

Firemen's Annuity and Benefit Fund of Chicago

GASB Statements Nos. 67 and 68
Accounting and Financial Reporting for
Pensions
December 31, 2017



May 24, 2018

The Retirement Board of the
Firemen's Annuity and Benefit Fund of Chicago
20 South Clark Street, Suite 1400
Chicago, Illinois 60654

Dear Members of the Board:

This report provides accounting and financial reporting information as of December 31, 2017, that is intended to comply with the Governmental Accounting Standards Board ("GASB") Statement Nos. 67 and 68 for the Firemen's Annuity and Benefit Fund of Chicago ("FABF" or "Fund"). These calculations have been made on a basis that is consistent with our understanding of these Statements.

GASB Statement No. 67 is the accounting standard that applies to the stand-alone financial reports issued by retirement systems. GASB Statement No. 68 establishes accounting and financial reporting for state and local government employers who provide their employees (including former employees) pension benefits through a trust.

Our calculation of the liability associated with the FABF benefits (described in Section E) was performed for the purpose of providing reporting and disclosure information that satisfies the requirements of GASB Statement Nos. 67 and 68. The Net Pension Liability is not an appropriate measure for measuring the sufficiency of plan assets to cover the estimated cost of settling the employer's benefit obligation. The Net Pension Liability is also not an appropriate measure for assessing the need for or amount of future employer contributions. A calculation of the plan's liability for purposes other than satisfying the requirements of GASB Statement Nos. 67 and 68 may produce significantly different results. This report may be provided to parties other than FABF only in its entirety and only with the permission of FABF.

This report is based upon information, furnished to us by FABF, concerning retirement and ancillary benefits, active members, deferred vested members, retirees and beneficiaries, and financial data. If the understanding of this information is different, please let us know. This information was checked for internal consistency, but it was not audited.

This report complements the funding actuarial valuation report that was provided to FABF and should be considered in conjunction with that report. Please see the funding actuarial valuation report as of December 31, 2017, for additional discussion of the nature of actuarial calculations and more information related to participant data, economic and demographic assumptions, and benefit provisions.

The actuarial valuation as of December 31, 2017, reflects updated demographic assumptions based on the 2017 Actuarial Experience Study for the period January 1, 2012 to December 31, 2016. The Board is currently reviewing updates to the economic assumptions which are expected to apply to the next actuarial valuation as of December 31, 2018.

The funding objective is to provide employer and employee contributions sufficient to provide the benefits of the Fund when due. Pursuant to Public Act ("P.A.") 99-0506, effective May 30, 2016, the funding policy was amended and requires City contributions to be equal to \$199 million in payment year 2016, \$208 million in payment year 2017, \$227 million in payment year 2018, \$235 million in payment year 2019, and \$245 million in payment year 2020. For payment years after 2020, the City is required to make level percent of pay contributions for plan years 2020 through 2055 that along with member contributions and investment earnings are expected to generate a projected funded ratio of 90 percent by plan year end 2055. The projections are based on an open group, level percent of pay financing and the Entry Age Normal cost method.

This is a severely underfunded plan. The funded ratio is only 20.2 percent (using market value of assets) and the unfunded liability is approximately \$4.5 billion as of December 31, 2017. The funded ratio is not projected to even reach 50 percent funded for another 26 years until 2043.

The funding policy defined in P.A. 99-0506 provides for fixed dollar City contributions for payment years 2016 to 2020, and level percent of pay contributions for years 2021 to 2055 that, along with member contributions and investment income, are projected to produce a funded ratio of 90 percent by 2055. This funding policy significantly defers contributions when compared to the provisions of the prior funding policy defined in P.A. 96-1495. The amount of annual contributions defined under P.A. 99-0506 does not even cover normal cost plus interest on the unfunded liability for the next 12 years. This means the unfunded liability is actually projected to increase to a high of \$5.1 billion in 2029, when contributions are finally sufficient to start reducing the unfunded liability.

We understand P.A. 99-0506 defines the amount of City contributions to FABF. Nevertheless, we continue to recommend that the plan sponsor seriously consider making additional contributions (in excess of the statutory requirement) to ensure that there are sufficient assets available in the fund in all years to pay the promised benefits.

We also recommend that the Board perform projections which include pessimistic scenarios such as investment return lower than assumed, lower contributions received than expected, higher benefit payments than expected, etc., to more fully understand the impact of less than optimal future expectations.

This actuarial valuation assumes that the City will be able to make future contributions on a timely basis. We did not perform an analysis of the ability of the City to make future contributions. Such an analysis is not within the scope of our assignment or within our analytical skill set. Failure to receive City contributions on a timely basis could jeopardize the sustainability of the Fund.



The actuarial valuation results set forth in this report are based on the data and actuarial techniques described above, and upon the provisions of the Fund as of the actuarial valuation date. To the best of our knowledge, the information contained in this report is complete and accurate based on the statutes in effect as of December 31, 2017, and fairly presents the actuarial position of the Fund as of December 31, 2017, for purposes of complying with the financial reporting requirements under GASB Statement Nos. 67 and 68. All calculations have been made in conformity with generally accepted actuarial principles and practices as well as with the Actuarial Standards of Practice issued by the Actuarial Standards Board.

The actuarial assumptions used in this actuarial valuation are reasonable and appropriate for purposes of measuring the GASB Statement Nos. 67 and 68 pension liabilities as of December 31, 2017, under the current provisions.

This report should not be relied on for any purpose other than the purpose stated.

The signing actuaries are independent of the plan sponsor.

Alex Rivera and **Lance J. Weiss** are Members of the American Academy of Actuaries (MAAA) and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

Respectfully submitted,

By *Alex Rivera*
Alex Rivera, F.S.A., E.A., M.A.A.A., F.C.A.
Senior Consultant

By *Lance J. Weiss*
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Senior Consultant



Auditor's Note – This information is intended to assist in preparation of the financial statements of the Firemen's Annuity and Benefit Fund of Chicago. Financial statements are the responsibility of management, subject to the auditor's review. Please let us know if the auditor recommends any changes.



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SECTION A

EXECUTIVE SUMMARY

Executive Summary as of December 31, 2017

	2017
Actuarial Valuation Date	December 31, 2017
Measurement Date of the Net Pension Liability	December 31, 2017
Employer's Fiscal Year Ending Date (Reporting Date)	December 31, 2017

Membership

Number of	
- Retirees and Beneficiaries	4,878
- Inactive, Nonretired Members	77
- Active Members	4,613
- Total	9,568
Covered Payroll	\$ 469,407,281

Net Pension Liability

Total Pension Liability	\$ 5,746,150,005
Plan Fiduciary Net Position	1,126,153,314
Net Pension Liability	\$ 4,619,996,691
Plan Fiduciary Net Position as a Percentage	
of Total Pension Liability	19.60%
Net Pension Liability as a Percentage	
of Covered Payroll	984.22%

Development of the Single Discount Rate

Single Discount Rate Beginning of Year	7.30%
Single Discount Rate End of Year	7.23%
Long-Term Expected Rate of Investment Return Beginning of Year	7.50%
Long-Term Expected Rate of Investment Return End of Year	7.50%
Long-Term Municipal Bond Rate Beginning of Year*	3.78%
Long-Term Municipal Bond Rate End of Year*	3.31%
Last Year Trust Assets are Available to Pay Benefits	2070

Total Pension Expense \$ 440,354,305

Deferred Outflows and Deferred (Inflows) of Resources by Source to be Recognized in Future Pension Expenses

	Deferred Outflows of Resources	Deferred (Inflows) of Resources
Difference Between Expected and Actual Non-Investment Experience	\$ 38,350,683	\$ 3,983,494
Changes in Assumptions	433,139,253	49,018,666
Net Difference Between Projected and Actual Earnings		
on Pension Plan Investments	38,717,007	52,299,837
Total	\$ 510,206,943	\$ 105,301,997

*Source: *The rate at the beginning of the year is based on the rate as of December 29, 2016, from the "20-Bond GO Index" which is the Bond Buyer Index, general obligation, 20 years to maturity, mixed quality. In describing this index, the Bond Buyer notes that the bonds' average credit quality is roughly equivalent to Moody's Investors Service's Aa2 rating and Standard & Poor's Corps' AA.*

The rate at the end of the year is the rate for fixed-income municipal bonds with 20 years to maturity that include only federally tax-exempt municipal bonds as reported in Fidelity Index's "20-Year Municipal GO AA Index" as of December 29, 2017. In describing this index, Fidelity notes that the municipal curves are constructed using option-adjusted analytics of a diverse population of over 10,000 tax exempt securities.

Discussion

Accounting Standard

For pension plans that are administered through trusts or equivalent arrangements, Governmental Accounting Standards Board (“GASB”) Statement No. 67 establishes standards of financial reporting for separately issued financial reports and specifies the required approach for measuring the pension liability. Similarly, GASB Statement No. 68 establishes standards for state and local government employers (as well as non-employer contributing entities) to account for and disclose the net pension liability, pension expense and other information associated with providing retirement benefits to their employees (and former employees) on their basic financial statements.

The following discussion provides a summary of the information that is required to be disclosed under these accounting standards. A number of these disclosure items are provided in this report. However, certain non-actuarial information, such as notes regarding accounting policies and investments, are not included in this report and the retirement system and/or plan sponsor will be responsible for preparing and disclosing that information to comply with these accounting standards.

Financial Statements

GASB Statement No. 68 requires state or local governments to recognize the net pension liability and the pension expense on their financial statements. The net pension liability is the difference between the total pension liability and the plan’s fiduciary net position. In traditional actuarial terms, this is analogous to the accrued liability less the market value of assets (not the smoothed actuarial value of assets that is often encountered in actuarial valuations performed to determine the employer’s contribution requirement).

Paragraph 57 of GASB Statement No. 68 states, “Contributions to the pension plan from the employer subsequent to the measurement date of the collective net pension liability and before the end of the employer’s reporting period should be reported as a deferred outflow of resources related to pensions.” The information contained in this report does not incorporate any contributions made to FABF subsequent to the measurement date of December 31, 2017.

The pension expense recognized each fiscal year is equal to the change in the net pension liability from the beginning of the year to the end of the year, adjusted for deferred recognition of the liability and investment experience.

Pension plans that prepare their own, stand-alone financial statements are required to present two financial statements – a statement of fiduciary net position and a statement of changes in fiduciary net position in accordance with GASB Statement No. 67. The statement of fiduciary net position presents the assets and liabilities of the pension plan at the end of the pension plan’s reporting period. The statement of changes in fiduciary net position presents the additions, such as contributions and investment income, and deductions, such as benefit payments and expenses, and net increase or decrease in the fiduciary net position.

Discussion

Notes to Financial Statements

GASB Statement No. 68 requires the notes of the employer's financial statements to disclose the total pension expense, the pension plan's liabilities and assets and deferred outflows and inflows of resources related to pensions.

GASB Statement Nos. 67 and 68 require the notes of the financial statements for the employers and pension plans to include certain additional information. The list of disclosure items should include:

- A description of benefits provided by the plan;
- The type of employees and number of members covered by the pension plan;
- A description of the plan's funding policy, which includes member and employer contribution requirements;
- The pension plan's investment policies;
- The pension plan's fiduciary net position, net pension liability and the pension plan's fiduciary net position as a percentage of the total pension liability;
- The net pension liability using a discount rate that is 1 percent higher and 1 percent lower than used to calculate the total pension liability and net pension liability for financial reporting purposes;
- Significant assumptions and methods used to calculate the total pension liability;
- Inputs to the discount rates; and
- Certain information about mortality assumptions and the dates of experience studies.

Retirement systems that issue stand-alone financial statements are required to disclose additional information in accordance with GASB Statement No. 67. This information includes:

- The composition of the pension plan's board and the authority under which benefit terms may be amended;
- A description of how fair value is determined;
- Information regarding certain reserves and investments, which include concentrations of investments greater than or equal to 5 percent, receivables and insurance contracts excluded from plan assets; and
- Annual money-weighted rate of return.

Required Supplementary Information

GASB Statement No. 67 requires a 10-year fiscal history of:

- Sources of changes in the net pension liability;
- Information about the components of the net pension liability and related ratios, including the pension plan's fiduciary net position as a percentage of the total pension liability and the net pension liability as a percent of covered-employee payroll; and
- A comparison of the actual employer contributions to the actuarially determined contributions based on the plan's funding policy.

Discussion

Timing of the Actuarial Valuation

An actuarial valuation to determine the total pension liability is required to be performed at least every two years. The net pension liability and pension expense should be measured as of the pension plan's fiscal year end (measurement date) on a date that is within the employer's prior fiscal year. If the actuarial valuation used to determine the total pension liability is not calculated as of the measurement date, the total pension liability is required to be rolled forward from the actuarial valuation date to the measurement date.

The total pension liability shown in this report is based on an actuarial valuation performed as of December 31, 2017, and a measurement date of December 31, 2017.

Single Discount Rate

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

For the purpose of this valuation, the expected rate of return on pension plan investments is 7.50 percent; the municipal bond rate is 3.31 percent (based on the most recent date available on or before the measurement date from the "state & local bonds" rate from Federal Reserve statistical release(H.15)); and the resulting Single Discount Rate is 7.23 percent.

Effective Date and Transition

GASB Statement Nos. 67 and 68 are effective for fiscal years beginning after June 15, 2013, and June 15, 2014, respectively; earlier application is encouraged by the GASB.

Recent Legislation

The following Public Acts were passed in 2017 by the 100th General Assembly that made changes to the Fund Provisions.

Public Act 100-0334 effective August 25, 2017

Provides for the forfeiture of benefits for any person who otherwise would receive a survivor benefit who is convicted of any felony relating to or arising out of or in connection with the service of the member from whom the benefit results.

Discussion

Public Act 100-0539 effective November 7, 2017

For firemen born after December 31, 1954, but before January 1, 1966, changed the initial increase granted and provides for a 3 percent increase if a 1.5 percent increase was previously granted.

Public Act 100-0544 effective November 8, 2017

At any time during the six months following the effective date of the Public Act, an active member may apply for transfer of up to ten years of his or her creditable service accumulated in an Article 4 (downstate) pension fund.

The preceding plan changes are not expected to significantly change the results of the actuarial valuation as of December 31, 2017.

Change in Assumptions

The actuarial assumptions have been changed since the last report to reflect the results of the experience study performed for the period January 1, 2012 through December 31, 2016. The Board adopted new demographic actuarial assumptions at their March 21, 2018, meeting and elected to maintain the economic assumptions previously used for the December 31, 2016, actuarial valuation. We understand the Board intends to continue their discussion related to the recommended economic assumptions for use in future valuations.

Following is a summary of the actuarial assumptions adopted by the Board as a result of the most recent experience study:

Economic Assumptions

- **Price inflation:** Maintain the rate of price inflation of 2.50 percent.
- **Retiree Cost-of-Living Adjustment and Increases in the Pay Cap for Pensionable Pay for Participants Hired on and After January 1, 2011:** Maintain the assumed rate of COLA and increases in capped pay for participants hired on or after January 1, 2011, of 1.25 percent ($\frac{1}{2}$ of 2.50 percent).
- **Investment return:** Maintain the nominal investment return assumption of 7.50 percent.
- **General wage inflation and payroll growth assumption:** Maintain the general wage inflation assumption of 1.25 percent above inflation, or 3.75 percent. This assumption serves as the across-the-board portion of salary increases and the rate at which the pay at hire is assumed to increase in future years for projection purposes.
- **Salary increase:** Maintain the current salary increase rates.

Discussion

Mortality Assumptions

- Update post-retirement mortality tables to the most recently published national “blue collar” tables, the RP-2014 Blue Collar Healthy Annuitant Mortality tables. We also assume mortality rates will improve in the future using a fully generational approach, but with the most recently published projection scale, MP-2017. These new mortality tables are a move from a single-dimensional age-based table to a two-dimensional table, where the year a person was born also influences their mortality rate.
- Update pre-retirement mortality tables for active employees to the most recently published national “blue collar” tables, the RP-2014 Blue Collar Employee mortality tables. We also assume mortality rates will improve in the future using a fully generational approach, but with the most recently published projection scale, MP-2017.
- Apply certain scaling factors to the base mortality tables; i.e., RP-2014 Blue Collar Tables, to partially reflect observed mortality experience to the extent it is credible.

Other Demographic Assumptions

- **Retirement rates:** Decrease rates slightly in earlier ages of eligibility for retirement and increase rates for other ages.
- **Turnover rates:** Increase the rate of termination during a member’s second year of service and decrease rates for service beyond 10 years.
- **Disability rates:** Adjust the allocation between occupational disease disability, ordinary disability and duty disability and lower age-based rates across all ages.

Actuarial Methods and Policies

- **Cost method:** Continue to use the Entry Age Normal cost method, which is required by State Statute.
- **Amortization method:** The State Statute requires fixed City contributions for payment years 2016 through 2020 and level percentage of pay contributions thereafter, such that the funded ratio reaches 90 percent by the end of 2055. There is no separate amortization of the unfunded accrued liability that leads to a 100 percent funding of the accrued liability. This funding method may not comply with generally accepted actuarial principles for the funding of a retirement fund because the funding method targets 90 percent instead of 100 percent.
- **Asset smoothing method:** The asset smoothing method is also defined by State Statute. Gains and losses, the difference between the actual investment return and expected investment return, are smoothed in over a five-year period at a rate of 20 percent per year.

Discussion

- **Administrative expenses:** Administrative expenses are provided by FABF's staff. Future administrative expenses, for projection purposes, are assumed to increase at the assumed rate of inflation.
- **Dependent assumptions:** Decrease the current marriage assumption from 85 percent to 75 percent based on the demographics of the valuation census data over the experience study period. Decrease the age differential between males and females from four years to three years. The male spouse is assumed to be three years older than the female spouse. No dependent assumptions are made for current retirees as actual eligible spouse data is provided.
- **Decrement timing:** Change the decrement timing from beginning of year to middle of year.
- **Pay Increase timing:** Change the pay increase timing from middle of year to beginning of year.

SECTION B

FINANCIAL STATEMENTS

Auditor's Note: This information is intended to assist in preparation of the financial statements of the Firemen's Annuity and Benefit Fund of Chicago. Financial statements are the responsibility of management, subject to the auditor's review. Please let us know if the auditor recommends any changes.

Pension Expense under GASB Statement No. 68

Fiscal Year Ended December 31, 2017

A. Expense

1. Service Cost Including Pension Plan Administrative Expense	\$	93,366,729
2. Interest on the Total Pension Liability		371,622,080
3. Current-Period Benefit Changes		-
4. Employee Contributions (made negative for addition here)		(47,364,276)
5. Projected Earnings on Plan Investments (made negative for addition here)		(75,195,060)
6. Other Changes in Plan Fiduciary Net Position		(22,879)
7. Recognition of Outflow/(Inflow) of Resources due to Liabilities		7,271,744
8. Recognition of Outflow/(Inflow) of Resources due to Assumption Changes		85,822,333
9. Recognition of Outflow/(Inflow) of Resources due to Assets		4,853,634
10. Total Pension Expense	\$	440,354,305

B. Reconciliation of Net Pension Liability

1. Net Pension Liability Beginning of Year	\$	4,130,244,404
2. Pension Expense		440,354,305
3. Employer Contributions (made negative for addition here)		(228,452,611)
4. Change in Liability Experience Outflows/(Inflows) Recognized in Current Liabilities		19,682,594
5. Change in Assumption Changes Experience Outflows/(Inflows) Recognized in Current Liabilities		328,396,429
6. Change in Investment Experience Outflows/(Inflows) Recognized in Current Assets		(70,228,430)
7. Net Pension Liability End of Year	\$	4,619,996,691

Statement of Outflows and Inflows Arising from Current and Prior Reporting Periods

Fiscal Year Ended December 31, 2017

A. Outflows and (Inflows) of Resources Recognized in Current and Future Pension Expenses as of Plan Year End December 31, 2017

Experience (Gain)/Loss	Original Balance	Date Established	Original Recognition Period/ Amortization Factor	Amount Recognized in Past Pension Expenses	Amount Recognized in Current Pension Expense	Deferred (Inflows)	Deferred Outflows
						to be Recognized in Future Pension Expenses	to be Recognized in Future Pension Expenses
1. Differences Between Expected and Actual Non-Investment Experience	\$ 26,954,338	December 31, 2017	5.9972	\$ -	\$ 4,494,487	\$ -	\$ 22,459,851
	24,110,158	December 31, 2016	5.8667	4,109,663	4,109,663	-	15,890,832
	(7,980,712)	December 31, 2015	5.9897	(2,664,812)	(1,332,406)	(3,983,494)	-
	<u>\$ 43,083,784</u>		5.9320	<u>\$ 1,444,851</u>	<u>\$ 7,271,744</u>	<u>\$ (3,983,494)</u>	<u>\$ 38,350,683</u>
2. Assumption Changes	\$ 414,218,762	December 31, 2017	5.9972	\$ -	\$ 69,068,692	\$ -	\$ 345,150,070
	(74,372,930)	December 31, 2016	5.8667	(12,677,132)	(12,677,132)	(49,018,666)	-
	176,281,502	December 31, 2015	5.9897	58,861,546	29,430,773	-	87,989,183
	<u>\$ 516,127,334</u>		5.9320	<u>\$ 46,184,414</u>	<u>\$ 85,822,333</u>	<u>\$ (49,018,666)</u>	<u>\$ 433,139,253</u>
3. Difference Between Expected and Actual Investment Earnings	\$ (65,374,796)	December 31, 2017	5.0000	\$ -	\$ (13,074,959)	\$ (52,299,837)	\$ -
	14,299,119	December 31, 2016	5.0000	2,859,824	2,859,824	-	8,579,471
	<u>75,343,843</u>	December 31, 2015	<u>5.0000</u>	<u>30,137,538</u>	<u>15,068,769</u>	<u>-</u>	<u>30,137,536</u>
	<u>\$ 24,268,166</u>		5.0000	<u>\$ 32,997,362</u>	<u>\$ 4,853,634</u>	<u>\$ (52,299,837)</u>	<u>\$ 38,717,007</u>
4. Total	\$ 583,479,284			\$ 80,626,627	\$ 97,947,711	\$ (105,301,997)	\$ 510,206,943

B. Deferred Outflows and Deferred (Inflows) of Resources by Year to be Recognized in Future Pension Expenses

Year Ending December 31	Differences Between Expected and Actual Non-Investment Experience	Assumption Changes	Differences Between Expected and Actual Investment Experience	Year Ending December 31	Deferred Outflows of Resources	Deferred (Inflows) of Resources	Net Deferred Outflows/ (Inflows) of Resources
2018	\$ 7,271,744	\$ 85,822,333	\$ 4,853,634	2018	\$ 125,032,208	\$ (27,084,497)	\$ 97,947,711
2019	7,271,744	85,822,333	4,853,632	2019	125,032,206	(27,084,497)	97,947,709
2020	7,285,468	85,519,197	(10,215,136)	2020	109,660,302	(27,070,773)	82,589,529
2021	8,056,330	58,081,422	(13,074,960)	2021	77,125,022	(24,062,230)	53,062,792
2022	4,481,903	68,875,302	-	2022	73,357,205	-	73,357,205
Thereafter	-	-	-	Thereafter	-	-	-
Total	\$ 34,367,189	\$ 384,120,587	\$ (13,582,830)	Total	\$ 510,206,943	\$ (105,301,997)	\$ 404,904,946

Statement of Fiduciary Net Position

Years Ended December 31, 2017, and 2016

	2017	2016
Assets		
Receivables		
Employer contributions - net	\$ 222,194,272	\$ 200,385,829
Investment income	2,559,800	2,404,085
Other receivables	3,090,610	2,940,740
Securities lending	88,334	88,214
Unsettled trades	4,790,998	2,874,296
Total receivables	232,724,014	208,693,164
Prepaid expenses	165,861	213,718
Investments - at fair value		
Cash deposits and short-term investments	46,195,477	66,904,580
Corporate bonds	121,812,826	112,584,442
Equities	617,148,695	520,286,225
Pooled funds	31,170,538	28,675,801
Private equity and venture capital	16,485,995	21,896,500
U.S. and Foreign Governmental obligations	68,387,838	64,043,527
Subtotal	901,201,369	814,391,075
Collateral held for securities on loan	111,709,566	123,059,048
Total investments - fair value	1,012,910,935	937,450,123
Total assets	1,245,800,810	1,146,357,005
Liabilities and net position		
Liabilities		
Accounts payable and accrued expenses	1,342,608	1,067,983
Participant accounts	519,101	574,919
Securities lending collateral	111,709,566	123,059,048
Securities lending	22,063	22,023
Unsettled trades	6,054,158	2,619,239
Total liabilities	119,647,496	127,343,212
Net Position - Restricted for Pension Benefits	\$ 1,126,153,314	\$ 1,019,013,793

Statement of Changes in Fiduciary Net Position Years Ended December 31, 2017, and 2016

	<u>2017</u>	<u>2016</u>
Additions		
Contributions		
Employer ¹	\$ 228,452,611	\$ 154,101,396
Plan Member	47,364,276	48,959,929
Total Contributions	<u>275,816,887</u>	<u>203,061,325</u>
Investment Income		
Net appreciation in fair value of investments	125,047,682	40,957,812
Interest	8,864,708	8,071,511
Dividends	11,491,614	10,686,533
	<u>145,404,004</u>	<u>59,715,856</u>
Less investment expenses	(5,493,881)	(5,006,920)
Investment income - net	139,910,123	54,708,936
Securities lending		
Income	1,766,076	1,005,661
Lender (borrower) rebates	(970,095)	(135,212)
Management fees	(198,702)	(217,200)
Securities lending income - net	<u>597,279</u>	<u>653,249</u>
Gift Fund donations	4,330	4,680
Miscellaneous income	18,549	1,814
Tax levy interest	13,543	4,157
Interest on Lewis settlement	48,911	5,514,764
Total additions	<u>416,409,622</u>	<u>263,948,925</u>
Deductions		
Benefits ¹	302,518,486	283,085,767
Refunds	3,579,629	3,673,250
Administrative expenses	3,171,986	3,216,823
Litigation settlement	-	60,385
Total deductions	<u>309,270,101</u>	<u>290,036,225</u>
Net increase	107,139,521	(26,087,300)
Net Position Restricted for Pension Benefits		
Beginning of year	1,019,013,793	1,045,101,093
End of year	<u>\$ 1,126,153,314</u>	<u>\$ 1,019,013,793</u>

¹ Excludes health insurance supplement of \$2,056,995 paid in 2016.

SECTION C

REQUIRED SUPPLEMENTARY INFORMATION

Auditor's Note: This information is intended to assist in preparation of the financial statements of the Firemen's Annuity and Benefit Fund of Chicago. Financial statements are the responsibility of management, subject to the auditor's review. Please let us know if the auditor recommends any changes.

Statement of Changes in Net Pension Liability and Related Ratios Current Period Fiscal Year Ended December 31, 2017

A. Total Pension Liability

1. Service Cost Including Pension Plan Administrative Expense	\$ 93,366,729
2. Interest on the Total Pension Liability	371,622,080
3. Changes of benefit terms	-
4. Difference between expected and actual experience of the Total Pension Liability	26,954,338
5. Changes of assumptions	414,218,762
6. Benefit payments, including refunds of employee contributions	(306,098,115)
7. Pension Plan Administrative Expenses	(3,171,986)
8. Net change in total pension liability	<u>596,891,808</u>
9. Total pension liability – beginning	<u>5,149,258,197</u>
10. Total pension liability – ending	<u><u>\$ 5,746,150,005</u></u>

B. Plan Fiduciary Net Position

1. Contributions – employer	\$ 228,452,611
2. Contributions – employee	47,364,276
3. Net investment income	140,569,856
4. Benefit payments, including refunds of employee contributions	(306,098,115)
5. Pension Plan Administrative Expense	(3,171,986)
6. Other	22,879
7. Net change in plan fiduciary net position	<u>107,139,521</u>
8. Plan fiduciary net position – beginning	<u>1,019,013,793</u>
9. Plan fiduciary net position – ending	<u><u>\$ 1,126,153,314</u></u>

C. Net Pension Liability

\$ 4,619,996,691

D. Plan Fiduciary Net Position as a Percentage of the Total Pension Liability

19.60%

E. Covered-Employee Payroll

\$ 469,407,281

F. Net Pension Liability as a Percentage of Covered Employee Payroll

984.22%

Statement of Required Supplementary Information

Schedule of Changes in Net Pension Liability and Related Ratios Multiyear

Fiscal year ending December 31,	2017	2016	2015	2014
Total Pension Liability				
Service Cost Including Pension Plan Administrative Expense	\$ 93,366,729	\$ 94,115,473	\$ 87,203,153	\$ 83,095,601
Interest on the Total Pension Liability	371,622,080	342,084,603	338,986,636	329,965,941
Benefit Changes	-	227,212,695	-	-
Difference between Expected and Actual Experience	26,954,338	24,110,158	(7,980,712)	-
Assumption Changes	414,218,762	(74,372,930)	176,281,502	88,448,895
Benefit Payments	(302,518,486)	(283,085,767)	(274,459,754)	(261,571,672)
Refunds	(3,579,629)	(3,673,250)	(3,557,317)	(2,321,666)
Pension Plan Administrative Expense	(3,171,986)	(3,216,823)	(3,149,549)	(3,069,192)
Net Change in Total Pension Liability	596,891,808	323,174,159	313,323,959	234,547,907
Total Pension Liability - Beginning	5,149,258,197	4,826,084,038	4,512,760,079	4,278,212,172
Total Pension Liability - Ending (a)	\$ 5,746,150,005	\$ 5,149,258,197	\$ 4,826,084,038	\$ 4,512,760,079
Plan Fiduciary Net Position				
Employer Contributions	\$ 228,452,611	\$ 154,101,396	\$ 236,104,362	\$ 107,334,399
Employee Contributions	47,364,276	48,959,929	46,552,247	48,056,393
Pension Plan Net Investment Income	140,569,856	60,881,106	7,595,562	30,867,889
Benefit Payments	(302,518,486)	(283,085,767)	(274,459,754)	(261,571,672)
Refunds	(3,579,629)	(3,673,250)	(3,557,317)	(2,321,666)
Pension Plan Administrative Expense	(3,171,986)	(3,216,823)	(3,149,549)	(3,069,192)
Other	22,879	(53,891)	7,141	7,393
Net Change in Plan Fiduciary Net Position	107,139,521	(26,087,300)	9,092,692	(80,696,456)
Plan Fiduciary Net Position - Beginning	1,019,013,793	1,045,101,093	1,036,008,401	1,116,704,857
Plan Fiduciary Net Position - Ending (b)	\$ 1,126,153,314	\$ 1,019,013,793	\$ 1,045,101,093	\$ 1,036,008,401
Net Pension Liability - Ending (a) - (b)	4,619,996,691	4,130,244,404	3,780,982,945	3,476,751,678
Plan Fiduciary Net Position as a Percentage				
of Total Pension Liability	19.60%	19.79%	21.66%	22.96%
Covered Employee Payroll	\$ 469,407,281	\$ 478,470,944	\$ 465,231,594	\$ 460,189,982
Net Pension Liability as a Percentage				
of Covered Employee Payroll	984.22%	863.22%	812.71%	755.50%

Ten fiscal years will be built prospectively.

Please see the following page for additional notes relating to the Schedule of Changes in Net Pension Liability and Related Ratios.

Schedules of Required Supplementary Information

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

Beginning of year total pension liability for fiscal year 2017 used a Single Discount Rate of 7.30 percent and the benefit provisions and funding policy in effect as of the December 31, 2016, funding actuarial valuation. The Single Discount Rate of 7.30 percent was based on a long-term expected rate of return on pension plan investments of 7.50 percent used in the December 31, 2016, funding actuarial valuation for the years 2016 through 2066, and a long-term municipal bond rate as of December 30, 2016, of 3.78 percent for subsequent years.

End of year total pension liability for fiscal year 2017 uses a Single Discount Rate of 7.23 percent and the benefit provisions and funding policy in effect as of the December 31, 2017, funding actuarial valuation. The Single Discount Rate of 7.23 percent was based on a long-term expected rate of return on pension plan investments of 7.50 percent used in the December 31, 2017, funding actuarial valuation for the years 2017 through 2070 and a long-term municipal bond rate as of December 29, 2017, of 3.31 percent for subsequent years.

The increase in the total pension liability for fiscal year 2017 due to actuarial assumption and method changes includes the impact of changing the demographic assumptions used in the actuarial valuation, to reflect the results of the experience study performed for the period January 1, 2012 through December 31, 2016, and the change in the municipal bond rate from December 29, 2016, to December 29, 2017. Changes in actuarial assumptions led to the change in the Single Discount Rate from 7.30 percent to 7.23 percent (based on the long-term expected rate of return on pension plan investments of 7.50 percent used in the December 31, 2016, and December 31, 2017, funding actuarial valuations and the long-term municipal bond rate of 3.78 percent as of December 29, 2016, and 3.31 percent as of December 29, 2017, respectively). This change was measured at the end of the year using the benefit provisions in effect as of December 31, 2017.

Schedules of Required Supplementary Information

Schedule of the Net Pension Liability Multiyear

FY Ending December 31,	Total Pension Liability	Plan Net Position	Net Pension Liability	Plan Net Position as a % of Total Pension Liability	Covered Payroll*	Net Pension Liability as a % of Covered Payroll
2014	\$ 4,512,760,079	\$ 1,036,008,401	\$ 3,476,751,678	22.96%	\$ 460,189,982	755.50%
2015	4,826,084,038	1,045,101,093	3,780,982,945	21.66%	465,231,594	812.71%
2016	5,149,258,197	1,019,013,793	4,130,244,404	19.79%	478,470,944	863.22%
2017	5,746,150,005	1,126,153,314	4,619,996,691	19.60%	469,407,281	984.22%

* Covered payroll is the amount in force as of the valuation date and likely differs from actual payroll paid during the fiscal year.

Ten fiscal years will be built prospectively.

Schedules of Contribution Multiyear Last 10 Fiscal Years

FY Ending December 31,	Actuarially Determined Contribution*	Actual Contribution	Contribution Deficiency/ (Excess)	Covered Payroll**	Actual Contribution as a % of Covered Payroll	Statutory Contribution***
2008	\$ 189,940,561	\$ 81,257,754	\$ 108,682,807	\$ 396,181,778	20.51%	\$ 91,112,448
2009	203,866,919	89,211,671	114,655,248	400,912,173	22.25%	84,424,004
2010	218,388,037	80,947,311	137,440,726	400,404,320	20.22%	82,904,631
2011	250,056,273	82,869,839	167,186,434	425,385,354	19.48%	85,315,391
2012	271,505,718	81,521,883	189,983,835	418,964,763	19.46%	85,869,109
2013	294,877,895	103,669,015	191,208,880	416,491,784	24.89%	106,980,765
2014	304,265,411	107,334,399	196,931,012	460,189,982	23.32%	109,697,945
2015	323,544,987	236,104,362	87,440,625	465,231,594	50.75%	196,618,542
2016	333,952,291	154,101,396	179,850,895	478,470,944	32.21%	205,943,005
2017	372,845,121	228,452,611	144,392,510	469,407,281	48.67%	227,000,000 ^o

* The historical FABF Statutory Funding Policy does not conform to Actuarial Standards of Practice; therefore, the Actuarially Determined Contribution is equal to the normal cost plus an amount to amortize the unfunded liability using level dollar payments and a 30-year amortization period. Amounts for fiscal years prior to 2015 were based on the "ARC" which was equal to normal cost plus an amount to amortize the unfunded liability using a 30-year open period level dollar amortization.

** Covered payroll is the amount in force as of the valuation date and likely differs from actual payroll paid during the fiscal year.

***Excludes amounts paid for health insurance supplement.

^o Fixed statutory contribution of \$227,000,000 for fiscal year end December 31, 2017, excludes required City contribution for Exempt Rank funding.

Notes to Schedule of Contributions

Valuation Date: December 31, 2017

Methods and Assumptions Used to Determine Contribution Rates as of the Valuation Date:

Actuarial Cost Method	Entry Age Normal
Amortization Method	Prior to 2015, the total City contribution was generated by a tax equal to 2.26 times the contributions by the firemen to the Fund two years prior to the year of the tax levy. For tax levy years 2015-2019, the statutory contributions are equal \$199 million, \$208 million, \$227 million, \$235 million and \$245 million respectively. For tax levy years on and after 2020, the statutory contributions are equal to a level percentage of pay contribution determined so that the Fund attains a 90 percent funded ratio by the end of 2055 on an open group basis.
Remaining Amortization Period	Not Applicable. An amortization payment is not directly calculated. The amortization payment is the difference between the total statutory contribution and the employer normal cost contribution.
Asset Valuation Method	5-year smoothed market
Inflation	2.50 percent
Salary Increases	Salary increase rates based on age-related productivity and merit rates plus wage inflation of 3.75 percent.
Postretirement Benefit Increases	A retiree born before January 1, 1966, with at least 20 years of service or receiving a mandatory retirement minimum annuity, receives an increase of 3 percent of the original annuity, starting on the first of the month following the first anniversary of his retirement or the first of the month following attainment of age 55, whichever is later, and shall not be subject to a 30 percent maximum increase. For retirees born on or after January 1, 1966, automatic increases are 1.5 percent of the original annuity, commencing at age 60, or the first anniversary of retirement, if later, to a maximum of 30 percent. For participants who first became members on or after January 1, 2011, increases are equal to the lesser of 3.00 percent and 50 percent of CPI-U of the original benefit, commencing at age 60.
Investment Rate of Return	7.50 percent as of the December 31, 2017, actuarial valuation.
Retirement Age	Experience-based table of rates that are specific to the type of eligibility condition. Last updated for the December 31, 2017, actuarial valuation pursuant to an experience study of the period January 1, 2012 through December 31, 2016.
Mortality	Post Retirement Mortality: Scaling factors of 106 percent for males, and 98 percent for females of the RP-2014 Blue Collar Healthy Annuitant mortality table, sex distinct, with generational mortality improvement using MP-2017 2-dimensional mortality improvement scales. Disabled Mortality: Scaling factors of 107 percent for males, and 99 percent for females of the RP-2014 Blue Collar Healthy Annuitant mortality table, sex distinct, with generational mortality improvement using MP-2017 2-dimensional mortality improvement scales. Pre-Retirement Mortality: Scaling factors of 92 percent for males, and 100 percent for females of the RP-2014 Blue Collar Employee mortality table, sex distinct, with generational mortality improvement using MP-2017 2-dimensional mortality improvement scales. Future mortality improvements in pre- and post-retirement mortality are reflected by projecting the base mortality tables back from the year 2014 to the year 2006 using the MP-2014 projection scale and projecting from 2006 using the MP-2017 projection scale.

Other Information:

Notes The actuarial valuation is based on the statutes in effect as of December 31, 2017.

Methods and Assumptions Used for Accounting Purposes as of the Valuation Date:

Actuarial Cost Method	Entry Age Normal
Discount Rate	7.30 percent as of the December 31, 2016, actuarial valuation. 7.23 percent as of the December 31, 2017, actuarial valuation.

SECTION D

NOTES TO FINANCIAL STATEMENTS

Auditor's Note: This information is intended to assist in preparation of the financial statements of the Firemen's Annuity and Benefit Fund of Chicago. Financial statements are the responsibility of management, subject to the auditor's review. Please let us know if the auditor recommends any changes.

Sensitivity of Net Pension Liability to the Single Discount Rate Assumption

Single Discount Rate

A Single Discount Rate of 7.23 percent was used to measure the total pension liability. This Single Discount Rate was based on an expected rate of return on pension plan investments of 7.50 percent and a municipal bond rate of 3.31 percent. The projection of cash flows used to determine this Single Discount Rate assumed that plan member contributions will be made at the current contribution rate and that employer contributions will be made at rates as specified by the Statutes. Based on these assumptions, the pension plan's fiduciary net position and future contributions were sufficient to finance the benefit payments only through the year 2070. As a result, the long-term expected rate of return on pension plan investments was applied to projected benefit payments through the year 2070, and the municipal bond rate was applied to all benefit payments after that date.

Regarding the sensitivity of the net pension liability to changes in the Single Discount Rate, the following presents the plan's net pension liability, calculated using a Single Discount Rate of 7.23 percent, as well as what the plan's net pension liability would be if it were calculated using a Single Discount Rate that is one percent lower or one percent higher:

Sensitivity of Net Pension Liability To the Single Discount Rate Assumption

1% Decrease	Current Single Discount Rate Assumption	1% Increase
6.23%	7.23%	8.23%
\$ 5,303,879,317	\$ 4,619,996,691	\$ 4,046,477,380

Summary of Population Statistics

Inactive Plan Members or Beneficiaries Currently Receiving Benefits	4,878
Inactive Plan Members Entitled to But Not Yet Receiving Benefits	77
Active Plan Members ¹	<u>4,613</u>
Total Plan Members	9,568

¹Includes eight participants on ordinary disability who continue to accrue benefit service as of December 31, 2017.

Additional information about the member data used is included in the December 31, 2017, funding actuarial valuation report.

SECTION E

SUMMARY OF BENEFITS

Summary of Benefits

Plan Descriptions (as of December 31, 2017)

Participants

Person employed by the City of Chicago in its fire service as firefighter, fire paramedic, fire engineer, marine engineer or fire pilot, whose duty it is to participate in the work of controlling and extinguishing fire at the location of any such fire, whether or not he is assigned to fire service other than the actual extinguishing of fire.

Service

In computing service, the following periods shall be counted:

All periods of active service, vacation, leave of absence with whole or part pay, military service, periods of disability for which he receives disability benefit and leave of absence without pay to perform the duties of a member of the General Assembly prior to January 9, 1997. It is computed on a day-to-day basis. Employees may purchase the 1980-strike time and periods of suspension less than one year. Employees may purchase, with 4 percent interest, periods of employment of the Chicago Fire Department from 1970 until the employee entered this fund.

Retirement Annuity

Eligibility

For participants who first became members before January 1, 2011, attainment of age 50 with at least 10 years of service.

For participants who first became members on or after January 1, 2011, attainment of age 55 with at least 10 years of service. Participants may retire at attainment of age 50 with 10 years of service with a reduced benefit.

Mandatory

Retirement is mandatory for a participant who has attained age 63, except for emergency medical technicians.

Accumulation Annuity

At age 50 or more, with 10 or more years of service, the employee is entitled to an annuity based on the sums accumulated for age and service annuity plus 1/10 of the sum accumulated from the contributions by the City for the age and service annuity for each completed year of service after the first 10 years. At age 50 or more with 20 or more years or at age 63, the employee is entitled to an annuity based on all sums accumulated to his or her credit. The maximum is 75 percent of highest salary.

Minimum Formula Annuity

If the employee has 20 or more years of service (the annuity will begin no earlier than age 50), he or she is entitled to the following annuity: 50 percent plus 2.5 percent of the final average salary for each year or fraction of service over twenty years. Maximum is 75 percent of the final average salary.

Summary of Benefits

Retirement at Age 63 with Less than 20 Years of Service¹

An employee who reaches compulsory retirement age with less than 20 years but greater than 10 years of service shall be entitled to a minimum annuity equal to 30 percent of final average salary for the first 10 years of service plus an additional 2 percent for each year in excess of 10, not to exceed 50 percent of final average salary.

Minimum Annuity

The minimum monthly annuity is the greater of \$1,050 or 125 percent of the Federal Poverty Level if the firefighter retired at age 50 or over with at least 20 years of service.

For participants who first became members on or after January 1, 2011, the member is entitled to an annuity based on an accrual rate of 2.5 percent of the final average salary for each fraction of service. Maximum is 75 percent of the final average salary. Final average salary is calculated using salary from the eight highest consecutive years within the last 10 years of service prior to retirement. Pensionable salary is limited to \$106,800 in 2011, increased by the lesser of 3 percent and one-half of the annual unadjusted percentage increase in the Consumer Price Index-U (but not less than zero) as measured in the preceding 12-month period ending with the September preceding the November 1, which is the date that the new amount will be calculated and made available to the pension funds.

For participants who first became members on or after January 1, 2011, who retire after age 50 but before age 55 is attained, the member is entitled to an annuity based on an accrual rate of 2.5 percent of the final average salary for each fraction of service, reduced by one half of one percent per month for retirement prior to age 55, subject to a maximum benefit of 75 percent.

Automatic Increase in Annuity

If an employee qualifies for a minimum formula annuity, 1.5 percent of the original annuity, starting on the first of the month one year after retirement or the first of the month following attainment of age 60 (age 55 if born before January 1, 1966, effective November 29, 2016), whichever is later, with a maximum of 30 percent (20 years). Such increases shall be 3 percent for firefighters born before January 1, 1966, (effective November 29, 2016) and such firefighters shall not be subject to the 30 percent maximum increase.

For participants who first became members on or after January 1, 2011, increases are equal to the lesser of 3.00 percent and 50 percent of CPI-U of the original benefit, commencing at age 60.

Widow/Widower Annuity

Payable until remarriage if widow/widower remarries before age 60, except Compensation and Supplemental Annuities. If the annuity is suspended because the widow/widower remarries before age 60, annuity payments will be resumed if the subsequent marriage ends. Any widow/widower's annuity, which was suspended on account of remarriage prior to December 31, 1989, will be resumed, if subsequent marriage ends, the later of July 14, 1995, or when the marriage ended. Beginning January 16, 2004, widows retain their rights to benefits after remarriage at any age. Benefits are not available to a

¹ Between January 1994 and December 2000, benefits have been administered as if there were no compulsory retirement age. Beginning December 2000 benefits have been administered as if age 63 is the compulsory retirement age for non-EMT participants and there is no compulsory retirement age for EMT participants.

Summary of Benefits

widow of a fireman who received a refund of contributions for widow's benefits, unless the refund is repaid with 4 percent interest per year.

Death in Service (Non-Duty)

- (1) If the firefighter dies with at least 1.5 years of service, 30 percent of the salary attached to the rank of a first class firefighter in the classified career service at the time of the firefighter's death; or,
- (2) 50 percent of the annuity the deceased firefighter would have received if he had retired just prior to the date of death; or,
- (3) Money purchase based on the total salary deductions and City contributions for age and service annuity and widow/widower's annuity.
- (4) The widow of an active fireman with 10 or more years of service will receive no less than 50 percent of the benefit that the active fireman would have received had they attained age 50 and 20 years of service.

Death In Service (Duty Related)

Compensation Annuity²

The annuity paid to the spouse equals 75 percent of the firefighter's salary attached to his civil service position at the time of his death. This amount increases as the salary of the position increases. This benefit is payable until the year in which the firefighter would have reached the compulsory retirement age.

Death In Service (Duty Disability)

Compensation Annuity

The annuity paid to the spouse of a member who dies in receipt of duty disability benefits equals 75 percent of the firefighter's salary attached to his civil service position at the time of his death. This amount increases as the salary of the position increases.

Death after Retirement

- (1) If the firefighter dies after retirement, the annuity is 50 percent of the retirement annuity that the deceased firefighter was receiving at the time of his or her death; or
- (2) Money purchase based on the sums accumulated for the spouse annuity plus 10 percent of the accumulated City contributions for each year of service from 10 to 20 years, and full accumulated City contributions after 20 years of service.

Maximum Annuity

No maximum dollar amount.

² Between January 1994 and December 2000, benefits have been administered as if there were no compulsory retirement age. Beginning December 2000 benefits have been administered as if age 63 is the compulsory retirement age for non-EMT participants and there is no compulsory retirement age for EMT participants.

Summary of Benefits

Minimum Annuity

The minimum monthly annuity for any widow/widower is the greater of \$1,000 or 125 percent of the Federal Poverty Level.

For participants who first became members on or after January 1, 2011, widow benefits are equal to 66-2/3 percent of the firemen's earned annuity at the date of death. Automatic increases to the annuity are equal to the lesser of 3.00 percent and 50 percent of CPI-U, commencing when the survivor reaches age 60, and applied to the original granted retirement annuity.

Child Annuity

Upon the death of the firefighter, unmarried children less than age 18 (except where child is so physically or mentally handicapped as to be unable to support himself) are eligible to receive an annuity. The amount of annuity payable for a child is 10 percent of the current annual maximum salary of a first class firefighter while a widow/widower survives; 15 percent when no widow/widower survives.

Family Maximum

The total annuities for widow/widower and children cannot exceed 60 percent for non-duty death, or 100 percent for duty death, of the current maximum annual salary of a first class firefighter.

Parent Annuity

Parent's annuity is provided for each surviving parent of a firefighter who dies prior to separation from service, or while out of service with at least 20 years; provided there is no widow/widower or child and that the deceased firefighter was contributing to their support. The benefit is an amount equal to 18 percent of the current annual salary attached to the classified position held by the firefighter at the time of death.

Disabilities

Duty Disability Benefit³

Injury incurred in the performance of duty. The amount of the benefit is 75 percent of salary at the time the disability is allowed payable to employee's compulsory retirement age plus \$30 per month for each unmarried child less than age 18 (except where the child is so physically or mentally handicapped as to be unable to support him/herself), but the total amount of child benefits shall not exceed 25 percent of salary. Effective January 1, 1994, the minimum benefit, if the employee has been on disability at least 10 years, is 50 percent of current salary at the rank held by the employee when he was removed from the Department payroll. Salary deductions are contributed by the City. There are no age or service requirements for retirement on money purchase annuity and receiving full contributions.

³ Between January 1994 and December 2000, benefits have been administered as if there were no compulsory retirement age. Beginning December 2000 benefits have been administered as if age 63 is the compulsory retirement age for non-EMT participants and there is no compulsory retirement age for EMT participants.

Summary of Benefits

Occupational Disease Disability⁴

A firefighter who has 10 or more years of service and is unable to perform his or her duties by reason of heart disease, tuberculosis or any disease of the lungs or respiratory tract, resulting solely from his or her service as a firefighter. Occupational disease also includes disabling cancer of the type which may be caused by exposure to heat, radiation or a known carcinogen as defined by the International Agency for Research on Cancer. The amount of the benefit is 65 percent of salary at the time of the employee's removal from the Department payroll payable to compulsory retirement age plus \$30 a month for each unmarried child less than age 18 (except where the child is so physically or mentally handicapped as to be unable to support him/ herself), but the total amount of child's benefits shall not exceed 25 percent of salary. Effective January 1, 1994, the minimum benefit, if the employee has been on disability at least 10 years, is 50 percent of current salary at the rank held by the employee when he or she was removed from Department payroll. Salary deductions are contributed by the City. There are no age or service requirements for retirement on money purchase annuity and receiving full contributions.

Ordinary Disability Benefit

Cause other than the performance of an act of duty, payable after 30 days for a period equal to 50 percent of total service (not including any previous O.D. time), but not to exceed five years. The disability benefit is 50 percent of salary at time of disability less pension deductions. When the disabled firefighter becomes eligible for the minimum formula annuity, the disability benefit shall cease, and he or she shall thereafter receive an annuity; however, there are no age or service requirements to retire on money purchase from disability prior to qualification for the minimum formula annuity if the disability then terminates.

Death Benefit

In active service, on an authorized leave of absence, if death occurs within 60 days of receipt of salary, receiving duty or ordinary disability benefit, occurring within 60 days of termination of such benefit, or occurring on retirement while in receipt of annuity and separation was effective after age 50 and application was made within 60 days from separation; payable to written beneficiaries or, if none, to estate.

⁴ Between January 1994 and December 2000, benefits have been administered as if there were no compulsory retirement age. Beginning December 2000 benefits have been administered as if age 63 is the compulsory retirement age for non-EMT participants and there is no compulsory retirement age for EMT participants.

Summary of Benefits

Age	Death in Service After July 1, 1983	Death After Retirement After July 1, 1983
49 and under	\$12,000	\$6,000
50	11,600	6,000
51	11,200	6,000
52	10,800	6,000
53	10,400	6,000
54	10,000	6,000
55	9,600	6,000
56	9,200	6,000
57	8,800	6,000
58	8,400	6,000
59	8,000	6,000
60	7,600	6,000
61	7,200	6,000
62	6,800	6,000
63	6,400	6,000
64 and over	6,000	6,000

Refunds

To Firefighters

Of entire amount (excluding ordinary disability pension deductions) with interest at 4 percent if entered before June 30, 1953, and 3 percent otherwise, before age 50, or before age 57 and less than 10 years of service. A firefighter who receives a refund and who subsequently reenters the service shall not receive, nor his or her widow/widower or parents, any annuity benefit or pension unless the refund is repaid with 4 percent interest. Repayment must be made within two years after reentry.

For Widow/Widower Annuity

If the firefighter is not married when he retires on annuity, he or she will receive a refund of all his or her contributions, with interest, for spouse's annuity.

Refunds of Remaining Amounts

If amounts contributed by a firefighter (with interest) are not paid out to him or her, in the form of a refund or annuity, or his or her widow/widower in the form of annuity, the remaining amounts (with interest) shall be paid out to his or her heirs, or to administrator of estate, for burial expense. If there are children under age 18, amount necessary to pay children annuities will not be refunded. There will be no refund paid to a widow/widower whose annuity is suspended because of remarriage.

Summary of Benefits

Deductions and Contributions

	<u>Deductions</u>	<u>City Contributions¹</u>
Employee	7.125 %	8.500 %
Spouse	1.500 %	2.000 %
Ordinary Disability	0.125 %	0.000 %
Annuity Increase	<u>0.375 %</u>	<u>0.000 %</u>
	9.125 %	10.500 %

¹ Credited to participant's Accumulation Annuity and Widow's Annuity accounts

Prior to 2015, the city shall levy a tax annually at a rate on the dollar of the assessed valuation of all taxable property that will produce an amount not to exceed the total amount of contributions by the firefighters to the Fund made in the calendar year two years prior multiplied by 2.26 for 1982 and each year thereafter, plus \$142,000 for the Ordinary Death Benefit.

Under P.A. 99-0506, City contributions are equal to \$199 million in payment year 2016, \$208 million in payment year 2017, \$227 million in payment year 2018, \$235 million in payment year 2019 and \$245 million in payment year 2020. For payment years after 2020, annual employer contributions combined with member contributions and other Fund revenue must equal the amount, as a level percentage of payroll, that is sufficient to produce 90 percent funding by the end of fiscal year 2055.

Death Benefit

Employees contribute \$2.50 per month at the same time and with the same frequency as other deductions (with each payment of salary).

Tax Shelter of Employee Salary Deductions

Beginning January 1, 1982, employee contributions were designated for income tax purposes to be made by the employer. The W-2 salary is therefore reduced by the amount of contribution. For pension purposes the salary remains unchanged. Income tax will be paid when a refund or annuity is received. For the purpose of benefits, refunds or financing, these contributions will be treated as employee contributions.

Compulsory Retirement Age

Effective January 1, 1994, the federal law (ADEA) allowing compulsory retirement at age 63 lapsed. As such, duty disability and occupational disease disability benefits and widow/widower compensation benefits may be "open ended"; i.e., without limiting age.

Effective December 2000 the City of Chicago enacted a compulsory retirement age of 63 for non-EMT participants. As such, all disability benefits for non-EMT participants cease at age 63 and become payable as retiree benefits.

Summary of Benefits

Compensation Widows

Beginning January 1, 2001, mandatory retirement will have no impact on Widow benefits. Therefore, effective with the December 31, 2001, valuation, all Supplemental Widows have been re-classified as Compensation Widows. The classification of Supplemental Widows has been discontinued.

Salary Cap and COLA Development for Members Hired on or after January 1, 2011

Year Ending	CPI-U	½ CPI-U	COLA	Maximum Annual Pensionable Earnings
2011			3.00%	\$ 106,800.00
2012	3.90%	1.95%	1.95%	108,882.60
2013	2.00%	1.00%	1.00%	109,971.43
2014	1.20%	0.60%	0.60%	110,631.26
2015	1.70%	0.85%	0.85%	111,571.63
2016	0.00%	0.00%	0.00%	111,571.63
2017	1.50%	0.75%	0.75%	112,408.42
2018	2.20%	1.10%	1.10%	113,644.91

SECTION F

ACTUARIAL COST METHOD AND ACTUARIAL ASSUMPTIONS

Actuarial Cost Method and Actuarial Assumptions

ACTUARIAL COST METHOD

An Actuarial Cost Method is a set of techniques used by the actuary to develop contribution levels under a retirement plan. The Actuarial Cost Method used in this actuarial valuation for statutory funding and State reporting purposes and GASB accounting purposes is the Entry Age Normal cost method.

Under the Entry Age Normal Cost Method, each participant's projected benefit is allocated on a level percent of pay basis from entry age to assumed exit age. The Actuarial Accrued Liability is the portion of the present value of benefits associated with pay prior to the actuarial valuation date. The Normal Cost is the present value of benefits associated with pay during the current plan year.

To the extent that current assets are less than the Actuarial Accrued Liability, an Unfunded Actuarial Accrued Liability ("UAAL") develops. The UAAL is generally amortized over a fixed period of time (e.g., 30 years) from the date incurred. The total contribution developed under this method is the sum of the Normal Cost and the payment toward the UAAL.

CURRENT ACTUARIAL ASSUMPTIONS

The actuarial assumptions have been changed since the last report to reflect the results of the experience study performed for the period January 1, 2012 through December 31, 2016. The recommendations for discount rate, general inflation rate and salary increased rates assumptions are still under review and changes to the economic assumptions were not adopted in this actuarial valuation. The other actuarial assumptions were adopted by the Board at their March 21, 2018, meeting. Please refer to the 2017 Actuarial Experience Study Report dated March 20, 2018, for additional disclosures.

Demographic Assumptions

Mortality:

Post-Retirement Mortality: Scaling factors of 106 percent for males, and 98 percent for females of the RP-2014 Blue Collar Healthy Annuitant mortality table, sex distinct, with generational mortality improvement using MP-2017 2-dimensional mortality improvement scales recently released by the SOA. This assumption provides a margin for mortality improvements.

Disabled Mortality: Scaling factors of 107 percent for males, and 99 percent for females of the RP-2014 Blue Collar Healthy Annuitant mortality table, sex distinct, with generational mortality improvement using MP-2017 2-dimensional mortality improvement scales recently released by the SOA. This assumption provides a margin for mortality improvements.

Pre-Retirement Mortality: Scaling factors of 92 percent for males, and 100 percent for females of the RP-2014 Blue Collar Employee mortality table, sex distinct, with generational mortality improvement using MP-2017 2-dimensional mortality improvement scales recently released by the SOA. This assumption provides a margin for mortality improvements.

Actuarial Cost Method and Actuarial Assumptions

Future mortality improvements in pre- and post-retirement mortality are reflected by projecting the base mortality tables back from the year 2014 to the year 2006 using the MP-2014 projection scale and projecting from 2006 using the MP-2017 projection scale.

Age	Future Life Expectancy (years) in 2017		Future Life Expectancy (years) in 2030	
	Post-Retirement		Pos-Rretirement	
	Male	Female	Male	Female
35	47.47	51.72	48.90	53.04
40	42.37	46.49	43.75	47.78
45	37.36	41.35	38.70	42.61
50	32.46	36.29	33.77	37.53
55	27.73	31.38	29.00	32.58
60	23.26	26.69	24.42	27.81
65	19.08	22.21	20.11	23.23
70	15.21	17.93	16.11	18.88
75	11.67	13.97	12.48	14.84

Rate of Retirement: The table below shows the assumed rates of retirement.

Attained Age	Hired before January 1, 2011		Hired on or after January 1, 2011	
	Firefighters	Paramedic	Firefighters	Paramedic
	Rates	Rates	Rates	Rates
50	0.02	0.03	0.01	0.01
51	0.02	0.03	0.01	0.01
52	0.02	0.03	0.01	0.01
53	0.02	0.04	0.01	0.01
54	0.04	0.08	0.01	0.01
55	0.12	0.08	0.13	0.08
56	0.12	0.10	0.13	0.10
57	0.13	0.10	0.14	0.10
58	0.13	0.12	0.14	0.12
59	0.16	0.12	0.16	0.12
60	0.20	0.15	0.20	0.15
61	0.25	0.15	0.25	0.15
62	0.60	0.20	0.60	0.20
63	1.00	0.30	1.00	0.30
64		0.40		0.40
65		1.00		1.00

Actuarial Cost Method and Actuarial Assumptions

Rate of Termination: The following are sample rates from the table:

<u>Years of Service</u>	<u>Rate</u>
0	0.020
1	0.008
2-8	0.006
9-13	0.005
14-29	0.004
30+	0.000

Rate of Disability: The rate at which members are assumed to become disabled under the provisions of the Fund. The rates assumed are as follows:

<u>Attained Age</u>	<u>Rates</u>
20-24	0.0009
25-29	0.0009
30-34	0.0010
35-39	0.0010
40-44	0.0018
45-49	0.0038
50-54	0.0106
55-59	0.0208
60-63	0.0250

Of the participants who become disabled, 55 percent are assumed to be duty disability, 40 percent are assumed to be occupational disease disability and 5 percent are assumed to be ordinary disability.

Economic Assumptions

Investment Return: 7.50 percent per year, compounded annually, net of investment expenses. The 7.50 percent assumption is composed of a 2.50 percent inflation assumption and a 5.00 percent real rate of return assumption. This assumption was first effective with the December 31, 2015, actuarial valuation.

General Inflation: 2.50 percent per year, compounded annually.

This assumption serves as the basis for the determination of annual increases in pension and the pensionable salary cap for Tier Two members.

Wage Inflation and Payroll Growth: 3.75 percent per year, compounded annually.

Actuarial Cost Method and Actuarial Assumptions

Future Salary Increases: The assumed base rate of individual salary increase is 3.75 percent per year (underlying wage inflation assumption), plus an additional percentage based on the following service scale:

<u>Years of Service</u>	<u>Rates</u>
0	21.25%
1	5.25%
2	5.25%
3	5.00%
4	5.00%
5-9	0.00%
10	3.50%
11-14	0.00%
15	3.50%
16-19	0.00%
20	4.00%
21-24	0.00%
25	3.20%
26-29	0.00%
30	1.50%
Over 30	0.00%

Asset Value: For State reporting, the actuarial value of assets is smoothed by using a five-year phase-in of each year's unexpected investment gains and losses on the market value.

For the GASB Statement Nos. 67 and 68 Actuarially Determined Contribution, the actuarial value of assets is smoothed by using a five-year average market value.

Expenses: Future administrative expenses are assumed to increase at the assumed inflation assumption of 2.50 percent.

Other Assumptions and Provisions

Marital Status: It is assumed that 75 percent of active members have an eligible spouse. The male spouse is assumed to be three years older than the female spouse. No assumption is made about other dependents.

Reciprocal Service: No assumption for reciprocal service.

Military Service: No assumption for military service.

Actuarial Cost Method and Actuarial Assumptions

Benefit Service:	Exact fractional years of service are used to determine the amount of benefit payable. After a participant has 20 years of service, future benefit service is increased to the nearest integer.
Decrement Timing:	All decrements are assumed to occur mid-year.
Decrement Relativity:	Decrement rates are used directly, without adjustment for multiple decrement table effects.
Decrement Operation:	Turnover decrements do not operate after member reaches retirement eligibility for a minimum annuity formula benefit.
Eligibility Testing:	Eligibility for benefits is determined based upon the age nearest birthday and service on the date the decrement is assumed to occur.
Pay Increase Timing:	Beginning of the (fiscal) year.
Beneficiary COLA Approximation:	For current retirees, benefits for future survivors were increased by 35 percent to approximate the value of COLA benefits earned prior to the retirees death.

Projection Assumptions

Active Population:	Active members who terminate, retire, become disabled or die during the year are replaced by new entrants such that the number of active members remains level during the projection period based on the most recent actuarial valuation. The number of active members as of the actuarial valuation at December 31, 2017, is 4,613.
New Entrant Profile:	The entry age of future new entrants, which is summarized below, is based on the profile of current active members hired over the last five years with one or more years of service as of December 31, 2017. These members were hired from January 1, 2013 through December 31, 2016. The group hired due to the Lewis Settlement was excluded from the development of the new entrant profile.

Entry Age	Number
Less than 25	73
25 to 30	284
30 to 35	302
35 to 40	97
40 to 45	8
45 and Over	2

Actuarial Cost Method and Actuarial Assumptions

Approximately 89 percent of the new entrants are assumed to be male.

New Entrant Pay:

Based on the most recent employment contract, new entrants were assumed to earn \$56,304 for the plan year ending December 31, 2018. The new entrant pay for members hired after 2018 is assumed to increase by the wage inflation assumption of 3.75 percent.

New Entrant Pay Increases:

Pay for a specific new entrant is assumed to increase in the future by the wage inflation and the service based salary increase assumptions.

The projections assume a pay cap of \$112,408.42 for plan year 2017, and a pay cap of \$113,644.91 for plan year 2018, increasing by 1.25 percent per year after plan year 2018. The annual increase of 1.25 percent per year is based on 50 percent of the CPI-U increase which is assumed to be 2.50 percent per year.

SECTION G

CALCULATION OF THE SINGLE DISCOUNT RATE

Calculation of the Single Discount Rate

GASB Statement Nos. 67 and 68 includes a specific requirement for the discount rate that is used for the purpose of the measurement of the Total Pension Liability. This rate considers the ability of the fund to meet benefit obligations in the future. To make this determination, employer contributions, employee contributions, benefit payments, expenses and investment returns are projected into the future. The Plan Net Position (assets) in future years can then be determined and compared to its obligation to make benefit payments in those years. As long as assets are projected to be on hand in a future year, the assumed actuarial valuation discount rate is used. In years where assets are not projected to be sufficient to meet benefit payments, the use of a municipal bond rate is required, as described in the following paragraph.

The Single Discount Rate (“SDR”) is equivalent to applying these two rates to the benefits that are projected to be paid during the different time periods. The SDR reflects (1) the long-term expected rate of return on pension plan investments (during the period in which the fiduciary net position is projected to be sufficient to pay benefits) and (2) a tax-exempt municipal bond rate based on an index of 20-year general obligation bonds with an average AA credit rating as of the measurement date (to the extent that the contributions for use with the long-term expected rate of return are not met).

For the purpose of this valuation, the expected rate of return on pension plan investments is 7.50 percent; the municipal bond rate is 3.31 percent; and the resulting Single Discount Rate is 7.23 percent.

The sponsor finances benefits using a funding policy defined in state statutes. Sponsor contributions are equal to a fixed payment schedule for payment years 2016 through 2020 and a level percentage of pay contribution determined so that the Fund attains a 90 percent funded ratio by the end of 2055 on an open group basis for payment years on and after 2021. The statutory contribution does not explicitly separate projected employer contributions between current plan members and future plan members.

For purposes of developing the Single Discount Rate, we have projected actuarial liabilities on an Entry Age Normal basis, and compared against projected market value of assets. We have assumed the actuarial liability for future member will be fully financed, to the extent that assets are available, any remaining asset will be assigned to current plan members. Based on this assignment of assets and employer contributions, plan assets assigned to current members are projected to be depleted by 2070.

The tables in this section provide background for the development of the Single Discount Rate.

The following tables show the assignment of assets and employer contributions and the projection of assets for current members as of the actuarial valuation date. Our projections assume the sponsor will make the required statutory contributions. The projections are based on the statutory funding projections performed during the December 31, 2017, actuarial valuation.

Total administrative expenses are assumed to increase at the assumed rate of inflation, or 2.50 percent. Total administrative expenses are allocated between current and future hires by total payroll.

Projection of Funded Status and Assignment of Assets

PYE 12/31	Open Group Actuarial	Closed Group	Future Member		Future Member	Closed Group Assigned	Funded Ratio	Funded Ratio
	Liability	Actuarial Liability	Actuarial Liability	Open Group Assets	Assigned Assets	Assets	Current Members	Future Members
	(a)	(b)	(c)=(a)-(b)	(d)	(e)=min[(c),(d)]	(f)=(d)-(e)	(g)=(f)/(b)	(h)=(e)/(c)
2017	\$5,582,426,437	\$5,582,426,437	\$ -	\$ 1,126,153,314	\$ -	\$ 1,126,153,314	20.17%	0.00%
2018	5,758,167,552	5,758,167,552	-	1,145,784,327	-	1,145,784,327	19.90%	0.00%
2019	5,928,002,097	5,924,345,133	3,656,964	1,159,379,991	3,656,964	1,155,723,027	19.51%	100.00%
2020	6,091,502,067	6,080,161,851	11,340,216	1,264,695,173	11,340,216	1,253,354,957	20.61%	100.00%
2021	6,248,987,871	6,225,408,126	23,579,744	1,365,342,332	23,579,744	1,341,762,588	21.55%	100.00%
2022	6,401,479,118	6,360,578,535	40,900,582	1,465,511,539	40,900,582	1,424,610,957	22.40%	100.00%
2023	6,549,979,800	6,486,140,196	63,839,603	1,568,390,695	63,839,603	1,504,551,092	23.20%	100.00%
2024	6,694,092,012	6,601,208,499	92,883,513	1,673,752,722	92,883,513	1,580,869,209	23.95%	100.00%
2025	6,832,691,055	6,704,077,425	128,613,630	1,780,584,565	128,613,630	1,651,970,936	24.64%	100.00%
2026	6,964,847,455	6,793,149,673	171,697,782	1,888,020,702	171,697,782	1,716,322,920	25.27%	100.00%
2027	7,090,893,143	6,868,060,058	222,833,086	1,997,222,170	222,833,086	1,774,389,084	25.84%	100.00%
2028	7,212,696,971	6,929,734,498	282,962,473	2,112,527,396	282,962,473	1,829,564,923	26.40%	100.00%
2029	7,330,599,522	6,978,062,555	352,536,967	2,234,243,268	352,536,967	1,881,706,300	26.97%	100.00%
2030	7,444,157,972	7,012,375,860	431,782,112	2,360,471,517	431,782,112	1,928,689,405	27.50%	100.00%
2031	7,552,620,138	7,031,675,688	520,944,450	2,489,037,815	520,944,450	1,968,093,365	27.99%	100.00%
2032	7,655,831,356	7,035,281,410	620,549,947	2,619,740,458	620,549,947	1,999,190,511	28.42%	100.00%
2033	7,753,976,051	7,022,781,138	731,194,913	2,753,328,478	731,194,913	2,022,133,565	28.79%	100.00%
2034	7,847,422,553	6,993,974,373	853,448,180	2,889,972,107	853,448,180	2,036,523,927	29.12%	100.00%
2035	7,937,024,574	6,949,192,898	987,831,676	3,030,772,677	987,831,676	2,042,941,001	29.40%	100.00%
2036	8,023,310,817	6,888,535,305	1,134,775,512	3,176,231,313	1,134,775,512	2,041,455,801	29.64%	100.00%
2037	8,106,915,717	6,812,137,329	1,294,778,388	3,327,758,421	1,294,778,388	2,032,980,033	29.84%	100.00%
2038	8,188,415,707	6,720,262,565	1,468,153,143	3,486,459,241	1,468,153,143	2,018,306,098	30.03%	100.00%
2039	8,268,476,887	6,613,273,135	1,655,203,752	3,653,765,585	1,655,203,752	1,998,561,833	30.22%	100.00%
2040	8,347,630,810	6,491,560,407	1,856,070,403	3,830,941,150	1,856,070,403	1,974,870,747	30.42%	100.00%
2041	8,425,987,507	6,355,244,698	2,070,742,809	4,018,854,484	2,070,742,809	1,948,111,675	30.65%	100.00%
2042	8,503,694,006	6,204,676,660	2,299,017,346	4,218,692,516	2,299,017,346	1,919,675,169	30.94%	100.00%
2043	8,580,909,642	6,040,528,472	2,540,381,169	4,431,651,527	2,540,381,169	1,891,270,358	31.31%	100.00%
2044	8,657,682,391	5,863,626,821	2,794,055,570	4,659,015,691	2,794,055,570	1,864,960,121	31.81%	100.00%
2045	8,734,055,650	5,675,034,347	3,059,021,303	4,901,649,300	3,059,021,303	1,842,627,997	32.47%	100.00%
2046	8,810,246,193	5,476,108,338	3,334,137,855	5,161,094,537	3,334,137,855	1,826,956,682	33.36%	100.00%
2047	8,886,625,688	5,268,513,344	3,618,112,344	5,439,164,896	3,618,112,344	1,821,052,552	34.56%	100.00%
2048	8,963,928,718	5,054,306,097	3,909,622,620	5,738,177,500	3,909,622,620	1,828,554,879	36.18%	100.00%
2049	9,043,167,272	4,835,864,776	4,207,302,496	6,060,937,646	4,207,302,496	1,853,635,150	38.33%	100.00%
2050	9,125,210,617	4,615,385,556	4,509,825,061	6,410,106,831	4,509,825,061	1,900,281,770	41.17%	100.00%
2051	9,210,436,658	4,394,390,245	4,816,046,413	6,787,846,268	4,816,046,413	1,971,799,856	44.87%	100.00%
2052	9,299,213,126	4,174,104,101	5,125,109,024	7,196,363,007	5,125,109,024	2,071,253,982	49.62%	100.00%
2053	9,392,103,175	3,955,663,377	5,436,439,798	7,638,208,570	5,436,439,798	2,201,768,772	55.66%	100.00%
2054	9,489,797,086	3,740,141,168	5,749,655,919	8,116,219,722	5,749,655,919	2,366,563,804	63.27%	100.00%
2055	9,593,237,200	3,528,670,700	6,064,566,499	8,633,669,895	6,064,566,499	2,569,103,396	72.81%	100.00%
2056	9,703,238,052	3,322,165,157	6,381,072,895	8,732,914,246	6,381,072,895	2,351,841,351	70.79%	100.00%
2057	9,820,489,783	3,121,315,686	6,699,174,097	8,838,440,804	6,699,174,097	2,139,266,708	68.54%	100.00%
2058	9,945,574,924	2,926,589,794	7,018,985,130	8,951,017,430	7,018,985,130	1,932,032,301	66.02%	100.00%
2059	10,079,111,622	2,738,366,686	7,340,744,936	9,071,200,459	7,340,744,936	1,730,455,523	63.19%	100.00%
2060	10,221,611,770	2,556,912,142	7,664,699,627	9,199,450,592	7,664,699,627	1,534,750,965	60.02%	100.00%
2061	10,373,454,539	2,382,366,818	7,991,087,721	9,336,109,085	7,991,087,721	1,345,021,364	56.46%	100.00%
2062	10,534,911,925	2,214,830,077	8,320,081,847	9,481,420,732	8,320,081,847	1,161,338,885	52.43%	100.00%
2063	10,706,168,723	2,054,366,570	8,651,802,153	9,635,551,851	8,651,802,153	983,749,698	47.89%	100.00%
2064	10,887,280,971	1,901,009,083	8,986,271,889	9,798,552,875	8,986,271,889	812,280,986	42.73%	100.00%
2065	11,078,165,044	1,754,732,802	9,323,432,242	9,970,348,541	9,323,432,242	646,916,298	36.87%	100.00%
2066	11,278,647,370	1,615,504,602	9,663,142,768	10,150,782,633	9,663,142,768	487,639,866	30.18%	100.00%
2067	11,488,397,330	1,483,229,876	10,005,167,453	10,339,557,597	10,005,167,453	334,390,144	22.54%	100.00%
2068	11,706,990,479	1,357,800,895	10,349,189,584	10,536,291,431	10,349,189,584	187,101,847	13.78%	100.00%
2069	11,933,901,858	1,239,101,982	10,694,799,877	10,740,511,673	10,694,799,877	45,711,797	3.69%	100.00%
2070	12,168,519,796	1,126,985,493	11,041,534,302	10,951,667,817	10,951,667,817	-	0.00%	99.19%
2071	12,410,200,393	1,021,319,605	11,388,880,788	11,169,180,355	11,169,180,355	-	0.00%	98.07%

The projections in this report are strictly for the purpose of determining the GASB Single Discount Rate and are different from a funding projection for the ongoing plan.

Current Member Projection of Assets and Assignment of Employer Contributions

PYE 12/31	Assets (boy)	Member Contributions	Administrative Expenses	Benefit Payments	Assigned Employer/City Contribution	Income on Asset and Cash Flow	Assets (eoy)
2018	\$ 1,126,153,314	\$ 43,767,540	\$ 3,251,286	\$ 325,570,646	\$ 235,000,000	\$ 69,685,405	\$ 1,145,784,327
2019	1,145,784,327	43,879,687	3,206,273	344,314,382	243,352,992	70,226,677	1,155,723,027
2020	1,155,723,027	42,645,431	3,139,571	363,200,217	351,253,506	70,072,781	1,253,354,957
2021	1,253,354,957	41,299,719	3,063,738	381,358,665	356,928,857	74,601,456	1,341,762,588
2022	1,341,762,588	39,992,149	2,979,120	398,427,501	363,813,670	80,449,171	1,424,610,957
2023	1,424,610,957	38,853,557	2,889,312	414,681,130	372,763,943	85,893,076	1,504,551,092
2024	1,504,551,092	37,614,521	2,793,284	430,951,828	381,373,727	91,074,982	1,580,869,209
2025	1,580,869,209	36,209,061	2,692,603	447,803,175	389,423,986	95,964,457	1,651,970,936
2026	1,651,970,936	34,595,689	2,583,866	464,941,085	396,825,678	100,455,569	1,716,322,920
2027	1,716,322,920	32,917,651	2,466,750	481,395,502	404,534,727	104,476,038	1,774,389,084
2028	1,774,389,084	31,405,802	2,349,734	496,348,688	414,387,915	108,080,544	1,829,564,923
2029	1,829,564,923	29,889,250	2,235,243	510,497,581	423,528,625	111,456,326	1,881,706,300
2030	1,881,706,300	28,291,568	2,121,916	524,187,991	430,369,345	114,632,099	1,928,689,405
2031	1,928,689,405	26,602,103	2,013,036	537,654,202	434,999,080	117,470,015	1,968,093,365
2032	1,968,093,365	24,887,439	1,907,433	550,657,638	438,976,705	119,798,074	1,999,190,511
2033	1,999,190,511	23,224,023	1,801,296	563,039,244	443,019,083	121,540,487	2,022,133,565
2034	2,022,133,565	21,513,163	1,696,364	574,394,407	446,261,872	122,706,099	2,036,523,927
2035	2,036,523,927	19,833,521	1,591,621	584,349,695	449,226,519	123,298,350	2,042,941,001
2036	2,042,941,001	18,176,707	1,487,171	593,131,394	451,614,653	123,342,005	2,041,455,801
2037	2,041,455,801	16,565,647	1,380,366	600,748,805	454,239,019	122,848,737	2,032,980,033
2038	2,032,980,033	15,025,813	1,275,017	607,141,067	456,842,026	121,874,309	2,018,306,098
2039	2,018,306,098	13,502,987	1,170,592	612,132,736	459,568,482	120,487,593	1,998,561,833
2040	1,998,561,833	12,004,739	1,064,608	615,752,546	462,351,627	118,769,703	1,974,870,747
2041	1,974,870,747	10,515,128	955,746	618,266,396	465,152,085	116,795,857	1,948,111,675
2042	1,948,111,675	9,059,861	842,522	619,499,062	468,205,039	114,640,179	1,919,675,169
2043	1,919,675,169	7,678,308	731,670	619,232,719	471,469,615	112,411,654	1,891,270,358
2044	1,891,270,358	6,383,697	623,221	617,393,196	475,080,013	110,242,471	1,864,960,121
2045	1,864,960,121	5,188,534	520,370	613,827,423	478,536,395	108,290,739	1,842,627,997
2046	1,842,627,997	4,107,333	423,067	608,350,773	482,280,506	106,714,687	1,826,956,682
2047	1,826,956,682	3,161,799	335,084	600,799,105	486,354,548	105,713,712	1,821,052,552
2048	1,821,052,552	2,370,640	257,072	590,931,883	490,791,141	105,529,502	1,828,554,879
2049	1,828,554,879	1,767,903	193,278	578,623,184	495,688,722	106,440,108	1,853,635,150
2050	1,853,635,150	1,337,590	147,366	564,175,970	500,887,751	108,744,615	1,900,281,770
2051	1,900,281,770	1,006,202	113,810	548,269,993	506,177,992	112,717,695	1,971,799,856
2052	1,971,799,856	729,309	85,025	531,231,111	511,443,030	118,597,924	2,071,253,982
2053	2,071,253,982	502,640	60,779	513,223,277	516,685,002	126,611,203	2,201,768,772
2054	2,201,768,772	319,961	40,855	494,378,066	521,907,222	136,986,770	2,366,563,804
2055	2,366,563,804	187,406	24,529	474,719,670	527,130,992	149,965,393	2,569,103,396
2056	2,569,103,396	102,332	14,221	454,535,556	71,389,689	165,795,712	2,351,841,351
2057	2,351,841,351	49,245	7,156	434,082,794	62,435,310	159,030,751	2,139,266,708
2058	2,139,266,708	19,885	3,244	413,615,953	62,352,083	144,012,822	1,932,032,301
2059	1,932,032,301	5,287	986	393,242,955	62,440,310	129,221,566	1,730,455,523
2060	1,730,455,523	674	145	373,094,710	62,546,253	114,843,369	1,534,750,965
2061	1,534,750,965	-	-	353,304,339	62,682,547	100,892,190	1,345,021,364
2062	1,345,021,364	-	-	333,918,676	62,862,532	87,373,665	1,161,338,885
2063	1,161,338,885	-	-	314,977,635	63,096,988	74,291,460	983,749,698
2064	983,749,698	-	-	296,516,624	63,400,385	61,647,528	812,280,986
2065	812,280,986	-	-	278,593,571	63,787,389	49,441,494	646,916,298
2066	646,916,298	-	-	261,214,695	64,266,648	37,671,615	487,639,866
2067	487,639,866	-	-	244,436,900	64,852,734	26,334,444	334,390,144
2068	334,390,144	-	-	228,265,996	65,552,828	15,424,872	187,101,847
2069	187,101,847	-	-	212,701,857	66,373,938	4,937,869	45,711,797
2070	45,711,797	-	-	197,766,949	157,187,420	(5,132,267)	-
2071	-	-	-	183,435,332	193,217,470	(9,782,138)	-

The projections in this report are strictly for the purpose of determining the GASB Single Discount Rate and are different from a funding projection for the ongoing plan.

Development of Single Discount Rate

PYE 12/31	Benefit Payments	Discount Rate	Discounted Benefit Payment	Single Discount Rate	Discounted Benefit Payment
2018	\$ 325,570,646	7.50%	\$ 314,008,214	7.23%	\$ 314,399,088
2019	344,314,382	7.50%	308,917,469	7.23%	310,072,515
2020	363,200,217	7.50%	303,127,222	7.23%	305,018,569
2021	381,358,665	7.50%	296,076,537	7.23%	298,666,058
2022	398,427,501	7.50%	287,747,274	7.23%	290,987,030
2023	414,681,130	7.50%	278,591,409	7.23%	282,429,898
2024	430,951,828	7.50%	269,323,165	7.23%	273,714,116
2025	447,803,175	7.50%	260,329,681	7.23%	265,233,092
2026	464,941,085	7.50%	251,435,143	7.23%	256,809,176
2027	481,395,502	7.50%	242,170,711	7.23%	247,962,903
2028	496,348,688	7.50%	232,272,612	7.23%	238,420,522
2029	510,497,581	7.50%	222,226,758	7.23%	228,677,016
2030	524,187,991	7.50%	212,266,405	7.23%	218,971,689
2031	537,654,202	7.50%	202,529,727	7.23%	209,447,903
2032	550,657,638	7.50%	192,956,288	7.23%	200,044,544
2033	563,039,244	7.50%	183,530,171	7.23%	190,746,151
2034	574,394,407	7.50%	174,168,873	7.23%	181,467,723
2035	584,349,695	7.50%	164,825,612	7.23%	172,160,725
2036	593,131,394	7.50%	155,630,360	7.23%	162,961,211
2037	600,748,805	7.50%	146,631,698	7.23%	153,921,157
2038	607,141,067	7.50%	137,852,959	7.23%	145,066,484
2039	612,132,736	7.50%	129,289,610	7.23%	136,393,965
2040	615,752,546	7.50%	120,980,610	7.23%	127,946,331
2041	618,266,396	7.50%	112,999,555	7.23%	119,803,453
2042	619,499,062	7.50%	105,325,439	7.23%	111,945,442
2043	619,232,719	7.50%	97,935,029	7.23%	104,349,827
2044	617,393,196	7.50%	90,831,720	7.23%	97,022,341
2045	613,827,423	7.50%	84,006,622	7.23%	89,955,613
2046	608,350,773	7.50%	77,448,468	7.23%	83,139,635
2047	600,799,105	7.50%	71,150,766	7.23%	76,569,428
2048	590,931,883	7.50%	65,099,741	7.23%	70,232,094
2049	578,623,184	7.50%	59,296,520	7.23%	64,130,717
2050	564,175,970	7.50%	53,782,315	7.23%	58,311,864
2051	548,269,993	7.50%	48,619,549	7.23%	52,845,607
2052	531,231,111	7.50%	43,821,928	7.23%	47,749,627
2053	513,223,277	7.50%	39,382,734	7.23%	43,019,455
2054	494,378,066	7.50%	35,289,885	7.23%	38,644,690
2055	474,719,670	7.50%	31,522,439	7.23%	34,605,086
2056	454,535,556	7.50%	28,076,437	7.23%	30,898,873
2057	434,082,794	7.50%	24,942,400	7.23%	27,518,162
2058	413,615,953	7.50%	22,108,256	7.23%	24,452,102
2059	393,242,955	7.50%	19,552,833	7.23%	21,679,634
2060	373,094,710	7.50%	17,256,764	7.23%	19,181,482
2061	353,304,339	7.50%	15,201,302	7.23%	16,938,857
2062	333,918,676	7.50%	13,364,849	7.23%	14,929,591
2063	314,977,635	7.50%	11,727,207	7.23%	13,132,850
2064	296,516,624	7.50%	10,269,646	7.23%	11,529,232
2065	278,593,571	7.50%	8,975,715	7.23%	10,101,701
2066	261,214,695	7.50%	7,828,654	7.23%	8,832,692
2067	244,436,900	7.50%	6,814,716	7.23%	7,707,869
2068	228,265,996	7.50%	5,919,892	7.23%	6,712,447
2069	212,701,857	7.50%	5,131,394	7.23%	5,832,879
2070	197,766,949	7.50%	4,438,225	7.23%	5,057,519
2071	183,435,332	3.31%	32,126,739	7.23%	4,374,605
2081	70,899,833	3.31%	8,966,135	7.23%	841,050
2091	14,417,826	3.31%	1,316,546	7.23%	85,074
2101	935,564	3.31%	61,686	7.23%	2,746
2111	8,384	3.31%	399	7.23%	12
2116	252	3.31%	10	7.23%	0
Total Present Value			\$ 6,556,546,452		\$ 6,556,546,452

The projections in this report are strictly for the purpose of determining the GASB Single Discount Rate and are different from a funding projection for the ongoing plan.

SECTION H

GLOSSARY OF TERMS

Glossary of Terms

<i>Accrued Service</i>	Service credited under the system which was rendered before the date of the actuarial valuation.
<i>Actuarial Accrued Liability (“AAL”)</i>	The AAL is the difference between the actuarial present value of all benefits and the actuarial value of future normal costs. The definition comes from the fundamental equation of funding which states that the present value of all benefits is the sum of the Actuarial Accrued Liability and the present value of future normal costs. The AAL may also be referred to as "accrued liability" or "actuarial liability."
<i>Actuarial Assumptions</i>	These assumptions are estimates of future experience with respect to rates of mortality, disability, turnover, retirement, rate or rates of investment income and compensation increases. Actuarial assumptions are generally based on past experience, often modified for projected changes in conditions. Economic assumptions (compensation increases, payroll growth, inflation and investment return) consist of an underlying real rate of return plus an assumption for a long-term average rate of inflation.
<i>Actuarial Cost Method</i>	A mathematical budgeting procedure for allocating the dollar amount of the actuarial present value of the pension trust benefits between future normal cost and actuarial accrued liability. The actuarial cost method may also be referred to as the actuarial funding method.
<i>Actuarial Equivalent</i>	A single amount or series of amounts of equal actuarial value to another single amount or series of amounts, computed on the basis of appropriate actuarial assumptions.
<i>Actuarial Gain (Loss)</i>	The difference in liabilities between actual experience and expected experience during the period between two actuarial valuations is the gain (loss) on the accrued liabilities.
<i>Actuarial Present Value (“APV”)</i>	The amount of funds currently required to provide a payment or series of payments in the future. The present value is determined by discounting future payments at predetermined rates of interest and probabilities of payment.
<i>Actuarial Valuation</i>	The actuarial valuation report determines, as of the actuarial valuation date, the service cost, total pension liability and related actuarial present value of projected benefit payments for pensions.
<i>Actuarial Valuation Date</i>	The date as of which an actuarial valuation is performed.
<i>Actuarially Determined Contribution (“ADC”) or Annual Required Contribution (“ARC”)</i>	A calculated contribution into a defined benefit pension plan for the reporting period, most often determined based on the funding policy of the plan. Typically the Actuarially Determined Contribution has a normal cost payment and an amortization payment.

Glossary of Terms

<i>Amortization Method</i>	The method used to determine the periodic amortization payment may be a level dollar amount, or a level percent of pay amount. The period will typically be expressed in years, and the method will either be “open” (meaning, reset each year) or “closed” (the number of years remaining will decline each year).
<i>Amortization Payment</i>	The amortization payment is the periodic payment required to pay off an interest-discounted amount with payments of interest and principal.
<i>Cost-of-Living Adjustments</i>	Postemployment benefit changes intended to adjust benefit payments for the effects of inflation.
<i>Cost-Sharing Multiple-Employer Defined Benefit Pension Plan (cost-sharing pension plan)</i>	A multiple-employer defined benefit pension plan in which the pension obligations to the employees of more than one employer are pooled and pension plan assets can be used to pay the benefits of the employees of any employer that provides pensions through the pension plan.
<i>Covered-Employee Payroll</i>	The payroll of employees that are provided with pensions through the pension plan.
<i>Deferred Inflows and Outflows</i>	The deferred inflows and outflows of pension resources are amounts used under GASB Statement No. 68 in developing the annual pension expense. Deferred inflows and outflows arise with differences between expected and actual experiences; changes of assumptions. The portion of these amounts not included in pension expense should be included in the deferred inflows or outflows of resources.
<i>Deferred Retirement Option Program (“DROP”)</i>	A program that permits a plan member to elect a calculation of benefit payments based on service credits and salary, as applicable, as of the DROP entry date. The plan member continues to provide service to the employer and is paid for the service by the employer after the DROP entry date; however, the pensions that would have been paid to the plan member are credited to an individual member account within the defined benefit pension plan until the end of the DROP period. Other variations for DROP exist and will be more fully detailed in the plan provision section of the valuation report.
<i>Discount Rate</i>	<p>For GASB purposes, the discount rate is the single rate of return that results in the present value of all projected benefit payments to be equal to the sum of the funded and unfunded projected benefit payments, specifically:</p> <ol style="list-style-type: none">1. The benefit payments to be made while the pension plans’ fiduciary net position is projected to be greater than the benefit payments that are projected to be made in the period; and2. The present value of the benefit payments not in (1) above, discounted using the municipal bond rate.

Glossary of Terms

<i>Entry Age Actuarial Cost Method (“EAN”)</i>	The EAN is a cost method for allocating the costs of the plan between the normal cost and the accrued liability. The actuarial present value of the projected benefits of each individual included in an actuarial valuation is allocated on a level basis (either level dollar or level percent of pay) over the earnings or service of the individual between entry age and assumed exit ages(s). The portion of the actuarial present value allocated to a valuation year is the normal cost. The portion of this actuarial present value not provided for at a valuation date by the actuarial present value of future normal costs is the actuarial accrued liability. The sum of the accrued liability plus the present value of all future normal costs is the present value of all benefits.
<i>Fiduciary Net Position</i>	The fiduciary net position is the market value of the assets of the trust dedicated to the defined benefit provisions.
<i>GASB</i>	The Governmental Accounting Standards Board is an organization that exists in order to promulgate accounting standards for governmental entities.
<i>Long-Term Expected Rate of Return</i>	The long-term rate of return is the expected return to be earned over the entire trust portfolio based on the asset allocation of the portfolio.
<i>Money-Weighted Rate of Return</i>	The money-weighted rate of return is a method of calculating the returns that adjusts for the changing amounts actually invested. For purposes of GASB Statement No. 67, money-weighted rate of return is calculated as the internal rate of return on pension plan investments, net of pension plan investment expense.
<i>Multiple-Employer Defined Benefit Pension Plan</i>	A multiple-employer plan is a defined benefit pension plan that is used to provide pensions to the employees of more than one employer.
<i>Municipal Bond Rate</i>	The Municipal Bond Rate is the discount rate to be used for those benefit payments that occur after the assets of the trust have been depleted.
<i>Net Pension Liability (“NPL”)</i>	The NPL is the liability of employers and non-employer contributing entities to plan members for benefits provided through a defined benefit pension plan.
<i>Non-Employer Contributing Entities</i>	Non-employer contributing entities are entities that make contributions to a pension plan that is used to provide pensions to the employees of other entities. For purposes of the GASB accounting statements, plan members are not considered non-employer contributing entities.
<i>Normal Cost</i>	The portion of the actuarial present value allocated to a valuation year is called the normal cost. For purposes of application to the requirements of this Statement, the term normal cost is the equivalent of service cost.

Glossary of Terms

<i>Other Postemployment Benefits (“OPEB”)</i>	All postemployment benefits other than retirement income (such as death benefits, life insurance, disability and long-term care) that are provided separately from a pension plan, as well as postemployment healthcare benefits regardless of the manner in which they are provided. Other postemployment benefits do not include termination benefits.
<i>Real Rate of Return</i>	The real rate of return is the rate of return on an investment after adjustment to eliminate inflation.
<i>Service Cost</i>	The service cost is the portion of the actuarial present value of projected benefit payments that is attributed to a valuation year.
<i>Total Pension Expense</i>	The total pension expense is the sum of the following items that are recognized at the end of the employer’s fiscal year: <ol style="list-style-type: none">1. Service Cost2. Interest on the Total Pension Liability3. Current-Period Benefit Changes4. Employee Contributions (made negative for addition here)5. Projected Earnings on Plan Investments (made negative for addition here)6. Pension Plan Administrative Expense7. Other Changes in Plan Fiduciary Net Position8. Recognition of Outflow (Inflow) of Resources due to Liabilities9. Recognition of Outflow (Inflow) of Resources due to Assets
<i>Total Pension Liability (“TPL”)</i>	The TPL is the portion of the actuarial present value of projected benefit payments that is attributed to past periods of member service.
<i>Unfunded Actuarial Accrued Liability (“UAAL”)</i>	The UAAL is the difference between actuarial accrued liability and valuation assets.
<i>Valuation Assets</i>	The valuation assets are the assets used in determining the unfunded liability of the plan. For purposes of GASB Statement Nos. 67 and 68, the valuation assets are equal to the market value of assets.