordinary Death Benefit in force on the last day of service.

**DISABILITY RETIREMENTS*****Ordinary Disability Retirement*****Eligibility:**

Regardless of the Plan elected, a member who has completed 10 or more years of City service preceding the occurrence of disability, for causes other than an accident in the actual performance of duty, is entitled to an ordinary disability retirement allowance.

**Benefits:**

If, at the time of becoming disabled, the member could have retired for service with benefits payable immediately, the ordinary disability allowance will be the same as the service retirement allowance without reduction on account of age. For all other members, the ordinary disability allowance is computed in the same manner as though the member had been eligible for service retirement under the Age-55-Increased-Benefits Pension Plan with benefits payable immediately, but never less than the allowance that would have been payable under the provisions in effect prior to July 1, 1970.

***Accident Disability Retirement*****Eligibility:**

A member is entitled to an accident disability retirement allowance upon the occurrence of a disability caused by an accident in the actual performance of duty.

**Benefits:**

The retirement allowance will consist of a pension equal to 3/4 of the average salary in the last 5 years, plus a pension which is the actuarial equivalent of the Reserve for Increased-Take-Home-Pay, and an annuity purchased with the member's accumulated deductions.

**DEATH BENEFITS*****Ordinary Death Benefits*****Benefits:**

Upon the death of a member in active service, a benefit is paid to his/her estate or to such person(s) as (s)he shall have nominated.

**Tier I Members**

- If a member completed less than 10 years of City Service, the benefit is equal to the compensation earnable by the member in the 6 months immediately preceding death.
- If the total number of years of City Service is greater than 10, but less than 20, the benefit is equal to the compensation earnable by the member during the 12 months immediately preceding death.
- If the total number of years of City Service exceeds 20, the benefit is equal to twice the compensation earnable by the member during the 12 months immediately preceding death.
- In addition, the member's accumulated deductions and the Reserve for Increased-Take-Home-Pay are paid to the member's estate or to the designated beneficiary.

The benefits payable on account of such a member who, at the time of his/her death, would have been eligible for service retirement is either the benefit described above or a lump sum that is actuarially equivalent to the retirement allowance which would have been payable had the member retired on the day before his/her death, whichever is larger.

**Tier II Members** must choose between the two following death benefits so that, upon the member's death, benefits are paid pursuant to the member's election:

**Death Benefit 1:** This benefit provides one month's salary for each year of service, up to a maximum of three years' salary. In addition, the member's accumulated deductions are payable. If the member would have been eligible to receive an unreduced retirement allowance at the time of his/her death, the benefit is a lump sum that is actuarially equivalent to the retirement allowance which would have been payable had the member retired on the day before his/her death, if greater.

**Death Benefit 2:** In addition to a refund of the member's accumulated deductions, this benefit provides one year's salary for each year of service up to a maximum of three years' salary after three years of service. The benefit reduces after age 60 at the rate of 5% per year, to a maximum reduction of 50% of the benefits in effect at age 60.

A benefit is also payable upon death after retirement and is expressed as follows:

- If death occurs in the first year after retirement, 50% of the benefit in force immediately before retirement.
- If death occurs in the second year following retirement, 25% of the benefit in force immediately before retirement.
- If death occurs subsequently, 10% of the benefit in force at age 60 or immediately before retirement if retirement was earlier than age 60.

If retirement occurs after age 60, the minimum death benefit payable after retirement is 10% of the death benefit in force at age 60.

The death benefit for a vested member with at least 10 years of credited service, who died while inactive before becoming eligible for unreduced retirement benefits, is equal to 50% of the death benefit that would have been payable had the member died on their last day of active service, in addition to a refund of the member contributions.

The Rules and Regulations adopted by the Teachers' Retirement Board in accordance with Chapter 581 of the Laws of 1970 provide that the first \$50,000 of each benefit on account of death in active service is payable from the Group Term Life Insurance Plan. Only the amount in excess of \$50,000, if any, is payable by TRS.

#### **Beneficiaries:**

The latest named beneficiary, duly designated with TRS, will receive the death benefits. If there is no eligible beneficiary on file, the benefits will be paid to the member's estate.

### ***Accidental Death Benefits***

#### **Eligibility:**

A member is entitled to accidental death benefits upon the occurrence of death caused by an accident in the actual performance of duty and not the result of willful negligence.

#### **Benefits:**

The accidental death benefits are (a) a lump-sum equal to the Reserve for Increased-Take-Home-Pay and (b) a pension equal to one-half of the average salary in the last five years payable annually to the widow until remarriage or death, or if there is no widow, to a child or children until the attainment of age 18 of the youngest child, or if there is no widow, or child, to the dependent parents, and (c) a lump-sum equal to the member's accumulated deductions and Reserve for Increased-Take-Home-Pay payable to the member's estate or to the designated beneficiary. Alternatively, the beneficiary of a Tier I member may elect to receive a lump sum that is actuarially equivalent to the retirement allowance which would have been payable if the member had retired on the day before the member's death, provided that the death occurred after the member became eligible to retire for service.

## **Cost-of-Living Adjustments**

### **Eligibility:**

Automatic annual Cost-of-Living Adjustments (COLA) are applicable to retired members in all tiers. COLA are payable to members who are either (1) at least age 62 and have been retired for at least 5 years or (2) at least age 55 and have been retired for at least 10 years. Additionally, COLA are payable to members who retired for disability after being retired for 5 or more years and beneficiaries receiving accidental death benefits who have been receiving them for at least 5 years.

### **Benefits:**

Starting with benefits for September 2001, the annual increase for COLA is equal to 50% of the increase in the Consumer Price Index for all Urban Consumers (CPI-U) based on the year ending March 31, rounded to the next higher .1%, not less than 1% nor greater than 3% of the first \$18,000 of the sum of maximum retirement allowance and prior COLA.

COLA are payable during the life of the retired member. One half of the amount is also payable after the member's death and during the life of the spouse beneficiary if such retired member had elected one of the options under the Administrative Code which provides that benefits are to be continued for the life of such spouse after the death of the retired member, and where the death of such retired member occurred or occurs more than 30 days after the effective date of the retirement of such member.

## **Options on Retirement**

A member, upon retirement, may receive his/her basic retirement allowance in monthly installments throughout life with all payments ending at death, or may elect to receive the actuarial equivalent in the following optional forms.

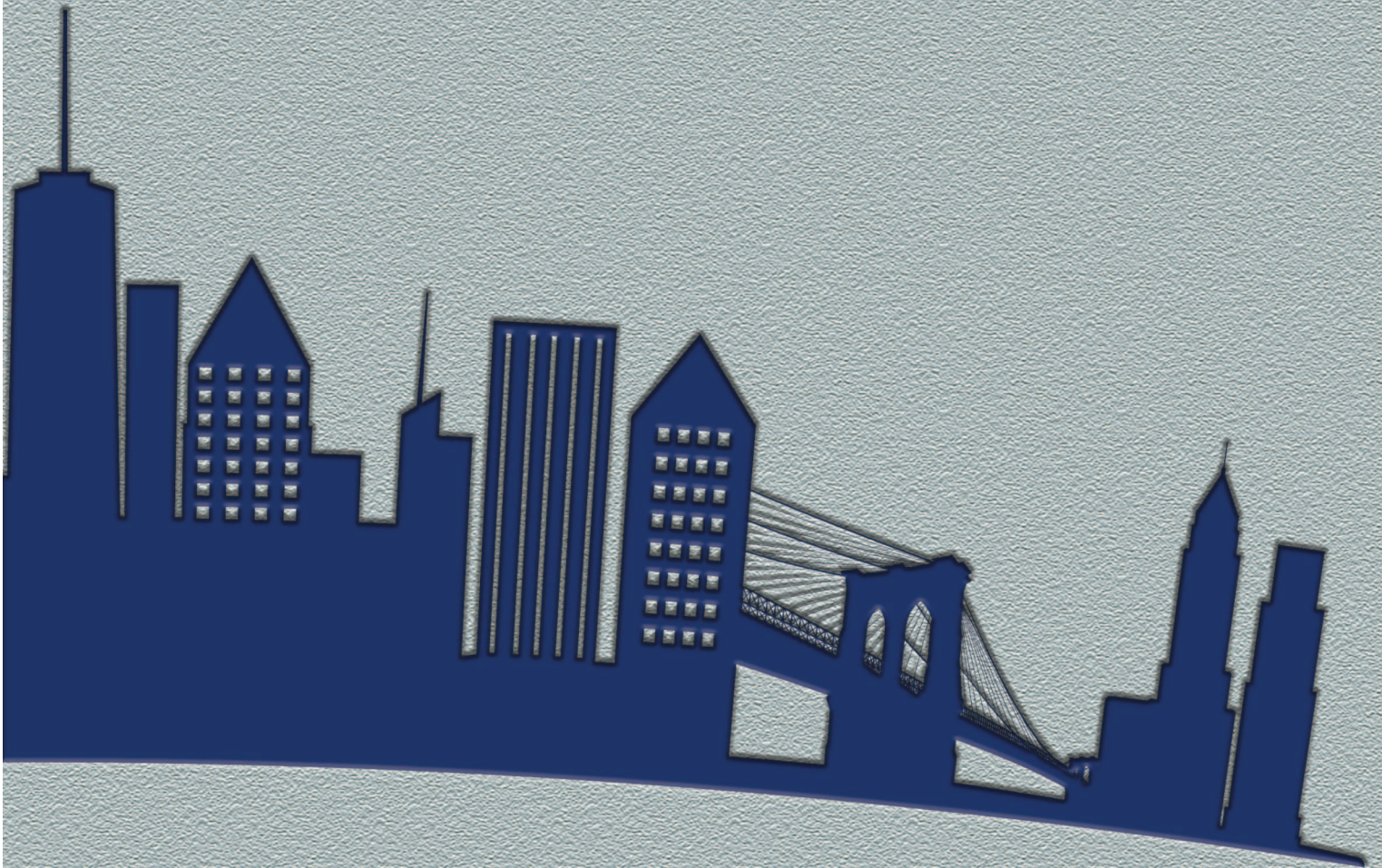
- (1) A joint-and-survivor allowance under which reduced payment will be made during life, with a provision that upon the member's death, the same payments or one-half of such payments shall be continued throughout the life of other such person(s) as the member shall have designated.  
(Applicable to members under Tiers I and II.)
- (2) A joint-and-survivor allowance under which reduced payments will be made during life, with a provision that upon the member's death, 100% or less (i.e., in 10% increments) of such payments shall be continued throughout the life of such other person(s) as the member shall have designated.  
(Applicable to members under Tier III.)
- (3) A joint-and-survivor allowance under which reduced payments will be made during life, with a provision that upon a member's death, 100% or less (i.e., in 25% increments) of such payments shall be continued throughout the life of such other person(s) as the member shall have designated.  
(Applicable to members under Tiers IV and VI.)
- (4) A joint-and-survivor allowance under which reduced payments will be made during life, with a provision that in the event of a member's death prior to the death of the designated beneficiary, the person designated would receive a percentage of the payments under the applicable plan, which had been received by the member under that plan. Should the designated beneficiary predecease the member, the member's retirement allowance "pops up" to the amount which would have been payable, had no optional modification of the retirement allowance been in effect. (All Tiers)

- (5) A ten-year or five-year certain and life allowance under which reduced payments will be made during life, with a provision that in case of death within ten or five years of retirement, the balance that would have been payable had the member survived for ten or five years, shall continue to be paid to the designated beneficiary or estate. (All Tiers)
- (6) A cash refund allowance under which reduced payment will be made during life, with a provision that, in case of death before such payments have equaled the present value of the retirement allowance at the time of retirement, the balance shall be paid to the designated beneficiary or estate in a lump-sum. (Applicable to members under Tier I.)
- (7) A cash refund allowance under which reduced payments will be made during life, with a provision that, in case of death before such payments have equaled the present value of the retirement allowance at the time of retirement, the balance from the annuity portion of the retirement allowance shall be paid to the designated beneficiary or estate in a lump-sum. (Applicable to members under Tier II.)
- (8) A cash refund allowance under which reduced payment will be made during life, with a provision that, upon the member's death, a sum specified by the retiree at the time of retirement, would be paid to the designated beneficiary or estate. (Applicable to members under Tiers I and II, by resolution of the Teachers' Retirement Board.)
- (9) Such other actuarial equivalent optional forms as may be certified by the Actuary and approved by the Teachers' Retirement Board. (All Tiers)

### **Annuity Options for Beneficiaries of a Death Benefit**

Upon a member's death, the beneficiary may elect to receive the actuarial equivalent of a lump-sum death benefit, otherwise payable, in one of the following forms: 1) An annual amount payable for life in monthly installments, all payments ending at death; (This is only available to the beneficiary of a member who joined under Tiers I and II.) or 2) A cash refund allowance under which reduced payments will be made during life, with a provision that, in case of death before such payments have equaled the lump-sum payable upon the member's death, the balance shall be paid to the designated beneficiary or estate. (This is only available to the beneficiary of a member joined under Tier I.)

# FINANCIAL



## INDEPENDENT AUDITORS' REPORT

To the Retirement Board of the  
Teachers' Retirement System of The City of New York

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

We have audited the accompanying combining statements of fiduciary net position of the Teachers' Retirement System of The City of New York Qualified Pension Plan ("QPP") and the Teachers' Retirement System of The City of New York Tax-Deferred Annuity ("TDA") Program, which collectively comprise the Teachers' Retirement System of The City of New York, (the "Systems"), a fiduciary fund of The City of New York, as of June 30, 2019 and 2018, 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, 2019 and 2018, 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 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 and Schedule 5, 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, Investment, Actuarial and Statistical Sections 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 24, 2019  
(except for the Other Information,  
as to which the date is December 19, 2019)

**TEACHERS' RETIREMENT SYSTEM OF THE CITY OF NEW YORK  
MANAGEMENT'S DISCUSSION AND ANALYSIS (UNAUDITED)  
JUNE 30, 2019 AND 2018**

This narrative discussion and analysis of the Teachers' Retirement System of the City of New York's ("TRS" or the "System") financial performance provides an overview of the System's combining financial activities for the Fiscal Years ended June 30, 2019 and 2018. It is meant to assist the reader in understanding TRS' combining financial statements by providing an overall review of the combining financial activities during the years and the effects of significant changes, as well as a comparison with prior years' activity and results. This discussion and analysis is intended to be read in conjunction with the System's combining financial statements. TRS administers the TRS Qualified Pension Plan ("QPP") and the TRS Tax-Deferred Annuity ("TDA") Program. The QPP is a cost-sharing, multiple-employer defined-benefit pension plan. The QPP provides pension benefits to City public school teachers and certain other personnel, participating Charter Schools and participating City University of New York ("CUNY") teachers and other personnel. The TDA Program is a tax-deferred annuity program described in Internal Revenue Code section 403(b) and is available as a supplemental savings option to QPP members.

## **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 Programs, 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 of accounting.
- **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 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 ("RSI")** — as required by GASB, the RSI includes the management discussion and analysis (this section) and information presented following the notes to the combining financial statements.

**TEACHERS' RETIREMENT SYSTEM OF THE CITY OF NEW YORK  
MANAGEMENT'S DISCUSSION AND ANALYSIS (UNAUDITED)  
JUNE 30, 2019 AND 2018**

**HIGHLIGHTS AND RECENT DEVELOPMENTS**

**Employer Information**

Employers that participate in TRS include the Department of Education ("DOE"), City University of New York ("CUNY") both Junior and Senior Colleges and New York City Charter Schools that elect to participate. All employers may participate in the QPP and the TDA Program.

The following schedule provides the 2019 QPP summary information of the employer groups.

	<b>Members Active</b>	<b>Contribution Employer</b>	<b>Contribution Member</b>	<b>Members Retired</b>	<b>Pension Payments</b>
DOE	115,500	\$3.5 billion	\$204 million	84,000	\$ 4.3 billion
CUNY	8,000	\$141 million	\$12 million	2,600	\$ 135 million
Charter Schools	600	\$7.9 million	\$1.3 million	less than 50	\$ 1.7 million

**UFT Contract**

A new collective bargaining agreement between the DOE and the United Federation of Teachers ("UFT"), the primary union for the DOE's employees, was ratified in October 2018. The contract runs from February 14, 2019 to September 13, 2022. In addition to workplace improvements, the new agreement includes wage increases and upward adjustments to starting and top salary amounts. The wage increases impact employer contributions, member contributions, and payments to retirees.

**FINANCIAL HIGHLIGHTS**

**QPP Fiduciary Net Position**

The QPP's net position restricted for benefits is held in trust for the payment of future benefits to members and pensioners. The QPP's net position restricted for benefits was \$58.0 billion, \$54.5 billion, and \$50.1 billion, as of June 30, 2019, 2018, and 2017, respectively. The System's employer contributions amounted to \$3.8 billion, \$3.9 billion, and \$3.9 billion, for Fiscal Years 2019, 2018, and 2017, respectively. The QPP's benefit payments totaled \$4.5 billion, \$4.4 billion, and \$4.2 billion, for Fiscal Years 2019, 2018, and 2017, respectively. Below is a summary of the QPP's net position and changes in net position.

**TEACHERS' RETIREMENT SYSTEM OF THE CITY OF NEW YORK  
MANAGEMENT'S DISCUSSION AND ANALYSIS (UNAUDITED)  
JUNE 30, 2019 AND 2018**

**QPP Fiduciary Net Position**  
**June 30, 2019, 2018, and 2017**  
**(In thousands)**

	2019	2018	2017
Cash	\$ 76,796	\$ 75,847	\$ 101,499
Receivables for investments sold	2,305,855	839,544	989,725
Receivables for accrued interest and dividends	290,228	273,387	164,163
Member loan receivables	320,976	312,219	298,146
Investments, at fair value	83,854,645	78,901,468	72,404,290
Collateral from securities lending	1,222,314	1,117,593	1,610,321
Other assets	42,615	62,852	38,932
Total assets	<u>88,113,429</u>	<u>81,582,910</u>	<u>75,607,076</u>
Accounts payable	646,918	643,567	529,059
Payable for investments purchased	2,574,584	1,568,064	1,353,803
Accrued benefits payable	77,154	13,858	13,987
Investments due to TDA Program	25,602,248	23,707,352	22,004,183
Payable for securities lending	1,222,314	1,117,593	1,610,321
Total liabilities	<u>30,123,218</u>	<u>27,050,434</u>	<u>25,511,353</u>
Net position restricted for benefits	<u>\$ 57,990,211</u>	<u>\$ 54,532,476</u>	<u>\$ 50,095,723</u>

Cash balances amounted to \$76.8 million at June 30, 2019, an increase of \$949.0 thousand (1.3%) from June 30, 2018. Cash balances amounted to \$75.8 million at June 30, 2018, a decrease of \$25.7 million (-25.3%) from June 30, 2017. Cash balances consist of advances to investment managers' accounts, accounts used to process reimbursement transfers between the System's investment programs, and bank accounts associated with the collections of loan insurance premiums and loan service charges. As of June 30, 2019, the largest cash balances consisted of the International and Private Equity investment managers of the TRSNYC Pension fund with \$34.4 million and \$20.3 million, respectively. Large cash balances held by an investment manager are due to a recent sale or the general investment cycle. For example, Private Equity's investment cycle generally begins with cash from assets sold during the month and ends with subsequent purchases following month-end.

Receivables for investment securities sold amounted to \$2.3 billion at June 30, 2019, an increase of \$1.5 billion (174.7%) from June 30, 2018. Receivables for investment securities sold amounted to \$839.5 million at June 30, 2018, a decrease of \$150.2 million (-15.2%) from June 30, 2017. These balances are principally composed of receivables for securities that have been sold but have not yet settled (*i.e.*, the cash has not been collected). The changes resulted primarily from timing differences between trade and settlement dates occurring around fiscal year end. Trades typically do not settle until a few days after the trade date.

Receivables for accrued interest and dividends amounted to \$290.2 million as of June 30, 2019, an increase of \$16.8 million (6.2%) from June 30, 2018. Receivables for accrued interest and dividends amounted to \$273.4 million as of June 30, 2018, an increase of \$109.2 million (66.5%) from June 30, 2017. Changes in accrued earnings are impacted primarily by the cumulative value of the interest or dividend bearing securities, as well as by changes in discount rates, and interest-payable dates.

**TEACHERS' RETIREMENT SYSTEM OF THE CITY OF NEW YORK  
MANAGEMENT'S DISCUSSION AND ANALYSIS (UNAUDITED)  
JUNE 30, 2019 AND 2018**

At June 30, 2019, member loan receivables amounted to \$321.0 million, an increase of \$8.8 million (2.8%) from the previous year. At June 30, 2018, member loan receivables amounted to \$312.2 million, an increase of \$14.1 million (4.7%) from the previous year. The increases primarily reflect interest accrued on loans receivables for Tiers III, IV, and VI members as new loans have kept pace with loan repayments.

Investments at June 30, 2019 were \$83.9 billion, an increase of \$5.0 billion (6.3%) from June 30, 2018. Investments at June 30, 2018 were \$78.9 billion compared to \$72.4 billion at June 30, 2017, an increase of \$6.5 billion (9.0%) from June 30, 2017. As of June 30, 2019, the QPP's total investment portfolio, including both the TRSNYC Pension and Variable-Return Funds, consisted of 54% equity investments, 34% fixed income securities and 12% alternative investments. The alternative investments consisted of private equity (5%), private real estate investments (3%), opportunistic fixed income (3%), and infrastructure securities (1%). The \$5.0 billion annual increase in investments is the result of \$5.7 billion in net investment income less a \$459.8 million net decrease in the year-over-year payables for investment securities purchased and investment receivables sold. More generally, investments as of June 30, 2019, in comparison with investment values as of June 30, 2018, reflect the equity and fixed income markets' annual returns. For the year ended June 30, 2019, the Russell 3000 Index, a broad measure of U.S. equity markets, returned 9.0%. The Morgan Stanley Capital International ("MSCI") World Index excluding the United States, returned 0.2%. The NYC Core + 5, a composite index maintained by New York City's Office of the Comptroller and a broad measure of the U.S. fixed income markets, returned 8.7%. The Dow Jones U.S. Select Real Estate Securities Index returned 9.8%. As of June 30, 2018, the QPP's total investment portfolio consisted of 54% equity investments, 35% fixed income securities and 11% alternative investments (primarily private equity and real estate investments). For the year ended June 30, 2018, the Russell 3000 Index returned 14.8%, the MSCI Europe, Australasia and Far East ("EAFE") returned 7.7%, the NYC Core + 5 returned 0.5%, and the Dow Jones U.S. Select Real Estate Securities Index returned 4.2%.

Other assets at June 30, 2019 totaled \$42.6 million, a \$20.2 million (-32.2%) decrease from June 30, 2018. The year-over-year decrease in other assets, as of June 30, 2019, was primarily due to the receipt in July 2018 of a \$11.6 million City University of New York (CUNY) employer contribution receivable, and a \$7.6 million decrease in a cash flow reimbursements due from the TDA Program. Other assets at June 30, 2018 totaled \$62.9 million, a \$24.0 million (61.4%) increase from June 30, 2017. The year-over-year increase in other assets, as of June 30, 2018, was primarily due to the \$11.6 million CUNY receivable, and a \$10.0 million (83.6%) increase in assets allocated for future administrative expenses.

Accounts payable at June 30, 2019 amounted to \$646.9 million, a \$3.4 million (0.5%) increase from June 30, 2018. Accounts payable as of June 30, 2019 consisted of balances due to depositories (72.6%), reserve for expenses (12.1%), accrued investment expenses (5.1%), unclaimed funds (4.0%), and other payables (6.2%). Accounts payable at June 30, 2018 amounted to \$643.6 million, a \$114.5 million (21.6%) increase from June 30, 2017. Accounts payable as of June 30, 2018 consisted of balances due to depositories (72.9%), reserve for expenses (12.8%), accrued investment expenses (5.1%), unclaimed funds (4.2%), and other payables (5.0%).

Payables for investments purchased at June 30, 2019 amounted to \$2.6 billion, a \$1.0 billion (64.2%) increase from June 30, 2018. Payables for investments purchased at June 30, 2018 amounted to \$1.6 billion, a \$214.3 million (15.8%) increase from June 30, 2017. Investments purchased are accounted for on a trade-date basis. The increase resulted from timing differences between settlement dates and trade dates, similar to receivables for investments sold (discussed earlier).

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Accrued benefits payable at June 30, 2019 amounted to \$77.2 million, a \$63.3 million (456.7%) increase from June 30, 2018. The \$63.3 million increase is primarily attributed to an increase of pending death benefits due to beneficiaries at year-end. Due to a system enhancement in Fiscal Year 2019, amounts due to beneficiaries can now be calculated following notice of death without waiting for the beneficiary claim to be received and reviewed. Accrued benefits payable at June 30, 2018 amounted to \$13.9 million, a \$129.0 thousand (-0.9%) decrease from June 30, 2017.

Investments due to the TDA Program reflect the TDA Program's share of assets of the TRSNYC Pension Fund/Fixed Fund investments. Assets in the TDA Program's Fixed Return Fund are pooled with the QPP assets as System assets in the TRSNYC Pension Fund for investment purposes only. The amounts owned by the TDA Program are equal to member contributions, inter-fund transfers from other TDA program's passport funds, and earnings applied in accordance with statutory-interest rates (7% for members of the UFT and 8.25% for certain other participants). See Note 2 for a full description of the TDA Fixed Return Fund investment program.

**QPP Changes in Fiduciary Net Position  
Years Ended June 30, 2019, 2018, and 2017  
(In thousands)**

	2019	2018	2017
Additions:			
Member contributions	\$ 217,205	\$ 195,241	\$ 180,076
Employer contributions	3,759,199	3,949,689	3,945,768
Net receipts from other retirement systems	1,222	(3,534)	(2,291)
Net securities lending income	12,132	15,325	17,446
Net investment income	<u>5,709,178</u>	<u>6,259,790</u>	<u>8,115,834</u>
Total additions	<u>9,698,936</u>	<u>10,416,511</u>	<u>12,256,833</u>
Deductions:			
Administrative expenses	64,291	65,076	60,790
TDA Rebalance	(27,449)	(32,704)	43,938
Benefits payments and withdrawals	4,487,680	4,351,924	4,219,312
Payment of statutory-interest to TDA Program	<u>1,716,679</u>	<u>1,595,462</u>	<u>1,466,615</u>
Total deductions	<u>6,241,201</u>	<u>5,979,758</u>	<u>5,790,655</u>
Net (decrease) increase in net position	<u>\$ 3,457,735</u>	<u>\$ 4,436,753</u>	<u>\$ 6,466,178</u>
Net position restricted for benefits			
Beginning of year	<u>54,532,476</u>	<u>50,095,723</u>	<u>43,629,545</u>
End of year	<u>\$ 57,990,211</u>	<u>\$ 54,532,476</u>	<u>\$ 50,095,723</u>

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TRS received \$217.2 million in member contributions in Fiscal Year 2019, a \$22.0 million (11.2%) increase from Fiscal Year 2018. TRS received \$195.2 million in member contributions in Fiscal Year 2018, a \$15.1 million (8.4%) increase from Fiscal Year 2017. The \$22.0 million increase in Fiscal Year 2019 and the \$15.1 million increase in Fiscal Year 2018 were both primarily due to UFT salary increases and a larger active Tier VI membership.

Employer contributions during Fiscal Year 2019 were \$3.8 billion, a \$190.5 million (-4.8%) decrease from Fiscal Year 2018. Employer contributions during Fiscal Year 2018 were \$3.9 billion, a \$3.9 million (0.1%) increase from Fiscal Year 2017. The Fiscal Year 2019 decrease was primarily due to a net actuarial gain and changes in actuarial assumptions. The June 30, 2017 (Lag) actuarial valuation and June 30, 2016 (Lag) actuarial valuation were used to determine Fiscal Year 2019 and 2018 employer contributions, respectively.

The QPP's net investment income for Fiscal Year 2019 was \$5.7 billion, a \$550.6 million (-8.8%) decrease from Fiscal Year 2018. The QPP's net investment income of \$5.7 billion consisted of \$2.3 billion in dividend and interest income plus a net gain of \$3.7 billion on the appreciation in fair value of the QPP's investments less \$301.4 million in investment expenses. Net investment income for the QPP portion of the TRSNYC Pension Fund, QPP portion of the Diversified Equity Fund, QPP portion of the Balanced Fund, QPP portion of the International Equity Fund, QPP portion of the Inflation Protection Fund, and QPP portion of the Socially Responsive Fund totaled \$5.3 billion, \$415.5 million, \$4.2 million, \$386 thousand, \$172 thousand, and \$540 thousand, respectively. The QPP's net investment income for Fiscal Year 2018 was \$6.3 billion, a \$1.8 billion (-22.9%) decrease from Fiscal Year 2017. The QPP's net investment income of \$6.3 billion consisted of \$2.4 billion in dividend and interest income plus a net gain of \$4.2 billion on the appreciation in fair value of the QPP's investments less \$350.7 million in investment expenses. Net investment income for the QPP portion of the TRSNYC Pension Fund, QPP portion of the Diversified Equity Fund, QPP portion of the Balanced Fund (before January 1, 2018 Bond Fund), QPP portion of the International Equity Fund, QPP portion of the Inflation Protection Fund, and QPP portion of the Socially Responsive Fund totaled \$5.5 billion, \$728.9 million, \$927 thousand, \$1.1 million, \$354 thousand, and \$1.6 million, respectively.

For Fiscal Year 2019, the QPP's effective net investment income for the QPP portion of the TRSNYC Pension Fund increased due to investment returns attributable to the TDA Program's TRSNYC Pension Fund assets. The TDA Fixed Return Fund program resulted in approximately \$24.0 million more assets accruing to the QPP's Contingent Reserve Fund of Employer's Contributions, as a result of the TDA Program's investment returns being above the Statutory Rates. For Fiscal Year 2018, the QPP's effective net investment income for the QPP portion of the TRSNYC Pension Fund increased due to investment returns attributable to the TDA Program's TRSNYC Pension Fund assets. The TDA Fixed Return Fund program resulted in approximately \$234.1 million more assets accruing to the QPP's Contingent Reserve Fund of Employer's Contributions, as a result of the TDA Program's investment returns being above the Statutory Rates. The table below displays the TDA Program's impact on the QPP's Contingent Reserve Fund of Employer's Contributions for Fiscal Years 2019, 2018, and 2017.

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**Revenue (Expense) to Contingent Reserve Fund**

**TRSNYC Pension Fund Assets (QPP)\***

**Years Ended 2019, 2018, and 2017**

**(In thousands)**

	<b>2019</b>	<b>2018</b>	<b>2017</b>
Net Investment Income	\$ 5,299,563	\$ 5,541,133	\$ 7,327,841
TDA percent of Fixed Assets as of June 30	32.95%	32.74%	33.30%
TDA percent of Fixed Assets 6/30/16:			32.69%
TDA percent of Fixed Assets (average)	32.85%	33.02%	32.99%
Investment Income on account of TDA Investment	\$ 1,740,705	\$ 1,829,591	\$ 2,417,743
Less Statutory Interest to TDA	(1,716,679)	(1,595,462)	(1,466,615)
Revenue (Expense) to QPP Contingent Reserve	<u>\$ 24,026</u>	<u>\$ 234,129</u>	<u>\$ 951,128</u>

\*Includes security-lending income

Administrative expenses during Fiscal Year 2019 were \$64.3 million, a decrease of \$785.0 thousand (-1.2%) from Fiscal Year 2018. The System continues its phased implementation to replace its legacy IBM A/S 400 computer system with a system based on Microsoft's .NET programming framework. Sagitec, an outside vendor and a provider of Pension Database Systems, and Cognizant, a software testing company, have been assisting with this multi-year project. In Fiscal Year 2019, the System worked on updating its pension payroll module and also implemented a new death benefit-related processing module. The change in administrative expenses also reflects the annual update in the System's administrative expenses attributed to the QPP. (See Note 8.) The QPP's total administrative expenses for Fiscal Year 2019 accounted for 72.8% of the System's administrative expenditures. The balance of \$24.0 million (27.2%) was expensed to the TDA Program. Administrative expenses during Fiscal Year 2018 were \$65.1 million, an increase of \$4.3 million (7.1%) from Fiscal Year 2017. In Fiscal Year 2018, the System primarily worked on modernizing death benefit-related processing. The change in administrative expenses also reflects the annual update in the System's administrative expenses attributed to the QPP. (See Note 8.) The QPP's total administrative expenses for Fiscal Year 2018 accounted for 74.3% of the System's administrative expenditures. The balance of \$22.5 million (25.7%) was expensed to the TDA Program. The System's administrative expenditures have been \$88.3 million, \$87.5 million, and \$94.9 million, for Fiscal Years 2019, 2018, and 2017, respectively.

The TDA rebalance during Fiscal Year 2019 resulted in \$27.4 million in transfers to the TRSNYC Pension Fund from the TDA Program due to a surplus in the TDA Program's Variable Annuity and Pension Reserve Funds. The Administrative Code of the City of New York under sections 13-582 and 13-577 provide for certain internal transfer of funds. These transfers are intended to rebalance estimated actuarial liabilities with reported assets and follow liability reviews conducted by the Actuary of the City of New York. Also, \$115.7 million was transferred due to a surplus in the QPP Program's variable-return funds. The \$115.7 million transfer increased the investments held by the QPP's TRSNYC Pension Fund and decreased the investments held by the QPP Program's variable-return funds but did not impact net investments held by the QPP plan (see Note 2, Intra-Fund Payable/Receivable). The TDA rebalance during Fiscal Year 2018 resulted in \$32.7 million transfers to the TRSNYC Pension Fund from the TDA Program due to a surplus in the TDA Program's Variable Annuity and Pension Reserve Funds. Also, \$83.4 million was transferred to fully fund the QPP Program's Variable Annuity and Pension Reserve Funds. The \$83.4 million transfer reduced the investments held by the QPP's TRSNYC Pension Fund and increased the investments held by the QPP Program's variable-return funds but did not impact net investments held by the QPP plan (see Note 2, Intra-Fund Payable/Receivable).

Benefit payments and withdrawals during Fiscal Year 2019 were \$4.5 billion, a \$135.8 million (3.1%) increase from Fiscal Year 2018. The \$135.8 million increase in benefit payments and withdrawals was primarily due to a \$88.4 million (2.1%) increase in payments to retirees, and a \$53.2 million (172.5%)

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increase in death benefit payments. In total, benefit payments and withdrawals distributed during Fiscal Year 2019 were composed of 97.4% in retirement benefits and 2.6% in refund/withdrawals and survivor benefits. Benefit payments and withdrawals during Fiscal Year 2018 were \$4.4 billion, a \$132.6 million (3.1%) increase from Fiscal Year 2017. The \$132.6 million increase in benefit payments and withdrawals was primarily due to a \$134.0 million (3.2%) increase in payments to retirees. In total, benefit payments and withdrawals distributed during Fiscal Year 2018 were composed of 98.4% in retirement benefits and 1.6% in refund/withdrawals and survivor benefits.

Payments of statutory-interest due to the TDA from its investment in the TRSNYC Pension Fund Assets (Fixed Return Fund) during Fiscal Year 2019 were \$1.7 billion, an increase of \$121.2 million (7.6%) from Fiscal Year 2018. Payments of statutory-interest due to the TDA from its investment in the TRSNYC Pension Fund Assets (Fixed Return Fund) during Fiscal Year 2018 were \$1.6 billion, an increase of \$128.8 million (8.8%) from Fiscal Year 2017.

**TDA Program Financial Highlights** — The TDA Program's net position restricted for benefits was \$35.3 billion, \$33.4 billion, and \$31.1 billion, as of June 30, 2019, 2018, and 2017, respectively. Member contributions amounted to \$995.0 million, \$856.3 million, and \$743.7 million, for Fiscal Years 2019, 2018, and 2017, respectively. Benefit payments and withdrawals totaled \$1.4 billion, \$1.1 billion, and \$1.0 billion, for Fiscal Years 2019, 2018, and 2017, respectively. Below is a summary of the TDA program's net position and changes in net position.

**TDA Program's Fiduciary Net Position  
June 30, 2019, 2018, and 2017**

(In thousands)	2019	2018	2017
Cash	\$ 9,533	\$ 7,371	\$ 3,952
Receivables for investments sold	55,994	7,250	23,956
Receivables for accrued interest and dividends	16,531	15,580	12,777
Member loan receivables	403,787	386,804	376,016
Investments, at fair value	9,591,018	9,427,324	8,838,152
Investment in TRSNYC Pension Fund	25,602,248	23,707,352	22,004,183
Collateral from securities lending	57,798	95,170	108,414
Other assets	20,813	18,613	16,296
Total assets	35,757,722	33,665,464	31,383,746
Accounts payable	68,740	85,715	96,908
Payable for investment securities purchased	59,678	12,473	43,416
Accrued benefits payable	238,111	91,124	82,915
Payable for securities lending transactions	57,798	95,170	108,414
Total liabilities	424,327	284,482	331,653
Net position held in trust for benefits	\$ 35,333,395	\$ 33,380,982	\$ 31,052,093

Cash balances amounted to \$9.5 million at June 30, 2019, an increase of \$2.2 million (29.3%) from June 30, 2018. Cash balances amounted to \$7.4 million at June 30, 2018, an increase of \$3.4 million (86.5%) from June 30, 2017. Cash balances consist of accounts used to reimburse the funds of the Variable-Annuity Program and accounts used for advance funding of the variable-return funds' investment managers.

Receivables for investment securities sold at June 30, 2019 amounted to \$56.0 million, an increase of \$48.7 million (672.3%) from June 30, 2018. Receivables for investment securities sold at June 30, 2018 amounted to \$7.3 million, a decrease of \$16.7 million (-69.7%) from June 30, 2017. These balances are principally composed of receivables for securities that have been sold but have not yet settled (*i.e.*, the cash has not been collected). The year-over-year changes resulted from timing differences in trading and settlement dates. Trades typically do not settle until a few days after the trade date.

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Receivables for accrued earnings at June 30, 2019 were \$16.5 million, an increase of \$1.0 million (6.1%) from June 30, 2018. Receivables for accrued earnings at June 30, 2018 were \$15.6 million, an increase of \$2.8 million (21.9%) from June 30, 2017. Changes in accrued earnings are impacted by the cumulative value of the interest or dividend-bearing securities, discount rates, and interest payable dates at fiscal year-end.

Member loan receivables at June 30, 2019 amounted to \$403.8 million, an increase of \$17.0 million (4.4%) from June 30, 2018. For Fiscal Year 2019, loan disbursements amounted to \$204.8 million and principal and interest payments amounted to \$205.6 million. Member loan receivables at June 30, 2018 amounted to \$386.8 million, an increase of \$10.8 million (2.9%) from June 30, 2017. For Fiscal Year 2018, loan disbursements amounted to \$189.7 million and principal and interest payments amounted to \$197.5 million.

The variable-return funds' investments at June 30, 2019, including collateral received for securities lending, were \$9.6 billion, an increase of \$126.3 million (1.3%) from June 30, 2018. The variable-return funds' investments at June 30, 2018, including collateral received for securities lending, were \$9.5 billion, an increase of \$575.9 million (6.4%) from June 30, 2017.

Assets of the TDA Program's Fixed Return Fund invested in the TRSNYC Pension Fund at June 30, 2019 were \$25.6 billion, an increase of \$1.9 billion (8.0%) from June 30, 2018. In addition to the 7% statutory return for UFT members [and 8.25% for non-UFT members] for Fiscal Year 2019, contributions, withdrawals and investment transfers to (from) the Fixed Return Fund totaled \$687.5 million, -\$1.1 billion, and \$439.0 million, respectively. Assets of the TDA Program's Fixed Return Fund invested in the TRSNYC Pension Fund at June 30, 2018 were \$23.7 billion, an increase of \$1.7 billion (7.7%) from June 30, 2017. In addition to the 7% statutory return for UFT members [and 8.25% for non-UFT members] for Fiscal Year 2018, contributions, withdrawals and investment transfers to (from) the Fixed Return Fund totaled \$591.8 million, -\$853.6 million and \$382.3 million, respectively.

Other assets at June 30, 2019 were \$20.8 million, an increase of \$2.2 million (11.8%) over June 30, 2018. Other assets at June 30, 2018 were \$18.6 million, an increase of \$2.3 million (14.2%) over June 30, 2017. Other assets primarily represent assets already allocated for future administrative expenses.

Accounts payable at June 30, 2019 amounted to \$68.7 million, a decrease of \$17.0 million (-19.8%) from June 30, 2018. Accounts payable at June 30, 2018 amounted to \$85.7 million, a decrease of \$11.2 million (-11.6%) from June 30, 2017. The TDA Program's accounts payable balance primarily represents a reserve fund to pay the TDA Program's investment and administrative expenses.

Payables for investment securities purchased at June 30, 2019 amounted to \$59.7 million, an increase of \$47.2 million (378.5%) from June 30, 2018. Payables for investment securities purchased at June 30, 2018 amounted to \$12.5 million, a decrease of \$30.9 million (71.3%) from June 30, 2017. Investments purchased are accounted for on a trade-date basis. The changes resulted from timing differences in settlement and trade dates, similar to receivables for investments sold (discussed earlier).

Accrued benefits payable at June 30, 2019 amounted to \$238.1 million, an increase of \$147.0 million (161.3%) from June 30, 2018. The \$147.0 million increase is primarily attributed to an increase of pending death benefits due to beneficiaries at year-end. Due to a system enhancement in Fiscal Year 2019, amounts due to beneficiaries can now be calculated following notice of death without waiting for the beneficiary claim to be received and reviewed. Accrued benefits payable at June 30, 2018 amounted to \$91.1 million, an increase of \$8.2 million (9.9%) from June 30, 2017. The \$8.2 million increase in accrued benefits payable is attributed to changes in TDA withdrawal amounts processed in July and August (an estimate is used for August) after year-end.

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**Changes in TDA Program's Fiduciary Net Position**  
**Years Ended June 30, 2019, 2018, and 2017**  
**(In Thousands)**

	2019	2018	2017
Additions:			
Member contributions	\$ 995,035	\$ 856,294	\$ 743,663
Net investment income	668,269	1,053,660	1,396,698
Net securities lending income	1,271	1,531	1,802
Total additions	<u>1,664,575</u>	<u>1,911,485</u>	<u>2,142,163</u>
Deductions:			
Administrative expenses	23,964	22,456	33,032
TDA rebalance	27,449	32,704	(43,938)
Benefits payments	1,377,428	1,122,898	1,011,931
Receipt of statutory-interest for portion of investment in TRS NYC Pension Fund	<u>(1,716,679)</u>	<u>(1,595,462)</u>	<u>(1,466,615)</u>
Total deductions	<u>(287,838)</u>	<u>(417,404)</u>	<u>(465,590)</u>
Net increase in net position	<u>\$ 1,952,413</u>	<u>\$ 2,328,889</u>	<u>\$ 2,607,753</u>
Net position restricted for benefits			
Beginning of year	<u>33,380,982</u>	<u>31,052,093</u>	<u>28,444,340</u>
End of year	<u>\$ 35,333,395</u>	<u>\$ 33,380,982</u>	<u>\$ 31,052,093</u>

TRS's TDA Program received \$995.0 million in member contributions during Fiscal Year 2019, an increase of \$138.7 million (16.2%) from Fiscal Year 2018. There were 89,708 members contributing in Fiscal Year 2019 compared to 87,296 members contributing in Fiscal Year 2018. TRS's TDA Program received \$856.3 million in member contributions during Fiscal Year 2018, an increase of \$112.6 million (15.1%) from Fiscal Year 2017. There were 87,296 members contributing in Fiscal Year 2018 compared to 83,856 members contributing in Fiscal Year 2017.

Net investment income for the TDA Program's variable-return funds for Fiscal Year 2019 decreased by \$385.4 million (-36.6%) from Fiscal Year 2018. Net investment income for the TDA Program's variable-return funds for Fiscal Year 2018 decreased by \$343.0 million (-24.6%) from Fiscal Year 2017. Net investment gains/ losses primarily reflect the appreciation/depreciation in fair value of the TDA Program's variable-return fund investments, including both realized and unrealized gains and losses.

Administrative expenses for the Fiscal Year ended June 30, 2019 totaled \$24.0 million, an increase of \$1.5 million (6.7%) from Fiscal Year 2018. Administrative expenses for the Fiscal Year ended June 30, 2018 totaled \$22.4 million, a decrease of \$10.6 million (-32.0%) from Fiscal Year 2017. The TDA Program accounted for a portion of the System's total administrative expenses; see QPP administrative expenses above and Note 8.

The TDA rebalance during Fiscal Year 2019 resulted in a \$27.4 million transfer to the TRS NYC Pension Fund from the TDA Program. The TDA rebalance during Fiscal Year 2018 resulted in a \$32.7 million transfer to the TRS NYC Pension Fund from the TDA Program. The Administrative Code of the City of New York under sections 13-582 and 13-577 provide for certain internal transfer of funds. These transfers are intended to rebalance estimated actuarial liabilities with reported assets; see Note 2, Intra-Fund Payable/Receivable.

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Benefit payments and withdrawals for the Fiscal Year ended June 30, 2019 totaled \$1.4 billion, an increase of \$254.5 million (22.7%) from Fiscal Year 2018. Benefit payments and withdrawals for the Fiscal Year ended June 30, 2018 totaled \$1.1 billion, an increase of \$111.0 million (11.0%) from Fiscal Year 2017. Benefit payments and withdrawals consist primarily of total and partial withdrawals and lump sum payments to beneficiaries.

Receipts of statutory-interest for the TDA Program's Fixed Return Fund portion in investments in the TRS NYC Pension Fund assets for Fiscal Year 2019 were \$1.7 billion, an increase of \$121.2 million (7.6%) from Fiscal Year 2018. Receipts of statutory-interest for the TDA Program's Fixed Return Fund portion in investments in the TRS NYC Pension Fund assets for Fiscal Year 2018 were \$1.6 billion, an increase of \$128.8 million (8.8%) from Fiscal Year 2017.

### Cash Flow

Monthly contributions, loan repayments, and interest and dividends earned on investments less benefit payments, new loans, and investment and administrative expenses account for the System's non-investment cash flow. The table below provides a three-year summary.

Cash Flow Review (In thousands)	June 30, 2019 QPP	June 30, 2019 TDA	June 30, 2018 QPP	June 30, 2018 TDA	June 30, 2017 QPP	June 30, 2017 TDA
Contributions	\$ 3,976,403	\$ 995,035	\$ 4,144,930	\$ 856,294	\$ 4,125,844	\$ 743,663
Contributions — Loan adj.	-	(393)	-	(16)	-	(157)
Loan repayments (cash)	147,934	205,573	140,129	197,528	131,640	192,340
401(a) receipts/(payments)	1,222	-	(3,534)	-	(2,291)	-
Interest income	1,148,789	33,155	1,330,009	35,177	932,169	34,368
Interest income — Loan adj.	(13,738)	(27,699)	(21,407)	(26,615)	(20,450)	(26,192)
Dividend income	1,112,731	176,359	1,056,636	146,932	981,087	138,237
Investment expenses (net)	(301,437)	1,824	(350,668)	(2,148)	(313,801)	5,518
Benefits/withdrawals	(4,487,680)	(1,377,428)	(4,351,924)	(1,122,898)	(4,219,312)	(1,011,931)
Withdrawals — Loan adj.	11,787	10,889	17,713	8,511	16,559	13,069
New loans	(154,367)	(204,811)	(150,066)	(189,680)	(149,750)	(186,684)
Administrative expenses	(64,291)	(23,964)	(65,076)	(22,456)	(60,790)	(33,032)
	<u>\$ 1,377,353</u>	<u>\$ (211,460)</u>	<u>\$ 1,746,742</u>	<u>\$ (119,371)</u>	<u>\$ 1,420,905</u>	<u>\$ (130,801)</u>

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**Investments**

TRS investment funds include both QPP and TDA Program assets. The table below details the QPP and TDA Program's portions of the funds.

**TRS Investment Funds  
by Plan Percentage**

	June 30, 2019	June 30, 2019	June 30, 2018	June 30, 2018	June 30, 2017	June 30, 2017
	QPP	TDA	QPP	TDA	QPP	TDA
TRSNYC Pension Fund	67.0%	33.0%	67.3%	32.7%	66.7%	33.3%
Variable-Return Funds:						
Diversified equity*	39.0%	57.1%	40.6%	55.8%	41.4%	55.2%
Balanced fund**	15.9%	84.1%	18.8%	81.2%	22.1%	77.9%
International equity	6.9%	93.1%	7.9%	92.1%	9.7%	90.3%
Inflation protection	5.6%	94.4%	7.1%	92.9%	8.8%	91.2%
Socially responsive equity	5.4%	94.6%	6.3%	93.7%	7.4%	92.6%

\* Remaining portion is held by Board of Education Retirement System.

\*\* Bond Fund prior to January 1, 2018.

To rate investment performance, both the TRSNYC Pension Fund assets and variable-return funds' investments are monitored with various benchmarks.

In addition to other indices, the "policy index" is a benchmark for the complete TRS NYC Pension Fund. As of June 30, 2019, the policy index includes the following:

**TRSNYC Pension Fund Policy Index as of June 30, 2019\***

<b>Investment Type</b>	<b>Benchmark</b>	<b>Percent</b>
U.S. Equity	Russell 3000	31.4%
International Developed EAFE Markets	MSCI World ex USA IMI Net	11.4%
Int'l Active- Global	MSCI World Net Dividends Index	0.4%
Emerging Markets	MSCI Custom TRS Emerging Markets (Net)	8.9%
International Emerging Managers FoF	NYC Blended Custom Benchmark for FoF	0.7%
Private Equity	Russell 3000 + 300 b.p per annum	6.0%
Private Real Estate - Core	NFI - ODCE Net	2.7%
Private Real Estate - Non Core	NFI - ODCE Net + 200 bps	1.4%
Infrastructure	CPI + 4%	1.3%
US Treasury Long Duration	FTSE Treasury 10+	10.7%
Mortgage	FTSE Mortgage Index	4.1%
ETI	ETI Custom Benchmark	0.9%
Investment Grade Credit	NYC - Investment Grade Credit	4.9%
High Yield	Bloomberg Barclays US High Yield 2% Issuer Capped	6.0%
Bank Loans	Credit Suisse Leveraged Loan	2.0%
TIPS	BBG BARC Gbl Inf-Lk: US TIPS (Dly)	4.2%
Opportunistic Fixed	OFI - JPMGHY / CSFB 50/50 Blend Plus 300 b.p. per annum	3.0%
		<b>100.0%</b>

\*Source: Teachers' Retirement System of New York City Performance Overview as of June 30, 2019, prepared by State Street.

**TEACHERS' RETIREMENT SYSTEM OF THE CITY OF NEW YORK  
MANAGEMENT'S DISCUSSION AND ANALYSIS (UNAUDITED)  
JUNE 30, 2019 AND 2018**

Variable-return funds are benchmarked using the Russell 3000, Standard & Poor's 500, FTSE Global All Cap, Bloomberg Barclays 1-5 Year Government/Credit indices, as well as numerous other indices.

TRS earns additional investment income by lending its investment securities. The borrowers provide collateral to TRS that is valued in excess of the securities loaned, and the collateral is invested in short-term interest-bearing funds. For the Fiscal Year ended June 30, 2019, net securities lending income amounted to \$13.4 million, a decrease of \$3.5 million from Fiscal Year 2018. For the Fiscal Year ended June 30, 2018, net securities lending income amounted to \$16.8 million, a decrease of \$2.4 million from Fiscal Year 2017. (See Note 2.)

Investments held by TRS, including collateral from securities-lending transactions, are listed according to their investment classification in the following table:

**Investment Summary (by Asset Class)  
(in thousands)**

	2019	2018	2017
Short-term investments	\$ 1,897,730	\$ 1,971,516	\$ 1,249,819
Debt securities and Fixed Income	26,671,698	26,117,272	21,295,745
Equity securities	54,807,149	51,313,246	51,172,993
Alternative investments	10,069,086	8,926,759	7,523,885
Collateral from securities lending	<u>1,280,112</u>	<u>1,212,762</u>	<u>1,718,735</u>
Total	<u>\$ 94,725,775</u>	<u>\$ 89,541,555</u>	<u>\$ 82,961,177</u>

**Investment Summary (by Plan)  
(in thousands)**

	2019	2018	2017
<b>TRSNYC Pension Fund</b>			
QPP	\$ 52,091,309	\$ 48,704,639	\$ 44,080,037
TDA	<u>25,602,248</u>	<u>23,707,352</u>	<u>22,004,183</u>
Total	<u>77,693,557</u>	<u>72,411,991</u>	<u>66,084,220</u>

**Variable-Return Funds**

QPP	6,161,088	6,489,478	6,320,070
TDA	<u>9,591,018</u>	<u>9,427,324</u>	<u>8,838,152</u>
Total	<u>15,752,106</u>	<u>15,916,802</u>	<u>15,158,222</u>

**Collateral for Security Lending**

QPP Pension Fund	1,182,863	1,048,388	1,530,310
QPP Variable-Return Funds	39,451	69,204	80,011
TDA Variable-Return Funds	<u>57,798</u>	<u>95,170</u>	<u>108,414</u>
Total	<u>1,280,112</u>	<u>1,212,762</u>	<u>1,718,735</u>

<b>Total Investments</b>	<u>\$ 94,725,775</u>	<u>\$ 89,541,555</u>	<u>\$ 82,961,177</u>
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**CONTACT INFORMATION**

This financial report is designed to provide a general overview of the Teachers' Retirement System's finances. Questions concerning any data provided in this report or requests for additional information should be directed to Mr. Paul J. Raucci, Chief Accountant, Teachers' Retirement System of the City of New York, 55 Water Street, New York, NY 10041.

\* \* \* \* \*

**TEACHERS' RETIREMENT SYSTEM OF THE CITY OF NEW YORK**  
**COMBINING STATEMENTS OF FIDUCIARY NET POSITION**  
**JUNE 30, 2019**  
**(In Thousands)**

ASSETS:	QPP	TDA	Eliminations	Total
Cash	\$ 76,796	\$ 9,533	\$ -	\$ 86,329
Receivables:				
Investment securities sold	2,305,855	55,994	-	2,361,849
Accrued interest and dividends	290,228	16,531	-	306,759
Member loans (Note 6)	320,976	403,787	-	724,763
Total receivables	2,917,059	476,312	-	3,393,371
Investments — at fair value (Notes 2 and 3):				
TRSNYC Pension Fund Assets (Fixed-Return Fund):				
Short-term investment:				
Commercial paper	567,394	-	-	567,394
Short-term investment fund	779,479	-	-	779,479
Discount notes	203,555	-	-	203,555
U.S. Treasury bills and Agencies	100,011	-	-	100,011
Debt securities:				
U.S. Government	11,074,088	-	-	11,074,088
Corporate and Other *	11,914,295	-	-	11,914,295
Treasury inflation protected securities	3,387,131	-	-	3,387,131
Equity securities:				
Domestic equity	24,374,505	-	-	24,374,505
International equity	15,224,013	-	-	15,224,013
Alternative Investments**	10,069,086	-	-	10,069,086
Collateral from securities lending (Fixed-Return Fund)	1,182,863	-	-	1,182,863
Diversified Equity Fund:				
Short-term investments	123,852	109,819	-	233,671
Equity securities	5,826,298	8,535,976	-	14,362,274
Debt securities	120,152	176,032	-	296,184
Balanced Fund:				
Short-term investments	775	4,105	-	4,880
Equity securities	62,502	330,847	-	393,349
International Equity Fund:				
Short-term investments	65	878	-	943
International equity	11,131	150,972	-	162,103
Inflation Protection Fund:				
Short-term investments	13	211	-	224
Equity securities	3,930	66,134	-	70,064
Socially Responsive Equity Fund:				
Short-term investments	410	7,163	-	7,573
Equity securities	10,975	191,682	-	202,657
International equity	985	17,199	-	18,184
Collateral from securities lending (Variable-Return Funds)	39,451	57,798	-	97,249
Total investments	85,076,959	9,648,816	-	94,725,775
TDA Investment in TRSNYC Pension Fund	-	25,602,248	(25,602,248)	-
Other assets	42,615	20,813	(27,616)	35,812
	88,113,429	35,757,722	(25,629,864)	98,241,287
LIABILITIES:				
Accounts payable	646,918	68,740	(27,616)	688,042
Payable for investment securities purchased	2,574,584	59,678	-	2,634,262
Accrued benefits payable	77,154	238,111	-	315,265
Due to TDA Program's Fixed Return Fund	25,602,248	-	(25,602,248)	-
Securities lending (Note 2)	1,222,314	57,798	-	1,280,112
Total liabilities	30,123,218	424,327	(25,629,864)	4,917,681
NET POSITION RESTRICTED FOR BENEFITS				
Benefits to be provided by QPP	57,990,211	-	-	57,990,211
Benefits to be provided by TDA Program	-	35,333,395	-	35,333,395
Total net position restricted for benefits	\$ 57,990,211	\$ 35,333,395	\$ -	\$ 93,323,606

\* Corporate and Other for 2019 includes \$324,258 Mortgage debt security and \$923,739 other Fixed Income of collective trust funds

\*\* Alternative Investments for 2019 includes \$185,400 Fixed Income of collective trust funds.

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

**TEACHERS' RETIREMENT SYSTEM OF THE CITY OF NEW YORK**  
**COMBINING STATEMENTS OF FIDUCIARY NET POSITION**  
**JUNE 30, 2018**  
**(In Thousands)**

ASSETS:	QPP	TDA	Eliminations	Total
Cash	\$ 75,847	\$ 7,371	\$ -	\$ 83,218
Receivables:				
Investment securities sold	839,544	7,250	-	846,794
Accrued interest and dividends	273,387	15,580	-	288,967
Member loans (Note 6)	312,219	386,804	-	699,023
Total receivables	1,425,150	409,634	-	1,834,784
Investments — at fair value (Notes 2 and 3):				
TRSNYC Pension Fund Assets (Fixed-Return Fund):				
Short-term investment:				
Commercial paper	6,487	-	-	6,487
Short-term investment fund	1,578,263	-	-	1,578,263
Discount notes	111,733	-	-	111,733
Debt securities:				
U.S. Government	13,288,993	-	-	13,288,993
Corporate and Other	7,016,574	-	-	7,016,574
Equity securities	20,536,514	-	-	20,536,514
Alternative Investments	8,926,759	-	-	8,926,759
Collective Trust Funds:				
International equity	15,436,970	-	-	15,436,970
Mortgage debt security	555,508	-	-	555,508
Treasury inflation protected securities	3,106,109	-	-	3,106,109
Fixed income	1,848,081	-	-	1,848,081
Collateral from securities lending (Fixed-Return Fund)	1,048,388	-	-	1,048,388
Diversified Equity Fund:				
Short-term investments	135,558	126,684	-	262,242
Equity securities	6,125,780	8,424,180	-	14,549,960
Debt securities	127,150	174,857	-	302,007
Balanced Fund (formerly the Bond Fund):				
Short-term investments	849	3,667	-	4,516
Equity securities	70,562	304,711	-	375,273
Debt securities	-	-	-	-
International Equity Fund:				
Short-term investments	80	927	-	1,007
International equity	12,076	140,561	-	152,637
Inflation Protection Fund:				
Short-term investments	3	45	-	48
Equity securities	4,596	60,120	-	64,716
Socially Responsive Equity Fund:				
Short-term investments	453	6,767	-	7,220
Equity securities	11,654	174,104	-	185,758
International equity	717	10,701	-	11,418
Collateral from securities lending (Variable-Return Funds)	69,204	95,170	-	164,374
Total investments	80,019,061	9,522,494	-	89,541,555
TDA Investment in TRSNYC Pension Fund	-	23,707,352	(23,707,352)	-
Other assets	62,852	18,613	(32,538)	48,927
Total assets	81,582,910	33,665,464	(23,739,890)	91,508,484
LIABILITIES:				
Accounts payable	643,567	85,715	(32,538)	696,744
Payable for investment securities purchased	1,568,064	12,473	-	1,580,537
Accrued benefits payable	13,858	91,124	-	104,982
Due to TDA Program's Fixed Return Fund	23,707,352	-	(23,707,352)	-
Securities lending (Note 2)	1,117,593	95,170	-	1,212,763
Total liabilities	27,050,434	284,482	(23,739,890)	3,595,026
NET POSITION RESTRICTED FOR BENEFITS				
Benefits to be provided by QPP	54,532,476	-	-	54,532,476
Benefits to be provided by TDA Program	-	33,380,982	-	33,380,982
Total net position restricted for benefits	\$ 54,532,476	\$ 33,380,982	\$ -	\$ 87,913,458

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

**TEACHERS' RETIREMENT SYSTEM OF THE CITY OF NEW YORK**  
**COMBINING STATEMENTS OF CHANGES IN FIDUCIARY NET POSITION**  
**YEAR ENDED JUNE 30, 2019**  
(In Thousands)

	QPP	TDA	Total
ADDITIONS:			
Contributions:			
Member contributions (Note 4)	\$ 217,205	\$ 995,035	\$ 1,212,240
Employer contributions	3,696,686	-	3,696,686
Other employer contributions	62,513	-	62,513
Total contributions	<u>3,976,404</u>	<u>995,035</u>	<u>4,971,439</u>
Investment income (Note 2):			
Interest income	1,148,789	33,155	1,181,944
Dividend income	1,112,731	176,359	1,289,090
Net appreciation in fair value of investments	3,749,095	456,931	4,206,026
Total investment income	<u>6,010,615</u>	<u>666,445</u>	<u>6,677,060</u>
Less:			
Investment expenses	307,370	9,527	316,897
Net (decrease) in variable expense provision	<u>(5,933)</u>	<u>(11,351)</u>	<u>(17,284)</u>
Net investment income	<u>5,709,178</u>	<u>668,269</u>	<u>6,377,447</u>
Securities lending transactions:			
Securities lending income	13,416	1,412	14,828
Less - securities lending fees	<u>(1,284)</u>	<u>(141)</u>	<u>(1,425)</u>
Net securities lending income	<u>12,132</u>	<u>1,271</u>	<u>13,403</u>
Other:			
Net receipts to other retirement systems	<u>1,222</u>	<u>-</u>	<u>1,222</u>
Total additions	<u>9,698,936</u>	<u>1,664,575</u>	<u>11,363,511</u>
DEDUCTIONS:			
Benefit payments and withdrawals	4,487,680	1,377,428	5,865,108
Administrative expenses (Note 8)	64,291	23,964	88,255
Other:			
Statutory Interest for TDA Program's Fixed Return Fund	1,716,679	(1,716,679)	-
TDA Rebalance	(27,449)	27,449	-
Total deductions	<u>6,241,201</u>	<u>(287,838)</u>	<u>5,953,363</u>
NET INCREASE IN NET POSITION	3,457,735	1,952,413	5,410,148
NET POSITION RESTRICTED FOR BENEFITS:			
Beginning of year	<u>54,532,476</u>	<u>33,380,982</u>	<u>87,913,458</u>
End of year	<u>\$ 57,990,211</u>	<u>\$ 35,333,395</u>	<u>\$ 93,323,606</u>

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

**TEACHERS' RETIREMENT SYSTEM OF THE CITY OF NEW YORK**  
**COMBINING STATEMENTS OF CHANGES IN FIDUCIARY NET POSITION**  
**YEAR ENDED JUNE 30, 2018**  
(In Thousands)

	QPP	TDA	Total
ADDITIONS:			
Contributions:			
Member contributions (Note 4)	\$ 195,241	\$ 856,294	\$ 1,051,535
Employer contributions	3,889,710	-	3,889,710
Other employer contributions	59,979	-	59,979
Total contributions	<u>4,144,930</u>	<u>856,294</u>	<u>5,001,224</u>
Investment income (Note 2):			
Interest income	1,330,009	35,177	1,365,186
Dividend income	1,056,636	146,932	1,203,568
Net appreciation in fair value of investments	4,223,813	873,699	5,097,512
Total investment income	<u>6,610,458</u>	<u>1,055,808</u>	<u>7,666,266</u>
Less:			
Investment expenses	356,269	10,436	366,705
Net (decrease) in variable expense provision	<u>(5,601)</u>	<u>(8,288)</u>	<u>(13,889)</u>
Net investment income	<u>6,259,790</u>	<u>1,053,660</u>	<u>7,313,450</u>
Securities lending transactions:			
Securities lending income	16,654	1,706	18,360
Less - securities lending fees	<u>(1,329)</u>	<u>(175)</u>	<u>(1,504)</u>
Net securities lending income	<u>15,325</u>	<u>1,531</u>	<u>16,856</u>
Total additions	<u>10,420,045</u>	<u>1,911,485</u>	<u>12,331,530</u>
DEDUCTIONS:			
Benefit payments and withdrawals	4,351,924	1,122,898	5,474,822
Administrative expenses (Note 8)	65,076	22,456	87,532
Other:			
Net receipts to other retirement systems	3,534	-	3,534
Statutory Interest for TDA Program's Fixed Return Fund	1,595,462	(1,595,462)	-
TDA Rebalance	(32,704)	32,704	-
Total deductions	<u>5,983,292</u>	<u>(417,404)</u>	<u>5,565,888</u>
NET INCREASE IN NET POSITION	4,436,753	2,328,889	6,765,642
NET POSITION RESTRICTED FOR BENEFITS:			
Beginning of year	<u>50,095,723</u>	<u>31,052,093</u>	<u>81,147,816</u>
End of year	<u>\$ 54,532,476</u>	<u>\$ 33,380,982</u>	<u>\$ 87,913,458</u>

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

**TEACHERS' RETIREMENT SYSTEM OF THE CITY OF NEW YORK**  
**NOTES TO COMBINING FINANCIAL STATEMENTS**  
**JUNE 30, 2019 AND 2018**

**1. PLAN 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") and City laws). The City's five major actuarially-funded pension systems are the Teachers' Retirement System of the City of New York ("TRS" or the "System"), The New York City Employees' Retirement System ("NYCERS"), The New York City Board of Education Retirement System ("BERS"), 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 others.

TRS administers the TRS Qualified Pension Plan (the "QPP") and the TRS Tax-Deferred Annuity Program (the "TDA Program").

The QPP is a cost-sharing, multiple-employer pension plan. The QPP provides pension benefits for certain City public school teachers and certain other school and college teachers. The employers, in addition to The City, are The City University of New York ("CUNY") and several Charter Schools (collectively, the "Employers"). Substantially all teachers in the public schools of The City become members of the QPP, and certain other specified school and college personnel may become members on the first day of permanent employment.

The QPP functions in accordance with State and City laws, which establish benefit terms and Employer and member contribution requirements for the QPP. The QPP is a tax-qualified retirement plan under section 401(a) of the Internal Revenue Code ("IRC") that has received a favorable determination letter from the Internal Revenue Service ("IRS"). The QPP combines features of a defined-benefit pension plan with those of a defined-contribution pension plan, but is a defined-benefit pension plan for financial reporting purposes. Contributions are made by the Employers and the members.

The TDA Program was established and is administered pursuant to IRC Section 403(b) and NYC Administrative Code section 13-582 and became effective February 1, 1970. Members of the QPP have the option to participate in the TDA Program, which provides a means of deferring income tax payments on members' voluntary contributions until after retirement or upon withdrawal of contributions. Contributions to the TDA Program are made by the members only and are voluntary. Benefits provided under the TDA Program are derived from members' accumulated contributions and earnings thereon. The TDA Program is a defined-contribution pension plan for financial reporting purposes.

The QPP and TDA Program are fiduciary funds of The City and are included in the Pension and Other Employee Benefit Trust Funds section of The City's Comprehensive Annual Financial Report ("CAFR").

**TEACHERS' RETIREMENT SYSTEM OF THE CITY OF NEW YORK**  
**NOTES TO COMBINING FINANCIAL STATEMENTS**  
**JUNE 30, 2019 AND 2018**

**Board of Trustees**

The Teachers' Retirement Board, a seven-trustee Board, sets policy and oversees TRS' operations. Three TRS Board trustees are elected from and by the TRS membership. These trustees serve three-year terms. The Mayor appoints two Board trustees, one of whom must be a member of the Panel for Educational Policy. The City Comptroller and the Chair of the Panel for Education Policy are the other two Board trustees, each of which may designate a representative to act on his or her behalf.

**Membership Data**

The QPP's and TDA Program's membership, at June 30, 2019 and June 30, 2018 consisted of:

<b>QPP</b>	<b>2019 *</b>	<b>2018</b>
Retirees and beneficiaries receiving benefits	87,000	86,295
Terminated vested members not yet receiving benefits	17,000	16,433
Other inactives**	10,000	9,416
Active members	124,000	121,764
Total	<u>238,000</u>	<u>233,908</u>
 <b>TDA Program</b>	 <b>2019 *</b>	 <b>2018</b>
Retirees receiving a TDA annuity	2,700	2,811
Retirees or Inactive members with TDA deferral	58,000	55,874
Active members with TDA	97,000	90,648
Total	<u>157,700</u>	<u>149,333</u>

\*Preliminary.

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

**TEACHERS' RETIREMENT SYSTEM OF THE CITY OF NEW YORK**  
**NOTES TO COMBINING FINANCIAL STATEMENTS**  
**JUNE 30, 2019 AND 2018**

The QPP's and TDA Program's membership, at June 30, 2017 and June 30, 2016, the dates of the membership data used in determining Fiscal Year 2019 and Fiscal Year 2018 employer contributions, consisted of:

<b>QPP</b>	<b>2017</b>	<b>2016</b>
Retirees and beneficiaries receiving benefits	84,770	84,093
Terminated vested members not yet receiving benefits	15,229	14,393
Other inactives*	7,997	7,401
Active members	120,826	118,201
Total	<u>228,822</u>	<u>224,088</u>

<b>TDA Program</b>	<b>2017</b>	<b>2016</b>
Retirees receiving a TDA annuity	2,866	2,930
Retirees or Inactive members with TDA deferral	54,448	52,722
Active members with TDA	87,694	84,907
Total	<u>145,008</u>	<u>140,559</u>

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

## **Summary of Benefits**

### *QPP Plan*

The State Constitution provides that the 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 and member contributions for employees joining the QPP on or after the effective date of such amendments. As such, benefits under the QPP fall into various categories (also referred to as "Tiers") based on the year when an employee joined the QPP. A brief overview follows:

- Members who joined prior to July 1, 1973 ("Tier I") are entitled to service retirement benefits of 50% of "final salary" (as defined within State and City laws) after 20 years of service; a portion is provided from member contributions, plus additional benefits equal to specified percentages (as defined within State and City laws) per year of service of "final salary" for years in excess of the 20-year minimum. These 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 Increased-Take-Home-Pay ("ITHP") contributions [accumulated after the twentieth year of member qualifying service]. ITHP represents amounts contributed by The City to members' QPP accounts 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.

**TEACHERS' RETIREMENT SYSTEM OF THE CITY OF NEW YORK**  
**NOTES TO COMBINING FINANCIAL STATEMENTS**  
**JUNE 30, 2019 AND 2018**

In addition, these same members could elect a service retirement benefit with no minimum service requirement that 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 on attainment of age 55. This benefit is increased, where applicable, by an annuity attributable to the member's contributions and by any benefits attributable to the Employers' contributions with respect to such service under the ITHP contributions.

- Members who joined the QPP after June 30, 1973 and before July 27, 1976 ("Tier II") have provisions similar to Tier I, except that the eligibility for retirement and the salary base for benefits are different and there is a limitation on the maximum benefit. This maximum limitation was subsequently eliminated under Chapter 574 of the Laws of 2000 for all Tier II members who retired after December 8, 2000. Members retiring prior to the age of 62 without 30 years of credited service are subject to an age-reduction factor in their retirement allowance. Effective February 27, 2008, active members were eligible to enroll in a 55 retirement age minimum and 25 credited years of service retirement option ("55/25 retirement option") enabling them to eliminate any age-reduction factor in their retirement allowance (Chapter 19 of Laws of 2008). Those choosing the 55/25 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.

For Tier I and II members enrolled in the QPP prior to July 27, 1976, ITHP contributions made on their behalf, as well as their own contributions are invested, at their election, in the Fixed Return Fund or in variable-return funds. Members can elect to invest in multiples of 5% and change their elections on a quarterly basis. Members receive statutory returns, currently 8.25%, on member contributions or ITHP contributions to the Fixed Return Fund ("Fixed Annuity Program").

Certain members of Tier I and Tier II have the right to make voluntary member contributions ("Voluntary Contributions") in excess of their required member contributions ("Required Contributions"). Both the investment of the Voluntary Contributions and the Required Contributions are directed by each member. A member may invest in: (1) the QPP's Fixed Return Fund in which it is credited with interest at the Statutory-Interest Rate (currently 8.25% for Tier I and Tier II contributions and 7.0% for UFT members and 8.25% for non-UFT members for TDA Contributions) and/or (2) in one or more of the QPP's variable-return funds (see Note 2—Investment Programs). 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 \$53.7 million and \$56.0 million, for the years ended June 30, 2019 and 2018, respectively. Actuarial estimates of the impact of Excesses and Deficiencies are incorporated into calculation of the QPP's net pension liability.

The variable-return funds include only member contributions and ITHP contributions made on their behalf, as described above, and are expressed in terms of units that are valued monthly based on investment experience. At retirement, monthly annuities attributable to member Voluntary Excess Contributions and ITHP contributions can be paid in both fixed and variable amounts, based on the member's election, which can be changed quarterly. Other benefits are paid only in fixed amounts. Monthly annuities attributable to investments in the variable-return

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funds are not fixed in amount, but are based on investment experience through the preceding month.

- Members who joined the QPP on or after July 27, 1976 and prior to September 1, 1983 ("Tier III") were later mandated into Tier IV. However, these members retain their Tier III rights. Tier III requires member contributions of 3.0% of salary for a ten-year period (Chapter 126 of the Laws of 2000) and generally provides for reducing benefits by one-half of the primary Social Security benefit attributable to service with the Employer and for an annual cost-of-living escalator in pension benefits of not more than 3.0%. Members retiring prior to the age of 62 without 30 years of credited service are subject to an age-reduction factor in their retirement allowance.
- Members who joined the QPP on or after September 1, 1983 ("Tier IV") were required to make contributions of 3.0% 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 completion of ten years of credited service, whichever is earlier (Chapter 126 of the Laws of 2000). The annual benefit is approximately 1.67% of "final average salary" per year of service for members with less than 20 years of service and 2.0% of "final average salary" per year of service for members with 20 to 30 years of service, plus a 1.5% addition of "final average salary" per year of service for service in excess of 30 years of service. Members retiring prior to the age of 62 without 30 years of credited service experience an age-reduction factor in their retirement allowance. Effective February 27, 2008, active members were eligible to enroll in a 55 retirement age minimum and 25 credited years of service retirement option enabling them to eliminate any age-reduction factor in their retirement allowance. 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. Members joining after February 27, 2008 are automatically enrolled in a 55 retirement age minimum and 27 credited years of service retirement program ("55/27 retirement program"). These members are required to make additional plan contributions of 1.85% of salary until they have accumulated 27 years of credited service.

Members under the 55/27 retirement program who joined after December 10, 2009, but before April 1, 2012, were 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.

- Members who join on and after April 1, 2012 ("Tier VI") are required to make contributions of 3.0% per year through March 31, 2013. Thereafter, contributions range from 3.0% to 6.0% in accordance with a schedule based on salary. Member contributions continue until retirement. Salary is limited to the New York State Governor's salary. Tier VI members are generally eligible to retire with unreduced benefits beginning at age 63 or with reduced benefits beginning at age 55, if vested.

Members enrolled in the QPP on or after July 27, 1976 ("Tier III, IV and VI") who resign or otherwise terminate from service prior to eligibility for a benefit, are refunded all of their member contributions with 5.0% interest (RSSL, Article 15). Tier III, IV and VI members who work for the Department of Education also receive a monthly supplemental contribution. The monthly supplemental contribution of \$550 per year for supervisors and administrators and \$400 per year for other eligible members is credited to the members' Annuity Savings Accumulation Fund ("ASAF").

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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 and eligible for benefits upon the completion of five years of service. After December 10, 2009, new members who belong to the UFT, and all Tier VI members, become fully vested upon the completion of ten years of service.

The QPP provides death benefits and retirement benefits on the occurrence of accidental or ordinary disability. In terms of payment options of the retirement annuity, the QPP provides a number of options depending on whether retirement payments, following death, will continue to an assigned beneficiary.

During the spring 2000 session, the State Legislature approved and the State Governor ("Governor") authorized automatic Cost-of-Living Adjustments ("COLAs") for certain retirees and beneficiaries (Chapter 125 of the Laws of 2000). COLA is payable to all members who are either: (1) at least age 62 and have been retired for at least five years or (2) at least age 55 and have been retired for at least ten years. Additionally, COLA is payable to members who retired for disability after being retired for five or more years and beneficiaries receiving accidental death benefits who have been receiving them for at least five years. COLA is one-half of the increase in the CPI-U based on the year ending March 31, rounding to the next higher 0.1%, not less than 1% nor greater than 3% of the first \$18,000 of the sum of the maximum retirement allowance and prior COLA.

#### *TDA Program*

The TDA Program is administered by the TRS Board. Contributions to the TDA Program are made by the members only and are voluntary. To participate in the Program, active members of the QPP are required to submit a salary-reduction agreement and enrollment request. Members may choose to stop contributions at any time. A participant may elect to exclude an amount (within the maximum allowed by the IRS) of compensation from current taxable income by contributing it to the TDA Program. This maximum amount is calculated based on various individual factors. Members can elect to invest in the Fixed Return Fund or the variable-return funds.

A participant may withdraw all or part of the balance of his/her account prior to or at the time of retirement. As of January 1, 1989, the tax laws restricted withdrawals of tax-deferred annuity contributions and accumulated earnings thereon for reasons other than retirement or termination. Contributions made after December 31, 1988 and investment earnings credited after December 31, 1988 may only be withdrawn upon attainment of age 59½ or for reasons of hardship (as defined by IRS regulations). Previously, hardship withdrawals were limited to contributions only and, if hardship withdrawal occurred, the member was not able to contribute for a six-month period. The Budget Act of 2018 authorizes plans to remove these restrictions beginning no later than January 1, 2020.

If a member dies while an in-service employee, the full value of his/her TDA Program account at the date of death is paid to the member's beneficiary or estate.

When a member resigns before attaining vested rights under the QPP, (s)he may withdraw the value of the account or may leave the account in the TDA Program for a period of up to seven school years after the date of resignation, provided (s)he does not withdraw his/her account from the QPP. If a member resigns after attaining vested rights under the QPP, (s)he may leave his/her account in the TDA Program, provided the member does not withdraw his/her QPP funds. Once a withdrawal is made from the QPP, the member's participation in the TDA Program is automatically terminated, and the value of the account in the TDA Program will be paid out to the member. Upon death, TDA balances are paid to the assigned beneficiaries or may be invested on behalf of the beneficiaries in the TDA Program's variable-return funds.

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At retirement, several payment options are available to those who annuitize their TDA Program funds. Generally, payment options similar to the QPP are available under the TDA Program.

See "Investments" below for a discussion of TDA investment programs.

**2. SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES**

**Basis of Accounting** — The QPP and the TDA Program use the accrual basis of accounting where the measurement focus is on the 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 the Employers make payroll deductions from members' salary. Employer contributions to the QPP are recognized when due and the employer has a legal obligation to provide the contributions. Benefits and refunds are recognized when due and payable in accordance with the terms of 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 (the "IIF"), and Alternative Investment Funds (the "ALTINVF"). The IIF are private funds of publicly traded securities that are managed by various investment managers on behalf of the QPP and the TDA Program. Fair value is determined by TRS 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 the New York City Office of the Comptroller or TRS management based on information provided by the various GPs after review by an independent consultant and the custodial bank, State Street, for the System's TRSNYC Pension Fund assets.

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.

**Fair Value Measurement** — Government Accounting Standards Board ("GASB") Statement No. 72, *Fair Value Measurement and Application* requires the System to use valuation techniques which are appropriate under the circumstances and are either 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 were used for the fair value measurements.

**Investment Presentation** — The TDA Program Fixed Return Fund's portion of TRSNYC Pension Fund assets are shown as commingled with the QPP's portion of TRSNYC Pension Fund assets, and an offsetting liability is used to show the TDA Program's share of the funds.

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**Investment Programs** — Prior to July 1, 2008, investments were composed of the assets of the following investment programs: the TRSNYC Pension Fund (which includes a component, the Fixed Return Fund, which was previously referred to as the Fixed Annuity Program) and two variable-return funds — the Diversified Equity Fund and the Stable-Value Fund. As of July 1, 2008, the investment programs were expanded to include three new variable-return funds — the International Equity Fund, the Inflation Protection Fund and the Socially Responsive Equity Fund. On January 1, 2012, the Stable-Value Fund became the Bond Fund. On January 1, 2018, the Bond Fund became the Balanced Fund. The Balanced Fund objective is to seek current income and some capital appreciation by investing in a portfolio that includes both stocks and bonds. The six investment programs are collectively referred to as the TRS Passport Funds.

All investment programs excluding the TRSNYC Pension Fund are referred to as the variable-return funds. The TRSNYC Pension Fund includes System investments from QPP employer contributions, QPP Tier I and II members' and ITHP contributions, QPP Tier III, IV, and VI members' contributions and ASAF contributions and TDA Program member contributions invested in the Fixed Return Fund. Investing in variable-return funds is available for both QPP Tier I and II members', ITHP contributions and TDA program investments.

In the Fixed Return Fund, deposits from members' TDA Program accounts are invested along with QPP assets and TDA Program accounts and are credited with a fixed rate of return, determined by the New York State Legislature ("Statutory-Interest Rates"). Payment of the Statutory-Interest is an obligation of The City (NYC Admin. Code section 13-533). The Statutory-Interest Rates are as follows:

- 7% for TDA investments by members who are serving in (or resigned/retired from) titles represented by the United Federation of Teachers. The crediting rate of 7% has been in effect since December 11, 2009. The prior crediting rate of 8.25% had been in effect since July 1, 1988 to December 11, 2009.
- 8.25% for TDA investments by all other members. This crediting rate has been in effect since July 1, 1988.

TDA Program assets are pooled with QPP assets for investment purposes only. NYC Administrative Code section 13-582, subdivision [k], provides for the maintenance of TDA accounts in the Annuity Savings Funds ("Fixed Return Fund") and Variable Annuity Programs ("variable-return funds"), which are distinct from similar funds for the QPP. This is in accordance with requirements that assets of the TDA Program be accounted for separately from assets of the QPP Plan. Statutory Rates received by funds invested in the QPP Plan's and the TDA Plan's Annuity Savings Fund ("Fixed Return Fund") are set, respectively, by NYC Administrative Code sections 13-638.2 and 13-582 [d].

Assets in the TDA Fixed Return Fund are invested with assets of the QPP, on a pro rata basis consistent with the QPP's asset allocation policy. Earnings on these investments over (or under) the Statutory Rates are considered by the Actuary in determining employer contribution obligations. Earnings over the Statutory Rates accrue to the benefit of the QPP. Earnings under the Statutory Rates are considered by the Actuary in determining employer contributions to the QPP, such that the City is ultimately responsible for any deficiency. For financial reporting purposes, TDA fixed return assets invested alongside QPP assets are reflected as a receivable due from the QPP equal in amount to the aggregate original principal amounts contributed by TDA Program members to the fixed return program, plus accrued interest at the Statutory Rate adjusted for withdrawals and transfers to or from variable funds. This receivable is reported by the TDA Program as an Investment in the Fixed Return Fund, and the corresponding liability is reported by the QPP as Fixed Return Funds due to TDA.

Assets of the variable-return funds of the QPP and the TDA Program Diversified Equity Fund are co-invested along with certain assets of the BERS. These financial statements reflect the QPP's and TDA

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Program's variable-return funds' proportionate shares of Diversified Equity Fund investments and the related activity.

**Other Employer Contributions** — Include amounts for Contingent Reserve Funds for half (or employer's portion) of Additional Member Contributions (Chapter 19 1.85%), buyback payments for outside and military service, and DOE supplemental contributions for the ASAF and ASF funds. The employer portion of Additional Member Contributions is not part of the employer's appropriation amount and also not recoverable by member upon member's resignation.

**Investment Expenses** — The variable-return funds maintain a reserve for administrative and investment expenses. As of June 30, 2019, the reserve was \$78,399,400 for QPP and \$42,993,114 for TDA. The expense reserve and net investment expenses for 2019 were reduced by \$5,932,905 for QPP and \$11,350,305 for TDA. As of June 30, 2018, the reserve was \$82,384,850 for QPP and \$53,442,554 for TDA. The expense reserve and net investment expenses for 2018 were reduced by \$5,600,764 for QPP and \$8,288,135 for TDA.

**Income Taxes** — Income earned by the QPP and TDA Program is not subject to Federal income tax.

**Accounts Payable** — Accounts payable is principally comprised of amounts owed to the System's banks due to depositories, unclaimed funds, reserves for investment and administrative expenses for the variable-return funds, and investment expenses accrued to the QPP and TDA Program. The System's practice is to fully invest its day-end cash balances in a pooled short-term fund. A typical benefit payment bank account would show balance, since funds are only deposited as outstanding benefit checks are presented to the banks for payment each day.

**Intra-fund Payable / Receivable** — At fiscal year-end, intra-fund payables/receivables between the TRSNYC Pension Fund and the Variable-Return Funds are excluded from QPP and TDA Program assets. The Administrative Code of the City of New York (ACNY) Sections 13-577 and 13-582 provide for certain internal transfers of funds. These transfers are intended to rebalance estimated actuarial liabilities with reported assets. In Fiscal Year 2019, \$115.7 million was transferred from the QPP Variable-Return funds to the QPP TRSNYC Pension Fund. In addition, in Fiscal Year 2019, \$27.4 million was transferred to the QPP from the TDA Program. In Fiscal Year 2018, \$83.4 million was transferred from the QPP TRSNYC Pension Fund to the Variable-Return funds. In addition, in Fiscal Year 2018, \$32.7 million was transferred to the QPP from the TDA Program.

**Payment of Statutory-Interest on the TDA Program's Fixed Return Fund** — The fixed interest, credited to TDA Program member account balances invested in the Fixed Return Fund (7.0% APR for UFT members after December 10, 2009; 8.25% APR for non-UFT members and for UFT members prior to December 10, 2009), and owed and transferred to the TDA Program, is reported as a transfer payment of interest by the QPP and transfer receipt of interest for the TDA Program.

**Inter-Plan Eliminations** — Included on the Combining Statements of Fiduciary Net Position and the Combining Statements of Changes in Fiduciary Net Position is an elimination column, the purpose of which is to remove from the statement any transactions involving dealings between reported entities. The eliminations include offsetting payables and receivables associated with the TDA Program's investment in the TRSNYC Pension Fund. In addition, payables and receivables between the QPP, the TDA Program, and the System's administrative expense fund are eliminated.

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**Securities-Lending Transactions** — State statutes and Board policies permit the Funds to lend their 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 Funds' agent lends the following types of securities: short-term securities, common stocks, long-term corporate bonds, U.S. Government and U.S. Government agency bonds, asset-backed securities, international equities, and bonds held in collective investment funds. In return, the Funds receive collateral in the form of cash, U.S. Treasury, and U.S. Government agency securities at 100% to 105% of the principal plus accrued interest for reinvestment. At June 30, 2019 and 2018, management believes that the Funds had no credit risk exposure to borrowers because the amounts the Funds owed the borrowers equaled or exceeded the amounts the borrowers owed the Funds. The contracts with the Funds' Custodian require the Securities Lending Agent to Indemnify the Funds as follows: 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 Funds or the borrowers. Cash collateral is invested by the securities lending agent using approved Lender's Investment guidelines. The weighted average maturity is 44.4 days for State Street's TRS NYC Pension Fund investments and 1.9 days for JP Morgan Chase's Variable-Return Fund investments. The securities-lending program in which the Funds participate only allows pledging or selling securities in the case of borrower default.

During Fiscal Year 2019, net earnings from the securities-lending program were \$13.4 million. Net earnings from QPP were \$12.1 million including \$11.3 million from TRS NYC Pension Fund and \$867.5 thousand from variable-return funds. The TDA net earnings from the Variable-Return funds securities-lending program amounted to \$1.3 million.

During Fiscal Year 2018, net earnings from the securities-lending program were \$16.8 million. Net earnings from QPP were \$15.3 million, including \$14.2 million from TRS NYC Pension Fund and \$1.1 million from variable-return funds. The TDA net earnings from the Variable-Return funds securities-lending program amounted to \$1.5 million.

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 Combining Statements of Fiduciary Net Position. Cash received as collateral on securities-lending transactions and investments made with that cash are reported as assets. As of the balance sheet date, the maturities of the investments made with cash collateral on average exceed the maturities of the securities loans by approximately 43.3 days for State Street's TRS NYC Pension Fund investments and 0.9 days for JP Morgan Chase's Variable-Return Fund investments. Securities received as collateral are also reported as assets if the government entity has the ability to pledge or sell them with a borrower default. Accordingly, the System records the investments purchased with the cash collateral from securities lending with a corresponding liability for securities lending. Securities on loan are carried at fair value; as of June 30, 2019 and 2018, the values on loan by the TRS NYC Pension Fund were \$1.2 billion and \$1.1 billion, respectively, and the values on loan by the variable-return funds were \$94.6 million and \$160.0 million, respectively. Collateral received related to securities lending as of June 30, 2019 and 2018 was \$ 1.3 billion (including \$1.2 billion of cash collateral) and \$1.1 billion, respectively, for the TRS NYC Pension Fund, and \$97.2 million and \$164.4 million, respectively, for the variable-return funds.

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**3. INVESTMENTS AND DEPOSITS**

The Comptroller of the City of New York (the "Comptroller") acts as an investment advisor to TRS and employs an independent consultant for the TRS NYC Pension Fund. In addition, TRS employs an independent investment consultant as an investment advisor for its variable-return funds. TRS utilizes investment managers to manage the long-term debt and equity portfolios. The managers are regularly reviewed, with regard to both their investment performance and their adherence to investment guidelines.

The State Retirement and Social Security Law ("RSSL") and Administrative Code of the City of New York ("NYCAC") authorize the investments of assets subject to the terms, conditions, limitations, and restrictions imposed by law for investments by savings bank and domestic life insurance companies. The State Retirement and Social Security Law §§ 176-178(a), Banking Law § 235 and the ACNY establish the criteria for permissible equity investments. Investments up to 25% of total assets of the QPP and the TDA Program may be made in instruments not expressly permitted by the State RSSL.

QPP and TDA Program assets are diversified over a range of investments, and multiple strategies are used in an effort to limit overall risk.

TRS possesses investment policy statements for its QPP and TDA Program, and investment risk management is an inherent function of the asset allocation process. The System's assets are diversified over a broad range of asset classes and encompass multiple investment strategies aimed at limiting concentration risk. The asset allocation per investment program and targeted for Fiscal Years 2019 and 2018 included securities in the following categories. It is worth noting that the TRS NYC Pension Fund primarily holds QPP assets and the returns from this fund impact the funding of the QPP, a defined-benefit plan. The variable-return funds primarily relate to the TDA Program, a defined-contribution plan.

**TRS NYC Pension Fund**  
**Target Asset Allocations**

<b>Investment Type</b>	<b>Asset Allocation Percentages *</b>	
	<b>2019</b>	<b>2018</b>
Common stock	32.5%	32.6%
International investments – Non U.S.	12.2%	12.2%
International investments – Emerging Markets	9.0%	9.1%
Common stock – REITS	0.0%	0.0%
Alternative investments – Real Estate	3.7%	3.6%
Alternative investments – Private Equity	5.4%	5.3%
Alternative investments – Infrastructure	1.1%	0.9%
Alternative investments – Opportunistic Fixed Income	2.8%	2.6%
Fixed income	33.3%	33.7%
Total	<u>100.0%</u>	<u>100.0%</u>

\* Represents adjusted target policy percentages.

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**Variable-Return Funds**  
**Target Asset Allocations**

<b>Investment Type</b>	<b>Asset Allocation Percentages</b>	
	<b>2019</b>	<b>2018</b>
Diversified Equity (Variable A):		
Common stock – Passive	55.0%	55.0%
Common stock – Active	15.0%	15.0%
Common stock – Defensive	10.0%	10.0%
International investments	20.0%	20.0%
Balanced Fund (formerly Bond Fund - Variable B):		
Fixed Income	70.0%	70.0%
Equity	30.0%	30.0%
International Equity (Variable C):		
International Investments	100.0%	100.0%
Inflation Protection Equity (Variable D):		
Inflation Protection Fidelity Strategic Real Return Mutual Fund	100.0%	100.0%
Socially Responsible (Variable E):		
Socially Responsible NB SRF	100.0%	100.0%

State Street is currently the custodian for essentially all securities of the TRSNYC Pension Fund. JPMorgan Chase is currently the custodian for essentially all securities of the variable-return programs.

The information reflected in the Credit Ratings and in the Years to Maturity is derived from the Custodians' Risk and Performance Analytics Reporting System.

**Concentrations** — The System's investment programs do not have investments in any one entity that represent 5% or more of the assets in the QPP or TDA Program's net position, with the exception of U.S. Government securities.

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**Credit Risk** — The plausible risk of a loss or default resulting from a borrower's inability to repay a loan or fulfill its contractual debt obligations. To manage credit risk, the Plan's Portfolios other than U.S. Government and related portfolios, have credit rating limitations. Investment Grade portfolios are limited to mostly ratings, of Baa2 and above, except that they are also permitted a 10% maximum exposure to Ba2 & B2 rated securities. While High Yield non-investment grade managers primarily invest in Ba2& B2 rated securities, they can also invest up to 10% of their portfolio in securities rated Caa2.

The quality ratings of the TRSNYC Pension Fund investments, by percentage of the rated portfolio, as described by nationally recognized rating organizations, at June 30, 2019 and 2018, are as follows:

Investment Type Pension Fund June 30, 2019		Moody's Quality Ratings																	
Investment Type (in percent)	Aaa	Aa1	Aa2	Aa3	A1	A2	A3	Baa1	Baa2	Baa3	Ba1	Ba2	Ba3	B1	B2	B3	Caa1 & Below	Not Rated	Total
U.S. Government	39.26%	0.02%	0.05%	0.01%	0.04%	0.01%	0.06%	0.02%	0.13%	0.01%	-	-	-	-	-	-	-	0.44%	40.05%
Corporate bonds	13.66%	0.20%	0.13%	0.22%	0.48%	1.33%	1.67%	1.89%	2.05%	2.39%	1.43%	2.20%	3.72%	3.20%	3.66%	2.71%	1.64%	12.33%	54.91%
Short term:																			
Commercial Paper	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.05%	2.05%
Discount Notes & T-Bills	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.10%	1.10%
Pooled Fund	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.89%	1.89%
Percent of Rated Portfolio	52.92%	0.22%	0.18%	0.23%	0.52%	1.34%	1.73%	1.91%	2.18%	2.40%	1.43%	2.20%	3.72%	3.20%	3.66%	2.71%	1.64%	17.81%	100.00%

Investment Type Pension Fund June 30, 2018		Moody's Quality Ratings																	
Investment Type (in percent)	Aaa	Aa1	Aa2	Aa3	A1	A2	A3	Baa1	Baa2	Baa3	Ba1	Ba2	Ba3	B1	B2	B3	Caa1 & Below	Not Rated	Total
U.S. Government	60.49%	0.02%	0.03%	0.01%	0.02%	0.01%	0.08%	-	0.10%	-	-	-	-	-	-	-	-	0.31%	61.07%
Corporate bonds	0.70%	0.12%	0.12%	0.20%	0.53%	0.85%	1.74%	2.15%	2.14%	2.20%	1.73%	2.01%	3.27%	3.37%	2.68%	2.66%	1.63%	4.13%	32.23%
Short-term:																			
Commercial Paper	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.12%	2.12%
Discount Notes & T-Bills	0.36%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.71%	1.07%
Pooled Fund	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.51%	3.51%
Percent of Rated Portfolio	61.55%	0.14%	0.15%	0.21%	0.55%	0.86%	1.82%	2.15%	2.24%	2.20%	1.73%	2.01%	3.27%	3.37%	2.68%	2.66%	1.63%	10.78%	100.00%

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The quality ratings of the variable-return fund investments, both QPP and TDA, by percentage of the rated portfolio, as described by nationally recognized statistical rating organizations, at June 30, 2019 and 2018, are as follows:

Investment Type  
Variable Funds  
June 30, 2019

	Moody's Credit Rating																			Total
	Aaa	Aa1	Aa2	Aa3	A1	A2	A3	Baa1	Baa2	Baa3	Ba1	Ba2	Ba3	B1	B2	B3	Caa1	Caa2	Not Rated	
U.S. Government	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Corporate	-	-	-	-	-	0.49%	-	0.42%	-	0.72%	0.30%	-	0.74%	0.22%	0.30%	-	-	-	49.53%	52.72%
Yankee bonds	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Municipal bonds	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
U.S. Agencies	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Short Term:																				
U.S. Treasury Bills	0.30%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.30%
Money Market	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	46.85%	46.85%
Cash Equivalent	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.13%	0.13%
Percent of rated portfolio	0.30%	0.00%	0.00%	0.00%	0.00%	0.49%	0.00%	0.42%	0.00%	0.72%	0.30%	0.00%	0.74%	0.22%	0.30%	0.00%	0.00%	0.00%	96.51%	100.00%

Investment Type  
Variable Funds  
June 30, 2018

	Moody's Quality Rating																			Total
	Aaa	Aa1	Aa2	Aa3	A1	A2	A3	Baa1	Baa2	Baa3	Ba1	Ba2	Ba3	B1	B2	B3	Caa1	Caa2	Not Rated	
U.S. Government *	0.54%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.54%
Corporate bonds	-	-	-	-	-	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%
Percent of rated portfolio	0.54%	-	-	-	-	0.98%	0.18%	-	0.31%	0.46%	-	0.29%	1.27%	0.25%	-	0.49%	0.39%	-	94.84%	100.00%

\* Includes U.S. Treasury Bills

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**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 QPP and TDA Program will not be able to recover the value of their 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 or QPP and TDA Program, and are held by either the counterparty or the counterparty's trust department or agent, but not in the System's name.

Investments are held by the TRS NYC Pension Fund and variable-return funds' custodians and registered in the System's or QPP and TDA Program's name.

All of the System's deposits are insured by the Federal Deposit Insurance Corporation or collateralized by securities held by a financial institution separate from their respective depository financial institution.

**Interest Rate Risk** — Interest rate risk is the risk that the value of debt securities will be affected by fluctuations in market interest rates. The duration of the portfolio, relative to the duration of the portfolio's benchmark, is monitored by the Bureau of Asset Management.

The lengths of investment maturities (in years) of TRS NYC Pension Fund investments, both QPP and TDA, as shown by the percent of the rated portfolio, at June 30, 2019 and 2018, are as follows:

**Years to Maturity**

June 30, 2019	Investment Maturities				
Investment Type	Fair	Less than	One to Five	Six to Ten	More than
Pension Fund	Value	One Year	Years	Years	Ten Years
U.S. Government	40.05 %	0.04 %	10.58 %	8.68 %	20.75 %
Corporate bonds	54.91	0.50	22.61	14.84	16.96
Short-term:					
Commercial paper	2.05	2.05	-	-	-
Pooled funds	1.89	1.89	-	-	-
Discount Notes and Treasury	1.10	1.10	-	-	-
Percent of rated portfolio	100.00 %	5.58 %	33.19 %	23.52 %	37.71 %

June 30, 2018	Investment Maturities				
Investment Type	Fair Value	Less than One Year	One to Five Years	Six to Ten Years	More than Ten Years
Pension Fund					
U.S. Government	61.07 %	0.51 %	22.53 %	11.31 %	26.72 %
Corporate bonds	32.23	0.60	10.93	15.27	5.43
Short-term:					
Commercial paper	2.12	2.12	-	-	-
Pooled funds	3.51	3.51	-	-	-
Discount Notes and Treasury	1.07	1.07	-	-	-
Percent of rated portfolio	100.00 %	7.81 %	33.46 %	26.58 %	32.15 %

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The lengths of investment maturities (in years) of the variable-return funds' for QPP and TDA, as shown by the percent of the rated portfolio, at June 30, 2019 and 2018, are as follows:

**Years to Maturity**

<b>June 30, 2019</b> <b>Investment Type</b> <b>Variable Funds</b>	<b>Investment Maturities (in years)</b>				
	<b>Fair Value</b>	<b>Less than One Year</b>	<b>One to Five Years</b>	<b>Six to Ten Years</b>	<b>More than Ten Years</b>
U.S. Government	- %	- %	- %	- %	- %
Corporate bonds	52.72	1.83	33.77	13.31	3.81
Yankee bonds	-	-	-	-	-
Municipal bonds	-	-	-	-	-
U.S. Agencies	-	-	-	-	-
Short-term:					
U.S. Treasury Bills	0.30	0.30	-	-	-
Money Market Funds	46.85	46.85	-	-	-
Cash Equivalent	0.13	0.13	-	-	-
Percent of rated portfolio	100.00 %	49.11 %	33.77 %	13.31 %	3.81 %

**Years to Maturity**

<b>June 30, 2018</b> <b>Investment Type</b> <b>Variable Funds</b>	<b>Investment Maturities (in years)</b>				
	<b>Fair Value</b>	<b>Less than One Year</b>	<b>One to Five Years</b>	<b>Six to Ten Years</b>	<b>More than Ten Years</b>
U.S. Government *	0.54 %	0.54 %	- %	- %	- %
Corporate bonds	51.02	2.89	27.60	15.20	5.33
Yankee bonds	-	-	-	-	-
Municipal bonds	-	-	-	-	-
U.S. Agencies	-	-	-	-	-
Short-term:					
Money Market Funds	48.33	48.33	-	-	-
Cash Equivalent	0.11	0.11	-	-	-
Percent of rated portfolio	100.00 %	51.87 %	27.60 %	15.20 %	5.33 %

\* Includes U.S. Treasury Bills

**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 stocks and/or bonds. The currency markets are diversifiers in a total portfolio context; therefore, the TRSNYC Pension Fund 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.

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In addition, the TRSNYC Pension Fund and variable-return funds have investments in foreign stocks and/or bonds denominated in foreign currencies. Foreign currency exposures as of June 30, 2019 and 2018 are as follows (amounts in thousands of U.S. dollars):

<b>Trade Currency</b>	<b>Pension Fund</b>	<b>Variable-Return Funds</b>	<b>Pension Fund</b>	<b>Variable-Return Funds</b>
<b>(in thousands)</b>	<b>June 30, 2019</b>	<b>June 30, 2019</b>	<b>June 30, 2018</b>	<b>June 30, 2018</b>
Euro Currency	\$ 3,412,071	\$ 796,132	\$ 2,923,910	\$ 779,856
Japanese Yen	1,978,864	548,934	1,964,182	544,484
British Pnd Sterling	1,694,782	417,881	1,604,375	438,376
South Korean Won	1,185,756	65,598	1,284,166	75,314
Indian Rupee	1,034,745	59,524	966,612	52,587
New Taiwan Dollar	931,014	36,902	979,440	42,043
Swiss Franc	800,191	238,287	751,385	201,809
Brazilian Real	670,123	31,595	498,524	15,757
South African Rand	575,411	23,473	646,706	28,719
Canadian Dollar	482,512	27,037	408,646	23,176
Hong Kong Dollar	400,094	93,064	364,691	83,457
Australian Dollar	338,378	146,905	280,588	141,509
Thai Baht	279,009	15,217	256,975	17,512
Indonesian Rupiah	275,906	7,067	228,356	6,328
Mexican Nuevo Peso	256,320	7,093	271,175	6,807
Danish Krone	244,099	44,257	239,095	39,163
Swedish Krona	210,046	55,456	213,840	51,730
Malaysian Ringgit	183,919	7,996	191,489	12,626
Singapore Dollar	159,356	38,070	139,334	37,241
Polish Zloty	148,865	6,384	130,079	3,688
Turkish Lira	110,208	10,044	131,251	9,865
Norwegian Krone	108,206	20,033	104,159	21,193
Philippines Peso	102,166	56	111,469	1,840
Chilean Peso	90,138	1,938	105,781	1,946
Qatari Rial	57,802	-	26,162	-
UAE Dirham	51,012	5,784	38,464	2,350
Hungarian Forint	43,308	2,651	37,077	2,130
Colombian Peso	40,193	-	48,093	-
Israeli Shekel	25,017	6,948	18,089	6,129
Czech Koruna	21,542	82	26,853	116
Egyptian Pound	14,088	902	20,455	213
New Zealand Dollar	13,560	5,112	8,356	4,333
Peruvian Nuevo Sol	5,405	-	12,122	-
<b>Total</b>	<b>\$ 15,944,106</b>	<b>\$ 2,720,422</b>	<b>\$ 15,031,899</b>	<b>\$ 2,652,297</b>

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**Securities Lending Transactions**

*Credit Risk* — The quality ratings of investments held as collateral for Securities Lending by the TRS NYC Pension Fund at June 30, 2019 and 2018 are as follows (in thousands):

**Investment Type and Fair Value  
of Securities Lending Transactions - Pension Fund  
(in thousands)  
June 30, 2019**

	<b>Moody's Quality Ratings</b>						<b>Total</b>
	<b>Aaa &amp; Below</b>	<b>A1</b>	<b>A2</b>	<b>A3</b>	<b>Baa2</b>	<b>Not Rated</b>	
Government	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Corporate bonds	-	-	-	-	-	-	-
Yankee bonds	-	-	-	-	-	-	-
Short-term:							
Repurchase Agreements	-	-	-	-	-	-	-
Reverse Repurchase Agreements	-	-	77,184	137,323	8,040	470,720	693,267
Money Market	113,702	-	-	-	-	88,578	202,280
U.S. Treasury	-	-	-	-	-	-	-
U.S. Agency	-	-	-	-	-	171,848	171,848
Cash or Cash Equivalent	-	113,896	-	-	-	-	113,896
Payable/Receivable	-	-	-	-	-	-	-
Uninvested	-	-	-	-	-	1,572	1,572
<b>Total</b>	<b>\$ 113,702</b>	<b>\$ 113,896</b>	<b>\$ 77,184</b>	<b>\$ 137,323</b>	<b>\$ 8,040</b>	<b>\$ 732,718</b>	<b>\$ 1,182,863</b>
Percent of securities lending portfolio	<u>9.61%</u>	<u>9.63%</u>	<u>6.53%</u>	<u>11.61%</u>	<u>0.68%</u>	<u>61.94%</u>	<u>100.00%</u>

**June 30, 2018**

	<b>Moody's Quality Ratings</b>						<b>Total</b>
	<b>Aaa &amp; Below</b>	<b>A1</b>	<b>A2</b>	<b>A3</b>	<b>Baa2</b>	<b>Not Rated</b>	
Government	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Corporate bonds	-	-	-	-	-	-	-
Yankee bonds	-	-	-	-	-	-	-
Short-term:							
Repurchase Agreements	-	-	-	-	-	-	-
Reverse Repurchase Agreements	-	-	3,961	194,097	54,048	283,390	535,496
Money Market	119,471	-	-	-	-	-	119,471
U.S. Treasury	-	-	-	-	-	-	-
U.S. Agency	-	-	-	-	-	291,751	291,751
Cash or Cash Equivalent	-	100,098	-	-	-	-	100,098
Payable/Receivable	-	-	-	-	-	-	-
Uninvested	-	-	-	-	-	1,572	1,572
<b>Total</b>	<b>\$ 119,471</b>	<b>\$ 100,098</b>	<b>\$ 3,961</b>	<b>\$ 194,097</b>	<b>\$ 54,048</b>	<b>\$ 576,713</b>	<b>\$ 1,048,388</b>
Percent of securities lending portfolio	<u>11.40%</u>	<u>9.55%</u>	<u>0.38%</u>	<u>18.51%</u>	<u>5.15%</u>	<u>55.01%</u>	<u>100.00%</u>

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The quality ratings of investments held as collateral for Securities Lending under the variable-return funds at June 30, 2019 and 2018 are as follows (in thousands):

**Investment Type and Fair Value of  
Securities Lending Transactions - Variable Return Funds  
(In thousands)  
June 30, 2019**

	<b>Moody's Quality Ratings</b>			
	<b>Aaa</b>	<b>A3</b>	<b>Not Rated</b>	<b>Total</b>
Government	\$ 20,977	\$ -	\$ -	\$ 20,977
Corporate bonds	-	-	-	-
Yankee bonds	-	-	-	-
Short-term:				
Repurchase Agreements	66,060	-	7,963	74,023
Reverse Repurchase Agreements	-	-	-	-
Money Market	-	-	-	-
U.S. Treasury	2,249	-	-	2,249
U.S. Agency	-	-	-	-
Cash Equivalent	-	-	-	-
Payable/Receivable	-	-	-	-
Uninvested	-	-	-	-
<b>Total</b>	<b>\$ 89,286</b>	<b>\$ -</b>	<b>\$ 7,963</b>	<b>\$ 97,249</b>
Percent of securities lending portfolio	<u>91.81%</u>	<u>0.00%</u>	<u>8.19%</u>	<u>100.00%</u>

**June 30, 2018**

	<b>Moody's Quality Ratings</b>			
	<b>Aaa</b>	<b>A3</b>	<b>Not Rated</b>	<b>Total</b>
Government *	\$ 22,299	\$ -	\$ -	\$ 22,299
Corporate bonds	-	-	-	-
Yankee bonds	-	-	-	-
Short-term:				
Repurchase Agreements	32,763	19,273	90,029	142,065
Reverse Repurchase Agreements	-	-	-	-
Money Market	-	-	-	-
U.S. Agency	-	-	-	-
Cash Equivalent	-	-	-	-
Payable/Receivable	-	-	-	-
Uninvested	-	-	10	10
<b>Total</b>	<b>\$ 55,062</b>	<b>\$ 19,273</b>	<b>\$ 90,039</b>	<b>\$ 164,374</b>
Percent of securities lending portfolio	<u>33.50%</u>	<u>11.73%</u>	<u>54.77%</u>	<u>100.00%</u>

\* includes \$5,729 in U.S. Treasury Bills

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*Interest Rate Risk* — The lengths of investment maturities (in years) of the collateral for Securities Lending held by the TRSNYC Pension Fund at June 30, 2019 and 2018 are as follows (in thousands):

**Years to Maturity**

<b>Investment Type - Pension Fund June 30, 2019</b>	<b>Investment Maturities</b>				
	<b>Fair Value</b>	<b>Less Than One Year</b>	<b>One to Five Years</b>	<b>Six to Ten Years</b>	<b>More Than Ten Years</b>
Government	\$ -	\$ -	\$ -	\$ -	\$ -
Corporate bonds	-	-	-	-	-
Short-term:					
Repurchase agreements	-	-	-	-	-
Reverse repurchase agreements	693,267	693,267	-	-	-
Money market	202,280	202,280	-	-	-
U.S. Agency	171,848	171,848	-	-	-
Cash equivalents	113,896	113,896	-	-	-
Payable/Receivable	-	-	-	-	-
Uninvested	1,572	1,572	-	-	-
<b>Total</b>	<b>\$ 1,182,863</b>	<b>\$ 1,182,863</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>
Percent of Securities Lending Portfolio	100.00 %	100.00 %	- %	- %	- %

<b>Investment Type - Pension Fund June 30, 2018</b>	<b>Investment Maturities</b>				
	<b>Fair Value</b>	<b>Less Than One Year</b>	<b>One to Five Years</b>	<b>Six to Ten Years</b>	<b>More Than Ten Years</b>
Government	\$ -	\$ -	\$ -	\$ -	\$ -
Corporate bonds	-	-	-	-	-
Short-term:					
Repurchase agreements	-	-	-	-	-
Reverse repurchase agreements	535,496	535,496	-	-	-
Money market	119,471	119,471	-	-	-
U.S. Agency	291,751	291,751	-	-	-
Cash equivalents	100,098	100,098	-	-	-
Payable/Receivable	-	-	-	-	-
Uninvested	1,572	1,572	-	-	-
<b>Total</b>	<b>\$ 1,048,388</b>	<b>\$ 1,048,388</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>
Percent of Securities Lending Portfolio	100.00 %	100.00 %	- %	- %	- %

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**YEARS ENDED JUNE 30, 2019 AND 2018**

The lengths of investment maturities (in years) of the collateral for Securities Lending held under the variable-return funds at June 30, 2019 and 2018 are as follows (in thousands):

**Years to Maturity**

<b>Investment Type - Variable Return Funds (in thousands) June 30, 2019</b>	<b>Investment Maturities</b>				
	<b>Fair Value</b>	<b>Less Than One Year</b>	<b>One to Five Years</b>	<b>Six to Ten Years</b>	<b>More Than Ten Years</b>
Government	\$ 20,977	\$ 1,192	\$ 14,877	\$ 2,868	\$ 2,040
Corporate Bonds	-	-	-	-	-
Short-term:					
Repurchase agreements	74,023	74,023	-	-	-
Reversal purchase agreements	-	-	-	-	-
Certificates of deposit	-	-	-	-	-
Commercial paper	-	-	-	-	-
Variable rate demand notes	-	-	-	-	-
U.S. Treasury	2,249	2,249	-	-	-
U.S. Agency	-	-	-	-	-
Time deposit	-	-	-	-	-
Uninvested	-	-	-	-	-
<b>Totals</b>	<b>\$ 97,249</b>	<b>\$ 77,464</b>	<b>\$ 14,877</b>	<b>\$ 2,868</b>	<b>\$ 2,040</b>
Percent of securities lending portfolio	100.00 %	79.65 %	15.30 %	2.95 %	2.10 %

<b>Investment Type - Variable Return Funds (in thousands) June 30, 2018</b>	<b>Investment Maturities</b>				
	<b>Fair Value</b>	<b>Less Than One Year</b>	<b>One to Five Years</b>	<b>Six to Ten Years</b>	<b>More Than Ten Years</b>
Government *	\$ 22,299	\$ 6,579	\$ 11,423	\$ 2,008	\$ 2,289
Corporate Bonds	-	-	-	-	-
Short-term:					
Repurchase agreements	142,065	142,065	-	-	-
Reversal purchase agreements	-	-	-	-	-
Certificates of deposit	-	-	-	-	-
Commercial paper	-	-	-	-	-
Variable rate demand notes	-	-	-	-	-
U.S. Treasury	-	-	-	-	-
U.S. Agency	-	-	-	-	-
Time deposit	-	-	-	-	-
Uninvested	10	10	-	-	-
<b>Totals</b>	<b>\$ 164,374</b>	<b>\$ 148,654</b>	<b>\$ 11,423</b>	<b>\$ 2,008</b>	<b>\$ 2,289</b>
Percent of securities lending portfolio	100.00 %	90.44 %	6.95 %	1.22 %	1.39 %

\* Includes \$5,729 in US Treasury Bills

**Rate of Return** — For the years ended June 30, 2019 and 2018, the annual money-weighted rate of return on the TRS NYC Pension Fund was 7.50% and 8.14%, respectively. The money-weighted rate of return expresses investment performance, net of investment expense adjusted for the changing amounts actually 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.

The System categorizes its fair value measurements within the fair value hierarchy established by generally accepted accounting principles. 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, 2019 and June 30, 2018:

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**GASB 72 - Disclosure (Pension Fund)**

June 30, 2019

(In thousands)

	2019			
	Level One	Level Two	Level Three	QPP Total
<b>INVESTMENTS — At fair value (Notes 2 and 3):</b>				
Short-term investments:				
Commercial paper	\$ -	\$567,394	\$ -	\$567,394
Short-term investment fund	-	779,479	-	779,479
Discount notes	-	203,555	-	203,555
U.S. Treasury bills and Agencies	-	100,011	-	100,011
Debt securities:				
U.S. Government	-	11,074,088	-	11,074,088
Corporate and Other	-	11,386,655	527,640	11,914,295
Treasury inflation protected securities	-	3,387,131	-	3,387,131
Equity securities:				
Domestic equity	24,367,892	-	6,613	24,374,505
International equity	15,222,381	-	1,632	15,224,013
Alternative investments	12,379	181,958	9,874,749	10,069,086
<b>Total Pension Fund Investments</b>	<b>\$39,602,652</b>	<b>\$27,680,271</b>	<b>\$10,410,634</b>	<b>\$77,693,557</b>

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**GASB 72 Disclosure (Pension Fund)**

**June 30, 2018**

**(In thousands)**

	<b>2018</b>			
	Level One	Level Two	Level Three	Total
<b>INVESTMENTS — at fair value</b>				
Short-term investments:				
Commercial paper	\$ -	\$ 6,487	\$ -	\$ 6,487
Short-term investment fund	48,888	1,529,375	-	1,578,263
Discount notes	-	111,733	-	111,733
Debt securities:				
U.S. Government	-	13,288,993	-	13,288,993
Corporate and Other	-	7,016,306	268	7,016,574
Equity securities	20,534,746	56	1,712	20,536,514
Alternative investments	14,652	-	8,912,107	8,926,759
Collective trust funds:				
International equity	15,436,384	-	586	15,436,970
Mortgage debt security	-	154,234	401,274	555,508
Treasury inflation protected securities	-	3,106,109	-	3,106,109
Fixed income	-	1,848,081	-	1,848,081
Total Pension Fund investments	<u>\$ 36,034,670</u>	<u>\$ 27,061,374</u>	<u>\$ 9,315,947</u>	<u>\$ 72,411,991</u>

**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 hierarchy are securities whose stated market price is unobservable by the marketplace; 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.

**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 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

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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.

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 redemption restrictions have a material effect on the fair value of the portfolio investments.

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**GASB 72 Disclosure**

**Variable-Return Funds**

**June 30, 2019**

(in thousands)

**INVESTMENTS- at fair value**

Diversified Equity Fund:

Short-term investments

Equity securities

Debt securities

Balanced Fund:

Short-term investments

Equity securities

International Equity Fund:

Short-term investments

International equity

Inflation Protection Fund:

Short-term investments

Equity securities

Socially Responsive Equity Fund:

Short-term investments

Equity securities

International equity

**Total Variable-Return Funds Investments**

<b>2019</b>			
Level One	Level Two	Level Three	Total
\$ -	\$ 233,671	\$ -	\$ 233,671
13,713,982	476,061	172,231	14,362,274
-	296,182	2	296,184
-	4,880	-	4,880
-	393,349	-	393,349
-	943	-	943
154,785	5,374	1,944	162,103
-	224	-	224
70,064	-	-	70,064
-	7,573	-	7,573
202,657	-	-	202,657
18,184	-	-	18,184
<u>\$ 14,159,672</u>	<u>\$ 1,418,257</u>	<u>\$ 174,177</u>	<u>\$ 15,752,106</u>

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**GASB 72 Disclosure****Variable-Return Funds****June 30, 2018**

(in thousands)

**INVESTMENTS- at fair value**

## Diversified Equity Fund:

	Level One	Level Two	Level Three	Total
Short-term investments	\$ -	\$ 262,242	\$ -	\$ 262,242
Equity securities	14,216,058	332,339	1,563	14,549,960
Debt securities	-	302,005	2	302,007

## Balanced Fund:

Short-term investments	-	4,516	-	4,516
Equity securities	-	375,273	-	375,273

## International Equity Fund:

Short-term investments	-	1,007	-	1,007
International equity	149,135	3,486	16	152,637

## Inflation Protection Fund:

Short-term investments	-	48	-	48
Equity securities	64,716	-	-	64,716

## Socially Responsive Equity Fund:

Short-term investments	-	7,220	-	7,220
Equity securities	185,758	-	-	185,758
International equity	11,418	-	-	11,418

Total Variable-Return Funds Investments	<u>\$ 14,627,085</u>	<u>\$ 1,288,136</u>	<u>\$ 1,581</u>	<u>\$ 15,916,802</u>
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Equity securities classified in Level 1 of the fair value hierarchy (above) are valued using prices quoted in active markets for those securities.

Equity and debt securities classified in Level 2 of the fair value hierarchy (above) are valued using a matrix pricing technique. Matrix pricing is used to value securities based on the securities' relationship to benchmark quoted prices.

Securities are classified in Level 3 (above) when inputs to the valuation methodology are unobservable and significant to the fair value measurement. Instruments are often based on internally developed models of the custodian, in which there are few, if any, external observations. Generally, Level 3 includes distressed securities or alternative investments.

**4. QPP CONTRIBUTIONS**

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

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**Member Contributions** — Members who joined prior to July 27, 1976 contribute by salary deductions on the basis of a normal rate of contribution that is assigned by the QPP at membership. This member normal rate, which is dependent upon age, years of prior service, and actuarial tables in effect at the time of membership, is determined so as to provide approximately one-fourth of the service retirement allowance at the earliest age for service retirement. For age at membership equal to 20 and with no prior service, the member normal rate is equal to 4.6%. For age at membership equal to 40 with no prior service, the member normal rate is equal to 3.6%.

Members who joined on or after July 27, 1976 are mandated to contribute 3% of salary. Effective October 1, 2000, these members are not required to make contributions after the tenth anniversary of their membership date or completion of ten years of credited service, whichever is earlier.

Effective February 27, 2008, active members were eligible to enroll in a 55 retirement age minimum and 25 credited years of service retirement option ("55/25 retirement option"), enabling them to eliminate any age-reduction factor in their retirement allowance. Those choosing the age 55/25 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. Members joining after February 27, 2008 are automatically enrolled in a 55 retirement age minimum and 27 credited years of service retirement program ("55/27 retirement program"). These members are required to make additional pension contributions of 1.85% of salary until they have accumulated 27 years of credited service. Chapter 504 of the Laws of 2009 ("Chapter 504/09") provides that individuals joining after December 10, 2009, who participate in the 55/27 retirement program, are required to make pension contributions of 4.85% of salary until they have 27 years of credited service and contributions of 1.85% of salary thereafter.

Also, under Chapter 504/09, all members represented by the UFT who join the QPP on and after December 10, 2009 will become vested after ten years of credited service.

Under Chapter 18 of the Laws of 2012, members who join on and after April 1, 2012 are automatically enrolled in Tier VI. These members are required to make contributions ranging from 3.0% (based on a salary of \$45,000 and less) to 6.0% (based on a salary above \$100,000) until separation from service or retirement.

**Employer Contributions** — Statutorily-required contributions ("Statutory Contributions") to the QPP, determined by the City's Chief Actuary of the Office of the Actuary (the "Actuary") in accordance with the State statutes and City laws, are generally funded by the Employers within the appropriate fiscal year. These contributions consider any expected deficiencies between the statutory rates of interest on TDA Program deposits in the Fixed Return Fund and on statutory rates of interest credited to QPP members and actual investment earnings on such funds. The Statutory Contribution for the year ended June 30, 2019, based on an actuarial valuation as of June 30, 2017, was \$3,697 million, and the Statutory Contribution for the year ended June 30, 2018, based on an actuarial valuation as of June 30, 2016, was \$3,890 million. The Statutory Contributions for Fiscal Years 2019 and 2018 were equal to the Actuarial Contributions. Refer to the Schedule of Employers' Contributions in the accompanying required supplementary information for more information on the actuarial methods and assumptions applied by the Actuary to determine the Statutory Contributions.

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**5. QPP NET PENSION LIABILITY**

The components of the net pension liability of the Employers at June 30, 2019 and 2018 were as follows:

	(in millions)	
	<b>2019</b>	<b>2018</b>
Total pension liability	\$73,347	\$73,244
Fiduciary net position *	\$57,990	\$54,533
Employers' net pension liability	\$15,357	\$18,711
Fiduciary net position as a percentage of the total pension liability	79.1%	74.5%

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

**Actuarial Methods and Assumptions**

The total pension liability as of June 30, 2019 was determined by an actuarial valuation as of June 30, 2018 that was rolled forward to develop the total pension liability at the fiscal year-end. Last year, the total pension liability as of June 30, 2018 was determined by an actuarial valuation as of June 30, 2016 that was rolled forward two years to the 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 and beneficiaries were developed from an experience study of the QPP.

The Fiscal Year 2019 results reflect changes in the actuarial assumptions and methods since the prior year. The changes are primarily the result of an experience study performed by Bolton, Inc., which compared actual experience of the systems for the four- and ten-year periods ending June 30, 2017 to that expected based on the prior set of actuarial assumptions and methods. These new actuarial assumptions and methods were adopted by the TRS Retirement Board during Fiscal Year 2019.

Pursuant to Section 96 of the New York City Charter, a study of the actuarial assumptions used to value liabilities of the QPP is 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

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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 allocations and best estimates of arithmetic real rates of return for each major asset class are summarized in the following table:

<b>Asset Class</b>	<b>Target Asset Allocation</b>	<b>Long-Term Expected Real Rate of Return</b>
U.S. Public Markets Equities	29.0%	5.6%
International Public Markets Equities	12.0%	7.1%
Emerging Public Markets Equities	9.0%	9.9%
Private Market Equities	6.0%	10.3%
Fixed Income (Core, TIPS, High Yield, Opportunistic, Convertibles)	33.0%	3.4%
Alternatives (Real Assets, Hedge Funds)	11.0%	6.3%
Total	<u>100.0%</u>	

#### **Discount Rate**

The discount rate used to measure the total pension liability was 7.0%. The projections 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 non-active QPP members. Therefore, the long-term 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 one-percentage point lower (6.0%) or one-percentage point higher (8.0%) than the current rate:

<b>(in thousands)</b>	<b>1% Decrease (6%)</b>	<b>Discount Rate (7%)</b>	<b>1% Increase (8%)</b>
Employers' Net Pension Liability — June 30, 2019	\$ 23,630,238	\$ 15,356,639	\$ 8,426,189

#### **6. MEMBER LOANS**

The balance of member loans receivable for the QPP at June 30, 2019 and 2018 was \$321.0 million and \$312.2 million, respectively. QPP members are permitted to borrow up to 75% of their own contributions, including accumulated interest. Outstanding loan balances are insured in order to protect members' balances in case of death. In return for insurance coverage, Tiers III, IV, and VI members supplement their loan interest payments of 6.0% APR with a 0.1% ("APR") insurance fee. Tiers I and II members pay loan interest payments of 6.0% APR and are not subject to the insurance

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fee. Upon termination of employment before retirement, certain QPP members are entitled to refunds of their own contributions, including accumulated interest, less any loans outstanding.

The balance of member loans receivable for the TDA Program at June 30, 2019 and 2018 is \$403.8 million and \$386.8 million, respectively. Members of the TDA Program are permitted to borrow up to 75% of their own contributions, including accumulated interest. TDA Program members supplement their member loans' interest payments (7.0% for UFT, 8.25% for all other members) with a 0.3% ("APR") insurance fee. This fee funds a reserve, which is used to repay members' loan balances outstanding in case of death. Upon termination of employment before retirement, members are entitled to refunds of their own contributions, including accumulated interest, less any loans outstanding.

## **7. RELATED PARTIES**

The Comptroller has been appointed by law as custodian for the assets of the QPP and TDA Program with discretionary authority. Securities are held by certain banks under custodial agreements with the Comptroller. The Comptroller, the Financial Information Services Agency ("FISA"), and the Office of Payroll Administration ("OPA") provide cash receipt and cash disbursement services and financial services; the Office of Management and Budget ("OMB") provides budget review services; and the City's Corporation Counsel provides legal services to TRS. The cost of providing such services amounted to \$12.3 million and \$11.8 million in Fiscal Years 2019 and 2018, respectively. In addition, actuarial services are provided to TRS by the New York City Office of the Actuary. The City also provides other administrative services.

## **8. ADMINISTRATIVE EXPENSES**

Chapter 593 of the Laws of 1996 ("Chapter 593/96"), effective July 1, 1996, authorized the Board of Trustees to draw upon its assets to pay the administrative expenses incurred by TRS. Prior to Fiscal Year 1997, The City and Variable Annuity Programs had paid all administrative expenses. After Chapter 593/96, administrative expenses incurred by the System is attributed to the QPP and the variable-return funds of the TDA Program. The cost sharing is weighted and depends on an assessment of the prior year's administrative activities. Total TRS administrative expenses, attributable to the QPP and TDA Program, amounted to \$88.3 million and \$87.5 million for Fiscal Years 2019 and 2018, respectively. In addition to TRS' administrative expenses, other City agencies attribute the cost for services rendered by them during the fiscal year; see Note 7 above.

In November 2015, the System amended and extended its lease agreement to rent office space. The agreement will expire on May 31, 2039. The future minimum rental payments required under this operating lease are as follows:

<b>Years Ending June 30,</b>	<b>Amount</b>
2020	\$ 8,760,000
2021	8,760,000
2022	8,760,000
2023	9,480,000
2024	9,559,000
Thereafter	180,754,000

Rent expense under the lease agreement for the year ended June 30, 2019, was approximately \$7.9 million, and for year ended June 30, 2018, was approximately \$7.9 million, less \$1.9 million rent credit.

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**9. CONTINGENT LIABILITIES AND OTHER MATTERS**

**Contingent Liabilities** — The QPP and TDA Program have certain contingent liabilities. TRS management, on advice from legal counsel, believes that such proceedings and contingencies will not have a material effect on the fiduciary net position of the QPP or cause changes in its fiduciary net position. Under the State statutes and City laws that govern the functioning of the QPP, increases in the obligation of the QPP to members and beneficiaries ordinarily result in increases in the obligations of the Employers to the QPP.

**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 ("QPP Net Pension Liability") 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.

The most recently completed study was published by Bolton, Inc. dated June 2019. Bolton analyzed experience for the four- and ten year periods ending June 30, 2017 and made recommendations with respect to the actuarial assumptions and methods based on their analysis. Based, in part, on these, recommendations, the Actuary proposed new assumptions and methods for use in determining Employer Contributions for Fiscal Years beginning on and after July 1, 2018. These assumptions and methods have been adopted by the Board of Trustees during Fiscal Year 2019.

Previously, Gabriel, Roeder, Smith & Company (GRS) published their study in October 2015.

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

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

Chapter 3 of the Laws of 2013 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 expenses, continued it and other interest rates until June 30, 2016, and defined the amortization of Unfunded Actuarial Accrued Liabilities ("UAAL").

Chapter 489 of the Laws of 2013 ("Chapter 489/13") 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 who are otherwise eligible to receive retirement service credit for such service. Such members would not be required to make member contributions to receive such credit.

Chapter 510 of the Laws of 2015 clarifies for Tier VI 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,

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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 266 of the Laws of 2018 extends the time for members or eligible beneficiaries to file a Notice of Participation in World Trade Center Rescue, Recovery, and Cleanup Operations to September 11, 2022.

This law was signed on September 7, 2018, and shall be deemed to have been in full force and effect on and after September 11, 2001.

\* \* \* \* \*

**TEACHERS' RETIREMENT SYSTEM OF THE CITY OF NEW YORK**  
**REQUIRED SUPPLEMENTARY INFORMATION (UNAUDITED)**  
**QUALIFIED PENSION PLAN**  
**SCHEDULE OF CHANGES IN THE EMPLOYERS' NET PENSION LIABILITY AND RELATED RATIOS**  
(In Thousands)

	<b>SCHEDULE 1</b>					
	<b>2019</b>	<b>2018</b>	<b>2017</b>	<b>2016</b>	<b>2015</b>	<b>2014</b>
Total pension liability:						
Service cost	\$ 1,691,144	\$ 1,436,617	\$ 1,386,674	\$ 1,274,308	\$ 1,223,158	\$ 1,205,662
Interest	4,914,552	5,071,481	5,147,042	4,131,177	4,027,139	4,407,702
Changes of benefit terms	-	-	-	-	-	-
Differences between expected and actual experience	(1,188,247)	(2,235,673)	1,008,249	1,229,501	1,507,964	-
Changes of assumptions	(826,850)	-	-	2,432,878	-	-
Benefit payments/withdrawals	(4,487,680)	(4,351,924)	(4,219,312)	(4,107,455)	(4,024,272)	(3,818,248)
Net change in total pension liability	102,919	(79,499)	3,322,653	4,960,409	2,733,989	1,795,116
Total pension liability – beginning	73,243,931	73,323,430	70,000,777	65,040,368	62,306,379	60,511,262
Total pension liability – ending (a)	73,346,850	73,243,931	73,323,430	70,000,777	65,040,368	62,306,378
Plan fiduciary net position:						
Contributions - Employer	3,696,686	3,889,710	3,888,399	3,760,714	3,325,528	3,054,424
Contributions - Other Employer*	62,513	59,979	57,369	n/a	n/a	n/a
Contributions - Employee	217,205	195,241	180,076	173,696	158,590	154,962
Net investment income	5,721,310	6,275,115	8,133,280	960,267	1,611,929	9,435,906
Benefit payments/withdrawals	(4,487,680)	(4,351,924)	(4,219,312)	(4,107,455)	(4,024,272)	(3,818,248)
Payment of Interest on TDA Fixed Funds	(1,716,679)	(1,595,462)	(1,466,615)	(1,354,207)	(1,248,988)	(1,147,923)
Administrative expenses	(64,291)	(65,076)	(60,790)	(59,367)	(58,391)	(46,042)
Other Changes	28,671	29,170	(46,229)	1,233	329	404
Net change in plan fiduciary net position	3,457,735	4,436,753	6,466,178	(625,119)	(235,275)	7,633,483
Plan fiduciary net position – beginning	54,532,476	50,095,723	43,629,545	44,254,664	44,489,939	36,856,456
Plan fiduciary net position – ending (b)**	57,990,211	54,532,476	50,095,723	43,629,545	44,254,664	44,489,939
Employer's net pension liability – ending (a)-(b)	\$ 15,356,639	\$ 18,711,455	\$ 23,227,707	\$ 26,371,232	\$ 20,785,704	\$ 17,816,440
Plan fiduciary net position as a percentage of the total pension liability	79.06%	74.45%	68.32%	62.33%	68.04%	71.41%
Covered Payroll	\$ 10,404,404	\$ 9,200,180	\$ 8,818,537	\$ 8,256,100	\$ 8,074,522	\$ 7,996,942
TRS' Net Pension Liability as a Percentage of covered payroll	147.60%	203.38%	263.40%	319.42%	257.42%	222.79%

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

\*Includes amounts for employer's portion of Additional Member Contributions and supplemental contributions for the ASAF and ASF Funds.

\*\*Such amounts represent the preliminary Systems' fiduciary net position and may differ from the Systems' final fiduciary net position.

See Independent Auditors' Report.

**TEACHERS' RETIREMENT SYSTEM OF THE CITY OF NEW YORK**  
**REQUIRED SUPPLEMENTARY INFORMATION (UNAUDITED)**  
**QUALIFIED PENSION PLAN**  
**SCHEDULE OF EMPLOYERS' CONTRIBUTIONS**  
(In Thousands)

**SCHEDULE 2**

	<u>2019</u>	<u>2018</u>	<u>2017</u>	<u>2016</u>	<u>2015</u>	<u>2014</u>	<u>2013</u>	<u>2012</u>	<u>2011</u>	<u>2010</u>
Actuarially determined contribution	\$ 3,696,686	\$ 3,889,710	\$ 3,888,399	\$ 3,702,569	\$ 3,270,007	\$ 2,998,694	\$ 2,855,640	\$ 2,673,078	\$ 2,468,973	\$ 2,484,074
Contributions in relation to the actuarially determined contribution	<u>3,696,686</u>	<u>3,889,710</u>	<u>3,888,399</u>	<u>3,702,569</u>	<u>3,270,007</u>	<u>2,998,694</u>	<u>2,855,640</u>	<u>2,673,078</u>	<u>2,468,973</u>	<u>2,484,074</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 <sup>1</sup>	\$10,404,404	\$ 9,200,180	\$ 8,818,537	\$ 8,256,100	\$ 8,074,522	\$ 7,996,942	\$ 7,833,329	\$ 7,920,935	\$ 7,935,248	\$ 7,859,999
Contributions as a percentage of covered payroll	35.530%	42.279%	44.093%	44.846%	40.498%	37.498%	36.455%	33.747%	31.114%	31.604%

<sup>1</sup> Projected payroll at time 1.0 under previous roll-forward methodology through 2018. Actual payroll at valuation date (time = 0) beginning in 2019.

See Independent Auditors' Report.

**TEACHERS' RETIREMENT SYSTEM OF THE CITY OF NEW YORK**  
**REQUIRED SUPPLEMENTARY INFORMATION (UNAUDITED)**  
**QUALIFIED PENSION PLAN**  
**SCHEDULE OF EMPLOYERS' CONTRIBUTIONS**  
(In Thousands)

**SCHEDULE 2 (CONTINUED)**

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 2019 contributions were determined using an actuarial valuation as of June 30, 2017). The methods and assumptions used to determine the actuarially determined contributions are as follows:

Valuation Dates	June 30, 2017	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, 2008
Actuarial cost method	Entry Age	Entry Age	Entry Age	Entry Age	Entry Age	Entry Age	Entry Age	Entry Age	Frozen Initial Liability <sup>1</sup>
Amortization method for Unfunded Actuarial Accrued Liabilities:									
Initial Unfunded	Increasing Dollar	Increasing Dollar	Increasing Dollar	Increasing Dollar	Increasing Dollar	Increasing Dollar	Increasing Dollar	Increasing Dollar	NA <sup>2</sup>
Post-2010 Unfunded	Level Dollar	Level Dollar	Level Dollar	Level Dollar	Level Dollar	Level Dollar	Level Dollar	Level Dollar	NA <sup>2</sup>
Remaining amortization period:									
Initial Unfunded	15 years (closed)	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>
2010 ERI	0	0	1 year (closed)	2 years (closed)	3 years (closed)	4 years (closed)	5 years (closed)	NA	NA <sup>2</sup>
2011 Actuarial Gain/Loss	9 years (closed)	10 years (closed)	11 years (closed)	12 years (closed)	13 years (closed)	14 years (closed)	15 years (closed)	NA	NA <sup>2</sup>
2012 Actuarial Gain/Loss	10 years (closed)	11 years (closed)	12 years (closed)	13 years (closed)	14 years (closed)	15 years (closed)	NA	NA	NA <sup>2</sup>
2013 Actuarial Gain/Loss	11 years (closed)	12 years (closed)	13 years (closed)	14 years (closed)	15 years (closed)	NA	NA	NA	NA <sup>2</sup>
2014 Actuarial Gain/Loss	12 years (closed)	13 years (closed)	14 years (closed)	15 years (closed)	NA	NA	NA	NA	NA <sup>2</sup>
2015 Actuarial Gain/Loss	13 years (closed)	14 years (closed)	15 years (closed)	NA	NA	NA	NA	NA	NA <sup>2</sup>
2016 Actuarial Gain/Loss	14 years (closed)	15 years (closed)	NA	NA	NA	NA	NA	NA	NA <sup>2</sup>
2017 Actuarial Gain/Loss	15 years (closed)	NA	NA	NA	NA	NA	NA	NA	NA <sup>2</sup>
2017 ASAF Method Change	20 years (closed)	NA	NA	NA	NA	NA	NA	NA	NA <sup>2</sup>
2017 Method Change	20 years (closed)	NA	NA	NA	NA	NA	NA	NA	NA <sup>2</sup>
2017 Assumption Change	20 years (closed)	NA	NA	NA	NA	NA	NA	NA	NA <sup>2</sup>
Actuarial Asset Valuation (AAV) Method <sup>3</sup>	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, 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.

See Independent Auditors' Report.

**TEACHERS' RETIREMENT SYSTEM OF THE CITY OF NEW YORK**  
**REQUIRED SUPPLEMENTARY INFORMATION (UNAUDITED)**  
**QUALIFIED PENSION PLAN**  
**SCHEDULE OF EMPLOYERS' CONTRIBUTIONS**  
(In Thousands)

**SCHEDULE 2 (CONTINUED)**

Valuation Dates	June 30, 2017	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, 2008
Actuarial assumptions:									
Assumed rate of return <sup>4</sup>	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	7.0% per annum, net of investment expenses	8.0% per annum, gross of investment expenses
Post-retirement mortality	Tables adopted by Retirement Board during Fiscal Year 2019	Tables adopted by Retirement Board during Fiscal Year 2016	Tables adopted by Retirement Board during Fiscal Year 2016	Tables adopted by Retirement Board during Fiscal Year 2016	Tables adopted by Retirement Board during Fiscal Year 2012	Tables adopted by Retirement Board during Fiscal Year 2012	Tables adopted by Retirement Board during Fiscal Year 2012	Tables adopted by Retirement Board during Fiscal Year 2012	Tables adopted by Retirement Board during Fiscal Year 2012
Active service: withdrawal, death, disability, service retirement	Tables adopted by Retirement Board during Fiscal Year 2019	Tables adopted by Retirement Board during Fiscal Year 2012	Tables adopted by Retirement Board during Fiscal Year 2012	Tables adopted by Retirement Board during Fiscal Year 2012	Tables adopted by Retirement Board during Fiscal Year 2012	Tables adopted by Retirement Board during Fiscal Year 2012	Tables adopted by Retirement Board during Fiscal Year 2012	Tables adopted by Retirement Board during Fiscal Year 2006	Tables adopted by Retirement Board during Fiscal Year 2000
Salary increases <sup>4</sup>	In general, merit and promotion increases plus assumed General Wage Increases of 3.0% per year.	In general, merit and promotion increases plus assumed General Wage Increases of 3.0% per year.	In general, merit and promotion increases plus assumed General Wage Increases of 3.0% per year.	In general, merit and promotion increases plus assumed General Wage Increases of 3.0% per year.	In general, merit and promotion increases plus assumed General Wage Increases of 3.0% per year.	In general, merit and promotion increases plus assumed General Wage Increases of 3.0% per year.	In general, merit and promotion increases plus assumed General Wage Increases of 3.0% per year.	In general, merit and promotion increases plus assumed General Wage Increases of 3.0% per year.	In general, merit and promotion increases plus assumed General Wage Increases of 3.0% per year.
Cost-of-Living Adjustments <sup>4</sup>	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.	1.5% per annum for Auto Cola. 2.5% per annum for Escalation.	1.3% per annum

<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. 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.

<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.

<sup>3</sup> As of the June 30, 2014 (Lag) valuation, the AAV is constrained to be no more than 20% from Fair Value.

<sup>4</sup> Developed using a long-term Consumer Price Inflation assumption of 2.5% per year.

See Independent Auditors' Report.

**TEACHERS' RETIREMENT SYSTEM OF THE CITY OF NEW YORK  
REQUIRED SUPPLEMENTARY INFORMATION (UNAUDITED)  
QUALIFIED PENSION PLAN  
SCHEDULE OF INVESTMENT RETURNS**

**SCHEDULE 3**

The following table displays the annual money-weighted rate of return, net of investment expense, for TRSNYC Pension Fund investments for each of the past six fiscal years:

<b>Fiscal Year-Ended</b>	<b>Money-weighted Rate of Return</b>
June 30, 2019	7.50%
June 30, 2018	8.14%
June 30, 2017	12.50%
June 30, 2016	1.66%
June 30, 2015	2.81%
June 30, 2014	17.60%

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**  
**SCHEDULE OF ADMINISTRATIVE EXPENSES**  
Year Ended June 30, 2019

**SCHEDULE 4**

	Total	QPP	TDA
<b>PERSONNEL SERVICES</b>			
Staff Salaries	\$31,778,585	\$24,838,142	\$6,940,443
Social Security	1,806,239	1,411,756	394,483
Insurance (Health)	5,272,001	4,120,596	1,151,405
Welfare Benefit Fund	1,406,998	1,099,710	307,288
TOTAL PERSONNEL SERVICES	40,263,823	31,470,204	8,793,619
<b>PROFESSIONAL SERVICES</b>			
Data Processing Support and Licenses	6,523,149	5,098,493	1,424,656
Temporary and Consulting Staffing	6,421,923	5,019,375	1,402,548
Outside Professional Services	690,201	539,461	150,740
TOTAL PROFESSIONAL SERVICES	13,635,273	10,657,329	2,977,944
<b>MODERNIZATION INITIATION</b>			
Personnel Services	121,757	69,834	51,923
Consultants and Temporary Costs	8,660,253	4,967,114	3,693,139
IT Vendor Development Costs	9,352,970	5,364,424	3,988,546
QA Vendor Non-IT Costs	2,902,426	1,664,695	1,237,731
Equipment Costs	595,330	341,453	253,877
Other Expenses	904,446	518,748	385,698
TOTAL MODERNIZATION INITIATION***	22,537,182	12,926,268	9,610,914
<b>RENTALS</b>			
Office Space	7,881,850	6,160,454	1,721,396
Real Estate Taxes & Operating Expenses	692,931	541,595	151,336
Equipment Leasing	124,510	97,317	27,193
TOTAL RENTALS	8,699,291	6,799,366	1,899,925
<b>COMMUNICATION</b>			
Telephone	249,304	194,856	54,448
Postage	437,628	342,050	95,578
Local Traveling Expenses*	46,563	36,393	10,170
Non-Local Traveling Expenses**	117,584	91,904	25,680
TOTAL COMMUNICATION	851,079	665,203	185,876
<b>OTHER OPERATING EXPENSES</b>			
Utilities	285,851	223,421	62,430
Supplies and Materials	95,413	74,575	20,838
Maintenance, Repairs, and Services	499,997	390,798	109,199
Office Equipment and Furniture	2,045	1,598	447
Storage	287,808	224,951	62,857
Printing	564,117	440,914	123,203
Training Programs	486,437	380,199	106,238
Dues and Subscriptions	46,799	36,578	10,221
TOTAL OTHER OPERATING EXPENSES	2,268,467	1,773,034	495,433
<b>TOTAL ADMINISTRATIVE EXPENSES***</b>	<b>\$88,255,115</b>	<b>\$64,291,404</b>	<b>\$23,963,711</b>

\* Total TRS Local Traveling Expenses includes Local Travel Fare \$5,525, Courier \$25,432, Meals & Refreshments \$11,701, and Conferences \$3,905.

\*\* Total TRS Non-Local Traveling Expenses includes Hotels & Meals \$50,698, Travel Fare \$28,436, and Conferences \$38,450.

\*\*\* The QPP Fixed Return Fund's administrative expense amounted to \$49,710,534, of which the modernization portion was \$6,310,411. The Variable Return Fund's administrative expense amounted to \$38,544,581, of which the modernization portions attributable to the QPP and TDA were \$6,615,857 and \$9,610,914, respectively.

The schedule shows total expenses paid by TRS. Other administrative expenses of \$12,338,929 were paid on TRS' behalf by other City agencies under Regulation 85 of the New York State Superintendent of Insurance Regulations.

See Note 8 of Financial Statement for Administrative Expenses.

See Independent Auditors' Report.

## SCHEDULE 5

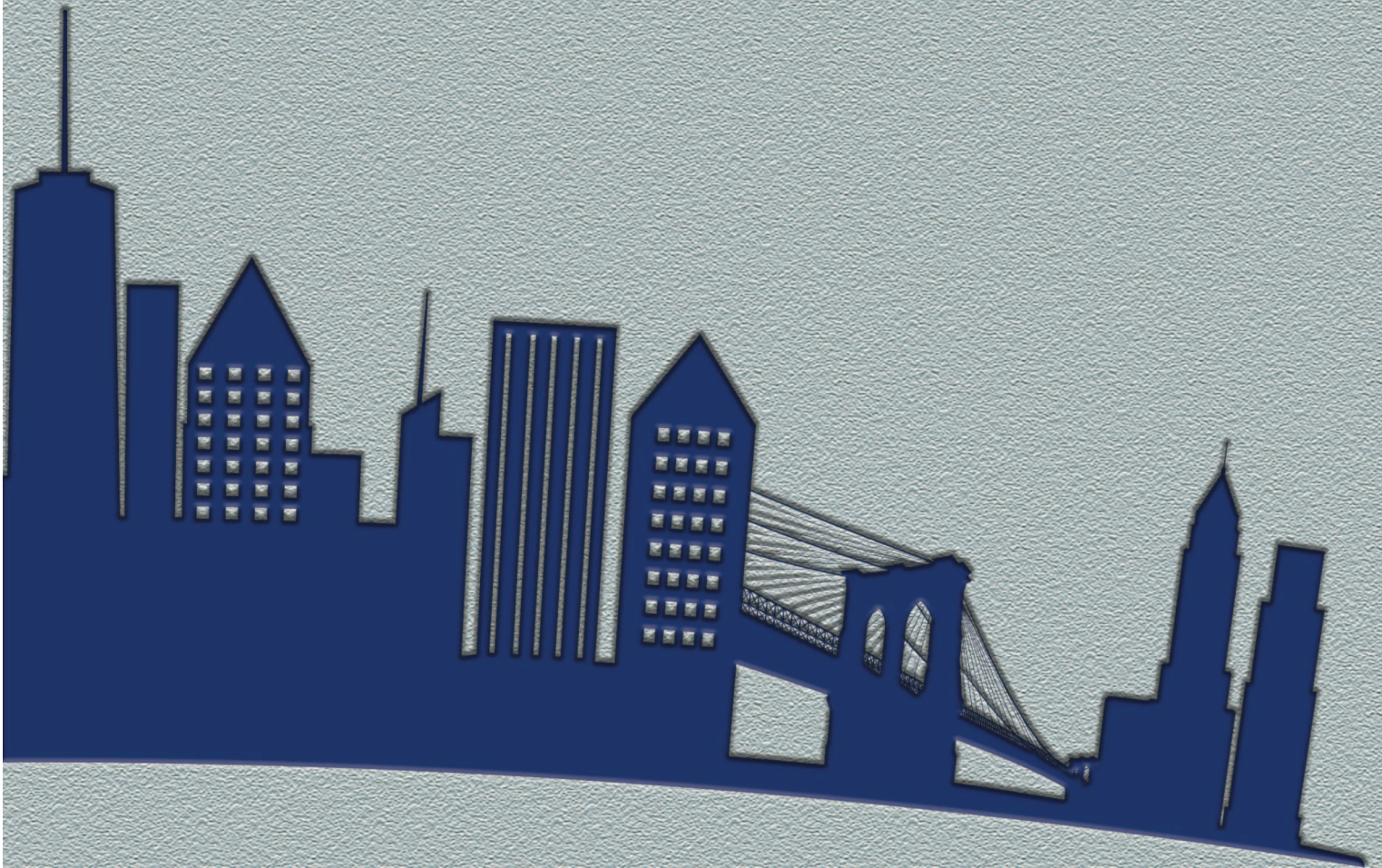
**ADDITIONAL SUPPLEMENTARY INFORMATION**  
**SCHEDULE OF INVESTMENT EXPENSES AND SERVICES (QPP & TDA)**  
**Year Ended June 30, 2019**

	ASSETS UNDER MANAGEMENT	INVESTMENT EXPENSES AND SERVICES
<b>INVESTMENT CATEGORY</b>		
Pension Fund	\$77,693,557,449	\$290,242,228
Diversified Equity and Int'l Equity Funds	15,055,175,067	15,342,142
Balanced Fund	398,228,969	1,083
Inflation Protection Fund	70,287,437	291
Socially Responsive Equity Fund	228,414,156	1,013,246
<b>OTHER INVESTMENT SERVICES</b>		
NYC Office of Comptroller (Fixed-Return Fund)		6,022,251
Consultant		3,669,158
Legal		423,877
Other (Variable Return Fund) Services		182,667
Provision for Expense Reduction		(17,283,210)
	<b><u>\$93,445,663,078*</u></b>	<b><u>\$299,613,733</u></b>

*\* Excludes \$1,280,112,033 in securities lending.*

See Independent Auditors' Report.

# INVESTMENT



## REPORT ON INVESTMENT ACTIVITY

The below report on investment activity was prepared by Rocaton Investment Advisors. Fund summaries of the System's Investment Options follow it. After the reports are disclosures of sector returns, asset class allocation, investment management and other service fees, and bond and equity holdings. The disclosures supplement the investment information of the Financial Section.

**Prepared by Rocaton Investment Advisors, LLC,  
Investment Consultant to the Teachers' Retirement System of the City of New York**

As of June 30, 2019, TRS offered six investment program options to its membership: the Fixed Return Fund, the Diversified Equity Fund, the Balanced Fund, the International Equity Fund, the Inflation-Protection Fund, and the Socially Responsive Equity Fund. State Street and JP Morgan Chase are the custodians of the assets of these investment programs. The custodian calculates the return information using time-weighted compound return. The structure of each of these programs differs depending upon its investment objective. These six programs and their objectives are described below.

The pooled New York City Pension Fund includes a) all funds that Tier I/II members invested in the Fixed Return Fund and b) Employer Contribution assets for Tier I/II members c) all Tier III/IV/VI QPP funds d) all TDA funds invested in the Fixed Return Fund. The Fixed Return Fund currently provides Tier I/II participants with an 8.25% return. Tier III/IV/VI members are credited 5% in their QPP accounts. UFT members and non UFT members with TDA funds invested in the Fixed Return Fund are provided with 7.0% and 8.25% returns, respectively. The combined QPP and TDA Fixed Return Funds assets totaled \$77.7 billion as of June 30, 2019. The overall Pension Fund had a net of fee return of 7.54% for the fiscal year ending June 30, 2019. As of June 30, 2019, the Fund had 31% U.S. equity investments, 20% non-U.S. equity investments, 13% in alternative investments, 36% fixed income investments and short-term investments (due to rounding, percentages do not add to 100%). The Fund's long-term asset allocation policy is based on the Fund's long-term investment horizon of more than 20 years. The investment structure has a significant emphasis on risk control. For example, as of June 30, 2019, approximately 97% of U.S. equity assets were invested in indexed or risk-controlled strategies. This emphasis on indexed and risk-controlled strategies also enables the program to more effectively control costs. The Fund's fixed income holdings are primarily high-quality U.S. securities with smaller allocations to sectors such as enhanced yield and convertibles securities.

The Diversified Equity Fund's objective is to provide participants with a diversified equity investment portfolio. As of June 30, 2019, the Diversified Equity Fund, including both QPP and TDA assets, had \$14.9 billion in assets and had a net of fee return of 7.10% for the fiscal year ending June 30, 2019. This portfolio's target structure is a mixture of U.S. equities (70%), non-U.S. equities (20%), and defensive strategies (10%). The defensive sector is made up of convertible bond strategies, conservatively-oriented equity strategies, and tactical asset allocation strategies. Tactical asset allocation strategies shift allocations to and within asset classes such as stocks, bonds, and cash depending upon the managers' analysis of market conditions. The diversification of this portfolio beyond U.S. equities is intended to broaden diversification and help protect participants against significant market downturns within a single asset class (i.e., U.S. stocks). Again, risk control and cost-effectiveness are a very important focus of the investment structure. For example, as of June 30, 2019, approximately 70% of the assets within the Diversified Equity Fund were invested in indexed strategies.

The Balanced Fund's objective is to seek current income and some capital appreciation. The Balanced Fund invests in both stocks and bonds and targets a conservative mix of approximately 70% bonds and 30% stocks. The Fund's bond allocation is passively managed and includes allocations to short-term U.S. Treasuries, Agencies, short-term investment-grade Corporate Bonds, and some foreign securities. The Fund's stock allocation is passively managed and is composed of U.S. and non-U.S. companies located in developed and emerging markets, traded on a variety of stock exchanges and denominated in a variety of currencies around the world. As of June 30, 2019, the combined QPP and TDA Balanced Funds' assets totaled \$398.2 million, and the Fund earned a net of fee return of 5.12% for the fiscal year ending June 30, 2019.

The International Equity Fund invests primarily in the stocks of non-U.S. companies located in both developed and emerging markets. The objective of this fund is to provide a return comparable to the return of the non-U.S. developed equity markets over a full market cycle. As of June 30, 2019, the combined QPP and TDA International Equity Funds' assets totaled \$163.0 million. For the fiscal year ending June 30, 2019, the International Equity Fund returned 2.35%, net of fees.

The Inflation Protection Fund seeks exposure to multiple asset classes and markets. The objective of this fund is to provide a rate of return that exceeds inflation over a full market cycle. As of June 30, 2019, the combined TDA and QPP Inflation Protection Funds' assets totaled \$70.3 million. For the fiscal year ending June 30, 2019, the Inflation Protection Fund returned 1.85%, net of fees.

The Socially Responsive Equity Fund invests primarily in stocks of large- and mid-cap U.S. and non-U.S. companies that meet certain financial and social criteria. The objective of this fund is to provide a rate of return comparable to the broad equity market while reflecting social priorities. As of June 30, 2019, the combined QPP and TDA Socially Responsive Equity Funds' assets totaled \$228.4 million. For the fiscal year ending June 30, 2019, the Socially Responsive Equity Fund returned 3.40%, net of fees.

The investment strategies of these investment managers are monitored periodically for consistency with TRS' overall investment objectives.

### **ECONOMIC REVIEW**

Interest rates declined in the U.S. during the one-year period ending June 30, 2019, with the 10-year Treasury note yielding 2.0% at the end of June, a decline of 70 basis points from June 30, 2018. The returns of investment grade fixed income sectors generated positive results over the trailing one-year period, with corporates returning 10.72% and treasuries returning 7.24%. U.S. equities (proxied by the S&P 500) gained 10.42% during the trailing one-year period, outperforming non-U.S. developed markets (proxied by the MSCI EAFE Index), which returned 1.60%. Additionally, emerging market equities (proxied by the MSCI Emerging Markets Index) posted a return of 1.61% for the one year ending June 30, 2019. The return on the broad fixed income market (proxied by the Bloomberg Barclays U.S. Aggregate Bond Index) during the trailing one-year period was 7.87%. High yield fixed income (below investment grade corporate bonds proxied by the Bloomberg Barclays U.S. High Yield Index) underperformed higher quality domestic fixed income during the one-year period ending June 30, 2019, returning 7.48%, while emerging markets debt (proxied by the J.P. Morgan EMBI Global Diversified Index) returned 7.46%.

### **U.S. MARKETS REVIEW**

Most major domestic equity indices rose during the one-year period ending June 30, 2019, with larger market capitalization companies, as represented by the Russell 1000 Index, outperforming their smaller counterparts, as represented by the Russell 2000 Index. The Russell 1000 Index returned 10.02% during the one-year period ending June 30, 2019 versus the Russell 2000 Index return of -3.31% for the same period. The Russell 3000 Index, a broad measure of the U.S. equity markets, returned 8.98% for the one-year period ending June 30, 2019. For the 12 months ending June 30, 2019, growth stocks outperformed value stocks as the Russell 3000 Growth Index outperformed the Russell 3000 Value Index by over 3%.

For the year ending June 30, 2019, the Bloomberg Barclays U.S. Aggregate Bond Index, a broad index of U.S. investment grade bonds, returned 7.87%.

### **INTERNATIONAL MARKETS REVIEW**

The return for the MSCI EAFE Index, a measure of the developed international equity markets, was 1.08% in U.S. dollar terms for the one-year period ending June 30, 2019. Of the following four regions: Japan, Pacific ex-Japan, U.K., and Europe ex-U.K., Pacific ex-Japan had the strongest performance for the one-year period, with a return of 8.06%. Europe ex-U.K. followed with a return of 3.39% for the one-year period while the MSCI U.K. and MSCI Japan markets returned -2.05%, and -4.19%, respectively. International small-cap stocks underperformed foreign large cap companies for the 12-month period ending June 30, 2019 with the MSCI EAFE Small Cap Index's return of -6.35%. The MSCI Emerging Markets Index returned 1.21% for the one-year period ending June 30, 2019. All of the performance information regarding non-U.S. markets is provided from the perspective of U.S.-based investors and, as such, were translated at fiscal year-end and reviewed as US dollar denominations.

#### ***Rocaton Investment Advisors, LLC***

20 Glover Avenue  
Norwalk, Connecticut 06850

*Performance information for MSCI non-U.S. equity indices represents Total Return Net Dividends in U.S. Dollar Terms.*

## INVESTMENT OPTIONS

Below is a depiction of the investment programs in the QPP and the TDA Program available to members. The programs' portfolios are structured differently to allow members to diversify their investments. Please see pages 87-91 for detailed descriptions of the investment programs.

PENSION FUND	DIVERSIFIED EQUITY FUND	BALANCED FUND
(Member Contributions, Pension Reserve Funds & ITHP Contributions)	(Member Contributions & ITHP Contributions)	(Member Contributions & ITHP Contributions)
Tiers I/II QPP funds in the Fixed Return Fund +	Tiers I/II QPP funds in the Diversified Equity Fund +	Tiers I/II QPP funds in the Balanced Fund +
All Tiers III/IV/VI QPP Funds +		
All Tiers' TDA funds in the Fixed Return Fund	All Tiers' TDA funds in the Diversified Equity Fund	All Tiers' TDA funds in the Balanced Fund

INTERNATIONAL EQUITY FUND	INFLATION PROTECTION FUND	SOCIALLY RESPONSIVE EQUITY FUND
(Member Contributions & ITHP Contributions)	(Member Contributions & ITHP Contributions)	(Member Contributions & ITHP Contributions)
Tiers I/II QPP funds in the International Equity Fund +	Tiers I/II QPP funds in the Inflation Protection Fund +	Tiers I/II QPP funds in the Socially Responsive Equity Fund +
All Tiers' TDA funds in the International Equity Fund	All Tiers' TDA funds in the Inflation Protection Fund	All Tiers' TDA funds in the Socially Responsive Equity Fund

*Note: Members' QPP accounts receive additional contributions from their employer: "Pension Reserve" funds, which are invested in the Pension Fund, are provided to all members on a statutory basis consistent with generally accepted actuarial principles; actuarial variations are performed annually as of June 30. "Increased-Take-Home Pay" (ITHP) funds, provided by the City of New York to Tier I and Tier II members only, are invested according to member designation in any combination of the six investment programs.*

The table below compares accumulations as of June 30, 2019, based on assumed contributions of \$100.00 per month into each of the Fixed Return, Diversified Equity, Balanced, International Equity, Inflation Protection, and Socially Responsive Equity Funds.

**10-YEAR COMPARISON OF ACCUMULATIONS  
IN TRS' INVESTMENT PROGRAMS**  
*As of June 30, 2019*

MONTHS OF PARTICIPATION	12	24	36	48	60	72	84	96	108	120
<b>Fixed Return Fund (TDA/UFT)</b> <sup>1</sup>	\$1,239	\$2,564	\$3,982	\$5,499	\$7,122	\$8,859	\$10,718	\$12,707	\$14,837	\$17,114
<b>Fixed Return Fund (All others)</b> <sup>1</sup>	\$1,245	\$2,594	\$4,053	\$5,633	\$7,343	\$9,194	\$11,198	\$13,367	\$15,714	\$18,256
<b>Diversified Equity Fund</b> <sup>2</sup>	\$1,273	\$2,613	\$4,189	\$5,938	\$7,672	\$9,639	\$12,047	\$14,810	\$17,764	\$21,173
<b>Balanced Fund</b> <sup>3</sup>	\$1,249	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
<b>International Equity Fund</b> <sup>4</sup>	\$1,261	\$2,483	\$3,954	\$5,532	\$7,021	\$8,569	\$10,396	\$12,382	\$14,330	\$16,490
<b>Inflation Protection Fund</b> <sup>5</sup>	\$1,230	\$2,482	\$3,775	\$5,142	\$6,422	\$7,755	\$9,121	\$10,626	\$12,208	\$14,011
<b>Socially Responsive Equity Fund</b> <sup>6</sup>	\$1,240	\$2,557	\$4,081	\$5,785	\$7,501	\$9,461	\$11,951	\$14,716	\$17,637	\$21,136

<sup>1</sup> *Fixed Return Fund*

*QPP: Tiers I/II members are credited with 8.25% annually on QPP investments in the Fixed Return Fund; this rate has been in effect since July 1, 1988.*

*TDA: Members who are represented by the United Federation of Teachers (UFT) are credited with 7% annually on TDA investments. This rate has been in effect since December 11, 2009; the previous rate was 8.25%. Members who are not represented by the UFT are credited with 8.25% annually on TDA investments in the Fund; this rate has been in effect since July 1, 1988. The numbers in the chart represent the accumulation for a UFT member.*

<sup>2</sup> *Based on July 2019 unit value of \$98.450*

<sup>3</sup> *Based on July 2019 unit value of \$16.248*

<sup>4</sup> *Based on July 2019 unit value of \$10.756*

<sup>5</sup> *Based on July 2019 unit value of \$10.079*

<sup>6</sup> *Based on July 2019 unit value of \$17.608*

## PENSION FUND Fund Summary Fiscal Year 2019

**Return: 7.54%**

**Total Investments: \$77.694 Billion**

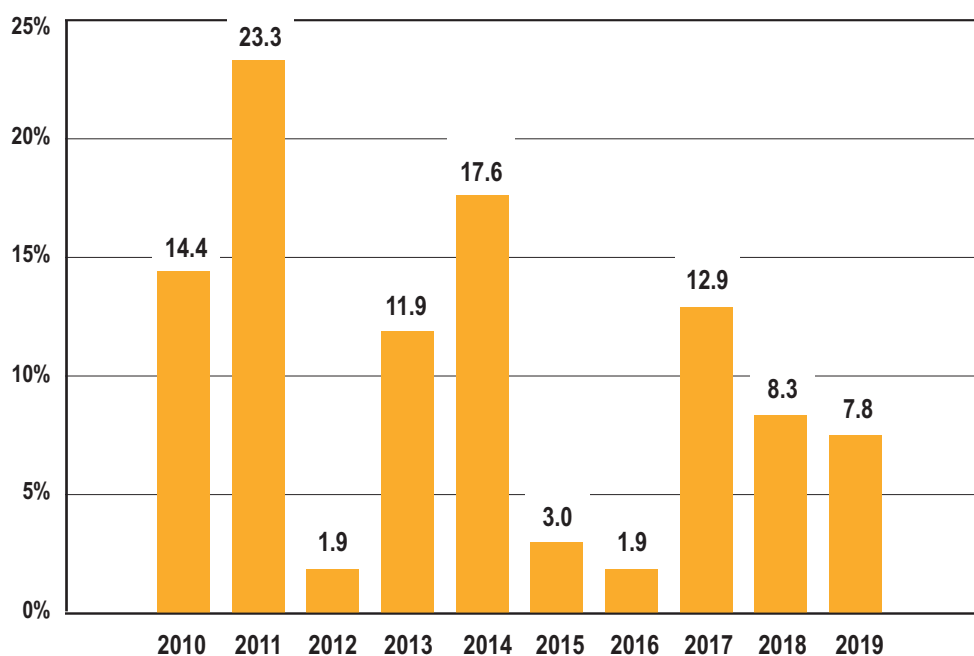
During Fiscal Year 2019, the Pension Fund's portfolio, consisting primarily of equities and fixed-income investments, yielded a net return of 7.54% and a gross return of 7.76%. The 7.76% gross return was a decrease from the 8.33% return for Fiscal Year 2018.

The Pension Fund includes a) all funds that Tier I/II members invested in the Fixed Return Fund; b) Employer Contribution assets for Tier I/II members; c) all Tier III/IV/VI Qualified Pension Plan (QPP) funds; and d) all Tax-Deferred Annuity (TDA) Program funds invested in the Fixed Return Fund. The Fixed Return Fund

provides an annual rate of return that is set by the New York State Legislature in accordance with applicable laws. The combined QPP and TDA Fixed Return Fund assets totaled \$77.694 billion as of June 30, 2019.

The Comptroller of the City of New York invests the Pension Fund's holdings in a diversified portfolio, as authorized by the Teachers' Retirement Board. This portfolio consists of U.S. and international equities and fixed-income instruments, with smaller allocations to private equity and real estate investments.

### 2010-2019 PENSION FUND ANNUAL RATE OF RETURN\*



\* Reflects Gross Returns (Annualized Net Return for Pension Fund available beginning Fiscal Year 2015.)

## DIVERSIFIED EQUITY FUND

### Fund Summary

Fiscal Year 2019

**Return: 7.10%**

**Total Investments: \$14.892 Billion**

For the 12-month period ending June 30, 2019, the U.S. equity market, as measured by the Russell 3000 Index, returned 8.98%. The Russell 3000 Index includes no fees and provides a passive representation of the overall U.S. stock market. For the same 12-month period ending June 30, 2019, the Diversified Equity Fund returned 7.10%, after fees. The Fund invests in a diversified blend of investment strategies that historically have made the Diversified Equity Fund less volatile over long time periods than the overall U.S. equity market. The Hybrid Benchmark, which includes no fees, is constructed based upon a passive reflection of the Diversified Equity Fund's target asset allocation among domestic stocks, domestic fixed-income securities, and international equities. As of June 30, 2019, the Hybrid Benchmark was 70% Russell 3000 Index, 20% International Equity Composite Benchmark, and 10% Defensive Strategies Composite Benchmark. Over the 12-month period ending June 30, 2019, the Diversified Equity Fund underperformed the Hybrid Benchmark's return of 7.42%.

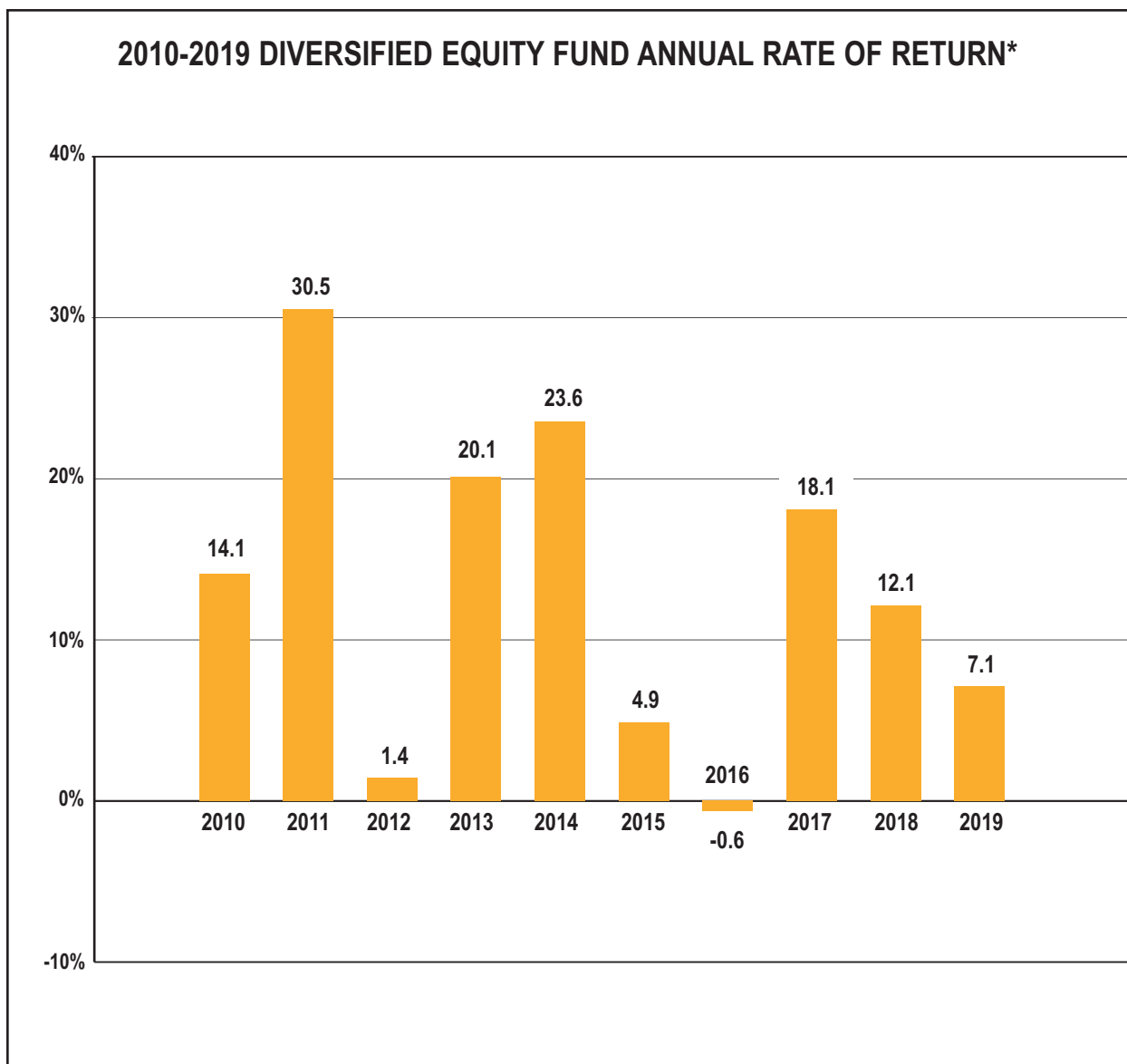
For the three-year period ending June 30, 2019, the Diversified Equity Fund returned 12.35% on an annualized basis, after fees, trailing the Russell 3000 Index's annualized return of 14.02% and the Hybrid Benchmark's annualized returns of 12.86% over the same period. For the five-year period ending June 30, 2019, the Diversified Equity Fund returned 8.12%, annualized, after fees, behind the Russell 3000 Index's annualized return of 10.19% and the Hybrid Benchmark's annualized returns of 8.80%. Due to its diversified structure, the Diversified Equity Fund has exhibited less performance volatility than the Russell 3000 Index over the same five-year period.

As of June 30, 2019, approximately 76% of the Diversified Equity Fund's portfolio was invested in the U.S. common stock market. The Diversified Equity Fund's portfolio also contained approximately 20% in international stocks and

approximately 4% in fixed income, cash-equivalents, and other securities as of the fiscal year-end. The international stock and the fixed income allocations contribute to portfolio diversification.

The Diversified Equity Fund utilizes several different investment strategies managed by professional money management firms. These strategies are classified into the component sectors described here. Returns after fees for all of the Diversified Equity Fund's component sectors for the one-year period ending June 30, 2019 are as follows:

- The Passive Core (or index) sector is comprised of two index mandates.
- The Active Domestic Equity sector is comprised of strategies focused on particular market capitalization ranges and investment styles.
- The Defensive Strategies sector is designed to provide a diversification benefit to the overall fund and has generally been beneficial to the fund during periods of market decline. The sector is comprised of a variety of strategy types. The Tactical Asset Allocation managers within this sector, which can modify its mix of equity, bonds, and cash equivalents, was positioned, with approximately 63% equity exposure, and approximately 37% fixed income exposure in their portfolio as of June 30, 2019. The sector also includes two low expected volatility equity strategies, two convertible bond portfolios, which exhibit a hybrid of equity and fixed income characteristics, and lastly, a global allocation fund which typically holds about 60% equities and 40% fixed income. The fixed income exposure of the overall Diversified Equity Fund comes from the Defensive Strategies sector.
- The International Equity sector is comprised of strategies focused on particular market capitalization ranges and investment styles across developed and emerging markets.



\* After expenses

## BALANCED FUND

### Fund Summary

Fiscal Year 2019

**Return: 5.12%**

**Total Investments: \$398.229 Million**

As of January 1, 2018, the Bond Fund became the Balanced Fund.

The Balanced Fund has targets of 70% U.S. short-term fixed income and 30% passive world equity. The fund aims to passively track its

benchmark, which is 70% Bloomberg Barclays U.S. Govt/Credit 1-5 Year Float Adjusted Index, and 30% FTSE Global All Cap Index. For the one-year period ending June 30, 2019, the Fund has returned 5.12%.

## INTERNATIONAL EQUITY FUND

### Fund Summary

Fiscal Year 2019

**Return: 2.35%**

**Total Investments: \$163.046 Million**

As of June 30, 2019, the International Equity Fund was primarily comprised of a mix of active and passive management, implemented by one passive and seven active non-U.S. equity managers, which invest primarily in the stocks of non-U.S. companies located in developed and emerging markets. For the one-year period ending June 30, 2019, the International Equity Fund returned 2.35%, after fees, outperforming the International Composite Benchmark, which returned 1.46%. For the

three-year period ending June 30, 2019, the International Equity Fund returned 9.85%, outperforming the benchmark return of 9.41%. Over the longer five-year period ending June 30, 2019, the International Equity Fund has returned 3.51%, outperforming the benchmark return of 3.23%. The total return of this option reflects performance of the underlying managers as well as the impact of cash flows into and out of the fund.

## INFLATION PROTECTION FUND

### Fund Summary

Fiscal Year 2019

**Return: 1.85%**

**Total Investments: \$70.288 Million**

The Inflation Protection Fund primarily invests in an actively managed mutual fund that seeks exposure to multiple asset classes including, but not limited to, various real return strategies with a goal of providing, over a full market cycle, a real rate of return that exceeds inflation. For the one-year period ending June 30, 2019, the Inflation Protection Fund returned 1.85%, after fees, versus the Inflation Protection Fund Benchmark's return of 3.27%. The Inflation Protection Fund Benchmark reflects a composition of 25% Bloomberg Commodity Index, 25% S&P/LSTA Leveraged Loan Index,

30% Barclays US TIPS Index, 12% Dow Jones Wilshire Real Estate Securities Index, and 8% BofA ML US Real Estate Corporate Bond Index. For the three-year period ending June 30, 2019, the Inflation Protection Fund returned 2.78%, outperforming the benchmark return of 2.40%. Over the longer five-year period ending June 30, 2019, the Inflation Protection Fund underperformed the benchmark by 24 basis points, returning 0.76%. The total return of this option reflects performance of the underlying manager as well the impact of cash flows into and out of the fund.

## SOCIALLY RESPONSIVE EQUITY FUND

### Fund Summary

Fiscal Year 2019

**Return: 3.40%**

**Total Investments: \$228.414 Million**

The Socially Responsive Equity Fund primarily invests in an actively managed separate account with the goal of providing a return comparable to the large-capitalization U.S. equity market over a full market cycle while reflecting social priorities. For the one-year period ending June 30, 2019, the Socially Responsive Equity Fund returned 3.40%, after fees, versus the S&P 500 Index's return of 10.42%. For the three-year period ending June 30, 2019, the Socially Responsive Equity

Fund returned 11.42%, underperforming the S&P 500 Index return of 14.19% for the same period. Over the longer five-year period ending June 30, 2019, the Socially Responsive Equity Fund has also trailed the benchmark, returning 8.17% against the benchmark return of 10.71%. The total return of this option reflects performance of the underlying manager as well as the impact of cash flows into and out of the fund.

**ANNUALIZED INVESTMENT RESULTS<sup>1</sup>**

As of June 30, 2019

	Current Year 2019	3 Year	Annualized 5 Year	10 Year
<b>TRS Pension Fund<sup>2</sup></b>	7.76%	9.63%	6.69%	10.09%
Benchmark: Policy Index <sup>3</sup>	7.92%	9.55%	6.78%	10.37%
<b>TRS Diversified Equity Fund</b>	7.10%	12.35%	8.12%	12.72%
Hybrid Benchmark <sup>4</sup>	7.42%	12.86%	8.80%	13.29%
Benchmark: Russell 3000	8.98%	14.02%	10.19%	14.67%
<b>TRS Balanced Fund</b>	5.12%	N/A	N/A	N/A
Benchmark: Custom Benchmark <sup>5</sup>	5.65%	4.84%	3.38%	4.91%
<b>TRS International Equity Fund</b>	2.35%	9.85%	3.51%	8.09%
Benchmark: International Equity Composite Benchmark <sup>6</sup>	1.46%	9.41%	3.23%	7.66%
<b>TRS Inflation Protection Fund</b>	1.85%	2.78%	0.76%	5.21%
Benchmark: Inflation Protection Fund Benchmark <sup>7</sup>	3.27%	2.40%	1.00%	2.71%
<b>TRS Socially Responsive Equity Fund</b>	3.40%	11.42%	8.17%	12.88%
Benchmark: Standard & Poor's 500	10.42%	14.19%	10.71%	14.70%

1 Performance calculations reflect time-weighted compound returns. Chart reflects TRS Pension Fund's gross returns. Investment results of variable-return funds are net of operational fees (advisory and custody) and administrative expenses.

2 Average crediting rates for the Fixed Annuity Program for the specified period. These rates are set by the New York State Legislature. QPP: Tier I/II members are credited with 8.25% annually on QPP investments. TDA: Members who are represented by the United Federation of Teachers (UFT) are credited with 7% annually on TDA investments. Members who are not represented by the UFT are credited with 8.25% annually on TDA investments in the Fund.

3 The "Policy Index" is a custom benchmark representing the weighted average return of the weighted benchmark indexes for each major investment program within the TRS Pension Fund. For the weights of the benchmark indexes, see the MD&A of the Financial Section.

4 The Hybrid Benchmark is rebalanced monthly to Variable A's target weights of 70% Russell 3000/ 20% International Equity Composite Benchmark/ 10% Defensive Strategies' Composite Benchmark.

5 The Custom Benchmark return is 70% Bloomberg Barclays U.S. Government/Credit 1-5 Year Float Adjusted Index and 30% FTSE Global All Cap Index.

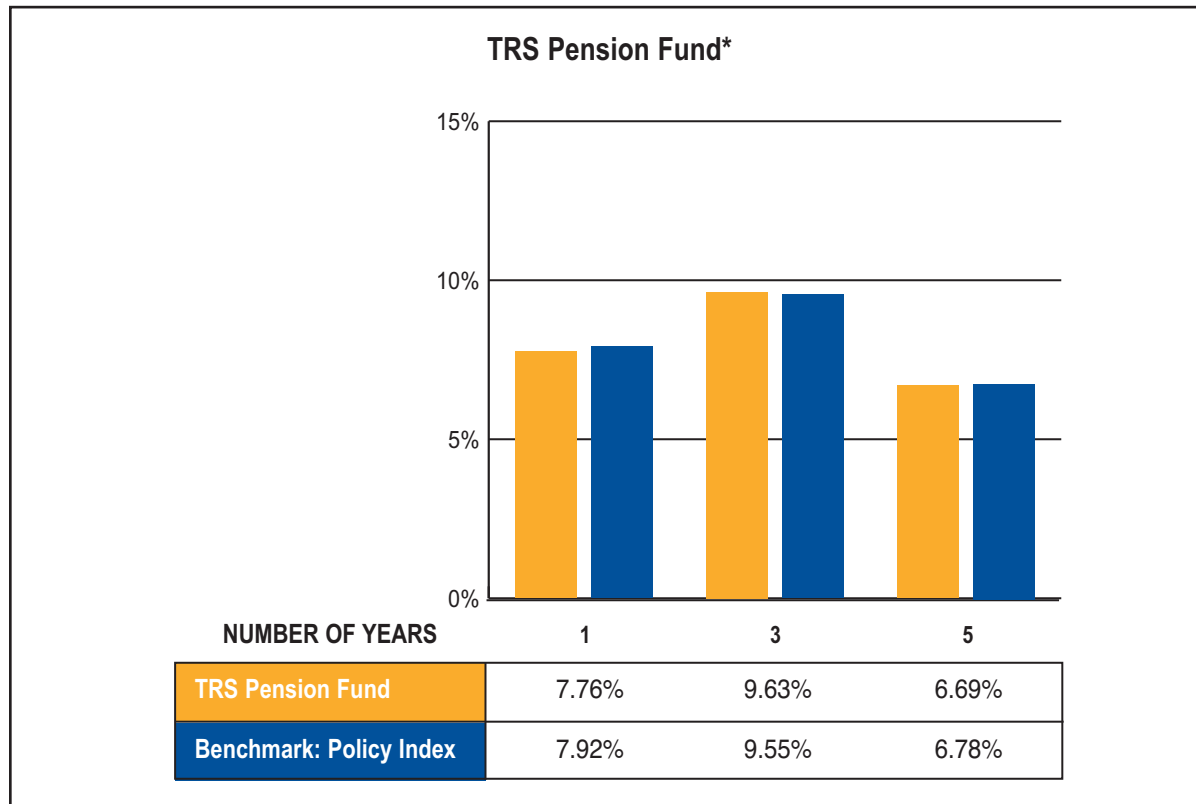
6 The International Equity Composite Benchmark is 86.5% MSCI EAFE/ 3.1% S&P Developed ex US Small Cap Index/ 10.4% Custom MSCI Emerging Markets Index.

7 The Inflation Protection Fund Benchmark is currently comprised of 25% Bloomberg Commodity Index, 25% S&P/LSTA Leveraged Loan Index, 30% Barclays US TIPS Index, 12% Dow Jones Wilshire Real Estate Securities Index, and 8% BofAML US Real Estate Corporate Bond Index.

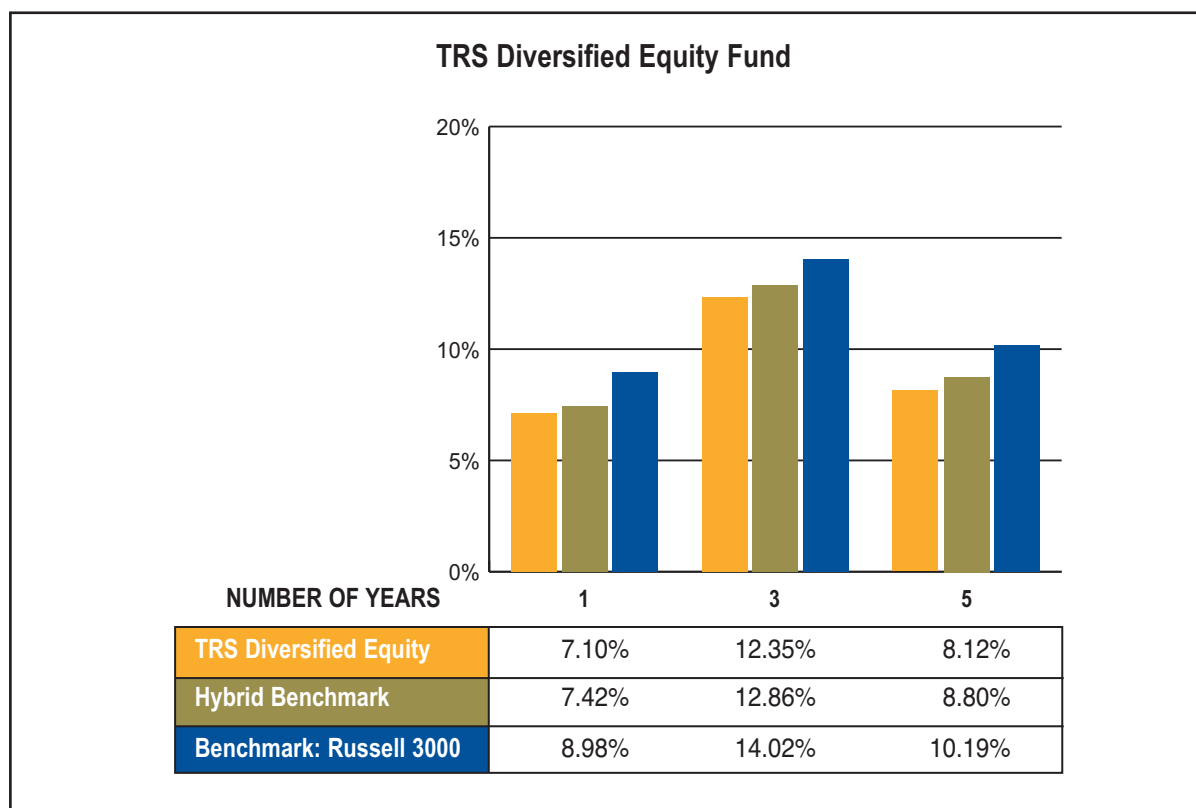
The above information has been gathered from reliable sources, but TRS can only take responsibility for the accuracy of the information concerning its own investment programs.

## ANNUALIZED INVESTMENT RESULTS

As of June 30, 2019

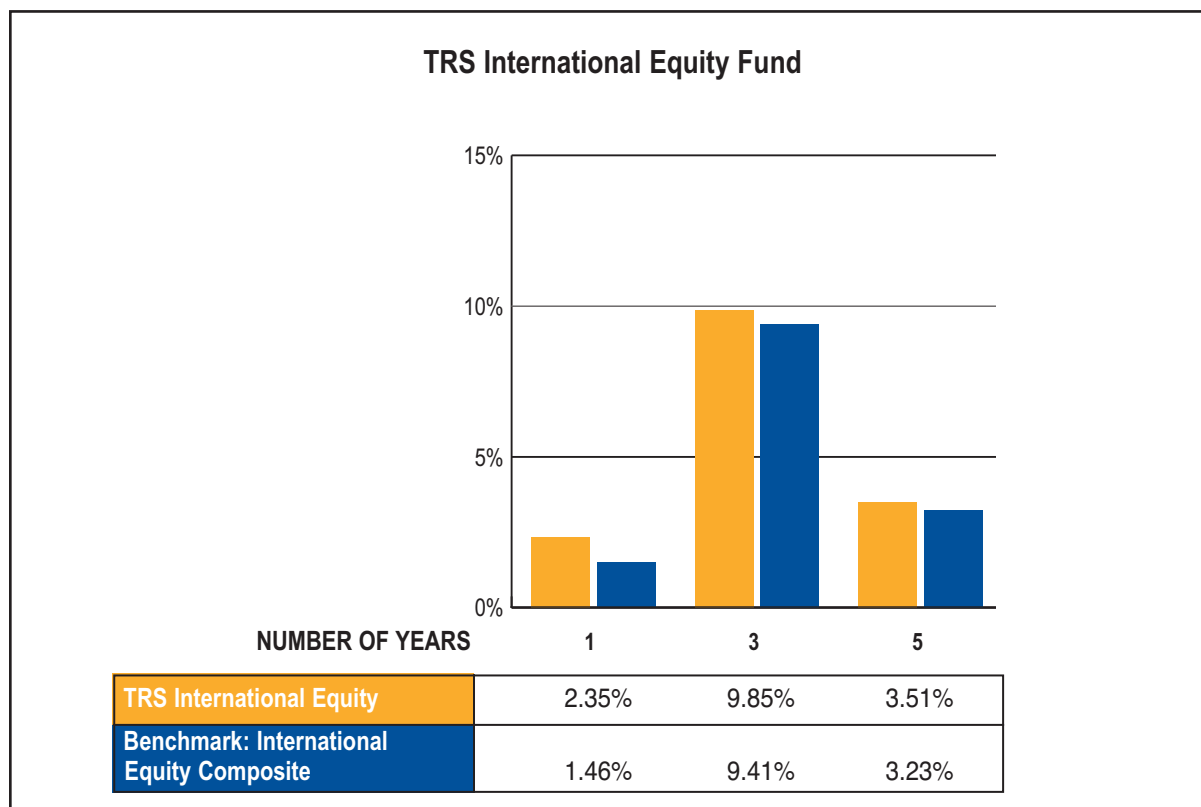
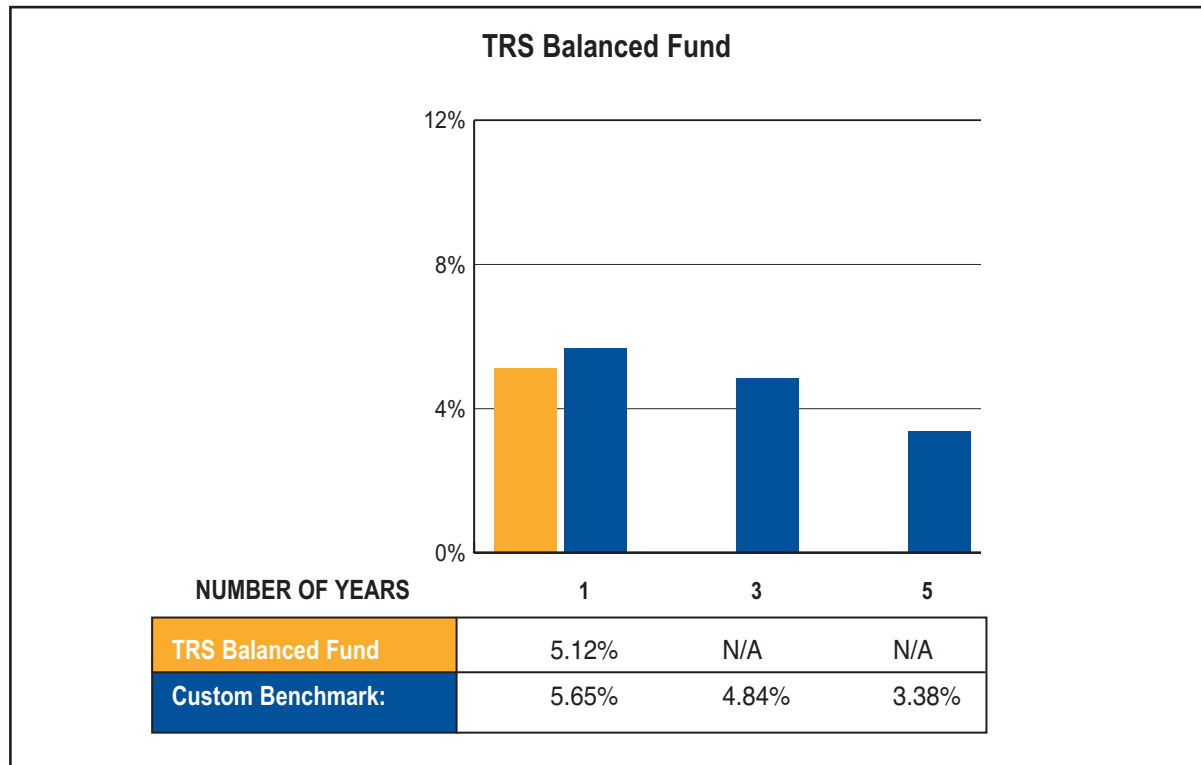


\* Reflects TRS Pension Fund's Gross Return.



**ANNUALIZED INVESTMENT RESULTS (Continued)**

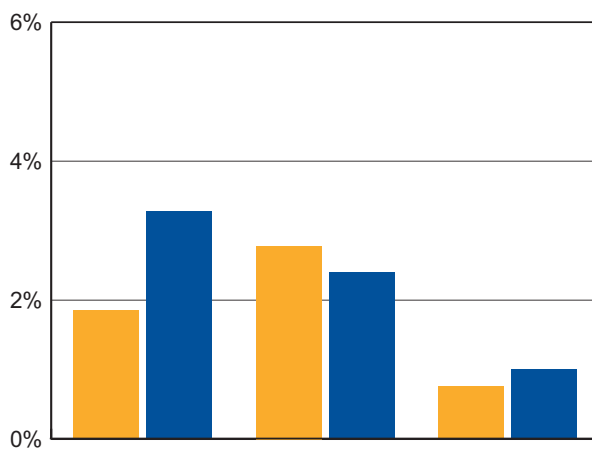
As of June 30, 2019



## ANNUALIZED INVESTMENT RESULTS

As of June 30, 2019

## TRS Inflation Protection Fund



NUMBER OF YEARS

TRS Inflation Protection

1

3

5

Benchmark: Inflation Protection  
Fund Benchmark

1.85%

2.78%

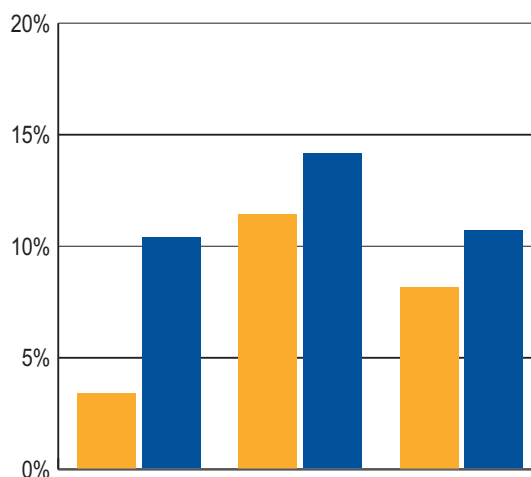
0.76%

3.27%

2.40%

1.00%

## TRS Socially Responsive Equity Fund



NUMBER OF YEARS

TRS Socially Responsive Equity

1

3

5

Benchmark:  
Standard & Poor's 500

3.40%

11.42%

8.17%

10.42%

14.19%

10.71%

**INVESTMENT SUMMARY (QPP & TDA)**

As of June 30, 2019

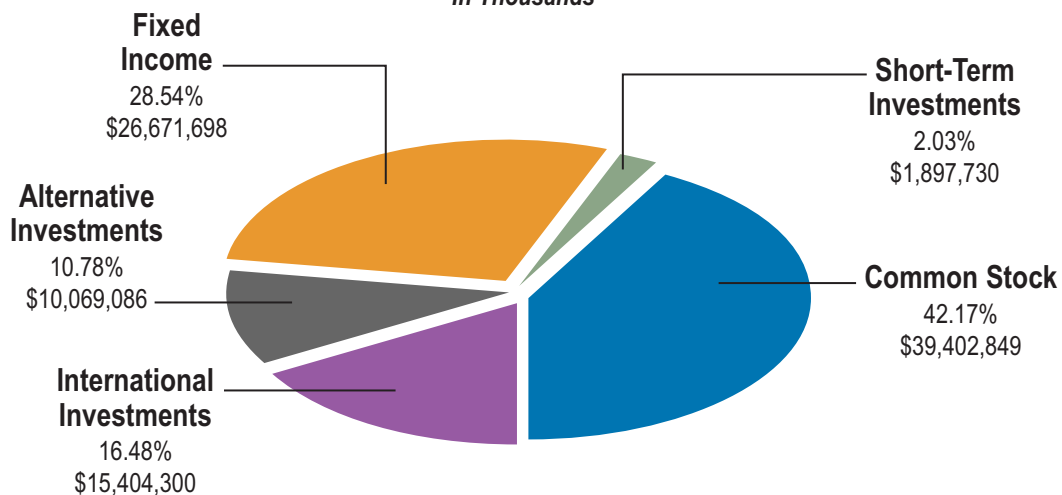
Type of Investment	Fair Value In Thousands	Percent of Total Fair Value
Fixed Income:		
Government Bonds	\$11,074,088	11.85%
Corporate and Other	11,914,295	12.75
TIPS	3,387,131	3.62
Misc. Fixed Income	296,184	0.32
<b>Total Fixed Income</b>	<b>\$ 26,671,698</b>	<b>28.54%</b>
Common Stock:		
Financial & Utility	\$8,194,348	8.77%
Basic Industry	7,309,995	7.82
Consumer & Service	13,202,964	14.13
Technological	5,189,540	5.56
Miscellaneous	5,506,002	5.89
<b>Total Common Stock</b>	<b>\$39,402,849</b>	<b>42.17%</b>
<b>International Investments</b>	<b>\$15,404,300</b>	<b>16.48%</b>
<b>Alternative/Private-Equity Investments</b>	<b>\$10,069,086</b>	<b>10.78%</b>
<b>Short-Term Investments</b>	<b>\$1,897,730</b>	<b>2.03%</b>
<b>Total Investments</b>	<b>\$93,445,663*</b>	<b>100.00%</b>

\* Excludes \$1,280,112 in securities lending.

**TOTAL INVESTMENTS ASSET ALLOCATION\***

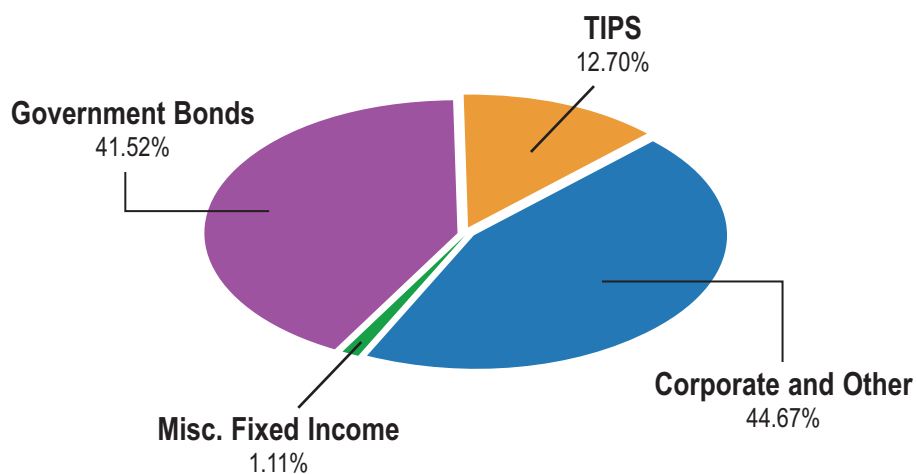
As of June 30, 2019

In Thousands

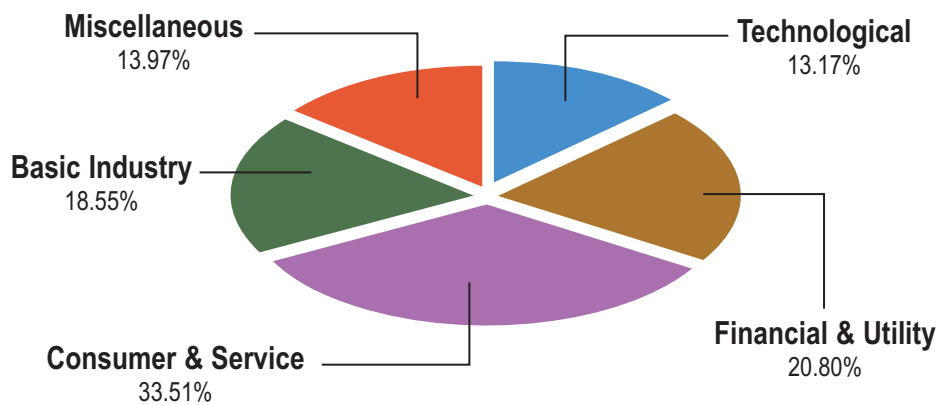


**FIXED-INCOME INVESTMENTS ASSET ALLOCATION**

As of June 30, 2019

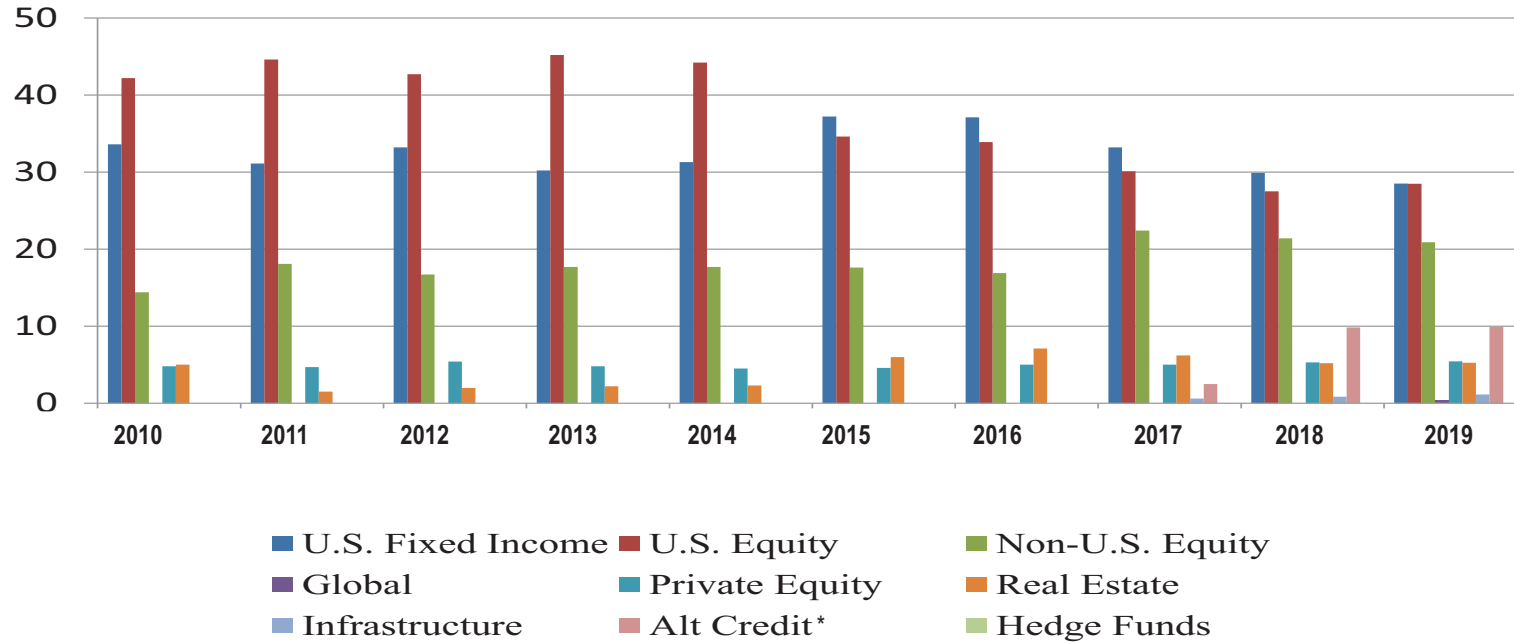
**EQUITY INVESTMENTS ASSET ALLOCATION**

As of June 30, 2019



## CHANGES IN ASSET ALLOCATION BY PERCENTAGE FOR TRS PENSION FUND OVER 10-YEAR PERIOD

June 30, 2010 – June 30, 2019



*\*For the Fiscal year 2018, Opportunistic Fixed Income has changed to Alternative Credit.*

## LIST OF LARGEST BOND ASSETS HELD (BY FAIR VALUE)

As of June 30, 2019

Par Value		Interest Rate	Due Date	Fair Value
\$391,610,000	United States Treasury Notes	3.375%	05/15/44	\$455,062,568
301,245,000	United States Treasury Notes	3.750	11/15/43	370,838,620
301,645,000	United States Treasury Notes	3.000	08/15/48	330,820,104
279,104,700	United States Treasury Notes	3.125	08/15/44	311,385,950
283,390,000	United States Treasury Notes	2.875	11/30/25	300,980,017
216,438,400	United States Treasury Notes	3.000	02/15/49	237,709,966
218,595,000	United States Treasury Notes	3.000	10/31/25	233,667,125
190,500,000	United States Treasury Notes	2.250	02/15/27	195,218,685
195,725,000	United States Treasury Notes	1.625	05/15/26	192,636,460
160,485,000	United States Treasury Notes	2.375	05/15/29	165,845,199
139,490,000	United States Treasury Notes	3.375	11/15/48	164,200,654
148,590,000	United States Treasury Notes	2.875	08/15/28	159,676,300
138,005,000	United States Treasury Notes	3.000	05/15/42	151,115,475

## LIST OF LARGEST EQUITY ASSETS HELD (BY FAIR VALUE)

As of June 30, 2019

Company Name	Shares	Fair Value
Microsoft Corp	8,068,320	\$1,080,832,147
Apple Inc	4,835,065	956,956,065
Amazon.Com Inc	434,107	822,038,038
Facebook Inc	2,548,756	491,909,908
Berkshire Hathaway Inc	2,163,546	461,203,101
Johnson & Johnson	2,811,066	391,525,272
JPMorgan Chase & Co	3,448,680	385,562,424
Alphabet Inc - CL A	328,998	356,239,034
Alphabet Inc - CL C	319,290	345,123,754
Exxon Mobil Corp	4,444,483	340,580,732
Visa Inc	1,828,478	317,332,357
The Procter & Gamble Co	2,703,439	296,432,086
Pfizer Inc	6,327,453	274,105,264
Bank Of America Corp	9,441,908	273,815,332
Unitedhealth Group Inc	1,098,726	268,100,131
The Walt Disney Co	1,905,139	266,033,610
AT&T Inc	7,663,329	256,798,155
Cisco Systems Inc	4,684,882	256,403,592
Chevron Corp	2,030,259	252,645,430
Mastercard Inc	954,702	252,547,320
Verizon Communications Inc	4,392,488	250,942,839
Home Depot Inc	1,159,305	241,100,661
Comcast Corp	5,684,418	240,337,193
Merck & Co Inc	2,860,224	239,829,782
Intel Corp	4,773,106	228,488,584

**Note:** The above tables reflect assets of both the Qualified Pension Plan (QPP) and the Tax-Deferred Annuity (TDA) Program. The complete list of assets held by TRS' six investment programs is included in the publication Investment Portfolios.

SUMMARY OF INVESTMENT MANAGERS AND FEES (QPP & TDA)			
YEAR ENDED JUNE 30, 2019			
INVESTMENT MANAGERS		QPP	TOTAL
<b>FIXED ANNUITY PROGRAM</b>			
<b>Fixed Income</b>			
Advent Capital Management	Investment Manager	\$448,716	\$448,716
Amundi Smith Breeden	Investment Manager	148,576	148,576
Barings	Investment Manager	1,451,244	1,451,244
Barrow Hanley Mewhinney Strauss	Investment Manager	742,870	742,870
Blackrock	Investment Manager	1,509,927	1,509,927
Brigade Capital Management	Investment Manager	808,226	808,226
Credit Suisse Asset Management	Investment Manager	1,017,806	1,017,806
Eaton Vance Management	Investment Manager	1,128,754	1,128,754
Gia Partners	Investment Manager	120,159	120,159
Guggenheim Partners	Investment Manager	1,404,202	1,404,202
Integrity Fixed Income Management	Investment Manager	37,230	37,230
LM Capital Group	Investment Manager	114,066	114,066
Mackay Shields	Investment Manager	862,117	862,117
Neuberger Berman Group	Investment Manager	2,782,550	2,782,550
New Century Advisors	Investment Manager	111,648	111,648
Nomura Asset Management	Investment Manager	721,965	721,965
Oaktree Capital Management	Investment Manager	1,130,065	1,130,065
Optimum Quantvest Corporation	Investment Manager	41,411	41,411
Pinebridge Investments	Investment Manager	271,253	271,253
Prudential Financial	Investment Manager	559,544	559,544
Pugh Capital Management	Investment Manager	128,860	128,860
Ramirez Asset Management	Investment Manager	107,135	107,135
Shenkman Capital Management	Investment Manager	423,056	423,056
State Street Global Advisors	Investment Manager	1,777,427	1,777,427
Stone Harbor Investment	Investment Manager	975,075	975,075
T Rowe Price	Investment Manager	3,801,001	3,801,001
Taplin Canida & Habacht	Investment Manager	277,680	277,680
Victory Capital Management	Investment Manager	289,131	289,131
Voya Investment	Investment Manager	1,083,066	1,083,066
Wells Capital Management	Investment Manager	466,282	466,282
<b>Domestic Equity</b>			
Adelante Capital Management	Investment Manager	1,054,776	1,054,776
Altravue Capital	Investment Manager	79,171	79,171
Blackrock	Investment Manager	432,776	432,776
Bowling Portfolio Management	Investment Manager	81,352	81,352
Bridge City Capital	Investment Manager	130,722	130,722
Brown Asset Management	Investment Manager	5,164,089	5,164,089
Centersquare Investment Management	Investment Manager	951,250	951,250
Cohen Steers Capital Management	Investment Manager	970,908	970,908
Dean Capital Management	Investment Manager	106,351	106,351
Essex Investment Management	Investment Manager	104,963	104,963
Lisanti Capital Growth	Investment Manager	66,390	66,390
<b>International Fund</b>			
Acadian Asset Management	Investment Manager	2,291,641	2,291,641
Algert Global	Investment Manager	215,160	215,160
Arga Investment Management	Investment Manager	213,582	213,582
Ativo Capital Management	Investment Manager	272,496	272,496

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**SUMMARY OF INVESTMENT MANAGERS AND FEES (QPP & TDA)**  
**YEAR ENDED JUNE 30, 2019 (Continued)**

INVESTMENT MANAGERS		QPP	TOTAL
Bailard Institutional	Investment Manager	\$207,874	\$207,874
Baillie Gifford	Investment Manager	13,913,716	13,913,716
Blackcrane Capital	Investment Manager	199,138	199,138
Blackrock	Investment Manager	545,044	545,044
Causeway Capital Management	Investment Manager	4,463,125	4,463,125
Change Global Investments	Investment Manager	73,164	73,164
Denali Advisors	Investment Manager	257,731	257,731
Dimensional Fund Advisors	Investment Manager	5,370,477	5,370,477
Dundas Global Investors	Investment Manager	322,382	322,382
Fidelity Institutional Asset Management	Investment Manager	1,839,741	1,839,741
Fiera Capital Corporation	Investment Manager	1,392,876	1,392,876
FIS Group	Investment Manager	1,714	1,714
Global Alpha Capital Management	Investment Manager	46,450	46,450
Haven Global Partners	Investment Manager	68,016	68,016
Henry James International Management	Investment Manager	192,138	192,138
John Hsu Capital Group	Investment Manager	56,254	56,254
Lazard Asset Management	Investment Manager	2,064,524	2,064,524
Leading Edge Investment	Investment Manager	10,058	10,058
Martin Investment Management	Investment Manager	24,435	24,435
Metis Global Partners	Investment Manager	42,043	42,043
Morgan Stanley Investment Management	Investment Manager	1,898,459	1,898,459
Osmosis Investment Management	Investment Manager	98,574	98,574
Parametric Portfolio Associate	Investment Manager	4,328,712	4,328,712
Radin Capital Partners	Investment Manager	44,957	44,957
Redwood Investments	Investment Manager	252,594	252,594
Smith Asset Management Group	Investment Manager	129,352	129,352
Sprucegrove Investment Management	Investment Manager	2,907,552	2,907,552
State Street Global Advisors	Investment Manager	490,374	490,374
T Rowe Price	Investment Manager	21	21
Walter Scott & Partners	Investment Manager	4,199,253	4,199,253
Governance For Owners Group	Fee Refund	(1,012)	(1,012)
<b>TIPS MTA Fund</b>			
Blackrock	Investment Manager	431,843	431,843
State Street Global Advisors	Investment Manager	29,529	29,529
<b>Mortgage Fund</b>			
RBC Global Asset Management	Investment Manager	266,847	266,847
AFLCIO Housing Invstmnt Trust	Investment Manager	1,113,622	1,113,622
<b>Alternative Investment</b>			
Acon Investments	Investment Manager	27,970	27,970
Actis	Investment Manager	1,421,000	1,421,000
Aermont Capital	Investment Manager	1,261,892	1,261,892
Aisling Capital	Investment Manager	2,346,607	2,346,607
Almanac Realty Investors	Investment Manager	1,392,713	1,392,713
Altaris Capital Partners	Investment Manager	109,676	109,676
American Security Partners	Investment Manager	2,153,679	2,153,679
American Value Partners	Investment Manager	76,984	76,984
Angelo Gordon	Investment Manager	1,580,176	1,580,176
Apax Partners	Investment Manager	4,119,646	4,119,646

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SUMMARY OF INVESTMENT MANAGERS AND FEES (QPP & TDA)			
YEAR ENDED JUNE 30, 2019 (Continued)			
INVESTMENT MANAGERS		QPP	TOTAL
Apollo Global Management	Investment Manager	\$7,823,923	\$7,823,923
Ardian	Investment Manager	5,427,546	5,427,546
ARES Management	Investment Manager	8,622,371	8,622,371
Arsenal Capital Partners	Investment Manager	252,409	252,409
Artemis Real Estate Partners	Investment Manager	600,388	600,388
Aurora Capital Group	Investment Manager	51,681	51,681
Avanath Capital	Investment Manager	185,359	185,359
Avenue Capital Group	Investment Manager	4,072	4,072
Avista Capital Partners	Investment Manager	29,309	29,309
Axiom Infrastructure	Investment Manager	250,649	250,649
Basis Management Group	Investment Manager	144,675	144,675
BC Partners	Investment Manager	2,033,226	2,033,226
Black Diamond Capital Partners	Investment Manager	67,228	67,228
Blackrock	Investment Manager	1,542,158	1,542,158
Blackstone	Investment Manager	2,794,709	2,794,709
Blue Wolf Capital	Investment Manager	72,864	72,864
Bridgepoint Capital	Investment Manager	3,297,371	3,297,371
Brightwood Capital Advisers	Investment Manager	1,072,241	1,072,241
Brookfield Asset Management	Investment Manager	4,771,097	4,771,097
Canyon Johnson Urban	Investment Manager	6,663	6,663
Capital Partners	Investment Manager	399,847	399,847
Capri Capital Partners	Investment Manager	582,972	582,972
Carlyle Group	Investment Manager	5,187,170	5,187,170
Carpenter Community Banc	Investment Manager	709,863	709,863
Catterton Partners	Investment Manager	163,916	163,916
CCMP Capital Advisors	Investment Manager	44,741	44,741
Centerbridge Partners	Investment Manager	950,622	950,622
City Investment Fund Associates	Investment Manager	19,341	19,341
Clarion Partners	Investment Manager	964,876	964,876
Colony Investors	Investment Manager	1,172	1,172
Constellation Growth Capital	Investment Manager	52,621	52,621
Contrarian Capital Management	Investment Manager	954,253	954,253
Craton Equity Partners	Investment Manager	63,820	63,820
Crestview Partners	Investment Manager	1,206,082	1,206,082
CVC Capital Partners	Investment Manager	4,468,894	4,468,894
Deutsche Bank	Investment Manager	488,208	488,208
Divcowest Re Investments	Investment Manager	1,410,501	1,410,501
DRA Advisors	Investment Manager	2,040,048	2,040,048
EIG Credit Management	Investment Manager	21,931	21,931
EQT Partners	Investment Manager	6,787,706	6,787,706
Exeter Property Group	Investment Manager	626,501	626,501
Fairview Capital Partners	Investment Manager	272,307	272,307
FDG Capital Partners	Investment Manager	21,324	21,324
Fortress Investment Group	Investment Manager	4,097,838	4,097,838
Freeman Spogli	Investment Manager	1,826	1,826
FTV Capital	Investment Manager	1,175,910	1,175,910
GCM Grosvenor	Investment Manager	562,776	562,776
GF Capital Management	Investment Manager	14,167	14,167
Global Infrastructure Management	Investment Manager	2,232,581	2,232,581
Goldentree Asset Management	Investment Manager	1,085,131	1,085,131
Grain Management	Investment Manager	557,695	557,695

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**SUMMARY OF INVESTMENT MANAGERS AND FEES (QPP & TDA)**  
**YEAR ENDED JUNE 30, 2019 (Continued)**

INVESTMENT MANAGERS		QPP	TOTAL
Grey Mountain Partners	Investment Manager	\$114,085	\$114,085
GSC Group	Investment Manager	9,989	9,989
GSO Capital Partners	Investment Manager	16,730	16,730
H2 Capital Partners	Investment Manager	3,087,609	3,087,609
Halyard Capital	Investment Manager	35,719	35,719
Heitman Capital Management	Investment Manager	833,466	833,466
ICV Partners	Investment Manager	510,634	510,634
Incline Equity Partners	Investment Manager	31,548	31,548
Industry Funds Management	Investment Manager	10,660,394	10,660,394
Intermedia	Investment Manager	18,259	18,259
Intermediate Capital Group	Investment Manager	598,995	598,995
Jamestown	Investment Manager	586,606	586,606
JP Morgan	Investment Manager	2,404,803	2,404,803
KKR	Investment Manager	5,625,021	5,625,021
Landmark Partners	Investment Manager	1,755,404	1,755,404
Lasalle Investment Management	Investment Manager	380,896	380,896
Leeds Equity Partners	Investment Manager	1,103,761	1,103,761
Leonard Green & Partners	Investment Manager	2,757,922	2,757,922
Levine Leichtman Capital	Investment Manager	128,372	128,372
Lexington Partners	Investment Manager	2,467,942	2,467,942
Lincolnshire Management	Investment Manager	172,718	172,718
Lone Star	Investment Manager	3,079,262	3,079,262
Maranon Capital	Investment Manager	595,850	595,850
Marathon Asset Management	Investment Manager	2,603,057	2,603,057
Metlife	Investment Manager	628,456	628,456
Midocean Partners	Investment Manager	1,729,192	1,729,192
Mill City Capital	Investment Manager	134,923	134,923
Montreux Equity Partners	Investment Manager	166,657	166,657
Nautic Partners	Investment Manager	32,278	32,278
Neuberger Berman Group	Investment Manager	57,579	57,579
New Mainstream Capital	Investment Manager	387,422	387,422
New Mountain Capital	Investment Manager	456,000	456,000
NGN	Investment Manager	158,657	158,657
Oak Hill Advisors	Investment Manager	1,998,268	1,998,268
Oaktree Capital Management	Investment Manager	1,480,513	1,480,513
Olympus Growth	Investment Manager	1,116,952	1,116,952
Onex Credit Partners	Investment Manager	904,844	904,844
Paladin	Investment Manager	320,664	320,664
Palladium Equity Partners	Investment Manager	1,795,813	1,795,813
Patriot Financial Partners	Investment Manager	525,953	525,953
Pegasus Capital Advisors	Investment Manager	1,931,379	1,931,379
Phoenix Realty Group	Investment Manager	1,067	1,067
Pine Brook Capital Partners	Investment Manager	31,155	31,155
Platinum Equity	Investment Manager	9,218,982	9,218,982
Prism Venture Partners	Investment Manager	22,110	22,110
Prologis	Investment Manager	88,665	88,665
Prudential Financial	Investment Manager	1,815,184	1,815,184
Psilos Group Partners	Investment Manager	49,143	49,143
Quaker Bioventures	Investment Manager	121,674	121,674
Related Fund Management	Investment Manager	1,623,801	1,623,801
Riverstone Carlyle Global Energy	Investment Manager	98,896	98,896

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SUMMARY OF INVESTMENT MANAGERS AND FEES (QPP & TDA) YEAR ENDED JUNE 30, 2019 (Continued)			
INVESTMENT MANAGERS		QPP	TOTAL
RLJ Equity Partners	Investment Manager	\$148,179	\$148,179
RRE Ventures	Investment Manager	39,595	39,595
SCP Partners	Investment Manager	249,055	249,055
Silverpeak Legacy Partners	Investment Manager	21,526	21,526
Siris Capital Group	Investment Manager	1,960,008	1,960,008
Snow Phipps	Investment Manager	5,802	5,802
Solera Partners	Investment Manager	102,606	102,606
Starvest Partners	Investment Manager	157,945	157,945
Stellex Capital Management	Investment Manager	460,602	460,602
Stockbridge Capital Group	Investment Manager	43,741	43,741
Stone Point Capital	Investment Manager	4,607,693	4,607,693
Taconic Investment Partners	Investment Manager	69,981	69,981
Terra Firma Investments	Investment Manager	12,922	12,922
The Hudson Companies	Investment Manager	853,415	853,415
The Raine Group	Investment Manager	524,328	524,328
The Yucaipa Group	Investment Manager	757,944	757,944
Thomas Mcnerney & Partners	Investment Manager	15,116	15,116
Thor Equities Group	Investment Manager	34,033	34,033
Torchlight Investors	Investment Manager	886,189	886,189
Trilantic Capital Partners	Investment Manager	1,823,426	1,823,426
Tristan Capital Partners	Investment Manager	1,354,196	1,354,196
UBS Asset Management	Investment Manager	1,099,045	1,099,045
Urban America Advisors	Investment Manager	51,963	51,963
USAA Real Estate	Investment Manager	591,632	591,632
Valor Equity Partners	Investment Manager	848,257	848,257
Vanbarton Group	Investment Manager	1,991,263	1,991,263
Vista Equity Partners	Investment Manager	19,500,351	19,500,351
Warburg Pincus	Investment Manager	6,067,896	6,067,896
Webster Capital	Investment Manager	236,549	236,549
Welsh Carson Anderson & Stowe	Investment Manager	3,401,899	3,401,899
Westbrook Partners	Investment Manager	931,305	931,305
Ernst and Young	Purchase Fees	38,949	38,949
Pricewaterhouse Coopers Taiwan	Purchase Fees	14,268	14,268
SSB - Tax adjustments	Purchase Fees	112	112
Bryan Cave	Legal Fees	1,164	1,164
Cox Castle Nicholson	Legal Fees	27,022	27,022
Day Pintney	Legal Fees	34,306	34,306
Foley & Lardner	Legal Fees	20,102	20,102
Foster Pepper	Legal Fees	44,681	44,681
Hitchcock	Legal Fees	3,610	3,610
Morgan Lewis Bockius	Legal Fees	108,647	108,647
Nixon Peabody	Legal Fees	3,547	3,547
Pillsbury Winthrop Shaw Pittman	Legal Fees	25,231	25,231
Reinhart Boerner Van Dueren	Legal Fees	76,037	76,037
Seward Kissel	Legal Fees	913	913
Squire Patton Boggs	Legal Fees	22,336	22,336
Aksia	Consultant Fees	1,726	1,726
BAM - Subscriptions	Consultant Fees	15,479	15,479
Courtland Partners	Consultant Fees	100,151	100,151

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**SUMMARY OF INVESTMENT MANAGERS AND FEES (QPP & TDA)**  
**YEAR ENDED JUNE 30, 2019 (Continued)**

INVESTMENT MANAGERS		QPP	TDA	TOTAL
Hamilton Lane Advisors	Consultant Fees	\$1,000,000		\$1,000,000
Institutional Shareholders Services	Consultant Fees	481		481
Mercer Investment Advisors	Consultant Fees	73,496		73,496
MSCI Barra	Consultant Fees	296,120		296,120
MSCI ESG Research	Consultant Fees	34,669		34,669
MSCI Investment Property Databank	Consultant Fees	100,766		100,766
NYC Office of Comptroller - BAM	Consultant Fees	6,022,251		6,022,251
Rocaton Investment	Consultant Fees	547,083		547,083
Shareholder Research Services	Consultant Fees	275,478		275,478
Stepstone Group	Consultant Fees	582,636		582,636
The Burgiss Group	Consultant Fees	102,348		102,348
<b>DIVERSIFIED EQUITY FUND AND INTERNATIONAL EQUITY FUND</b>			<b>TDA</b>	
Acadian Asset Management	Investment Manager	\$238,969	\$267,698	\$506,667
Advent Capital Management	Investment Manager	552,621	619,058	1,171,679
Amalgamated Bank	Investment Manager	24,839	27,826	52,665
Analytic Investors	Investment Manager	212,981	238,586	451,567
Baillie Gifford	Investment Manager	378,372	423,860	802,232
Blackrock	Investment Manager	325,656	364,806	690,462
Cardinal	Investment Manager	324,553	363,571	688,124
Clearbridge Investments	Investment Manager	431,968	483,899	915,867
Diamond Hill Capital Management	Investment Manager	115,207	129,057	244,264
GMO	Investment Manager	1,273	1,426	2,699
Invesco	Investment Manager	244,982	274,434	519,416
MCM	Investment Manager	155,470	174,161	329,631
MFS Investment Advisors Intl Equity	Investment Manager	373,803	418,742	792,545
New South Capital Management	Investment Manager	734,967	823,326	1,558,293
Pyramis Global	Investment Manager	282,494	316,456	598,950
Shapiro Capital Management	Investment Manager	791,535	886,693	1,678,228
Sound Shore Management	Investment Manager	306,329	343,156	649,485
Sprucegrove Investment Management	Investment Manager	167,557	187,700	355,257
Walter Scott & Partners	Investment Manager	327,154	366,485	693,639
Wasatch Advisors	Investment Manager	642,164	719,365	1,361,529
Wellington Management	Investment Manager	213,086	238,703	451,789
Zazove Conv Bond	Investment Manager	32,155	36,021	68,176
Groom Law Group	Legal Fees	17,025	36,856	53,881
eVestment Alliance	Consultant Fees	5,665	12,263	17,928
Rocaton Investment Advisors	Consultant Fees	202,644	296,712	499,356
Broadridge Financial Solutions	Data Services	41,344	87,136	128,480
Supporting Services	Travel & Other	14,877	32,205	47,082
JPMorgan Chase Bank	Custodian Bank	357,971	401,007	758,978
<b>BALANCED FUND</b>				
Groom Law Group	Legal Fees	355	1,605	1,960
eVestment Alliance	Consultant Fees	118	534	652
Rocaton Investment Advisors	Consultant Fees	2,288	9,776	12,064
Broadridge Financial Solutions	Data Services	740	3,351	4,091
Supporting Services	Travel & Other	310	1,403	1,713
JPMorgan Chase Bank	Custodian Bank	171	912	1,083

Continued on page 106

SUMMARY OF INVESTMENT MANAGERS AND FEES (QPP & TDA)				
YEAR ENDED JUNE 30, 2019				
INVESTMENT MANAGERS		QPP	TDA	TOTAL
<b>INFLATION PROTECTION FUND</b>				
Fidelity Strategic R. Fund	Mutual Fund	-	-	-
Groom Law Group	Legal Fees	\$32	\$151	\$183
eVestment Alliance	Consultant Fees	10	50	60
Rocaton Investment Advisors	Consultant Fees	156	1,924	2,080
Broadridge Financial Solutions	Data Services	66	315	381
Supporting Services	Travel & Other	28	132	160
JP Morgan Chase Bank	Custodian Bank	15	276	291
<b>SOCIALLY RESPONSE EQUITY FUND</b>				
Neuberger Berman Group	Investment Manager	84,960	925,633	1,010,593
Groom Law Group	Legal Fees	34	223	257
eVestment Alliance	Consultant Fees	11	74	85
Rocaton Investment Advisors	Consultant Fees	416	6,084	6,500
Broadridge Financial Solutions	Data Services	70	465	535
Supporting Services	Travel & Other	30	195	225
JP Morgan Chase Bank	Custodian Bank	223	2,430	2,653
<b>Investment Expenses</b>	<b>Subtotal:</b>	<b>\$307,370,202</b>	<b>\$9,526,741</b>	<b>\$316,896,943</b>
Provision for Administrative Expenses	Administrative Fees	8,174,796	12,186,239	20,361,035
Reserve Transfer to				
Administrative expenses	Fund Transfer	(14,107,701)	(23,536,544)	(37,644,245)
<b>Net (decrease) in variable expense provision</b>	<b>Subtotal:</b>	<b>(\$5,932,905)</b>	<b>(\$11,350,305)</b>	<b>(\$17,283,210)</b>
<b>Total Investment Expenses</b>		<b>\$301,437,297</b>	<b>(\$1,823,564)</b>	<b>\$299,613,733</b>

**SCHEDULE OF PAYMENTS OF COMMISSIONS TO BROKERS (PENSION FUND)**  
**FISCAL YEAR ENDED JUNE 30, 2019**

<b>BROKERAGE FIRM</b>	<b>NO. OF SHARES TRADED</b>	<b>COMMISSION PER SHARE</b>	<b>COMMISSION PAID</b>
Abel Noser	452,797	\$0.05	\$21,847
ABG Securities AS (Stockholm)	44,224	0.01	471
ABG Securities Limited	31,458	0.00	85
Actinver Casa De Bolsa SA De CV	23,800	0.00	50
Anand Rathi Share and Stock Bkr LTD	37,080	0.01	516
Arqaam Capital South Africa	603,736	0.00	2,315
Arqaam Securities LLC	149,863	0.00	652
Autonomous Research LLP	76,959	0.04	3,097
Autrepat-Div Re	122,450	0.01	1,788
Baader Bank AG	30,968	0.03	955
Banco Bice	227,959	0.01	1,190
Banco Itau SA	296,279	0.01	2,378
Banco Modal SA	60,260	0.01	338
Banco Pactual SA	152,200	0.00	575
Banco Santander Central Hispano	332,426	0.03	11,058
Bank JVentobel Und Co AG	60,940	0.16	9,607
Bank of America Corporation	380,783	0.02	8,792
Bank of America Merrill Lynch Secur Inc	3,787,139	0.00	18,051
Banque Paribas	17,703	0.02	360
Barclays Capital	3,642,497	0.01	40,635
Barclays Capital Inc	270,983	0.03	7,617
Barclays Capital Inc/Le	2,108,490	0.01	10,833
Barclays Capital Le	646,082	0.04	25,040
Barclays Capital Securities LTD	3,700	0.03	112
Bloomberg Tradebook LLC	36,042	0.03	1,054
BMO Capital Markets	151,843	0.03	3,988
BNP Paribas Securities (Asia) LTD	2,200	0.01	31
BNP Paribas Securities India Private Lim	20,944	0.07	1,467
BNP Paribas Securities Services	9,670,779	0.00	33,229
BNP Paribas Securities Services Austr Br	22,400	0.00	88
BNP Paribas Securities Services SA	205,360,085	0.00	150,944
BOFA Securities Inc	30,806,346	0.01	228,427
Bradesco SA CTVM	2,867,756	0.00	12,363
B. Riley & Co, LLC	38,216	0.02	764
BTG Pactual Chile SA Corredores De Bolsa	2,496,192	0.00	355
BTIG, LLC	174,237	0.02	3,952
Cabrera Capital Markets LLC	410,560	0.00	1,536
Canaccord Genuity Inc	172,806	0.04	6,446
Canadian Imperial Bank of Commerce	1,466,592	0.00	6,691
Cantor Fitzgerald & Co	198,276	0.02	4,036
Cantor Fitzgerald Europe	1,700	0.01	20
Cantor Fitzgerald/Cantor Clearing Serv	1,964,592	0.02	45,443
Capital Institutional Svcs Inc Equities	5,650	0.02	113
Carnegie AS	100,268	0.04	3,689
Carnegie Investment Bank AB	61,518	0.01	659
Carnegie Securities Finland	107,970	0.04	4,764
CastleOak Securities	8,500	0.01	99
China International Capital Co	317,200	0.01	2,218
CIBC World Mkts Inc	255,655	0.02	5,130

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**SCHEDULE OF PAYMENTS OF COMMISSIONS TO BROKERS (PENSION FUND)**  
**FISCAL YEAR ENDED JUNE 30, 2019 (Continued)**

BROKERAGE FIRM	NO. OF SHARES TRADED	COMMISSION PER SHARE	COMMISSION PAID
CIMB Securities (HK) LTD	21,500	\$0.01	\$193
CIMB-GK Securities Pte LTD	44,045	0.01	639
Citation Group	19,620	0.03	680
Citibank Mexico	608,850	0.00	1,205
Citibank NA	4,200	0.01	29
Citibank NA Istanbul	295,000	0.00	1,245
Citibank NA Lima	73,403	0.01	447
Citibank NA Spain	3,315	0.02	61
Citibank of Colombia	438,216	0.01	2,879
Citigroup Global Markets Australia Pty	229,794	0.01	1,498
Citigroup Global Markets Inc	10,510,142	0.01	60,137
Citigroup Global Markets India	661,840	0.01	7,348
Citigroup Global Markets Limited	29,468,221	0.01	160,653
Citigroup Global Markets Taiwan	9,919,316	0.00	5,147
Citigroup Global Market Korea Secs LTD	880,538	0.01	7,220
CL Securities Taiwan Company Limited	34,870,325	0.00	61,304
CLSA Americas	8,000	0.04	320
CLSA Australia Pty LTD	1,767,363	0.00	5,013
CLSA Securities Korea LTD	979,257	0.02	22,041
CLSA Securities Malaysia Sdn Bhd	1,820,600	0.00	1,379
CLSA Singapore Pte LTD	8,073,155	0.01	67,153
COL Financial Group, Inc	2,290,000	0.00	241
Commerce Intl Merchant Bankers	14,400	0.00	38
Commercial Bank of Qatar, LTD	165,741	0.01	1,130
Convergex LLC	31,600	0.02	474
Cornerstone Macro LLC	18,975	0.05	949
Cowen and Company, LLC	556,676	0.03	14,194
Cowen Execution Services LLC	40,981,700	0.01	217,203
Craig - Hallum	75,749	0.04	3,405
Credibolsa Sociedad Agente	1,803,296	0.01	9,463
Credicorp Capital Colombia SA	3,635,778	0.00	16,117
Credit Lyonnais Securities (Asia)	47,843,254	0.00	16,328
Credit Lyonnais Securities (India)	7,859,712	0.00	33,614
Credit Suisse First Boston	36,213,456	0.00	28,833
Credit Suisse First Boston (Europe)	97,745	0.11	10,507
Credit Suisse First Boston SA Ctvm	354,700	0.01	4,457
Credit Suisse Secs India Private LTD	460,679	0.01	3,822
Credit Suisse Securities (Europe) LTD	17,505,022	0.00	58,830
Credit Suisse Securities (USA) LLC	39,315,032	0.00	149,697
Crest Depository Limited	49,000	0.01	388
CS First Boston (Hong Kong) Limited	1,253,100	0.00	5,971
CSFB Australia Equities LTD	561,775	0.00	1,234
Daiwa SBCM Europe	408,800	0.04	17,707
Daiwa Securities (HK) LTD	196,500	0.00	750
Daiwa Securities America Inc	723,509	0.06	45,422
Daiwa Securities Company LTD	8,300	0.01	75
Danareska Securities, Pt	13,257,800	0.00	3,376
Danske Bank	55,300	0.01	361
Danske Bank AS	21,774	0.01	134
Davy Stockbrokers	377,880	0.01	5,592

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**SCHEDULE OF PAYMENTS OF COMMISSIONS TO BROKERS (PENSION FUND)**  
**FISCAL YEAR ENDED JUNE 30, 2019 (Continued)**

BROKERAGE FIRM	NO. OF SHARES TRADED	COMMISSION PER SHARE	COMMISSION PAID
DBS Vickers (Hong Kong) Limited	109,000	\$0.02	\$1,927
DBS Vickers Securities (Singapore)	822,000	0.01	5,854
DBS Vickers Securities (Thailand)	434,300	0.00	67
Den Norske Bank	32,747	0.00	133
Deutsche Bank AG	1,023,500	0.00	1,326
Deutsche Bank AG London	847,637	0.01	6,164
Deutsche Bank Securities Inc	3,004,208	0.01	22,366
Deutsche Eq In Prvt Lim Db	159,627	0.01	1,224
Deutsche Morgan Grenfell Secs	622,346	0.00	2,584
Deutsche Securities Asia LTD	725,540	0.01	3,982
Deutsche WertpapierService Bank AG	2,095	0.34	711
Dolat Capital Markets LTD	46,250	0.01	346
Dougherty & Company LLC	47,514	0.03	1,578
DSP Merrill Lynch LTD	2,638,201	0.01	36,401
Dupont Gilbert SA	6,590	0.21	1,355
Edelweiss Securities Pvt LTD	2,092	0.01	28
EFG Eurobank Securities SA	16,241	0.02	386
Emkay Global Financial Svcs LTD	81,000	0.02	1,576
Erste Bank Befektetesi Rt	34,304	0.06	1,971
Euroclear Bank SA NV	10,000	0.02	240
Euromobiliare Sim SPA	47,155	0.02	765
Evercore Group LLC	157,068	0.02	3,592
Exane SA	1,341,992	0.04	50,473
Fidelity Capital Markets	3,976	0.03	119
Fidelity Clearing Canada	161,241	0.02	2,431
Financial Brokerage Group	10,204,800	0.01	110,899
Flow Corretora De Mercadorias LTDa	10,047,132	0.00	38,297
Fubon Securities Co LTD	116,230	0.00	351
Goldman Sachs & Co Intl	129,300	0.00	485
Goldman Sachs & Co LLC	41,971,153	0.00	205,796
Goldman Sachs (Asia) LLC	2,290,324	0.00	4,554
Goldman Sachs (India)	2,631,778	0.00	4,680
Goldman Sachs Australia Pty LTD	914,175	0.00	2,592
Goldman Sachs Do Brasil Corretora	1,210,343	0.00	4,744
Goldman Sachs International	5,936,192	0.01	33,124
Goodbody Stockbrokers	560,832	0.00	1,547
Green Street Trading, LLC	429,193	0.04	16,097
Hilltop Securities Inc	8,487	0.04	339
Hongkong and Shanghai Banking Corporation	25,000	0.00	19
HSBC Bank Australia Limited	53,360	0.02	894
HSBC Bank PLC	31,167,506	0.00	144,371
HSBC Bank USA	61,721	0.00	257
HSBC Brokerage (USA) Inc	72,739	0.01	664
HSBC Securities (USA) Inc	20,984,943	0.00	8,673
HSBC Securities India Holdings	320,887	0.00	1,495
Hyundai Securities	5,606	0.05	259
ICBCFS LLC	33,877	0.02	700
ICICI Brokerage Services	8,176,911	0.00	10,148
IM Trust SA Corredores De Bolsa	81,965,837	0.00	30,365
India Infoline LTD	54,938	0.01	384

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**SCHEDULE OF PAYMENTS OF COMMISSIONS TO BROKERS (PENSION FUND)**  
**FISCAL YEAR ENDED JUNE 30, 2019 (Continued)**

BROKERAGE FIRM	NO. OF SHARES TRADED	COMMISSION PER SHARE	COMMISSION PAID
Instinet	1,018,917	\$0.01	\$7,684
Instinet Australia Clearing Srvcs Pty LTD	5,113,861	0.00	14,644
Instinet LLC	15,848,751	0.00	48,085
Instinet Pacific Limited	99,497,602	0.00	64,521
Instinet Singapore Services Pt	4,664,351	0.00	11,574
Instinet UK LTD	39,652,742	0.01	284,006
Interfund Transfer	37,800	0.01	449
Investec Bank PLC	961,511	0.00	3,103
Investec Securities LTD	560,042	0.00	958
Investment Technology Group Inc	1,201,043	0.02	29,125
Investment Technology Group LTD	10,109,440	0.01	71,310
Ipopema Securities SA	39,293	0.04	1,416
Is Yatirim Menkul Degerler AS	2,674,689	0.00	3,832
ISI Group Inc	921,309	0.04	33,770
ITG Australia LTD	43,555,496	0.00	32,578
ITG Canada	429,866	0.01	3,280
ITG Inc	675,588	0.00	980
Ivy Securities, Inc	1,547,808	0.04	64,326
Ixe Casa De Bolsa SA De CV	259,300	0.00	673
Jefferies & Company Inc	4,180,522	0.01	51,197
Jefferies India Private Limited	4,003,736	0.00	17,617
Jefferies International LTD	61,069,568	0.00	32,258
JMP Securities	10,001	0.03	300
Joh Berenberg, Gossler & Co KG	2,557,926	0.01	27,925
Jonestrading Institutional Services LLC	1,438,896	0.02	25,529
JP Morgan Clearing Corp	1,695,324	0.02	26,257
JP Morgan India Private LTD	2,273,275	0.00	11,304
JP Morgan Securities (Asia Pacific) LTD	58,793,565	0.00	28,230
JP Morgan Securities (Australia) LTD	2,870,082	0.00	3,854
JP Morgan Securities (Taiwan) LTD	16,445,896	0.00	7,758
JP Morgan Securities Asia Pte Limited	11,800	0.02	192
JP Morgan Securities Inc	10,588,078	0.00	24,271
JP Morgan Securities Indonesia	1,960,966	0.00	1,003
JP Morgan Securities Limited	241,239	0.03	6,932
JP Morgan Securities LLC	1,458,614	0.03	40,735
JP Morgan Securities PLC	20,257,611	0.01	153,686
JP Morgan Securities Singapore	897,537	0.00	1,319
JPMorgan Securities (Far East) LTD Seoul	487,856	0.01	4,425
Jyske Bank AS	2,335	0.09	205
KAS-Associatie NV	7,101	0.01	84
Kempen & Co NV	12,900	0.01	173
Kepler Equities Paris	228,313	0.03	7,526
Keybank Capital Markets Inc	261,821	0.03	8,114
KGI Securities Co LTD	224,000	0.00	899
Kim Eng Securities (HK) LTD	522,643	0.01	4,543
King (C.L.) & Associates, Inc	119,876	0.04	4,602
Korea Investment And Securities Co, LTD	623,493	0.03	16,259
Kotak Securities LTD	4,444,848	0.01	34,275
KT Zmico Securities Company Limited	14,300	0.05	724
Larrain Vial	4,001,327	0.00	2,922

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**SCHEDULE OF PAYMENTS OF COMMISSIONS TO BROKERS (PENSION FUND)**  
**FISCAL YEAR ENDED JUNE 30, 2019 (Continued)**

BROKERAGE FIRM	NO. OF SHARES TRADED	COMMISSION PER SHARE	COMMISSION PAID
Liberum Capital Limited	16,100	\$0.02	\$318
Liquidnet Canada Inc	8,000	0.00	27
Liquidnet Europe Limited	53,116	0.07	3,476
Liquidnet Inc	2,175,473	0.02	46,116
Loop Capital Markets	9,200,848	0.02	156,679
Loop Capital Markets LLC	4,649,054	0.00	18,038
Luminex Trading and Analytics LLC	8,293	0.01	83
Macquarie Bank Limited	43,924,618	0.00	65,969
Macquarie Capital (Europe) LTD	92,844	0.01	934
Macquarie Capital (USA) Inc	177,412	0.02	4,017
Macquarie Sec NZ LTD	102,560	0.00	218
Macquarie Securities (India) Pvt LTD	414,590	0.00	881
Macquarie Securities (USA) Inc	5,798	0.04	232
Macquarie Securities Korea Limited	218,503	0.01	1,840
Mainfirst Bank De	76,543	0.04	3,298
Mandarin Securities Corp	14,710	0.00	13
Maybank Kim Eng Securities Pte LTD	1,130,500	0.00	565
Mediobanca Spa	196,803	0.01	2,688
Mellon Bank Na	15,900	0.02	244
Merrill Lynch	65,164	0.05	3,258
Merrill Lynch Equities (Australia)	3,500	0.00	13
Merrill Lynch Far East LTD	55,200	0.00	99
Merrill Lynch International	60,566,708	0.00	181,788
Merrill Lynch Intl London	39,400	0.00	89
Merrill Lynch Pierce Fenner & Smith	14,691,903	0.00	29,998
Mirabaud Securities LLP	36,604	0.11	3,979
Mirae Asset Daewoo Co, LTD	128,506	0.10	12,298
Mirae Asset Sec USA	73,789	0.03	1,853
Mischler Financial Group	26,245	0.01	266
Mitsubishi UFJ Securities (USA)	484,443	0.05	25,675
Mitsubishi UFJ Securities Int PLC	22,400	0.07	1,460
Mizuho International PLC	37,300	0.03	1,103
Mizuho Securities Asia Limited	4,600	0.06	281
Mizuho Securities USA Inc	295,863	0.05	16,164
MKM Partners LLC	339,536	0.04	13,274
Morgan Stanley and Co International	17,880,532	0.00	57,830
Morgan Stanley Co Incorporated	56,666,454	0.00	168,525
Morgan Stanley Dean Witter Australia	442,708	0.00	744
Morgan Stanley India Company Pvt LTD	4,254,457	0.00	8,791
Morgan Stanley Taiwan Limited	5,776,000	0.00	13,835
National Financial Services Corporation	440,479	0.02	6,939
National Financial Services LLC	9,437	0.02	216
Needham and Company LLC	189,415	0.04	8,056
Nesbitt Burns	197,974	0.01	2,670
NH Investment and Securities Co LTD	279,307	0.02	5,184
Nomura Financial Advisory & Sec India	5,122,373	0.00	15,633
Nomura Securities International Inc	72,701	0.02	1,409
Nordea Bank AB (Publ), Finnish Branch	162,400	0.01	887
Nordea Bank Sweden AB (Publ)	5,917	0.01	47
North South Capital LLC	35,270	0.02	751

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**SCHEDULE OF PAYMENTS OF COMMISSIONS TO BROKERS (PENSION FUND)**  
**FISCAL YEAR ENDED JUNE 30, 2019 (Continued)**

BROKERAGE FIRM	NO. OF SHARES TRADED	COMMISSION PER SHARE	COMMISSION PAID
Northland Securities Inc	11,947	\$0.04	\$478
Numis Securities Inc	158,771	0.01	1,088
Numis Securities Limited	260,327	0.01	3,240
ODDO Cie	1,910	0.02	37
ODDO Et Cie	26,573	0.03	892
Oppenheimer & Co Inc	3,875	0.05	194
OSK Securities (Thailand) Public Company	31,760	0.01	353
Parel	372,635	0.02	6,728
Paribas	4,600	0.02	73
Pavilion Global Markets LTD	791,555	0.01	5,727
Peel Hunt LLP	5,558,275	0.00	1,046
Penserra Securities	3,234,529	0.02	67,364
Penserra Securities LLC	6,780,262	0.00	15,209
Pershing LLC	375,176,822	0.00	171,274
Pershing Securities Limited	256,403	0.02	4,129
Pictet and Cie	36,232	0.01	489
Piper Jaffray & Co	104,972	0.04	4,077
Raiffeisen Zentralbank Oesterreich AG	850,176	0.02	16,526
Raymond James and Associates Inc	655,536	0.03	21,218
Raymond James LTD	195,204	0.02	3,385
RBC Capital Markets LLC	747,910	0.02	14,740
RBC Dominion Securities Corporation	277,637	0.02	5,594
RBC Dominion Securities Inc	1,814,342	0.01	14,860
Redburn (Europe) Limited	3,093,905	0.01	37,206
RHB Investment Bank Berhad	920,100	0.00	1,682
Robert W. Baird Co Incorporated	1,158,006	0.02	27,635
Royal Bank Of Canada Europe LTD	1,541,954	0.01	15,601
Samsung Securities Co LTD	66,589	0.02	1,309
Sanford C Bernstein LTD	6,132,301	0.01	83,212
SBICAP Securities Limited	39,869	0.02	882
Scotia Capital (USA) Inc	73,751	0.01	384
Scotia Capital Inc	107,800	0.01	633
Seaport Group Securities LLC	130,335	0.02	1,955
Securities Services Nominees	493,097	0.01	2,497
SG Americas Securities LLC	11,988,864	0.00	6,271
SG Asia Securities (India) Pvt LTD	4,051,028	0.00	9,416
SG Securities (London) LTD	7,734,060	0.00	3,479
SG Securities HK	39,713,895	0.00	13,823
Sidoti & Company LLC	7,981	0.03	239
Sigma Securities SA	14,901	0.00	72
Singer Capital Markets Limited	52,020	0.02	817
Skandinaviska Enskilda Banken	16,429	0.02	360
Skandinaviska Enskilda Banken London	27,878	0.01	312
Skandinaviska Enskilda Banken A/S	7,920	0.06	442
SMBC Nikko Capital Markets Limited	1,213,800	0.03	39,391
SMBC Nikko Securities (Honk Kong) LTD	127,925	0.01	1,448
SMBC Securities Inc	326,526	0.01	2,567
Societe Generale	1,886,852	0.00	7,373
Societe Generale London Branch	8,509,593	0.01	51,020
Stephens Inc	159,321	0.04	7,167

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**SCHEDULE OF PAYMENTS OF COMMISSIONS TO BROKERS (PENSION FUND)**  
**FISCAL YEAR ENDED JUNE 30, 2019**

<b>BROKERAGE FIRM</b>	<b>NO. OF SHARES TRADED</b>	<b>COMMISSION PER SHARE</b>	<b>COMMISSION PAID</b>
Stifel Nicolaus & Co Inc	644,182	\$0.03	\$17,832
Stifel Nicolaus Europe Limited	19,284	0.01	248
Suntrust Capital Markets, Inc	79,342	0.04	2,972
Svenska Handelsbanken	8,369	0.01	93
Telsey Advisory Group LLC	41,665	0.05	2,083
The Fig Group, LLC	96,200	0.01	1,296
The Hongkong and Shanghai Bank	1,269,816	0.01	7,625
Toronto Dominion Securities Inc	1,233,700	0.01	6,981
UBS AG	49,648,446	0.00	144,571
UBS AG London	43,154,952	0.00	11,042
UBS Limited	27,487,273	0.00	124,913
UBS Securities Asia LTD	8,336,801	0.00	25,240
UBS Securities Canada Inc	1,622,413	0.01	11,969
UBS Securities India Private LTD	2,503,965	0.01	16,558
UBS Securities LLC	2,641,778	0.00	11,864
UBS Securities Pte LTD	5,801,926	0.00	28,746
UBS Securities Pte LTD, Seoul	495,284	0.04	21,240
UBS Warburg Australia Equities	4,046,611	0.00	4,444
UOB Kay Hian Pte Limited	425,666	0.00	691
US Bancorp Investments Inc	103,350	0.01	1,048
Virtu Americas LLC	396,058	0.03	12,179
Wall Street Access	30,600	0.03	918
Weeden & Co	3,552,648	0.03	103,661
Wells Fargo Securities, LLC	703,310	0.03	19,971
William Blair & Company LLC	327,465	0.04	13,419
Williams Capital Group LP (The)	10,077,826	0.01	62,562
Wilson HTM LTD	4,418	0.00	14
Winterflood Securities LTD	55,700	0.00	125
Wolfe Trahan Securities	48,335	0.03	1,560
XP Investments Cctvm SA	51,900	0.01	333
Yuanta Securities Co, LTD	1,114,000	0.00	1,755
Zannex Securities	821,500	0.00	722

**SCHEDULE OF PAYMENTS OF COMMISSIONS TO BROKERS (VARIABLE-RETURN FUNDS)**  
**FISCAL YEAR ENDED JUNE 30, 2019**

<b>BROKERAGE FIRM</b>	<b>NO. OF SHARES TRADED</b>	<b>COMMISSION PER SHARE</b>	<b>COMMISSION PAID</b>
Abel Noser	8,475,325	\$0.03	\$257,940
ABG Securities AS (Stockholm)	9,000	0.01	97
B. Riley & Co, LLC	258,883	0.03	6,895
Banco Pactual SA Rio De Janeiro	274,603	0.00	1,248
Banco Santander SA New York	21,043	0.05	957
Bank J Vontobel Und Co	11,080	0.14	1,543
Bank Of America Merrill Lynch Securities	171,850	0.00	475
Bank Of Americas Securities Inc	929,101	0.00	633
Barclays Bank London	683,550	0.01	6,028
Barclays Bank PLC New York	5,597	0.01	73
Barclays Capital Inc	22,694	0.01	179
Barclays Capital Inc/Le	126,209	0.01	1,798
Barclays Capital Le	1,531,152	0.02	25,974
Barclays Capital Securities LTD	8,249	0.01	73
Baypoint Trading LLC	1,452,554	0.03	37,159
Berenberg Bank Hamburg	386,845	0.01	2,287
Bloomberg Tradebook LLC	104,762	0.03	3,143
Bmo Capital Markets Corp	386,108	0.02	7,310
BNP Paribas Securities (Asia) LTD	46,439	0.03	1,444
BNP Paribas Securities Services	583,155	0.01	6,161
BNP Paribas Security Svcs London	311,345	0.00	446
BNY Convergenx Execution Solutions	686,117	0.01	4,837
Bradesco SA	1,190,672	0.00	5,034
Broad Court Cap Corp Sub Div Merrill	178,700	0.03	5,362
Caceis Bank Deutschland GMBH	1,240	0.12	152
Cantor Clearing Services	5,648	0.02	113
Cantor Fitzgerald & Co Inc	4,634,172	0.01	54,445
Cantor Fitzgerald Europe	300	0.01	4
Cantor Fitzgerald/Mis Brokers	32,000	0.02	640
Carnegie AS	3,230	0.06	193
Carnegie Secs Helsinki	14,460	0.04	635
Celfin Capital Sa Corredores De Bolsa	80,836	0.00	42
China Intl Capital Corp Hk Secs LTD	214,000	0.00	216
CIBC London	19,290	0.02	421
CIBC World Markets Toronto	1,500	0.01	9
CIMB Investment Bank Berhad	3,325	0.00	4
CIMB-GK Securities Pte LTD	54,600	0.00	42
Citadel Securities Institutional LLC	455,903	0.01	2,280
Citigroup Global Markets Inc	3,040,628	0.01	35,059
Citigroup Global Markets Limited	3,069,529	0.00	10,940
Citigroup Global Mkt Ind Pvt LTD	148,478	0.00	557
Citigroup Global Mkt Secs LTD	49,380	0.01	312
Citigroup Global Mkts Australia Pty	5,393	0.01	72
Citigroup Pty Limited	64,962	0.01	560
CLSA Australia Pty LTD	107,190	0.00	310
CLSA India LTD	168,245	0.01	1,723
CLSA LTD Hong Kong	1,188,600	0.00	1,144
CLSA Singapore Pte LTD	366,968	0.01	1,923
Collins Stewart LLC	20,533	0.02	410
Compass Point Research & Trading	9,553	0.04	382

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**SCHEDULE OF PAYMENTS OF COMMISSIONS TO BROKERS (VARIABLE-RETURN FUNDS)**  
**FISCAL YEAR ENDED JUNE 30, 2019 (Continued)**

BROKERAGE FIRM	NO. OF SHARES TRADED	COMMISSION PER SHARE	COMMISSION PAID
Convergex LLC	183,850	\$0.02	\$3,677
Cornerstone Macro LLC	671	0.02	13
Cowen And Company LLC	1,879,431	0.03	52,337
Craig - Hallum	413,428	0.02	9,895
Credit Lyonnais Sec (USA) Inc NY	16,000	0.00	44
Credit Lyonnais Sec Seoul	23,220	0.07	1,537
Credit Lyonnais Secs (Asia) Taipei	146,000	0.01	1,149
Credit Lyonnais Secs Singapore	136,996	0.02	2,560
Credit Suisse AG Dublin	361,069	0.03	12,136
Credit Suisse Equities (Australia)	12,047	0.00	48
Credit Suisse First Boston HK	176,200	0.01	1,021
Credit Suisse First Boston SA	32,800	0.01	213
Credit Suisse Securities (Europe)	2,620,754	0.00	12,703
Credit Suisse Securities (USA) LLC	861,582	0.01	4,761
CSFB (Europe) LTD Seoul Secs Brnch	14,850	0.11	1,619
CSFB India (Secs) Pvt LTD Mumbai	175,215	0.00	168
CSFB Taipei	4,697,205	0.00	4,112
Cuttone & Co	12,130	0.01	121
D Carnegie AB Stockholm	87,236	0.03	2,469
D.A. Davidson & Co	100,534	0.04	4,020
Daiwa Capital Markets America Inc	93,800	0.03	2,694
Daiwa Capital Markets Hong Kong	57,400	0.00	277
Danske Bank	124,886	0.02	2,051
Davy Stockbrokers	316,315	0.00	1,547
DBS Vickers Ballas Hong Kong LTD	12,000	0.02	212
DBS Vickers Secs (Sing) Pte LTD	39,000	0.02	876
Den Norske Bank ASA	81,500	0.00	187
Deutsche Bank London	124,587	0.01	1,292
Deutsche Bank Securities Inc NY	3,458,907	0.00	17,105
Deutsche Secs Asia LTD Hong Kong	89,200	0.00	59
Deutsche Secs Asia Seoul	2,930	0.03	92
Deutsche Secs Aust LTD Sydney	338,998	0.00	1,308
Direct Trading Institutional Inc	529,732	0.01	3,951
DNB Nor Markets Custody	49,700	0.00	118
Dougherty & Company LLC	77,172	0.03	2,172
DSP Merrill Lynch LTD Mumbai	183,631	0.01	2,650
Edelweiss Securities Pvt LTD	36,708	0.01	216
Euroclear Bank SA	200,000	0.00	76
Exane Paris	41,000	0.01	238
Exane SA	254,574	0.01	3,188
Fidelity Capital Markets	268,988	0.01	2,763
Fidelity Clearing Canada ULC	26,300	0.02	526
Fidentiis Equities SV SA Madrid	1,948	0.03	54
Financial Brokerage Group	1,239,042	0.00	1,722
First Analysis Securities Corp	8,158	0.02	163
First Union Capital Markets	316,328	0.03	9,553
Frank Russell Secs/Broadcort Cap Secs	14,969	0.02	299
Friedman Billings & Ramsey	102,136	0.01	1,433
Goldman Sachs	4,411,350	0.02	71,082
Goldman Sachs (Asia) LLC Seoul	88,500	0.01	941

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**SCHEDULE OF PAYMENTS OF COMMISSIONS TO BROKERS (VARIABLE-RETURN FUNDS)**  
**FISCAL YEAR ENDED JUNE 30, 2019 (Continued)**

BROKERAGE FIRM	NO. OF SHARES TRADED	COMMISSION PER SHARE	COMMISSION PAID
Goldman Sachs (Asia) Taipei	7,385	\$0.00	\$1
Goldman Sachs (India) Securities	1,893,437	0.00	2,381
Goldman Sachs Australia Pty LTD	98,752	0.00	235
Goldman Sachs Do Brasil Corretora	748,693	0.00	1,385
Goldman Sachs International	1,904,690	0.00	7,024
Goldman Sachs New York	3,242,182	0.00	6,286
Goodbody Stockbrokers Dublin	124,572	0.00	351
Guzman & Company	223,616	0.01	2,237
Haitong Intl Securities Co Limited	52,406	0.00	112
Hilltop Securities Inc	2,342	0.04	94
Hongkong & Shanghai Bnking Corp LTD	16,576	0.02	283
HSBC Bank PLC London	5,178,855	0.00	8,527
HSBC Brokerage (USA) Inc	58,613	0.00	149
HSBC Secs & Cap Mkts India Pvt LTD	102,146	0.00	374
HSBC Securities Brokers (Asia) LTD	249,526	0.00	205
HSBC Securities USA	5,268,346	0.00	3,393
HSBC Taipei	39,000	0.00	48
Hyundai Securities	48,610	0.03	1,377
Ichiyoshi Securities	208,000	0.03	6,376
ICICI Brokerage Services Mumbai	805,073	0.00	2,937
Imperial Capital LLC	114,400	0.03	3,432
Industrial And Commercial Bank of China	23,350	0.03	701
Instinet	3,173,392	0.01	30,167
Instinet Australia Clearing Svcs	216,789	0.00	375
Instinet Clearing Services Inc	34,678	0.01	440
Instinet Corp New York	411,412	0.00	1,446
Instinet Europe Limited	2,269,906	0.01	14,261
Instinet Pacific LTD Hong Kong	10,179,161	0.00	5,674
Instinet Singapore Services Pte LTD	135,000	0.00	431
Investec Henderson Crosthwaite Secs	111,152	0.00	518
Investment Technology Group Dublin	151,468	0.01	855
Investment Technology Group Inc	1,892,916	0.01	13,570
ISI Group Inc	2,587,978	0.02	53,266
ITG Australia Limited Melbourne	1,726,836	0.00	5,400
ITG Canada Corp Toronto	97,894	0.01	686
ITG Inc	30,912	0.01	186
ITG Inc New York	1,137,396	0.00	684
ITG London	1,149,925	0.01	6,510
Janney Montgomery Scott Inc	155,405	0.04	6,214
Jefferies & Company	399,442	0.02	8,995
Jefferies & Company Inc NY	49,632	0.02	755
Jefferies India Private Limited	21,419	0.03	625
Jefferies International	61,167	0.02	1,403
Jefferies International London	25,900	0.01	138
JM Financial Institutional	58,950	0.01	463
JM Morgan Stanley Secs Pvt LTD	841,083	0.00	2,498
JMP Securities	110,916	0.02	2,218
JNK Securities Inc	236,123	0.01	2,364
Johnson Rice & Company LLC	1,213,500	0.03	36,405
Jones Trading Institutional Services	1,810,603	0.03	56,167

Continued on page 117

**SCHEDULE OF PAYMENTS OF COMMISSIONS TO BROKERS (VARIABLE-RETURN FUNDS)**  
**FISCAL YEAR ENDED JUNE 30, 2019 (Continued)**

BROKERAGE FIRM	NO. OF SHARES TRADED	COMMISSION PER SHARE	COMMISSION PAID
JP Morgan Securities (Far East) Ltd	3,812	\$0.03	\$104
JP Morgan Securities Australia Limited	59,896	0.01	358
JP Morgan Securities Limited	1,718,940	0.02	28,379
JPM Securities	75,525	0.02	1,511
JPMorgan Chase Bank	3,511,928	0.02	76,208
JPMorgan Clearing Corp NY	213,742	0.00	684
JPMorgan Secs Inc NY	908,911	0.00	3,538
JPMorgan Secs London	271,667	0.01	2,160
JPMorgan Securities (Asia Pacific)	9,404,095	0.00	7,179
JPMorgan Chase / CustJPMCC	868,762	0.00	2,011
KAS Bank	6,000	0.01	37
KBC Peel Hunt	158,995	0.00	222
Keefe Bruyette & Woods Inc	20,347	0.03	537
Kempen And Co	1,600	0.02	28
Kepler Capital Markets	4,375	0.07	317
Keybank Capital Markets Inc	22,137	0.04	885
King (C.L.) & Associates Inc	26,917	0.04	1,077
KM Partners LLC	14,143	0.03	424
Knight Equity Markets Lp	471	0.02	8
Knight Execution & Clearing Services	9,084	0.02	159
Korea Investment And Securities Co	51,695	0.03	1,567
Kotak Securities Mumbai	598,321	0.01	4,358
Leerink Swann And Company	61,140	0.03	1,845
Liberum Capital Limited	7,100	0.02	140
Liquidnet Asia Limited Hong Kong	93,000	0.00	210
Liquidnet Canada Inc	12,100	0.02	204
Liquidnet Europe LTD London	277,777	0.00	434
Liquidnet Inc	991,569	0.02	24,459
Longbow Securities LLC	4,785	0.04	191
Luminex Trading And Analytics LLC	31,331	0.00	148
Macquarie Bank Limited	5,804,976	0.00	5,866
Macquarie Capital (Europe) LTD Ldn	275,525	0.01	2,749
Macquarie Securities (Singapore)	1,400	0.03	45
Macquarie Securities (USA) Inc	408,666	0.01	2,422
Macquarie Securities Indian Pvt LTD	19,258	0.00	33
Macquarie Securities LTD Seoul	2,520	0.04	89
Mainfirst Bank AG	3,958	0.06	229
Mediobanca Spa Milano Italy	35,900	0.00	166
MEMO	57	1.60	91
Merrill Lynch & Co Inc (Atlas Gbl) NY	11,865	0.08	945
Merrill Lynch And Co Inc	6,935	0.03	180
Merrill Lynch Equities (Australia)	247,710	0.00	196
Merrill Lynch International London	7,717,942	0.00	22,428
Merrill Lynch Pierce Fenner & Smith	4,415,447	0.01	60,681
Mirae Asset Securities	9,202	0.13	1,163
Mitsubishi UFJ Securities (USA)	129,368	0.01	716
Mizuho Securities Asia LTD	9,000	0.02	173
Mizuho Securities Inc	42,194	0.03	1,462
Morgan Stanley & Co	6,274,235	0.01	52,407
Morgan Stanley And Co International	60,000	0.00	115

*Continued on page 118*

**SCHEDULE OF PAYMENTS OF COMMISSIONS TO BROKERS (VARIABLE-RETURN FUNDS)**  
**FISCAL YEAR ENDED JUNE 30, 2019 (Continued)**

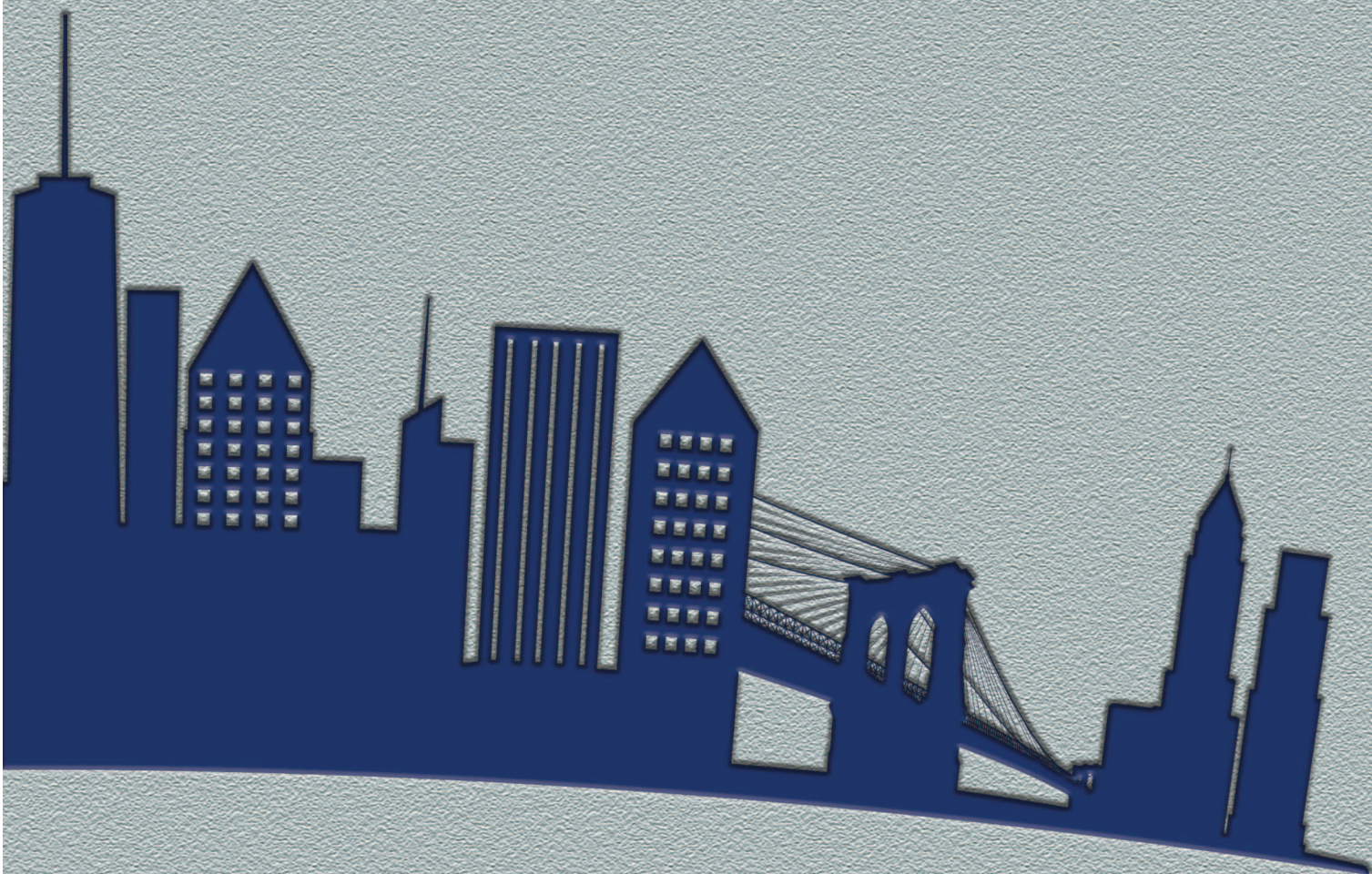
BROKERAGE FIRM	NO. OF SHARES TRADED	COMMISSION PER SHARE	COMMISSION PAID
Morgan Stanley And Co Intl Taipei	1,102,000	\$0.00	\$1,265
Morgan Stanley Dean Witter Sydney	5,830	0.01	40
Morgan Stanley Intl Seoul	18,118	0.07	1,206
National Finl Svcs Corp	22,456,885	0.01	116,612
NBC Clearing Services Inc	5,683	0.02	87
Needham And Company LLC	72,079	0.03	1,969
Nesbitt Burns Toronto	420,431	0.01	5,513
Nomura Financial Advisory And Securities	741,032	0.00	720
Nordea Bank Finland PLC	11,522	0.01	71
Northland Securities Inc	42,035	0.04	1,681
Numis Securities London	98,242	0.00	309
Oddo Et Cie Paris	24,716	0.02	612
Oppenheimer & Co Inc	413,053	0.02	7,321
Parel Paris	12,900	0.01	123
Pershing LLC	745,445	0.02	12,519
Pershing Securities	121,600	0.03	3,234
Peters & Co Calgary Canada	7,040	0.02	134
Piper Jaffray & Co	62,401	0.04	2,426
Pulse Trading LLC	115,337	0.02	2,281
Raymond James & Assoc, Florida	3,934	0.04	143
Raymond James & Associates Inc	576,674	0.04	21,012
RBC Capital Markets Corporation	173,260	0.03	5,570
RBC Dominion Secs Toronto	153,169	0.01	1,620
RBC Europe London	1,800	0.01	15
Redburn (Europe) Limited	344,627	0.00	1,570
Redburn Partners LLP London	73,700	0.02	1,226
Robert W Baird & Co	72,269	0.03	2,297
Rosenblatt Securities Inc	203,782	0.01	2,039
Roth Capital Partners, LLC	245,880	0.01	3,540
Royal Bank Of Canada Europe Limited	115,480	0.02	2,086
Salomon Smith Barney Taipei Brch	1,232,000	0.00	326
Samsung Securities	2,496	0.05	125
Sandler O'Neill & Partners LP	40,936	0.04	1,564
Sanford C Bernstein & Co Inc	1,480,536	0.01	20,427
Sanford C Bernstein LTD London	370,880	0.01	3,895
Sanford C. Bernstein And Co., LLC	241,543	0.01	2,291
Scotia Capital Markets	2,066	0.02	31
Scotia Capital Mkts Toronto	14,600	0.01	195
Scotia Mcleod New York	8,123	0.02	188
Seaport Group Securities LLC	156,934	0.02	3,377
SG Americas Securities LLC	608,312	0.01	3,669
SG Asia Sec (India) Prvt LTD Mumbai	243,735	0.00	775
SG Secs (London) LTD Taipei	2,009,000	0.00	570
SG Securities (Hk) LTD Hong Kong	1,937,981	0.00	847
SIDCO/ITG Inc	15,697	0.03	541
Sidoti & Company LLC	534,021	0.02	10,682
SMBC Nikko Securities (Hong Kong)	62,731	0.01	716
SMBC Securities Inc	62,500	0.01	809
Societe Generale	31,352	0.01	290
Societe Generale London Branch	1,594,432	0.01	9,197

Continued on page 119

**SCHEDULE OF PAYMENTS OF COMMISSIONS TO BROKERS (VARIABLE-RETURN FUNDS)**  
**FISCAL YEAR ENDED JUNE 30, 2019**

<b>BROKERAGE FIRM</b>	<b>NO. OF SHARES TRADED</b>	<b>COMMISSION PER SHARE</b>	<b>COMMISSION PAID</b>
Societe Generale Secs Corp New York	648,482	\$0.00	\$1,036
Stephens Inc	103,457	0.04	3,800
Stifel Nicolaus & Co Inc	328,676	0.02	7,771
Suntrust Capital Markets Inc	879,087	0.03	26,942
Svenska Handelsbanken	43,140	0.01	474
Taylor D W & Co LTD	183,829	0.01	1,838
Themis Trading LLC	311,816	0.01	3,116
Toronto Dominion Secs Toronto	37,214	0.02	596
UBS (International) LTD	26,144	0.00	78
UBS AG London	8,049,504	0.00	18,222
UBS AG Stamford CT	1,135,985	0.00	3,449
UBS Limited	2,516,734	0.00	9,089
UBS Securities Asia LTD	449,234	0.01	2,460
UBS Securities Australia LTD	329,100	0.00	684
UBS Securities Canada Inc	3,786	0.00	17
UBS Securities LLC (Warburg)	624,108	0.01	6,136
UBS Warburg Secs India Pvt Mumbai	58,151	0.01	741
UBS Warburg Securities LTD Seoul	32,828	0.06	1,934
UBS Warburg Securities Taiwan	1,443,442	0.00	3,124
Virtu Americas LLC	285	0.01	2
Wall St Access	63,833	0.00	256
Weeden And Co	3,832,535	0.01	38,502
Wells Fargo Securities LLC	52,110	0.04	1,962
William Blair & Company	82,722	0.02	1,720
Winterflood Securities Limited	46,300	0.00	101
Wolfe Trahan Securities	91,300	0.03	2,739
Woori Investment And Securities	22,664	0.01	286
Zannex Securities	415,800	0.00	377

# ACTUARIAL





## OFFICE OF THE ACTUARY

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 NEW YORK, NY 10007  
 (212) 442-5775 • FAX: (212) 442-5777

SHERRY S. CHAN  
 CHIEF ACTUARY

December 6, 2019

Board of Trustees  
 Teachers' Retirement System of the City of New York  
 55 Water Street, 16<sup>th</sup> Floor  
 New York, NY 10041

Re: Actuarial Information for the Comprehensive Annual Financial Report (CAFR) for the  
 Fiscal Year Ended June 30, 2019

Dear Members of the Board of Trustees:

The financial objective of the Teachers' Retirement System of the City of New York - Qualified Pension Plan (TRS-QPP or the Plan) is to fund members' retirement benefits during their active service by establishing 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, 2017 (Lag) actuarial valuation to determine Fiscal Year 2019 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 2019, the Actuarial Contributions to TRS, 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.

Pursuant to the Governmental Accounting Standards Board (GASB) Statement No. 67 (GASB67) and Statement No. 68 (GASB68), on September 27, 2019, the Actuary published the "Fiscal Year 2019 GASB 67/68 Report for the City of New York and the New York City Retirement Systems" (the Fiscal Year 2019 GASB67/68 Report). Appendix B of the Fiscal Year 2019 GASB67/68 Report contains information developed in accordance with GASB67 for TRS.

## **Actuarial Assumptions and Methods**

The Actuary issued a Report entitled, "Proposed Changes in Actuarial Assumptions and Methods Used in Determining Employer Contributions for Fiscal Years Beginning on and After July 1, 2018 for the New York City Teachers' Retirement System," dated January 17, 2019. The actuarial assumptions and methods described in that report were adopted by the Board of Trustees at the February 28, 2019 Board meeting and are referred to as the "2019 A&M." These new actuarial assumptions and methods are effective beginning with Fiscal Year 2019.

These actuarial assumptions and methods 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, 2017 (Lag) actuarial valuation is shown in the Introductory 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.

A summary of the census data used in the June 30, 2017 (Lag) actuarial valuation is included in this CAFR. A summary of the census data used in the June 30, 2016 (Lag) actuarial valuation of the Plan is available in the Fiscal Year 2018 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 11).

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 12), as prescribed by the Government Finance Officers Association (GFOA). This Solvency Test represents an alternative approach to describing progress toward funding objectives.

Board of Trustees  
Teachers' Retirement System of the City of New York  
December 6, 2019  
Page 3

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

The actuarial information herein is believed to be presented in a manner 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, 2017 (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.

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

- Membership Data.
- Net Pension Liability.
- Actuarial Assumptions and Methods.
- Schedule of Changes in Employers' Net Pension Liability and Related Ratios.
- Schedule of Employer Contributions.

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, 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: Ms. Dolores Capone - New York City Office of the Actuary  
Mr. Craig Chu - New York City Office of the Actuary  
Mr. Edward Hue - New York City Office of the Actuary  
Mr. Thad McTigue - New York City Teachers' Retirement System  
Mr. Paul Raucci - New York City Teachers' Retirement System  
Ms. Patricia Reilly - New York City Teachers' Retirement System  
Mr. Michael Samet - New York City Office of the Actuary  
Keith Snow, Esq. - New York City Office of the Actuary

# TEACHERS' RETIREMENT SYSTEM OF THE CITY OF NEW YORK QUALIFIED PENSION PLAN

## SUMMARY OF ACTUARIAL ASSUMPTIONS AND METHODS IN EFFECT FOR THE JUNE 30, 2017 (LAG) ACTUARIAL VALUATION

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 (ACCNy), 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.

Based on the most recent actuarial experience study and recommendations prepared by Bolton, Inc. in their 10-year experience study ending on June 30, 2017, the Actuary issued a Report entitled "Proposed Changes in Actuarial Assumptions and Methods Used in Determining Employer Contributions for Fiscal Years Beginning on and After July 1, 2018 for the New York City Teachers' Retirement System," dated January 17, 2019. The actuarial assumptions and methods described in that report were adopted by the Board of Trustees at the February 28, 2019 Board meeting and are referred to as the "2019 A&M." These new actuarial assumptions and methods are effective beginning with Fiscal Year 2019.

2. The Actuarial Interest Rate (AIR) assumption is 7.0% per annum, net of investment expenses (4.0% per annum for benefits payable under the Variable Annuity Programs).
3. Active service tables are used to estimate various withdrawals from active service. Probabilities are shown in Table 1 for members withdrawing from active service for service retirement, Table 2 for members terminating from active service without employer-provided benefits or with vested benefits, and in Tables 3 and 4 for members withdrawing from active service due to disability or death, respectively.
4. The service retiree mortality, disabled retiree mortality, and beneficiary mortality base tables are projected from 2012 using mortality improvement scale MP-2018. The base tables are also multiplied by adjustment factors to convert them from lives-weighted to amounts-weighted tables to reflect socioeconomic effects on mortality. Base table probabilities for service and disability pensioners are shown in Tables 5a and 5b, respectively, and for beneficiaries in Table 5c.

# TEACHERS' RETIREMENT SYSTEM OF THE CITY OF NEW YORK

## QUALIFIED PENSION PLAN

### SUMMARY OF ACTUARIAL ASSUMPTIONS AND METHODS IN EFFECT FOR THE JUNE 30, 2017 (LAG) ACTUARIAL VALUATION (Cont'd)

5. A salary scale is used to estimate salaries at termination, retirement, or death. Percentage increases are shown in Table 6. 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. 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 Accrued Liability (AL).

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

Under this method, actuarial gains and losses, as they occur, reduce and increase the UAL, 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.

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.

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

# TEACHERS' RETIREMENT SYSTEM OF THE CITY OF NEW YORK

## QUALIFIED PENSION PLAN

### SUMMARY OF ACTUARIAL ASSUMPTIONS AND METHODS IN EFFECT FOR THE JUNE 30, 2017 (LAG) ACTUARIAL VALUATION (Cont'd)

This methodology requires adjustments to certain components used to determine Fiscal Year XX employer contributions:

- a. Normal Cost: The normal cost as of June 30, XX-2 is rolled forward with the AIR of 7.0% to derive the mid-year normal cost for Fiscal Year XX.
- b. UAL Payments: For determining the UAL payments for Fiscal Year XX, and to be consistent with the OYLM, the UAL as of June 30, XX-2 is adjusted by the discounted value of employer normal cost and UAL payments paid during Fiscal Year XX-1 and the discounted value of Administrative Expenses reimbursed during Fiscal Years XX-1 and XX.

10. 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 (i.e. cumulative rates of 15%, 30%, 45%, 60%, 80%, and 100% over a period of six years).

The AVA is further constrained to be within a corridor of 80% to 120% of the Market Value of Assets (MVA).

11. Obligations attributable to the WTC Disability Law and to the WTC Death Benefits Law are determined through the use of explicit assumptions in the 2019 A&M, and through estimation techniques for post-retirement reclassifications.

# TEACHERS' RETIREMENT SYSTEM OF THE CITY OF NEW YORK QUALIFIED PENSION PLAN

## SUMMARY OF ACTUARIAL ASSUMPTIONS AND METHODS IN EFFECT FOR THE JUNE 30, 2017 (LAG) ACTUARIAL VALUATION (Cont'd)

<p style="text-align: center;"><b>Table 1</b></p> <p style="text-align: center;">PROBABILITIES OF SERVICE RETIREMENT</p>					
Age	Reduced Service Retirement	Unreduced Service Retirement Probabilities For Members Who Did Not Elect an Improved Retirement Program		Unreduced Service Retirement Probabilities For Members Who Did Elect an Improved Retirement Program	
		Year 1	Ultimate	Year 1	Ultimate
55	2.50%	18.00%	0.00%	37.50%	0.00%
56	2.50%	18.00%	20.00%	37.50%	22.00%
57	2.50%	18.00%	20.00%	37.50%	22.00%
58	2.50%	18.00%	20.00%	37.50%	22.00%
59	3.75%	18.00%	20.00%	37.50%	22.00%
60	5.00%	18.00%	20.00%	37.50%	22.00%
61	6.25%	18.00%	20.00%	37.50%	22.00%
62	7.50% *	27.00%/18.00% **	20.00%	50.00%	33.00%
63	0.00%	18.00%/27.00% ***	20.00%	37.50%	22.00%
64	0.00%	18.00%	20.00%	37.50%	22.00%
65	0.00%	27.00%	20.00%	50.00%	33.00%
66	0.00%	18.00%	20.00%	37.50%	22.00%
67	0.00%	18.00%	20.00%	37.50%	22.00%
68	0.00%	18.00%	20.00%	37.50%	22.00%
69	0.00%	18.00%	20.00%	37.50%	22.00%
70	0.00%	20.00%	20.00%	37.50%	22.00%
71	0.00%	20.00%	20.00%	37.50%	22.00%
72	0.00%	20.00%	20.00%	37.50%	22.00%
73	0.00%	20.00%	20.00%	37.50%	22.00%
74	0.00%	20.00%	20.00%	37.50%	22.00%
75	0.00%	20.00%	20.00%	37.50%	22.00%
76	0.00%	20.00%	20.00%	37.50%	22.00%
77	0.00%	20.00%	20.00%	37.50%	22.00%
78	0.00%	20.00%	20.00%	37.50%	22.00%
79	0.00%	20.00%	20.00%	37.50%	22.00%
80+	N/A	100.00%	100.00%	100.00%	100.00%

\* 7.50% only applies to Tier 6 members; 0.00% otherwise.

\*\* 27.00% for Tier 1, 2, & 4 members and 18.00% for Tier 6 members.

\*\*\* 18.00% for Tier 1, 2, & 4 members and 27.00% for Tier 6 members.

# TEACHERS' RETIREMENT SYSTEM OF THE CITY OF NEW YORK QUALIFIED PENSION PLAN

## SUMMARY OF ACTUARIAL ASSUMPTIONS AND METHODS IN EFFECT FOR THE JUNE 30, 2017 (LAG) ACTUARIAL VALUATION (Cont'd)

Table 2	
PROBABILITIES OF TERMINATION	
Years of Service	Probability of Termination
0	9.00%
1	8.00%
2	7.00%
3	6.00%
4	5.00%
5	4.00%
6	3.50%
7	3.05%
8	2.65%
9	2.30%
10	2.00%
11	1.75%
12	1.55%
13	1.40%
14	1.30%
15	1.25%
16	1.20%
17	1.15%
18	1.10%
19	1.05%
20	1.00%
21	0.90%
22	0.80%
23	0.70%
24	0.60%
25+	0.50%

# TEACHERS' RETIREMENT SYSTEM OF THE CITY OF NEW YORK

## QUALIFIED PENSION PLAN

### SUMMARY OF ACTUARIAL ASSUMPTIONS AND METHODS IN EFFECT FOR THE JUNE 30, 2017 (LAG) ACTUARIAL VALUATION (Cont'd)

Table 3				
PROBABILITIES OF DISABILITY RETIREMENT				
	Ordinary Disability		Accidental Disability	
Age	Males	Females	Males	Females
15	0.01%	0.01%	0.00%	0.00%
16	0.01%	0.01%	0.00%	0.00%
17	0.01%	0.01%	0.00%	0.00%
18	0.01%	0.01%	0.00%	0.00%
19	0.01%	0.01%	0.00%	0.00%
20	0.01%	0.01%	0.00%	0.00%
21	0.01%	0.01%	0.00%	0.00%
22	0.01%	0.01%	0.00%	0.00%
23	0.01%	0.01%	0.00%	0.00%
24	0.01%	0.01%	0.00%	0.00%
25	0.01%	0.01%	0.00%	0.00%
26	0.01%	0.01%	0.00%	0.00%
27	0.01%	0.01%	0.00%	0.00%
28	0.01%	0.01%	0.00%	0.00%
29	0.01%	0.01%	0.00%	0.00%
30	0.01%	0.01%	0.00%	0.00%
31	0.02%	0.01%	0.00%	0.00%
32	0.03%	0.02%	0.00%	0.00%
33	0.04%	0.03%	0.01%	0.00%
34	0.05%	0.04%	0.01%	0.00%
35	0.06%	0.05%	0.01%	0.01%
36	0.07%	0.06%	0.01%	0.01%
37	0.08%	0.07%	0.01%	0.01%
38	0.08%	0.08%	0.02%	0.01%
39	0.09%	0.09%	0.02%	0.01%
40	0.10%	0.10%	0.02%	0.01%
41	0.11%	0.11%	0.02%	0.01%
42	0.12%	0.12%	0.02%	0.01%
43	0.13%	0.13%	0.02%	0.02%
44	0.14%	0.14%	0.02%	0.02%
45	0.15%	0.15%	0.03%	0.02%
46	0.15%	0.16%	0.03%	0.02%
47	0.15%	0.17%	0.03%	0.02%
48	0.15%	0.18%	0.03%	0.03%
49	0.15%	0.19%	0.03%	0.03%
50	0.15%	0.20%	0.03%	0.03%
51	0.15%	0.20%	0.03%	0.03%
52	0.15%	0.20%	0.03%	0.03%
53	0.15%	0.20%	0.03%	0.03%
54	0.15%	0.20%	0.03%	0.03%
55	0.15%	0.20%	0.04%	0.04%
56	0.15%	0.20%	0.04%	0.04%
57	0.15%	0.20%	0.04%	0.04%
58	0.15%	0.20%	0.04%	0.04%
59	0.15%	0.20%	0.04%	0.04%
60	0.15%	0.20%	0.04%	0.04%
61	0.15%	0.20%	0.04%	0.04%
62	0.15%	0.20%	0.04%	0.04%
63	0.15%	0.20%	0.04%	0.04%
64	0.15%	0.20%	0.04%	0.04%
65	0.15%	0.20%	0.04%	0.04%
66	0.15%	0.20%	0.04%	0.04%
67	0.15%	0.20%	0.04%	0.04%
68	0.15%	0.20%	0.04%	0.04%
69	0.15%	0.20%	0.04%	0.04%
70	0.15%	0.20%	0.04%	0.04%
71	0.15%	0.20%	0.04%	0.04%
72	0.15%	0.20%	0.04%	0.04%
73	0.15%	0.20%	0.04%	0.04%
74	0.15%	0.20%	0.04%	0.04%
75	0.15%	0.20%	0.04%	0.04%
76	0.15%	0.20%	0.04%	0.04%
77	0.15%	0.20%	0.04%	0.04%
78	0.15%	0.20%	0.04%	0.04%
79	0.15%	0.20%	0.04%	0.04%
80+	N/A	N/A	N/A	N/A

# TEACHERS' RETIREMENT SYSTEM OF THE CITY OF NEW YORK QUALIFIED PENSION PLAN

## SUMMARY OF ACTUARIAL ASSUMPTIONS AND METHODS IN EFFECT FOR THE JUNE 30, 2017 (LAG) ACTUARIAL VALUATION (Cont'd)

Table 4 PROBABILITIES OF MORTALITY FOR ACTIVE MEMBERS			
Age	Ordinary Death		Accidental Death
	Males	Females	
15	0.040%	0.025%	0.000%
16	0.040%	0.025%	0.000%
17	0.040%	0.025%	0.000%
18	0.040%	0.025%	0.000%
19	0.040%	0.025%	0.000%
20	0.040%	0.025%	0.000%
21	0.040%	0.025%	0.000%
22	0.040%	0.025%	0.000%
23	0.040%	0.025%	0.000%
24	0.040%	0.025%	0.000%
25	0.040%	0.025%	0.000%
26	0.040%	0.025%	0.000%
27	0.040%	0.025%	0.000%
28	0.040%	0.025%	0.000%
29	0.040%	0.025%	0.000%
30	0.040%	0.025%	0.000%
31	0.042%	0.026%	0.000%
32	0.044%	0.028%	0.000%
33	0.046%	0.029%	0.000%
34	0.048%	0.030%	0.000%
35	0.050%	0.031%	0.000%
36	0.052%	0.033%	0.000%
37	0.054%	0.034%	0.000%
38	0.056%	0.035%	0.000%
39	0.058%	0.036%	0.000%
40	0.060%	0.038%	0.000%
41	0.070%	0.044%	0.000%
42	0.080%	0.050%	0.000%
43	0.090%	0.056%	0.000%
44	0.100%	0.063%	0.000%
45	0.110%	0.069%	0.000%
46	0.120%	0.075%	0.000%
47	0.130%	0.081%	0.000%
48	0.140%	0.088%	0.000%
49	0.150%	0.094%	0.000%
50	0.160%	0.100%	0.000%
51	0.170%	0.106%	0.000%
52	0.180%	0.113%	0.000%
53	0.190%	0.119%	0.000%
54	0.200%	0.125%	0.000%
55	0.210%	0.131%	0.000%
56	0.220%	0.138%	0.000%
57	0.230%	0.144%	0.000%
58	0.240%	0.150%	0.000%
59	0.250%	0.156%	0.000%
60	0.260%	0.163%	0.000%
61	0.270%	0.169%	0.000%
62	0.280%	0.175%	0.000%
63	0.290%	0.181%	0.000%
64	0.300%	0.188%	0.000%
65	0.320%	0.200%	0.000%
66	0.350%	0.219%	0.000%
67	0.390%	0.244%	0.000%
68	0.440%	0.275%	0.000%
69	0.500%	0.313%	0.000%
70	0.540%	0.350%	0.000%
71	0.600%	0.388%	0.000%
72	0.650%	0.425%	0.000%
73	0.700%	0.463%	0.000%
74	0.750%	0.525%	0.000%
75	0.800%	0.588%	0.000%
76	0.890%	0.650%	0.000%
77	0.980%	0.713%	0.000%
78	1.070%	0.775%	0.000%
79	1.160%	0.925%	0.000%
80+	N/A	N/A	N/A

# TEACHERS' RETIREMENT SYSTEM OF THE CITY OF NEW YORK

## QUALIFIED PENSION PLAN

### SUMMARY OF ACTUARIAL ASSUMPTIONS AND METHODS IN EFFECT FOR THE JUNE 30, 2017 (LAG) ACTUARIAL VALUATION (Cont'd)

Table 5a					
PROBABILITIES OF MORTALITY FOR SERVICE RETIREES					
Age	Males	Females	Age	Males	Females
15	0.0108%	0.0105%	68	1.3827%	0.8399%
16	0.0146%	0.0128%	69	1.5070%	0.8992%
17	0.0197%	0.0140%	70	1.6306%	0.9855%
18	0.0222%	0.0145%	71	1.7953%	1.1072%
19	0.0235%	0.0151%	72	1.9579%	1.2311%
20	0.0246%	0.0153%	73	2.1191%	1.3549%
21	0.0263%	0.0162%	74	2.2784%	1.4775%
22	0.0278%	0.0171%	75	2.4370%	1.5961%
23	0.0295%	0.0181%	76	2.7233%	1.8356%
24	0.0309%	0.0193%	77	3.0074%	2.0765%
25	0.0320%	0.0206%	78	3.2885%	2.3162%
26	0.0335%	0.0220%	79	3.5677%	2.5533%
27	0.0347%	0.0234%	80	3.8824%	2.7842%
28	0.0364%	0.0249%	81	4.4474%	3.3221%
29	0.0386%	0.0267%	82	5.0193%	3.8708%
30	0.0418%	0.0286%	83	5.5977%	4.4089%
31	0.0476%	0.0348%	84	6.1798%	5.0027%
32	0.0532%	0.0401%	85	6.7676%	5.5878%
33	0.0583%	0.0449%	86	7.7139%	6.2981%
34	0.0629%	0.0489%	87	8.6843%	6.9333%
35	0.0673%	0.0527%	88	9.6857%	7.5758%
36	0.0698%	0.0557%	89	10.7135%	8.5620%
37	0.0720%	0.0591%	90	11.7744%	9.6778%
38	0.0745%	0.0626%	91	13.6049%	10.8390%
39	0.0782%	0.0672%	92	15.5105%	11.9717%
40	0.0837%	0.0726%	93	17.4679%	13.1425%
41	0.0941%	0.0775%	94	19.5105%	15.1670%
42	0.1051%	0.0838%	95	21.6689%	17.3761%
43	0.1167%	0.0918%	96	23.7343%	19.5275%
44	0.1294%	0.1013%	97	25.7571%	21.6213%
45	0.1432%	0.1132%	98	27.8633%	23.3643%
46	0.1582%	0.1271%	99	29.8272%	23.8705%
47	0.1744%	0.1429%	100	31.5152%	23.9898%
48	0.1918%	0.1597%	101	33.0771%	24.9134%
49	0.2102%	0.1774%	102	34.4234%	26.0067%
50	0.2317%	0.1950%	103	35.6398%	27.2992%
51	0.2657%	0.2130%	104	36.6357%	28.7614%
52	0.3011%	0.2304%	105	37.3430%	30.3385%
53	0.3373%	0.2472%	106	37.7004%	31.9944%
54	0.3744%	0.2638%	107	37.8599%	33.6898%
55	0.4112%	0.2806%	108	38.0314%	35.3785%
56	0.4578%	0.3034%	109	38.1998%	37.0129%
57	0.5025%	0.3264%	110	50.0000%	50.0000%
58	0.5448%	0.3498%	111	50.0000%	50.0000%
59	0.5843%	0.3732%	112	50.0000%	50.0000%
60	0.6211%	0.3973%	113	50.0000%	50.0000%
61	0.7018%	0.4321%	114	50.0000%	50.0000%
62	0.7804%	0.4686%	115	50.0000%	50.0000%
63	0.8588%	0.5072%	116	50.0000%	50.0000%
64	0.9371%	0.5479%	117	50.0000%	50.0000%
65	0.9994%	0.5912%	118	50.0000%	50.0000%
66	1.1295%	0.6619%	119	50.0000%	50.0000%
67	1.2569%	0.7367%	120	100.0000%	100.0000%

# TEACHERS' RETIREMENT SYSTEM OF THE CITY OF NEW YORK QUALIFIED PENSION PLAN

## SUMMARY OF ACTUARIAL ASSUMPTIONS AND METHODS IN EFFECT FOR THE JUNE 30, 2017 (LAG) ACTUARIAL VALUATION (Cont'd)

Table 5b					
PROBABILITIES OF MORTALITY FOR DISABLED RETIREES					
Age	Males	Females	Age	Males	Females
15	0.3819%	0.3483%	68	2.8007%	2.0012%
16	0.5167%	0.4712%	69	2.8946%	2.0043%
17	0.6964%	0.5141%	70	3.0268%	2.0073%
18	0.7863%	0.5351%	71	3.1148%	2.0103%
19	0.8312%	0.5569%	72	3.2684%	2.1811%
20	0.8353%	0.5649%	73	3.3926%	2.3760%
21	0.8659%	0.5961%	74	3.5875%	2.5968%
22	0.8978%	0.6295%	75	3.7271%	2.8417%
23	0.9464%	0.6597%	76	3.9657%	3.0808%
24	0.9977%	0.6908%	77	4.2691%	3.3373%
25	1.0424%	0.7150%	78	4.5349%	3.6085%
26	1.0960%	0.7387%	79	4.8252%	3.8944%
27	1.1348%	0.7520%	80	5.1378%	4.1909%
28	1.1774%	0.7625%	81	5.6917%	4.6921%
29	1.2163%	0.7686%	82	6.2841%	5.1536%
30	1.2878%	0.7763%	83	6.8835%	5.5061%
31	1.3554%	0.9885%	84	7.7954%	6.1180%
32	1.3755%	1.1922%	85	8.8286%	6.7342%
33	1.3953%	1.3874%	86	9.9032%	7.3088%
34	1.4153%	1.3942%	87	10.8837%	8.2536%
35	1.4357%	1.4012%	88	11.9567%	9.3264%
36	1.4563%	1.4082%	89	13.8059%	10.3734%
37	1.4772%	1.4152%	90	15.7270%	11.4459%
38	1.4985%	1.4223%	91	17.7012%	12.6271%
39	1.5200%	1.4294%	92	19.6428%	14.1350%
40	1.5418%	1.4366%	93	21.9234%	15.4424%
41	1.5640%	1.4436%	94	24.0761%	16.9560%
42	1.5865%	1.4509%	95	26.0577%	18.4261%
43	1.6093%	1.4581%	96	28.3614%	20.1727%
44	1.6324%	1.4654%	97	30.3483%	21.6213%
45	1.6559%	1.5299%	98	31.8739%	23.3643%
46	1.6797%	1.6016%	99	33.6652%	23.8705%
47	1.7038%	1.6623%	100	35.0392%	23.9898%
48	1.7283%	1.7238%	101	36.0496%	24.9134%
49	1.7531%	1.7485%	102	37.0460%	26.0067%
50	1.7783%	1.7736%	103	37.7767%	27.2992%
51	1.8039%	1.7991%	104	38.1460%	28.7614%
52	1.9408%	1.8530%	105	38.3076%	30.3385%
53	2.0713%	1.8909%	106	38.4698%	31.9944%
54	2.2040%	1.9173%	107	38.6325%	33.6898%
55	2.3207%	1.9622%	108	38.8076%	35.3785%
56	2.4304%	1.9652%	109	38.9794%	37.0129%
57	2.4937%	1.9681%	110	50.0000%	50.0000%
58	2.5070%	1.9711%	111	50.0000%	50.0000%
59	2.5245%	1.9741%	112	50.0000%	50.0000%
60	2.5362%	1.9770%	113	50.0000%	50.0000%
61	2.5394%	1.9801%	114	50.0000%	50.0000%
62	2.5426%	1.9831%	115	50.0000%	50.0000%
63	2.5480%	1.9861%	116	50.0000%	50.0000%
64	2.5797%	1.9891%	117	50.0000%	50.0000%
65	2.6258%	1.9921%	118	50.0000%	50.0000%
66	2.6510%	1.9951%	119	50.0000%	50.0000%
67	2.7083%	1.9982%	120	100.0000%	100.0000%

# TEACHERS' RETIREMENT SYSTEM OF THE CITY OF NEW YORK

## QUALIFIED PENSION PLAN

### SUMMARY OF ACTUARIAL ASSUMPTIONS AND METHODS IN EFFECT FOR THE JUNE 30, 2017 (LAG) ACTUARIAL VALUATION (Cont'd)

Table 5c					
PROBABILITIES OF MORTALITY FOR BENEFICIARIES					
Age	Males	Females	Age	Males	Females
15	0.0105%	0.0092%	68	1.8256%	1.3605%
16	0.0142%	0.0112%	69	1.9386%	1.4332%
17	0.0191%	0.0122%	70	2.0542%	1.5007%
18	0.0222%	0.0133%	71	2.2359%	1.6745%
19	0.0240%	0.0143%	72	2.4230%	1.8463%
20	0.0251%	0.0145%	73	2.6165%	2.0157%
21	0.0268%	0.0153%	74	2.8157%	2.1838%
22	0.0284%	0.0161%	75	3.0220%	2.3492%
23	0.0301%	0.0171%	76	3.4928%	2.6652%
24	0.0315%	0.0183%	77	3.9787%	2.9831%
25	0.0327%	0.0195%	78	4.4792%	3.3011%
26	0.0342%	0.0208%	79	4.9963%	3.6207%
27	0.0354%	0.0221%	80	5.5282%	3.9391%
28	0.0371%	0.0236%	81	6.1051%	4.4386%
29	0.0394%	0.0252%	82	6.6894%	4.9473%
30	0.0427%	0.0270%	83	7.2805%	5.4665%
31	0.0495%	0.0330%	84	7.8749%	5.9942%
32	0.0562%	0.0384%	85	8.4753%	6.5354%
33	0.0625%	0.0431%	86	9.6136%	7.4659%
34	0.0682%	0.0471%	87	10.8005%	8.3995%
35	0.0743%	0.0511%	88	12.0443%	9.3428%
36	0.0780%	0.0542%	89	13.3397%	10.2918%
37	0.0818%	0.0579%	90	14.6958%	11.2477%
38	0.0861%	0.0618%	91	16.4185%	12.8868%
39	0.0917%	0.0666%	92	18.1416%	14.4887%
40	0.0997%	0.0719%	93	19.8574%	16.0801%
41	0.1394%	0.0775%	94	21.6187%	17.5854%
42	0.1774%	0.0859%	95	23.5884%	19.0626%
43	0.2143%	0.0968%	96	25.4266%	20.2474%
44	0.2507%	0.1111%	97	27.2119%	21.2937%
45	0.2875%	0.1287%	98	29.0202%	22.0663%
46	0.3207%	0.1501%	99	30.6654%	22.5443%
47	0.3534%	0.1748%	100	32.1584%	22.6473%
48	0.3849%	0.2022%	101	33.7521%	23.5294%
49	0.4150%	0.2319%	102	35.1259%	24.5619%
50	0.4431%	0.2633%	103	36.3671%	25.7825%
51	0.5156%	0.2999%	104	37.3834%	27.1635%
52	0.5928%	0.3376%	105	38.1051%	28.6530%
53	0.6740%	0.3762%	106	38.4698%	30.2169%
54	0.7583%	0.4151%	107	38.6325%	31.8182%
55	0.8440%	0.4540%	108	38.8076%	33.4131%
56	0.9048%	0.5132%	109	38.9794%	34.9566%
57	0.9604%	0.5735%	110	50.0000%	50.0000%
58	1.0101%	0.6353%	111	50.0000%	50.0000%
59	1.0536%	0.6981%	112	50.0000%	50.0000%
60	1.0919%	0.7631%	113	50.0000%	50.0000%
61	1.1835%	0.8329%	114	50.0000%	50.0000%
62	1.2676%	0.8908%	115	50.0000%	50.0000%
63	1.3473%	0.9493%	116	50.0000%	50.0000%
64	1.4238%	1.0146%	117	50.0000%	50.0000%
65	1.4985%	1.0876%	118	50.0000%	50.0000%
66	1.6059%	1.1681%	119	50.0000%	50.0000%
67	1.7146%	1.2609%	120	100.0000%	100.0000%

# TEACHERS' RETIREMENT SYSTEM OF THE CITY OF NEW YORK QUALIFIED PENSION PLAN

## SUMMARY OF ACTUARIAL ASSUMPTIONS AND METHODS IN EFFECT FOR THE JUNE 30, 2017 (LAG) ACTUARIAL VALUATION (Cont'd)

<b>Table 6</b>  ANNUAL RATES OF MERIT AND SALARY INCREASE		
<b>Years of Service</b>	<b>Merit Increase</b>	<b>Salary Increase</b>
0	10.00%	13.00%
1	8.00%	11.00%
2	6.00%	9.00%
3	5.00%	8.00%
4	6.00%	9.00%
5	5.00%	8.00%
6	5.00%	8.00%
7	4.00%	7.00%
8	2.00%	5.00%
9	5.00%	8.00%
10	1.00%	4.00%
11	1.00%	4.00%
12	3.00%	6.00%
13	1.00%	4.00%
14	5.00%	8.00%
15	1.00%	4.00%
16	1.00%	4.00%
17	2.00%	5.00%
18	1.00%	4.00%
19	9.00%	12.00%
20	1.00%	4.00%
21	5.00%	8.00%
22+	1.00%	4.00%

# TEACHERS' RETIREMENT SYSTEM OF THE CITY OF NEW YORK

## QUALIFIED PENSION PLAN

<p style="text-align: center;"><b>Table 7</b></p> <p style="text-align: center;">ACTIVE MEMBER VALUATION DATA</p>				
<b>June 30 (Lag) Actuarial Valuation</b>	<b>Number</b>	<b>Annual Salary</b>	<b>Average Annual Salary</b>	<b>Percentage Increase/ (Decrease) In Avg. Salary</b>
2008	112,472	\$7,926,647,584	\$70,477	7.2%
2009	113,132	8,016,635,700	70,861	0.5%
2010	111,647	7,979,671,378	71,472	0.9%
2011	109,636	7,888,203,642	71,949	0.7%
2012	112,460	8,013,395,184	71,256	- 1.0%
2013	112,481	8,128,378,071	72,264	1.4%
2014	111,726	8,274,685,657	74,062	2.5%
2015	114,652	8,844,650,633	77,143	4.2%
2016	118,201	9,224,267,647	78,039	1.2%
2017	120,826	9,848,899,232	81,513	4.5%

Salaries reflect the impact of recent labor contract settlements and certain non-union salary increases with retroactive effective dates, if any.

## TEACHERS' RETIREMENT SYSTEM OF THE CITY OF NEW YORK QUALIFIED PENSION PLAN

<b>Table 8</b> SUMMARY OF PLAN MEMBERSHIP		
<b>Group</b>	<b>June 30, 2017 (Lag)</b>	<b>June 30, 2016 (Lag)</b>
Active members	120,826	118,201
Active Off Payroll <sup>1</sup>	7,997	7,401
Terminated vested members not yet receiving benefits	15,279	14,393
Retirees and beneficiaries currently receiving benefits	<u>84,770</u>	<u>84,093</u>
Total	228,872	224,088

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

# TEACHERS' RETIREMENT SYSTEM OF THE CITY OF NEW YORK

## QUALIFIED PENSION PLAN

<p style="text-align: center;"><b>Table 9</b></p> <p style="text-align: center;">RETIREES AND BENEFICIARIES ADDED TO AND REMOVED FROM THE ROLLS</p>								
June 30 (Lag) Actuarial Valuation	Added to Rolls		Removed from Rolls		End of Year Rolls		% Increase in Annual Allowances	Average Annual Allowances
	Number	Annual Allowances <sup>1</sup>	Number	Annual Allowances	Number	Annual Allowances <sup>2</sup>		
2008	3,252	\$75,074,813	1,969	\$64,757,835	69,775	\$2,941,612,151	0.4%	\$42,159
2009	3,115	6,288,013	2,065	73,586,895	70,825	2,874,313,269	(2.3%)	40,583
2010	3,534	207,981,284	2,003	64,538,942	72,356	3,017,755,611	5.0%	41,707
2011	3,849	278,652,149	2,141	67,488,320	74,064	3,228,919,440	7.0%	43,596
2012	4,684	200,786,572	2,209	62,805,438	76,539	3,366,900,574	4.3%	43,989
2013	4,078	248,087,233	2,440	77,107,240	78,177	3,537,880,567	5.1%	45,255
2014	4,356	275,947,759	2,114	67,585,789	80,419	3,746,242,537	5.9%	46,584
2015	4,728	219,769,491	2,370	81,986,287	82,777	3,884,025,741	3.7%	46,922
2016	3,808	157,518,432	2,492	86,890,450	84,093	3,954,653,723	1.8%	47,027
2017	3,519	254,567,439	2,842	111,573,800	84,770	4,097,647,362	3.6%	48,338

<sup>1</sup> 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.

# TEACHERS' RETIREMENT SYSTEM OF THE CITY OF NEW YORK

## QUALIFIED PENSION PLAN

Table 10			
STATUTORY VS ACTUARIAL CONTRIBUTIONS			
Fiscal Year Ended June 30	Statutory Contribution <sup>1</sup>	Actuarial Contribution	Employer Rate of Contribution <sup>2</sup>
2010	\$2,484,073,500	\$2,484,073,500	31.6%
2011	2,468,973,357	2,468,973,357	31.1%
2012	2,673,078,096	2,673,078,096	33.7%
2013	2,855,639,947	2,855,639,947	36.5%
2014	2,998,693,727	2,998,693,727	37.7%
2015	3,270,006,920	3,270,006,920	40.5%
2016	3,702,569,102	3,702,569,102	44.8%
2017	3,888,399,470	3,888,399,470	44.1%
2018	3,889,709,927	3,889,709,927	42.3%
2019 <sup>3</sup>	3,696,685,559	3,696,685,559	37.7%

<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 adjusted, where applicable, to be consistent with collective bargaining agreements estimated to be achieved.

<sup>3</sup>Starting with the Fiscal Year ended June 30, 2019, the Statutory and Actuarial Contributions include amounts contributed by the Department of Education into each member's Annuity Savings Accumulation Fund (ASAF).

# TEACHERS' RETIREMENT SYSTEM OF THE CITY OF NEW YORK

## QUALIFIED PENSION PLAN

### 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 UAL, actuarial gains and losses are financed over the working lifetimes of active participants and are not identified as separate UAL.

The funding status and funding progress information provided in the Schedule below 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 Accrued Liability (AL). Under the EAN cost method, the UAL equals the AL minus the Actuarial Value of Assets.

<p style="text-align: center;"><b>Table 11</b></p> <p style="text-align: center;">FUNDED STATUS BASED ON ENTRY AGE NORMAL COST METHOD</p> <p style="text-align: center;">(\$ Thousands)</p>						
June 30 (Lag) Valuation Date	(1) Actuarial Value of Assets (AVA)	(2) Accrued Liability (AL)	(3) Unfunded AL (UAL) (2) - (1)	(4) Funded Ratio (1) / (2)	(5) Covered Payroll	(6) UAL as a % of Covered Payroll (3) / (5)
2008	\$32,227,375	\$49,400,762	\$17,173,387	65.2%	\$7,926,648	216.7%
2009	30,774,981	47,988,459	17,213,478	64.1%	8,016,636	214.7%
2010	32,477,527	55,138,366	22,660,839	58.9%	7,979,671	284.0%
2011	33,601,537	57,702,731	24,101,194	58.2%	7,888,204	305.5%
2012	33,871,180	58,783,399	24,912,219	57.6%	8,013,395	310.9%
2013	35,186,072	61,988,933	26,802,861	56.8%	8,128,378	329.7%
2014	37,521,424	67,309,977	29,788,553	55.7%	8,274,686	360.0%
2015	39,290,072	69,625,608	30,335,536	56.4%	8,844,651	343.0%
2016	41,015,087	69,964,412	28,949,325	58.6%	9,224,268	313.8%
2017	44,381,706	69,552,380	25,170,674	63.8%	9,848,899	255.6%

Effective June 30, 2010, AL is based on the Entry Age Normal cost method. Previously, the Frozen Initial Liability cost method was used. Salaries reflect the impact of recent labor contract settlements and certain non-union salary increases with retroactive effective dates, if any.

# TEACHERS' RETIREMENT SYSTEM OF THE CITY OF NEW YORK

## QUALIFIED PENSION PLAN

Table 12							
COMPARATIVE SUMMARY OF ACCRUED LIABILITIES FUNDED BY ACTUARIAL VALUE OF ASSETS							
SOLVENCY TEST							
(\$ Thousands)							
June 30 (Lag) Valuation Date	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)
2008	\$2,898,027	\$29,182,084	\$14,743,596	\$32,227,375	100%	100%	1%
2009	2,823,873	27,862,679	14,620,140	30,774,981	100%	100%	1%
2010	2,962,696	32,264,333	17,529,345	32,477,527	100%	91%	1%
2011	3,167,737	34,317,270	17,770,140	33,601,537	100%	89%	1%
2012	3,122,720	35,575,735	17,558,791	33,871,180	100%	86%	0%
2013	3,330,541	37,451,527	18,565,932	35,186,072	100%	85%	0%
2014	3,547,779	40,753,340	20,193,955	37,521,424	100%	83%	0%
2015	3,646,765	42,095,109	20,888,473	39,290,072	100%	85%	0%
2016	3,765,740	41,651,524	21,465,314	41,015,087	100%	89%	0%
2017	3,291,234	42,149,684	23,681,032	44,381,706	100%	97%	0%

See following "SOLVENCY TEST – NOTES."

# TEACHERS' RETIREMENT SYSTEM OF THE CITY OF NEW YORK

## 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.

The values in the Table are dependent upon census data, benefit levels (which have changed over the past years), and the actuarial assumptions and methods employed at each valuation date.

To fully evaluate trends in financial soundness, changes in assumptions need to be evaluated. Beginning with the June 30, 2010 (Lag) actuarial valuation, 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. The two most recent changes in assumptions and methods occurred in the June 30, 2017 (Lag) valuation used to compute the Employer Contributions for Fiscal Year 2019 and in the June 30, 2014 (Lag) valuation used to compute the Employer contribution for Fiscal Year 2016.

# TEACHERS' RETIREMENT SYSTEM OF THE CITY OF NEW YORK QUALIFIED PENSION PLAN

## CONTRIBUTIONS

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

### A. MEMBER CONTRIBUTIONS

#### 1. Coordinated Retirement Plan (Article 15):

A Tier III/IV member of this Plan is mandated to contribute 3% of annual wages during all the years of coverage. If a member resigns or is otherwise terminated from City Service prior to eligibility for a benefit, all of his or her contributions with 5% interest will be refunded upon request.

Beginning October 1, 2000, Tier III and IV members will not be required to make basic required contributions after the 10th anniversary of their membership date or completion of 10 years of City Service, whichever is earlier. Effective February 27, 2008, active members were eligible to enroll in a 55/25 plan (age 55 with 25 years of service). Those that chose the 55/25 plan were required to contribute an additional 1.85% of pay from February 28, 2008 until June 29, 2008, or until they have accumulated 25 years of service, whichever is later. New members joining after February 27, 2008 are automatically enrolled in a 55/27 plan (age 55 with 27 years of service). These members are required to pay an additional 1.85% of pay for the first 27 years of service. New members after December 10, 2009 who are represented by the UFT are required to contribute 4.85% of salary for the first 27 years of service and 1.85% of salary thereafter.

A Tier VI member is mandated to contribute between 3.0% and 6.0% of salary until the later of separation from service or retirement.

#### 2. Twenty-Year Pension Plan:

A member of this Plan is required to contribute a percentage of salary which, if paid from the date of entry until the date of completion of 20 years of City Service, would provide at the payability date, an annuity of approximately one-eighth of the member's final salary as of the completion of 20 years of City Service. Tier II members who elected to join the 55/25 plan pay an additional 1.85% of pay.

## TEACHERS' RETIREMENT SYSTEM OF THE CITY OF NEW YORK

### QUALIFIED PENSION PLAN

#### 3. Age-55-Increased-Benefits Pension Plan:

A member of this Plan is required to contribute a percentage of salary, which if paid to the age for service retirement under the law in effect prior to July 1, 1970, would provide an annuity equal to approximately 1% of the average annual compensation during the last five years of service multiplied by years of service. Tier II members who elected to join the 55/25 plan pay an additional 1.85% of pay.

Member contributions are accumulated with interest in individually maintained accounts. Except under Article 15, upon retirement, the amount to the member's credit (i.e. Accumulated Deductions) is used to purchase his or her annuity on the basis of the tables adopted by the Teachers' Retirement Board. Upon death in service, the death benefits, including the Accumulated Deductions, are paid to the beneficiary and, on termination of employment other than by death or retirement, the Accumulated Deductions are returned to the member.

Beginning July 1, 1960, on a year-to-year basis, the required contributions of members were reduced by an Increased-Take-Home-Pay factor initially equal to 2.5% of salary. The following table shows effective periods and Increased-Take-Home-Pay factors.

PERIOD	INCREASED-TAKE-HOME-PAY FACTOR
<b>Board of Education Employees</b>	
07/01/60 - 06/30/61	2.5%
07/01/61 - 08/31/67	5.0%
09/01/67 - 08/31/68	8.0%
<b>Board of Higher Education Employees</b>	
09/01/67 - 08/31/68	5.0%
<b>Twenty-Year and Age-55-Increased-Benefits Pension Plan Members</b>	
09/01/68 - 06/30/70	8.0%
07/01/70 - 12/31/75	5.0%
01/01/76 and later	2.5%
<b>Article 15 Members</b>	
All	0.0%

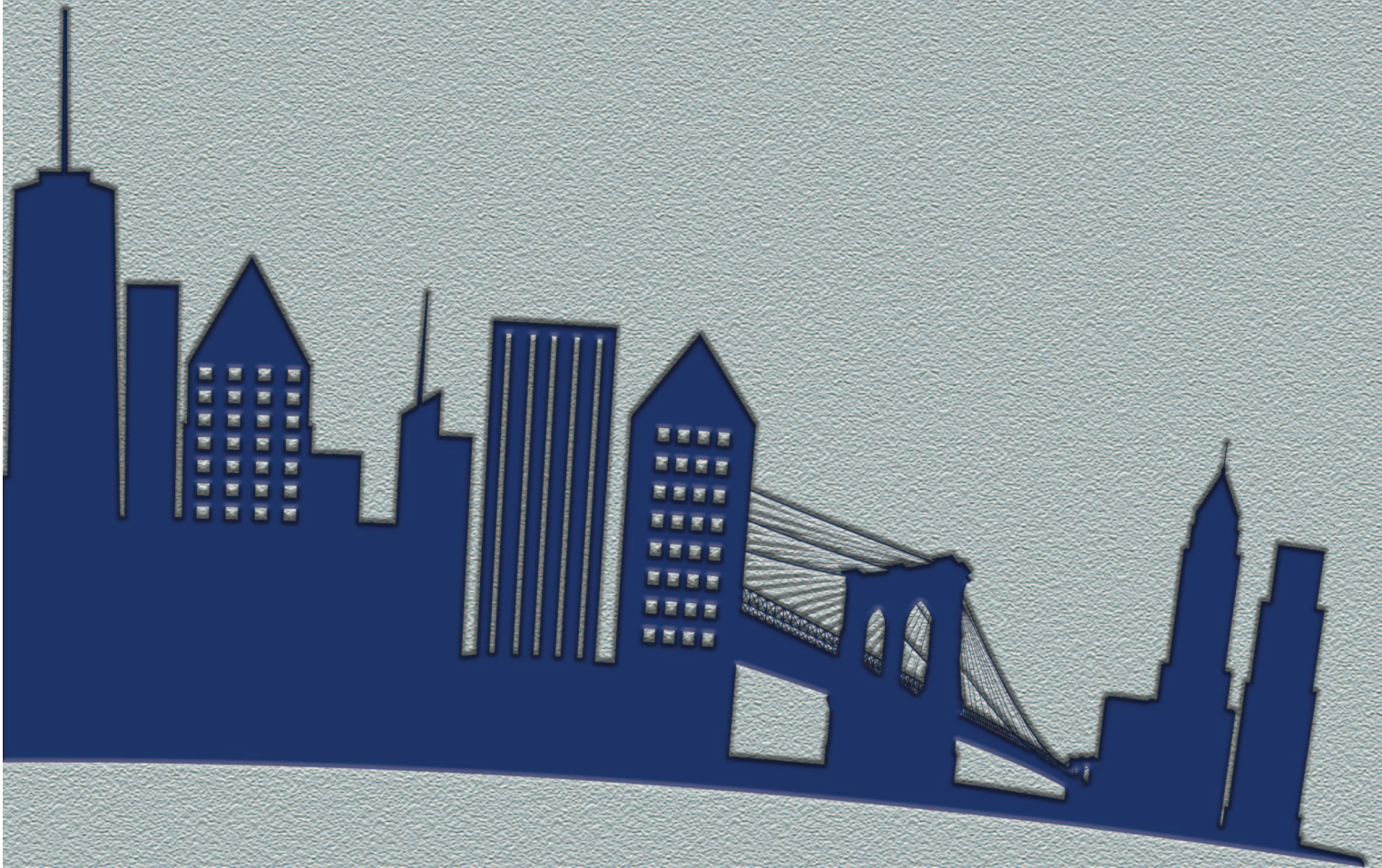
## TEACHERS' RETIREMENT SYSTEM OF THE CITY OF NEW YORK QUALIFIED PENSION PLAN

### **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 TO STATISTICAL SECTION

This part of the Comprehensive Annual Financial Report presents detailed information as a context for understanding how the information in the Financial Section relates to the Teachers' Retirement System's overall condition. The following are the categories of the various schedules that are included in this Section:

### **QPP Financial Trend Information**

Schedules 1 through 3 contain trend information to help the reader understand how the QPP's financial performance and condition have changed over time.

### **QPP Demographic and Economic Information of In-Service Members**

Schedules 4 through 7 offer demographic and economic information of in-service members to help the reader understand this segment of the QPP membership population.

### **QPP Benefit Payment and Demographic and Economic Information of Retired Members**

Schedules 8 through 16 present information to help the reader assess the QPP's current and future benefit payment obligations based on financial and demographic information of retired members.

### **QPP and TDA Operating Expense Information**

Schedule 17 contains trend information as it relates to investment and administrative expenses of the System.

### **TDA Financial Trend Information**

Schedules 18 through 20 contain trend information to help the reader understand how the TDA Program's financial performance and condition have changed over time.

### **TDA Membership Information of In-Service and Retired Members**

Schedules 21 through 25 present membership information to help the reader assess the TDA Program's demographics and financial activity.

**SCHEDULE 1: NET POSITION AND CHANGES IN NET POSITION—QPP***In Thousands*

Year Ended	Pension Fund	Diversified Equity	Balanced Fund*	International Equity	Inflation Protection	Socially Responsive Equity	Net Position	Changes in Net Position
2010	\$23,140,827	\$3,107,689	\$129,595	\$13,803	\$3,754	\$2,742	\$26,398,410	\$3,320,921
2011	29,942,258	3,523,126	112,117	15,626	4,527	3,883	33,601,537	7,203,127
2012	29,611,995	3,053,466	80,952	16,802	5,937	5,609	32,774,761	(826,776)
2013	33,654,166	3,110,127	63,719	16,320	5,882	6,242	36,856,456	4,081,695
2014	41,199,953	3,210,248	48,507	17,082	5,662	8,487	44,489,939	7,633,483
2015	41,452,046	2,740,658	34,034	15,071	4,747	8,108	44,254,664	(235,275)
2016	41,440,456	2,142,217	22,786	12,262	3,930	7,894	43,629,545	(625,119)
2017	43,920,339	6,058,218	83,594	16,685	4,760	12,127	50,095,723	6,466,178
2018	48,172,801	6,256,312	69,477	16,458	4,553	12,875	54,532,476	4,436,753
2019	51,949,650	5,947,790	61,152	15,470	3,904	12,245	57,990,211	3,457,735

\* Bond Fund prior to January 1, 2018 and Stable-Value Fund prior to January 1, 2012.

**SCHEDULE 2: 2019 CHANGES IN NET POSITION—QPP***In Thousands*

	Pension Fund	Diversified Equity	Balanced Fund	International Equity	Inflation Protection	Socially Responsive Equity	Total
2018 Net Position	\$48,172,801	\$6,256,312	\$69,477	\$16,458	\$4,553	\$12,875	\$54,532,476
Member Contributions	216,875	290	40	-	-	-	217,205
Employer Contributions	3,759,181	17	1	-	-	-	3,759,199
Interest & Misc Income	1,155,781	5,095	15	5	9	16	1,160,921
Dividend Income	964,931	145,852	1,377	143	121	307	1,112,731
Realized Profit/Loss	694,117	250,457	14	245	168	738	945,739
Unrealized Profit/Loss	2,784,495	17,845	1,914	(135)	(224)	(539)	2,803,356
Benefit Payments	(3,871,764)	(587,675)	(8,636)	(1,511)	(404)	(1,110)	(4,471,100)
Refunds & Withdrawals	(16,529)	(51)	-	-	-	-	(16,580)
Interest Paid to TDA Funds	(1,716,679)	-	-	-	-	-	(1,716,679)
Transfer to other Systems	1,222	-	-	-	-	-	1,222
Interfund Transfer	127,717	(124,791)	(2,957)	287	(314)	58	0
TDA Rebalance	27,449	-	-	-	-	-	27,449
Provision for Expenses*	(349,947)	(15,561)	(93)	(22)	(5)	(100)	(365,728)
<b>2019 Net changes</b>	<b>\$3,776,849</b>	<b>(\$308,522)</b>	<b>(\$8,325)</b>	<b>(\$988)</b>	<b>(\$649)</b>	<b>(\$630)</b>	<b>\$3,457,735</b>
<b>2019 Net Position</b>	<b>\$51,949,650</b>	<b>\$5,947,790</b>	<b>\$61,152</b>	<b>\$15,470</b>	<b>\$3,904</b>	<b>\$12,245</b>	<b>\$57,990,211</b>

\* Includes Administrative and Investment Expenses.

### SCHEDULE 3: CHANGES IN NET POSITION—QPP

*In Thousands*

	1	2	3	4	5	6	7	8	9	10	11
Year Ended June 30*	Net Member Contributions	Employer Contributions	Net Investment Income	Transfer from/to Other Systems	TDA Fixed Interest Payments	Total Retirement Benefits	Loans Closed at Retirement	Withdrawals	Other Benefits**	Administrative Expenses	Change in Net Position
2010	\$138,075	\$2,566,288	\$4,778,159	(\$2,109)	(\$816,557)	(\$3,017,755)	(\$30,338)	(\$12,782)	(\$240,595)	(\$41,465)	\$3,320,921
2011	158,829	2,525,111	8,888,669	737	(854,073)	(3,228,940)	(39,998)	(10,593)	(197,066)	(39,549)	7,203,127
2012	164,361	2,732,263	803,007	853	(945,967)	(3,366,901)	(28,031)	(17,273)	(129,375)	(39,713)	(826,776)
2013	154,698	2,912,844	5,721,112	(44)	(1,047,979)	(3,537,881)	(24,006)	(12,690)	(44,677)	(39,682)	4,081,695
2014	154,962	3,054,424	9,435,906	404	(1,047,923)	(3,740,243)	(24,866)	(18,813)	(134,326)	(46,042)	7,633,483
2015	158,590	3,325,528	1,611,929	329	(1,248,988)	(3,884,026)	(28,775)	(14,312)	(97,159)	(58,391)	(235,275)
2016	173,696	3,760,714	960,267	1,233	(1,354,207)	(3,954,654)	(20,126)	(13,639)	(119,036)	(59,367)	(625,119)
2017	180,076	3,945,768	8,133,280	(2,291)	(1,466,615)	(4,097,646)	(16,958)	(13,493)	(135,153)***	(60,790)	6,466,178
2018	195,241	3,949,689	6,275,115	(3,534)	(1,595,462)	(4,234,277)	(17,935)	(17,262)	(49,746)***	(65,076)	4,436,753
2019	217,205	3,759,199	5,721,310	1,222	(1,716,679)	(4,340,759)	(12,800)	(16,580)	(90,092)***	(64,291)	3,457,735

#### Total Retirement Benefits By Type

Year June 30*	6a Service Retirement Allowances	6b Ordinary Disability Retirement Allowances	6c Accident Disability Retirement Allowances	6d Death Benefits To Beneficiaries	Total Retirement Benefits
2010	(\$2,851,639)	(\$40,327)	(\$22,809)	(\$102,980)	(\$3,017,755)
2011	(3,046,583)	(43,348)	(25,596)	(113,413)	(3,228,940)
2012	(3,178,074)	(46,071)	(27,811)	(114,945)	(3,366,901)
2013	(3,337,405)	(48,492)	(28,487)	(123,497)	(3,537,881)
2014	(3,531,071)	(51,484)	(23,087)	(134,601)	(3,740,243)
2015	(3,660,115)	(54,633)	(30,276)	(139,002)	(3,884,026)
2016	(3,721,783)	(56,624)	(30,912)	(145,335)	(3,954,654)
2017	(3,855,232)	(58,447)	(31,470)	(152,497)	(4,097,646)
2018	(3,979,655)	(61,606)	(32,700)	(160,316)	(4,234,277)
2019	(4,071,639)	(64,891)	(33,665)	(170,564)	(4,340,759)

\* Benefit Payment categories for 2010-2018 take into account retirement valuation reports.

\*\* Other Benefits consists of Retiree Advances, delayed interest payments, Active Death Payments, and excluding Fiscal Year 2019, adjustment of retirement benefits is based on retirement valuation reports. Also, Fiscal Year 2011 includes \$112,462 in Nager II benefit payments, Fiscal Year 2010 includes \$149,406 minimum accumulation settlement.

\*\*\* TDA rebalance transfers include a \$43,938 negative adjustment in 2017, a \$32,704 positive adjustment in 2018, and a \$27,449 positive adjustment in 2019.

**Note:** Benefit payments and withdrawals include columns 6, 7, 8, and 9.

**SCHEDULE 4: PARTICIPATING EMPLOYERS—QPP***As of June 30, 2017 (Lag)*

<b>Employer</b>			<b>Number of In-Service Members*</b>	<b>Annual Payroll*</b>
NYC Department of Education and City University of New York			114,102	\$9,414,545,065
City University of New York Senior Colleges & Community Colleges			6,184	390,617,342
<b>Charter Schools**</b>	<b>Start Date</b>	<b>Type</b>		
Future Leaders Institute	09/2005	DOE Conversion - UFT	42	3,198,331
Harriet Tubman	09/2005	DOE Conversion - Non Union	62	3,923,509
Kipp Academy	09/2000	DOE Conversion - UFT	86	6,841,975
Kipp NYC***	07/2016	Non Conversion - Non Union	39	3,864,783
Opportunity	09/2004	Non Conversion - UFT	61	4,771,713
Renaissance	09/2000	DOE Conversion - UFT	59	5,194,362
South Bronx	09/2015	Non Conversion - UFT	27	1,885,261
UFT Elementary	09/2005	Non Conversion - UFT	34	2,957,959
University Prep (formally UFT Green Dot)	09/2008	Non Conversion - UFT	41	3,974,294
Voice	09/2008	Non Conversion - Non Union	60	4,326,832
Wildcat	09/2000	DOE Conversion - UFT	29	2,797,806
<b>SUBTOTAL</b>			<b>540</b>	<b>\$43,736,825</b>
<b>TOTAL</b>			<b>120,826</b>	<b>\$9,848,899,232</b>

\* The number of in service employees and their corresponding Annual Payroll include only current active members receiving salary as of each June 30th.

\*\* Charter Schools that were converted from the NYC Department of Education Schools became participating employers when they were first converted to Charter Schools. Unless restricted by a collective bargaining agreement, a non-conversion Charter School decision to participate is voluntary and at the discretion of the individual school. Imagine Me Leadership Charter School became a participant in 2017, and employer contribution has begun in Fiscal Year 2019.

\*\*\* KIPP AMP and KIPP Infinity combined to form KIPP NYC as of July 1, 2016.

**SCHEDULE 5: ACTIVE MEMBERSHIP SUMMARY—QPP**

Year	As of July 1	Contributors Registered	Payroll Updates	Contributors Withdrawn	As of June 30th
2009	112,472	7,526	(4,015)*	(2,851)	113,132
2010	113,132	4,617	(3,378)	(2,724)	111,647
2011	111,647	4,779	(3,717)	(3,073)	109,636
2012	109,636	9,519	(3,135)	(3,560)	112,460
2013	112,460	7,101	(3,744)	(3,336)	112,481
2014	112,481	7,915	(4,032)	(4,638)	111,726
2015	111,726	8,727	(2,499)	(3,302)	114,652
2016	114,652	10,239	(2,519)	(4,171)	118,201
2017	118,201	9,466	(2,894)	(3,947)	120,826
2018	120,826	8,797	(3,619)	(4,240)	121,764

\*Revised for FY 2010.

Active membership summary based on latest valuation reports. Estimated active memberships of 124,000 for 2019.

**SCHEDULE 6: TABLE OF AVERAGE SALARIES OF IN-SERVICE MEMBERS—QPP**

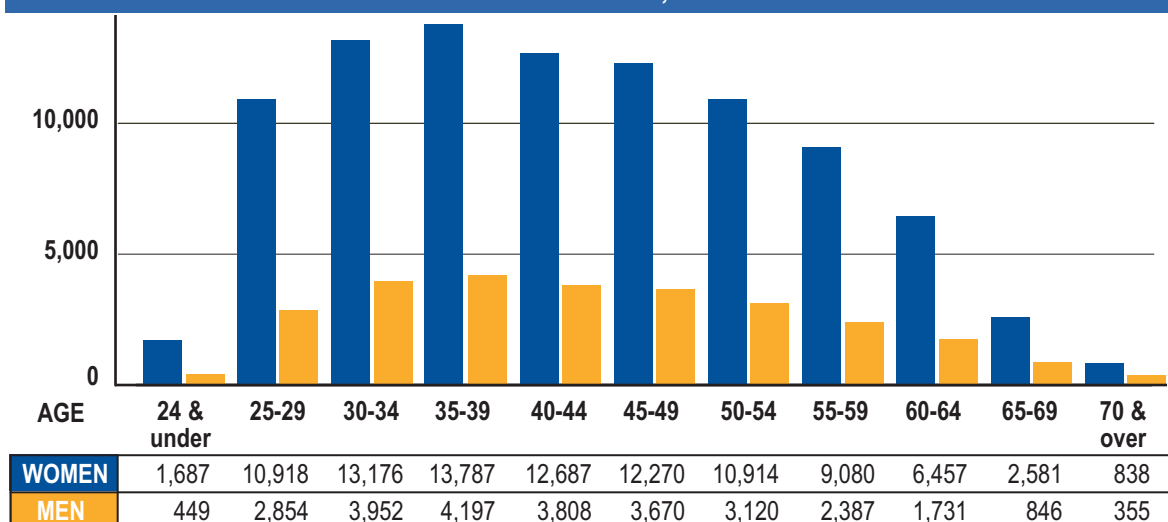
As of June 30, 2018

MEN			WOMEN		
Age	Number of In-Service Members*	Average Salaries*	Age	Number of In-Service Members*	Average Salaries*
24 & under	449	\$53,579	24 & under	1,687	\$54,896
25-29	2,854	64,323	25-29	10,918	65,921
30-34	3,952	77,760	30-34	13,176	78,245
35-39	4,197	89,723	35-39	13,787	87,041
40-44	3,808	97,406	40-44	12,687	90,556
45-49	3,670	100,988	45-49	12,270	91,522
50-54	3,120	103,584	50-54	10,914	90,077
55-59	2,387	102,230	55-59	9,080	86,947
60-64	1,731	97,367	60-64	6,457	86,103
65-69	846	92,252	65-69	2,581	84,774
70 & over	355	87,886	70 & over	838	76,157
<b>TOTAL</b>	<b>27,369</b>	<b>\$90,542</b>	<b>TOTAL</b>	<b>94,395</b>	<b>\$83,970</b>
TOTAL ANNUAL SALARIES \$2,478,047,028			TOTAL ANNUAL SALARIES \$7,926,356,656		

\* The member count and the annual payroll include only those who were on the June 30<sup>th</sup> payroll.

**IN-SERVICE MEMBERS ON PAYROLL—DISTRIBUTION BY AGE**

As of June 30, 2018



### SCHEDULE 7: IN-SERVICE MEMBERSHIP BY TIER AND BY TITLE—QPP

Year	Average Age	IN-SERVICE MEMBERSHIP BY TIER					IN-SERVICE MEMBERSHIP BY TITLE					
		Tier I	Tier II	Tier III	Tier IV	Tier VI	Teachers	Paraprofessionals	Principals and Administrators	Full-Time CUNY Faculty	Adjunct CUNY Instructors	Others
2010	45.2	1.6%	0.8%	2.7%	94.9%	0.0%	67.9%	15.2%	5.4%	1.9%	1.1%	8.5%
2011	45.5	1.2%	0.6%	2.3%	95.9%	0.0%	67.2%	15.6%	5.5%	2.1%	1.3%	8.3%
2012	45.4	0.9%	0.5%	1.8%	96.6%	0.2%	65.1%	16.7%	5.4%	2.4%	2.4%	8.0%
2013	45.3	0.7%	0.4%	1.4%	91.4%	6.1%	64.9%	16.9%	5.5%	2.7%	2.4%	7.6%
2014	44.8	0.5%	0.2%	1.0%	86.3%	12.1%	64.7%	16.6%	5.7%	3.0%	2.4%	7.6%
2015	44.8	0.4%	0.2%	0.7%	81.3%	17.4%	64.5%	16.8%	5.4%	3.3%	2.3%	7.7%
2016	44.7	0.3%	0.2%	0.6%	81.0%	17.9%	63.6%	17.3%	5.6%	3.4%	2.3%	7.8%
2017	44.6	0.2%	0.1%	0.5%	71.6%	27.6%	62.9%	17.7%	5.6%	3.7%	2.3%	7.8%
2018	44.7	0.2%	0.1%	0.4%	67.7%	31.6%	62.9%	17.6%	5.6%	3.9%	2.3%	7.7%
2019	44.8	0.1%	0.1%	0.3%	64.5%	35.0%	62.5%	17.8%	5.6%	4.2%	2.3%	7.6%

### SCHEDULE 8: RETIREE SUMMARY—QPP

Year	As of July 1	Retirees Registered	Payroll Status Changes	Retirees Withdrawn	As of June 30th
2009	69,775	2,626	(140)	(1,436)	70,825
2010	70,825	3,065	(404)	(1,130)	72,356
2011	72,356	3,285	(39)	(1,537)	74,065
2012	74,064	4,180	(412)	(1,293)	76,539
2013	76,539	3,541	(451)	(1,452)	78,177
2014	78,177	3,791	(186)	(1,363)	80,419
2015	80,419	4,171	(308)	(1,505)	82,777
2016	82,777	3,267	(16)	(1,935)	84,093
2017	84,093	3,030	(153)	(2,200)	84,770
2018	84,770	3,578	(21)	(2,032)	86,295

Retiree membership summary based on latest valuation reports. Estimated retiree memberships of 87,000 for 2019.

### SCHEDULE 9: AVERAGE YEARS OF SERVICE OF NEW RETIREES—QPP

#### Average Years of Service

Year Ended June 30	Men	Women	Men and Women	Total Number of Retirees*
2009	26.7	25.1	25.5	2,626
2010	26.6	25.8	26.0	3,065
2011	26.5	25.3	25.6	3,285
2012	25.8	25.2	25.3	4,180
2013	25.1	24.8	24.9	3,541
2014	24.2	24.7	24.6	3,791
2015	24.9	24.0	24.2	4,171
2016	24.5	24.3	24.4	3,267
2017	25.6	25.0	25.1	3,030
2018	25.6	25.1	25.2	3,578

\*Total number of new retirees based on latest valuation reports.

### SCHEDULE 10: PAYMENT OPTIONS CHOSEN AT RETIREMENT—QPP

Year	Average Age	OPTIONS CHOSEN BY TIER I/II MEMBERS					OPTIONS CHOSEN BY TIER III/IV/VI MEMBERS			
		Maximum Payout	Pop-Up Payments	Continuing Payments	Lump-Sum Payment	Guaranteed Number of Payments	Maximum Payout	Pop-Up Payments	Continuing Payments	Guaranteed Number of Payments
2010	60.5	65.2%	20.3%	12.5%	0.8%	1.2%	71.4%	17.1%	9.3%	2.2%
2011	60.5	59.2%	24.5%	12.1%	2.8%	1.4%	71.0%	16.4%	10.5%	2.1%
2012	60.6	61.1%	24.8%	11.3%	1.1%	1.7%	71.4%	17.2%	9.7%	1.7%
2013	60.7	64.1%	21.5%	11.5%	1.3%	1.6%	68.9%	19.1%	10.3%	1.7%
2014	60.8	62.1%	25.2%	10.7%	1.1%	0.9%	69.2%	19.5%	9.6%	1.7%
2015	60.8	50.8%	25.4%	20.0%	1.5%	2.3%	68.5%	18.1%	10.6%	2.8%
2016	60.9	59.4%	20.3%	17.6%	0.7%	2.0%	68.2%	19.6%	10.7%	1.5%
2017	60.9	62.4%	23.7%	11.9%	0.0%	2.0%	67.8%	19.4%	10.9%	1.9%
2018	61.0	56.1%	27.1%	15.0%	0.9%	0.9%	66.6%	20.3%	11.6%	1.5%
2019	61.0	56.4%	15.4%	25.6%	1.3%	1.3%	66.7%	20.5%	11.4%	1.4%

## SCHEDULE 11: RETIREES' AVERAGE MONTHLY BENEFIT PAYMENTS AND FINAL AVERAGE SALARY ORGANIZED BY YEARS OF CREDITED SERVICE—QPP

	Year*	Survivor	Other**	Under 5 Yrs***	5 - 9 Yrs	10 - 14 Yrs	15 - 19 Yrs	20 - 24 Yrs	25 - 29 Yrs	30 - 35 Yrs	35 & up Yrs	Total
Retirees	2010	3,935	6,493	59	934	3,709	5,310	7,829	14,557	18,139	11,391	72,356
Retirees	2011	3,989	6,423	60	1,040	3,937	5,466	8,163	15,057	18,401	11,529	74,065
Retirees	2012	4,071	5,882	63	1,165	4,382	5,720	8,786	15,942	18,786	11,742	76,539
Retirees	2013	4,118	5,363	64	1,270	4,704	5,862	9,371	16,634	19,064	11,727	78,177
Retirees	2014	4,257	8,208	65	1,377	5,054	6,011	9,600	16,671	18,140	11,036	80,419
Retirees	2015	4,403	4,620	68	1,481	5,543	6,374	10,588	18,260	19,649	11,791	82,777
Retirees	2016	4,564	4,989	67	1,516	5,794	6,535	10,854	18,568	19,536	11,670	84,093
Retirees	2017	4,635	3,879	69	1,566	5,975	6,713	11,266	19,106	19,912	11,649	84,770
Retirees	2018	4,651	3,264	67	1,679	6,290	6,909	11,720	19,784	20,279	11,652	86,295
Retirees	2019****	4,734	5,557	65	1,722	6,245	6,757	11,661	19,027	19,839	11,393	87,000

	Year*	Under 5 Yrs***	5 - 9 Yrs	10 - 14 Yrs	15 - 19 Yrs	20 - 24 Yrs	25 - 29 Yrs	30 - 34 Yrs	35 & up Yrs
Avg Monthly Benefit	2010	\$1,073	\$609	\$872	\$1,336	\$2,172	\$3,466	\$4,592	\$5,976
Avg Monthly Benefit	2011	\$1,194	\$568	\$951	\$1,459	\$2,394	\$4,004	\$5,451	\$7,556
Avg Monthly Benefit	2012	\$1,265	\$588	\$987	\$1,504	\$2,331	\$3,682	\$4,798	\$6,286
Avg Monthly Benefit	2013	\$1,292	\$597	\$993	\$1,478	\$2,417	\$3,822	\$4,969	\$6,532
Avg Monthly Benefit	2014	\$1,322	\$614	\$1,005	\$1,531	\$2,451	\$3,897	\$5,100	\$6,764
Avg Monthly Benefit	2015	\$1,324	\$606	\$1,046	\$1,541	\$2,609	\$4,054	\$5,279	\$7,350
Avg Monthly Benefit	2016	\$1,290	\$681	\$1,118	\$1,555	\$2,601	\$4,065	\$5,202	\$6,895
Avg Monthly Benefit	2017	\$1,360	\$648	\$1,112	\$1,626	\$2,693	\$4,198	\$5,368	\$7,061
Avg Monthly Benefit	2018	\$1,442	\$995	\$1,219	\$1,714	\$2,792	\$4,266	\$5,481	\$7,240
Avg Monthly Benefit	2019****	\$1,506	\$906	\$1,153	\$1,620	\$2,741	\$4,276	\$5,475	\$7,232

	Year*	Under 5 Yrs***	5 - 9 Yrs	10 - 14 Yrs	15 - 19 Yrs	20 - 24 Yrs	25 - 29 Yrs	30 - 34 Yrs	35 & up Yrs
Final Average Salary	2010	\$28,056	\$39,632	\$41,401	\$43,566	\$53,567	\$61,429	\$71,226	\$80,400
Final Average Salary	2011	\$28,895	\$40,803	\$42,607	\$44,701	\$55,226	\$63,830	\$72,377	\$81,273
Final Average Salary	2012	\$30,270	\$42,741	\$44,943	\$46,367	\$57,724	\$66,782	\$73,787	\$82,267
Final Average Salary	2013	\$31,076	\$43,539	\$46,381	\$47,698	\$59,738	\$69,113	\$74,985	\$82,940
Final Average Salary	2014	\$30,646	\$43,911	\$47,700	\$48,561	\$60,661	\$70,338	\$75,376	\$83,206
Final Average Salary	2015	\$30,946	\$44,441	\$49,831	\$50,645	\$63,802	\$73,796	\$77,860	\$84,692
Final Average Salary	2016	\$30,465	\$44,767	\$51,350	\$52,142	\$65,096	\$75,755	\$78,660	\$85,340
Final Average Salary	2017	\$30,945	\$45,569	\$52,882	\$54,286	\$67,606	\$78,798	\$80,914	\$86,726
Final Average Salary	2018	\$32,029	\$45,696	\$53,990	\$55,783	\$69,233	\$80,890	\$82,536	\$87,830
Final Average Salary	2019****	\$32,819	\$45,373	\$53,449	\$55,695	\$69,782	\$81,534	\$83,186	\$88,424

\* Retiree figures for 2010-2018 take into account retirement valuation reports.

\*\* Refers to retirees with a payment setup processed by a previous database system. The current payment system was initiated in 1998.

\*\*\* Retirees include Service Retirement, Accidental Disability and Ordinary Disability. The majority of retirees with under 5 Yrs. of service are Accidental Disability.

\*\*\*\* Retiree figures for 2019 include Service or FAS retirement revision cases previously categorized as "Other"

**Note:** If elected, total monthly benefits for Tier I and Tier II members depend on current unit value.

### SCHEDULE 12: AVERAGE ANNUAL BENEFIT PAYMENT AMOUNTS—QPP

Year Ended June 30	SERVICE RETIREMENT BENEFITS		ORDINARY (NON-DUTY) DISABILITY BENEFITS		ACCIDENTAL (DUTY) DISABILITY BENEFITS		SURVIVORS' BENEFITS	
	Number	Average Annual Allowance	Number	Average Annual Allowance	Number	Average Annual Allowance	Number	Average Annual Benefit
2009	64,281	\$42,235	2,037	\$19,141	589	\$35,993	3,918	\$25,317
2010	65,734	43,381	2,068	19,500	619	36,849	3,935	26,170
2011	67,253	45,300	2,153	20,134	670	38,202	3,989	28,432
2012	69,515	45,718	2,242	20,549	711	39,116	4,071	28,235
2013	71,017	46,994	2,299	21,093	713	39,954	4,148	29,773
2014	73,069	48,325	2,379	21,641	714	40,738	4,257	31,619
2015	75,251	48,639	2,481	22,020	732	41,360	4,313	32,229
2016	76,346	48,749	2,541	22,284	745	41,492	4,461	32,579
2017	76,973	50,086	2,549	22,929	744	42,299	4,504	33,858
2018	78,364	50,784	2,640	23,336	757	43,197	4,534	35,359

### SCHEDULE 13: SERVICE RETIREMENT ALLOWANCES—QPP

*As of June 30, 2018*

MEN			WOMEN		
Age	Number of Retirees	Average Annual Allowance	Age	Number of Retirees	Average Annual Allowance
under 30	-	-	under 30	-	-
30-34	-	-	30-34	-	-
35-39	-	-	35-39	-	-
40-44	-	-	40-44	-	-
45-49	-	-	45-49	-	-
50-54	-	-	50-54	-	-
55-59	750	\$53,708	55-59	2,164	\$53,106
60-64	1,778	51,957	60-64	6,100	48,789
65-69	3,926	56,174	65-69	12,650	50,986
70-74	6,877	64,827	70-74	13,341	52,319
75-79	3,914	59,224	75-79	9,126	45,693
80-84	2,388	57,223	80-84	5,701	40,587
85-89	1,606	55,848	85-89	3,944	39,163
90 & over	955	51,959	90 & over	3,144	36,432
<b>TOTAL</b>	<b>22,194</b>	<b>\$58,800</b>	<b>TOTAL</b>	<b>56,170</b>	<b>\$47,585</b>
TOTAL ANNUAL ALLOWANCES PAID \$1,306,777,818			TOTAL ANNUAL ALLOWANCES PAID \$2,672,876,974		

**SCHEDULE 14: ORDINARY DISABILITY RETIREMENT ALLOWANCES—QPP***As of June 30, 2018*

MEN			WOMEN		
Age	Number of Retirees	Average Annual Allowance	Age	Number of Retirees	Average Annual Allowance
under 30	-	-	under 30	-	-
30-34	-	-	30-34	-	-
35-39	2	\$18,148	35-39	7	\$27,234
40-44	10	29,128	40-44	38	24,465
45-49	22	28,206	45-49	94	25,854
50-54	32	28,398	50-54	161	27,293
55-59	68	27,944	55-59	310	24,274
60-64	97	24,333	60-64	381	22,750
65-69	114	26,638	65-69	429	22,967
70-74	116	26,145	70-74	318	21,609
75-79	49	24,013	75-79	183	17,973
80-84	25	20,994	80-84	84	16,549
85-89	12	27,005	85-89	42	17,860
90 & over	6	33,669	90 & over	40	22,516
<b>TOTAL</b>	<b>553</b>	<b>\$26,066</b>	<b>TOTAL</b>	<b>2,087</b>	<b>\$22,612</b>
TOTAL ANNUAL ALLOWANCES PAID \$14,414,481			TOTAL ANNUAL ALLOWANCES PAID \$47,191,673		

**SCHEDULE 15: ACCIDENT DISABILITY RETIREMENT ALLOWANCES—QPP***As of June 30, 2018*

MEN			WOMEN		
Age	Number of Retirees	Average Annual Allowance	Age	Number of Retirees	Average Annual Allowance
under 30	-	-	under 30	-	-
30-34	-	-	30-34	1	\$40,124
35-39	1	\$37,648	35-39	2	38,682
40-44	6	50,562	40-44	7	42,185
45-49	6	45,864	45-49	15	44,006
50-54	4	59,951	50-54	30	45,579
55-59	16	45,617	55-59	57	44,431
60-64	21	54,212	60-64	86	40,519
65-69	32	45,783	65-69	128	41,326
70-74	65	48,205	70-74	113	39,504
75-79	29	48,155	75-79	40	49,949
80-84	13	47,778	80-84	40	31,472
85-89	7	39,839	85-89	18	38,258
90 & over	7	44,234	90 & over	13	47,289
<b>TOTAL</b>	<b>207</b>	<b>\$47,965</b>	<b>TOTAL</b>	<b>550</b>	<b>\$41,402</b>
TOTAL ANNUAL ALLOWANCES PAID \$9,928,789			TOTAL ANNUAL ALLOWANCES PAID \$22,771,335		

**SCHEDULE 16: SURVIVORS' BENEFITS—QPP***As of June 30, 2018*

<b>MEN</b>			<b>WOMEN</b>		
<b>Age</b>	<b>Number of Beneficiaries</b>	<b>Average Annual Benefit</b>	<b>Age</b>	<b>Number of Beneficiaries</b>	<b>Average Annual Benefit</b>
under 30	4	\$26,818	under 30	5	\$23,090
30-34	5	9,441	30-34	4	8,315
35-39	8	25,716	35-39	15	22,508
40-44	12	20,740	40-44	16	17,055
45-49	17	18,908	45-49	22	18,197
50-54	25	13,588	50-54	43	13,931
55-59	32	16,332	55-59	89	24,929
60-64	54	28,031	60-64	108	31,677
65-69	131	29,125	65-69	292	41,030
70-74	212	36,406	70-74	462	43,300
75-79	199	34,465	75-79	570	41,694
80-84	190	28,293	80-84	510	40,870
85-89	177	28,891	85-89	512	37,522
90 & over	251	26,658	90 & over	569	32,043
<b>TOTAL</b>	<b>1,317</b>	<b>\$29,521</b>	<b>TOTAL</b>	<b>3,217</b>	<b>\$37,748</b>
<b>TOTAL ANNUAL BENEFITS PAID</b>		<b>\$38,879,107</b>	<b>TOTAL ANNUAL BENEFITS PAID</b>		<b>\$121,436,741</b>

**SCHEDULE 17: NUMBER AND COST OF INVESTMENT AND ADMINISTRATIVE SERVICES (QPP & TDA)**

<b>Year Ended</b>	<b>Investment Agent Count</b>	<b>Investment Expenses</b>	<b>TRS Employees Count*</b>	<b>Administrative Expenses</b>
2010	206	\$139,101,694	365	\$51,929,857
2011	188	\$136,300,683	364	\$49,428,933
2012	221	\$122,647,913	368	\$50,064,502
2013	227	\$151,401,872	373	\$49,877,929
2014	230	\$169,736,553	376	\$63,230,181
2015	228	\$205,719,517	370	\$84,173,556
2016	230	\$209,422,244	365	\$91,998,934
2017	221	\$308,283,033	351	\$93,821,614
2018	227	\$352,816,375	347	\$87,532,002
2019	228	\$299,613,733**	350	\$88,255,115

\* Employee count does not include Consultants, Temporary Employees, and Summer Interns.

\*\* 2019 details are found in the schedule: Summary of Investment Managers and Fees of the Investment Section.

**SCHEDULE 18: NET POSITION AND CHANGES IN NET POSITION—TDA PROGRAM***In Thousands*

Year Ended	Pension Fund	Diversified Equity	Balanced Fund*	International Equity	Inflation Protection	Socially Responsive Equity	Net Position	Changes in Net Position
2010	\$11,884,377	\$4,999,750	\$293,448	\$51,831	\$11,978	\$12,441	\$17,253,825	\$1,816,103
2011	13,118,153	6,293,322	308,666	71,674	19,833	22,145	19,833,793	2,579,968
2012	14,554,722	5,975,066	301,727	57,905	22,590	30,087	20,942,097	1,108,304
2013	16,021,066	6,762,476	304,675	71,621	28,001	41,837	23,229,676	2,287,579
2014	17,450,769	7,909,321	304,788	96,028	37,488	75,095	25,873,489	2,643,813
2015	18,922,602	7,869,896	302,816	97,942	39,437	100,889	27,333,582	1,460,093
2016	20,511,536	7,365,430	312,613	96,081	41,444	117,236	28,444,340	1,110,758
2017	22,223,301	8,194,607	310,195	120,211	50,138	153,641	31,052,093	2,607,753
2018	23,963,722	8,704,088	316,507	143,858	60,281	192,526	33,380,982	2,328,889
2019	25,745,844	8,804,658	340,687	156,367	67,024	218,815	35,333,395	1,952,413

\* Bond Fund prior to January 1, 2018 and Stable-Value Fund prior to January 1, 2012.

**SCHEDULE 19: CHANGES IN NET POSITION—TDA PROGRAM***In Thousands*

Year Ended	1 Net Member Contributions	2 Fixed Interest from TRS NYC Pension Fund	3 Net Investment Income	5 Withdrawals	6 Other Benefits*	7 Annuitized Payments	8 Administrative Expenses	9 Change in Net Position
2010	\$640,370	\$816,557	\$683,726	(\$212,307)	(\$72,051)	(\$29,727)	(\$10,465)	\$1,816,103
2011	631,840	854,073	1,585,111	(369,370)	(80,565)	(31,241)	(9,880)	2,579,968
2012	627,159	945,967	109,651	(431,412)	(98,606)	(34,103)	(10,352)	1,108,304
2013	633,900	1,047,979	1,216,793	(460,659)	(104,402)	(35,837)	(10,195)	2,287,579
2014	638,979	1,147,923	1,631,411	(577,102)	(139,759)	(40,451)	(17,188)	2,643,813
2015	662,601	1,248,988	435,632	(658,504)	(157,994)	(44,847)	(25,783)	1,460,093
2016	717,566	1,354,207	(11,194)	(708,466)	(164,389)	(44,334)	(32,632)	1,110,758
2017	743,663	1,466,615	1,398,500	(781,276)	(139,690)**	(47,027)	(33,032)	2,607,753
2018	856,294	1,595,462	1,055,191	(882,994)	(220,931)**	(51,677)	(22,456)	2,328,889
2019	995,035	1,716,679	669,540	(996,830)	(356,090)**	(51,957)	(23,964)	1,952,413

\* Other Benefits consists of active death payments and delayed interest payments.

\*\* Includes \$43,938 positive, \$32,704 negative, and \$27,449 negative adjustments in 2017, 2018, and 2019, respectively, of TDA rebalance transfers.

**SCHEDULE 20: 2019 CHANGES IN NET POSITION—TDA PROGRAM***In Thousands*

	Pension Fund	Diversified Equity	Balanced Fund	International Equity	Inflation Protection	Socially Responsive Equity	Total
2018 Net Position	\$23,963,722	\$8,704,088	\$316,507	\$143,858	\$60,281	\$192,526	\$33,380,982
Member Contributions	687,478	225,727	26,310	19,363	9,706	26,451	995,035
Payment of interest on TDA fixed return funds	1,716,679	-	-	-	-	-	1,716,679
Interest & Misc Income	27,699	5,657	677	56	156	181	34,426
Dividend Income	-	161,945	7,318	1,601	2,144	3,351	176,359
Realized Profit/Loss	-	278,092	76	2,749	2,985	8,044	291,946
Unrealized Profit/Loss	-	163,393	9,263	(553)	(3,942)	(3,176)	164,985
Benefit Payments	(314,155)	(73,232)	(2,848)	(769)	(280)	(203)	(391,487)
Refunds & Withdrawals	(774,332)	(191,139)	(9,351)	(2,751)	(3,338)	(5,030)	(985,941)
Interfund Transfer	439,047	(423,944)	(5,146)	(6,687)	(1,071)	(2,199)	-
TDA Rebalance	(294)	(26,234)	(1,248)	(223)	471	79	(27,449)
Provision for Expenses*	-	(19,695)	(871)	(277)	(88)	(1,209)	(22,140)
<b>2019 Net changes</b>	<b>1,782,122</b>	<b>\$100,570</b>	<b>\$24,180</b>	<b>\$12,509</b>	<b>\$6,743</b>	<b>\$26,289</b>	<b>\$1,952,413</b>
<b>2019 Net Position</b>	<b>\$25,745,844</b>	<b>\$8,804,658</b>	<b>\$340,687</b>	<b>\$156,367</b>	<b>\$67,024</b>	<b>\$218,815</b>	<b>\$35,333,395</b>

\* Includes Administrative and Investment Expenses.

**SCHEDULE 21: TDA PROGRAM SUMMARY (EXCLUDES ANNUITANTS)**

Year	As of July 1	Contributors Registered	Payroll Status Changes	Contributors Withdrawn	As of June 30th
2009	72,898	1,121	3,768	(2,638)	75,149
2010	75,149	458	3,041	(2,731)	75,917
2011	75,917	845	2,617	(3,022)	76,357
2012	76,357	1,435	2,965	(3,513)	77,244
2013	77,244	1,834	2,095	(3,400)	77,773
2014	77,773	1,914	1,587	(3,569)	77,705
2015	77,705	2,751	3,168	(2,440)	81,184
2016	81,184	3,367	3,464	(3,108)	84,907
2017	84,907	2,851	3,037	(3,101)	87,694
2018	87,694	2,774	3,436	(3,256)	90,648

*Active membership summary based on latest valuation reports.*

### SCHEDULE 22: TDA PROGRAM ANNUITANTS SUMMARY

Year	As of July 1	Annuitants Registered	Payroll Status Changes	Annuitants Withdrawn	As of June 30th
2009	3,857	51	7	(311)	3,604
2010	3,604	63	(81)	(167)	3,419
2011	3,419	86	10	(264)	3,251
2012	3,251	140	(42)	(165)	3,184
2013	3,184	97	(50)	(176)	3,055
2014	3,055	120	(5)	(134)	3,036
2015	3,036	105	(18)	(132)	2,991
2016	2,991	86	16	(163)	2,930
2017	2,930	97	3	(164)	2,866
2018	2,866	91	28	(174)	2,811

*Annuitant membership summary based on latest valuation reports.*

### SCHEDULE 23: MEMBERSHIP BY AGE (ACTIVE, DEFERRAL & BENEFICIARY ACCOUNTS AS OF JUNE 30, 2019)—TDA PROGRAM

Age	Contributing		Non-Contributing		Deferred*		Beneficiary		Loans**	
	Count	Fund Balance	Count	Fund Balance	Count	Fund Balance	Count	Fund Balance	Count	Loan Balance
=<25	8,556	\$117,986,743	539	\$3,234,301	-	-	18	\$1,806,016	634	\$2,727,381
30	12,008	347,927,662	1,160	27,525,354	34	\$1,289,985	22	1,987,399	2,628	15,678,689
35	13,596	813,337,370	1,806	85,379,915	230	14,500,952	15	1,826,117	6,115	41,908,492
40	13,220	1,257,470,470	1,249	71,255,765	369	25,917,718	40	10,644,003	8,734	61,035,207
45	12,639	1,641,680,566	951	65,701,935	484	45,290,744	53	12,752,877	9,773	66,116,855
50	11,266	1,906,422,119	834	71,184,367	569	68,333,841	74	15,365,043	8,769	62,205,597
55	8,980	1,715,610,011	650	68,069,196	3,119	898,822,235	121	24,746,641	7,430	56,324,810
60	6,262	1,321,083,640	418	41,608,586	6,709	2,124,021,541	125	28,981,003	5,516	41,485,066
65	2,432	589,304,575	182	20,291,126	12,343	4,831,926,593	127	37,592,544	3,803	33,884,830
70	599	191,267,236	84	9,336,837	15,826	7,571,225,038	149	56,519,953	2,575	24,422,954
75	108	49,666,744	24	2,185,648	9,545	4,342,757,072	155	55,227,943	1,156	10,442,837
80	34	23,607,361	13	4,233,338	4,984	2,064,806,483	117	40,421,413	373	3,493,007
85	5	5,305,502	7	633,365	2,533	915,086,968	61	14,049,452	124	1,139,838
90	3	1,256,627	1	72,489	985	246,302,857	33	7,621,210	20	209,164

Source: TRS query reports

\* Includes inactive memberships.

\*\* Loan balances include interest and insurance receivable amounts.

**SCHEDULE 24: WITHDRAWALS BY AGE (FROM ACTIVE, DEFERRAL & BENEFICIARY ACCOUNTS, FISCAL YEAR 2019)—TDA PROGRAM**

Age	Partial Withdrawals*		401(a) Service Purchase		RMD Withdrawals**		Total Withdrawals***		Survivors' Payments ****	
	Count	Distribution	Count	Distribution	Count	Distribution	Count	Distribution	Count	Distribution
=<25	17	\$187,097	5	\$14,567	17	\$22,276	180	\$1,626,910	1	\$2,350
30	65	588,548	14	44,902	13	32,876	269	4,910,978	7	246,619
35	144	2,088,162	33	111,880	17	73,441	276	7,903,712	15	286,217
40	250	4,162,690	45	175,977	31	210,368	182	6,344,621	37	1,675,185
45	290	5,595,320	72	263,463	45	330,661	139	4,397,943	65	2,230,816
50	298	6,018,051	80	453,849	64	427,637	97	4,068,471	84	6,604,637
55	2,012	31,844,031	116	679,841	93	610,895	118	10,475,073	114	7,675,306
60	4,686	65,470,451	74	369,973	89	850,461	205	13,484,722	206	22,417,713
65	4,841	66,288,803	42	242,677	105	1,698,803	125	9,893,149	323	50,403,248
70	4,001	61,235,126	6	30,721	12,657	232,141,144	117	10,862,165	424	80,092,073
75	1,648	24,966,072	1	10,662	8,378	180,246,035	38	3,009,272	435	86,546,933
80	565	12,830,802	-	-	4,462	110,745,032	22	4,894,807	401	51,070,503
85	250	5,400,980	-	-	2,187	62,091,087	12	971,286	401	49,704,169
90	56	1,160,829	-	-	729	19,544,399	10	764,262	216	20,329,911

Source: TRS query reports

\* Includes 138 Partial Withdrawals to Beneficiaries.

\*\* Includes 874 RMD Withdrawals to Beneficiaries.

\*\*\* Includes 35 Total Withdrawals to Beneficiaries.

\*\*\*\* Includes the establishment of 248 (\$31.5 million) new Beneficiary accounts.

### SCHEDULE 25: FUND CONVERSION OF INVESTMENT BALANCES BY AGE (FISCAL YEAR 2019 )—TDA PROGRAM

From	To	=<25	30	35	40	45	50	55	60	65	70	75	80	85	90+
FX	VA	14.8%	15.7%	9.4%	6.6%	3.2%	3.5%	2.8%	2.0%	2.1%	3.3%	0.9%	1.3%	0.0%	15.9%
FX	VB	1.1%	0.7%	0.8%	0.3%	0.7%	0.2%	0.1%	0.1%	0.0%	0.0%	0.1%	0.3%	0.0%	0.0%
FX	VC	3.4%	1.1%	0.7%	1.0%	0.3%	0.3%	0.1%	0.2%	0.2%	0.0%	0.2%	0.6%	0.0%	0.0%
FX	VD	0.2%	0.1%	0.3%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
FX	VE	3.0%	3.8%	4.1%	2.1%	1.0%	0.7%	0.6%	0.6%	1.6%	0.4%	0.4%	0.0%	0.0%	6.8%
VA	FX	42.0%	45.0%	64.7%	73.0%	83.3%	86.2%	86.5%	88.6%	87.6%	89.8%	94.2%	93.3%	91.4%	69.7%
VA	VB	0.0%	0.0%	0.1%	0.3%	0.2%	0.3%	0.2%	0.1%	0.6%	0.7%	0.8%	0.0%	4.3%	0.0%
VA	VC	0.0%	0.1%	0.3%	0.6%	1.0%	0.5%	0.6%	0.1%	0.2%	0.1%	0.0%	0.0%	0.0%	0.0%
VA	VD	0.0%	0.0%	0.0%	0.0%	0.3%	0.0%	0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%
VA	VE	0.7%	1.6%	0.3%	0.5%	0.7%	1.0%	0.4%	0.4%	0.6%	0.6%	0.6%	1.0%	0.0%	0.0%
VB	FX	3.8%	3.9%	3.0%	3.4%	2.9%	1.7%	2.5%	2.5%	1.6%	1.0%	0.5%	0.4%	1.1%	0.0%
VB	VA	0.9%	0.8%	0.9%	0.5%	0.4%	0.4%	0.3%	0.5%	0.2%	0.3%	0.1%	0.0%	0.0%	0.0%
VB	VC	0.0%	0.1%	0.1%	0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
VB	VD	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%
VB	VE	0.0%	0.2%	0.0%	0.2%	0.1%	0.2%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%
VC	FX	8.3%	7.9%	4.2%	3.1%	1.5%	1.1%	1.9%	1.6%	1.0%	1.6%	0.8%	0.2%	1.8%	1.5%
VC	VA	2.1%	0.9%	0.8%	0.7%	0.4%	0.2%	0.4%	0.0%	0.0%	0.5%	0.1%	0.2%	0.0%	0.0%
VC	VB	0.0%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.3%	1.0%	0.0%
VC	VD	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
VC	VE	2.2%	0.4%	0.6%	0.6%	0.1%	0.1%	0.4%	0.0%	0.2%	0.4%	0.4%	1.5%	0.0%	0.0%
VD	FX	3.4%	3.0%	1.4%	0.7%	0.4%	0.5%	0.5%	0.5%	0.3%	0.0%	0.1%	0.0%	0.1%	0.0%
VD	VA	0.5%	0.7%	0.2%	0.2%	0.1%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%
VD	VB	0.0%	0.3%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.3%	0.0%	0.0%	0.0%
VD	VC	0.1%	0.4%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
VD	VE	0.3%	1.1%	0.1%	0.1%	0.0%	0.0%	0.1%	0.0%	0.0%	0.2%	0.0%	0.0%	0.0%	0.0%
VE	FX	12.1%	11.0%	6.7%	5.4%	3.1%	2.8%	2.4%	2.6%	3.7%	0.7%	0.4%	0.9%	0.3%	6.1%
VE	VA	1.1%	0.6%	1.1%	0.4%	0.2%	0.2%	0.1%	0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%
VE	VB	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
VE	VC	0.0%	0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
VE	VD	0.0%	0.2%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Source: TRS query reports

FX refers to the Fixed Return Fund

VA refers to the Diversified Equity Fund

VB refers to the Balanced Fund

VC refers to the International Equity Fund

VD refers to the Inflation Protection Fund

VE refers to the Socially Responsive Equity Fund



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