CAMBRIDGE
Retirement System
Audit Report
JAN. 1, 2017 - DEC. 31, 2021

PUBLIC EMPLOYEE RETIREMENT ADMINISTRATION COMMISSION
COMMONWEALTH OF MASSACHUSETTS

TABLE OF CONTENTS

July 3, 2024

The Public Employee Retirement Administration Commission (PERAC) has completed a review of the audits of the Cambridge Retirement System conducted by the firm of KPMG LLP, Certified Public Accountants. KPMG conducted these audits in accordance with auditing standards generally accepted in the United States of America and the standards applicable to financial audits in *Government Auditing Standards*, issued by the Comptroller General of the United States. The audits covered the period from January 1, 2017 to December 31, 2021.

We conducted an inspection of the work papers prepared by KPMG. We determined that the audits were conducted in a competent professional manner and the work papers demonstrated that audit tests and procedures were performed in sufficient detail to allow us to accept the final audit reports as issued.

We identified specific differences between these financial audits designed to provide an opinion on financial statements and our compliance audits performed in accordance with the accounting and management standards established by PERAC in regulation 840 CMR 25.00 and in compliance with the provisions specified in PERAC Memo #18/2019.

Accordingly, we supplemented the field work conducted in the audits by KPMG with certain limited procedures designed to provide additional assurance that the accounting and management standards established by PERAC were adhered to and complied with. The specific objectives of our review were to determine: 1) that the Board is exercising appropriate fiduciary oversight, 2) that cash balances are accurately stated, 3) that travel expenses were properly documented and accounted for, 4) that retirement contributions are accurately deducted, 5) that retirement allowances were correctly calculated, and 6) that required member documentation is maintained.

To achieve these objectives, we inspected certain records of the Cambridge Retirement Board in the above areas. Specifically, we reviewed the minutes of the Board meetings for compliance with fiduciary oversight, verified cash balances and tested a sample of travel expenses for Board approvals, supporting documentation and proper accounting. We tested the payroll records of a sample of active members to confirm that the correct percentage of regular compensation is being deducted, including the additional two percent over $30,000. We tested a sample of members who retired during our audit period to verify that their retirement allowance was calculated in accordance with the statute. We also reviewed a sample of member files for accuracy and completeness.

In our opinion, the financial records are being maintained and the management functions are being performed in conformity with the standards established by PERAC with the exception of those related to our supplemental work which are detailed in the findings presented in this report.

It should be noted that the financial statements included in this audit report were based on the work performed by KPMG and the tests conducted for the periods referenced in their opinion. These audits were not performed by employees or representatives of PERAC. It should also be noted that the opinions expressed in these audit reports were based on the laws and regulations in effect at the time.

The financial statements and footnotes presented in this report were limited to the express results as of and for the years ended December 31, 2021, December 31, 2020, December 31, 2019, December 31, 2018, and December 31, 2017.

In closing, I wish to acknowledge the work of KPMG LLP who conducted these examinations, and the PERAC examiners who conducted limited procedures to supplement the field work and express my appreciation to the Cambridge Retirement Board and staff for their courtesy and cooperation.

Sincerely,

Bill Keefe

William T. Keefe.
Executive Director

EXPLANATION OF FINDINGS AND RECOMMENDATIONS

1. Regular Compensation:

A review of active member payroll from the units of the Cambridge Retirement System revealed the following issues in the determination of regular compensation:

- The police department's hazardous duty pay has retirement deductions withheld, but there is no service associated with it, therefore it cannot be regular compensation.
- The Cambridge Health Alliance is withholding retirement deductions from three pay codes that do not qualify as regular compensation. One of these is pay for extra hours worked, but since the hours are not pre-determined it does not meet the conditions of 840 CMR 15.03 3(b). The other two codes are bonuses, which are not regular compensation pursuant to 840 CMR 15.03 3(f).
- It is not entirely clear whether or not Health Alliance employees receive more than one day's pay when they work on a holiday. If they are being paid once for the holiday, then a second payment for that same holiday should not be regular compensation.

Recommendation: The Board should instruct the payroll departments to stop withholding deductions on the cited pay codes. The Health Alliance holiday pay should be investigated to ensure that the regular compensation part of it is being handled correctly.

Board Response:

- The Police Department's hazardous duty pay is part of all patrol officers and superior officers pay. Hazardous duty pay is given due to the nature of the officer's work. The pay is considered regular compensation because it is regular, recurring, and given to all police officers regardless of title. The service attached to this pay is the shift that each officer works.
- Concerning the Cambridge Health Alliance (CHA) payroll issues, the bonus pays deductions were stopped in October of 2023 once it was brought to our attention. To address the other pay code items, related to CHA 's new payroll system, in early January CRS reached out to the Controller of the CHA to make her aware of the issues. Since that time, CRS has had several conference calls identifying all the areas that need to be changed in the payroll system. As of the end of May the CHA had hired a programming firm to make program changes to their payroll system. The Board remains in contact with the Health Alliance concerning their progress.

PERAC Response:

Regarding the Police Department's hazardous duty pay, although the regular compensation regulation does reference "the character of the work", even payments that fall into that category need to be for a specific service to be considered regular compensation. Examples of these include extra pay for being on a hazmat response team, K-9 stipend for caring for the dog, DPW employees who are paid different amounts for driving different vehicles, and employees who are paid extra for training new hires. Working an assigned shift is not a specific service to classify hazardous duty pay as regular compensation. In order for this hazardous duty stipend to be pensionable, it will need to be included as part of the patrol and superior officers base pay.

2. Membership:

A review of active member and retiree folders revealed the following:

- Section 4(1)(o) states that no service is to be granted for a position receiving compensation of less than $5,000 annually. For members who are buying prior non-member time, the Board is crediting some service after pro-rating the time and then annualizing based on this pro-ration.
- Two retirees had their regular compensation adjusted because of the spiking test in Section 5(2)(f) but did not receive a refund of the contributions associated with the unused regular compensation.
- One disability calculation used a salary that was approximately $1,400 too low, resulting in an allowance that is understated by almost $1,000.

Recommendation: The Board should examine its records for members who were granted service that could be contrary to Section 4(1)(o).

Pursuant to Section 5(2)(f) the two retirees should receive refunds for the portion of their regular compensation that was reduced due to spiking.

The disability allowance should be recalculated.

Board Response:

- When a member seeks to purchase non-membership service, CRS staff receive an hours and earnings report from the respective Human Resources department. CRS staff reviews the number of hours worked and pro-rates the services against a full-time position. Staff annualizes the salary based upon full-time employment. The Board maintains that the method used for calculating non-membership service does not violate the under $5,000 rule and is consistent with PERAC memos.
- Concerning the two retirees who had their regular compensation lowered due to anti-spiking, CRS staff are waiting for the final Court decision to be rendered.
- Concerning the disability allowance, CRS staff recalculated the allowance and made a retroactive payment to the retiree.

PERAC Response:

Regarding the purchase of non-member service time, Section 4(1)(o) is silent about a full-time position. The salaries for part-time workers do not get adjusted to a full-time equivalent. If the part-time workers had a set schedule, then their part-time salary would be annualized to determine if they were in a position with annual compensation of at least $5,000.

FINAL DETERMINATION:

PERAC Audit staff will follow up in six (6) months to ensure appropriate actions have been taken regarding all findings.

SUPPLEMENTARY INFORMATION

SCHEDULE OF ALLOCATION OF INVESTMENTS OWNED

(percentages by category)

	AS OF DECEMBER 31, 2021	
	MARKET VALUE	PERCENTAGE OF TOTAL ASSETS
Cash	$17,860,830	1.0%
Short Term Investments	962,640	0.1%
Fixed Income Securities	52,499,548	2.9%
Equities	23,994,718	1.3%
Pooled Domestic Equity Funds	696,109,061	38.6%
Pooled International Equity Funds	220,719,479	12.2%
Pooled Domestic Fixed Income Funds	144,941,025	8.0%
Pooled Alternative Investment Funds	308,717,284	17.1%
Pooled Real Estate Funds	269,244,940	14.9%
Hedge Funds	66,863,949	3.71%
Grand Total	$1,801,913,475	100.0%

For the year ending December 31, 2021, the rate of return for the investments of the Cambridge Retirement System was 17.74%. For the ten-year period ending December 31, 2021, the rate of return for the investments of the Cambridge Retirement System averaged 10.90%. For the 37-year period ending December 31, 2021, since PERAC began evaluating the returns of the retirement systems, the rate of return on the investments of the Cambridge Retirement System was 9.56%.

The composite rate of return for all retirement systems for the year ending December 31, 2021 was 19.51%. For the ten-year period ending December 31, 2021, the composite rate of return for the investments of all retirement systems averaged 10.86%. For the 37-year period ending December 31, 2021, since PERAC began evaluating the returns of the retirement systems, the composite rate of return on the investments of all retirement systems averaged 9.58%.

ADMINISTRATION OF THE SYSTEM

The System is administered by a five-person Board of Retirement consisting of the City Auditor who shall be a member ex-officio, a second member appointed by the governing authority, a third and fourth member who shall be elected by the members in or retired from the service of such system, and a fifth member appointed by the other four board members.

Ex-officio Member:	Joesph McCann		
Appointed Member:	Michael Gardner	Term Expires:	3/1/2025
Elected Member:	Francis Murphy, Chairman	Term Expires:	10/1/2025
Elected Member:	James Monagle	Term Expires:	7/31/2026
Appointed Member:	Nadia Chamblin-Foster	Term Expires:	1/1/2027

The Board members are required to meet at least once a month. The Board must keep a record of all of its proceedings. The Board must annually submit to the appropriate authority an estimate of the expenses of administration and cost of operation of the system. The board must annually file a financial statement of condition for the system with the Executive Director of PERAC.

The investment of the system's funds is the responsibility of the Board. All retirement allowances must be approved by the Retirement Board. The PERAC Actuary performs verification prior to payment, unless the system has obtained a waiver for superannuation calculations allowing them to bypass this requirement. All expenses incurred by the System must be approved by a majority vote of the Board. Payments shall be made only upon vouchers signed by two persons designated by the Board.

Retirement board members and employees are bonded by an authorized agent representing a company licensed to do business in Massachusetts. Fidelity insurance is the only required policy coverage under Ch. 32 §21 and §23 as well as 840 CMR 17.01. The policy is designed to cover specific intentional acts such as theft, fraud or embezzlement and also specify who commits such acts, most commonly employees of the system. This coverage reimburses the system for the losses it suffers as a result of its employees' actions. It does not insure the employees for their illegal acts. Statutorily required coverage is provided by the current fidelity insurance policy to a limit of $1,000,000 with a $10,000 deductible issued through Travelers Casualty and Surety Company. The system also has Fiduciary coverage to a limit of $50,000,000 under a blanket policy issued through the Massachusetts Association of Contributory Retirement Systems.

BOARD REGULATIONS

The Cambridge Retirement Board has adopted Supplemental Regulations which are available on the PERAC website at [https://mass.gov/Cambridge-retirement-board-regulations.](https://mass.gov/Cambridge-retirement-board-regulations)

SUPPLEMENTARY INFORMATION (Continued)

ACTUARIAL VALUATION AND ASSUMPTIONS

The most recent actuarial valuation of the System was prepared by the Segal Group as of January 1, 2022.

The actuarial liability for active members was	$798,886,966
The actuarial liability for vested terminated members was	29,039,617
The actuarial liability for non-vested terminated members was	5,854,416
The actuarial liability for retired members was	1,026,186,169
The total actuarial liability was	$1,859,967,168
System assets as of that date were (actuarial value)	1,684,598,108
The unfunded actuarial liability was	$175,369,060
The ratio of system's assets to total actuarial liability was	90.6%
As of that date the total covered employee payroll was	$247,847,724

The normal cost for employees on that date was	10.5% of payroll
The normal cost for the employer (including expenses) was	6.2% of payroll

The principal actuarial assumptions used in the valuation are as follows:

Investment Return:	7.10% per annum
Rate of Salary Increase:	4.0% includes an allowance for inflation of 3%.

SCHEDULE OF FUNDING PROGRESS AS OF JANUARY 1, 2022

Actuarial Valuation Date	Actuarial Value of Assets (a)	Actuarial Accrued Liability (b)	Unfunded AAL (UAAL) (b-a)	Funded Ratio (a/b)	Covered Payroll (c)	UAAL as a % of Cov. Payroll ((b-a)/c)
1/1/2022	$1,684,598,108	$1,859,967,168	$175,369,060	90.6%	$247,847,724	70.8%
1/1/2020	$1,450,739,460	$1,690,622,307	$239,882,847	85.8%	$235,687,286	101.8%
1/1/2018	$1,335,576,051	$1,523,134,269	$187,558,218	87.7%	$222,022,885	84.5%
1/1/2016	$1,084,498,793	$1,337,405,483	$252,906,690	81.1%	$211,726,778	119.4%
1/1/2014	$949,671,604	$1,199,887,878	$250,216,274	79.1%	$208,967,363	119.7%

SUPPLEMENTARY INFORMATION (Continued)

MEMBERSHIP EXHIBIT

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Retirement in Past Years										
Superannuation	70	116	109	81	125	87	99	104	101	122
Ordinary Disability	1	0	0	0	1	1	0	0	0	0
Accidental Disability	7	4	10	9	6	10	8	5	3	5
Total Retirements	78	120	119	90	132	98	107	109	104	127
Total Retirees, Beneficiaries and Survivors	1,879	1,925	1,990	2,013	2,091	2,132	2,165	2,289	2,304	2,347
Total Active Members	3,604	3,181	3,041	3,033	2,972	2,972	2,971	3,013	3,020	2,985
Pension Payments										
Superannuation	$30,910,284	$33,169,062	$36,228,262	$38,668,380	$41,635,859	$45,206,017	$47,640,533	$50,687,931	$53,939,637	$57,459,663
Survivor/Beneficiary Payments	2,809,459	3,034,064	3,191,977	3,463,232	3,602,791	3,649,622	3,694,824	3,794,391	3,987,408	4,209,463
Ordinary Disability	684,411	830,950	639,777	646,708	627,531	625,142	622,750	613,815	604,924	570,451
Accidental Disability	7,896,108	8,175,480	8,664,785	9,010,963	9,308,748	9,730,316	10,156,696	10,697,186	10,827,501	10,815,102
Other	4,089,494	4,198,725	4,466,204	4,618,517	4,846,677	5,523,900	5,617,408	5,780,007	5,727,668	5,903,525
Total Payments for Year	$46,389,756	$49,408,281	$53,191,005	$56,407,800	$60,021,606	$64,734,996	$67,732,210	$71,573,330	$75,087,137	$78,958,204

SUPPLEMENTARY INFORMATION (Continued)

LEASED PREMISES

The Cambridge Retirement Board leases approximately 4,570 squre feet of space for its offices located at 125 Cambridge Park Drive, Cambridge MA 02140. They signed a ten year year lease which commenced March 1, 2021. The landlord is PPF OFF 123 Cambridge Park Drive, LLC.

The following schedule displays the minimum lease obligation on non-cancelable operating leases as of December 31, 2021.

For the year ending	Annual Rent	Less Note 1	Net Rent
2022	$177,468	(2,724)	$174,744
2023	270,304	(2,806)	267,498
2024	278,413	(2,890)	275,523
2025	286,766	(2,976)	283,790
2026	295,369	(3,065)	292,304
2027	304,230	(3,158)	301,072
2028	313,356	(3,252)	310,104
2029	322,757	(3,350)	319,407
2030	331,611	(3,451)	328,160
2031 (through February)	55,268	(575)	54,693
Total future minimum lease payments required	$2,635,543	(28,247)	$2,607,296

Note 1:
The Cambridge Retirement Board sublets 554 square feet of office space to the Cambridge Public Employees' Dental and Vision Fund. These payments are used to offset the Board's rental expense.

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CITY OF CAMBRIDGE RETIREMENT SYSTEM

Financial Statements and Required Supplementary Information

December 31, 2021 and 2020

(With Independent Auditors' Report Thereon)

CITY OF CAMBRIDGE RETIREMENT SYSTEM

Financial Statements and Required Supplementary Information

December 31, 2021 and 2020

Table of Contents

KPMG LLP
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60 South Street
Boston, MA 02111

Independent Auditors' Report

City of Cambridge
Retirement System Board:

Report on the Audit of the Financial Statements

Opinion

We have audited the financial statements of the City of Cambridge Retirement System (the System), as of and for the years ended December 31, 2021 and 2020 and the related notes to the financial statements, which collectively comprise the System's basic financial statements for the years then ended as listed in the table of contents.

In our opinion, the accompanying financial statements referred to above present fairly, in all material respects, the fiduciary net position of the System as of December 31, 2021 and 2020, and the changes in fiduciary net position for the years then ended in accordance with U.S. generally accepted accounting principles.

Basis for Opinion

We conducted our audits in accordance with auditing standards generally accepted in the United States of America (GAAS) and the standards applicable to financial audits contained in *Government Auditing Standards,* issued by the Comptroller General of the United States. Our responsibilities under those standards are further described in the Auditors' Responsibilities for the Audit of the Financial Statements section of our report. We are required to be independent of the System and to meet our other ethical responsibilities, in accordance with the relevant ethical requirements relating to our audits. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Responsibilities of Management for the Financial Statements

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

In preparing the financial statements, management is required to evaluate whether there are conditions or events, considered in the aggregate, that raise substantial doubt about the System's ability to continue as a going concern for twelve months beyond the financial statement date, including any currently known information that may raise substantial doubt shortly thereafter.

Auditors' Responsibilities for the Audit of the Financial Statements

Our objectives are to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditors' report that includes our opinion. Reasonable assurance is a high level of assurance but is not absolute assurance and therefore is not a guarantee that an audit conducted in accordance with GAAS and *Government Auditing Standards* will always detect a material misstatement when it exists. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control. Misstatements are considered material if there is a

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substantial likelihood that, individually or in the aggregate, they would influence the judgment made by a reasonable user based on the financial statements.

In performing an audit in accordance with GAAS and *Government Auditing Standards*, we:

- Exercise professional judgment and maintain professional skepticism throughout the audit.
- Identify and assess the risks of material misstatement of the financial statements, whether due to fraud or error, and design and perform audit procedures responsive to those risks. Such procedures include examining, on a test basis, evidence regarding the amounts and disclosures in the financial statements.
- Obtain an understanding of internal control relevant to the audit 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 System's internal control. Accordingly, no such opinion is expressed.
- Evaluate the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluate the overall presentation of the financial statements.
- Conclude whether, in our judgment, there are conditions or events, considered in the aggregate, that raise substantial doubt about the System's ability to continue as a going concern for a reasonable period of time.

We are required to communicate with those charged with governance regarding, among other matters, the planned scope and timing of the audit, significant audit findings, and certain internal control related matters that we identified during the audit.

Required Supplementary Information

U.S. generally accepted accounting principles require that the management's discussion and analysis, and the required supplementary information as listed in the accompanying table of contents be presented to supplement the basic financial statements. Such information is the responsibility of management and, although not a part of the basic financial statements, is required by the Governmental Accounting Standards Board who considers it to be an essential part of financial reporting for placing the basic financial statements in an appropriate operational, economic, or historical context. We have applied certain limited procedures to the required supplementary information in accordance with GAAS, which consisted of inquiries of management about the methods of preparing the information and comparing the information for consistency with management's responses to our inquiries, the basic financial statements, and other knowledge we obtained during our audits of the basic financial statements. We do not express an opinion or provide any assurance on the information because the limited procedures do not provide us with sufficient evidence to express an opinion or provide any assurance.

Other Reporting Required by *Government Auditing Standards*

In accordance with *Government Auditing Standards*, we have also issued our report dated September 7, 2022 on our consideration of the System's internal control over financial reporting and on our tests of its compliance with certain provisions of laws, regulations, contracts, and grant agreements and other matters. The purpose of that report is solely to describe the scope of our testing of internal control over financial reporting and compliance and the results of that testing, and not to provide an opinion on the effectiveness of the System's internal control over financial reporting or on compliance. That report is an integral part of an audit performed in accordance with *Government Auditing Standards* in considering the System's internal control over financial reporting and compliance.

KPMG LLP

Boston, Massachusetts
September 7, 2022

This section presents Management's Discussion and Analysis (MD&A) of the City of Cambridge Retirement System's (the System or the Plan) financial activity and performance as of and for the years ended December 31, 2021 and 2020. The MD&A is unaudited and is intended to serve as an introduction to the Plan's basic financial statements, as well as to offer readers of the Plan's financial statements a narrative view and analysis of System's financial activities.

Financial Highlights

The fiduciary net position of the Plan as of December 31, 2021 totaled $1.842 billion, a $249.1 million, or 15.64% increase, due to positive returns in several asset classes. Fiduciary net position is the residual of the Plan's assets in excess of the Plan's liabilities as of the date of the Statements of Fiduciary Net Position. The Plan's assets are held in trust to meet future benefit payments.

Total Plan "additions" of $352.0 million, comprised of $83.6 million in contributions, and $268.4 million in investment gains, were reported for the year ended December 31, 2021. In comparison, the Plan reported total additions of $238.9 million and $274.4 million for the years ended December 31, 2020 and 2019, respectively. The increase in 2021 is due to larger investment returns in 2021 compared with 2020, and the decrease in 2020 from 2019 is due to smaller investment returns in 2020 compared with 2019.

For the year ended December 31, 2021, total Plan deductions were $102.9 million, an increase of $6.4 million, or 6.58% over the prior year, and are comprised of $95.4 million in benefit payments, $6.2 million in transfers and withdrawals and $1.3 million in administrative expenses. This $6.4 million increase is due to new retirements and an increase in refunds and transfers. This is as compared to total deductions of $96.6 million and $92.4 million for the years ended December 31, 2020, and 2019, respectively.

The Plan's fiduciary net position as a percentage of the total pension liability was 99.80%.

Overview of the Financial Statements

The basic financial statements consist of the: (1) Statements of Fiduciary Net Position; (2) Statements of Changes in Fiduciary Net Position; and (3) Notes to the Financial Statements; and (4) Required Supplementary Information.

The Statements of Fiduciary Net Position report the Plan's assets, liabilities, and net position restricted for pensions at the end of the year calculated using the following formula: Assets – Liabilities = Net position restricted for pensions. The Statements of Fiduciary Net Position report the financial position of the Plan at a given point in time, in this case, December 31. Over time, the increase or decrease in fiduciary net position serves as a useful indicator of the Plan's financial health.

The Statements of Changes in Fiduciary Net Position report additions to and deductions from the Plan during the year. The formula here is: Additions – Deductions = Net Increase (Decrease) in Plan Fiduciary Net Position. The Statements of Changes in Fiduciary Net Position report activity occurring over a specific period of time, in this case, the year beginning January 1 and ending December 31.

The Notes to the Financial Statements provide additional information that is essential to a full understanding of the data provided in the Plan's financial statements.

This report also includes Required Supplementary Information following the Notes to the Financial Statements that consists of the schedules of changes in net pension liability and related ratios, investment returns, and contributions and notes to schedule of contributions.

These statements and schedules are prepared in conformity with U.S. generally accepted accounting principles, including the accounting and financial reporting requirements found in GASB Statement No. 67.

Financial Analysis

Total assets as of December 31, 2021 and 2020 were $1.8 billion and $1.6 billion, respectively, and were comprised of cash and cash equivalents; due from brokers for securities sold; investments; cash collateral on securities lending, accrued interest and accrued dividends receivables; and contributions due from Plan members, the Plan sponsor and other systems. Total assets increased by $248.1 million or 15.5% from $1.6 billion as of December 31, 2020, due to investment gains in several asset classes. Total assets increased by $135.0 million or 9.2% between 2019 and 2020 due to investment gains in several asset classes. As of December 31, 2021 the System had fully liquidated the fixed income international manager.

Total liabilities as of December 31, 2021 were approximately $2.7 million and total liabilities as of December 31, 2020 were approximately $3.7 million. Total liabilities for 2021 and 2020 were primarily comprised of payables for investment management fees, and cash collateral on securities lending. Decreases in total liabilities since 2019 are primarily due to decreases in cash collateral on securities lending.

Total fiduciary net position held in trust for pension benefits totaled $1.842 billion at December 31, 2021 which represents an increase of $249.1 million or 15.64% over 2020. Fiduciary net position increased by $142.4 million or 9.8% between 2019 and 2020. The increase in 2021 is due to investment gains in several asset classes.

Condensed financial information

		2021	2020	Total $ change	Total % change
Assets:					
Cash and cash equivalents	$	18,823,470	4,477,345	14,346,125	320.42 %
Receivables and other assets		42,288,037	814,294	41,473,743	5,093.21
Investments		1,783,090,004	1,589,029,865	194,060,139	12.21
Cash collateral on securities lending		700,673	2,513,792	(1,813,119)	(72.13)
Total assets		1,844,902,184	1,596,835,296	248,066,888	15.53

CITY OF CAMBRIDGE RETIREMENT SYSTEM

Management's Discussion and Analysis

December 31, 2021 and 2020

(Unaudited)

Condensed financial information

	2021	2020	Total $ change	Total % change
Liabilities:				
Payables	1,999,303	1,220,964	778,339	63.75
Cash collateral on securities lending	700,673	2,513,792	(1,813,119)	(72.13)
Total liabilities	2,699,976	3,734,756	(1,034,780)	(27.71)
Fiduciary net position	$ 1,842,202,208	1,593,100,540	249,101,668	15.64 %

Condensed financial information

	2020	2019	Total $ change	Total % change
Assets:				
Cash and cash equivalents	$ 4,477,345	9,234,999	(4,757,654)	(51.52)%
Receivables and other assets	814,294	914,918	(100,624)	(11.00)
Investments	1,589,029,865	1,441,437,559	147,592,306	10.24
Cash collateral on securities lending	2,513,792	10,226,733	(7,712,941)	(75.42)
Total assets	1,596,835,296	1,461,814,209	135,021,087	9.24
Liabilities:				
Payables	1,220,964	848,016	372,948	43.98
Cash collateral on securities lending	2,513,792	10,226,733	(7,712,941)	(75.42)
Total liabilities	3,734,756	11,074,749	(7,339,993)	(66.28)
Fiduciary net position	$ 1,593,100,540	1,450,739,460	142,361,080	9.81 %

Revenues – Additions to Plan Fiduciary Net Position

Additions to the System's Fiduciary net position include plan member and plan sponsor contributions, transfers from other retirement systems and investment income. Contributions, net transfers and net investment income for plan year 2021 totaled approximately $352.0 million as compared to additions of approximately $238.9 million in 2020.

(Continued)

In 2021, member contributions increased by approximately $319.3 thousand or 1.3% due to the addition of new employees and the accrual of outstanding prior service buybacks. In 2020, member contributions increased by approximately $901.6 thousand or 3.8% due to the addition of new employees and the accrual of outstanding prior service buybacks.

Employers and nonemployer contributions of $54.1 million in 2021 increased by $5.8 million or 12.0%, compared to an increase of $2.7 million or 5.8% in 2020. The increase in 2021 and 2020 is due to an increase in the actuarial determined contributions (ADC) as determined by the Plan's actuary.

Net investment income for the year ending December 31, 2021 was $268.4 million representing a $106.1 million or 65.4% increase from 2020. The increase in net investment income in 2021 is the result of larger investment returns compared to 2020. Net investment income for the year ending December 31, 2020 was $162.3 million representing a $38.7 million or 19.3% decrease from 2019.

Condensed financial information

Additions		2021	2020	Total $ change	Total % change
Plan member contributions	$	25,030,544	24,711,247	319,297	1.29 %
Employers and nonemployer contributions		54,148,316	48,335,964	5,812,352	12.02
Transfers		4,382,410	3,523,137	859,273	24.39
Net investment income		268,450,250	162,343,552	106,106,698	65.36
Total additions	$	352,011,520	238,913,900	113,097,620	47.34 %

Condensed financial information

Additions		2020	2019	Total $ change	Total % change
Plan member contributions	$	24,711,247	23,809,697	901,550	3.79 %
Employers and nonemployer contributions		48,335,964	45,681,166	2,654,798	5.81
Transfers		3,523,137	3,796,690	(273,553)	(7.21)
Net investment income		162,343,552	201,086,610	(38,743,058)	19.27
Total additions	$	238,913,900	274,374,163	(35,460,263)	(12.92)%

Expenses – Deductions from Plan Fiduciary Net Position

Deductions to the Plan include the payment of pension benefits to members and beneficiaries, refunds of contributions to inactive members, transfers of member contributions to other Massachusetts public retirement plans and the cost of administration. For plan year 2021, the total deductions were $102.9 million, an increase

(Continued)

of $6.4 million or 6.6% over 2020. For plan year 2020, the total deductions were $96.6 million, an increase of $4.2 million or 4.6% over 2019.

Retirement benefit payments totaled $95.4 million, an increase of approximately $4.7 million or 5.2%. In 2020 retirement benefit payments totaled $90.7 million, an increase of approximately $5.1 million or 6.0% from the previous year. The increases in 2021 and 2020 are due to new retirements and pension increases also known as cost-of-living adjustments in those respective years.

For plan year 2021, refunds of contributions totaled approximately $2.3 million, an increase of approximately $730 thousand or 45.4% from 2020. For plan year 2020, refunds of contributions totaled approximately $1.6 million, a decrease of $327.3 thousand or 16.9% over 2019. The increase in 2021 is due to an increase in inactive members requesting withdrawals for their contributions from the Plan. The decrease in 2020 is due to a decrease in inactive members requesting withdrawals for their contributions from the Plan. Transfers to other Massachusetts public retirement systems totaled approximately $3.9 million, an increase of approximately $1.1 million or 38.8% from 2020. This is compared to a $844 thousand or 23.2% decrease from 2019 to 2020. Year to year changes in transfer rates can be attributed to variations in public sector workforce movement between Cambridge and other government employers.

In 2021, administrative expenses totaled approximately $1.3 million, a decrease of approximately $160.9 thousand or 10.9%, and in 2020, administrative expenses totaled approximately $1.5 million, an increase of approximately $249.5 thousand or 20.4%. The decrease in administrative expenses for 2021 is primarily attributable to miscellaneous expenses. The increase in administrative expenses for 2020 is primarily attributable to personnel and miscellaneous expenses.

Condensed financial information

Deductions		2021	2020	Total $ change	Total % change
Retirement benefits	$	95,379,449	90,676,119	4,703,330	5.19 %
Refunds of contributions		2,337,400	1,607,442	729,958	45.41
Other systems		3,883,154	2,798,511	1,084,643	38.76
Administrative expenses		1,309,849	1,470,748	(160,899)	(10.94)
Total deductions	$	102,909,852	96,552,820	6,357,032	6.58 %

Condensed financial information

Deductions		2020	2019	Total $ change	Total % change
Retirement benefits	$	90,676,119	85,555,285	5,120,834	5.99 %
Refunds of contributions		1,607,442	1,934,722	(327,280)	(16.92)
Other systems		2,798,511	3,642,559	(844,048)	(23.17)
Administrative expenses		1,470,748	1,221,287	249,461	20.43
Total deductions	$	96,552,820	92,353,853	4,198,967	4.55 %

Change in Plan Fiduciary Net Position

Change in fiduciary net position for the year ended December 31, 2021 was $249.1 million, which represents an increase of $106.7 million or 75% from the previous year. This increase is primarily the result of larger investment returns. Change in fiduciary net position for the year ended December 31, 2020 was $142.4 million, which represents a decrease of $39.7 million or 21.8% from the previous year. This decrease is primarily the result of smaller investment returns.

Condensed financial information

Changes in System fiduciary net position	2021	2020	Total $ change	Total % change
Total additions	$ 352,011,520	238,913,900	113,097,620	47.34 %
Total deductions	102,909,852	96,552,820	6,357,032	6.58
Change in plan fiduciary net position	$ 249,101,668	142,361,080	106,740,588	74.98 %

Condensed financial information

Changes in System fiduciary net position	2020	2019	Total $ change	Total % change
Total additions	$ 238,913,900	274,374,163	(35,460,263)	(12.92)%
Total deductions	96,552,820	92,353,853	4,198,967	4.55
Change in plan fiduciary net position	$ 142,361,080	182,020,310	(39,659,230)	(21.79)%

Overall Financial Position of System

Due to investment gains in several asset classes the Plan has experienced an increase in its investment portfolio for the year ending December 31, 2021. Management believes the Plan remains well funded and able to meet its obligations.

Requests for Information

This financial report is designed to provide an overview of System's finances. Questions concerning any of the information provided in this report should be addressed to City of Cambridge Retirement System, 125 CambridgePark Drive, Suite 104, Cambridge, MA 02140.

CITY OF CAMBRIDGE RETIREMENT SYSTEM

Statements of Fiduciary Net Position

December 31, 2021 and 2020

	2021	2020
Assets:		
Cash and cash equivalents	$ 18,823,470	4,477,345
Dividend and interest receivable	291,819	255,242
Other assets	896,180	553,777
Due from Brokers for Securities sold	41,100,038	5,275
Investments, at fair value:		
Fixed income securities	52,499,548	46,695,007
Equities	23,994,718	17,881,924
Pooled investments:		
Fixed income	144,941,025	117,426,119
Real estate	269,244,940	226,170,125
Domestic equities	696,109,061	627,176,468
International equities	220,719,479	237,526,544
International fixed income	—	52,515,528
Alternative	375,581,233	263,638,150
Total investments	1,783,090,004	1,589,029,865
Cash collateral on securities lending	700,673	2,513,792
Total assets	1,844,902,184	1,596,835,296
Liabilities:		
Accrued liabilities	832,290	896,372
Due to brokers for securities purchased	1,167,013	324,592
Cash collateral on securities lending	700,673	2,513,792
Total liabilities	2,699,976	3,734,756
Net position restricted for pensions	$ 1,842,202,208	1,593,100,540

See accompanying notes to financial statements.

CITY OF CAMBRIDGE RETIREMENT SYSTEM

Statements of Changes in Fiduciary Net Position

Years ended December 31, 2021 and 2020

	2021	2020
Additions:		
Contributions:		
Employers	$ 52,440,935	46,005,871
Nonemployer – City	1,707,381	2,330,093
Plan members	25,030,544	24,711,247
Other systems	3,890,352	3,310,192
Commonwealth of Massachusetts	492,058	212,945
Total contributions	83,561,270	76,570,348
Investment income:		
Interest and dividends	30,268,505	25,033,297
Securities lending income	1,769	51,027
Net appreciation (depreciation) in fair value of investments	248,704,163	145,980,402
Less:		
Management fees	(10,523,685)	(8,680,588)
Borrower rebates and fees under securities lending program	(502)	(40,586)
Net investment income	268,450,250	162,343,552
Total additions	352,011,520	238,913,900
Deductions:		
Benefits	95,379,449	90,676,119
Refunds of contributions	2,337,400	1,607,442
Other systems	3,883,154	2,798,511
Administrative expenses	1,309,849	1,470,748
Total deductions	102,909,852	96,552,820
Change in net position	249,101,668	142,361,080
Net position, beginning of year	1,593,100,540	1,450,739,460
Net position, end of year	$ 1,842,202,208	1,593,100,540

See accompanying notes to financial statements.

(1) Plan Description

The City of Cambridge Retirement System (the System or the Plan) is a cost-sharing, multiple-employer defined benefit pension plan administered by a Retirement Board comprised of five members: the City Auditor who serves as ex officio; two individuals elected by participants in the System; a fourth member appointed by the City Manager and a fifth member chosen by the other members of the Retirement Board. As of December 31, 2021, the System provides pension benefits to the retired employees of four employers: the City of Cambridge, Cambridge Housing Authority, Cambridge Redevelopment Authority and Cambridge Health Alliance.

The System is a member of the Massachusetts Contributory System, which is governed by Chapter 32 of the Massachusetts General Laws (MGL).

Employees covered by the Contributory Retirement Law are classified into one of four groups depending on job classification. Group 1 comprises most positions in state and local government. It is the general category of public employees. Group 2 is a limited category for specified hazardous occupations. Group 3 is for State Police only. Group 4 is mainly police and firefighters.

For employees hired prior to April 2, 2012, the annual amount of the retirement allowance is based on the member's final three year average salary multiplied by the number of years and full months of creditable service at the time of retirement and multiplied by a percentage based on the age of the member at retirement.

A member's final three year average salary is defined as the greater of the highest consecutive three year average annual rate of regular compensation or the average annual rate of regular compensation received during the last three years of creditable service prior to retirement.

For employees hired on April 2, 2012 or later, the annual amount of the retirement allowance is based on the member's final five year average salary multiplied by the number of years and full months of creditable service at retirement and multiplied by a percentage based on the age and years of creditable service of the member at retirement.

A member's final five-year average salary is defined as the greater of the highest consecutive five-year average annual rate of regular compensation or the average annual rate of regular compensation received during the last five years of creditable service prior to retirement.

For employees who became members after January 1, 2011, regular compensation is limited to 64% of the federal limit found in 26 U.S.C. 401(a) (17). In addition, regular compensation for members who retire after April 2, 2012 will be limited to prohibit "spiking" a member's salary to increase the retirement benefit.

For all employees, the maximum annual amount of the retirement allowance is 80% of the member's final average salary. Any member who is a veteran also receives an additional yearly retirement allowance of $15 per year of creditable service, not exceeding $300. The veteran allowance is paid in addition to the 80% maximum.

Membership in the System consisted of the following at January 1, 2022, the date of the latest actuarial valuation:

Retirees and beneficiaries receiving benefits	2,306
Terminated plan members entitled to, but not receiving benefits	497
Terminated plan members with a vested right to a deferred or immediate benefit	145
Active plan members	3,156
Total membership	6,104
Total number of participating employers	4

(2) Contributions Required and Contributions Made

Plan members are required to contribute to the System. Depending on their employment date, active members must contribute a range of 5% to 9% of their regular gross compensation. Members hired after December 31, 1978 must contribute an additional 2% of regular compensation in excess of $30,000. Participating employers are required to pay into the System their share of the remaining system wide actuarially determined contribution, which is apportioned among the employers based on active covered payroll. The contributions of plan members and the participating employers are governed by Chapter 32 of the MGL.

The Commonwealth is obligated to reimburse the System for a portion of the benefits payments for cost of living increases granted before July 1998.

(3) Summary of Significant Accounting Policies

(a) Basis of Accounting

The System's financial statements are prepared using the full accrual basis of accounting. Plan member contributions are recognized in the period in which the contributions are due. Employer contributions to the plan are recognized when due and the employer is legally required to provide the contributions. Benefits and refunds are recognized when due and payable in accordance with the terms of the plan.

(b) Cash and Cash Equivalents

Cash and cash equivalents are considered to be cash on deposit, and highly liquid short-term investments with original maturities of three months or less from the date of acquisition.

(c) Investment and Valuation

The System participates in the segmentation program of the Pension Reserves Investment Trust (PRIT) Fund which allows Massachusetts retirement systems to invest only in individual asset classes of the PRIT Fund. The PRIT Fund is an external investment pool, as defined by the Government Accounting Standards Board, and it is not registered with the Securities and Exchange Commission, but is subject to oversight by the Pension Reserves Investment Management Board (the PRIM Board). The System's alternative investments include investments in the PRIT hedge and private equity segments of the PRIT Fund. The PRIT Fund issues separately available audited financial statements.

Investments are reported at fair value. Securities traded on a national or international securities exchange are valued at the last reported sales price on the last business day of the plan year; investments traded on a national securities exchange for which no sale was reported on that date and investments in common and preferred stocks traded in over-the-counter markets are valued at the mean of the last reported bid and asked prices, or the last reported bid price. Mutual funds and commingled funds, including real estate and other alternative (including private equity and hedge) investments, are valued based on net asset value (NAV) or unit value at year-end. Changes in fair value are included in investment income (loss) in the statement of changes in fiduciary net position.

(d) Use of Estimates

The preparation of financial statements in conformity with U.S. generally accepted accounting principles requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and the disclosure of contingent assets and liabilities at the dates of the financial statements and the reported amounts of additions and deductions during the reporting periods. Actual results could differ from estimates.

(e) Other

Purchases and sales of securities are reflected on a trade-date basis. Realized gain or loss on sales of securities is based on average cost.

Dividend income is recorded on the ex-dividend date. Interest income is recorded as earned on an accrual basis.

The System presents in its Statements of Changes in Fiduciary Net Position the net appreciation (depreciation) in the fair value of its investments, which consists of the net realized gains and losses during the year and the change in unrealized appreciation and depreciation during the year on those investments.

(f) Investment Policy

The provisions of Massachusetts General Laws (M.G.L.) Chapter 32, Section 23(2) and the Board approved investment policy govern the Plan's investment practice.

Diversification is attained through varied investment management styles that comply with Massachusetts state law. This is accomplished through the retention of investment managers that adhere to M.G.L. Chapter 32, Section 23(3), the "Prudent Person" rule.

The System has retained an investment consultant to work with the Board in a fiduciary capacity to assure that strategic investment diversification is attained, to employ investment managers with expertise in their respective asset classes, and to closely monitor the implementation and performance of the respective investment strategies.

The System is currently invested in equities (domestic and international), fixed income securities (domestic), real estate and other alternative (including private equity and hedge).

The target allocation for each major asset class is summarized in the following table:

Asset class	2021 Target asset allocation	2020 Target asset allocation
Cash	— %	— %
Domestic equity	28.00	28.00
International developed markets equity	11.00	10.00
International emerging markets equity	10.00	10.00
Core fixed income	8.00	10.00
High yield fixed income	5.00	10.00
Real estate	10.00	11.00
Commodities	4.00	3.00
Hedge fund, GTAA, risk parity	3.00	5.00
Private equity	12.00	13.00
Emerging market debt	3.00	—
Short term govt money market	3.00	—
Infrastructure	3.00	—
Total	100.00 %	100.00 %

The Board's current rebalancing policy states that "The Board shall rebalance to the established targets during the quarter following the quarter ended whenever the asset class allocation falls outside the allowable ranges."

(g) *Commitments*

At December 31, 2021 and 2020, the System had contractual commitments to provide approximately $85 million and $72 million, respectively, of additional funding for alternative investments and real estate.

(4) Deposit and Investment Risks

(a) *Custodial Credit Risk*

Custodial credit risk is the risk that, in the event of a failure of a depository financial institution, the System deposits may not be returned. Investment securities are exposed to custodial credit risk if the securities are uninsured, are not registered in the name of the System and are held by either the depository financial institution or the depository financial institution's trust department or agent but not in the System's name. The System's cash and cash equivalent deposits that are not collateralized are subject to the Federal Deposit Insurance Corporation (FDIC) insurance limits. At December 31, 2021 and December 31, 2020, $17,582,892 and $4,013,986 of the System's cash and cash equivalent deposits, respectively, were uninsured and uncollateralized.

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Although there is no System–wide policy for custodial credit risk associated with deposits, the System's investments are held by the System's custodian and registered in the System's name. All of the System's securities are held by the System's custodial bank in the System's name, except for investments in mutual and commingled funds, real estate properties, and limited partnerships, which by their nature, are not subject to custodial credit risk. Investments in the Short-Term Investment Funds (STIF) are held in an SEC-registered pooled fund that is managed by the master custodian bank. The fair value of the position in the pool equals the value of the pool shares.

(b) Credit Risk

Credit risk exists when there is a possibility the issuer or other counterparty to an investment may be unable to fulfill its obligations.

There are no System – wide policy limitations for credit risk exposures within the portfolio. The System's fixed income investments are managed in accordance with an investment contract that is specific as to permissible credit quality ranges and the average credit quality of the overall portfolio.

The System allows investment managers to apply discretion under the "Prudent Person" rule. Investments are made, as a prudent person would be expected to act with discretion and intelligence, to seek reasonable income, preserve capital and, in general, avoid speculative investments.

The System's fixed income investments as of December 31, 2021 and 2020, if rated, were rated by Standard and Poor's and/or an equivalent national rating organization. The ratings are presented below using the Standard and Poor's rating scale:

Investment type	Fair value	AAA	AA	A	BBB	BB	Less than BB	Not rated
System (as of December 31, 2021):								
U.S. Treasury notes and bonds	$ 15,903,423	5,129,533	523,295	—	975,534	—	769,423	8,505,638
Municipal securities	1,811,744	—	1,074,561	291,789	—	—	201,776	243,618
U.S. agencies	4,036,790	8,259	—	—	—	—	—	4,028,531
Domestic corporate	23,042,672	861,022	912,246	9,212,915	11,047,650	—	267,916	740,923
Asset-backed:								
CMOs	5,999,386	4,928,894	—	186,270	—	—	—	884,222
Other	1,705,533	1,146,191	—	85,059	474,283	—	—	—
Pooled fixed-income investments	144,941,025	—	—	—	—	—	—	144,941,025
Total	$ 197,440,573	12,073,899	2,510,102	9,776,033	12,497,467	—	1,239,115	159,343,957

CITY OF CAMBRIDGE RETIREMENT SYSTEM

Notes to Financial Statements

December 31, 2021 and 2020

Investment type	Fair value	AAA	AA	A	BBB	BB	Less than BB	Not rated
System (as of December 31, 2020):								
U.S. Treasury notes and bonds	$ 10,039,946	4,179,660	—	—	2,423,386	—	—	3,436,900
Municipal securities	1,738,689	—	1,249,955	146,491	140,855	—	201,388	—
U.S. agencies	4,321,320	1,192,823	—	—	—	—	—	3,128,497
Domestic corporate	21,875,172	510,972	935,948	6,475,269	12,237,907	107,991	—	1,607,085
Asset-backed:								
CMOs	4,905,252	3,520,743	—	225,102	—	—	—	1,159,407
Other	3,814,628	3,147,849	—	168,290	498,489	—	—	—
Pooled fixed-income investments	169,941,647	—	—	—	—	—	—	169,941,647
Total	$ 216,636,654	12,552,047	2,185,903	7,015,152	15,300,637	107,991	201,388	179,273,536

(c) Concentration of Credit Risk

Concentration of credit risk is the risk of loss that may be attributed to the magnitude of a government's investment in a single issuer. The System has no investments, at fair value, that exceed 5% of the System's total investments as of December 31, 2021 and 2020 other than pooled investments. The System adheres to the provisions of M.G.L. c. 32, sec 23(2) when managing concentration risk.

(d) Interest Rate Risk

Interest rate risk is the risk that changes in interest rates will adversely affect the fair value of an investment. This risk is managed within the portfolio using the effective duration methodology. It is widely used in the management of fixed income portfolios in that it quantifies to a much greater degree the risk of interest rate changes.

The following is a listing of the System's fixed income investments and related maturity schedule (in years) as of December 31, 2021 and 2020:

Investment type	Fair value	Less than 1	1–5	6–10	More than 10
System (as of December 31, 2021):					
U.S. Treasury notes and bonds	$ 15,903,423	—	6,958,679	2,249,893	6,694,851
Municipal Securities	1,811,744	—	1,003,878	604,256	203,610
U.S. agencies	4,036,790	—	15,623	270,829	3,750,338
Domestic corporate	23,042,672	—	8,011,831	4,332,152	10,698,689
Asset-backed:					
CMOs	5,999,386	—	—	—	5,999,386
Other	1,705,533	—	1,426,850	278,683	—
Pooled fixed-income investments	144,941,025	—	—	144,941,025	—
Total	$ 197,440,573	—	17,416,861	152,676,838	27,346,874

Investment type	Fair value	Less than 1	1–5	6–10	More than 10
System (as of December 31, 2020):					
U.S. Treasury notes and bonds	$ 10,039,946	—	3,436,900	1,699,425	4,903,621
Municipal Securities	1,738,689	—	1,014,484	377,444	346,761
U.S. agencies	4,321,320	20,989	958,639	647,465	2,694,227
Domestic corporate	21,875,172	—	7,321,408	4,267,105	10,286,659
Asset-backed:					
CMOs	4,905,252	—	—	—	4,905,252
Other	3,814,628	—	3,356,488	458,140	—
Pooled fixed-income investments	169,941,647	—	—	169,941,647	—
Total	$ 216,636,654	20,989	16,087,919	177,391,226	23,136,520

(e) Foreign Currency Risk

Foreign currency risk is the risk that changes in exchange rates will adversely affect the fair value of an investment or a deposit. The System's asset allocation model which serves as a proxy for a foreign currency policy, limits the amount of foreign currency exposure to 21% of the System's total investments. Similar to the investments in domestic equities, the System employs or encourages its investment advisor to employ diversification, asset allocation, and quality strategies. Currency hedging is permitted for defensive purposes. Currency hedging shall be effected through the use of forward currency contracts. At December 31, 2021 and 2020, there were no open forward currency contracts.

Risk of loss arises from changes in currency exchange rates. The System's exposure to foreign currency risk is presented below at December 31, 2021 and 2020.

	2021	2020
Currency:		
International equity pooled funds (various currencies)	$ 220,719,479	237,526,544
International fixed income pooled funds (various currencies)	—	52,515,528
	$ 220,719,479	290,042,072

Although these investments are not denominated in a foreign currency, the underlying securities are denominated in various foreign currencies.

(f) Rates of Return

For the years ended December 31, 2021 and 2020, the annual money weighted rate of return on plan investments, net of plan investment expense was 17.01% and 12.23%, respectively. The money weighted rate of return expresses investment performance net of investment expenses adjusted for the changing amounts actually invested.

(g) Securities Lending

The Public Employment Retirement Administration Commission of Massachusetts (PERAC) has issued supplemental regulations that permit the System to engage in securities lending transactions. The System has entered into a Securities Lending Authorization Agreement (the Agreement) with a third party to act as the System's sub-custodian/agent for the purposes of managing a securities lending program.

The System lends fixed income, domestic equity, and international equity securities to approved broker/dealers. Collateral for securities loaned equals 102 percent of fair market value for domestic securities and 105 percent for international securities not denominated in U.S. dollars.

Types of collateral received from borrowers for securities loaned are cash and non-cash. The sub-custodian is authorized to invest the cash collateral in Approved Investments, as defined in the Agreement. Non-cash collateral received is not recorded in the accompanying financial statements as the System cannot pledge or sell the non-cash collateral except in the event of a borrower default.

As of December 31, 2021, the fair value of securities on loan was $1.9 million. The associated collateral was $1.9 million, of which $.7 million was cash collateral and $1.2 million was non-cash. The cash collateral has been reinvested in repurchase agreements ($.7 million). The repurchase agreements are valued at amortized cost which approximates fair value.

As of December 31, 2020, the fair value of securities on loan was $3.1 million. The associated collateral was $3.2 million, of which $2.5 million was cash collateral and $.7 million was non-cash. The cash collateral has been reinvested in repurchase agreements ($2.5 million). The repurchase agreements are valued at amortized cost which approximates fair value.

The Agreement limits the maturity value of any Approved Investment, as defined, to a maximum of 397 days, except U.S. government securities, which shall have a final maturity not exceeding 762 days.

At year-end, the System has no credit risk exposure to borrowers because the amounts the System owes the borrowers exceed the amounts the borrowers owe the System. The Agreement indemnifies the System if the borrowers fail to return the securities (and the collateral is inadequate to replace the securities lent) or fail to pay the System for income distributions by the securities' issuers while the securities are on loan.

As of December 31, 2021 and 2020, there were no violations of legal or contractual provisions. The System has not experienced any losses resulting from the default of a borrower or lending agent during the years ended December 31, 2021 and 2020.

(h) Fair Value Hierarchy

GAAP establishes a fair value hierarchy for investments that prioritizes inputs used to measure fair value into three levels:

Level 1 – quoted prices (unadjusted) for identical assets or liabilities in active markets that are accessible at the measurement date;

Level 2 – observable inputs that are based on inputs not quoted in active markets, but corroborated by market data.

Level 3 – unobservable inputs that are used when little or no market data is available.

The fair value hierarchy gives the highest priority to Level 1 inputs and the lowest priority to Level 3 inputs. In determining fair value, the System utilizes valuation techniques that maximize the use of observable inputs and minimize the use of unobservable inputs to the extent possible.

Investments held through commingled funds for which fair value is estimated using net asset values (NAVs) as a practical expedient are not categorized in the fair value hierarchy.

The System uses an independent pricing source to determine the fair value of investments at quoted market prices.

The System has the following fair value measurements as of December 31, 2021 and 2020:

	2021		
	Fair value	Level 1	Level 2
Investments by fair value level:			
Fixed income	$ 52,499,548	15,903,423	36,596,125
Equities	23,994,718	23,994,718	—
	76,494,266	39,898,141	36,596,125
Investments measured at NAV:			
Commingled equity funds:			
International	220,719,479	—	—
Domestic	696,109,061	—	—
Commingled fixed income funds:			
Domestic	144,941,025	—	—
Real estate	269,244,940	—	—
Other investments at fair value:			
Alternatives:			
PRIT hedge fund	66,863,949	—	—
PRIT private equity	227,705,725	—	—
Other non-PRIT alternatives	81,011,559	—	—
	1,706,595,738	—	—
Total investments	$ 1,783,090,004	39,898,141	36,596,125

	2020		
	Fair value	Level 1	Level 2
Investments by fair value level:			
Fixed income	$ 46,695,007	11,220,741	35,474,266
Equities	17,881,924	17,881,924	—
	64,576,931	29,102,665	35,474,266
Investments measured at NAV:			
Commingled equity funds:			
International	237,526,544	—	—
Domestic	627,176,468	—	—
Commingled fixed income funds:			
International	52,515,528	—	—
Domestic	117,426,119	—	—
Real estate	226,170,125	—	—
Other investments at fair value:			
Alternatives:			
PRIT hedge fund	61,089,883	—	—
PRIT private equity	125,544,179	—	—
Other non-PRIT alternatives	77,004,088	—	—
	1,524,452,934	—	—
Total investments	$ 1,589,029,865	29,102,665	35,474,266

The following represents the significant investment strategies and terms on which the System may redeem investments for those investments measured at the NAV (or its equivalent) as a practical expedient:

	Investments measured at NAV			
	2021	**2020**	**Redemption frequency**	**Redemption notice period**
Commingled equity funds	$ 916,828,540	864,703,012	Daily	1–30 days
Commingled fixed income funds	144,941,025	169,941,647	Daily	1–30 days
Real estate	269,244,940	226,170,125	Quarterly	1–30 days
Alternative	375,581,233	263,638,150	Quarterly	1–30 days

Commingled equity funds: This type includes 8 funds that invest primarily in U.S. large and small cap equity funds and international equity funds.

Commingled fixed income funds: This type includes 2 fixed income funds that invest in U.S. corporate bonds, U.S. government bonds, U.S. asset-backed securities and foreign bonds.

Real estate funds: This type includes 10 funds that invest primarily in real estate funds and global infrastructure.

Alternative funds: This type includes 17 funds that invest primarily in private equity and venture capital funds. The System is required to provide a 24 hour redemption notice for the PRIT hedge fund. The PRIT private equity fund is not redeemable until notified by the PRIM Board.

(5) Operating Expenses

The System's administrative expenses as shown on the Statements of Changes in Fiduciary Net Position are borne by the System and financed with investment income. These expenses include personnel and professional services, member communication and education, and other miscellaneous administrative expenses.

(6) Legally Required Reserve Accounts

The balances in the System's legally required reserves at December 31, 2021 and 2020 are as follows:

	2021	2020	Purpose
Annuity savings fund	$ 273,610,308	270,857,909	Active members' contribution balance
Annuity reserve fund	86,819,853	82,845,564	Retired members' contribution account
Pension reserve fund	1,470,970,207	1,227,317,187	Amounts appropriated to fund future retirement benefits
Pension fund	10,797,211	12,075,256	Remaining net assets
Military service fund	4,629	4,624	Amounts appropriated to fund military service time
	$ 1,842,202,208	1,593,100,540	

All reserve accounts are funded at levels required by State statute.

(7) Net Pension Liability

The components of the net pension liability of the System as of December 31, 2021 and 2020, are as follows:

	2021	2020
Total pension liability	$ 1,845,941,497	1,757,432,734
Fiduciary net position	1,842,202,208	1,593,100,540
System's net pension liability	$ 3,739,289	164,332,194
Fiduciary net position as a percentage of the total pension liability	99.80 %	90.65 %

(a) Actuarial Assumptions

The total pension liability at December 31, 2021 was measured by an actuarial valuation as of January 1, 2022. Total pension liability at December 31, 2020 was determined by an actuarial valuation as of January 1, 2020, rolled forward to the December 31, 2020, measurement date. The following actuarial assumptions were applied to the measurement of the total pension liability at December 31, 2021 and 2020:

	2021	2020
Inflation	3.0%	3.0%
Salary increases	4.0%	4.0%
Investment rate of return	7.10%	7.25%
Cost of living adjustments	3% of first $16,000	3% of first $16,000
Pre-retirement mortality	Group 1 and 2: Pub-2010 General Employee Amount-Weighted Mortality Table projected generationally using Scale MP-2021	Group 1 and 2: Pub-2010 General Employee Amount-Weighted Mortality Table set forward one year projected generationally using Scale MP-2019
	Group 4: Pub-2010 Safety Employee Amount-Weighted Mortality Table projected generationally using Scale MP-2021	Group 4: Pub-2010 Safety Employee Amount-Weighted Mortality Table projected generationally using Scale MP-2019
Healthy Retiree mortality	Group 1 and 2: Pub-2010 General Healthy Retiree and Contingent Survivor Amount-Weighted Mortality Tables projected generationally using Scale MP-2021	Group 1 and 2: Pub-2010 General Healthy Retiree and Contingent Survivor Amount-Weighted Mortality Tables set forward one year projected generationally using Scale MP-2019
	Group 4: Pub-2010 Safety Healthy Retiree and Contingent Survivor Amount-Weighted Mortality Tables projected generationally using Scale MP-2021	Group 4: Pub-2010 Safety Healthy Retiree and Contingent Survivor Amount-Weighted Mortality Tables projected generationally using Scale MP-2019
Disabled Retiree mortality	Group 1 and 2: Pub-2010 General Healthy Retiree Amount-Weighted Mortality Table set forward one year projected generationally using Scale MP-2021	Group 1 and 2: Pub-2010 General Healthy Retiree Amount-Weighted Mortality Table set forward one year projected generationally using Scale MP-2019
	Group 4: Pub-2010 Disabled Retiree Amount-Weighted Mortality Table projected generationally using Scale MP-2021	Group 4: Pub-2010 Disabled Retiree Amount-Weighted Mortality Table projected generationally using Scale MP-2019

- Long-term Expected Rate of Return:
  - The long-term expected rate of return on plan investments was determined using a building-block method in which best-estimate ranges of expected future real rates of return (expected returns, net of pension plan investment expense and inflation) are developed for each major asset class. These ranges are combined to produce the long-term expected rate of return by weighting the expected future real rates of return by the target asset allocation percentage and by adding expected inflation. The best estimates of arithmetic long-term expected real rates of return for each major asset class are summarized in the following table:

Asset class	2021 Long-term expected real rate of return	2020 Long-term expected real rate of return
Cash	(0.10)%	(0.19)%
Domestic equity	6.11	6.28
International developed markets equity	6.49	7.00
International emerging markets equity	8.12	8.82
Core fixed income	0.38	0.38
High yield fixed income	2.48	2.97
Real estate	3.72	3.50
Commodities	3.44	3.45
Hedge fund, GTAA, risk parity	2.63	2.35
Private equity	9.93	10.11
Emerging market debt	2.67	—
Infrastructure	5.16	—

(b) Discount Rate

The discount rates used to measure the total pension liability were 7.10% and 7.25% as of December 31, 2021 and 2020, respectively. The projection of cash flows used to determine the discount rate assumed that plan member contributions will be made at the current contribution rate and that employer contributions will be made at rates equal to the difference between actuarially determined contribution rates and the member rate. Based on those assumptions, the System's fiduciary net position was projected to be available to make all projected future benefit payments of current plan members. Therefore, the long-term expected rate of return on the plan investments was applied to all periods of projected benefit payments to determine the total pension liability.

(Continued)

(c) Sensitivity of the Net Pension Liability to Changes in the Discount Rate

The following presents the net pension liability of the System as of December 31, 2021 and 2020, calculated using the current discount rates, as well as what the net pension liability/(asset) would be if it were calculated using a discount rate that is one-percentage point lower or one-percentage point higher than the current rate:

	2021		
	1% decrease (6.10%)	Current discount rate (7.10%)	1% increase (8.10%)
System's net pension liability/(asset)	$ 220,295,164	3,739,289	(177,939,984)

	2020		
	1% decrease (6.25%)	Current discount rate (7.25%)	1% increase (8.25%)
System's net pension liability/(asset)	$ 366,870,367	164,332,194	(5,563,588)

(8) Subsequent Events

The System has evaluated subsequent events from the Statement of Fiduciary Net Position date of December 31, 2021 through September 7, 2022, the date on which the basic financial statements were issued, and determined there are no items to disclose.

CITY OF CAMBRIDGE RETIREMENT SYSTEM

Required Supplementary Information

Schedule of Changes in the Net Pension Liability and Related Ratios

(Unaudited)

	2021	2020	2019	2018	2017	2,016	2015	2014
Total pension liability:								
Service cost	$ 37,591,577	36,442,014	35,818,206	35,289,253	31,903,330	32,844,244	30,908,861	29,791,673
Interest	126,616,456	121,894,348	118,524,777	113,321,515	107,835,410	105,325,306	98,925,146	94,315,895
Changes of benefit terms	—	—	—	—	13,786,855	—	—	—
Differences between expected and actual experience	(29,621,312)	—	(21,185,206)	5,492,484	—	(29,237,110)	—	—
Changes of assumptions	51,102,912	—	56,581,172	—	43,565,250	—	42,033,481	—
Benefit payments, including refunds of member contributions	(97,180,870)	(91,525,935)	(87,257,596)	(83,253,157)	(78,642,592)	(72,563,588)	(69,354,414)	(64,034,766)
Net change in total pension liability	88,508,763	66,810,427	102,481,353	70,850,095	118,448,253	36,368,852	102,513,074	60,072,802
Total pension liability – beginning	1,757,432,734	1,690,622,307	1,588,140,954	1,517,290,859	1,398,842,606	1,362,473,754	1,259,960,680	1,199,887,878
Total pension liability – ending (a)	1,845,941,497	1,757,432,734	1,690,622,307	1,588,140,954	1,517,290,859	1,398,842,606	1,362,473,754	1,259,960,680
Plan fiduciary net position:								
Contributions – employers and nonemployer	54,148,316	48,335,964	45,681,166	43,173,090	40,831,840	40,047,891	37,851,149	35,775,814
Contributions – member	25,030,544	24,711,247	23,809,697	22,730,249	22,146,929	20,949,712	21,167,434	20,572,796
Net investments income/(loss)	268,413,527	162,343,552	201,086,610	(48,209,324)	190,247,348	90,299,489	(6,716,067)	64,639,098
Benefit payments, including refunds of member contributions, and other	(97,180,870)	(91,558,935)	(87,335,876)	(83,297,157)	(78,642,592)	(72,563,588)	(69,354,414)	(64,034,766)
Administrative expenses	(1,309,849)	(1,470,748)	(1,221,287)	(1,253,759)	(1,127,717)	(1,112,054)	(1,076,459)	(1,031,915)
Net change in plan fiduciary net position	249,101,668	142,361,080	182,020,310	(66,856,901)	173,455,808	77,621,450	(18,128,357)	55,921,027
Plan fiduciary net position – beginning	1,593,100,540	1,450,739,460	1,268,719,150	1,335,576,051	1,162,120,243	1,084,498,793	1,102,627,150	1,046,706,123
Plan fiduciary net position – ending (b)	1,842,202,208	1,593,100,540	1,450,739,460	1,268,719,150	1,335,576,051	1,162,120,243	1,084,498,793	1,102,627,150
Net pension liability – ending (a) – (b)	$ 3,739,289	164,332,194	239,882,847	319,421,804	181,714,808	236,722,363	277,974,961	157,333,530
Fiduciary net position as a percentage of the total pension liability	99.8 %	90.6 %	85.8 %	79.9 %	88.0 %	83.1 %	80.0 %	87.5 %
Covered payroll	$ 247,847,724	244,609,523	235,687,286	231,568,517	228,696,936	220,963,223	226,826,076	218,627,543
Plan net pension liability as a percentage of covered payroll	1.51 %	67.18 %	101.78 %	137.94 %	79.46 %	107.13 %	122.50 %	72.00 %

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

See accompanying independent auditors' report.

26

CITY OF CAMBRIDGE RETIREMENT SYSTEM

Required Supplementary Information

Notes to Schedule of Changes in the Net Pension Liability and Related Ratios

(Unaudited)

Benefit Changes		Amount of change TPL	Description
2017:	$	13,786,855	- The COLA base was changed from $14,000 to $16,000 effective July 1, 2018.

Changes of Assumptions		Amount of change TPL	Description
2021:	$	51,102,912	- Discount rate decreased from 7.25% to 7.10% - The mortality assumptions for Pre-Retirement Group 1 and 2 was updated from Pub-10 General Employee Amount- Weighted Morality Table set forward one year projected generationally with Scale MP-2019 to Pub-2010 General Employee Amount-Weighted Mortality Table projected generationally using Scale MP-2021 - The mortality assumptions for Pre-Retirement Group 4 was updated from Pub-10 Saftey Employee Amount-Weighted Morality Table projected generationally using Scale MP-2019 to Pub-2010 Safety Employee Amount-Weighted Mortality Table projected generationally using Scale MP-2021 - The mortality assumptions for the Healthy Retirement Group 1 and 2 was updated from Pub-2010 General Healthy Retiree and Contingent Surivor Amount-Weighted Mortality Tables set forward one year projected generationally using Scale MP-2019 to Pub-2010 General Healthy Retiree and Contingent Survivor Amount-Weighted Mortality Tables projected generationally using Scale MP-2021 - The mortality assumptions for the Healthy Retirement Group 4 was updated from Pub-10 Saftey Healthy Retiree and Contingent Survivor Amount-Weighted Mortality Tables projected generationally with Scale MP-2019 to Pub-2010 Safety Healthy Retiree and Contingent Survivor Amount-Weighted Mortality Tables projected generationally using Scale MP-2021 - The mortality assumptions for Disabled participants in Group 1 and 2 was updated from Pub-2010 General Healthly Retiree Amount-Weighted Mortality Table set forward one year projected generationally with Scale MP-2019 to Pub-2010 General Healthy Retiree Amount-Weighted Mortality Table set forward one year projected generationally using Scale MP-2021 - The mortality assumptions for Disabled participants in Group 4 was updated from Pub-210 Disabled Retiree Amount-Weigheted Mortality Table projected generationally using Scale MP-2019 to Pub-2010 Disabled Retiree Amount-Weighted Mortality Table projected generationally using Scale MP-2021 - The administrative expense assumption was decreased from $1,500,000 for calendar 2020 to $1,450,000 for calendar 2022, increasing 3% per year.
2019:	$	56,581,172	- Discount rate decreased from 7.50% to 7.25% - Salary Increases decreased from 4.50% to 4.00% - Wage Inflation decreased from 3.50% to 3.00% - The mortality assumptions for Pre-Retirement Group 1 and 2 was updated from RP-2014 Blue Collar Employee Morality Table set forward one year for females projected generationally with Scale MP-2017 to Pub-2010 General Employee Amount-Weighted Mortality Table set forward one year projected generationally using Scale MP-2019 - The mortality assumptions for Pre-Retirement Group 4 was updated from RP-2014 Blue Collar Employee Morality Table set forward one year for females projected generationally with Scale MP-2017 to Pub-2010 Safety Employee Amount-Weighted Mortality Table projected generationally using Scale MP-2019 - The mortality assumptions for the Healthy Retirement Group 1 and 2 was updated from RP-2014 Blue Collar Healthy Annuitant Mortality Table set forward one year for females projected generationally with Scale MP-2017 to Pub-2010 General Healthy Retiree and Contingent Survivor Amount-Weighted Mortality Tables set forward one year projected generationally using Scale MP-2019 - The mortality assumptions for the Healthy Retirement Group 4 was updated from RP-2014 Blue Collar Healthy Annuitant Mortality Table set forward one year for females projected generationally with Scale MP-2017 to Pub-2010 Safety Healthy Retiree and Contingent Survivor Amount-Weighted Mortality Tables projected generationally using Scale MP-2019 - The mortality assumptions for Disabled participants in Group 1 and 2 was updated from RP-2014 Blue Collar Healthy Annuitant Mortality Table set forward one year and projected generationally with Scale MP-2017 to Pub-2010 General Healthy Retiree Amount-Weighted Mortality Table set forward one year projected generationally using Scale MP-2019 - The mortality assumptions for Disabled participants in Group 4 was updated from RP-2014 Blue Collar Healthy Annuitant Mortality Table set forward one year and projected generationally with Scale MP-2017 to Pub-2010 Disabled Retiree Amount-Weighted Mortality Table projected generationally using Scale MP-2019 - The administrative expense assumption was increased from $1,300,000 for calendar 2018 to $1,500,000 for calendar 2019.
2017:	$	43,565,250	- Discount rate decreased from 7.75% to 7.50% - The mortality assumption for nondisabled participants was updated from RP-2000 Employee Healthy Annuitant Mortality Tables projected generationally from 2009 using Scale BB2D to the RP-2014 Blue Collar Employee and Healthy Annuitant Mortality Tables set forward one year for females projected generationally with Scale MP-2017. - The mortality assumptions for disabled participants was updated from the RP-2000 Healthy Annuitant Mortality Table projected generationally from 2015 using Scale BB2D to the RP-2014 Blue Collar Healthy Annuitant Mortality Table set forward one year and projected generationally with Scale MP-2017. - The administrative expense assumption was increased from $1,150,000 for calendar 2016 to $1,300,000 for calendar 2018.
2015:	$	42,033,481	- Discount rate decreased from 7.875% to 7.75% - The mortality assumption for nondisabled participants was changed from the RP-2000 Combined Healthy Mortality Table projected 17 years using AA to the RP-2000 Employee and Healthy Annuitant Mortality Tables projected generationally from 2009 using Scale BB2D. - The mortality assumption for disabled participants was changed from the RP-2000 Combined Healthy Mortality Table set forward five year projected 17 using Scale AA to the RP-2000 Healthy Annuitant Mortality Table projected generationally from 2015 using Scale BB2D. - The salary increase assumption was decreased from 4.75% to 4.5%. - The administrative expense assumption was increased from $1,100,000 for calendar 2014 to $1,150,000 for calendar 2016. - The asset valuation method was reset from an actuarial value of assets to a market value of assets.

CITY OF CAMBRIDGE RETIREMENT SYSTEM

Required Supplementary Information

Schedule of Investment Returns

(Unaudited)

	2021	2020	2019	2018	2017	2,016	2015	2014
Annual money-weighted rate of return, net of investment expense	17.01 %	12.23 %	16.12 %	(3.56)%	16.49 %	8.40 %	(0.60)%	6.20 %

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

See accompanying independent auditors' report.

CITY OF CAMBRIDGE RETIREMENT SYSTEM

Required Supplementary Information

Schedule of Contributions

(Unaudited)

	2021	2020	2019	2018	2017	2016	2015	2014	2013	2012
Actuarially determined contribution	$ 53,848,316	48,035,964	45,381,166	42,873,090	40,531,840	39,747,891	37,551,149	35,475,814	35,475,814	31,662,897
Contributions in relation to the actuarially determined contribution	54,148,316	48,335,964	45,681,166	43,173,090	40,831,840	40,047,891	37,851,149	35,775,814	35,775,814	31,967,897
Contribution deficiency (excess)	$ (300,000)	(300,000)	(300,000)	(300,000)	(300,000)	(300,000)	(300,000)	(300,000)	(300,000)	(305,000)
Covered payroll	$ 247,847,724	244,609,523	235,687,286	231,568,517	228,696,936	220,963,223	226,826,076	218,627,543	217,086,299	217,086,299
Contributions as a percentage of covered payroll	21.85 %	19.76 %	19.38 %	18.64 %	17.85 %	18.12 %	16.69 %	16.36 %	16.34 %	14.59 %

See accompanying independent auditors' report.

CITY OF CAMBRIDGE RETIREMENT SYSTEM

Required Supplementary Information

Notes to Schedule of Contributions

(Unaudited)

Methods and assumptions used to determine contribution rates:

Valuation date:

Actuarially determined contribution rates for 2021 are determined with the January 1, 2020 actuarial valuation.

The following assumptions were used for the periods included in the funding for 2021:

Actuarial cost method:	Entry age normal
Amortization method:	Prior year's contributions increased 12.10% per year, plus an additional contribution of $300,000 each year
Asset valuation method:	Market value of assets as of December 31, 2019 as reported in the System's Annual Statement
Inflation:	3.00%
Salary increases:	4.00%
Investment rate of return:	7.25%, net of plan investment expense lowered from 7.5%
Retirement benefits:	Depending on age at retirement and "Group" classification 0.1%–2.5% per year of service times highest three year average salary. A five year average salary is used for those hired after April 1, 2012
Post-retirement cost of living increases:	The cost-of-living base is $16,000. Annual cost of living increases are assumed to be 3% of the lesser of the base or annual benefits.
Mortality:	*Pre-Retirement Group 1 and 2*: Pub-2010 General Employee Amount-Weighted Mortality Table set forward one year projected gernerationally using Scale MP-2019 *Pre-Retirement Group 4*: Pub-2010 Safety Employee Amount-Weighted Mortality Table projected generationally using Scale MP-2019 *Healthy Group 1 and 2 Retiree*: Pub-2010 General Healthy Retiree and Contingent Survivor Amount-Weighted Mortality Tables set forwardone year projected generationally using Scale MP-2019 *Healthy Group 4 Retiree*: Pub-2010 Safety Healthy Retiree and Contingent Survivor Amount-Weighted Mortality Tables projected generationally using Scale MP-2019 *Disabled Group 1 and 2 Retiree*: Pub-2010 General Healthy Retiree Amount-Weighted Mortality Table set forward one year projected generationally using Scale MP-2019 *Disabled Group 4 Retiree*: Pub-2010 Disabled Retiree Amount-Weighted Mortality Table projected generationally using Scale MP-2019
Changes of Assumptions:	Actuarial assumptions are revised periodically to more closely reflect actual, as well as anticipate future experience. When actuarial assumptions have changed in prior years, the Retirement Board formally adopted the change at a monthly meeting.

See accompanying independent auditors' report.

KPMG

CITY OF CAMBRIDGE RETIREMENT SYSTEM

Financial Statements and Required Supplementary Information

December 31, 2020 and 2019

(With Independent Auditors' Report Thereon)

CITY OF CAMBRIDGE RETIREMENT SYSTEM

Financial Statements and Required Supplementary Information

December 31, 2020 and 2019

Table of Contents

KPMG LLP
Two Financial Center
60 South Street
Boston, MA 02111

Independent Auditors' Report

City of Cambridge
Retirement System Board:

Report on the Financial Statements

We have audited the accompanying financial statements of the City of Cambridge Retirement System (the System) as of and for the years ended December 31, 2020 and 2019, and the related notes to the financial statements, which collectively comprise the System's basic financial statements for the years then ended as listed in the accompanying table of contents.

Management's Responsibility for the Financial Statements

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

Auditors' Responsibility

Our responsibility is to express an opinion on these financial statements based on our audits. We conducted our audits in accordance with auditing standards generally accepted in the United States of America and the standards applicable to financial audits contained in *Government Auditing Standards*, issued by the Comptroller General of the United States. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditors' judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the entity's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. Accordingly, we express no such opinion. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluating the overall presentation of the financial statements.

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

Opinion

In our opinion, the financial statements referred to above present fairly, in all material respects, the fiduciary net position of the System as of December 31, 2020 and 2019, and the changes in fiduciary net position for the years then ended in accordance with U.S. generally accepted accounting principles.

KPMG

Other Matter

Required Supplementary Information

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

Other Reporting Required by *Government Auditing Standards*

In accordance with *Government Auditing Standards*, we have also issued our report dated August 30, 2021 on our consideration of the System's internal control over financial reporting and on our tests of its compliance with certain provisions of laws, regulations, contracts, and grant agreements and other matters. The purpose of that report is solely to describe the scope of our testing of internal control over financial reporting and compliance and the results of that testing, and not to provide an opinion on the effectiveness of the System's internal control over financial reporting or on compliance. That report is an integral part of an audit performed in accordance with *Government Auditing Standards* in considering the System's internal control over financial reporting and compliance.

KPMG LLP

Boston, Massachusetts
August 30, 2021

This section presents Management's Discussion and Analysis (MD&A) of the City of Cambridge Retirement System's (the System or the Plan) financial activity and performance as of and for the years ended December 31, 2020 and 2019. The MD&A is unaudited and is intended to serve as an introduction to the Plan's basic financial statements, as well as to offer readers of the Plan's financial statements a narrative view and analysis of System's financial activities.

Financial Highlights

The fiduciary net position of the Plan as of December 31, 2020 totaled $1.593 billion, a $142.4 million, or 9.81% increase, due to positive returns in several asset classes. Fiduciary net position is the residual of the Plan's assets in excess of the Plan's liabilities as of the date of the Statements of Fiduciary Net Position. The Plan's assets are held in trust to meet future benefit payments.

Total Plan "additions" of $238.9 million, comprised of $76.6 million in contributions, and $162.3 million in investment gains, were reported for the year ended December 31, 2020. In comparison, the Plan reported total additions of $274.4 million and $21.6 million for the years ended December 31, 2019 and 2018, respectively. The decrease in 2020 is due to smaller investment returns in 2020 compared with 2019, and the increase in 2019 from 2018 is due to investment gains in several asset classes.

For the plan year ended December 31, 2020, total Plan deductions were $96.6 million, an increase of $4.2 million, or 4.55% over the last year, and are comprised of $90.7 million in benefit payments, $4.4 million in transfers and withdrawals and $1.5 million in administrative expenses. This $4.2 million increase is due to new retirements. This is as compared to total deductions of $92.4 million and $88.5 million for the years ended December 31, 2019, and 2018, respectively.

The Plan's fiduciary net position as a percentage of the total pension liability was 90.65%.

Overview of the Financial Statements

The basic financial statements consist of the: (1) Statements of Fiduciary Net Position; (2) Statements of Changes in Fiduciary Net Position; and (3) Notes to the Financial Statements; and (4) Required Supplementary Information.

The Statements of Fiduciary Net Position report the Plan's assets, liabilities, and net position restricted for pensions at the end of the year calculated using the following formula: Assets – Liabilities = Net position restricted for pensions. The Statements of Fiduciary Net Position report the financial position of the Plan at a given point in time, in this case, December 31. Over time, the increase or decrease in fiduciary net position serves as a useful indicator of the Plan's financial health.

The Statements of Changes in Fiduciary Net Position report additions to and deductions from the Plan during the year. The formula here is: Additions – Deductions = Net Increase (Decrease) in Plan Fiduciary Net Position. The Statements of Changes in Fiduciary Net Position report activity occurring over a specific period of time, in this case, the year beginning January 1 and ending December 31.

The Notes to the Financial Statements provide additional information that is essential to a full understanding of the data provided in the Plan's financial statements.

CITY OF CAMBRIDGE RETIREMENT SYSTEM

Management's Discussion and Analysis

December 31, 2020 and 2019

(Unaudited)

This report also includes Required Supplementary Information following the Notes to the Financial Statements that consists of the schedules of changes in net pension liability and related ratios, investment returns, and contributions and notes to schedule of contributions.

These statements and schedules are prepared in conformity with U.S. generally accepted accounting principles, including the accounting and financial reporting requirements found in GASB Statement No. 67.

Financial Analysis

Total assets as of December 31, 2020 and 2019 were $1.6 billion and $1.5 billion, respectively, and were comprised of cash and cash equivalents; investments; cash collateral on securities lending, accrued interest and accrued dividends receivables; and contributions due from Plan members, the Plan sponsor and other systems. Total assets increased by $135.0 million or 9.2% from $1.5 billion as of December 31, 2019, due to investment gains in several asset classes. Total assets increased by $155.7 million or 11.9% between 2018 and 2019 due to investment gains in several asset classes.

Total liabilities as of December 31, 2020 were approximately $3.7 million and total liabilities as of December 31, 2019 were approximately $11.1 million. Total liabilities for 2020 and 2019 were primarily comprised of payables for investment management fees, refunds to members, and cash collateral on securities lending. Total liabilities decreased by $26.3 million or 70.4% between 2018 and 2019 due to a decrease in cash collateral on securities lending.

Total fiduciary net position held in trust for pension benefits totaled $1.593 billion at December 31, 2020 which represents an increase of $142.4 million or 9.8% over 2019. Fiduciary net position increased by $182.0 million or 14.4% between 2018 and 2019. The increase in 2020 is due to investment gains in several asset classes.

Condensed financial information

	2020	2019	Total $ change	Total % change
Assets:				
Cash and cash equivalents	$ 4,477,345	9,234,999	(4,757,654)	(51.52)%
Receivables and other assets	814,294	914,918	(100,624)	(11.00)
Investments	1,589,029,865	1,441,437,559	147,592,306	10.24
Cash collateral on securities lending	2,513,792	10,226,733	(7,712,941)	(75.42)
Total assets	1,596,835,296	1,461,814,209	135,021,087	9.24

4

(Continued)

Condensed financial information

	2020	2019	Total $ change	Total % change
Liabilities:				
Payables	$ 1,220,964	848,016	372,948	43.98
Cash collateral on securities lending	2,513,792	10,226,733	(7,712,941)	(75.42)
Total liabilities	3,734,756	11,074,749	(7,339,993)	(66.28)
Fiduciary net position	$ 1,593,100,540	1,450,739,460	142,361,080	9.81 %

Condensed financial information

	2019	2018	Total $ change	Total % change
Assets:				
Cash and cash equivalents	$ 9,234,999	9,793,854	(558,855)	(5.71)%
Receivables and other assets	914,918	1,004,148	(89,230)	(8.89)
Investments	1,441,437,559	1,260,028,861	181,408,698	14.40
Cash collateral on securities lending	10,226,733	35,255,585	(25,028,852)	(70.99)
Total assets	1,461,814,209	1,306,082,448	155,731,761	11.92
Liabilities:				
Payables	848,016	2,107,713	(1,259,697)	(59.77)
Cash collateral on securities lending	10,226,733	35,255,585	(25,028,852)	(70.99)
Total liabilities	11,074,749	37,363,298	(26,288,549)	(70.36)
Fiduciary net position	$ 1,450,739,460	1,268,719,150	182,020,310	14.35 %

Revenues – Additions to Plan Fiduciary Net Position

Additions to the System's Fiduciary net position include plan member and plan sponsor contributions, transfers from other retirement systems and investment income. Contributions, net transfers and net investment income for plan year 2020 totaled approximately $238.9 million as compared to additions of approximately $274.4 million in 2019.

In 2020, member contributions increased by approximately $901.6 thousand or 3.8% due to the addition of new employees and the accrual of outstanding prior service buybacks. In 2019, member contributions increased by approximately $1.1 million or 4.8% due to the addition of new employees and the accrual of outstanding prior service buybacks.

Plan sponsor contributions of $48.3 million in 2020 increased by $2.7 million or 5.8%, compared to an increase of $2.5 million or 5.8% in 2019. The increase in 2020 and 2019 is due to an increase in the actuarial determined contributions (ADC) as determined by the Plan's actuary.

Net investment income for the year ending December 31, 2020 was $162.3 million representing a $38.7 million or 19.3% decrease from 2019. The decrease in net investment income in 2020 is the result of smaller investment returns compared to 2019. Net investment income for the year ending December 31, 2019 was $201.1 million representing a $249.3 million or 517.1% increase from 2018.

Condensed financial information

Additions	2020	2019	Total $ change	Total % change
Plan member contributions	$ 24,711,247	23,809,697	901,550	3.79 %
Plan sponsor contribution	48,335,964	45,681,166	2,654,798	5.81
Transfers	3,523,137	3,796,690	(273,553)	(7.21)
Net investment income (loss)	162,343,552	201,086,610	(38,743,058)	(19.27)
Total additions	$ 238,913,900	274,374,163	(35,460,263)	(12.92)%

Condensed financial information

Additions	2019	2018	Total $ change	Total % change
Plan member contributions	$ 23,809,697	22,730,249	1,079,448	4.75 %
Plan sponsor contribution	45,681,166	43,173,090	2,508,076	5.81
Transfers	3,796,690	3,906,001	(109,311)	(2.80)
Net investment income (loss)	201,086,610	(48,209,324)	249,295,934	517.11
Total additions	$ 274,374,163	21,600,016	252,774,147	1,170.25 %

Expenses – Deductions from Plan Fiduciary Net Position

Deductions to the Plan include the payment of pension benefits to members and beneficiaries, refunds of contributions to inactive members, transfers of member contributions to other Massachusetts public retirement plans and the cost of administration. For plan year 2020, the total deductions were $96.6 million, an increase of $4.2 million or 4.6% over 2019. For plan year 2019, the total deductions were $92.4 million, an increase of $3.9 million or 4.4% over 2018.

(Continued)

Retirement benefit payments totaled $90.7 million, an increase of approximately $5.1 million or 6.0%. In 2019 retirement benefit payments totaled $85.6 million, an increase of approximately $4.9 million or 6.1% from the previous year. The increases in 2020 and 2019 are due to new retirements and pension increases also known as cost-of-living adjustments in those respective years.

For plan year 2020, refunds of contributions totaled approximately $1.6 million, a decrease of approximately $327.3 thousand or 16.9% from 2019. For plan year 2019, refunds of contributions totaled approximately $1.9 million, a decrease of approximately $864 thousand or 30.1% from 2018. The decrease in 2020 is due to a decrease in inactive members requesting withdrawals for their contributions from the Plan. The decrease in 2019 is due to a decrease in inactive members requesting withdrawals for their contributions from the Plan. Transfers to other Massachusetts public retirement systems totaled approximately $2.8 million, a decrease of approximately $844 thousand or 23.2% from 2019. This is compared to a $138 thousand or 3.7% decrease from 2018 to 2019. Year to year changes in transfer rates can be attributed to variations in public sector workforce movement between Cambridge and other government employers.

In 2020, administrative expenses totaled approximately $1.5 million, an increase of approximately $249.5 thousand or 20.4%, and in 2019, administrative expenses totaled approximately $1.2 million, a decrease of approximately $32 thousand or 2.6%. The increase in administrative expenses for 2020 is primarily attributable to personnel and miscellaneous expenses. The decrease in administrative expenses for 2019 is attributable to miscellaneous expenses.

Condensed financial information

Deductions		2020	2019	Total $ change	Total % change
Retirement benefits	$	90,676,119	85,555,285	5,120,834	5.99 %
Refunds of contributions		1,607,442	1,934,722	(327,280)	(16.92)
Other systems		2,798,511	3,642,559	(844,048)	(23.17)
Administrative expenses		1,470,748	1,221,287	249,461	20.43
Total deductions	$	96,552,820	92,353,853	4,198,967	4.55 %

Condensed financial information

Deductions		2019	2018	Total $ change	Total % change
Retirement benefits	$	85,555,285	80,623,068	4,932,217	6.12 %
Refunds of contributions		1,934,722	2,799,045	(864,323)	(30.88)
Other systems		3,642,559	3,781,045	(138,486)	(3.66)
Administrative expenses		1,221,287	1,253,759	(32,472)	(2.59)
Total deductions	$	92,353,853	88,456,917	3,896,936	4.41 %

(Continued)

CITY OF CAMBRIDGE RETIREMENT SYSTEM

Management's Discussion and Analysis

December 31, 2020 and 2019

(Unaudited)

Change in Plan Fiduciary Net Position

Change in fiduciary net position for the year ended December 31, 2020 was $142.4 million, which represents an decrease of $39.7 million or 21.8% from the previous year. This decrease is primarily the result of smaller investment returns. Change in fiduciary net position for the year ended December 31, 2019 was $182.0 million, which represents an increase of $248.9 million or 372.3% from the previous year. This increase is primarily the result of investment gains.

Condensed financial information

Changes in System fiduciary net position		2020	2019	Total $ change	Total % change
Total additions	$	238,913,900	274,374,163	(35,460,263)	(12.92)%
Total deductions		96,552,820	92,353,853	4,198,967	4.55
Change in plan fiduciary net position	$	142,361,080	182,020,310	(39,659,230)	(21.79)%

Condensed financial information

Changes in System fiduciary net position		2019	2018	Total $ change	Total % change
Total additions	$	274,374,163	21,600,016	252,774,147	1,170.25 %
Total deductions		92,353,853	88,456,917	3,896,936	4.41
Change in plan fiduciary net position	$	182,020,310	(66,856,901)	248,877,211	372.25 %

Overall Financial Position of System

Due to investment gains in several asset classes the Plan has experienced an increase in its investment portfolio for the year ending December 31, 2020. Management believes the Plan remains well funded and able to meet its obligations. However, management acknowledges that the investment losses from prior years, will result in increased employer contributions going forward. When plan net position declines, the Plan sponsor is statutorily obligated to offset the losses as part of its annual assessment.

Requests for Information

This financial report is designed to provide an overview of System's finances. Questions concerning any of the information provided in this report should be addressed to City of Cambridge Retirement System, 125 CambridgePark Drive, Suite 104, Cambridge, MA 02140.

CITY OF CAMBRIDGE RETIREMENT SYSTEM

Statements of Fiduciary Net Position

December 31, 2020 and 2019

	2020	2019
Assets:		
Cash and cash equivalents	$ 4,477,345	9,234,999
Dividend and interest receivable	255,242	458,315
Other assets	559,052	456,603
Investments, at fair value:		
Fixed income securities	46,695,007	58,824,164
Equities	17,881,924	20,534,791
Pooled investments:		
Fixed income	117,426,119	127,463,138
Real estate	226,170,125	212,645,918
Domestic equities	627,176,468	550,472,826
International equities	237,526,544	203,466,808
International fixed income	52,515,528	66,119,549
Alternative	263,638,150	201,910,365
Total investments	1,589,029,865	1,441,437,559
Cash collateral on securities lending	2,513,792	10,226,733
Total assets	1,596,835,296	1,461,814,209
Liabilities:		
Accrued liabilities	896,372	848,016
Due to brokers for securities purchased	324,592	—
Cash collateral on securities lending	2,513,792	10,226,733
Total liabilities	3,734,756	11,074,749
Net position restricted for pensions	$ 1,593,100,540	1,450,739,460

See accompanying notes to financial statements.

CITY OF CAMBRIDGE RETIREMENT SYSTEM

Statements of Changes in Fiduciary Net Position

Years ended December 31, 2020 and 2019

	2020	2019
Additions:		
Contributions:		
Employers	$ 46,005,871	42,708,371
Nonemployer – City	2,330,093	2,972,795
Plan members	24,711,247	23,809,697
Other systems	3,310,192	3,355,649
Commonwealth of Massachusetts	212,945	441,041
Total contributions	76,570,348	73,287,553
Investment income:		
Interest and dividends	25,033,297	28,133,592
Securities lending income	51,027	881,685
Net appreciation (depreciation) in fair value of investments	145,980,402	182,540,440
Less:		
Management fees	(8,680,588)	(9,663,001)
Borrower rebates and fees under securities lending program	(40,586)	(806,106)
Net investment income	162,343,552	201,086,610
Total additions	238,913,900	274,374,163
Deductions:		
Benefits	90,676,119	85,555,285
Refunds of contributions	1,607,442	1,934,722
Other systems	2,798,511	3,642,559
Administrative expenses	1,470,748	1,221,287
Total deductions	96,552,820	92,353,853
Change in net position	142,361,080	182,020,310
Net position, beginning of year	1,450,739,460	1,268,719,150
Net position, end of year	$ 1,593,100,540	1,450,739,460

See accompanying notes to financial statements.

(1) Plan Description

The City of Cambridge Retirement System (the System or the Plan) is a cost-sharing, multiple-employer defined benefit pension plan administered by a Retirement Board comprised of five members: the City Auditor who serves as ex officio; two individuals elected by participants in the System; a fourth member appointed by the City Manager and a fifth member chosen by the other members of the Retirement Board. As of December 31, 2020, the System provides pension benefits to the retired employees of four employers: the City of Cambridge, Cambridge Housing Authority, Cambridge Redevelopment Authority and Cambridge Health Alliance.

The System is a member of the Massachusetts Contributory System, which is governed by Chapter 32 of the Massachusetts General Laws (MGL).

Employees covered by the Contributory Retirement Law are classified into one of four groups depending on job classification. Group 1 comprises most positions in state and local government. It is the general category of public employees. Group 2 is a limited category for specified hazardous occupations. Group 3 is for State Police only. Group 4 is mainly police and firefighters.

For employees hired prior to April 2, 2012, the annual amount of the retirement allowance is based on the member's final three year average salary multiplied by the number of years and full months of creditable service at the time of retirement and multiplied by a percentage based on the age of the member at retirement.

A member's final three year average salary is defined as the greater of the highest consecutive three year average annual rate of regular compensation and the average annual rate of regular compensation received during the last three years of creditable service prior to retirement.

For employees hired on April 2, 2012 or later, the annual amount of the retirement allowance is based on the member's final five year average salary multiplied by the number of years and full months of creditable service at the retirement and multiplied by a percentage based on the age and years of creditable service of the member at retirement.

A member's final five-year average salary is defined as the greater of the highest consecutive five-year average annual rate of regular compensation and the average annual rate of regular compensation received during the last five years of creditable service prior to retirement.

For employees who became members after January 1, 2011, regular compensation is limited to 64% of the federal limit found in 26 U.S.C. 401(a) (17). In addition, regular compensation for members who retire after April 2, 2012 will be limited to prohibit "spiking" a member's salary to increase the retirement benefit.

For all employees, the maximum annual amount of the retirement allowance is 80% of the member's final average salary. Any member who is a veteran also receives an additional yearly retirement allowance of $15 per year of creditable service, not exceeding $300. The veteran allowance is paid in addition to the 80% maximum.

Membership in the System consisted of the following at January 1, 2020, the date of the latest actuarial valuation:

Retirees and beneficiaries receiving benefits	2,247
Terminated plan members entitled to, but not receiving benefits	498
Terminated plan members with a vested right to a deferred or immediate benefit	136
Active plan members	3,040
Total membership	5,921
Total number of participating employers	4

(2) Contributions Required and Contributions Made

Plan members are required to contribute to the System. Depending on their employment date, active members must contribute a range of 5% to 9% of their regular gross compensation. Members hired after December 31, 1978 must contribute an additional 2% of regular compensation in excess of $30,000. Participating employers are required to pay into the System their share of the remaining system wide actuarially determined contribution, which is apportioned among the employers based on active covered payroll. The contributions of plan members and the participating employers are governed by Chapter 32 of the MGL.

The Commonwealth is obligated to reimburse the System for a portion of the benefits payments for cost of living increases granted before July 1998.

(3) Summary of Significant Accounting Policies

(a) Basis of Accounting

The System's financial statements are prepared using the full accrual basis of accounting. Plan member contributions are recognized in the period in which the contributions are due. Employer contributions to the plan are recognized when due and the employer is legally required to provide the contributions. Benefits and refunds are recognized when due and payable in accordance with the terms of the plan.

(b) Cash and Cash Equivalents

Cash and cash equivalents are considered to be cash on deposit, and highly liquid short-term investments with original maturities of three months or less from the date of acquisition.

(c) Investment and Valuation

The System participates in the segmentation program of the Pension Reserves Investment Trust (PRIT) Fund which allows Massachusetts retirement systems to invest only in individual asset classes of the PRIT Fund. The PRIT Fund is an external investment pool, as defined by the Government Accounting Standards Board, and it is not registered with the Securities and Exchange Commission, but is subject to oversight by the Pension Reserves Investment Management Board (the PRIM Board). The System's alternative investments include investments in the PRIT hedge and private equity segments of the PRIT Fund. The PRIT Fund issue separately available audited financial statements.

Investments are reported at fair value. Securities traded on a national or international securities exchange are valued at the last reported sales price on the last business day of the plan year; investments traded on a national securities exchange for which no sale was reported on that date and investments in common and preferred stocks traded in over-the-counter markets are valued at the mean of the last reported bid and asked prices, or the last reported bid price. Mutual funds and commingled funds, including real estate and other alternative (including private equity and hedge) investments, are valued based on net asset value (NAV) or unit value at year-end. Changes in fair value are included in investment income (loss) in the statement of changes in fiduciary net position.

(d) Use of Estimates

The preparation of financial statements in conformity with U.S. generally accepted accounting principles requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and the disclosure of contingent assets and liabilities at the dates of the financial statements and the reported amounts of additions and deductions during the reporting periods. Actual results could differ from estimates.

(e) Other

Purchases and sales of securities are reflected on a trade-date basis. Realized gain or loss on sales of securities is based on average cost.

Dividend income is recorded on the ex-dividend date. Interest income is recorded as earned on an accrual basis.

The System presents in its Statements of Changes in Fiduciary Net Position the net appreciation (depreciation) in the fair value of its investments, which consists of the net realized gains and losses during the year and the change in unrealized appreciation and depreciation during the year on those investments.

(f) Investment Policy

The provisions of Massachusetts General Laws (M.G.L.) Chapter 32, Section 23(2) and the Board approved investment policy govern the Plan's investment practice.

Diversification is attained through varied investment management styles that comply with Massachusetts state law. This is accomplished through the retention of investment managers that adhere to M.G.L. Chapter 32, Section 23(3), the "Prudent Person" rule.

The System has retained an investment consultant to work with the Board in a fiduciary capacity to assure that strategic investment diversification is attained, to employ investment managers with expertise in their respective asset classes, and to closely monitor the implementation and performance of the respective investment strategies.

The System is currently invested in equities (domestic and international), fixed income securities (domestic and international), real estate and other alternative (including private equity and hedge).

The target allocation for each major asset class is summarized in the following table:

Asset class	2020 Target asset allocation	2019 Target asset allocation
Cash	— %	— %
Domestic equity	28.00	28.00
International developed markets equity	10.00	10.00
International emerging markets equity	10.00	10.00
Core fixed income	10.00	10.00
High yield fixed income	10.00	10.00
Real estate	11.00	11.00
Commodities	3.00	3.00
Hedge fund, GTAA, risk parity	5.00	5.00
Private equity	13.00	13.00
Total	100.00 %	100.00 %

The Board's current rebalancing policy states that "The Board shall rebalance to the established targets during the quarter following the quarter ended whenever the asset class allocation falls outside the allowable ranges."

(g) Commitments

At December 31, 2020 and 2019, the System had contractual commitments to provide approximately $72 million and $116 million, respectively, of additional funding for alternative investments and real estate.

(4) Deposit and Investment Risks

(a) Custodial Credit Risk

Custodial credit risk is the risk that, in the event of a failure of a depository financial institution, the System deposits may not be returned. Investment securities are exposed to custodial credit risk if the securities are uninsured, are not registered in the name of the System and are held by either the depository financial institution or the depository financial institution's trust department or agent but not in the System's name. The System's cash and cash equivalent deposits that are not collateralized are subject to the Federal Deposit Insurance Corporation (FDIC) insurance limits. At December 31, 2020 and December 31, 2019, $4,013,986 and $8,777,147 of the System's cash and cash equivalent deposits, respectively, were uninsured and uncollateralized.

Although there is no System–wide policy for custodial credit risk associated with deposits, the System's investments are held by the System's custodian and registered in the System's name. All of the System's securities are held by the System's custodial bank in the System's name, except for investments in mutual and commingled funds, real estate properties, and limited partnerships, which by their nature, are not subject to custodial credit risk. Investments in the Short-Term Investment Funds

(STIF) are held in an SEC-registered pooled fund that is managed by the master custodian bank. The fair value of the position in the pool equals the value of the pool shares.

(b) Credit Risk

Credit risk exists when there is a possibility the issuer or other counterparty to an investment may be unable to fulfill its obligations.

There are no System – wide policy limitations for credit risk exposures within the portfolio. The System's fixed income investments are managed in accordance with an investment contract that is specific as to permissible credit quality ranges and the average credit quality of the overall portfolio.

The System allows investment managers to apply discretion under the "Prudent Person" rule. Investments are made, as a prudent person would be expected to act with discretion and intelligence, to seek reasonable income, preserve capital and, in general, avoid speculative investments.

The System's fixed income investments as of December 31, 2020 and 2019, if rated, were rated by Standard and Poor's and/or an equivalent national rating organization. The ratings are presented below using the Standard and Poor's rating scale:

Investment type	Fair value	AAA	AA	A	BBB	BB	Less than BB	Not rated
System (as of December 31, 2020):								
U.S. Treasury notes and bonds	$ 10,039,946	4,179,660	—	—	2,423,386	—	—	3,436,900
Municipal securities	1,738,689	—	1,249,955	146,491	140,855	—	201,388	—
U.S. agencies	4,321,320	1,192,823	—	—	—	—	—	3,128,497
Domestic corporate	21,875,172	510,972	935,948	6,475,269	12,237,907	107,991	—	1,607,085
Asset-backed:								
CMOs	4,905,252	3,520,743	—	225,102	—	—	—	1,159,407
Other	3,814,628	3,147,849	—	168,290	498,489	—	—	—
Pooled fixed-income investments	169,941,647	—	—	—	—	—	—	169,941,647
Total	$ 216,636,654	12,552,047	2,185,903	7,015,152	15,300,637	107,991	201,388	179,273,536

Investment type	Fair value	AAA	AA	A	BBB	BB	Less than BB	Not rated
System (as of December 31, 2019):								
U.S. Treasury notes and bonds	$ 19,391,696	14,076,078	2,966,397	—	—	—	—	2,349,221
Municipal securities	1,703,928	—	1,394,998	308,930	—	—	—	—
U.S. agencies	1,872,330	15,909	—	—	—	—	—	1,856,421
Domestic corporate	25,413,248	732,622	573,628	5,534,691	17,176,332	106,946	—	1,289,029
Asset-backed:								
CMOs	5,208,336	3,665,984	—	259,442	—	—	—	1,282,910
Other	5,234,626	3,885,527	—	1,349,099	—	—	—	—
Pooled fixed-income investments	193,582,687	—	—	—	—	—	—	193,582,687
Total	$ 252,406,851	22,376,120	4,935,023	7,452,162	17,176,332	106,946	—	200,360,268

(c) Concentration of Credit Risk

Concentration of credit risk is the risk of loss that may be attributed to the magnitude of a government's investment in a single issuer. The System has no investments, at fair value, that exceed 5% of the System's total investments as of December 31, 2020 and 2019 other than pooled investments. The System adheres to the provisions of M.G.L. c. 32, sec 23(2) when managing concentration risk.

(d) Interest Rate Risk

Interest rate risk is the risk that changes in interest rates will adversely affect the fair value of an investment. This risk is managed within the portfolio using the effective duration methodology. It is widely used in the management of fixed income portfolios in that it quantifies to a much greater degree the risk of interest rate changes.

The following is a listing of the System's fixed income investments and related maturity schedule (in years) as of December 31, 2020 and 2019:

Investment type		Fair value	Less than 1	1–5	6–10	More than 10
System (as of December 31, 2020):						
U.S. Treasury notes and bonds	$	10,039,946	—	3,436,900	1,699,425	4,903,621
Municipal Securities		1,738,689	—	1,014,484	377,444	346,761
U.S. agencies		4,321,320	20,989	958,639	647,465	2,694,227
Domestic corporate		21,875,172	—	7,321,408	4,267,105	10,286,659
Asset-backed:						
CMOs		4,905,252	—	—	—	4,905,252
Other		3,814,628	—	3,356,488	458,140	—
Pooled fixed-income investments		169,941,647	—	—	169,941,647	—
Total	$	216,636,654	20,989	16,087,919	177,391,226	23,136,520

Investment type		Fair value	Less than 1	1–5	6–10	More than 10
System (as of December 31, 2019):						
U.S. Treasury notes and bonds	$	19,391,696	—	8,636,832	655,420	10,099,444
Municipal Securities		1,703,928	301,393	—	646,943	755,592
U.S. agencies		1,872,330	—	84,729	250,881	1,536,720
Domestic corporate		25,413,248	277,443	11,050,731	6,124,094	7,960,980
Asset-backed:						
CMOs		5,208,336	—	—	—	5,208,336
Other		5,234,626	—	4,737,583	497,043	—
Pooled fixed-income investments		193,582,687	—	—	193,582,687	—
Total	$	252,406,851	578,836	24,509,875	201,757,068	25,561,072

(e) Foreign Currency Risk

Foreign currency risk is the risk that changes in exchange rates will adversely affect the fair value of an investment or a deposit. The System's asset allocation model which serves as a proxy for a foreign currency policy, limits the amount of foreign currency exposure to 20% of the System's total investments. Similar to the investments in domestic equities, the System employs or encourages its investment advisor to employ diversification, asset allocation, and quality strategies. Currency hedging is permitted for defensive purposes. Currency hedging shall be effected through the use of forward currency contracts. At December 31, 2020 and 2019, there were no open forward currency contracts.

Risk of loss arises from changes in currency exchange rates. The System's exposure to foreign currency risk is presented below at December 31, 2020 and 2019.

	2020	2019
Currency:		
International equity pooled funds (various currencies)	$ 237,526,544	203,466,808
International fixed income pooled funds (various currencies)	52,515,528	66,119,549
	$ 290,042,072	269,586,357

Although these investments are not denominated in a foreign currency, the underlying securities are denominated in various foreign currencies.

(f) Rates of Return

For the years ended December 31, 2020 and 2019, the annual money weighted rate of return on plan investments, net of plan investment expense was 12.23% and 16.12%, respectively. The money weighted rate of return expresses investment performance net of investment expenses adjusted for the changing amounts actually invested.

(g) Securities Lending

The Public Employment Retirement Administration Commission of Massachusetts (PERAC) has issued supplemental regulations that permit the System to engage in securities lending transactions. The System has entered into a Securities Lending Authorization Agreement (the Agreement) with a third party to act as the System's sub-custodian/agent for the purposes of managing a securities lending program.

The System lends fixed income, domestic equity, and international equity securities to approved broker/dealers. Collateral for securities loaned equals 102 percent of fair market value for domestic securities and 105 percent for international securities not denominated in U.S. dollars.

Types of collateral received from borrowers for securities loaned are cash and non-cash. The sub-custodian is authorized to invest the cash collateral in Approved Investments, as defined in the Agreement. Non-cash collateral received is not recorded in the accompanying financial statements as the System cannot pledge or sell the non-cash collateral except in the event of a borrower default.

(Continued)

As of December 31, 2020, the fair value of securities on loan was $3.1 million. The associated collateral was $3.2 million, of which $2.5 million was cash collateral and $.7 million was non-cash. The cash collateral has been reinvested in repurchase agreements ($2.5 million). The repurchase agreements are valued at amortized cost which approximates fair value.

As of December 31, 2019, the fair value of securities on loan was $10.5 million. The associated collateral was $10.7 million, of which $10.2 million was cash collateral and $.5 million was non-cash. The cash collateral has been reinvested in repurchase agreements ($.2 million), floating rate notes ($9.6 million), commercial paper ($.2 million), and certificate of deposit ($.2 million) with a collective fair value of approximately $10.2 million. The repurchase agreements are valued at amortized cost which approximates fair value. The floating rate notes are valued at fair value and are considered level 2 securities in the fair value hierarchy.

The Agreement limits the maturity value of any Approved Investment, as defined, to a maximum of 397 days, except U.S. government securities, which shall have a final maturity not exceeding 762 days.

At year-end, the System has no credit risk exposure to borrowers because the amounts the System owes the borrowers exceed the amounts the borrowers owe the System. The Agreement indemnifies the System if the borrowers fail to return the securities (and the collateral is inadequate to replace the securities lent) or fail to pay the System for income distributions by the securities' issuers while the securities are on loan.

As of December 31, 2020 and 2019, there were no violations of legal or contractual provisions. The System has not experienced any losses resulting from the default of a borrower or lending agent during the years ended December 31, 2020 and 2019.

(h) Fair Value Hierarchy

GAAP establishes a fair value hierarchy for investments that prioritizes inputs used to measure fair value into three levels:

Level 1 – quoted prices (unadjusted) for identical assets or liabilities in active markets that are accessible at the measurement date;

Level 2 – observable inputs that are based on inputs not quoted in active markets, but corroborated by market data.

Level 3 – unobservable inputs that are used when little or no market data is available.

The fair value hierarchy gives the highest priority to Level 1 inputs and the lowest priority to Level 3 inputs. In determining fair value, the System utilizes valuation techniques that maximize the use of observable inputs and minimize the use of unobservable inputs to the extent possible.

Investments held through commingled funds for which fair value is estimated using net asset values (NAVs) as a practical expedient are not categorized in the fair value hierarchy.

The System uses an independent pricing source to determine the fair value of investments at quoted market prices.

CITY OF CAMBRIDGE RETIREMENT SYSTEM

Notes to Financial Statements

December 31, 2020 and 2019

The System has the following fair value measurements as of December 31, 2020 and 2019:

	2020		
	Fair value	Level 1	Level 2
Investments by fair value level:			
Fixed income	$ 46,695,007	11,220,741	35,474,266
Equities	17,881,924	17,881,924	—
	64,576,931	29,102,665	35,474,266
Investments measured at NAV:			
Commingled equity funds:			
International	237,526,544	—	—
Domestic	627,176,468	—	—
Commingled fixed income funds:			
International	52,515,528	—	—
Domestic	117,426,119	—	—
Real estate	226,170,125	—	—
Other investments at fair value:			
Alternatives:			
PRIT hedge fund	61,089,883	—	—
PRIT private equity	125,544,179	—	—
Other non-PRIT alternatives	77,004,088	—	—
	1,524,452,934	—	—
Total investments	$ 1,589,029,865	29,102,665	35,474,266

	2019		
	Fair value	Level 1	Level 2
Investments by fair value level:			
Fixed income	$ 58,824,164	19,391,695	39,432,469
Equities	20,534,791	20,534,791	—
	79,358,955	39,926,486	39,432,469
Investments measured at NAV:			
Commingled equity funds:			
International	203,466,808	—	—
Domestic	550,472,826	—	—

	2019		
	Fair value	Level 1	Level 2
Commingled fixed income funds:			
International	$ 66,119,549	—	—
Domestic	127,463,138	—	—
Real estate	212,645,918	—	—
Other investments at fair value:			
Alternatives:			
PRIT hedge fund	90,191,864	—	—
PRIT private equity	74,825,002	—	—
Other non-PRIT alternatives	36,893,499	—	—
	1,362,078,604	—	—
Total investments	$ 1,441,437,559	39,926,486	39,432,469

The following represents the significant investment strategies and terms on which the System may redeem investments for those investments measured at the NAV (or its equivalent) as a practical expedient:

	Investments measured at NAV			
	2020	2019	Redemption frequency	Redemption notice period
Commingled equity funds	$ 864,703,012	753,939,634	Daily	1–30 days
Commingled fixed income funds	169,941,647	193,582,687	Daily	1–30 days
Real estate	226,170,125	212,645,918	Quarterly	1–30 days
Alternative	263,638,150	201,910,365	Quarterly	1–30 days

Commingled equity funds: This type includes 9 funds that invest primarily in U.S. large and small cap equity funds and international equity funds.

Commingled fixed income funds: This type includes 3 fixed income funds that invest in U.S. corporate bonds, U.S. government bonds, U.S. asset-backed securities and foreign bonds.

Real estate funds: This type includes 11 funds that invest primarily in real estate funds and global infrastructure.

Alternative funds: This type includes 18 funds that invest primarily in private equity and venture capital funds. The System is required to provide a 24 hour redemption notice for the PRIT hedge fund. The PRIT private equity fund is not redeemable until notified by the PRIM Board.

(5) Operating Expenses

The System's administrative expenses as shown on the Statements of Changes in Fiduciary Net Position are borne by the System and financed with investment income. These expenses include personnel and professional services, member communication and education, and other miscellaneous administrative expenses.

(6) Legally Required Reserve Accounts

The balances in the System's legally required reserves at December 31, 2020 and 2019 are as follows:

	2020	2019	Purpose
Annuity savings fund	$ 270,857,909	264,264,157	Active members' contribution balance
Annuity reserve fund	82,845,564	81,218,993	Retired members' contribution account
Pension reserve fund	1,227,317,187	1,090,854,107	Amounts appropriated to fund future retirement benefits
Pension fund	12,075,256	14,397,583	Remaining net assets
Military service fund	4,624	4,620	Amounts appropriated to fund military service time
	$ 1,593,100,540	1,450,739,460	

All reserve accounts are funded at levels required by State statute.

(7) Net Pension Liability

The components of the net pension liability of the System as of December 31, 2020 and 2019, are as follows:

	2020	2019
Total pension liability	$ 1,757,432,734	1,690,622,307
Fiduciary net position	1,593,100,540	1,450,739,460
System's net pension liability	$ 164,332,194	239,882,847
Fiduciary net position as a percentage of the total pension liability	90.65 %	85.81 %

(a) Actuarial Assumptions

The total pension liability at December 31, 2020 and 2019 was measured by an actuarial valuation as of January 1, 2020. Update procedures were used to roll forward the total pension liability from the valuation dates to the measurement dates. The following actuarial assumptions were applied to the measurement of the total pension liability at December 31, 2020 and 2019:

	2020	2019
Inflation	3.0%	3.0%
Salary increases	4.0%	4.0%
Investment rate of return	7.25%	7.25%
Cost of living adjustments	3% of first $16,000	3% of first $16,000
Pre-retirement mortality	Group 1 and 2: Pub-2010 General Employee Amount-Weighted Mortality Table set forward one year projected generationally using Scale MP-2019	Group 1 and 2: Pub-2010 General Employee Amount-Weighted Mortality Table set forward one year projected generationally using Scale MP-2019
	Group 4: Pub-2010 Safety Employee Amount-Weighted Mortality Table projected generationally using Scale MP-2019	Group 4: Pub-2010 Safety Employee Amount-Weighted Mortality Table projected generationally using Scale MP-2019
Healthy Retiree mortality	Group 1 and 2: Pub-2010 General Healthy Retiree and Contingent Survivor Amount-Weighted Mortality Tables set forward one year projected generationally using Scale MP-2019	Group 1 and 2: Pub-2010 General Healthy Retiree and Contingent Survivor Amount-Weighted Mortality Tables set forward one year projected generationally using Scale MP-2019
	Group 4: Pub-2010 Safety Healthy Retiree and Contingent Survivor Amount-Weighted Mortality Tables projected generationally using Scale MP-2019	Group 4: Pub-2010 Safety Healthy Retiree and Contingent Survivor Amount-Weighted Mortality Tables projected generationally using Scale MP-2019
Disabled Retiree mortality	Group 1 and 2: Pub-2010 General Healthy Retiree Amount-Weighted Mortality Table set forward one year projected generationally using Scale MP-2019	Group 1 and 2: Pub-2010 General Healthy Retiree Amount-Weighted Mortality Table set forward one year projected generationally using Scale MP-2019
	Group 4: Pub-2010 Disabled Retiree Amount-Weighted Mortality Table projected generationally using Scale MP-2019	Group 4: Pub-2010 Disabled Retiree Amount-Weighted Mortality Table projected generationally using Scale MP-2019

- Long-term Expected Rate of Return:
  - The long-term expected rate of return on plan investments was determined using a building-block method in which best-estimate ranges of expected future real rates of return (expected returns, net of pension plan investment expense and inflation) are developed for each major asset class. These ranges are combined to produce the long-term expected rate of return by weighting the expected future real rates of return by the target asset allocation percentage and by adding expected inflation. The best estimates of arithmetic long-term expected real rates of return for each major asset class are summarized in the following table:

Asset class	2020 Long-term expected real rate of return	2019 Long-term expected real rate of return
Cash	(0.19)%	0.63 %
Domestic equity	6.28	6.15
International developed markets equity	7.00	6.78
International emerging markets equity	8.82	8.65
Core fixed income	0.38	1.11
High yield fixed income	2.97	3.51
Real estate	3.50	4.33
Commodities	3.45	4.13
Hedge fund, GTAA, risk parity	2.35	3.19
Private equity	10.11	9.99

(b) Discount Rate

The discount rates used to measure the total pension liability both as of December 31, 2020 and 2019 was 7.25%. The projection of cash flows used to determine the discount rate assumed that plan member contributions will be made at the current contribution rate and that employer contributions will be made at rates equal to the difference between actuarially determined contribution rates and the member rate. Based on those assumptions, the System's fiduciary net position was projected to be available to make all projected future benefit payments of current plan members. Therefore, the long-term expected rate of return on the plan investments was applied to all periods of projected benefit payments to determine the total pension liability.

(Continued)

(c) Sensitivity of the Net Pension Liability to Changes in the Discount Rate

The following presents the net pension liability of the System as of December 31, 2020 and 2019, calculated using the current discount rates, as well as what the net pension liability would be if it were calculated using a discount rate that is one-percentage point lower or one-percentage point higher than the current rate:

	2020		
	1% decrease (6.25%)	Current discount rate (7.25%)	1% increase (8.25%)
System's net pension liability	$ 366,870,367	164,332,194	(5,563,588)

	2019		
	1% decrease (6.25%)	Current discount rate (7.25%)	1% increase (8.25%)
System's net pension liability	$ 437,334,858	239,882,847	74,233,062

(8) Subsequent Events

The System has evaluated subsequent events from the Statement of Fiduciary Net Position date of December 31, 2020 through August 30, 2021, the date on which the basic financial statements were issued, and determined there are no items to disclose.

CITY OF CAMBRIDGE RETIREMENT SYSTEM

Required Supplementary Information

Schedule of Changes in the Net Pension Liability and Related Ratios

(Unaudited)

	2020	2019	2018	2017	2016	2015	2014
Total pension liability:							
Service cost	$ 36,442,014	35,818,206	35,289,253	31,903,330	32,844,244	30,908,861	29,791,673
Interest	121,894,348	118,524,777	113,321,515	107,835,410	105,325,306	98,925,146	94,315,895
Changes of benefit terms	—	—	—	13,786,855	—	—	—
Differences between expected and actual experience	—	(21,185,206)	5,492,484	—	(29,237,110)	—	—
Changes of assumptions	—	56,581,172	—	43,565,250	—	42,033,481	—
Benefit payments, including refunds of member contributions	(91,525,935)	(87,257,596)	(83,253,157)	(78,642,592)	(72,563,588)	(69,354,414)	(64,034,766)
Net change in total pension liability	66,810,427	102,481,353	70,850,095	118,448,253	36,368,852	102,513,074	60,072,802
Total pension liability – beginning	1,690,622,307	1,588,140,954	1,517,290,859	1,398,842,606	1,362,473,754	1,259,960,680	1,199,887,878
Total pension liability – ending (a)	1,757,432,734	1,690,622,307	1,588,140,954	1,517,290,859	1,398,842,606	1,362,473,754	1,259,960,680
Plan fiduciary net position:							
Contributions – employers and nonemployer	48,335,964	45,681,166	43,173,090	40,831,840	40,047,891	37,851,149	35,775,814
Contributions – member	24,711,247	23,809,697	22,730,249	22,146,929	20,949,712	21,167,434	20,572,796
Net investment income	162,343,552	201,086,610	(48,209,324)	190,247,348	90,299,489	(6,716,067)	64,639,098
Benefit payments, including refunds of member contributions, and other	(91,558,935)	(87,335,876)	(83,297,157)	(78,642,592)	(72,563,588)	(69,354,414)	(64,034,766)
Administrative expenses	(1,470,748)	(1,221,287)	(1,253,759)	(1,127,717)	(1,112,054)	(1,076,459)	(1,031,915)
Net change in plan fiduciary net position	142,361,080	182,020,310	(66,856,901)	173,455,808	77,621,450	(18,128,357)	55,921,027
Plan fiduciary net position – beginning	1,450,739,460	1,268,719,150	1,335,576,051	1,162,120,243	1,084,498,793	1,102,627,150	1,046,706,123
Plan fiduciary net position – ending (b)	1,593,100,540	1,450,739,460	1,268,719,150	1,335,576,051	1,162,120,243	1,084,498,793	1,102,627,150
Net pension liability – ending (a) – (b)	$ 164,332,194	239,882,847	319,421,804	181,714,808	236,722,363	277,974,961	157,333,530
Fiduciary net position as a percentage of the total pension liability	90.6 %	85.8 %	79.9 %	88.0 %	83.1 %	80.0 %	87.5 %
Covered payroll	$ 244,609,523	235,687,286	231,568,517	228,696,936	220,963,223	226,826,076	218,627,543
Plan net pension liability as a percentage of covered payroll	67.18 %	101.78 %	137.94 %	79.46 %	107.13 %	122.50 %	72.00 %

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

See accompanying independent auditors' report.

25

CITY OF CAMBRIDGE RETIREMENT SYSTEM

Required Supplementary Information

Notes to Schedule of Changes in the Net Pension Liability and Related Ratios

(Unaudited)

Benefit Changes	Amount of change TPL	Description
2017:	$ 13,786,855	- The COLA base was changed from $14,000 to $16,000 effective July 1, 2018.

Changes of Assumptions	Amount of change TPL	Description
2019:	$ 56,581,172	- Discount rate decreased from 7.50% to 7.25% - Salary increases decreased from 4.50% to 4.00% - Wage Inflation decreased from 3.50% to 3.00% - The mortality assumptions for Pre-Retirement Group 1 and 2 was updated from RP-2014 Blue Collar Employee Morality Table set forward one year for females projected generationally with Scale MP-2017 to Pub-2010 General Employee Amount-Weighted Mortality Table set forward one year projected generationally using Scale MP-2019 - The mortality assumptions for Pre-Retirement Group 4 was updated from RP-2014 Blue Collar Employee Morality Table set forward one year for females projected generationally with Scale MP-2017 to Pub-2010 Safety Employee Amount-Weighted Mortality Table projected generationally using Scale MP-2019 - The mortality assumptions for the Healthy Retirement Group 1 and 2 was updated from RP-2014 Blue Collar Healthy Annuitant Mortality Table set forward one year for females projected generationally with Scale MP-2017 to Pub-2010 General Healthy Retiree and Contingent Survivor Amount-Weighted Mortality Tables set forward one year projected generationally using Scale MP-2019 - The mortality assumptions for the Healthy Retirement Group 4 was updated from RP-2014 Blue Collar Healthy Annuitant Mortality Table set forward one year for females projected generationally with Scale MP-2017 to Pub-2010 Safety Healthy Retiree and Contingent Survivor Amount-Weighted Mortality Tables projected generationally using Scale MP-2019 - The mortality assumptions for Disabled participants in Group 1 and 2 was updated from RP-2014 Blue Collar Healthy Annuitant Mortality Table set forward one year and projected generationally with Scale MP-2017 to Pub-2010 General Healthy Retiree Amount-Weighted Mortality Table set forward one year projected generationally using Scale MP-2019 - The mortality assumptions for Disabled participants in Group 4 was updated from RP-2014 Blue Collar Healthy Annuitant Mortality Table set forward one year and projected generationally with Scale MP-2017 to Pub-2010 Disabled Retiree Amount-Weighted Mortality Table projected generationally using Scale MP-2019 - The administrative expense assumption was increased from $1,300,000 for calendar 2018 to $1,500,000 for calendar 2019.
2017:	$ 43,565,250	- Discount rate decreased from 7.75% to 7.50% - The mortality assumption for nondisabled participants was updated from RP-2000 Employee Healthy Annuitant Mortality Tables projected generationally from 2009 using Scale BB2D to the RP-2014 Blue Collar Employee and Healthy Annuitant Mortality Tables set forward one year for females projected generationally with Scale MP-2017. - The mortality assumptions for disabled participants was updated from the RP-2000 Healthy Annuitant Mortality Table projected generationally from 2015 using Scale BB2D to the RP-2014 Blue Collar Healthy Annuitant Mortality Table set forward one year and projected generationally with Scale MP-2017. - The administrative expense assumption was increased from $1,150,000 for calendar 2016 to $1,300,000 for calendar 2018.
2015:	$ 42,033,481	- Discount rate decreased from 7.875% to 7.75% - The mortality assumption for nondisabled participants was changed from the RP-2000 Combined Healthy Mortality Table projected 17 years using AA to the RP-2000 Employee and Healthy Annuitant Mortality Tables projected generationally from 2009 using Scale BB2D. - The mortality assumption for disabled participants was changed from the RP-2000 Combined Healthy Mortality Table set forward five year projected 17 using Scale AA to the RP-2000 Healthy Annuitant Mortality Table projected generationally from 2015 using Scale BB2D. - The salary increase assumption was decreased from 4.75% to 4.5%. - The administrative expense assumption was increased from $1,100,000 for calendar 2014 to $1,150,000 for calendar 2016. - The asset valuation method was reset from an actuarial value of assets to a market value of assets.

CITY OF CAMBRIDGE RETIREMENT SYSTEM

Required Supplementary Information

Schedule of Investment Returns

(Unaudited)

	2020	2019	2018	2017	2016	2015	2014
Annual money-weighted rate of return, net of investment expense	12.23 %	16.12 %	(3.56)%	16.49 %	8.40 %	(0.60)%	6.20 %

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

See accompanying independent auditors' report.

CITY OF CAMBRIDGE RETIREMENT SYSTEM

Required Supplementary Information

Schedule of Contributions

(Unaudited)

	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011
Actuarially determined contribution	$ 48,035,964	45,381,166	42,873,090	40,531,840	39,747,891	37,551,149	35,475,814	35,475,814	31,662,897	29,912,987
Contributions in relation to the actuarially determined contribution	48,335,964	45,681,166	43,173,090	40,831,840	40,047,891	37,851,149	35,775,814	35,775,814	31,967,897	32,212,987
Contribution deficiency (excess)	$ (300,000)	(300,000)	(300,000)	(300,000)	(300,000)	(300,000)	(300,000)	(300,000)	(305,000)	(2,300,000)
Covered payroll	$ 244,609,523	235,687,286	231,568,517	228,696,936	220,963,223	226,826,076	218,627,543	217,086,299	217,086,299	232,842,117
Contributions as a percentage of covered payroll	19.76 %	19.38 %	18.64 %	17.85 %	18.12 %	16.69 %	16.36 %	16.34 %	14.59 %	12.85 %

See accompanying independent auditors' report.

CITY OF CAMBRIDGE RETIREMENT SYSTEM

Required Supplementary Information

Notes to Schedule of Contributions

(Unaudited)

Methods and assumptions used to determine contribution rates:

Valuation date:

Actuarially determined contribution rates for 2020 are determined with the January 1, 2018 actuarial valuation.

The following assumptions were used for the periods included in the funding for 2020:

Actuarial cost method:	Entry age normal
Amortization method:	Prior year's contributions increased 5.85% for two years and remain level thereafter, plus an additional contribution of $300,000 each year
Asset valuation method:	Market value of assets as of December 31, 2017 as reported in the System's Annual Statement
Inflation:	3.50%
Salary increases:	4.50%
Investment rate of return:	7.50%, net of plan investment expense lowered from 7.75%
Retirement benefits:	Depending on age at retirement and "Group" classification 0.1%–2.5% per year of service times highest three year average salary. A five year average salary is used for those hired after April 1, 2012
Post-retirement cost of living increases:	The cost-of-living base is $16,000. Annual cost of living increases are assumed to be 3.0% of the lesser of the base or annual benefits.
Mortality:	Pre-Retirement: RP-2014 Blue Collar Employee Mortality Table set forward 1 year for female participants projected generationally using Scale MP-2017 Healthy Retiree: RP-2014 Blue Collar Healthy Annuitant Mortality Table set forward 1 year for female participants projected generationally using Scale MP-2017 Disabled Retiree: RP-2014 Blue Collar Healthy Annuitant Mortality Table set forward 1 year projected generationally using Scale MP-2017
Changes of Assumptions:	Actuarial assumptions are revised periodically to more closely reflect actual, as well as anticipate future experience. When actuarial assumptions have changed in prior years, the Retirement Board formally adopted the change at a monthly meeting.

See accompanying independent auditors' report.

KPMG

CITY OF CAMBRIDGE RETIREMENT SYSTEM

Financial Statements and Required Supplementary Information

December 31, 2019 and 2018

(With Independent Auditors' Report Thereon)

CITY OF CAMBRIDGE RETIREMENT SYSTEM

Financial Statements and Required Supplementary Information

December 31, 2019 and 2018

Table of Contents

KPMG LLP
Two Financial Center
60 South Street
Boston, MA 02111

Independent Auditors' Report

City of Cambridge
Retirement System Board:

Report on the Financial Statements

We have audited the accompanying financial statements of the City of Cambridge Retirement System (the System) as of and for the years ended December 31, 2019 and 2018, and the related notes to the financial statements, which collectively comprise the System's basic financial statements for the years then ended as listed in the accompanying table of contents.

Management's Responsibility for the Financial Statements

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

Auditors' Responsibility

Our responsibility is to express an opinion on these financial statements based on our audits. We conducted our audits in accordance with auditing standards generally accepted in the United States of America and the standards applicable to financial audits contained in *Government Auditing Standards*, issued by the Comptroller General of the United States. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditors' judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the entity's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. Accordingly, we express no such opinion. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluating the overall presentation of the financial statements.

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

Opinion

In our opinion, the financial statements referred to above present fairly, in all material respects, the fiduciary net position of the System as of December 31, 2019 and 2018, and the changes in fiduciary net position for the years then ended in accordance with U.S. generally accepted accounting principles.

KPMG

Other Matter

Required Supplementary Information

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

Other Reporting Required by *Government Auditing Standards*

In accordance with *Government Auditing Standards*, we have also issued our report dated August 28, 2020 on our consideration of the System's internal control over financial reporting and on our tests of its compliance with certain provisions of laws, regulations, contracts, and grant agreements and other matters. The purpose of that report is solely to describe the scope of our testing of internal control over financial reporting and compliance and the results of that testing, and not to provide an opinion on the effectiveness of the System's internal control over financial reporting or on compliance. That report is an integral part of an audit performed in accordance with *Government Auditing Standards* in considering the System's internal control over financial reporting and compliance.

KPMG LLP

Boston, Massachusetts
August 28, 2020

CITY OF CAMBRIDGE RETIREMENT SYSTEM

Management's Discussion and Analysis

December 31, 2019 and 2018

(Unaudited)

This section presents Management's Discussion and Analysis (MD&A) of the City of Cambridge Retirement System's (the System or the Plan) financial activity and performance as of and for the years ended December 31, 2019 and 2018. The MD&A is unaudited and is intended to serve as an introduction to the Plan's basic financial statements, as well as to offer readers of the Plan's financial statements a narrative view and analysis of System's financial activities.

Financial Highlights

The fiduciary net position of the Plan as of December 31, 2019 totaled $1.451 billion, a $182.0 million, or 14.35% increase, due to positive returns in several asset classes. Fiduciary net position is the residual of the Plan's assets in excess of the Plan's liabilities as of the date of the Statements of Fiduciary Net Position. The Plan's assets are held in trust to meet future benefit payments.

Total Plan "additions" of $274.4 million, comprised of $73.3 million in contributions, and $201.1 million in investment gains, were reported for the year ended December 31, 2019. In comparison, the Plan reported total additions of $21.6 million and $257.2 million for the years ended December 31, 2018 and 2017, respectively. The increase in 2019 is due to investment gains in several asset classes, and the decrease in 2018 from 2017 is due to investment losses in several asset classes.

For the plan year ended December 31, 2019, total Plan deductions were $92.4 million, an increase of $3.9 million, or 4.41% over the last year, and are comprised of $85.6 million in benefit payments, $5.6 million in transfers and withdrawals and $1.2 million in administrative expenses. This $3.9 million increase is due to new retirements. This is as compared to total deductions of $88.5 million and $83.7 million for the years ended December 31, 2018, and 2017, respectively.

The Plan's fiduciary net position as a percentage of the total pension liability was 85.8%.

Overview of the Financial Statements

The basic financial statements consist of the: (1) Statements of Fiduciary Net Position; (2) Statements of Changes in Fiduciary Net Position; and (3) Notes to the Financial Statements; and (4) Required Supplementary Information.

The Statements of Fiduciary Net Position report the Plan's assets, liabilities, and net position restricted for pensions at the end of the fiscal year calculated using the following formula: Assets – Liabilities = Net position restricted for pensions. The Statements of Fiduciary Net Position report the financial position of the Plan at a given point in time, in this case, December 31. Over time, the increase or decrease in fiduciary net position serves as a useful indicator of the Plan's financial health.

The Statements of Changes in Fiduciary Net Position report additions to and deductions from the Plan during the fiscal year. The formula here is: Additions – Deductions = Net Increase (Decrease) in Plan Fiduciary Net Position. The Statements of Changes in Fiduciary Net Position report activity occurring over a specific period of time, in this case, the year beginning January 1 and ending December 31.

The Notes to the Financial Statements provide additional information that is essential to a full understanding of the data provided in the Plan's financial statements.

This report also includes Required Supplementary Information following the Notes to the Financial Statements that consists of the schedules of changes in net pension liability and related ratios, investment returns, and contributions and notes to schedule of contributions.

These statements and schedules are prepared in conformity with U.S. generally accepted accounting principles, including the accounting and financial reporting requirements found in GASB Statement No. 67.

Financial Analysis

Total assets as of December 31, 2019 and 2018 were $1.5 billion and $1.3 billion, respectively, and were comprised of cash and cash equivalents; investments; cash collateral on securities lending, accrued interest and accrued dividends receivables; and contributions due from Plan members, the Plan sponsor and other systems. Total assets increased by $155.7 million or 11.9% from $1.3 billion as of December 31, 2018, due to investment gains in several asset classes. Total assets decreased by $80.5 million or 5.8% between 2017 and 2018 due to investment losses in several asset classes.

Total liabilities as of December 31, 2019 were approximately $11.1 million and total liabilities as of December 31, 2018 were approximately $37.4 million. Total liabilities for 2019 and 2018 were primarily comprised of payables for investment management fees, refunds to members, and cash collateral on securities lending. Total liabilities decreased by $13.7 million or 26.8% between 2017 and 2018 due to a decrease in cash collateral on securities lending.

Total fiduciary net position held in trust for pension benefits totaled $1.451 billion at December 31, 2019 which represents an increase of $182.0 million or 14.4% over 2018. Fiduciary net position decreased by $66.9 million or 5.0% between 2017 and 2018. The increase in 2019 is due to investment gains in several asset classes.

Condensed financial information

	2019	2018	Total $ change	Total % change
Assets:				
Cash and cash equivalents	$ 9,234,999	9,793,854	(558,855)	(5.71)%
Receivables and other assets	914,918	1,004,148	(89,230)	(8.89)
Investments	1,441,437,559	1,260,028,861	181,408,698	14.40
Cash collateral on securities lending	10,226,733	35,255,585	(25,028,852)	(70.99)
Total assets	1,461,814,209	1,306,082,448	155,731,761	11.92

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Condensed financial information

	2019	2018	Total $ change	Total % change
Liabilities:				
Payables	$ 848,016	2,107,713	(1,259,697)	(59.77)
Cash collateral on securities lending	10,226,733	35,255,585	(25,028,852)	(70.99)
Total liabilities	11,074,749	37,363,298	(26,288,549)	(70.36)
Fiduciary net position	$ 1,450,739,460	1,268,719,150	182,020,310	14.35 %

Condensed financial information

	2018	2017	Total $ change	Total % change
Assets:				
Cash and cash equivalents	$ 9,793,854	8,264,315	1,529,539	18.51 %
Receivables and other assets	1,004,148	1,905,840	(901,692)	(47.31)%
Investments	1,260,028,861	1,328,403,797	(68,374,936)	(5.15)%
Cash collateral on securities lending	35,255,585	48,028,012	(12,772,427)	(26.59)%
Total assets	1,306,082,448	1,386,601,964	(80,519,516)	(5.81)%
Liabilities:				
Payables	2,107,713	2,997,901	(890,188)	(29.69)%
Cash collateral on securities lending	35,255,585	48,028,012	(12,772,427)	(26.59)%
Total liabilities	37,363,298	51,025,913	(13,662,615)	(26.78)%
Fiduciary net position	$ 1,268,719,150	1,335,576,051	(66,856,901)	(5.01)%

Revenues – Additions to Plan Fiduciary Net Position

Additions to the System's Fiduciary net position include plan member and plan sponsor contributions, transfers from other retirement systems and investment income. Contributions, net transfers and net investment income for plan year 2019 totaled approximately $274.4 million as compared to additions of approximately $21.6 million in 2018.

In 2019, member contributions increased by approximately $1.1 million or 4.8% due to the addition of new employees and the accrual of outstanding prior service buybacks. In 2018, member contributions increased by approximately $583 thousand or 2.6% due to the addition of new employees and the accrual of outstanding prior service buybacks.

Plan sponsor contributions of $45.7 million in 2019 increased by $2.5 million or 5.8%, compared to an increase of $2.3 million or 5.8% in 2018. The increase in 2019 and 2018 is due to an increase in the actuarial determined contributions (ADC) as determined by the Plan's actuary.

Net investment income for the year ending December 31, 2019 was $201.1 million representing a $249.3 million or 517.1% increase from 2018. The increase in net investment income in 2019 is the result of investment gains in several asset classes. Net investment income for the year ending December 31, 2018 was a loss of $48.2 million representing a $238.5 million or 125.3% decrease from 2017.

Condensed financial information

Additions		2019	2018	Total $ change	Total % change
Plan member contributions	$	23,809,697	22,730,249	1,079,448	4.75 %
Plan sponsor contribution		45,681,166	43,173,090	2,508,076	5.81
Transfers		3,796,690	3,906,001	(109,311)	(2.80)
Net investment income (loss)		201,086,610	(48,209,324)	249,295,934	(517.11)
Total additions	$	274,374,163	21,600,016	252,774,147	1,170.25 %

Condensed financial information

Additions		2018	2017	Total $ change	Total % change
Plan member contributions	$	22,730,249	22,146,929	583,320	2.63 %
Plan sponsor contribution		43,173,090	40,831,840	2,341,250	5.73
Transfers		3,906,001	3,872,145	33,856	0.87
Net investment income (loss)		(48,209,324)	190,300,828	(238,510,152)	(125.33)
Total additions	$	21,600,016	257,151,742	(235,551,726)	(91.60)%

Expenses – Deductions from Plan Fiduciary Net Position

Deductions to the Plan include the payment of pension benefits to members and beneficiaries, refunds of contributions to inactive members, transfers of member contributions to other Massachusetts public retirement plans and the cost of administration. For plan year 2019, the total deductions were $92.4 million, an increase of $3.9 million or 4.4% over 2018. For plan year 2018, the total deductions were $88.5 million, an increase of $4.8 million or 5.7% over 2017.

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CITY OF CAMBRIDGE RETIREMENT SYSTEM

Management's Discussion and Analysis

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Retirement benefit payments totaled $85.6 million, an increase of approximately $4.9 million or 6.1%. In 2018 retirement benefit payments totaled $80.6 million, an increase of approximately $3.7 million or 4.7% from the previous year. The increases in 2019 and 2018 are due to new retirements and pension increases also known as cost-of-living adjustments in those respective years.

For plan year 2019, refunds of contributions totaled approximately $1.9 million, a decrease of approximately $864 thousand or 30.1% from 2018. For plan year 2018, refunds of contributions totaled approximately $2.8 million, an increase of approximately $672 thousand or 31.6% from 2017. The decrease in 2019 is due to a decrease in inactive members requesting withdrawals for their contributions from the Plan. The increase in 2018 is due to an increase in inactive members requesting withdrawals for their contributions from the Plan. Transfers to other Massachusetts public retirement systems totaled approximately $3.6 million, a decrease of approximately $138 thousand or 3.7% from 2018. This is compared to a $310 thousand or 8.9% increase from 2017 to 2018. Year to year changes in transfer rates can be attributed to variations in public sector workforce movement between Cambridge and other government employers.

In 2019, administrative expenses totaled approximately $1.2 million, a decrease of approximately $32 thousand or 2.6%, and in 2018, administrative expenses totaled approximately $1.3 million, an increase of approximately $126 thousand or 11.1%. The decrease in administrative expenses for 2019 is attributable to miscellaneous expenses. The increase in administrative expenses for 2018 is attributable to personnel and miscellaneous expenses.

Condensed financial information

Deductions		2019	2018	Total $ change	Total % change
Retirement benefits	$	85,555,285	80,623,068	4,932,217	6.12 %
Refunds of contributions		1,934,722	2,799,045	(864,323)	(30.88)
Other systems		3,642,559	3,781,045	(138,486)	(3.66)
Administrative expenses		1,221,287	1,253,759	(32,472)	(2.59)
Total deductions	$	92,353,853	88,456,917	3,896,936	4.41 %

Condensed financial information

Deductions		2018	2017	Total $ change	Total % change
Retirement benefits	$	80,623,068	76,970,845	3,652,223	4.74 %
Refunds of contributions		2,799,045	2,126,598	672,447	31.62
Other systems		3,781,045	3,470,774	310,271	8.94
Administrative expenses		1,253,759	1,127,717	126,042	11.18
Total deductions	$	88,456,917	83,695,934	4,760,983	5.69 %

Change in Plan Fiduciary Net Position

Change in fiduciary net position for the year ended December 31, 2019 was $182.0 million, which represents an increase of $248.9 million or 372.3% from the previous year. This increase is primarily the result of investment gains. Change in fiduciary net position for the year ended December 31, 2018 was ($66.9) million, which represents a decrease of $240.3 million or 138.5% from the previous year. This decrease is primarily the result of investment losses.

Condensed financial information

Changes in System fiduciary net position		2019	2018	Total $ change	Total % change
Total additions	$	274,374,163	21,600,016	252,774,147	1,170.25 %
Total deductions		92,353,853	88,456,917	3,896,936	4.41
Change in plan fiduciary net position	$	182,020,310	(66,856,901)	248,877,211	372.25 %

Condensed financial information

Changes in System fiduciary net position		2018	2017	Total $ change	Total % change
Total additions	$	21,600,016	257,151,742	(235,551,726)	(91.60)%
Total deductions		88,456,917	83,695,934	4,760,983	5.69
Change in plan fiduciary net position	$	(66,856,901)	173,455,808	(240,312,709)	(138.54)%

Overall Financial Position of System

Due to investment gains in several asset classes the Plan has experienced an increase in its investment portfolio for the year ending December 31, 2019. Management believes the Plan remains well funded and able to meet its obligations. However, management acknowledges that the investment losses from prior years, will result in increased employer contributions going forward. When plan net position declines, the Plan sponsor is statutorily obligated to offset the losses as part of its annual assessment.

Requests for Information

This financial report is designed to provide an overview of System's finances. Questions concerning any of the information provided in this report should be addressed to City of Cambridge Retirement System, 100 CambridgePark Drive, Suite 101, Cambridge, MA 02140.

CITY OF CAMBRIDGE RETIREMENT SYSTEM

Statements of Fiduciary Net Position

December 31, 2019 and 2018

		2019	2018
Assets:			
Cash and cash equivalents	$	9,234,999	9,793,854
Dividend and interest receivable		458,315	452,539
Other assets		456,603	551,609
Investments, at fair value:			
Fixed income securities		58,824,164	58,384,067
Equities		20,534,791	120,230,775
Pooled investments:			
Fixed income		127,463,138	134,281,690
Real estate		212,645,918	199,379,922
Domestic equities		550,472,826	329,735,952
International equities		203,466,808	166,056,092
International fixed income		66,119,549	62,561,122
Alternative		201,910,365	189,399,241
Total investments		1,441,437,559	1,260,028,861
Cash collateral on securities lending		10,226,733	35,255,585
Total assets		1,461,814,209	1,306,082,448
Liabilities:			
Accrued liabilities		848,016	836,110
Due to brokers for securities purchased		—	1,271,603
Cash collateral on securities lending		10,226,733	35,255,585
Total liabilities		11,074,749	37,363,298
Net position restricted for pensions	$	1,450,739,460	1,268,719,150

See accompanying notes to financial statements.

CITY OF CAMBRIDGE RETIREMENT SYSTEM

Statements of Changes in Fiduciary Net Position

Fiscal Years ended December 31, 2019 and 2018

		2019	2018
Additions:			
Contributions:			
Employers	$	42,708,371	40,323,505
Nonemployer – City		2,972,795	2,849,585
Plan members		23,809,697	22,730,249
Other systems		3,355,649	3,207,371
Commonwealth of Massachusetts		441,041	698,630
Total contributions		73,287,553	69,809,340
Investment income (loss):			
Interest and dividends		28,133,592	24,259,981
Securities lending income		881,685	1,102,082
Net appreciation (depreciation) in fair value of investments		182,540,440	(63,481,786)
Less:			
Management fees		(9,663,001)	(9,120,314)
Borrower rebates and fees under securities lending program		(806,106)	(969,287)
Net investment income (loss)		201,086,610	(48,209,324)
Total additions		274,374,163	21,600,016
Deductions:			
Benefits		85,555,285	80,623,068
Refunds of contributions		1,934,722	2,799,045
Other systems		3,642,559	3,781,045
Administrative expenses		1,221,287	1,253,759
Total deductions		92,353,853	88,456,917
Change in net position		182,020,310	(66,856,901)
Net position, beginning of year		1,268,719,150	1,335,576,051
Net position, end of year	$	1,450,739,460	1,268,719,150

See accompanying notes to financial statements.

(1) Plan Description

The City of Cambridge Retirement System (the System or the Plan) is a cost-sharing, multiple-employer defined benefit pension plan administered by a Retirement Board comprised of five members: the City Auditor who serves as ex officio; two individuals elected by participants in the System; a fourth member appointed by the City Manager and a fifth member chosen by the other members of the Retirement Board. As of December 31, 2019, the System provides pension benefits to the retired employees of four employers: the City of Cambridge, Cambridge Housing Authority, Cambridge Redevelopment Authority and Cambridge Health Alliance.

The System is a member of the Massachusetts Contributory System, which is governed by Chapter 32 of the Massachusetts General Laws (MGL).

Employees covered by the Contributory Retirement Law are classified into one of four groups depending on job classification. Group 1 comprises most positions in state and local government. It is the general category of public employees. Group 2 is a limited category for specified hazardous occupations. Group 3 is for State Police only. Group 4 is mainly police and firefighters.

For employees hired prior to April 2, 2012, the annual amount of the retirement allowance is based on the member's final three year average salary multiplied by the number of years and full months of creditable service at the time of retirement and multiplied by a percentage based on the age of the member at retirement.

A member's final three year average salary is defined as the greater of the highest consecutive three year average annual rate of regular compensation and the average annual rate of regular compensation received during the last three years of creditable service prior to retirement.

For employees hired on April 2, 2012 or later, the annual amount of the retirement allowance is based on the member's final five year average salary multiplied by the number of years and full months of creditable service at the retirement and multiplied by a percentage based on the age and years of creditable service of the member at retirement.

A member's final five-year average salary is defined as the greater of the highest consecutive five-year average annual rate of regular compensation and the average annual rate of regular compensation received during the last five years of creditable service prior to retirement.

For employees who became members after January 1, 2011, regular compensation is limited to 64% of the federal limit found in 26 U.S.C. 401(a) (17). In addition, regular compensation for members who retire after April 2, 2012 will be limited to prohibit “spiking” a member's salary to increase the retirement benefit.

For all employees, the maximum annual amount of the retirement allowance is 80% of the member's final average salary. Any member who is a veteran also receives an additional yearly retirement allowance of $15 per year of creditable service, not exceeding $300. The veteran allowance is paid in addition to the 80% maximum.

Membership in the System consisted of the following at January 1, 2020, the date of the latest actuarial valuation:

Retirees and beneficiaries receiving benefits	2,247
Terminated plan members entitled to, but not receiving benefits	498
Terminated plan members with a vested right to a deferred or immediate benefit	136
Active plan members	3,040
Total membership	5,921
Total number of participating employers	4

(2) Contributions Required and Contributions Made

Plan members are required to contribute to the System. Depending on their employment date, active members must contribute a range of 5% to 9% of their regular gross compensation. Members hired after December 31, 1978 must contribute an additional 2% of regular compensation in excess of $30,000. Participating employers are required to pay into the System their share of the remaining system wide actuarially determined contribution, which is apportioned among the employers based on active covered payroll. The contributions of plan members and the participating employers are governed by Chapter 32 of the MGL.

The Commonwealth is obligated to reimburse the System for a portion of the benefits payments for cost of living increases granted before July 1998.

(3) Summary of Significant Accounting Policies

(a) Basis of Accounting

The System's financial statements are prepared using the full accrual basis of accounting. Plan member contributions are recognized in the period in which the contributions are due. Employer contributions to the plan are recognized when due and the employer is legally required to provide the contributions. Benefits and refunds are recognized when due and payable in accordance with the terms of the plan.

(b) Cash and Cash Equivalents

Cash and cash equivalents are considered to be cash on deposit, and highly liquid short-term investments with original maturities of three months or less from the date of acquisition.

(c) Investment and Valuation

The System participates in the segmentation program of the Pension Reserves Investment Trust (PRIT) Fund which allows Massachusetts retirement systems to invest only in individual asset classes of the PRIT Fund. The PRIT Fund is an external investment pool, as defined by the Government Accounting Standards Board, and it is not registered with the Securities and Exchange Commission, but is subject to oversight by the Pension Reserves Investment Management Board (the PRIM Board). The System's alternative investments include investments in the PRIT hedge and private equity segments of the PRIT Fund. The PRIT Fund issue separately available audited financial statements.

Investments are reported at fair value. Securities traded on a national or international securities exchange are valued at the last reported sales price on the last business day of the plan year; investments traded on a national securities exchange for which no sale was reported on that date and investments in common and preferred stocks traded in over-the-counter markets are valued at the mean of the last reported bid and asked prices, or the last reported bid price. Mutual funds and commingled funds, including real estate and other alternative (including private equity and hedge) investments, are valued based on net asset value (NAV) or unit value at year-end. Changes in fair value are included in investment income (loss) in the statement of changes in fiduciary net position.

(d) Use of Estimates

The preparation of financial statements in conformity with U.S. generally accepted accounting principles requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and the disclosure of contingent assets and liabilities at the dates of the financial statements and the reported amounts of additions and deductions during the reporting periods. Actual results could differ from estimates.

(e) Other

Purchases and sales of securities are reflected on a trade-date basis. Realized gain or loss on sales of securities is based on average cost.

Dividend income is recorded on the ex-dividend date. Interest income is recorded as earned on an accrual basis.

The System presents in its Statements of Changes in Fiduciary Net Position the net appreciation (depreciation) in the fair value of its investments, which consists of the net realized gains and losses during the year and the change in unrealized appreciation and depreciation during the year on those investments.

(f) Investment Policy

The provisions of Massachusetts General Laws (M.G.L.) Chapter 32, Section 23(2) and the Board approved investment policy govern the Plan's investment practice.

Diversification is attained through varied investment management styles that comply with Massachusetts state law. This is accomplished through the retention of investment managers that adhere to M.G.L. Chapter 32, Section 23(3), the "Prudent Person" rule.

The System has retained an investment consultant to work with the Board in a fiduciary capacity to assure that strategic investment diversification is attained, to employ investment managers with expertise in their respective asset classes, and to closely monitor the implementation and performance of the respective investment strategies.

The System is currently invested in equities (domestic and international), fixed income securities (domestic and international), real estate and other alternative (including private equity and hedge).

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The target allocation for each major asset class is summarized in the following table:

Asset class	2019 Target asset allocation	2018 Target asset allocation
Cash	— %	— %
Domestic equity	28.00	25.00
International developed markets equity	10.00	9.00
International emerging markets equity	10.00	10.00
Core fixed income	10.00	15.00
High yield fixed income	10.00	8.00
Real estate	11.00	10.00
Commodities	3.00	2.50
Hedge fund, GTAA, risk parity	5.00	9.00
Private equity	13.00	11.50
Total	100.00 %	100.00 %

The Board's current rebalancing policy states that "The Board shall rebalance to the established targets during the quarter following the quarter ended whenever the asset class allocation falls outside the allowable ranges."

(g) Commitments

At December 31, 2019 and 2018, the System had contractual commitments to provide approximately $116 million and $125.5 million, respectively, of additional funding for alternative investments and real estate.

(4) Deposit and Investment Risks

(a) Custodial Credit Risk

Custodial credit risk is the risk that, in the event of a failure of a depository financial institution, the System deposits may not be returned. Investment securities are exposed to custodial credit risk if the securities are uninsured, are not registered in the name of the System and are held by either the depository financial institution or the depository financial institution's trust department or agent but not in the System's name. The System's cash and cash equivalent deposits that are not collateralized are subject to the Federal Deposit Insurance Corporation (FDIC) insurance limits. At December 31, 2019 and December 31, 2018, $8,777,147 and $9,313,071 of the System's cash and cash equivalent deposits, respectively, were uninsured and uncollateralized.

Although there is no System – wide policy for custodial credit risk associated with deposits, the System's investments are held by the System's custodian and registered in the System's name. All of the System's securities are held by the System's custodial bank in the System's name, except for investments in mutual and commingled funds, real estate properties, and limited partnerships, which by their nature, are not subject to custodial credit risk. Investments in the Short-Term Investment Funds

(STIF) are held in an SEC-registered pooled fund that is managed by the master custodian bank. The fair value of the position in the pool equals the value of the pool shares.

(b) Credit Risk

Credit risk exists when there is a possibility the issuer or other counterparty to an investment may be unable to fulfill its obligations.

There are no System – wide policy limitations for credit risk exposures within the portfolio. The System's fixed income investments are managed in accordance with an investment contract that is specific as to permissible credit quality ranges and the average credit quality of the overall portfolio.

The System allows investment managers to apply discretion under the "Prudent Person" rule. Investments are made, as a prudent person would be expected to act with discretion and intelligence, to seek reasonable income, preserve capital and, in general, avoid speculative investments.

The System's fixed income investments as of December 31, 2019 and 2018, if rated, were rated by Standard and Poor's and/or an equivalent national rating organization. The ratings are presented below using the Standard and Poor's rating scale:

Investment type	Fair value	AAA	AA	A	BBB	BB	Less than BB	Not rated
System (as of December 31, 2019):								
U.S. Treasury notes and bonds and municipal securities	$ 21,095,624	14,076,078	4,361,395	308,930	—	—	—	2,349,221
U.S. agencies	1,872,330	15,909	—	—	—	—	—	1,856,421
Domestic corporate	25,413,248	732,622	573,628	5,534,691	17,176,332	106,946	—	1,289,029
Asset-backed:								
CMOs	5,208,336	3,665,984	—	259,442	—	—	—	1,282,910
Other	5,234,626	3,885,527	—	1,349,099	—	—	—	—
Pooled fixed-income investments	193,582,687	—	—	—	—	—	—	193,582,687
Total	$ 252,406,851	22,376,120	4,935,023	7,452,162	17,176,332	106,946	—	200,360,268

Investment type	Fair value	AAA	AA	A	BBB	BB	Less than BB	Not rated
System (as of December 31, 2018):								
U.S. Treasury notes and bonds and municipal securities	$ 22,189,948	8,229,707	6,336,709	828,226	180,781	—	2,618,891	3,995,634
U.S. agencies	2,969,194	18,851	—	—	—	—	—	2,950,343
Domestic corporate	21,716,278	—	757,678	6,100,783	14,857,588	—	—	229
Asset-backed:								
CMOs	4,020,312	2,866,202	—	307,961	—	3,928	—	842,221
Other	7,488,335	4,348,502	211,630	1,515,303	257,156	224,659	177,348	753,737
Pooled fixed-income investments	196,842,812	—	—	—	—	—	—	196,842,812
Total	$ 255,226,879	15,463,262	7,306,017	8,752,273	15,295,525	228,587	2,796,239	205,384,976

(c) Concentration of Credit Risk

Concentration of credit risk is the risk of loss that may be attributed to the magnitude of a government's investment in a single issuer. The System has no investments, at fair value, that exceed 5% of the

System's total investments as of December 31, 2019 and 2018 other than pooled investments. The System adheres to the provisions of M.G.L. c. 32, sec 23(2) when managing concentration risk.

(d) Interest Rate Risk

Interest rate risk is the risk that changes in interest rates will adversely affect the fair value of an investment. This risk is managed within the portfolio using the effective duration methodology. It is widely used in the management of fixed income portfolios in that it quantifies to a much greater degree the risk of interest rate changes.

The following is a listing of the System's fixed income investments and related maturity schedule (in years) as of December 31, 2019 and 2018:

Investment type	Fair value	Less than 1	1–5	6–10	More than 10
System (as of December 31, 2019):					
U.S. Treasury notes and bonds and municipal securities	$ 21,095,624	301,393	8,636,832	1,302,363	10,855,036
U.S. agencies	1,872,330	—	84,729	250,881	1,536,720
Domestic corporate	25,413,248	277,443	11,050,731	6,124,094	7,960,980
Asset-backed:					
CMOs	5,208,336	—	—	—	5,208,336
Other	5,234,626	—	4,737,583	497,043	—
Pooled fixed-income investments	193,582,687	—	—	193,582,687	—
Total	$ 252,406,851	578,836	24,509,875	201,757,068	25,561,072

Investment type	Fair value	Less than 1	1–5	6–10	More than 10
System (as of December 31, 2018):					
U.S. Treasury notes and bonds and municipal securities	$ 22,189,948	180,781	11,727,818	1,018,228	9,263,121
U.S. agencies	2,969,194	—	171,457	338,416	2,459,321
Domestic corporate	21,716,278	966,016	9,787,369	6,591,965	4,370,928
Asset-backed:					
CMOs	4,020,312	—	—	—	4,020,312
Other	7,488,335	—	5,342,364	1,003,433	1,142,538
Pooled fixed-income investments	196,842,812	—	—	196,842,812	—
Total	$ 255,226,879	1,146,797	27,029,008	205,794,854	21,256,220

(e) Foreign Currency Risk

Foreign currency risk is the risk that changes in exchange rates will adversely affect the fair value of an investment or a deposit. The System's asset allocation model which serves as a proxy for a foreign currency policy, limits the amount of foreign currency exposure to 20% of the System's total investments. Similar to the investments in domestic equities, the System employs or encourages its investment advisor to employ diversification, asset allocation, and quality strategies. Currency hedging is permitted for defensive purposes. Currency hedging shall be effected through the use of forward currency contracts. At December 31, 2019 and 2018, there were no open forward currency contracts.

Risk of loss arises from changes in currency exchange rates. The System's exposure to foreign currency risk is presented below at December 31, 2019 and 2018.

		2019	2018
Currency:			
International equity pooled funds (various currencies)	$	203,466,808	166,056,092
International fixed income pooled funds (various currencies)		66,119,549	62,561,122
	$	269,586,357	228,617,214

Although these investments are not denominated in a foreign currency, the underlying securities are denominated in various foreign currencies.

(f) Rates of Return

For the years ended December 31, 2019 and 2018, the annual money weighted rate of return on plan investments, net of plan investment expense was 16.12% and (3.56)%, respectively. The money weighted rate of return expresses investment performance net of investment expenses adjusted for the changing amounts actually invested.

(g) Securities Lending

The Public Employment Retirement Administration Commission of Massachusetts (PERAC) has issued supplemental regulations that permit the System to engage in securities lending transactions. The System has entered into a Securities Lending Authorization Agreement (the Agreement) with a third party to act as the System's sub-custodian/agent for the purposes of managing a securities lending program.

The System lends fixed income, domestic equity, and international equity securities to approved broker/dealers. Collateral for securities loaned equals 102 percent of fair market value for domestic securities and 105 percent for international securities not denominated in U.S. dollars.

Types of collateral received from borrowers for securities loaned are cash and non-cash. The sub-custodian is authorized to invest the cash collateral in Approved Investments, as defined in the Agreement. Non-cash collateral received is not recorded in the accompanying financial statements as the System cannot pledge or sell the non-cash collateral except in the event of a borrower default.

As of December 31, 2019, the fair value of securities on loan was $10.5 million. The associated collateral was $10.7 million, of which $10.2 million was cash collateral and $.5 million was non-cash. The cash collateral has been reinvested in repurchase agreements ($.2 million), floating rate notes ($9.6 million), commercial paper ($.2 million), and certificate of deposit ($.2 million) with a collective fair value of approximately $10.2 million. The repurchase agreements are valued at amortized cost which approximates fair value. The floating rate notes are valued at fair value and are considered level 2 securities in the fair value hierarchy.

As of December 31, 2018, the fair value of securities on loan was $46.6 million. The associated collateral was $47.7 million, of which $35.3 million was cash collateral and $12.4 million was non-cash. The cash collateral has been reinvested in repurchase agreements ($8.2 million), time deposits ($.8 million) and floating rate notes ($26.3 million) with a collective fair value of approximately $35.3 million. The repurchase agreements and time deposits are valued at amortized cost which approximates fair value. The floating rate notes are valued at fair value and are considered level 2 securities in the fair value hierarchy.

The Agreement limits the maturity value of any Approved Investment, as defined, to a maximum of 397 days, except U.S. government securities, which shall have a final maturity not exceeding 762 days.

At year-end, the System has no credit risk exposure to borrowers because the amounts the System owes the borrowers exceed the amounts the borrowers owe the System. The Agreement indemnifies the System if the borrowers fail to return the securities (and the collateral is inadequate to replace the securities lent) or fail to pay the System for income distributions by the securities' issuers while the securities are on loan.

As of December 31, 2019 and 2018, there were no violations of legal or contractual provisions. The System has not experienced any losses resulting from the default of a borrower or lending agent during the years ended December 31, 2019 and 2018.

(h) Fair Value Hierarchy

GAAP establishes a fair value hierarchy for investments that prioritizes inputs used to measure fair value into three levels:

Level 1 – quoted prices (unadjusted) for identical assets or liabilities in active markets that are accessible at the measurement date;

Level 2 – observable inputs that are based on inputs not quoted in active markets, but corroborated by market data.

Level 3 – unobservable inputs that are used when little or no market data is available.

The fair value hierarchy gives the highest priority to Level 1 inputs and the lowest priority to Level 3 inputs. In determining fair value, the System utilizes valuation techniques that maximize the use of observable inputs and minimize the use of unobservable inputs to the extent possible.

Investments held through commingled funds for which fair value is estimated using net asset values (NAVs) as a practical expedient are not categorized in the fair value hierarchy.

The System uses an independent pricing source to determine the fair value of investments at quoted market prices.

(Continued)

CITY OF CAMBRIDGE RETIREMENT SYSTEM

Notes to Financial Statements

December 31, 2019 and 2018

The System has the following fair value measurements as of December 31, 2020 and 2019:

	2019		
	Fair value	Level 1	Level 2
Investments by fair value level:			
Fixed income	$ 58,824,164	19,391,695	39,432,469
Equities	20,534,791	20,534,791	—
	79,358,955	39,926,486	39,432,469
Investments measured at NAV:			
Commingled equity funds:			
International	203,466,808	—	—
Domestic	550,472,826	—	—
Commingled fixed income funds:			
International	66,119,549	—	—
Domestic	127,463,138	—	—
Real estate	212,645,918	—	—
Alternative:			
PRIT hedge fund	90,191,864	—	—
PRIT private equity	74,825,002	—	—
Other alternative	36,893,499	—	—
	1,362,078,604	—	—
Total investments	$ 1,441,437,559	39,926,486	39,432,469

	2018		
	Fair value	Level 1	Level 2
Investments by fair value level:			
Fixed income	$ 58,384,067	20,570,220	37,813,847
Equities	120,230,775	120,230,775	—
	178,614,842	140,800,995	37,813,847

	2018		
	Fair value	**Level 1**	**Level 2**
Investments measured at NAV:			
Commingled equity funds:			
International	$ 166,056,092	—	—
Domestic	329,735,952	—	—
Commingled fixed income funds:			
International	62,561,122	—	—
Domestic	134,281,690	—	—
Real estate	199,379,922	—	—
Alternative:			
PRIT hedge fund	102,637,320	—	—
PRIT private equity	50,006,361	—	—
Other alternative	36,755,560	—	—
	1,081,414,019	—	—
Total investments	$ 1,260,028,861	140,800,995	37,813,847

The following represents the significant investment strategies and terms on which the System may redeem investments for those investments measured at the NAV (or its equivalent) as a practical expedient:

	Investments measured at NAV			
	2019	**2018**	**Redemption frequency**	**Redemption notice period**
Commingled equity funds	$ 753,939,634	495,792,044	Daily	1–30 days
Commingled fixed income funds	193,582,687	196,842,812	Daily	1–30 days
Real estate	212,645,918	199,379,922	Quarterly	1–30 days
Alternative	201,910,365	189,399,241	Quarterly	1–30 days

1 Commingled equity funds: This type includes 9 funds that invest primarily in U.S. large and small cap equity funds and international equity funds.

2 Commingled fixed income funds: This type includes 3 fixed income funds that invest in U.S. corporate bonds, U.S. government bonds, U.S. asset-backed securities and foreign bonds.

3 Real estate funds: This type includes 11 funds that invest primarily in real estate funds and global infrastructure.

4 Alternative funds: This type includes 16 funds that invest primarily in private equity and venture capital funds. The System is required to provide a 24 hour redemption notice for the PRIT hedge fund. The PRIT private equity fund is not redeemable until notified by the PRIM Board.

(5) Operating Expenses

The System's administrative expenses as shown on the Statements of Changes in Fiduciary Net Position are borne by the System and financed with investment income. These expenses include personnel and professional services, member communication and education, and other miscellaneous administrative expenses.

(6) Legally Required Reserve Accounts

The balances in the System's legally required reserves at December 31, 2019 and 2018 are as follows:

	2019	2018	Purpose
Annuity savings fund	$ 264,264,157	259,847,186	Active members' contribution balance
Annuity reserve fund	81,218,993	78,312,155	Retired members' contribution account
Pension reserve fund	1,090,854,107	912,511,680	Amounts appropriated to fund future retirement benefits
Pension fund	14,397,583	18,043,514	Remaining net assets
Military service fund	4,620	4,615	Amounts appropriated to fund military service time
	$ 1,450,739,460	1,268,719,150	

All reserve accounts are funded at levels required by State statute.

(7) Net Pension Liability

The components of the net pension liability of the System as of December 31, 2019 and 2018, are as follows:

	2019	2018
Total pension liability	$ 1,690,622,307	1,588,140,954
Fiduciary net position	1,450,739,460	1,268,719,150
System's net pension liability	$ 239,882,847	319,421,804
Fiduciary net position as a percentage of the total pension liability	85.81 %	79.89 %

(a) Actuarial Assumptions

The total pension liability at December 31, 2019 was measured by an actuarial valuation as of January 1, 2020. Total pension liability at December 31, 2018 was determined by an actuarial valuation as of January 1, 2018. Update procedures were used to roll forward the total pension liability from the valuation dates to the measurement dates. The following actuarial assumptions were applied to the measurement of the total pension liability at December 31, 2019 and 2018:

	2019	2018
Inflation	3.0%	3.5%
Salary increases	4.0%	4.5%
Investment rate of return	7.25%	7.5%
Cost of living adjustments	3% of first $16,000	3% of first $16,000
Pre-retirement mortality	Group 1 and 2: Pub-2010 General Employee Amount-Weighted Mortality Table set forward one year projected generationally using Scale MP-2019 Group 4: Pub-2010 Safety Employee Amount-Weighted Mortality Table projected generationally using Scale MP-2019	RP-2014 Blue Collar Employee Mortality Table set forward one year for females projected generationally with Scale MP-2017
Healthy Retiree mortality	Group 1 and 2: Pub-2010 General Healthy Retiree and Contingent Survivor Amount-Weighted Mortality Tables set forward one year projected generationally using Scale MP-2019 Group 4: Pub-2010 Safety Healthy Retiree and Contingent Survivor Amount-Weighted Mortality Tables projected generationally using Scale MP-2019	RP-2014 Blue Collar Healthy Annuitant Mortality Table set forward one year for females projected generationally with Scale MP-2017
Disabled Retiree mortality	Group 1 and 2: Pub-2010 General Healthy Retiree Amount-Weighted Mortality Table set forward one year projected generationally using Scale MP-2019 Group 4: Pub-2010 Disabled Retiree Amount-Weighted Mortality Table projected generationally using Scale MP-2019	RP-2014 Blue Collar Healthy Annuitant Mortality Table set forward one year and projected generationally with Scale MP-2017

- Long-term Expected Rate of Return:
  - The long-term expected rate of return on plan investments was determined using a building-block method in which best-estimate ranges of expected future real rates of return (expected returns, net of pension plan investment expense and inflation) are developed for

each major asset class. These ranges are combined to produce the long-term expected rate of return by weighting the expected future real rates of return by the target asset allocation percentage and by adding expected inflation. The best estimates of arithmetic long-term expected real rates of return for each major asset class are summarized in the following table:

Asset class	2019 Long-term expected real rate of return	2018 Long-term expected real rate of return
Cash	0.63 %	1.12 %
Domestic equity	6.15	6.16
International developed markets equity	6.78	6.69
International emerging markets equity	8.65	9.47
Core fixed income	1.11	1.89
High yield fixed income	3.51	4.00
Real estate	4.33	4.58
Commodities	4.13	4.77
Hedge fund, GTAA, risk parity	3.19	3.68
Private equity	9.99	10.00

(b) *Discount Rate*

The discount rates used to measure the total pension liability were 7.25% and 7.5% as of December 31, 2019 and 2018, respectively. The projection of cash flows used to determine the discount rate assumed that plan member contributions will be made at the current contribution rate and that employer contributions will be made at rates equal to the difference between actuarially determined contribution rates and the member rate. Based on those assumptions, the System's fiduciary net position was projected to be available to make all projected future benefit payments of current plan members. Therefore, the long-term expected rate of return on the plan investments was applied to all periods of projected benefit payments to determine the total pension liability.

(c) *Sensitivity of the Net Pension Liability to Changes in the Discount Rate*

The following presents the net pension liability of the System as of December 31, 2019 and 2018, calculated using the current discount rates, as well as what the net pension liability would be if it were calculated using a discount rate that is one-percentage point lower or one-percentage point higher than the current rate:

	2019		
	1% decrease (6.25%)	Current discount rate (7.25%)	1% increase (8.25%)
System's net pension liability	$ 437,334,858	239,882,847	74,233,062

		2018		
		1% decrease (6.50%)	Current discount rate (7.50%)	1% increase (8.50%)
System's net pension liability	$	500,023,541	319,421,804	167,545,669

(8) Subsequent Events

On March 11, 2020, an outbreak of the novel strain of coronavirus known as COVID-19 was declared a pandemic by the World Health Organization. Due to this, the financial markets have experienced and may continue to experience significant volatility. Management and the System's investment advisor will continue to monitor the market conditions as information is available to evaluate the potential impacts, if any, on the value of its various investments and operations.

The System has evaluated subsequent events from the Statement of Fiduciary Net Position date of December 31, 2019 through August 28, 2020, the date on which the basic financial statements were issued, and determined there are no other items to disclose.

CITY OF CAMBRIDGE RETIREMENT SYSTEM

Required Supplementary Information

Schedule of Changes in the Net Pension Liability and Related Ratios

(Unaudited)

	2019	2018	2017	2016	2015	2014
Total pension liability:						
Service cost	$ 35,818,206	35,289,253	31,903,330	32,844,244	30,908,861	29,791,673
Interest	118,524,777	113,321,515	107,835,410	105,325,306	98,925,146	94,315,895
Changes of benefit terms	—	—	13,786,855	—	—	—
Differences between expected and actual experience	(21,185,206)	5,492,484	—	(29,237,110)	—	—
Changes of assumptions	56,581,172	—	43,565,250	—	42,033,481	—
Benefit payments, including refunds of member contributions	(87,257,596)	(83,253,157)	(78,642,592)	(72,563,588)	(69,354,414)	(64,034,766)
Net change in total pension liability	102,481,353	70,850,095	118,448,253	36,368,852	102,513,074	60,072,802
Total pension liability – beginning	1,588,140,954	1,517,290,859	1,398,842,606	1,362,473,754	1,259,960,680	1,199,887,878
Total pension liability – ending (a)	1,690,622,307	1,588,140,954	1,517,290,859	1,398,842,606	1,362,473,754	1,259,960,680
Plan fiduciary net position:						
Contributions – employers and nonemployer	45,681,166	43,173,090	40,831,840	40,047,891	37,851,149	35,775,814
Contributions – member	23,809,697	22,730,249	22,146,929	20,949,712	21,167,434	20,572,796
Net investment income	201,086,610	(48,209,324)	190,247,348	90,299,489	(6,716,067)	64,639,098
Benefit payments, including refunds of member contributions, and other	(87,335,876)	(83,297,157)	(78,642,592)	(72,563,588)	(69,354,414)	(64,034,766)
Administrative expenses	(1,221,287)	(1,253,759)	(1,127,717)	(1,112,054)	(1,076,459)	(1,031,915)
Net change in plan fiduciary net position	182,020,310	(66,856,901)	173,455,808	77,621,450	(18,128,357)	55,921,027
Plan fiduciary net position – beginning	1,268,719,150	1,335,576,051	1,162,120,243	1,084,498,793	1,102,627,150	1,046,706,123
Plan fiduciary net position – ending (b)	1,450,739,460	1,268,719,150	1,335,576,051	1,162,120,243	1,084,498,793	1,102,627,150
Net pension liability – ending (a) – (b)	$ 239,882,847	319,421,804	181,714,808	236,722,363	277,974,961	157,333,530
Fiduciary net position as a percentage of the total pension liability	85.8 %	79.9 %	88.0 %	83.1 %	80.0 %	87.5 %
Covered payroll	$ 235,687,286	231,568,517	228,696,936	220,963,223	226,826,076	218,627,543
Plan net pension liability as a percentage of covered payroll	101.78 %	137.94 %	79.46 %	107.13 %	122.50 %	72.00 %

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

See accompanying independent auditors' report.

CITY OF CAMBRIDGE RETIREMENT SYSTEM

Required Supplementary Information

Notes to Schedule of Changes in the Net Pension Liability and Related Ratios

(Unaudited)

Benefit Changes	Amount of change TPL	Description
2017:	$ 13,786,855	- The COLA base was changed from $14,000 to $16,000 effective July 1, 2018.

Changes of Assumptions	Amount of change TPL	Description
2019:	$ 56,581,172	- Discount rate decreased from 7.50% to 7.25% - Salary Increases decreased from 4.50% to 4.00% - Wage Inflation decreased from 3.50% to 3.00% - The mortality assumptions for Pre-Retirement Group 1 and 2 was updated from RP-2014 Blue Collar Employee Morality Table set forward one year for females projected generationally with Scale MP-2017 to Pub-2010 General Employee Amount-Weighted Mortality Table set forward one year projected generationally using Scale MP-2019 - The mortality assumptions for Pre-Retirement Group 4 was updated from RP-2014 Blue Collar Employee Morality Table set forward one year for females projected generationally with Scale MP-2017 to Pub-2010 Safety Employee Amount-Weighted Mortality Table projected generationally using Scale MP-2019 - The mortality assumptions for the Healthy Retirement Group 1 and 2 was updated from RP-2014 Blue Collar Healthy Annuitant Mortality Table set forward one year for females projected generationally with Scale MP-2017 to Pub-2010 General Healthy Retiree and Contingent Survivor Amount-Weighted Mortality Tables set forward one year projected generationally using Scale MP-2019 - The mortality assumptions for the Healthy Retirement Group 4 was updated from RP-2014 Blue Collar Healthy Annuitant Mortality Table set forward one year for females projected generationally with Scale MP-2017 to Pub-2010 Safety Healthy Retiree and Contingent Survivor Amount-Weighted Mortality Tables projected generationally using Scale MP-2019 - The mortality assumptions for Disabled participants in Group 1 and 2 was updated from RP-2014 Blue Collar Healthy Annuitant Mortality Table set forward one year and projected generationally with Scale MP-2017 to Pub-2010 General Healthy Retiree Amount-Weighted Mortality Table set forward one year projected generationally using Scale MP-2019 - The mortality assumptions for Disabled participants in Group 4 was updated from RP-2014 Blue Collar Healthy Annuitant Mortality Table set forward one year and projected generationally with Scale MP-2017 to Pub-2010 Disabled Retiree Amount-Weighted Mortality Table projected generationally using Scale MP-2019 - The administrative expense assumption was increased from $1,300,000 for calendar 2018 to $1,500,000 for calendar 2019.
2017:	$ 43,565,250	- Discount rate decreased from 7.75% to 7.50% - The mortality assumption for nondisabled participants was updated from RP-2000 Employee Healthy Annuitant Mortality Tables projected generationally from 2009 using Scale BB2D to the RP-2014 Blue Collar Employee and Healthy Annuitant Mortality Tables set forward one year for females projected generationally with Scale MP-2017. - The mortality assumptions for disabled participants was updated from the RP-2000 Healthy Annuitant Mortality Table projected generationally from 2015 using Scale BB2D to the RP-2014 Blue Collar Healthy Annuitant Mortality Table set forward one year and projected generationally with Scale MP-2017. - The administrative expense assumption was increased from $1,150,000 for calendar 2016 to $1,300,000 for calendar 2018.
2015:	$ 42,033,481	- Discount rate decreased from 7.875% to 7.75% - The mortality assumption for nondisabled participants was changed from the RP-2000 Combined Healthy Mortality Table projected 17 years using AA to the RP-2000 Employee and Healthy Annuitant Mortality Tables projected generationally from 2009 using Scale BB2D. - The mortality assumption for disabled participants was changed from the RP-2000 Combined Healthy Mortality Table set forward five year projected 17 using Scale AA to the RP-2000 Healthy Annuitant Mortality Table projected generationally from 2015 using Scale BB2D. - The salary increase assumption was decreased from 4.75% to 4.5%. - The administrative expense assumption was increased from $1,100,000 for calendar 2014 to $1,150,000 for calendar 2016. - The asset valuation method was reset from an actuarial value of assets to a market value of assets.

CITY OF CAMBRIDGE RETIREMENT SYSTEM

Required Supplementary Information

Schedule of Investment Returns

(Unaudited)

	2019	2018	2017	2016	2015	2014
Annual money-weighted rate of return, net of investment expense	16.12 %	(3.56)%	16.49 %	8.40 %	(0.60)%	6.20 %

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

See accompanying independent auditors' report.

CITY OF CAMBRIDGE RETIREMENT SYSTEM

Required Supplementary Information

Schedule of Contributions

(Unaudited)

	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010
Actuarially determined contribution	$ 45,381,166	42,873,090	40,531,840	39,747,891	37,551,149	35,475,814	35,475,814	31,662,897	29,912,987	28,353,542
Contributions in relation to the actuarially determined contribution	45,681,166	43,173,090	40,831,840	40,047,891	37,851,149	35,775,814	35,775,814	31,967,897	32,212,987	28,553,542
Contribution deficiency (excess)	$ (300,000)	(300,000)	(300,000)	(300,000)	(300,000)	(300,000)	(300,000)	(305,000)	(2,300,000)	(200,000)
Covered payroll	$ 235,687,286	231,568,517	228,696,936	220,963,223	226,826,076	218,627,543	217,086,299	217,086,299	232,842,117	232,842,117
Contributions as a percentage of covered payroll	19.38 %	18.64 %	17.85 %	18.12 %	16.69 %	16.36 %	16.34 %	14.59 %	12.85 %	12.18 %

See accompanying independent auditors' report.

CITY OF CAMBRIDGE RETIREMENT SYSTEM

Required Supplementary Information

Notes to Schedule of Contributions – Last 10 Years

(Unaudited)

Methods and assumptions used to determine contribution rates:

Valuation date:

Actuarially determined contribution rates for fiscal 2019 are determined with the January 1, 2018 actuarial valuation.

The following assumptions were used for the periods included in the funding for 2019:

Actuarial cost method:	Entry age normal
Amortization method:	Prior year's contributions increased 5.85% for two years and remain level thereafter, plus an additional contribution of $300,000 each year
Asset valuation method:	Market value of assets as of December 31, 2107 as reported in the System's Annual Statement
Inflation:	3.50%
Salary increases:	4.50%
Investment rate of return:	7.50%, net of plan investment expense lowered from 7.75%
Retirement benefits:	Depending on age at retirement and "Group" classification 0.1%–2.5% per year of service times highest three year average salary. A five year average salary is used for those hired after April 1, 2012
Post-retirement cost of living increases:	The cost-of-living base is $16,000. Annual cost of living increases are assumed to be 3.0% of the lesser of the base or annual benefits.
Mortality:	Pre-Retirement: RP-2014 Blue Collar Employee Mortality Table set forward 1 year for female participants projected generationally using Scale MP-2017 Healthy Retiree: RP-2014 Blue Collar Healthy Annuitant Mortality Table set forward 1 year for female participants projected generationally using Scale MP-2017 Disabled Retiree: RP-2014 Blue Collar Healthy Annuitant Mortality Table set forward 1 year projected generationally using Scale MP-2017
Changes of Assumptions:	Actuarial assumptions are revised periodically to more closely reflect actual, as well as anticipate future experience. When actuarial assumptions have changed in prior years, the Retirement Board formally adopted the change at a monthly meeting.

See accompanying independent auditors' report.

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CITY OF CAMBRIDGE RETIREMENT SYSTEM

Financial Statements and Required Supplementary Information

December 31, 2018 and 2017

(With Independent Auditors' Report Thereon)

CITY OF CAMBRIDGE RETIREMENT SYSTEM

Financial Statements and Required Supplementary Information

December 31, 2018 and 2017

Table of Contents

KPMG LLP
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60 South Street
Boston, MA 02111

Independent Auditors' Report

City of Cambridge
Retirement System Board:

Report on the Financial Statements

We have audited the accompanying financial statements of the City of Cambridge Retirement System (the System) as of and for the years ended December 31, 2018 and 2017, and the related notes to the financial statements, which collectively comprise the System's basic financial statements for the years then ended as listed in the accompanying table of contents.

Management's Responsibility for the Financial Statements

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

Auditors' Responsibility

Our responsibility is to express an opinion on these financial statements based on our audits. We conducted our audits in accordance with auditing standards generally accepted in the United States of America and the standards applicable to financial audits contained in *Government Auditing Standards*, issued by the Comptroller General of the United States. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditors' judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the entity's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. Accordingly, we express no such opinion. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluating the overall presentation of the financial statements.

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

Opinion

In our opinion, the financial statements referred to above present fairly, in all material respects, the fiduciary net position of the System as of December 31, 2018 and 2017, and the changes in fiduciary net position for the years then ended in accordance with U.S. generally accepted accounting principles.

KPMG

Other Matters

Required Supplementary Information

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

Other Reporting Required by *Government Auditing Standards*

In accordance with *Government Auditing Standards*, we have also issued our report dated September 3, 2019 on our consideration of the System's internal control over financial reporting and on our tests of its compliance with certain provisions of laws, regulations, contracts, and grant agreements and other matters. The purpose of that report is solely to describe the scope of our testing of internal control over financial reporting and compliance and the results of that testing, and not to provide an opinion on the effectiveness of the System's internal control over financial reporting or on compliance. That report is an integral part of an audit performed in accordance with *Government Auditing Standards* in considering the System's internal control over financial reporting and compliance.

KPMG LLP

Boston, Massachusetts
September 3, 2019

CITY OF CAMBRIDGE RETIREMENT SYSTEM

Management's Discussion and Analysis

December 31, 2018 and 2017

(Unaudited)

This section presents Management's Discussion and Analysis (MD&A) of the City of Cambridge Retirement System's (the System or the Plan) financial activity and performance as of and for the years ended December 31, 2018 and 2017. The MD&A is unaudited and is intended to serve as an introduction to the Plan's basic financial statements, as well as to offer readers of the Plan's financial statements a narrative view and analysis of System's financial activities.

Financial Highlights

The fiduciary net position of the Plan as of December 31, 2018 totaled $1,269 billion, a $66.9 million, or 5.01% decrease, due to negative returns in several asset classes. Fiduciary net position is the residual of the Plan's assets in excess of the Plan's liabilities as of the date of the Statements of Fiduciary Net Position. The Plan's assets are held in trust to meet future benefit payments.

Total Plan "additions" of $21.6 million, comprised of $69.8 million in contributions, and $48.2 million in investment losses, were reported for the year ended December 31, 2018. In comparison, the Plan reported total additions of $257.2 million and $154.8 million for the years ended December 31, 2017 and 2016, respectively. The decrease in 2018 is due to investment losses in several asset classes, and the increase in 2017 and 2016 is due to investment gains in most major asset classes.

For the plan year ended December 31, 2018, total Plan deductions were $88.5 million, an increase of $4.8 million, or 5.69% over the last year, and are comprised of $80.6 million in benefit payments, $6.6 million in transfers and withdrawals and $1.3 million in administrative expenses. This $4.8 million increase is due to new retirements and an increase in refunds and transfers. This is as compared to total deductions of $83.7 million and $77.2 million for the years ended December 31, 2017, and 2016, respectively.

For reporting purposes in accordance with the Government Accounting Standards Board (GASB), as of December 31, 2018, the Plan's fiduciary net position as a percentage of the total pension liability was 79.9%.

Overview of the Financial Statements

The basic financial statements consist of the: (1) Statements of Fiduciary Net Position; (2) Statements of Changes in Fiduciary Net Position; and (3) Notes to the Financial Statements; and (4) Required Supplementary Information.

The Statements of Fiduciary Net Position report the Plan's assets, liabilities, and net position restricted for pensions at the end of the fiscal year calculated using the following formula: Assets – Liabilities = Net position restricted for pensions. The Statements of Fiduciary Net Position report the financial position of the Plan at a given point in time, in this case, December 31. Over time, the increase or decrease in fiduciary net position serves as a useful indicator of the Plan's financial health.

The Statements of Changes in Fiduciary Net Position report additions to and deductions from the Plan during the fiscal year. The formula here is: Additions – Deductions = Net Increase (Decrease) in Plan Fiduciary Net Position. The Statements of Changes in Fiduciary Net Position report activity occurring over a specific period of time, in this case, the year beginning January 1 and ending December 31.

The Notes to the Financial Statements provide additional information that is essential to a full understanding of the data provided in the Plan's financial statements.

(Continued)

This report also includes Required Supplementary Information following the Notes to the Financial Statements that consists of the schedules of changes in net pension liability and related ratios, investment returns, and contributions and notes to schedule of contributions.

These statements and schedules are prepared in conformity with U.S. generally accepted accounting principles, including the accounting and financial reporting requirements found in GASB Statement No. 67.

Financial Analysis

Total assets as of December 31, 2018 and 2017 were $1.3 billion and $1.4 billion, respectively, and were comprised of cash and cash equivalents; investments; cash collateral on securities lending, accrued interest and accrued dividends receivables; and contributions due from Plan members, the Plan sponsor and other systems. Total assets decreased by $80.5 million or 5.8% from $1.4 billion as of December 31, 2017, due to investment losses in several asset classes. Total assets increased by $167.4 million or 13.7% between 2016 and 2017 due to investment gains in most major asset classes.

Total liabilities as of December 31, 2018 were approximately $37.4 million and total liabilities as of December 31, 2017 were approximately $51 million. Total liabilities for 2018 and 2017 were primarily comprised of payables for investment management fees, refunds to members, and cash collateral on securities lending. Total liabilities increased by $6.0 million or 10.6% between 2016 and 2017 due to an increase in payables.

Total fiduciary net position held in trust for pension benefits totaled $1.269 billion at December 31, 2018 which represents an decrease of $66.9 million or 5.0% over 2017. Fiduciary net position increased by $173.5 million or 14.9% between 2016 and 2017. The decrease in 2018 is due to investment losses in several asset classes.

Condensed financial information

	2018	2017	Total $ change	Total % change
Assets:				
Cash and cash equivalents	$ 9,793,854	8,264,315	1,529,539	18.51 %
Receivables and other assets	1,004,148	1,905,840	(901,692)	(47.31)
Investments	1,260,028,861	1,328,403,797	(68,374,936)	(5.15)
Cash collateral on securities lending	35,255,585	48,028,012	(12,772,427)	(26.59)
Total assets	1,306,082,448	1,386,601,964	(80,519,516)	(5.81)
Liabilities:				
Payables	2,107,713	2,997,901	(890,188)	(29.69)
Cash collateral on securities lending	35,255,585	48,028,012	(12,772,427)	(26.59)
Total liabilities	37,363,298	51,025,913	(13,662,615)	(26.78)
Fiduciary net position	$ 1,268,719,150	1,335,576,051	(66,856,901)	(5.01)%

CITY OF CAMBRIDGE RETIREMENT SYSTEM

Management's Discussion and Analysis

December 31, 2018 and 2017

(Unaudited)

Condensed financial information

	2017	2016	Total $ change	Total % change
Assets:				
Cash and cash equivalents	$ 8,264,315	8,220,224	44,091	0.54 %
Receivables and other assets	1,905,840	10,772,448	(8,866,608)	(82.31)
Investments	1,328,403,797	1,143,918,115	184,485,682	16.13
Cash collateral on securities lending	48,028,012	56,261,348	(8,233,336)	(14.63)
Total assets	1,386,601,964	1,219,172,135	167,429,829	13.73
Liabilities:				
Payables	2,997,901	790,544	2,207,357	279.22
Cash collateral on securities lending	48,028,012	56,261,348	(8,233,336)	(14.63)
Total liabilities	51,025,913	57,051,892	(6,025,979)	(10.56)
Fiduciary net position	$ 1,335,576,051	1,162,120,243	173,455,808	14.93 %

Revenues – Additions to Plan Fiduciary Net Position

Additions to the System's Fiduciary net position include plan member and plan sponsor contributions, transfers from other retirement systems and investment income. Contributions, net transfers and net investment income for plan year 2018 totaled approximately $21.6 million as compared to additions of approximately $257.2 million in 2017.

In 2018, member contributions increased by approximately $583 thousand or 2.6% due to the addition of new employees and the accrual of outstanding prior service buybacks. In 2017, member contributions increased by approximately $1.2 million or 5.7% due to the addition of new employees and the accrual of outstanding prior service buybacks.

Plan sponsor contributions of $43.2 million in 2018 increased by $2.3 million or 5.8%, compared to an increase of $784 thousand or 2% in 2017. The increase in 2018 and 2017 is due to an increase in the actuarial determined contributions (ADC) as determined by the Plan's actuary.

Net investment income for the year ending December 31, 2018 was a loss of $48.2 million representing a $238.5 million or 125.3% decrease from 2017. The decrease in net investment income in 2018 is the result of investment losses in several asset classes. Net investment income for the year ending December 31, 2017 was $190.3 million representing a $100 million or 110.6% increase from 2016.

Condensed financial information

Additions		2018	2017	Total $ change	Total % change
Plan member contributions	$	22,730,249	22,146,929	583,320	2.63 %
Plan sponsor contribution		43,173,090	40,831,840	2,341,250	5.73
Transfers		3,906,001	3,872,145	33,856	0.87
Net investment income (loss)		(48,209,324)	190,300,828	(238,510,152)	(125.33)
Total additions	$	21,600,016	257,151,742	(235,551,726)	(91.60)%

Condensed financial information

Additions		2017	2016	Total $ change	Total % change
Plan member contributions	$	22,146,929	20,949,712	1,197,217	5.71 %
Plan sponsor contribution		40,831,840	40,047,891	783,949	1.96
Transfers		3,872,145	3,463,890	408,255	11.79
Net investment income (loss)		190,300,828	90,344,889	99,955,939	110.64
Total additions	$	257,151,742	154,806,382	102,345,360	66.11 %

Expenses – Deductions from Plan Fiduciary Net Position

Deductions to the Plan include the payment of pension benefits to members and beneficiaries, refunds of contributions to inactive members, transfers of member contributions to other Massachusetts public retirement plans and the cost of administration. For plan year 2018, the total deductions were $88.5 million, an increase of $4.8 million or 5.7% over 2017. For plan year 2017, the total deductions were $83.7 million, an increase of $6.5 million or 8.4% over 2016.

Retirement benefit payments totaled $80.6 million, an increase of approximately $3.7 million or 4.7%. In 2017 retirement benefit payments totaled $77.0 million, an increase of approximately $5.8 million or 8.1% from the previous year. The increases in 2018 and 2017 are due to new retirements and pension increases also known as cost-of-living adjustments in those respective years.

For plan year 2018, refunds of contributions totaled approximately $2.8 million, an increase of approximately $672 thousand or 31.6% from 2017. For plan year 2017, refunds of contributions totaled approximately $2.1 million, a decrease of approximately $173 thousand or 7.5% from 2016. The increase in 2018 is due to an increase in inactive members requesting withdrawals for their contributions from the Plan. The decrease in 2017 is due to a decrease in inactive members requesting withdrawals for their contributions from the Plan. Transfers to other Massachusetts public retirement systems totaled approximately $3.8 million, an increase of approximately $310 thousand or 8.9% from 2017. This is compared to a $884 thousand or 34.2% increase from 2016 to 2017. Year to year changes in transfer rates can be attributed to variations in public sector workforce movement between Cambridge and other government employers.

In 2018, administrative expenses totaled approximately $1.3 million, an increase of approximately $126 thousand or 11.1%, and in 2017 administrative expenses totaled approximately $1.1 million, a nominal increase of approximately $16 thousand or 1.4%. The increase in administrative expenses for 2018 and 2017 is attributable to personnel and miscellaneous expenses.

Condensed financial information

Deductions		2018	2017	Total $ change	Total % change
Retirement benefits	$	80,623,068	76,970,845	3,652,223	4.74 %
Refunds of contributions		2,799,045	2,126,598	672,447	31.62
Other systems		3,781,045	3,470,774	310,271	8.94
Administrative expenses		1,253,759	1,127,717	126,042	11.18
Total deductions	$	88,456,917	83,695,934	4,760,983	5.69 %

Condensed financial information

Deductions		2017	2016	Total $ change	Total % change
Retirement benefits	$	76,970,845	71,186,255	5,784,590	8.13 %
Refunds of contributions		2,126,598	2,299,664	(173,066)	(7.53)
Other systems		3,470,774	2,586,960	883,814	34.16
Administrative expenses		1,127,717	1,112,053	15,664	1.41
Total deductions	$	83,695,934	77,184,932	6,511,002	8.44 %

CITY OF CAMBRIDGE RETIREMENT SYSTEM

Management's Discussion and Analysis

December 31, 2018 and 2017

(Unaudited)

Change in Plan Fiduciary Net Position

Change in fiduciary net position for the year ended December 31, 2018 was ($66.9) million, which represents a decrease of $240.3 million or 138.5% from the previous year. This decrease is primarily the result of investment losses. Change in fiduciary net position for the year ended December 31, 2017 was $173.5 million, which represents an increase of $95.8 million or 123.5% from the previous year. This increase is primarily the result of investment income.

Changes in System fiduciary net position		Condensed financial information 2018	2017	Total $ change	Total % change
Total additions	$	21,600,016	257,151,742	(235,551,726)	(91.60)%
Total deductions		88,456,917	83,695,934	4,760,983	5.69
Change in plan fiduciary net position	$	(66,856,901)	173,455,808	(240,312,709)	(138.54)%

Changes in System fiduciary net position		Condensed financial information 2017	2016	Total $ change	Total % change
Total additions	$	257,151,742	154,806,382	102,345,360	66.11 %
Total deductions		83,695,934	77,184,932	6,511,002	8.44
Change in plan fiduciary net position	$	173,455,808	77,621,450	95,834,358	123.46 %

Overall Financial Position of System

Due to investment losses in several asset classes the Plan has experienced an decrease in its investment portfolio for the year ending December 31, 2018. Management believes the Plan remains well funded and able to meet its obligations. However, management acknowledges that the investment losses, will result in increased employer contributions going forward. When plan net position declines, the Plan sponsor is statutorily obligated to offset the losses as part of its annual assessment.

Requests for Information

This financial report is designed to provide an overview of System' finances. Questions concerning any of the information provided in this report should be addressed to City of Cambridge Retirement System, 100 CambridgePark Drive, Suite 101, Cambridge, MA 02140.

CITY OF CAMBRIDGE RETIREMENT SYSTEM

Statements of Fiduciary Net Position

December 31, 2018 and 2017

	2018	2017
Assets:		
Cash and cash equivalents	$ 9,793,854	8,264,315
Dividend and interest receivable	452,539	439,358
Other assets	551,609	1,466,482
Investments, at fair value:		
Fixed income securities	58,384,067	58,461,693
Equities	120,230,775	180,982,205
Pooled investments:		
Fixed income	134,281,690	141,316,831
Real estate	199,379,922	131,925,775
Domestic equities	329,735,952	379,253,400
International equities	166,056,092	209,745,975
International fixed income	62,561,122	65,539,176
Alternative	189,399,241	161,178,742
Total investments	1,260,028,861	1,328,403,797
Cash collateral on securities lending	35,255,585	48,028,012
Total assets	1,306,082,448	1,386,601,964
Liabilities:		
Accrued liabilities	836,110	931,583
Due to brokers for securities purchased	1,271,603	2,066,318
Cash collateral on securities lending	35,255,585	48,028,012
Total liabilities	37,363,298	51,025,913
Net position restricted for pensions	$ 1,268,719,150	1,335,576,051

See accompanying notes to basic financial statements.

CITY OF CAMBRIDGE RETIREMENT SYSTEM

Statements of Changes in Fiduciary Net Position

Fiscal Years ended December 31, 2018 and 2017

		2018	2017
Additions:			
Contributions:			
Employers	$	40,323,505	37,004,588
Nonemployer – City		2,849,585	3,827,252
Plan members		22,730,249	22,146,929
Other systems		3,207,371	3,589,041
Commonwealth of Massachusetts		698,630	283,104
Total contributions		69,809,340	66,850,914
Investment income (loss):			
Interest and dividends		24,259,981	22,183,919
Securities lending income		1,102,082	661,106
Net appreciation (depreciation) in fair value of investments		(63,481,786)	175,807,364
Less:			
Management fees		(9,120,314)	(7,850,534)
Borrower rebates and fees under securities lending program		(969,287)	(501,027)
Net investment earnings		(48,209,324)	190,300,828
Total additions		21,600,016	257,151,742
Deductions:			
Benefits		80,623,068	76,970,845
Refunds of contributions		2,799,045	2,126,598
Other systems		3,781,045	3,470,774
Administrative expenses		1,253,759	1,127,717
Total deductions		88,456,917	83,695,934
Change in net position		(66,856,901)	173,455,808
Net position, beginning of year		1,335,576,051	1,162,120,243
Net position, end of year	$	1,268,719,150	1,335,576,051

See accompanying notes to basic financial statements.

(1) Plan Description

The City of Cambridge Retirement System (the System or the Plan) is a cost-sharing, multiple-employer defined benefit pension plan administered by a Retirement Board comprised of five members: the City Auditor who serves as ex officio; two individuals elected by participants in the System; a fourth member appointed by the City Manager and a fifth member chosen by the other members of the Retirement Board. As of December 31, 2018, the System provides pension benefits to the retired employees of four employers: the City of Cambridge, Cambridge Housing Authority, Cambridge Redevelopment Authority and Cambridge Health Alliance.

The System is a member of the Massachusetts Contributory System, which is governed by Chapter 32 of the Massachusetts General Laws (MGL).

Employees covered by the Contributory Retirement Law are classified into one of four groups depending on job classification. Group 1 comprises most positions in state and local government. It is the general category of public employees. Group 2 is a limited category for specified hazardous occupations. Group 3 is for State Police only. Group 4 is mainly police and firefighters.

For employees hired prior to April 2, 2012, the annual amount of the retirement allowance is based on the member's final three year average salary multiplied by the number of years and full months of creditable service at the time of retirement and multiplied by a percentage based on the age of the member at retirement.

A member's final three year average salary is defined as the greater of the highest consecutive three year average annual rate of regular compensation and the average annual rate of regular compensation received during the last three years of creditable service prior to retirement.

For employees hired on April 2, 2012 or later, the annual amount of the retirement allowance is based on the member's final five year average salary multiplied by the number of years and full months of creditable service at the retirement and multiplied by a percentage based on the age and years of creditable service of the member at retirement.

A member's final five-year average salary is defined as the greater of the highest consecutive five-year average annual rate of regular compensation and the average annual rate of regular compensation received during the last five years of creditable service prior to retirement.

For employees who became members after January 1, 2011, regular compensation is limited to 64% of the federal limit found in 26 U.S.C. 401(a) (17). In addition, regular compensation for members who retire after April 2, 2012 will be limited to prohibit "spiking" a member's salary to increase the retirement benefit.

For all employees, the maximum annual amount of the retirement allowance is 80% of the member's final average salary. Any member who is a veteran also receives an additional yearly retirement allowance of $15 per year of creditable service, not exceeding $300. The veteran allowance is paid in addition to the 80% maximum.

Membership in the System consisted of the following at January 1, 2018, the date of the latest actuarial valuation:

Retirees and beneficiaries receiving benefits	2,149
Terminated plan members entitled to, but not receiving benefits	621
Terminated plan members with a vested right to a deferred or immediate benefit	139
Active plan members	2,991
Total membership	5,900
Total number of participating employers	4

(2) Contributions Required and Contributions Made

Plan members are required to contribute to the System. Depending on their employment date, active members must contribute a range of 5% to 9% of their regular gross compensation. Members hired after December 31, 1978 must contribute an additional 2% of regular compensation in excess of $30,000. Participating employers are required to pay into the System their share of the remaining system wide actuarially determined contribution, which is apportioned among the employers based on active covered payroll. The contributions of plan members and the participating employers are governed by Chapter 32 of the MGL.

The Commonwealth is obligated to reimburse the System for a portion of the benefits payments for cost of living increases granted before July 1998.

(3) Summary of Significant Accounting Policies

(a) Basis of Accounting

The System's financial statements are prepared using the full accrual basis of accounting. Plan member contributions are recognized in the period in which the contributions are due. Employer contributions to the plan are recognized when due and the employer is legally required to provide the contributions. Benefits and refunds are recognized when due and payable in accordance with the terms of the plan.

(b) Cash and Cash Equivalents

Cash and cash equivalents are considered to be cash on deposit, and highly liquid short-term investments with original maturities of three months or less from the date of acquisition.

(c) Investment and Valuation

The System participates in the segmentation program of the Pension Reserves Investment Trust (PRIT) Fund which allows Massachusetts retirement systems to invest only in individual asset classes of the PRIT Fund. The PRIT Fund is an external investment pool, as defined by the Government Accounting Standards Board, and it is not registered with the Securities and Exchange Commission, but is subject to oversight by the Pension Reserves Investment Management Board (the PRIM Board). The System's alternative investments include investments in the PRIT hedge and private equity segments of the PRIT Fund. The PRIT Fund issue separately available audited financial statements.

Investments are reported at fair value. Securities traded on a national or international securities exchange are valued at the last reported sales price on the last business day of the plan year; investments traded on a national securities exchange for which no sale was reported on that date and investments in common and preferred stocks traded in over-the-counter markets are valued at the mean of the last reported bid and asked prices, or the last reported bid price. Mutual funds and commingled funds, including real estate and other alternative (including private equity and hedge) investments, are valued based on net asset value (NAV) or unit value at year-end. Changes in fair value are included in investment income (loss) in the statement of changes in fiduciary net position.

(d) Use of Estimates

The preparation of financial statements in conformity with U.S. generally accepted accounting principles requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and the disclosure of contingent assets and liabilities at the dates of the financial statements and the reported amounts of additions and deductions during the reporting periods. Actual results could differ from estimates.

(e) Other

Purchases and sales of securities are reflected on a trade-date basis. Realized gain or loss on sales of securities is based on average cost.

Dividend income is recorded on the ex-dividend date. Interest income is recorded as earned on an accrual basis.

The System presents in its Statements of Changes in Fiduciary Net Position the net appreciation (depreciation) in the fair value of its investments, which consists of the net realized gains and losses during the year and the change in unrealized appreciation and depreciation during the year on those investments.

(f) Investment Policy

The provisions of Massachusetts General Laws (M.G.L.) Chapter 32, Section 23(2) and the Board approved investment policy govern the Plan's investment practice.

Diversification is attained through varied investment management styles that comply with Massachusetts state law. This is accomplished through the retention of investment managers that adhere to M.G.L. Chapter 32, Section 23(3), the "Prudent Person" rule.

(Continued)

The System has retained an investment consultant to work with the Board in a fiduciary capacity to assure that strategic investment diversification is attained, to employ investment managers with expertise in their respective asset classes, and to closely monitor the implementation and performance of the respective investment strategies.

The System's is currently invested in equities (domestic and international), fixed income securities (domestic and international), real estate and other alternative (including private equity and hedge).

The target allocation for each major asset class is summarized in the following table:

Asset class	2018 Target asset allocation	2017 Target asset allocation
Cash	— %	— %
Domestic equity	25.00	26.00
International developed markets equity	9.00	9.00
International emerging markets equity	10.00	10.00
Core fixed income	15.00	10.00
High yield fixed income	8.00	13.00
Real estate	10.00	10.00
Commodities	2.50	5.00
Hedge fund, GTAA, Risk parity	9.00	9.00
Private equity	11.50	8.00
Total	100.00 %	100.00 %

The Board's current rebalancing policy states that "The Board shall rebalance to the established targets during the quarter following the quarter ended whenever the asset class allocation falls outside the allowable ranges."

(g) *Reclassifications of Prior Period Presentation*

Certain amounts in the June 30, 2017 presentation have been reclassified to correspond with the June 30, 2018 presentation.

(4) Deposit and Investment Risks

(a) Custodial Credit Risk

Custodial credit risk is the risk that, in the event of a failure of a depository financial institution, the System deposits may not be returned. Investment securities are exposed to custodial credit risk if the securities are uninsured, are not registered in the name of the System and are held by either the depository financial institution or the depository financial institution's trust department or agent but not in the System's name.

Although there is no System -wide policy for custodial credit risk associated with deposits, the System's investments are held by the System's custodian and registered in the System's name. All of the System's securities are held by the System's custodial bank in the System's name, except for investments in mutual and commingled funds, real estate properties, and limited partnerships, which by their nature, are not subject to custodial credit risk. Investments in the Short-Term Investment Funds (STIF) are held in an SEC-registered pooled fund that is managed by the master custodian bank. The fair value of the position in the pool equals the value of the pool shares.

(b) Credit Risk

Credit risk exists when there is a possibility the issuer or other counterparty to an investment may be unable to fulfill its obligations.

There are no System -wide policy limitations for credit risk exposures within the portfolio. The System's fixed income investments are managed in accordance with an investment contract that is specific as to permissible credit quality ranges and the average credit quality of the overall portfolio.

The System allows investment managers to apply discretion under the "Prudent Person" rule. Investments are made, as a prudent person would be expected to act with discretion and intelligence, to seek reasonable income, preserve capital and, in general, avoid speculative investments.

The System's fixed income investments as of December 31, 2018 and 2017, if rated, were rated by Standard and Poor's and/or an equivalent national rating organization. The ratings are presented below using the Standard and Poor's rating scale:

Investment type	Fair value	AAA	AA	A	BBB	BB	Less than BB	Not rated
System (as of December 31, 2018):								
U.S. Treasury notes and bonds and municipal securities	$ 22,189,948	8,229,707	6,336,709	828,226	180,781	—	2,618,891	3,995,634
U.S. agencies	2,969,194	18,851	—	—	—	—	—	2,950,343
Domestic corporate	21,716,278	—	757,678	6,100,783	14,857,588	—	—	229
Asset-backed:								
CMOs	4,020,312	2,866,202	—	307,961	—	3,928	—	842,221
Other	7,488,335	4,348,502	211,630	1,515,303	257,156	224,659	177,348	753,737
Pooled fixed-income investments	196,842,812	—	—	—	—	—	—	196,842,812
Total	$ 255,226,879	15,463,262	7,306,017	8,752,273	15,295,525	228,587	2,796,239	205,384,976

Investment type	Fair value	AAA	AA	A	BBB	BB	Less than BB	Not rated
System (as of December 31, 2017):								
U.S. Treasury notes and bonds and municipal securities	$ 23,097,165	9,548,953	2,250,030	32,520	554,598	—	637,771	10,073,293
U.S. agencies	2,757,829	24,285	—	—	—	—	—	2,733,544
Domestic corporate	21,687,331	573,814	367,106	6,448,775	13,826,768	—	158,968	311,900
Asset-backed:								
CMOs	3,513,088	2,870,072	—	318,393	—	14,629	—	309,994
Other	7,406,280	3,095,094	223,854	1,971,629	276,483	351,395	199,500	1,288,325
Pooled fixed-income investments	206,856,007	—	—	—	—	—	—	206,856,007
Total	$ 265,317,700	16,112,218	2,840,990	8,771,317	14,657,849	366,024	996,239	221,573,063

(c) Concentration of Credit Risk

Concentration of credit risk is the risk of loss that may be attributed to the magnitude of a government's investment in a single issuer. The System has no investments, at fair value, that exceed 5% of the System's total investments as of December 31, 2018 and 2017 other than pooled investments. The System adheres to the provisions of M.G.L. c. 32, sec 23(2) when managing concentration risk.

(d) Interest Rate Risk

Interest rate risk is the risk that changes in interest rates will adversely affect the fair value of an investment. This risk is managed within the portfolio using the effective duration methodology. It is widely used in the management of fixed income portfolios in that it quantifies to a much greater degree the risk of interest rate changes.

The following is a listing of the System's fixed income investments and related maturity schedule (in years) as of December 31, 2018 and 2017:

Investment type	Fair value	Less than 1	1–5	6–10	More than 10
System (as of December 31, 2018):					
U.S. Treasury notes and bonds and municipal securities	$ 22,189,948	180,781	11,727,818	1,018,228	9,263,121
U.S. agencies	2,969,194	—	171,457	338,416	2,459,321
Domestic corporate	21,716,278	966,016	9,787,369	6,591,965	4,370,928
Asset-backed:					
CMOs	4,020,312	—	—	—	4,020,312
Other	7,488,335	—	5,342,364	1,003,433	1,142,538
Pooled fixed-income investments	196,842,812	—	—	196,842,812	—
Total	$ 255,226,879	1,146,797	27,029,008	205,794,854	21,256,220

Investment type		Fair value	Less than 1	1–5	6–10	More than 10
System (as of December 31, 2017):						
U.S. Treasury notes and bonds and municipal securities	$	23,097,165	329,727	12,577,461	1,377,090	8,812,887
U.S. agencies		2,757,829	—	162,410	369,806	2,225,613
Domestic corporate		21,687,331	267,291	10,271,752	6,587,694	4,560,594
Asset-backed:						
CMOs		3,513,088	—	—	—	3,513,088
Other		7,406,280	7	4,383,753	1,198,349	1,824,171
Pooled fixed-income investments		206,856,007	—	—	140,307,641	66,548,366
Total	$	265,317,700	597,025	27,395,376	149,840,580	87,484,719

(e) *Foreign Currency Risk*

Foreign currency risk is the risk that changes in exchange rates will adversely affect the fair value of an investment or a deposit. The System's asset allocation model which serves as a proxy for a foreign currency policy, limits the amount of foreign currency exposure to 19% of the System's total investments. Similar to the investments in domestic equities, the System employs or encourages its investment advisor to employ diversification, asset allocation, and quality strategies. Currency hedging is permitted for defensive purposes. Currency hedging shall be effected through the use of forward currency contracts. At December 31, 2018 and 2017, there were no open forward currency contracts

Risk of loss arises from changes in currency exchange rates. The System's exposure to foreign currency risk is presented below at December 31, 2018 and 2017.

		2018	2017
Currency:			
International equity pooled funds (various currencies)	$	166,056,092	209,745,975
International fixed income pooled funds (various currencies)		62,561,122	65,539,176
	$	228,617,214	275,285,151

Although these investments are not denominated in a foreign currency, the underlying securities are denominated in various foreign currencies.

(f) *Rates of Return*

For the years ended December 31, 2018 and 2017, the annual money weighted rate of return on plan investments, net of plan investment expense was (3.56)% and 16.49%. The money weighted rate of return expresses investment performance net of investment expenses adjusted for the changing amounts actually invested.

(g) Securities Lending

The Public Employment Retirement Administration Commission of Massachusetts (PERAC) has issued supplemental regulations that permit the System to engage in securities lending transactions. The System has entered into a Securities Lending Authorization Agreement (the Agreement) with a third party to act as the System's sub-custodian/agent for the purposes of managing a securities lending program.

The System lends fixed income, domestic equity, and international equity securities to approved broker/dealers. Collateral for securities loaned equals 102 percent of fair market value for domestic securities and 105 percent for international securities not denominated in U.S. dollars.

Types of collateral received from borrowers for securities loaned are cash and non-cash. The sub-custodian is authorized to invest the cash collateral in Approved Investments, as defined in the Agreement. Non-cash collateral received is not recorded in the accompanying financial statements as the System cannot pledge or sell the non-cash collateral except in the event of a borrower default.

As of December 31, 2018, the fair value of securities on loan was $46.6 million. The associated collateral was $47.7 million, of which $35.3 million was cash collateral and $12.4 million was non-cash. The cash collateral has been reinvested in repurchase agreements ($8.2 million), time deposits ($.8 million) and floating rate notes ($26.3 million) with a collective fair value of approximately $35.3 million. The repurchase agreements and time deposits are valued at amortized cost which approximates fair value. The floating rate notes are valued at fair value and are considered level 2 securities in the fair value hierarchy.

As of December 31, 2017, the fair value of securities on loan was $58.0 million. The associated collateral was $59.6 million, of which $48.0 million was cash collateral and $11.6 million was non-cash. The cash collateral has been reinvested in repurchase agreements ($7.4 million), time deposits ($8.3 million) and floating rate and other fixed income notes ($32.3 million) with a collective fair value of approximately $48.0 million. The repurchase agreements and time deposits are valued at amortized cost which approximates fair value. The floating rate and other fixed income notes are valued at fair value and are considered level 2 securities in the fair value hierarchy

The Agreement limits the maturity value of any Approved Investment, as defined, to a maximum of 397 days, except U.S. government securities, which shall have a final maturity not exceeding 762 days.

At year-end, the System has no credit risk exposure to borrowers because the amounts the System owes the borrowers exceed the amounts the borrowers owe the System. The Agreement indemnifies the System if the borrowers fail to return the securities (and the collateral is inadequate to replace the securities lent) or fail to pay the System for income distributions by the securities' issuers while the securities are on loan.

As of December 31, 2018 and 2017, there were no violations of legal or contractual provisions. The System has not experienced any losses resulting from the default of a borrower or lending agent during the years ended December 31, 2018 and 2017.

(h) Fair Value Hierarchy

GAAP establishes a fair value hierarchy for investments that prioritizes inputs used to measure fair value into three levels:

Level 1 – quoted prices (unadjusted) for identical assets or liabilities in active markets that are accessible at the measurement date;

Level 2 – observable inputs that are based on inputs not quoted in active markets, but corroborated by market data.

Level 3 – unobservable inputs that are used when little or no market data is available.

The fair value hierarchy gives the highest priority to Level 1 inputs and the lowest priority to Level 3 inputs. In determining fair value, the System utilizes valuation techniques that maximize the use of observable inputs and minimize the use of unobservable inputs to the extent possible.

Investments held through commingled funds for which fair value is estimated using net asset values (NAVs) as a practical expedient are not categorized in the fair value hierarchy.

The System uses an independent pricing source to determine the fair value of investments at quoted market prices.

CITY OF CAMBRIDGE RETIREMENT SYSTEM

Notes to Financial Statements

December 31, 2018 and 2017

The System has the following fair value measurements as of December 31, 2018 and 2017:

	2018		
	Fair value	Level 1	Level 2
Investments by fair value level:			
Fixed income	$ 58,384,067	20,570,220	37,813,847
Equities	120,230,775	120,230,775	—
	178,614,842	140,800,995	37,813,847
Investments measured at NAV:			
Commingled equity funds:			
International	166,056,092	—	—
Domestic	329,735,952	—	—
Commingled fixed income funds:			
International	62,561,122	—	—
Domestic	134,281,690	—	—
Real estate	199,379,922	—	—
Alternative:			
PRIT hedge fund	102,637,320	—	—
PRIT private equity	50,006,361	—	—
Other Alternative	36,755,560	—	—
	1,081,414,019	—	—
Total investments	$ 1,260,028,861	140,800,995	37,813,847

CITY OF CAMBRIDGE RETIREMENT SYSTEM

Notes to Financial Statements

December 31, 2018 and 2017

	2017		
	Fair value	Level 1	Level 2
Investments by fair value level:			
Fixed income	$ 58,461,693	21,096,566	37,365,127
Equities	180,982,205	180,982,205	—
	239,443,898	202,078,771	37,365,127
Investments measured at NAV:			
Commingled equity funds:			
International	209,745,975	—	—
Domestic	379,253,400	—	—
Commingled fixed income funds:			
International	65,539,176	—	—
Domestic	141,316,831	—	—
Real estate	131,925,775	—	—
Alternative:			
PRIT hedge fund	104,259,703	—	—
PRIT private equity	23,069,389	—	—
Other Alternative	33,849,650	—	—
	1,088,959,899	—	—
Total investments	$ 1,328,403,797	202,078,771	37,365,127

The following represents the significant investment strategies and terms on which the System may redeem investments for those investments measured at the NAV (or its equivalent) as a practical expedient:

	Investments measured at NAV			
	2018	2017	Redemption frequency	Redemption notice period
Commingled equity funds	$ 495,792,044	588,999,375	Daily	1–30 days
Commingled fixed income funds	196,842,812	206,856,007	Daily	1–30 days
Real estate	199,379,922	131,925,775	Quarterly	1–30 days
Alternative	189,399,241	161,178,742	Quarterly	1–30 days

1 Commingled equity funds: This type includes 9 funds that invest primarily in U.S. large and small cap equity funds and international equity funds.

2 Commingled fixed income funds: This type includes 3 fixed income funds that invest in U.S. corporate bonds, U.S. government bonds, U.S. asset-backed securities and foreign bonds.

3 Real estate funds: This type includes 11 funds that invest primarily in real estate funds and global infrastructure

4 Alternative funds: This type includes 15 funds that invest primarily in private equity and venture capital funds. The System is required to provide a 24 hour redemption notice for the PRIT hedge fund. The PRIT private equity fund is not redeemable until notified by the PRIM Board.

(5) Operating Expenses

The System's administrative expenses as shown on the Statements of Changes in Fiduciary Net Position are borne by the System and financed with investment income. These expenses include personnel and professional services, member communication and education, and other miscellaneous administrative expenses.

(6) Legally Required Reserve Accounts

The balances in the System's legally required reserves at December 31, 2018 and 2017 are as follows:

	2018	2017	Purpose
Annuity savings fund	$ 259,847,186	254,904,453	Active members' contribution balance
Annuity reserve fund	78,312,155	76,897,958	Retired members' contribution account
Pension reserve fund	912,511,680	989,458,673	Amounts appropriated to fund future retirement benefits
Pension fund	18,043,514	14,310,356	Remaining net assets
Military service fund	4,615	4,611	Amounts appropriated to fund military service time
	$ 1,268,719,150	1,335,576,051	

All reserve accounts are funded at levels required by State statute.

(7) Net Pension Liability

The components of the net pension liability of the System as of December 31, 2018 and 2017, are as follows:

	2018	2017
Total pension liability	$ 1,588,140,954	1,517,290,859
Fiduciary net position	1,268,719,150	1,335,576,051
System's net pension liability	$ 319,421,804	181,714,808
Fiduciary net position as a percentage of the total pension liability	79.89 %	88.02 %

(a) Actuarial Assumptions

The total pension liability at December 31, 2018 and 2017 was determined by an actuarial valuation as of January 1, 2018 and update procedures were used to roll forward the total pension liability from the valuation date to the measurement date. The following actuarial assumptions were applied to the measurement of the total pension liability at December 31, 2018 and 2017:

	2018	2017
Inflation	3.5%	3.5%
Salary increases	4.5%	4.5%
Investment rate of return	7.50%	7.50%
Cost of living adjustments	3% of first $16,000	3% of first $16,000
Pre-retirement mortality	RP-2014 Blue Collar Employee Mortality Table set forward one year for females projected generationally with Scale MP-2017	RP-2014 Blue Collar Employee Mortality Table set forward one year for females projected generationally with Scale MP-2017
Healthy Retiree mortality	RP-2014 Blue Collar Healthy Annuitant Mortality Table set forward one year for females projected generationally with Scale MP-2017	RP-2014 Blue Collar Healthy Annuitant Mortality Table set forward one year for females projected generationally with Scale MP-2017
Disabled Retiree mortality	RP-2014 Blue Collar Healthy Annuitant Mortality Table set forward one year and projected generationally with Scale MP-2017	RP-2014 Blue Collar Healthy Annuitant Mortality Table set forward one year and projected generationally with Scale MP-2017

- Long-term Expected Rate of Return:
  - The long-term expected rate of return on plan investments was determined using a building-block method in which best-estimate ranges of expected future real rates of return (expected returns, net of pension plan investment expense and inflation) are developed for each major asset class. These ranges are combined to produce the long-term expected rate of return by weighting the expected future real rates of return by the target asset allocation percentage and by adding expected inflation. The best estimates of arithmetic long-term expected real rates of return for each major asset class are summarized in the following table:

Asset class	2018 Long-term expected real rate of return	2017 Long-term expected real rate of return
Cash	1.12 %	1.06 %
Domestic equity	6.16	6.15
International developed markets equity	6.69	7.11
International emerging markets equity	9.47	9.41
Core fixed income	1.89	1.68
High yield fixed income	4.00	4.13
Real estate	4.58	4.90
Commodities	4.77	4.71
Hedge fund, GTAA, Risk parity	3.68	3.94
Private equity	10.00	10.28

(b) Discount Rate

The discount rates used to measure the total pension liability both as of December 31, 2018 and 2017 was 7.5%. The projection of cash flows used to determine the discount rate assumed that plan member contributions will be made at the current contribution rate and that employer contributions will be made at rates equal to the difference between actuarially determined contribution rates and the member rate. Based on those assumptions, the System's fiduciary net position was projected to be available to make all projected future benefit payments of current plan members. Therefore, the long-term expected rate of return on the plan investments was applied to all periods of projected benefit payments to determine the total pension liability.

(c) Sensitivity of the Net Pension Liability to Changes in the Discount Rate

The following presents the net pension liability of the System as of December 31, 2018 and 2017, calculated using the discount rates of 7.50% as well as what the net pension liability would be if it were calculated using a discount rate that is one-percentage point lower or one-percentage point higher than the current rate:

	2018		
	1% decrease (6.50%)	**Current discount rate (7.50%)**	**1% increase (8.50%)**
System's net pension liability	$ 500,023,541	319,421,804	167,545,669

	2017		
	1% decrease (6.50%)	**Current discount rate (7.50%)**	**1% increase (8.50%)**
System's net pension liability	$ 354,551,044	181,714,808	36,543,502

CITY OF CAMBRIDGE RETIREMENT SYSTEM

Required Supplementary Information

Schedule of Changes in the Net Pension Liability and Related Ratios

(Unaudited)

	2018	2017	2016	2015	2014
Total pension liability:					
Service cost	$ 35,289,253	31,903,330	32,844,244	30,908,861	29,791,673
Interest	113,321,515	107,835,410	105,325,306	98,925,146	94,315,895
Changes of benefit terms	—	13,786,855	—	—	—
Differences between expected and actual experience	5,492,484	—	(29,237,110)	—	—
Changes of assumptions	—	43,565,250	—	42,033,481	—
Benefit payments, including refunds of member contributions	(83,253,157)	(78,642,592)	(72,563,588)	(69,354,414)	(64,034,766)
Net change in total pension liability	70,850,095	118,448,253	36,368,852	102,513,074	60,072,802
Total pension liability – beginning	1,517,290,859	1,398,842,606	1,362,473,754	1,259,960,680	1,199,887,878
Total pension liability – ending (a)	1,588,140,954	1,517,290,859	1,398,842,606	1,362,473,754	1,259,960,680
Plan fiduciary net position:					
Contributions – employers and nonemployer	43,173,090	40,831,840	40,047,891	37,851,149	35,775,814
Contributions – member	22,730,249	22,146,929	20,949,712	21,167,434	20,572,796
Net investment income	(48,209,324)	190,247,348	90,299,489	(6,716,067)	64,639,098
Benefit payments, including refunds of member contributions, and other	(83,297,157)	(78,642,592)	(72,563,588)	(69,354,414)	(64,034,766)
Administrative expenses	(1,253,759)	(1,127,717)	(1,112,054)	(1,076,459)	(1,031,915)
Net change in plan fiduciary net position	(66,856,901)	173,455,808	77,621,450	(18,128,357)	55,921,027
Plan fiduciary net position – beginning	1,335,576,051	1,162,120,243	1,084,498,793	1,102,627,150	1,046,706,123
Plan fiduciary net position – ending (b)	1,268,719,150	1,335,576,051	1,162,120,243	1,084,498,793	1,102,627,150
Net pension liability – ending (a) – (b)	$ 319,421,804	181,714,808	236,722,363	277,974,961	157,333,530
Fiduciary net position as a percentage of the total pension liability	79.9%	88.0%	83.1%	80.0%	87.5%
Covered payroll	$ 231,568,517	228,696,936	220,963,223	226,826,076	218,627,543
Plan net pension liability as a percentage of covered payroll	137.94%	79.46%	107.13%	122.5%	72.0%

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

See accompanying independent auditors' report.

Notes to Schedule:

Benefit Changes	Amount of change TPL	Description
2017:	$ 13,786,855	- The COLA base was changed from $14,000 to $16,000 effective July 1, 2018.

Changes of Assumptions	Amount of change TPL	Description
2017:	$ 43,565,250	- Discount rate decreased from 7.75% to 7.50% - The mortality assumption for non-disabled participants was updated from RP-2000 Employee Healthy Annuitant Mortality Tables projected generationally from 2009 using Scale BB2D to the RP-2014 Blue Collar Employee and Healthy Annuitant Mortality Tables set forward one year for females projected generationally with Scale MP-2017. - The mortality assumptions for disabled participants was updated from the RP-2000 Healthy Annuitant Mortality Table projected generationally from 2015 using Scale BB2D to the RP-2014 Blue Collar Healthy Annuitant Mortality Table set forward one year and projected generationally with Scale MP-2017. - The administrative expense assumption was increase from $1,150,000 for calendar 2016 to $1,300,000 for calendar 2018.
2015:	$ 42,033,481	- Discount rate decreased from 7.875% to 7.75% - The mortality assumption for non-disabled participants was changed from the RP-2000 Combined Healthy Mortality Table projected 17 years using AA to the RP-2000 Employee and Healthy Annuitant Mortality Tables projected generationally from 2009 using Scale BB2D. - The mortality assumption for disabled participants was changed from the RP-2000 Combined Healthy Mortality Table set forward five year projected 17 using Scale AA to the RP-2000 Healthy Annuitant Mortality Table projected generationally from 2015 using Scale BB2D. - The salary increase assumption was decreased from 4.75% to 4.5%. - The administrative expense assumption was increase from $1,100,000 for calendar 2014 to $1,150,000 for calendar 2016. - The asset valuation method was reset from an actuarial value of assets to a market value of assets.

CITY OF CAMBRIDGE RETIREMENT SYSTEM

Required Supplementary Information

Schedule of Investment Returns

(Unaudited)

	2018	2017	2016	2015	2014
Annual money-weighted rate of return, net of investment expense	(3.56)%	16.49 %	8.40 %	(0.60)%	6.20 %

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

See accompanying independent auditors' report.

CITY OF CAMBRIDGE RETIREMENT SYSTEM

Required Supplementary Information

Schedule of Contributions

(Unaudited)

	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009
Actuarially determined contribution	$ 42,873,090	40,531,840	39,747,891	37,551,149	35,475,814	35,475,814	31,662,697	29,912,987	28,353,542	27,727,711
Contributions in relation to the actuarially determined contribution	43,173,090	40,831,840	40,047,891	37,851,149	35,775,814	35,775,814	31,967,697	32,212,987	28,553,542	27,727,711
Contribution deficiency (excess)	$ (300,000)	(300,000)	(300,000)	(300,000)	(300,000)	(300,000)	(305,000)	(2,300,000)	(200,000)	—
Covered payroll	$ 231,568,517	228,696,936	220,963,223	226,826,076	218,627,543	217,086,299	217,086,299	232,842,117	232,842,117	222,162,255
Contributions as a percentage of covered payroll	18.64%	17.85%	18.12 %	16.69 %	16.36 %	16.34 %	14.59 %	12.85 %	12.18 %	12.48 %

See accompanying independent auditors' report.

28

CITY OF CAMBRIDGE RETIREMENT SYSTEM

Required Supplementary Information

Notes to Schedule of Contributions – Last 10 Years

(Unaudited)

Methods and assumptions used to determine contribution rates:

Valuation date:

Actuarially determined contribution rates for fiscal 2018 and 2019 are determined with the January 1, 2018 actuarial valuation

The following assumptions were used for the periods included in the funding for 2019 and 2018:

Actuarial cost method:	Entry age normal
Amortization method:	Prior year's contributions increased 5.78% plus an additional contribution of $300,000
Asset valuation method:	5-year smoothed market
Inflation:	3.50%
Salary increases:	4.50%
Investment rate of return:	7.50%, net of plan investment expense for 2018 and for 2017
Retirement benefits:	Depending on age at retirement and "Group" classification 0.1%–2.5% per year of service times highest three year average salary. A five year average salary is used for those hired after April 1, 2012
Post-retirement cost of living increases:	The cost-of-living base was increased from $14,000 to $16,000 as of July 1, 2018. Annual cost of living increases are assumed to be 3.0% of the lesser of the base or annual benefits.
Mortality:	Pre-Retirement: RP-2014 Blue Collar Employee Mortality Table set forward 1 year for female participants projected generationally using Scale MP-2017 Healthy Retiree: RP-2014 Blue Collar Healthy Annuitant Mortality Table set forward 1 year for female participants projected generationally using Scale MP-2017 Disabled Retiree: RP-2014 Blue Collar Healthy Annuitant Mortality Table set forward 1 year projected generationally using Scale MP-2017
Changes of Assumptions:	Actuarial assumptions are revised periodically to more closely reflect actual, as well as anticipate future experience. When actuarial assumptions have changed in prior years, the Retirement Board formally adopted the change at a monthly meeting.

See accompanying independent auditors' report.

KPMG

CITY OF CAMBRIDGE RETIREMENT SYSTEM

Financial Statements and Required Supplementary Information

December 31, 2017 and 2016

(With Independent Auditors' Report Thereon)

CITY OF CAMBRIDGE RETIREMENT SYSTEM

Financial Statements and Required Supplementary Information

December 31, 2017 and 2016

Table of Contents

KPMG LLP
Two Financial Center
60 South Street
Boston, MA 02111

Independent Auditors' Report

City of Cambridge
Retirement System Board:

Report on the Financial Statements

We have audited the accompanying financial statements of the City of Cambridge Retirement System (the System) as of and for the years ended December 31, 2017 and 2016, and the related notes to the financial statements, which collectively comprise the System's basic financial statements for the years then ended as listed in the accompanying table of contents.

Management's Responsibility for the Financial Statements

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

Auditors' Responsibility

Our responsibility is to express an opinion on these financial statements based on our audits. We conducted our audits in accordance with auditing standards generally accepted in the United States of America and the standards applicable to financial audits contained in *Government Auditing Standards*, issued by the Comptroller General of the United States. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditors' judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the entity's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. Accordingly, we express no such opinion. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluating the overall presentation of the financial statements.

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

Opinion

In our opinion, the financial statements referred to above present fairly, in all material respects, the fiduciary net position of the System as of December 31, 2017 and 2016, and the changes in fiduciary net position for the years then ended in accordance with U.S. generally accepted accounting principles.

Other Matters

Required Supplementary Information

U.S. generally accepted accounting principles require that the Management's Discussion and Analysis on pages 3 through 8 and the supplementary schedules of changes in net pension liability and related ratios, investment returns, and contributions and the notes to the schedule of contributions on pages 25 through 28 be presented to supplement the basic financial statements. Such information, although not a part of the basic financial statements, is required by the Governmental Accounting Standards Board who considers it to be an essential part of financial reporting for placing the basic financial statements in an appropriate operational, economic, or historical context. We have applied certain limited procedures to the required supplementary information in accordance with auditing standards generally accepted in the United States of America, which consisted of inquiries of management about the methods of preparing the information and comparing the information for consistency with management's responses to our inquiries, the basic financial statements, and other knowledge we obtained during our audit of the basic financial statements. We do not express an opinion or provide any assurance on the information because the limited procedures do not provide us with sufficient evidence to express an opinion or provide any assurance.

Other Reporting Required by *Government Auditing Standards*

In accordance with *Government Auditing Standards*, we have also issued our report dated September 7, 2018 on our consideration of the System's internal control over financial reporting and on our tests of its compliance with certain provisions of laws, regulations, contracts, and grant agreements and other matters. The purpose of that report is to describe the scope of our testing of internal control over financial reporting and compliance and the results of that testing, and not to provide an opinion on internal control over financial reporting or on compliance. That report is an integral part of an audit performed in accordance with *Government Auditing Standards* in considering the Plan's internal control over financial reporting and compliance.

KPMG LLP

Boston, Massachusetts
September 7, 2018

CITY OF CAMBRIDGE RETIREMENT SYSTEM

Management's Discussion and Analysis

December 31, 2017 and 2016

(Unaudited)

This section presents Management's Discussion and Analysis (MD&A) of the City of Cambridge Retirement System's (the System or the Plan) financial activity and performance as of and for the years ended December 31, 2017 and 2016. The MD&A is unaudited and is intended to serve as an introduction to the Plan's basic financial statements, as well as to offer readers of the Plan's financial statements a narrative view and analysis of System's financial activities.

Financial Highlights

The fiduciary net position of the Plan as of December 31, 2017 totaled $1.336 billion, a $173.5 million, or 14.9% increase, due to positive returns in most major asset classes. Fiduciary net position is the residual of the Plan's assets in excess of the Plan's liabilities as of the date of the Statements of Fiduciary Net Position. The Plan's assets are held in trust to meet future benefit payments.

Total Plan "additions" of $257.2 million, comprised of $66.9 million in contributions, and $190.3 million in investment earnings, were reported for the year ended December 31, 2017. In comparison, the Plan reported total additions of $154.8 million and $55.4 million for the years ended December 31, 2016 and 2015, respectively. The increase in 2017 and 2016 is due to investment gains in most major asset classes, and the decrease in 2015 Plan additions is due to investment losses in the global equity markets.

For the plan year ended December 31, 2017, total Plan deductions were $83.7 million, an increase of $6.5 million, or 8.4% over the last year, and are comprised of $77.0 million in benefit payments, $5.6 million in transfers and withdrawals and $1.1 million in administrative expenses. This $6.5 million increase is due to new retirements and an increase in transfers. This is as compared to total deductions of $77.2 million and $73.5 million for the years ended December 31, 2016, 2015, respectively.

For reporting purposes in accordance with the Government Accounting Standards Board (GASB), as of December 31, 2017, the Plan's fiduciary net position as a percentage of the total pension liability was 88.0%.

Overview of the Financial Statements

The basic financial statements consist of the: (1) Statements of Fiduciary Net Position; (2) Statements of Changes in Fiduciary Net Position; and (3) Notes to the Financial Statements; and (4) Required Supplementary Information.

The Statements of Fiduciary Net Position report the Plan's assets, liabilities, and net position restricted for pensions at the end of the fiscal year calculated using the following formula: Assets – Liabilities = Net position restricted for pensions. The Statements of Fiduciary Net Position report the financial position of the Plan at a given point in time, in this case, December 31. Over time, the increase or decrease in fiduciary net position serves as a useful indicator of the Plan's financial health.

The Statements of Changes in Fiduciary Net Position report additions to and deductions from the Plan during the fiscal year. The formula here is: Additions – Deductions = Net Increase (Decrease) in Plan Fiduciary Net Position. The Statements of Changes in Fiduciary Net Position report activity occurring over a specific period of time, in this case, the year beginning January 1 and ending December 31.

The Notes to the Financial Statements provide additional information that is essential to a full understanding of the data provided in the Plan's financial statements.

CITY OF CAMBRIDGE RETIREMENT SYSTEM

Management's Discussion and Analysis

December 31, 2017 and 2016

(Unaudited)

This report also includes Required Supplementary Information following the Notes to the Financial Statements that consists of the schedules of changes in net pension liability and related ratios, investment returns, and contributions and notes to schedule of contributions.

These statements and schedules are prepared in conformity with U.S. generally accepted accounting principles, including the accounting and financial reporting requirements found in GASB Statement No. 67.

Financial Analysis

Total assets as of December 31, 2017 and 2016 were $1.4 billion and $1.2 billion, respectively, and were comprised of cash and cash equivalents; investments; cash collateral on securities lending, accrued interest and accrued dividends receivables; and contributions due from Plan members, the Plan sponsor and other systems. Total assets increased by $175.4 million or 14.4% from $1.2 billion as of December 31, 2016, due to investment gains in most major asset classes. Total assets increased by $87.3 million or 7.7% between 2015 and 2016 due to investment gains in most major asset classes.

Total liabilities as of December 31, 2017 were approximately $61 million and total liabilities as of December 31, 2016 were approximately $59.1 million. Total liabilities for 2017 and 2016 were primarily comprised of payables for investment management fees, refunds to members, and cash collateral on securities lending. Total liabilities increased by $9.7 million or 19.6% between 2015 and 2016 due to a increase in cash collateral on securities lending.

Total fiduciary net position held in trust for pension benefits totaled $1.336 billion at December 31, 2017 which represents an increase of $173.5 million or 14.9% over 2016. Fiduciary net position increased by $77.6 million or 7.2% between 2015 and 2016. The increase in 2017 is due to investment gains in most major asset classes.

Condensed financial information

	2017	2016	Total $ change	Total % change
Assets:				
Cash and cash equivalents	$ 8,264,315	8,220,224	44,091	0.54 %
Receivables and other assets	1,905,840	10,772,448	(8,866,608)	(82.31)
Investments	1,328,403,797	1,143,918,115	184,485,682	16.13
Cash collateral on securities lending	58,043,809	58,273,194	(229,385)	(0.39)
Total assets	1,396,617,761	1,221,183,981	175,433,780	14.37
Liabilities:				
Payables	2,997,901	790,544	2,207,357	279.22
Cash collateral on securities lending	58,043,809	58,273,194	(229,385)	(0.39)
Total liabilities	61,041,710	59,063,738	1,977,972	3.35
Fiduciary net position	$ 1,335,576,051	1,162,120,243	173,455,808	14.93 %

CITY OF CAMBRIDGE RETIREMENT SYSTEM

Management's Discussion and Analysis

December 31, 2017 and 2016

(Unaudited)

Condensed financial information

	2016	2015	Total $ change	Total % change
Assets:				
Cash and cash equivalents	$ 8,220,224	9,380,833	(1,160,609)	(12.37)%
Receivables and other assets	10,772,448	12,485,300	(1,712,852)	(13.72)
Investments	1,143,918,115	1,063,766,325	80,151,790	7.53
Cash collateral on securities lending	58,273,194	48,266,529	10,006,665	20.73
Total assets	1,221,183,981	1,133,898,987	87,284,994	7.70
Liabilities:				
Payables	790,544	1,133,665	(343,121)	(30.27)
Cash collateral on securities lending	58,273,194	48,266,529	10,006,665	20.73
Total liabilities	59,063,738	49,400,194	9,663,544	19.56
Fiduciary net position	$ 1,162,120,243	1,084,498,793	77,621,450	7.16 %

Revenues – Additions to Plan Fiduciary Net Position

Additions to the System's Fiduciary net position include plan member and plan sponsor contributions, transfers from other retirement systems and investment income. Contributions, net transfers and net investment income for plan year 2017 totaled approximately $257.2 million as compared to additions of approximately $154.8 million in 2016.

In 2017, member contributions increased by approximately $1.2 million or 5.7% due to the addition of new employees and the accrual of outstanding prior service buybacks. In 2016, member contributions decreased by approximately $218 thousand or 1% also due to the addition of new employees and the accrual of outstanding prior service buybacks.

Plan sponsor contributions of $40.8 million in 2017 increased by $784 thousand or 2%, compared to an increase of $2.2 million or 5.8% in 2016. The increase in 2017 and 2016 is due to an increase in the Annual Required Employer Contribution (ARC) as determined by the Plan's actuary.

(Continued)

Net investment income for the year ending December 31, 2017 was $190.3 million representing a $100 million or 110.6% increase from 2016. The increase in net investment income in 2017 is the result of investment gains in most major asset classes. Net investment income for the year ending December 31, 2016 was $90.3 million representing a $97.0 million or 1451.0% increase from 2015.

Condensed financial information

Additions		2017	2016	Total $ change	Total % change
Plan member contributions	$	22,146,929	20,949,712	1,197,217	5.71 %
Plan sponsor contribution		40,831,840	40,047,891	783,949	1.96
Transfers		3,872,145	3,463,890	408,255	11.79
Net investment income (loss)		190,300,828	90,344,889	99,955,939	110.64
Total additions	$	257,151,742	154,806,382	102,345,360	66.11 %

Condensed financial information

Additions		2016	2015	Total $ change	Total % change
Plan member contributions	$	20,949,712	21,167,434	(217,722)	(1.03)%
Plan sponsor contribution		40,047,891	37,851,149	2,196,742	5.80
Net transfers		3,463,890	3,091,505	372,385	12.05
Net investment income (loss)		90,344,889	(6,688,994)	97,033,883	1,450.65
Total additions	$	154,806,382	55,421,094	99,385,288	179.33 %

Expenses – Deductions from Plan Fiduciary Net Position

Deductions to the Plan include the payment of pension benefits to members and beneficiaries, refunds of contributions to inactive members, transfers of member contributions to other Massachusetts public retirement plans and the cost of administration. For plan year 2017, the total deductions were $83.7 million, an increase of $6.5 million or 8.4% over 2016. For plan year 2016, the total deductions were $77.2 million, an increase of $3.6 million or 4.9% over 2015.

Retirement benefit payments totaled $77.0 million, an increase of approximately $5.8 million or 8.1%. In 2016 retirement benefit payments totaled $71.2 million, an increase of approximately $4.6 million or 6.9% from the previous year. The increases in 2017 and 2016 are due to new retirements and pension increases also known as cost-of-living adjustments in those respective years.

(Continued)

For plan year 2017, refunds of contributions totaled approximately $2.1 million, a decrease of approximately $173 thousand or 7.5% from 2016. For plan year 2016, refunds of contributions totaled approximately $2.3 million, a decrease of approximately $614 thousand or 21.1% from prior year. The decrease in 2017 is due to a decrease in inactive members requesting withdrawals for their contributions from the Plan. In 2016, the decrease in withdrawals is due to a decrease in inactive member refund requests. Transfers to other Massachusetts public retirement systems totaled approximately $3.5 million, an increase of approximately $884 thousand or 34.2% from 2016. This is compared to a $385 thousand or 13% decrease in transfers from 2015 to 2016. Year to year changes in transfer rates can be attributed to variations in public sector workforce movement between Cambridge and other government employers.

In 2017, administrative expenses totaled approximately $1.1million, a nominal increase of approximately $16 thousand or 1.4%, and in 2016 administrative expenses totaled approximately $1.1 million, an increase of approximately $36 thousand or 3.3%. The slight increase in administrative expenses for 2017 and 2016 is attributable to personnel and miscellaneous expenses.

Condensed financial information

Deductions		2017	2016	Total $ change	Total % change
Retirement benefits	$	76,970,845	71,186,255	5,784,590	8.13 %
Refunds of contributions		2,126,598	2,299,664	(173,066)	(7.53)
Other systems		3,470,774	2,586,960	883,814	34.16
Administrative expenses		1,127,717	1,112,053	15,664	1.41 %
Total deductions	$	83,695,934	77,184,932	6,511,002	8.44 %

Condensed financial information

Deductions		2016	2015	Total $ change	Total % change
Retirement benefits	$	71,186,255	66,587,426	4,598,829	6.91 %
Refunds of contributions		2,299,664	2,913,807	(614,143)	(21.08)
Other systems		2,586,960	2,971,759	(384,799)	(12.95)
Administrative expenses		1,112,053	1,076,459	35,594	3.31
Total deductions	$	77,184,932	73,549,451	3,635,481	4.94 %

CITY OF CAMBRIDGE RETIREMENT SYSTEM

Management's Discussion and Analysis

December 31, 2017 and 2016

(Unaudited)

Change in Plan Fiduciary Net Position

Change in fiduciary net position for the year ended December 31, 2017 was $173.5 million, which represents an increase of $95.8 million or 123.5%. This increase is primarily the result of investment income. Change in fiduciary net position for the year ended December 31, 2016 was $77.6 million, which represents a increase of $95.7 million or 528.2%. This increase is primarily the result of investment income as compared to investment losses in the prior year.

Condensed financial information

Changes in System fiduciary net position		2017	2016	Total $ change	Total % change
Total additions	$	257,151,742	154,806,382	102,345,360	66.11 %
Total deductions		83,695,934	77,184,932	6,511,002	8.44 %
Change in plan fiduciary net position	$	173,455,808	77,621,450	95,834,358	123.46 %

Condensed financial information

Changes in System fiduciary net position		2016	2015	Total $ change	Total % change
Total additions	$	154,806,382	55,421,094	99,385,288	179.33 %
Total deductions		77,184,932	73,549,451	3,635,481	4.94
Change in plan fiduciary net position	$	77,621,450	(18,128,357)	95,749,807	528.18 %

Overall Financial Position of System

Due to investment gains in most major asset classes the Plan has experienced an increase in its investment portfolio for the year ending December 31, 2017. Management believes the Plan remains well funded and able to meet its obligations. However, management acknowledges that the investment losses from prior years, coupled with assumption changes, including mortality and interest rates, will result in increased employer contributions going forward. When plan net position declines, the plan sponsor is statutorily obligated to offset the losses as part of its annual assessment.

Requests for Information

This financial report is designed to provide an overview of System' finances. Questions concerning any of the information provided in this report should be addressed to City of Cambridge Retirement System, 100 CambridgePark Drive, Suite 101, Cambridge, MA 02140.

CITY OF CAMBRIDGE RETIREMENT SYSTEM

Statements of Fiduciary Net Position

December 31, 2017 and 2016

	2017	2016
Assets:		
Cash and cash equivalents	$ 8,264,315	8,220,224
Dividend and interest receivable	439,358	445,077
Contributions receivable:		
City of Cambridge	—	6,460,026
Cambridge Health Alliance	—	2,929,420
Other	—	535,603
Other assets	1,466,482	402,322
Investments, at fair value:		
Fixed income securities	58,461,693	54,386,862
Equities	180,982,205	161,747,526
Pooled investments:		
Fixed income	141,316,831	133,263,428
Real estate	131,925,775	123,919,766
Domestic equities	379,253,400	308,445,524
International equities	209,745,975	181,681,306
International fixed income	65,539,176	47,287,175
Alternative	161,178,742	133,186,528
Total investments	1,328,403,797	1,143,918,115
Cash collateral on securities lending	58,043,809	58,273,194
Total assets	1,396,617,761	1,221,183,981
Liabilities:		
Accrued liabilities	931,583	790,544
Due to brokers for securities purchased	2,066,318	—
Cash collateral on securities lending	58,043,809	58,273,194
Total liabilities	61,041,710	59,063,738
Net position restricted for pensions	$ 1,335,576,051	1,162,120,243

See accompanying notes to basic financial statements.

CITY OF CAMBRIDGE RETIREMENT SYSTEM

Statements of Changes in Fiduciary Net Position

Fiscal Years ended December 31, 2017 and 2016

		2017	2016
Additions:			
Contributions:			
Employers	$	37,004,588	35,364,563
Nonemployee – City		3,827,252	4,683,328
Plan members		22,146,929	20,949,712
Other systems		3,589,041	2,897,113
Commonwealth of Massachusetts		283,104	566,777
Total contributions		66,850,914	64,461,493
Investment earnings:			
Interest and dividends		22,183,919	20,737,096
Securities lending income		661,106	106,081
Net appreciation in fair value of investments		175,807,364	76,310,706
Less:			
Management fees		(7,850,534)	(6,745,168)
Borrower rebates and fees under securities lending program		(501,027)	(63,826)
Net investment earnings		190,300,828	90,344,889
Total additions		257,151,742	154,806,382
Deductions:			
Benefits		76,970,845	71,186,255
Refunds of contributions		2,126,598	2,299,664
Other systems		3,470,774	2,586,960
Administrative expenses		1,127,717	1,112,053
Total deductions		83,695,934	77,184,932
Change in net position		173,455,808	77,621,450
Net position, beginning of year		1,162,120,243	1,084,498,793
Net position, end of year	$	1,335,576,051	1,162,120,243

See accompanying notes to basic financial statements.

(1) Plan Description

The City of Cambridge Retirement System (the System) is a cost-sharing, multiple-employer defined benefit pension plan administered by a Retirement Board comprised of five members: the City Auditor who serves as ex officio; two individuals elected by participants in the System; a fourth member appointed by the City Manager and a fifth member chosen by the other members of the Retirement Board. As of December 31, 2017, the System provides pension benefits to the retired employees of four employers: the City of Cambridge, Cambridge Housing Authority, Cambridge Redevelopment Authority and Cambridge Health Alliance.

The System is a member of the Massachusetts Contributory System, which is governed by Chapter 32 of the Massachusetts General Laws (MGL).

Employees covered by the Contributory Retirement Law are classified into one of four groups depending on job classification. Group 1 comprises most positions in state and local government. It is the general category of public employees. Group 4 comprises mainly police and firefighters. Group 2 is for other specified hazardous occupations.

For employees hired prior to April 2, 2012, the annual amount of the retirement allowance is based on the member's final three year average salary multiplied by the number of years and full months of creditable service at the time of retirement and multiplied by a percentage based on the age of the member at retirement.

A members final three year average salary is defined as the greater of the highest consecutive three year average annual rate of regular compensation and the average annual rate of regular compensation received during the last three years of creditable service prior to retirement.

For employees hired on April 2, 2012 or later, the annual amount of the retirement allowance is based on the member's final five year average salary multiplied by the number of years and full months of creditable service at the retirement and multiplied by a percentage based on the age and years of creditable service of the member at retirement.

A member's final five-year average salary is defined as the greater of the highest consecutive five-year average annual rate of regular compensation and the average annual rate of regular compensation received during the last five years of creditable service prior to retirement.

For employees who became members after January 1, 2011, regular compensation is limited to 64% of the federal limit found in 26 U.S.C. 401(a) (17). In addition, regular compensation for members who retire after April 2, 2012 will be limited to prohibit "spiking" a member's salary to increase the retirement benefit.

For all employees, the maximum annual amount of the retirement allowance is 80% of the member's final average salary. Any member who is a veteran also receives an additional yearly retirement allowance of $15 per year of creditable service, not exceeding $300. The veteran allowance is paid in addition to the 80% maximum.

Membership in the System consisted of the following at December 31, 2017, the date of the latest actuarial valuation:

Retirees and beneficiaries receiving benefits	2,019
Terminated plan members entitled to, but not receiving benefits	728
Terminated plan members with a vested right to a deferred or immediate benefit	126
Active plan members	3,019
Total membership	5,892
Total number of participating employers	4

(2) Contributions Required and Contributions Made

Plan members are required to contribute to the System. Depending on their employment date, active members must contribute a range of 5% to 9% of their regular gross compensation. Members hired after December 31, 1978 must contribute an additional 2% of regular compensation in excess of $30,000. Participating employers are required to pay into the System their share of the remaining system wide actuarially determined contribution, which is apportioned among the employers based on active covered payroll. The contributions of plan members and the participating employers are governed by Chapter 32 of the MGL.

The Commonwealth is obligated to reimburse the System for a portion of the benefits payments for cost of living increases granted before July 1998.

(3) Summary of Significant Accounting Policies

(a) Basis of Accounting

The System's financial statements are prepared using the full accrual basis of accounting. Plan member contributions are recognized in the period in which the contributions are due. Employer contributions to the plan are recognized when due and the employer is legally required to provide the contributions. Benefits and refunds are recognized when due and payable in accordance with the terms of the plan.

(b) Cash and Cash Equivalents

Cash and cash equivalents are considered to be cash on deposit, and highly liquid short-term investments with original maturities of three months or less from the date of acquisition.

(c) Investment Valuation

Investments are reported at fair value. Securities traded on a national or international securities exchange are valued at the last reported sales price on the last business day of the plan year; investments traded on a national securities exchange for which no sale was reported on that date and investments in common and preferred stocks traded in over-the-counter markets are valued at the mean of the last reported bid and asked prices, or the last reported bid price. Mutual funds and commingled funds, including real estate and private equity investments, are valued based on net asset value (NAV) or unit value at year-end. Changes in fair value are included in investment income (loss) in the statement of changes in fiduciary net position.

(d) Use of Estimates

The preparation of financial statements in conformity with U.S. generally accepted accounting principles requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and the disclosure of contingent assets and liabilities at the dates of the financial statements and the reported amounts of additions and deductions during the reporting periods. Actual results could differ from estimates.

(e) Other

Purchases and sales of securities are reflected on a trade-date basis. Realized gain or loss on sales of securities is based on average cost.

Dividend income is recorded on the ex-dividend date. Interest income is recorded as earned on an accrual basis.

The System presents in its Statements of Changes in Fiduciary Net Position the net appreciation (depreciation) in the fair value of its investments, which consists of the net realized gains and losses during the year and the change in unrealized appreciation and depreciation during the year on those investments.

(f) Investment Policy

The provisions of Massachusetts General Laws (M.G.L.) Chapter 32, Section 23(2) and the Board approved investment policy govern the Plan's investment practice.

Diversification is attained through varied investment management styles that comply with Massachusetts state law. This is accomplished through the retention of investment managers that adhere to M.G.L. Chapter 32, Section 23(3), the "Prudent Person" rule.

The System has retained an investment consultant to work with the Board in a fiduciary capacity to assure that strategic investment diversification is attained, to employ investment managers with expertise in their respective asset classes, and to closely monitor the implementation and performance of the respective investment strategies.

The System's is currently invested in equities (domestic and international), fixed income securities (domestic and international), real estate and private equity.

The target allocation for each major asset class is summarized in the following table:

Asset class	2017 Target asset allocation	2016 Target asset allocation
Cash	— %	— %
Domestic equity	26.00	25.00
International developed markets equity	9.00	9.00
International emerging markets equity	10.00	10.00
Core fixed income	10.00	15.00
High yield fixed income	13.00	8.00
Real estate	10.00	10.00
Commodities	5.00	5.00
Hedge fund, GTAA, Risk parity	9.00	9.00
Private equity	8.00	9.00
Total	100.00 %	100.00 %

The Board's current rebalancing policy states that "The Board shall rebalance to the established targets during the quarter following the quarter ended whenever the asset class allocation falls outside the allowable ranges."

(g) Reclassifications

Certain 2016 balances have been reclassified to conform with the 2017 presentation.

(4) Deposit and Investment Risks

(a) Custodial Credit Risk

Custodial credit risk is the risk that, in the event of a failure of a depository financial institution, the System deposits may not be returned. Investment securities are exposed to custodial credit risk if the securities are uninsured, are not registered in the name of the System and are held by either the depository financial institution or the depository financial institution's trust department or agent but not in the System's name.

Although there is no System -wide policy for custodial credit risk associated with deposits, the System's investments are held by the System's custodian and registered in the System's name. All of the System's securities are held by the System's custodial bank in the System's name, except for investments in mutual and commingled funds, real estate properties, and limited partnerships, which by their nature, are not subject to custodial credit risk. Investments in the Short-Term Investment Funds (STIF) are held in an SEC-registered pooled fund that is managed by the master custodian bank. The fair value of the position in the pool equals the value of the pool shares.

(b) Credit Risk

Credit risk exists when there is a possibility the issuer or other counterparty to an investment may be unable to fulfill its obligations.

CITY OF CAMBRIDGE RETIREMENT SYSTEM

Notes to Financial Statements

December 31, 2017 and 2016

There are no System -wide policy limitations for credit risk exposures within the portfolio. The System's fixed income investments are managed in accordance with an investment contract that is specific as to permissible credit quality ranges and the average credit quality of the overall portfolio.

The System allows investment managers to apply discretion under the "Prudent Person" rule. Investments are made, as a prudent person would be expected to act with discretion and intelligence, to seek reasonable income, preserve capital and, in general, avoid speculative investments.

The System's fixed income investments as of December 31, 2017 and 2016, if rated, were rated by Standard and Poor's and/or an equivalent national rating organization. The ratings are presented below using the Standard and Poor's rating scale:

Investment type	Fair value	AAA	AA	A	BBB	BB	Less than BB	Not rated
System (as of December 31, 2017):								
Cash collateral pool	$ 58,043,809	58,043,809	—	—	—	—	—	—
U.S. Treasury notes and bonds and municipal securities	23,097,165	9,548,953	2,250,030	32,520	554,598	—	637,771	10,073,293
U.S. agencies	2,757,829	24,285	—					2,733,544
Domestic corporate	25,564,402	2,842,592	590,960	7,123,643	14,103,251	—	158,968	744,988
Asset-backed:								
CMOs	3,330,927	1,832,674	—	318,393	—	14,629	—	1,165,231
Other	3,711,370	1,863,714	—	1,296,761	—	351,395	199,500	—
Pooled fixed-income investments	206,856,007	—	—	—	—	—	—	206,856,007
Total	$ 323,361,509	74,156,027	2,840,990	8,771,317	14,657,849	366,024	996,239	221,573,063

Investment type	Fair value	AAA	AA	A	BBB	BB	Less than BB	Not rated
System (as of December 31, 2016):								
Cash collateral pool	$ 58,273,194	58,273,194	—	—	—	—	—	—
U.S. Treasury notes and bonds and municipal securities	17,459,039	12,658,460	1,431,124	72,009	182,246	—	—	3,115,200
U.S. agencies	2,952,884	—	—	—	—	—	—	2,952,884
Domestic corporate	22,890,164	706,731	577,550	8,476,796	12,881,439	—	155,438	92,210
Asset-backed:								
CMOs	5,759,585	4,024,639	—	431,175	398,229	—	—	905,542
Other	5,325,190	3,045,859	193,000	1,145,234	—	—	—	941,097
Pooled fixed-income investments	180,550,603	—	—	—	—	—	—	180,550,603
Total	$ 293,210,659	78,708,883	2,201,674	10,125,214	13,461,914	—	155,438	188,557,536

(c) Concentration of Credit Risk

Concentration of credit risk is the risk of loss that may be attributed to the magnitude of a government's investment in a single issuer. The System has no investments, at fair value, that exceed 5% of the System's total investments as of December 31, 2017 and 2016 other than pooled investments. The System adheres to the provisions of M.G.L. c. 32, sec 23(2) when managing concentration risk.

(d) Interest Rate Risk

Interest rate risk is the risk that changes in interest rates will adversely affect the fair value of an investment. This risk is managed within the portfolio using the effective duration methodology. It is widely used in the management of fixed income portfolios in that it quantifies to a much greater degree the risk of interest rate changes.

The following is a listing of the System's fixed income investments and related maturity schedule (in years) as of December 31, 2017 and 2016:

Investment type	Fair value	Less than 1	1–5	6–10	More than 10
System (as of December 31, 2017):					
Cash collateral pool	$ 58,043,809	58,043,809	—	—	—
U.S. Treasury notes and bonds and municipal securities	23,097,165	329,727	12,577,461	1,377,090	8,812,887
U.S. agencies	2,757,829	—	162,410	369,806	2,225,613
Domestic corporate	25,564,402	267,298	12,234,229	6,964,546	6,098,329
Asset-backed:					
CMOs	3,330,927	—	—	—	3,330,927
Other	3,711,370	—	2,421,276	821,497	468,597
Pooled fixed-income investments	206,856,007	206,856,007	—	—	—
Total	$ 323,361,509	265,496,841	27,395,376	9,532,939	20,936,353

Investment type	Fair value	Less than 1	1–5	6–10	More than 10
System (as of December 31, 2016):					
Cash collateral pool	$ 58,273,194	58,273,194	—	—	—
U.S. Treasury notes and bonds and municipal securities	17,459,039	—	9,070,260	831,519	7,557,260
U.S. agencies	2,952,884	—	249,021	75,336	2,628,527
Domestic corporate	22,890,164	197,570	9,495,216	8,123,146	5,074,232
Asset-backed:					
CMOs	5,759,585	—	—	—	5,759,585
Other	5,325,190	—	3,986,956	868,638	469,596
Pooled fixed-income investments	180,550,603	180,550,603	—	—	—
Total	$ 293,210,659	239,021,367	22,801,453	9,898,639	21,489,200

(e) Foreign Currency Risk

Foreign currency risk is the risk that changes in exchange rates will adversely affect the fair value of an investment or a deposit. The System's asset allocation model which serves as a proxy for a foreign currency policy, limits the amount of foreign currency exposure to 19% of the System's total investments. Similar to the investments in domestic equities, the System employs or encourages its investment advisor to employ diversification, asset allocation, and quality strategies. Currency hedging is permitted for defensive purposes. Currency hedging shall be effected through the use of forward currency contracts. At December 31, 2017 and 2016, there were no open forward currency contracts

Risk of loss arises from changes in currency exchange rates. The System's exposure to foreign currency risk is presented below at December 31, 2017 and 2016.

		2017	2016
Currency:			
International equity pooled funds (various currencies)	$	209,745,975	181,681,306
International fixed income pooled funds (various currencies)		65,539,176	47,287,175
	$	275,285,151	228,968,481

Although these investments are not denominated in a foreign currency, the underlying securities are denominated in various foreign currencies.

(f) Rates of Return

For the years ended December 31, 2017 and 2016, the annual money weighted rate of return on plan investments, net of plan investment expense was 16.49% and 8.40%. The money weighted rate of return expresses investment performance net of investment expenses adjusted for the changing amounts actually invested.

(g) Securities Lending

The Public Employment Retirement Administration Commission of Massachusetts (PERAC) has issued supplemental regulations that permit the System to engage in securities lending transactions. These transactions are conducted by the System's custodian, which lends certain securities owned by the System to other broker dealers and banks pursuant to a form of loan agreement. The System and the borrowers maintain the right to terminate all securities lending transactions on demand.

At the System's direction, the custodian lends the System's securities and receives cash (including both U.S. and foreign currency), U.S. government securities, sovereign debt of foreign countries, and irrevocable bank letters of credit as collateral. The custodian does not have the ability to pledge or sell non-cash collateral unless the borrower defaults. Borrowers are required to deliver cash collateral in amounts equal to not less than 100% of the market value of the loaned securities.

The System does not impose any restrictions on the amount of securities lent on its behalf by the custodian. There were no failures by any borrowers to return loaned securities or pay distributions thereon and there were no losses from a default of the borrowers or the custodian for the years ended December 31, 2017 and 2016. The cash collateral received by the custodian on each loan was invested, together with the cash collateral of other qualified tax exempt plan lenders, in a collective investment pool. The relationship between the average maturities of the investment pool and loans was affected by the maturities of the loans made by other plans that invested cash collateral in the collective investment pool, which the System could not determine. Borrower rebates and fees paid to the custodian for the year ended December 31, 2017 and 2016 were $501,027 and $63,826, respectively.

At December 31, 2017 and 2016, the fair value of securities loaned by the System amounted to $59,570,933 and $59,718,447, respectively against which was held cash collateral of $58,043,809 for 2017 and $58,273,194 for 2016.

For loans having collateral other than cash, the related collateral securities are not recorded as assets in the statement of fiduciary net position, and a corresponding liability is not recorded, since the System cannot pledge or sell the collateral securities except in the event of a borrower's default.

(h) Fair Value Hierarchy

GAAP establishes a fair value hierarchy for investments that prioritizes inputs used to measure fair value into three levels:

Level 1 – quoted prices (unadjusted) for identical assets or liabilities in active markets that are accessible at the measurement date;

Level 2 – observable inputs that are based on inputs not quoted in active markets, but corroborated by market data.

Level 3 – unobservable inputs that are used when little or no market data is available.

The fair value hierarchy gives the highest priority to Level 1 inputs and the lowest priority to Level 3 inputs. In determining fair value, the System utilizes valuation techniques that maximize the use of observable inputs and minimize the use of unobservable inputs to the extent possible.

Investments held through commingled funds for which fair value is estimated using net asset values (NAVs) as a practical expedient are not categorized in the fair value hierarchy.

The System uses an independent pricing source to determine the fair value of investments at quoted market prices.

The System has the following fair value measurements as of December 31, 2017 and 2016:

	Fair value	Level 1	Level 2
Investments by fair value level:			
Fixed income	$ 58,461,693	21,096,566	37,365,127
Equities	180,982,205	180,982,205	—
	239,443,898	202,078,771	37,365,127
Investments measured at NAV:			
Commingled equity funds:			
International	209,745,975	—	—
Domestic	379,253,400	—	—
Commingled fixed income funds:			
International	65,539,176	—	—
Domestic	141,316,831	—	—
Real estate	131,925,775	—	—
Alternative	33,849,650	—	—
	961,630,807	—	—
Other investments at fair value:			
PRIT hedge fund	104,259,703	—	—
PRIT private equity	23,069,389	—	—
	127,329,092	—	—
Total investments	$ 1,328,403,797	202,078,771	37,365,127

	Fair value	Level 1	Level 2
Investments by fair value level:			
Fixed income	$ 54,386,862	15,465,102	38,921,760
Equities	161,747,526	161,747,526	—
	216,134,388	177,212,628	38,921,760
Investments measured at NAV:			
Commingled equity funds:			
International	181,681,306	—	—
Domestic	308,445,524	—	—
Commingled fixed income funds:		—	—
International	47,287,175	—	—
Domestic	133,263,428	—	—
Real estate	123,919,766	—	—
Alternative	28,741,524	—	—
	823,338,723	—	—
Other investments at fair value:			
PRIT hedge fund	96,393,834	—	—
PRIT private equity	8,051,170	—	—
	104,445,004	—	—
Total investments	$ 1,143,918,115	177,212,628	38,921,760

The PRIT hedge and private equity funds are external investment pools that are not registered with the Securities and Exchange Commission, but are subject to oversight by the Pension Reserves Investment Management Board (the PRIM Board). The PRIM Board was created by legislation to provide general supervision of the investments and management of PRIT. The PRIT hedge and private equity funds are not rated funds. The fair value of the PRIT hedge and private equity funds are based on unit value as reported by management of the PRIT funds. The PRIT funds issue separately available audited financial statements with a year-end of June 30. The System is required to provide a 24 hour redemption notice for the PRIT Hedge fund. The PRIT Private Equity fund is not redeemable until notified by the PRIM Board.

The following represents the significant investment strategies and terms on which the Plan may redeem investments for those investments measured at the NAV (or its equivalent) as a practical expedient:

	Investments measured at NAV			
	2017	2016	Redemption frequency	Redemption notice period
Commingled equity funds	$ 588,999,375	490,126,830	Daily	1–30 days
Commingled fixed income funds	206,856,007	180,550,603	Daily	1–30 days
Real estate	131,925,775	123,919,766	Quarterly	1–30 days
Alternative	33,849,650	28,741,524	Quarterly	1–30 days

1 Commingled equity funds: This type includes 9 funds that invest primarily in U.S. large and small cap equity funds and international equity funds.
2 Commingled fixed income funds: This type includes 3 fixed income funds that invest in U.S. corporate bonds, U.S. government bonds, U.S. asset-backed securities and foreign bonds.
3 Real estate funds: This type includes 8 funds that invest primarily in real estate funds and global infrastructure.
4 Alternative funds: This type includes 10 funds that invest primarily in private equity and venture capital funds.

(5) Operating Expenses

The System's administrative expenses as shown on the Statements of Changes in Fiduciary Net Position are borne by the System and financed with investment income. These expenses include personnel and professional services, member communication and education, and other miscellaneous administrative expenses.

(6) Legally Required Reserve Accounts

The balances in the System's legally required reserves at December 31, 2017 and 2016 are as follows:

	2017	2016	Purpose
Annuity savings fund	$ 254,904,453	248,712,833	Active members' contribution balance
Annuity reserve fund	76,897,958	75,244,429	Retired members' contribution account
Pension reserve fund	989,458,673	823,296,746	Amounts appropriated to fund future retirement benefits
Pension fund	14,310,356	14,861,629	Remaining net assets
Military service fund	4,611	4,606	Amounts appropriated to fund military service time
	$ 1,335,576,051	1,162,120,243	

All reserve accounts are funded at levels required by State statute.

(7) Net Pension Liability

The components of the net pension liability of the System as of December 31, 2017 and 2016, are as follows:

	2017	2016
Total pension liability	$ 1,517,290,859	1,398,842,606
Fiduciary net position	1,335,576,051	1,162,120,243
Plan's net pension liability	$ 181,714,808	236,722,363
Fiduciary net position as a percentage of the total pension liability	88.02 %	83.08 %

(a) Actuarial Assumptions

The total pension liability at December 31, 2017 and 2016 was determined by an actuarial valuation as of December 31, 2015 and update procedures were used to roll forward the total pension liability from the valuation date to the measurement date. The following actuarial assumptions were applied to the measurement of the total pension liability at December 31, 2017 and 2016:

	2017	2016
Inflation	3.5 %	3.5 %
Salary increases	4.5 %	4.5 %
Investment rate of return	7.50%	7.75%
Cost of living adjustments	3% of first $16,000	3% of first $14,000
Pre retirement mortality	RP-2014 Blue Collar Employee Mortality Table set forward one year for females projected generationally with Scale MP-2017	RP-2000 Employee Mortality Table projected generationally from 2009 with Scale BB2D
Healthy Retiree mortality	RP-2014 Blue Collar Healthy Annuitant Morality Table set forward one year for females projected generationally with Scale MP-2017	RP-2000 Healthy Annuitant Mortality Table projected generationally from 2009 with Scale BB2D
Disabled Retiree mortality	RP-2014 Blue Collar Healthy Annuitant Morality Table set forward one year and projected generationally with Scale MP-2017	RP-2000 Healthy Annuitant Mortality Table projected generationally from 2015 with Scale BB2D

- Long-term Expected Rate of Return:
  - The long-term expected rate of return on plan investments was determined using a building-block method in which best-estimate ranges of expected future real rates of return (expected returns, net of pension plan investment expense and inflation) are developed for each major asset class. These ranges are combined to produce the long-term expected rate of return by weighting the expected future real rates of return by the target asset allocation

percentage and by adding expected inflation. The best estimates of arithmetic long-term expected real rates of return for each major asset class are summarized in the following table:

Asset class	2017 Long-term expected real rate of return	2016 Long-term expected real rate of return
Cash	1.06 %	1.06 %
Domestic equity	6.15	6.44
International developed markets equity	7.11	7.40
International emerging markets equity	9.41	9.42
Core fixed income	1.68	2.02
High yield fixed income	4.13	4.43
Real estate	4.90	5.00
Commodities	4.71	4.43
Hedge fund, GTAA, Risk parity	3.94	3.75
Private equity	10.28	10.47

(b) Discount Rate

The discount rates used to measure the total pension liability were 7.50% and 7.75% as of December 31, 2017 and 2016, respectively. The projection of cash flows used to determine the discount rate assumed that plan member contributions will be made at the current contribution rate and that employer contributions will be made at rates equal to the difference between actuarially determined contribution rates and the member rate. Based on those assumptions, the System's fiduciary net position was projected to be available to make all projected future benefit payments of current plan members. Therefore, the long-term expected rate of return on the plan investments was applied to all periods of projected benefit payments to determine the total pension liability.

(c) Sensitivity of the Net Pension Liability to Changes in the Discount Rate

The following presents the net pension liability of the Plan as of December 31, 2017 and 2016, calculated using the discount rates of 7.50% and 7.75% respectively, as well as what the net pension liability would be if it were calculated using a discount rate that is one-percentage point lower or one-percentage point higher than the current rate:

		2017		
		1% decrease (6.50%)	**Current discount rate (7.50%)**	**1% increase (8.50%)**
System's net pension liability	$	354,551,044	181,714,808	36,543,502

		2016		
		1% decrease (6.75%)	**Current discount rate (7.75%)**	**1% increase (8.75%)**
System's net pension liability	$	394,661,909	236,722,363	103,742,993

CITY OF CAMBRIDGE RETIREMENT SYSTEM

Required Supplementary Information

Schedule of Changes in the Net Pension Liability and Related Ratios

(Unaudited)

	2017	2016	2015	2014
Total pension liability:				
Service cost	$ 31,903,330	32,844,244	30,908,861	29,791,673
Interest	107,835,410	105,325,306	98,925,146	94,315,895
Changes of benefit terms	13,786,855	—	—	—
Differences between expected and actual experience	—	(29,237,110)	—	—
Changes of assumptions	43,565,250	—	42,033,481	—
Benefit payments, including refunds of member contributions	(78,642,592)	(72,563,588)	(69,354,414)	(64,034,766)
Net change in total pension liability	118,448,253	36,368,852	102,513,074	60,072,802
Total pension liability – beginning	1,398,842,606	1,362,473,754	1,259,960,680	1,199,887,878
Total pension liability – ending (a)	1,517,290,859	1,398,842,606	1,362,473,754	1,259,960,680
Plan fiduciary net position:				
Contributions – employers and nonemployer	40,831,840	40,047,891	37,851,149	35,775,814
Contributions – member	22,146,929	20,949,712	21,167,434	20,572,796
Net investment income	190,247,348	90,299,489	(6,716,067)	64,639,098
Benefit payments, including refunds of member contributions	(78,642,592)	(72,563,588)	(69,354,414)	(64,034,766)
Administrative expenses	(1,127,717)	(1,112,054)	(1,076,459)	(1,031,915)
Net change in plan fiduciary net position	173,455,808	77,621,450	(18,128,357)	55,921,027
Plan fiduciary net position – beginning	1,162,120,243	1,084,498,793	1,102,627,150	1,046,706,123
Plan fiduciary net position – ending (b)	1,335,576,051	1,162,120,243	1,084,498,793	1,102,627,150
Net pension liability – ending (a) – (b)	$ 181,714,808	236,722,363	277,974,961	157,333,530
Fiduciary net position as a percentage of the total pension liability	88.0%	83.1%	80.0%	87.5%
Covered payroll	$ 228,696,936	220,963,223	226,826,076	218,627,543
Plan net pension liability as a percentage of covered payroll	79.46%	107.13%	122.5%	72.0%

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

See accompanying independent auditors' report.

CITY OF CAMBRIDGE RETIREMENT SYSTEM

Required Supplementary Information

Schedule of Investment Returns

(Unaudited)

	2017	2016	2015	2014
Annual money-weighted rate of return, net of investment expense	16.49%	8.40 %	(0.60)%	6.20 %

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

See accompanying independent auditors' report.

CITY OF CAMBRIDGE RETIREMENT SYSTEM

Required Supplementary Information

Schedule of Contributions

(Unaudited)

	2017	2016	2015	2014	2013	2012	2011	2010	2009	2008
Actuarially determined contribution	$ 40,531,840	39,747,891	37,551,149	35,475,814	35,475,814	31,662,897	29,912,987	28,353,542	27,727,711	26,891,503
Contributions in relation to the actuarially determined contribution	40,831,840	40,047,891	37,851,149	35,775,814	35,775,814	31,967,897	32,212,987	28,553,542	27,727,711	26,891,503
Contribution deficiency (excess)	$ (300,000)	(300,000)	(300,000)	(300,000)	(300,000)	(305,000)	(2,300,000)	(200,000)	—	—
Covered payroll	$ 228,696,936	220,963,223	226,826,076	218,627,543	217,086,299	217,086,299	232,842,117	232,842,117	222,162,255	231,770,736
Contributions as a percentage of covered payroll	17.85%	18.12 %	16.69 %	16.36 %	16.34 %	14.59 %	12.85 %	12.18 %	12.48 %	11.60 %

See accompanying independent auditors' report.

CITY OF CAMBRIDGE RETIREMENT SYSTEM

Required Supplementary Information (Unaudited)

Notes to Schedule of Contributions – Last 10 Years

(Unaudited)

Methods and assumptions used to determine contribution rates:

Valuation date:

Actuarially determined contribution rates for fiscal 2017 and 2018 are determined with the January 1, 2018 actuarial valuation

The following assumptions were used for the periods included in the funding for 2017 and 2016:

Actuarial cost method:	Entry age normal
Amortization method:	Prior year's contributions increased 1.97% plus an additional contribution of $300,000
Asset valuation method:	5-year smoothed market
Inflation:	3.50%
Salary increases:	4.50%
Investment rate of return:	7.50%, net of plan investment expense for 2017 and 7.75%, net of plan investment expense for 2016
Retirement benefits:	Depending on age at retirement and "Group" classification 0.1%–2.5% per year of service times highest three year average salary. A five year average salary is used for those hired after April 1, 2012
Post-retirement cost of living increases:	The cost-of-living base was increased from $14,000 to $16,000 as of July 1, 2018. Annual cost of living increases are assumed to be 3.0% of the lesser of the base or annual benefits.
Mortality:	Pre-Retirement: RP-2014 Blue Collar Employee Mortality Table set forward 1 year for female participants projected generationally using Scale MP-2017 (previously, RP-2000 Employee Mortality Table projected generationally using Scale BB2D from 2009) Healthy Retiree: RP-2014 Blue Collar Healthy Annuitant Mortality Table set forward 1 year for female participants projected generationally using Scale MP-2017 (previously, RP-2000 Healthy Annuitant Mortality Table projected generationally using Scale BB2D from 2009) Disabled Retiree: RP-2014 Blue Collar Healthy Annuitant Mortality Table set forward 1 year projected generationally using Scale MP-2017 (previously, RP-2000 Healthy Annuitant Mortality Table projected generationally using Scale BB2D from 2015)
Changes of Assumptions:	Actuarial assumptions are revised periodically to more closely reflect actual, as well as anticipate future experience. When actuarial assumptions have changed in prior years, the Retirement Board formally adopted the change at a monthly meeting.

See accompanying independent auditors' report.

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