Policemen's Annuity and Benefit Fund of Chicago

Actuarial Valuation Report for the Year Ending December 31, 2018

May 1, 2019

Board of Trustees
Policemen's Annuity and Benefit Fund
City of Chicago
221 North LaSalle Street, Suite 1626
Chicago, Illinois 60601-1404

Subject: Actuarial Valuation Report for the Year Ending December 31, 2018

Dear Members of the Board:

At your request, we have performed an actuarial valuation of the Policemen's Annuity and Benefit Fund of Chicago ("the PABF" or "the Fund") as of December 31, 2018. The primary purposes of this actuarial valuation are to determine the statutory contribution for tax levy year 2020 (i.e., payment year 2021) and to measure the funded status of the Fund as of December 31, 2018, based on the statutes in effect as of December 31, 2018. This report also provides the development of the plan year end 2019 Actuarially Determined Contribution ("ADC") as required by GASB Statement Nos. 67 and 68. Other information required under GASB Statement Nos. 67 and 68 is provided in a separate report. The actuarial assumptions and methods used were recommended by the actuary and approved by the Board.

We have prepared the supporting schedules for the actuarial section of the comprehensive annual financial report, including:

- Summary of Actuarial Valuation Methods and Assumptions;
- Schedule of Active Member Data;
- Retirements and Beneficiaries Added to and Removed from Rolls;
- Prioritized Solvency (Termination) Test;
- Development of Actuarially Determined Contributions under GASB Statement Nos. 67 and 68;
- Development of Actuarial Gains and Losses; and
- Summary of Basic Actuarial Values.

This actuarial valuation is based upon:

Data relative to the members of the Fund – Data for active members and persons receiving benefits from the Fund was provided by the Fund's staff. We have tested this data for reasonableness.

Asset Values – The actuarial value of assets is used in the development of the statutory contribution requirements. In each future fiscal year, gains and losses will be phased in over a five-year period.

Actuarial Method – The actuarial method utilized by the Fund, as required by statute, is the Entry-Age Normal cost method. The objective of this method is to recognize the costs of Fund benefits over the entire career of each member as a level percentage of compensation. Any Unfunded Actuarial Accrued Liability (UAAL) under this method is separately financed. All actuarial gains and losses under this method are reflected in the UAAL.

Actuarial Assumptions – All actuarial assumptions remain unchanged from the prior actuarial valuation and reflect the results of the experience study performed for the period of January 1, 2009 through December 31, 2013, approved by the Board on March 16, 2015, and the investment return and inflation assumptions first effective with the December 31, 2016, actuarial valuation. The assumptions used are set forth in Appendix 4: Actuarial Methods and Assumptions of the Valuation Report.

At its regularly scheduled meeting of May 31, 2019, the Retirement Board of the Policemen's Annuity and Benefit Fund of Chicago authorized Gabriel, Roeder, Smith & Company to perform an experience study of the actuarial assumptions for the five year period January 1, 2014 through December 31, 2018. The primary purpose of the study is to determine the continued appropriateness of the current actuarial assumptions by comparing actual experience to expected experience. The study will be completed in the summer of 2019.

Plan Provisions – The actuarial valuation is based on plan provisions and statutes in effect as of December 31, 2018.

The funding objective of the Fund 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 $420 million in payment year 2016, $464 million in payment year 2017, $500 million in payment year 2018, $557 million in payment year 2019 and $579 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% 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 23.8% (using actuarial value of assets) and the unfunded liability is approximately $10 billion as of December 31, 2018. The funded ratio is not projected to even reach 50% funded for another 25 years until 2043.

The funding policy defined in P.A. 99-0506 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 14 years. This means the unfunded liability is actually projected to increase to a high of $12.0 billion in 2032, when contributions are finally sufficient to start reducing the unfunded liability.

We understand that P.A. 99-0506 defines the amount of City Contributions to the PABF. 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.

The contribution rate in this report is determined using the actuarial assumptions and methods disclosed in Appendix 4 of this report. This report includes risk metrics on page 13 but does not include a more robust assessment of the risks of future experience not meeting the actuarial assumptions. Additional assessment of risks was outside the scope of this report.

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 funding actuarial valuation results contained in this report were prepared based on the statutes in effect as of December 31, 2018. The projected contributions contained in this report will be used to develop the blended discount rate under GASB Statement Nos. 67 and 68.

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, this actuarial statement is complete and accurate based on the statutes in effect as of December 31, 2018, and fairly presents the actuarial position of the Fund as of December 31, 2018. Based on these items, we certify these results to be true and correct.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period or additional cost or contribution requirements based on the plan's funded status); and changes in plan provisions or applicable law.

Actuarial valuations do not affect the ultimate cost of the Plan, only the timing of contributions into the Plan. Plan funding occurs over time. Contribution shortfalls (the difference between the actual contributions and the annual required contributions) remain the responsibility of the Plan sponsor. If the contribution levels over a period of years are lower or higher than necessary, it is normal and expected practice for adjustments to be made to future contribution levels to take account of this variance, with a view to funding the plan over time.

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

This report was prepared at the request of the Board and is intended for use by the Fund and those designated or approved by the Board. This report may be provided to parties other than the Fund only in its entirety and only with the permission of the Fund. GRS is not responsible for unauthorized use of this report.

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

The signing actuaries are independent of the plan sponsor.

Respectfully yours,

Lance J. Weiss, EA, MAAA, FCA
Senior Consultant

Alex Rivera, FSA, EA, MAAA, FCA
Senior Consultant

Table of Contents

Table of Contents

Appendix 3 (Cont'd)

Table of Contents

Summary of Actuarial Valuation Results

This report sets forth the results of the actuarial valuation of the Policemen's Annuity and Benefit Fund of the City of Chicago ("the PABF" or "the Fund") as of December 31, 2018. This actuarial valuation is based on the funding provisions in effect as of December 31, 2018. The purposes of this actuarial valuation are:

1. To provide the statutory contribution for tax levy year 2020 (i.e., payment year 2021) based on the provisions of Public Act 99-0506.
2. To estimate the projected statutory contributions for tax levy years after 2020 based on the provisions of Public Act 99-0506, for purposes of developing the blended discount rate under GASB Statement Nos. 67 and 68.
3. To develop the actuarially determined contributions (ADC) under GASB Statement Nos. 67 and 68 for plan year 2019.
4. To review the funded status of the Fund as of December 31, 2018, based on the statutes in effect as of the actuarial valuation date.

The funded status, in basic terms, is a comparison of Fund liabilities to Fund assets expressed as either unfunded liability or as a ratio of assets to liabilities. This comparison can be measured in various ways. Fund liabilities are dependent on the actuarial assumptions and actuarial cost method. Fund assets can be measured at market value, book value or some variation to smooth the fluctuations that invariably occur from year to year.

Funded status is measured differently for statutory funding and for Fund and City financial reports. The following chart shows how funded status is determined for each purpose.

PURPOSE	ACTUARIAL COST METHOD	ASSET VALUE
Statutory Funding	Entry-Age Normal	Actuarial (Market-Related) Value of Assets
Fund reporting after 2014 (GASB Statement No. 67 for pension benefits)	Entry-Age Normal	Market Value of Assets
City reporting after 2015 (GASB Statement No. 68 for pension benefits)	Entry-Age Normal	Market Value of Assets

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 associated with pay prior to the actuarial valuation date. The Normal Cost is the portion of the present value associated with pay during the current plan year.

The actuarial (market-related) value of assets is determined from market value with investment gains and losses smoothed over a five-year period. The actuarial assumptions used to determine the liabilities are the same in all three measures, with the exception of the investment return assumption.

Summary of Actuarial Valuation Results

Comments on Results

P.A. 99-0506, effective as of May 30, 2016, changed the City's contribution policy to a fixed dollar contribution of $420 million in payment year 2016, $464 million in payment year 2017, $500 million in payment year 2018, $557 million in payment year 2019, and $579 million in payment year 2020. For payment years after 2020, the City is required to make level percent of pay contributions for plan years through 2055 that, along with member contributions and investment earnings, are expected to generate a projected funded ratio of 90% by plan year end 2055.

This actuarial valuation determines the statutory contribution of $737.5 million (57.0% of projected pay) for tax levy year 2020 (i.e., payment year 2021).

Under the current statutory funding policy the funded ratio is projected to increase slowly over the next 12 years from 23.8% in 2018 to 31.7% in 2030. The funded ratio is projected to increase to 45.0% in 2040, 70.3% in 2050, and 90.0% in 2055. The statutory funding policy generates "back-loaded" City contributions with slow growth in the funded ratio. Underfunding the Fund creates the risk that the long-term investment return cannot be supported, minimal investment income is available to pay benefits, or worse, that benefit obligations cannot be met from the trust.

The calculations in this report were prepared based on the funding policy methods required by Public Act 99-0506. In light of the current funded status of this Retirement Fund, we do not endorse this funding policy because the Statutory funding policy defers funding for benefits into the future and places a higher burden on future generations of taxpayers.

We recommend a funding policy that contributes the net normal cost plus amortization of the unfunded actuarial liability over a reasonable period. For example, contributing the net normal cost plus amortization of the unfunded actuarial liability on a level dollar basis over a 30-year period in our opinion would produce a reasonable growth pattern in the funded ratio. Using this basis, the City's Actuarially Determined Contribution ("ADC") for plan year end 2019, net of member contributions, is approximately $933.8 million or 74.7% of payroll which compares to the current statutory contribution of $579.0 million or 46.3% of payroll. The ADC is a required disclosure item under GASB Statement Nos. 67 and 68. We recognize that the State Statute governs the funding policy of the Fund. The purpose of these recommendations is to highlight the difference between the Statutory appropriation methodology and an actuarially sound funding policy and to highlight the risks and additional costs of continuing to underfund the Fund.

Effective with Fiscal Year Ending December 31, 2014, GASB Statement No. 67 replaced GASB Statement No. 25 for pension plan financial reporting requirements. GASB Statement No. 68 replaced GASB Statement No. 27 for employer financial reporting effective with fiscal year ending December 31, 2015. The discount rate used for GASB Statement Nos. 67 and 68 reporting purposes will be based on a single equivalent discount rate using a combination of 7.25% for the projected benefits for all current members that can be paid from current assets and projected investment return, future employee contributions from current members, and future employer contributions attributable to current members, and a municipal bond rate for the portion of the projected benefits after assets are depleted.

Summary of Actuarial Valuation Results

The municipal bond rate is based on a yield or index rate for 20-year, tax exempt general obligation municipal bonds with an average rating of AA/Aa or higher (or equivalent quality on another rating scale). We believe the liability based on the GASB single equivalent discount rate will become an important liability for users of the Fund's financial information.

Due to the single equivalent discount rate and shorter amortization periods required under GASB Statement Nos. 67 and 68, the unfunded liabilities and pension expense will be much higher and more volatile than under the prior GASB standards. The measurements required under GASB Statement Nos. 67 and 68 are provided in a separate report.

Total actuarial liabilities were approximately $270 million less than expected. The key factors affecting the decrease in actuarial liability include actual salary increases less than assumed and other favorable demographic experience.

There was a loss on invested assets due to an approximate return of (4.48)% on market value compared with the assumed return of 7.25%.

The unfunded liability, under the methods used to develop the projected statutory contributions, decreased from an expected value of $10.23 billion to $10.07 billion. The key reasons for the decrease include favorable demographic experience.

Using the actuarial value of assets produced an unfunded liability of $10.07 billion and a funded ratio of 23.8%. Using the market value of assets produced an unfunded liability of $10.31 billion and a funded ratio 22.0%. Using the book value of assets produced an unfunded liability of $10.34 billion and a funded ratio of 21.7%.

Please note the highlighted area on page 32 showing the age/service distribution for active members. A large portion of the population is at or nearing retirement. We should continue to monitor this as the ratio of actives to retirees has been steadily declining, which can ultimately have a large impact on contribution requirements. A more thorough examination of these and other factors can be found in the Analysis of Actuarial Assumptions explanation on pages 10 and 11 and the gain/loss information in Table 5.

A summary of the primary results of this actuarial valuation is shown in the following table.

Summary of Actuarial Valuation Results

Actuarial Valuation at:	12/31/2017		12/31/2018	
	$ in Millions	% of Proj Pay [1]	$ in Millions	% of Proj Pay [1]
Contribution Levels				
Statutory Contribution [2]	$ 557.00	47.00%	$ 579.00	46.34%
(Tax Levy Year)	(2018)		(2019)	
(Payment Year)	(2019)		(2020)	
Statutory Contribution			737.53	57.00
(Tax Levy Year)			(2020)	
(Payment Year)			(2021)	
Actuarially Determined Contribution [3]	924.65	78.03	933.77	74.73
(Plan Year)	(2018)		(2019)	
	$ in Millions	% of Pay [1]	$ in Millions	% of Pay [1]
Funded Status - Actuarial Value				
Actuarial Value of Assets	$ 3,103.99	269.82%	$ 3,145.14	260.94%
Actuarial Liability	13,093.88	1,138.20	13,214.66	1,096.36
Funded Ratio	23.71%	N/A	23.80%	N/A
Funded Status - Market Value				
Market Value of Assets	$ 3,122.07	271.39%	$ 2,905.18	241.03%
Actuarial Liability	13,093.88	1,138.20	13,214.66	1,096.36
Funded Ratios	23.84%	N/A	21.98%	N/A
Funded Status - ADC Value				
Actuarial Value of Assets	$ 3,103.99	269.82%	$ 3,145.14	260.94%
Actuarial Liability - Entry Age [4]	13,093.88	1,138.20	13,214.66	1,096.36
Funded Ratios	23.71%	N/A	23.80%	N/A

[1] *For the actuarial valuation as of December 31, 2017, payroll as of the valuation date was $1,150 million and projected payroll was estimated to be $1,185 million in 2018. For the actuarial valuation as of December 31, 2018, payroll as of the valuation date was $1,205 million and projected payroll is estimated to be $1,250 million in 2019.*

[2] *Pursuant to P.A. 99-0506, the fiscal year 2018 tax levy, payable in fiscal year 2019, is equal to $557,000,000 and the fiscal year 2019 tax levy, payable in fiscal year 2020, is equal to $579,000,000. The statutory contribution expressed as a percentage of pay is based on projected payroll for the respective tax levy year.*

[3] *The ADC for fiscal year December 31, 2019, was based on a 30-year level dollar amortization policy.*

[4] *Used to determine the Actuarially Determined Contribution under GASB Statement Nos. 67 and 68.*

Five-Year Projection of Statutory Contributions

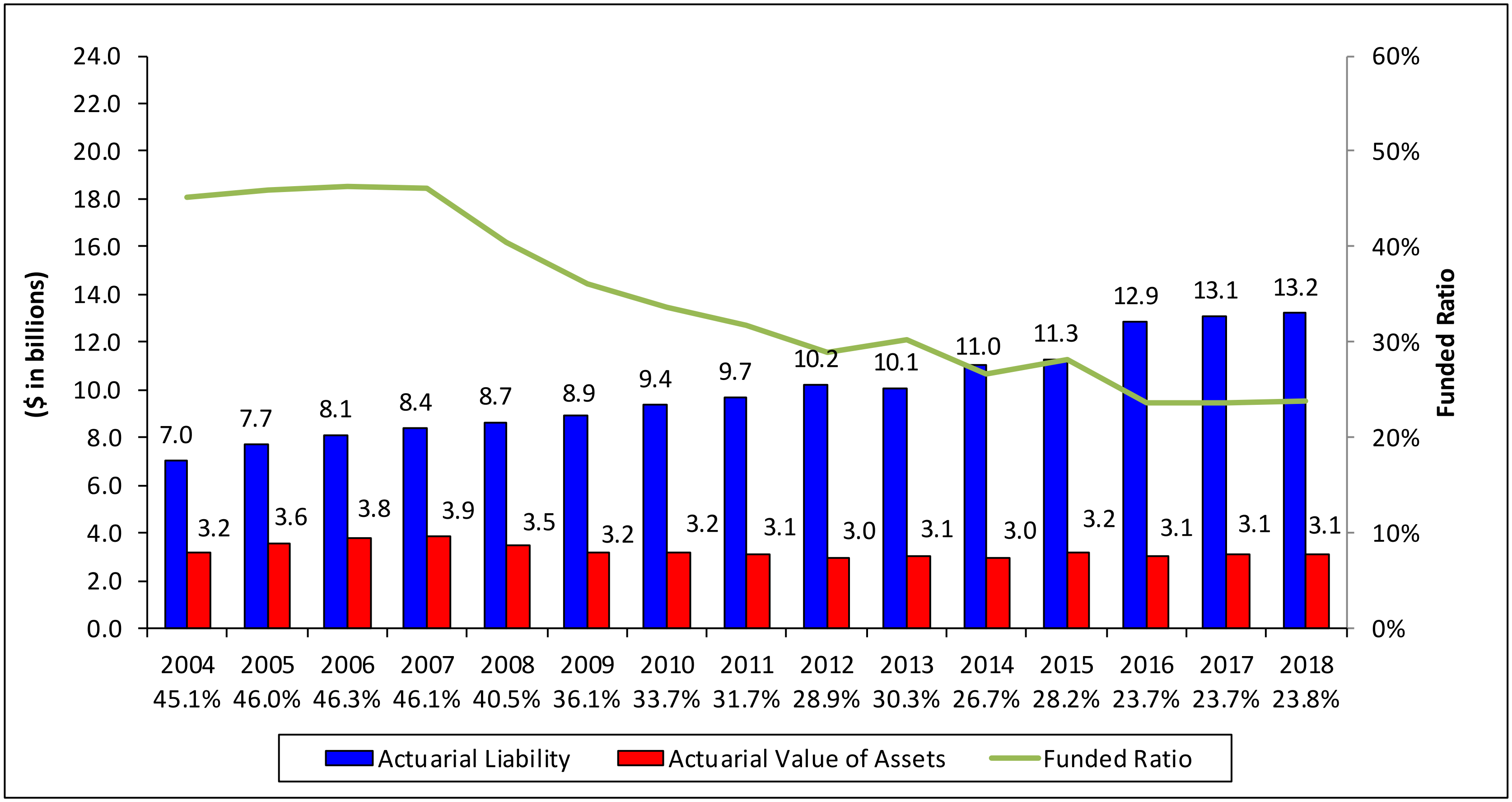
Following is a five-year projection of the statutory contributions based on fixed dollar contributions for payment years 2019 through 2020 and statutory actuarial calculations after payment year 2020.

City Contributions as of December 31, 2018 $ in thousands		
Tax Levy Year	**Payment Year**	**Statutory Contribution**
2018	2019	$ 557,000
2019	2020	579,000
2020	2021	737,527
2021	2022	763,981
2022	2023	785,718
2020 & Thereafter as % of Projected Pay	2021 & Thereafter	57.0%

Statutory Contributions for tax levy years 2021 and 2022 are projected amounts

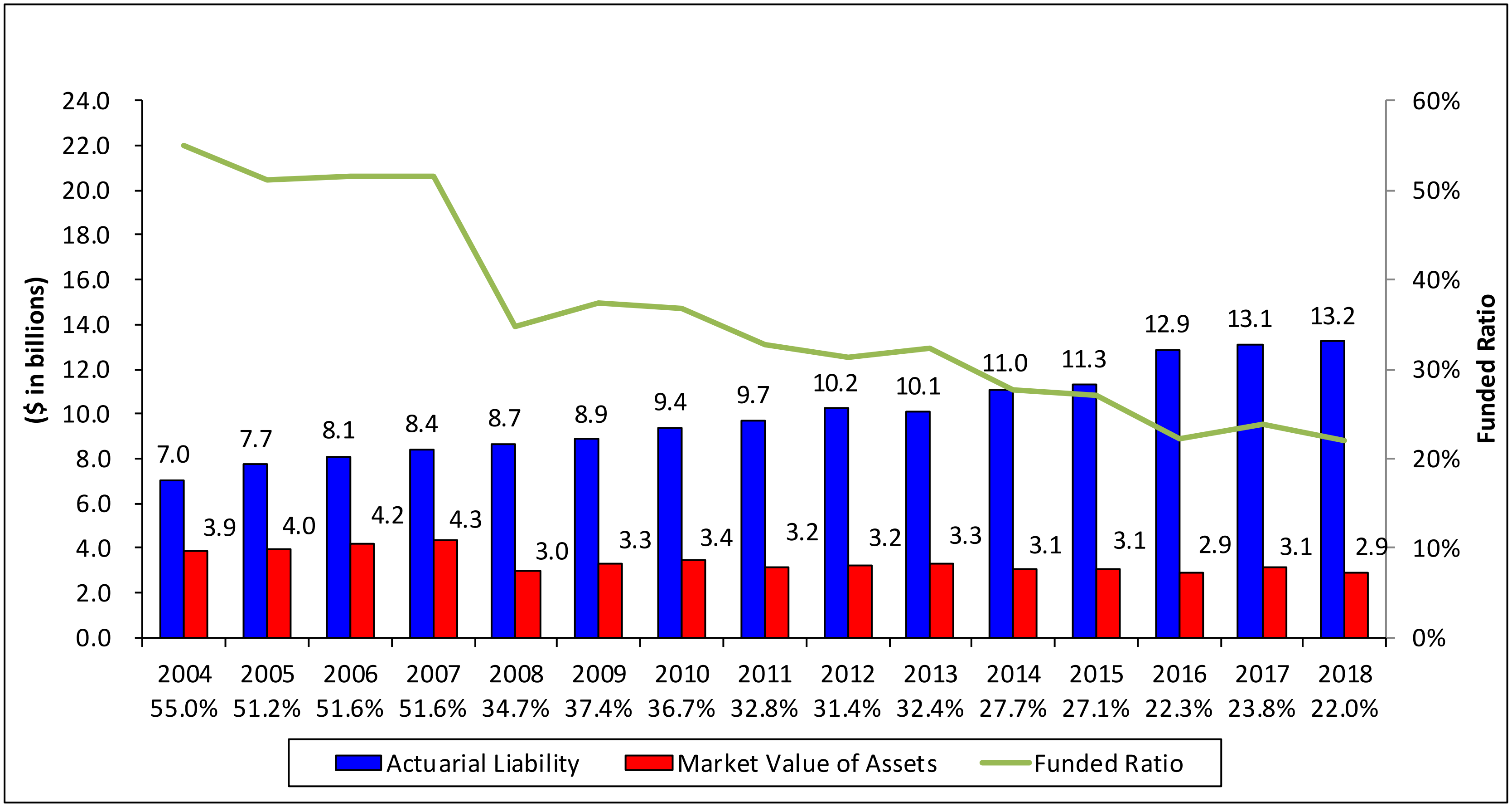
The statutory contribution for payment year 2021 is $737.5 million, which is approximately 57.0% of projected payroll in 2021. After 2021, the projected city contribution is 57.0% of projected payroll but will increase as a dollar amount as payroll increases. Full projection results through 2055 are shown in Table 3a. The Statutory contributions set forth in this report represent the contribution amount determined consistent with the state Statute.

Components of Funded Ratio
State Reporting



State reporting for 2016 through 2018 uses the Entry-Age Normal cost method. Years 2013 through 2015 used Projected Unit Credit for Actuarial Liabilities. Actuarial Liabilities prior to 2013 also use the Entry-Age Normal cost method. State reporting of assets is based on Actuarial (Market-Related) Value for Assets beginning in 2013 and Book Value of assets prior to 2013.

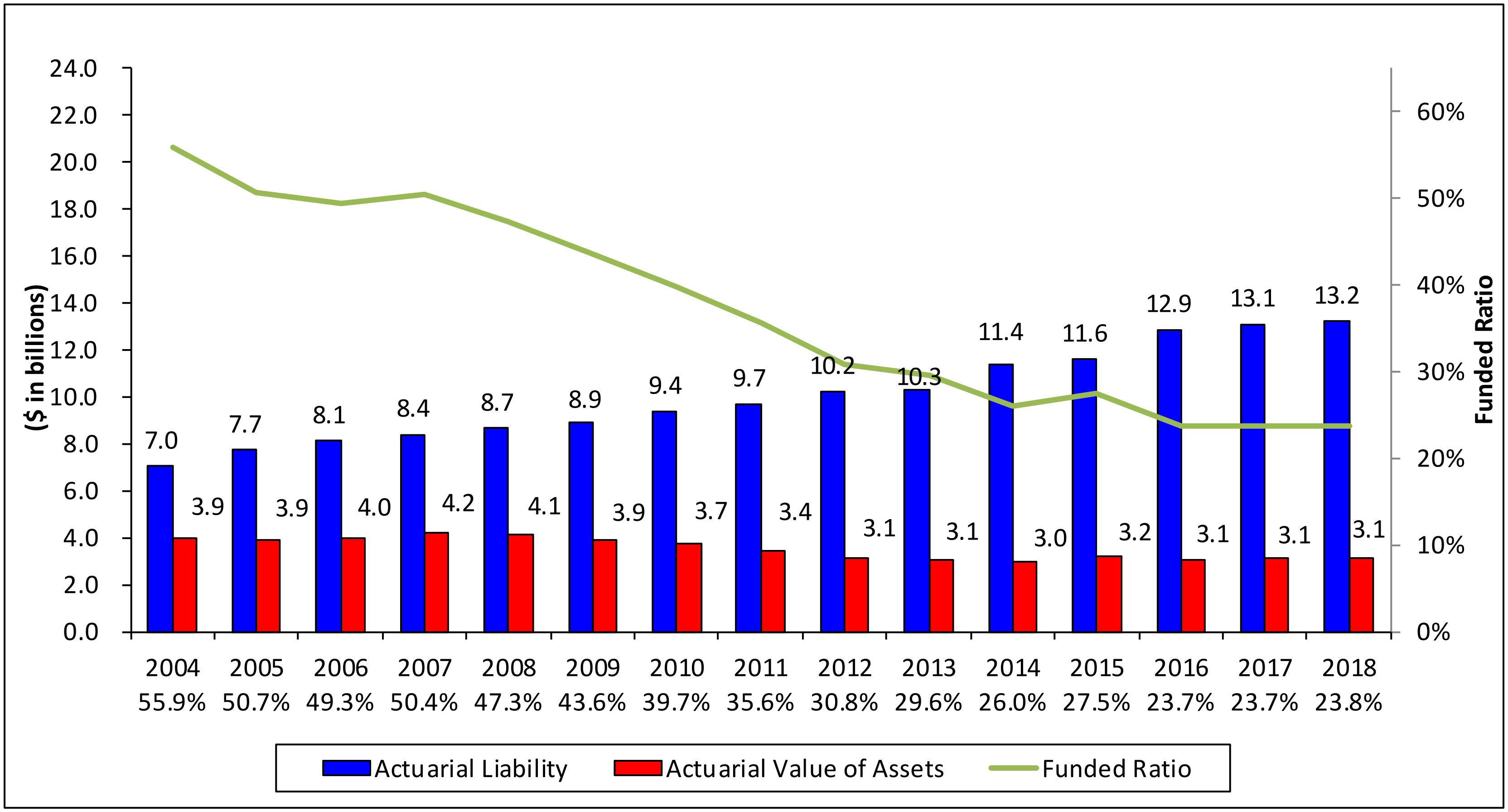
Components of Funded Ratio
Market Value of Assets



Years 2013 through 2015 used Projected Unit Credit for Actuarial Liabilities and Actuarial Liabilities for 2016 through 2018 and all years prior to 2013 used the Entry-Age Normal cost method. Market Value of Assets used for all years.

Summary of Actuarial Valuation Results

Components of Funded Ratio
Based on ADC under GASB Statement Nos. 67 and 68



ADC (under GASB) Actuarial Value of Assets based on five-year smoothing for all years. Actuarial Liabilities uses Entry-Age Normal cost method for all years.

Summary of Actuarial Valuation Results

Participants

	December 31, 2017	December 31, 2018
Active Participants		
Number	12,633	13,438
Average Age	42.6	41.9
Average Service	14.4	13.8
Average Annual Salary	$91,064 [1]	$89,695 [2]
Retirees		
Number	9,899	9,930
Average Age	69.4	69.7
Average Monthly Benefit	$5,468	$5,620
Survivors		
Number	3,122	3,117
Average Age	76.3	76.4
Average Monthly Benefit	$1,913	$1,979

[1] *Average annual salary for fiscal year end December 31, 2017 would have been $87,985 without the addition of duty availability pay.*
[2] *Average annual salary for fiscal year end December 31, 2018 would have been $86,899 without the addition of duty availability pay.*

The major characteristics of the Fund participants are summarized as follows:

A large portion of the active participant population is nearing or is eligible for retirement; 35.4% of the workforce is between the ages of 45 and 54, while 30.4% have 20 or more years of service. Total participants receiving benefits under the Fund, including retirees, disabilities, survivors and children increased 0.02% during 2018 from 13,628 to 13,631. The total retiree count increased by 0.3% during 2018. Total expenditures for benefits increased from $747.9 million in 2017 to $771.1 million during 2018, or 3.10%. There are more participants receiving benefits under the Fund than active members accruing benefits.

Changes in Provisions of the Fund

The following Public Act passed in 2018 by the 100th General Assembly, included changes to the Fund Provisions but did not impact the results of the actuarial valuation.

P.A. 100-1148, effective December 10, 2018

Technical correction related to filing copies of the report as required by Section 3.1 of the General Assembly Organizational Act and with the State Government Report Distribution Center for the General Assembly.

Summary of Actuarial Valuation Results

Analysis of Actuarial Assumptions

Actuarial assumptions are used to project future demographic and economic expectations for purposes of valuing the liabilities of the plan. The assumptions should reflect current patterns. However, their primary orientation is the long-term outlook for each factor affecting the valuation. Thus, while actual experience will fluctuate over the short run, actuarial assumptions are chosen in an attempt to model the future long run experience.

There are two general types of actuarial assumptions:

1. Demographic Assumptions — reflect the flow of participants into and out of a retirement system; and

2. Economic Assumptions — reflect the effect of the economic climate on a retirement system.

Demographic assumptions can be readily studied over recent plan experience. Economic assumptions can be studied against recent experience; however, future experience is more likely to be a result of outside factors than of plan specifics. The most significant demographic assumptions are active turnover, retirement, disability incidence and post-retirement mortality. The most significant economic assumptions are pay increases, investment return and inflation. Other actuarial assumptions include active mortality and percent married.

2018 Gain/Loss Analysis

We performed a gain/loss analysis of the major factors which contributed to the change in the unfunded actuarial liability between December 31, 2017 and December 31, 2018. A discussion by source follows.

Turnover

We reviewed withdrawals in 2018 from the Fund for reasons other than retirement, death or disability for members with less than 20 years of service. The ratio of actual withdrawals to expected withdrawals was 106% (6% more than expected). The overall result is a small actuarial loss.

Retirement

There were fewer retirements from active members during 2018 than expected. The ratio of actual retirements to expected retirements was 79%, resulting in an actuarial gain to the Fund.

Disability

The number of new disabled participants during 2018 was less than expected. The ratio of actual to expected disability was 34%, resulting in an actuarial gain to the Fund.

Summary of Actuarial Valuation Results

Mortality

There were more active member deaths and more annuitant deaths than expected during 2018, which resulted in a net actuarial gain to the Fund.

Pay Increase

For continuing active members in the 2017 and 2018 actuarial valuations average salaries increased by 3.52% based on members' pay rate as of December 31 in each respective year. This was less than the expected increase of 5.53% from the 2017 salary. The smaller than expected salary increases resulted in an actuarial gain to the Fund.

Investment Return

During 2018, assets earned (4.48)% on a market basis, 7.40% on a book basis and 3.92% on an actuarial basis which compares to the 2018 assumed return of 7.25%. During the year, the fund experienced a market value asset loss due to investment performance, and an actuarial loss on an actuarial (smoothed) value basis.

Data and Other Sources

There were small actuarial gains in liabilities due to data corrections and other sources.

Plan Provision Changes

The legislative changes to the Fund during calendar year 2018 did not directly impact the actuarial accrued liability as of December 31, 2018.

Assumption Changes

There were no changes to the actuarial assumptions during the plan year ending December 31, 2018.

Conclusion

Overall, we believe that the actuarial assumptions are reasonable for the purpose of the measurement of the Fund's costs in effect as of December 31, 2018, under the provisions of P.A. 99-0506. Table 5 of Appendix 1 shows a more detailed development of the actuarial gains and losses for the plan year ending December 31, 2018.

We recommend that an experience study be performed after completion of the actuarial valuation as of December 31, 2018, covering the period December 31, 2013, through December 31, 2018.

Risks Associated with Measuring the Accrued Liability and Actuarially Determined Contribution

The determination of the accrued liability and the statutory contribution requires the use of actuarial assumptions regarding future economic and demographic experience. Risk measures, as illustrated in this report, are intended to aid in the understanding of the effects of future experience differing from the actuarial assumptions used in the course of the actuarial valuation. Risk measures may also help with illustrating the potential volatility in the accrued liability and the total required employer contribution that result from the differences between actual experience and the actuarial assumptions.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions due to changing conditions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period, or additional cost or contribution requirements based on the Fund's funded status); and changes in plan provisions or applicable law. The scope of this actuarial valuation does not include an analysis of the potential range of such future measurements.

Examples of risk that may reasonably be anticipated to significantly affect the Fund's future financial condition include:

1. Investment risk – actual investment returns may differ from the expected returns;
2. Asset/Liability mismatch – changes in asset values may not match changes in liabilities, thereby altering the gap between the accrued liability and assets and consequently altering the funded status and contribution requirements;
3. Contribution risk – actual contributions may differ from expected future contributions. For example, actual contributions may not be made in accordance with the Fund's funding policy or material changes may occur in the anticipated number of covered employees, covered payroll, or other relevant contribution base;
4. Salary and Payroll risk – actual salaries and total payroll may differ from expected, resulting in actual future accrued liability and contributions differing from expected;
5. Longevity risk – members may live longer or shorter than expected and receive pensions for a period of time other than assumed; and
6. Other demographic risks – members may terminate, retire or become disabled at times other than assumed resulting in actual future accrued liability and contributions differing from expected.

The effects of certain trends in experience can generally be anticipated. For example if the investment return since the most recent actuarial valuation is less (or more) than the assumed rate, the cost of the plan can be expected to increase (or decrease). Likewise if longevity is improving (or worsening), increases (or decreases) in cost can be anticipated.

The statutory contribution for tax levy year 2020 shown on page 20 should be considered as the minimum contribution that complies with the funding policy governed by statute. The timely receipt of the statutory contribution is critical to support the financial health of the Fund. Users of this report should be aware that contributions made at the statutorily determined amount do not necessarily guarantee benefit security.

Plan Maturity Measures

Risks facing a pension plan evolve over time. A young plan with virtually no investments and paying few benefits may experience little investment risk. An older plan with a large number of members in pay status and a significant trust may be much more exposed to investment risk. Generally accepted plan maturity measures include the following:

	2017	2018
Ratio of the Market Value of Assets to Covered Payroll	2.71	2.41
Ratio of Actuarial Accrued Liability to Covered Payroll	11.38	10.96
Ratio of Actives to Retirees and Beneficiaries	0.95	1.00
Ratio of Net Cash Flow to Market Value of Assets	-4.97%	-2.72%

Ratio of Market Value of Assets to Payroll

The relationship between assets and payroll is a useful indicator of the potential volatility of contributions. For example, if the market value of assets is 5.0 times the payroll, a return on assets 5 percent different than assumed would equal 25 percent of payroll. A higher (lower) or increasing (decreasing) level of this maturity measure generally indicates a higher (lower) or increasing (decreasing) volatility in plan sponsor contributions as a percentage of payroll.

Ratio of Actuarial Accrued Liability to Payroll

The relationship between actuarial accrued liability and payroll is a useful indicator of the potential volatility of contributions for a fully funded plan. A funding policy that targets a funded ratio of 100 percent is expected to result in the ratio of assets to payroll and the ratio of liability to payroll converging over time.

The ratio of liability to payroll may also be used as a measure of sensitivity of the liability itself. For example, if the actuarial accrued liability is 13 times the payroll, a change in liability 2 percent other than assumed would equal 26 percent of payroll. A higher (lower) or increasing (decreasing) level of this maturity measure generally indicates a higher (lower) or increasing (decreasing) volatility in liability (and also plan sponsor contributions) as a percentage of payroll.

Risks Associated with Measuring the Accrued Liability and Actuarially Determined Contribution

Ratio of Actives to Retirees and Beneficiaries

A young plan with many active members and few retirees will have a high ratio of active to retirees. A mature open plan may have close to the same number of actives to retirees resulting in a ratio near 1.0. A super-mature or closed plan may have significantly more retirees than actives resulting in a ratio below 1.0.

Ratio of Net Cash Flow to Market Value of Assets

A positive net cash flow means contributions exceed benefits and expenses. A negative cash flow means existing funds are being used to make payments. A certain amount of negative net cash flow is generally expected to occur when benefits are prefunded through a qualified trust. Large negative net cash flows as a percent of assets may indicate a super-mature plan or a need for additional contributions.

Additional Risk Assessment

Additional risk assessment is outside the scope of the annual actuarial valuation. Additional assessment may include scenario tests, sensitivity tests, stochastic modeling, stress tests and a comparison of the present value of accrued benefits at low-risk discount rates with the actuarial accrued liability.

APPENDIX 1

RESULTS OF ACTUARIAL VALUATION

Summary

Table 1A

	December 31, 2017	December 31, 2018
Assets		
Book Value - Beginning of Year	$ 2,706,810,585	$ 2,750,013,384
Income		
Investment Income Net of Expenses	$ 198,345,714	$ 200,634,126
Employer Contributions	494,483,191	588,034,930
Employee Contributions	103,011,250	107,186,492
Miscellaneous	97,239	1,600,348
Subtotal	$ 795,937,394	$ 897,455,896
Outgo (Refunds, Benefits, & Administration)	$ 752,734,595	$ 775,731,040
Book Value - End of Year	$ 2,750,013,384	$ 2,871,738,240
Market Value - End of Year	3,122,066,293	2,905,179,841
Actuarial Value - End of Year	3,103,989,602	3,145,136,204
Member Counts		
Active	12,633	13,438
Retirees	9,899	9,930
Survivors	3,122	3,117
Disabilities	268	247
Inactives	640	721
Children	339	337
Payroll Data		
Valuation Payroll	$ 1,150,406,094	$ 1,205,324,445
Average Salary	91,064	89,695

Table 1B

Actuarial Values	December 31, **2017**	December 31, **2018**
Statutory Funding		
Actuarial Liability	$ 13,093,882,568	$ 13,214,658,111
Assets - Actuarial Value	3,103,989,602	3,145,136,204
Unfunded Liability	9,989,892,966	10,069,521,907
Funded Ratio	23.71%	23.80%
Statutory Employer Contribution [1]	$ 557,000,000	$ 579,000,000
(Tax Levy Year)	(2018)	(2019)
Book Value Funding		
Actuarial Liability	$ 13,093,882,568	$ 13,214,658,111
Assets - Book Value	2,750,013,384	2,871,738,240
Unfunded Liability	10,343,869,184	10,342,919,871
Funded Ratio	21.00%	21.73%
Termination Values		
Liability	$ 9,908,323,446	$ 10,032,841,883
Deficiency	7,158,310,062	7,161,103,643
Quick Ratio	27.75%	28.62%
Market Value Funding		
Actuarial Liability	$ 13,093,882,568	$ 13,214,658,111
Assets - Market Value	3,122,066,293	2,905,179,841
Unfunded Liability	9,971,816,275	10,309,478,270
Funded Ratio	23.84%	21.98%
ADC Values		
Actuarial Liability - Entry Age [2]	$ 13,093,882,568	$ 13,214,658,111
Assets - Actuarial Value	3,103,989,602	3,145,136,204
Unfunded Liability [2]	9,989,892,966	10,069,521,907
Funded Ratio	23.71%	23.80%
Actuarially Determined Contribution (ADC)	924,653,899	933,769,914
(Plan Year End)	(2018)	(2019)

[1]Pursuant to P.A. 99-0506, effective May 30, 2016, the fiscal year 2019 tax levy, payable in fiscal year 2020, is equal to $579,000,000 and the fiscal year 2020, tax levy, payable in fiscal year 2021, is estimated to be $737,527,285.
[2]Used to develop the Actuarially Determined Contribution under GASB Statement Nos. 67 and 68.

Table 1C

Active Accrued Liability and Normal Cost by Tier
As of December 31, 2018

	Tier 1 Members	Tier 2 Members[1]	Total
(1) Count	8,869	4,569	13,438
(2) Payroll	$ 883,800,855	$ 321,523,590	$ 1,205,324,445
(3) Average Payroll	$ 99,651	$ 70,371	$ 89,695
(4) Actuarial Accrued Liability (AAL)	$ 4,619,899,693	$ 155,466,677	$ 4,775,366,370
(5) Total Normal Cost	$ 177,724,434	$ 54,049,752	$ 231,774,186
(6) Total Normal Cost as a Percent of Pay	20.1%	16.8%	19.2%
(7) Estimated Member Contributions[2]	$ 81,285,835	$ 29,611,771	$ 110,897,606
(8) Net Normal Cost	$ 96,438,599	$ 24,437,981	$ 120,876,580
(9) Net Normal Cost as a Percent of Pay	10.9%	7.6%	10.0%

[1]*Members hired on or after January 1, 2011.*

[2]*Based on expected capped pay for plan year end December 31, 2018.*

Summary of Basic Actuarial Values

Table 2

	Actuarial Present Value (APV) of Projected Benefits As of 12/31/2018	Actuarial Accrued Liability (AAL) As of 12/31/2018
(1) Values for Active Members		
(a) Retirement	$6,368,190,525	$4,549,392,072
(b) Termination	102,670,455	13,051,503
(c) Disability	485,833,402	183,094,952
(d) Death	68,012,771	29,827,843
Total for Actives	$7,024,707,153	$4,775,366,370
(2) Values for Inactive Members		
(a) Retired	$7,518,434,109	$7,518,434,109
(b) Survivor	626,165,999	626,165,999
(c) Disability	235,944,824	235,944,824
(d) Inactive (Deferred Vested/ Terminated Pending Refund)	49,179,378	49,179,378
(e) Children	9,567,431	9,567,431
Total for Inactives	$8,439,291,741	$8,439,291,741
(3) Grand Totals	$15,463,998,894	$13,214,658,111
(4) Normal Cost for Active Members	$ 231,774,186	
(5) Actuarial Present Value of Future Compensation	$13,379,286,380	

Development of Statutory Contribution

Table 3a

Actuarial Valuation Projection Results as of December 31, 2018
Discount Rate of 7.25%
($ in Thousands)

Year Ending	Actuarial Accrued Liability	Market Value of Assets	Actuarial Value of Assets	Unfunded Liability	Actuarial Value Funded Ratio [1]	Capped Payroll	Employer Normal Cost	Statutory Contribution [2]	Statutory Contribution as % of Pay	Employee Contributions	Benefit Payments	Admin Expenses
2018	$13,214,658	$2,905,180	$3,145,136	$10,069,522	23.80%	$1,205,324	$117,052	$ 589,635	48.9%	$107,186	$771,104	$ 4,627
2019	13,595,697	2,968,312	3,116,087	10,479,611	22.92%	1,249,509	120,877	579,000	46.3%	110,898	797,206	4,754
2020	13,979,165	3,178,548	3,281,155	10,698,010	23.47%	1,294,144	111,755	737,527	57.0%	124,317	825,990	4,885
2021	14,362,560	3,399,343	3,471,646	10,890,914	24.17%	1,340,563	111,767	763,981	57.0%	128,757	857,515	5,019
2022	14,743,602	3,627,415	3,627,415	11,116,186	24.60%	1,378,703	111,345	785,718	57.0%	132,374	889,938	5,157
2023	15,120,207	3,860,247	3,860,247	11,259,960	25.53%	1,414,739	110,945	806,254	57.0%	135,873	924,105	5,299
2024	15,490,779	4,096,604	4,096,604	11,394,176	26.45%	1,450,108	110,492	826,411	57.0%	139,338	959,416	5,444
2025	15,852,987	4,334,339	4,334,339	11,518,648	27.34%	1,484,434	109,961	845,973	57.0%	142,815	996,485	5,594
2026	16,204,737	4,572,783	4,572,783	11,631,955	28.22%	1,519,479	109,152	865,945	57.0%	146,222	1,034,631	5,748
2027	16,544,479	4,812,436	4,812,436	11,732,043	29.09%	1,556,372	108,152	886,970	57.0%	149,738	1,073,456	5,906
2028	16,871,724	5,054,397	5,054,397	11,817,327	29.96%	1,594,175	107,028	908,514	57.0%	153,240	1,111,771	6,068
2029	17,186,716	5,300,344	5,300,344	11,886,372	30.84%	1,632,682	105,927	930,459	57.0%	156,754	1,149,011	6,235
2030	17,490,081	5,551,914	5,551,914	11,938,167	31.74%	1,671,084	104,914	952,344	57.0%	160,304	1,184,916	6,407
2031	17,782,714	5,811,959	5,811,959	11,970,756	32.68%	1,710,643	103,852	974,888	57.0%	163,896	1,219,136	6,583
2032	18,065,614	6,083,257	6,083,257	11,982,357	33.67%	1,751,190	102,930	997,996	57.0%	167,665	1,251,970	6,764
2033	18,339,748	6,369,750	6,369,750	11,969,998	34.73%	1,794,417	102,057	1,022,631	57.0%	171,650	1,283,462	6,950
2034	18,606,814	6,676,417	6,676,417	11,930,397	35.88%	1,840,522	101,235	1,048,906	57.0%	175,824	1,312,951	7,141
2035	18,869,349	7,007,870	7,007,870	11,861,480	37.14%	1,886,972	100,470	1,075,378	57.0%	180,033	1,339,588	7,338
2036	19,129,458	7,367,738	7,367,738	11,761,720	38.52%	1,932,349	99,687	1,101,238	57.0%	184,185	1,363,798	7,539
2037	19,387,968	7,754,672	7,754,672	11,633,296	40.00%	1,969,068	98,454	1,122,164	57.0%	187,464	1,385,671	7,747
2038	19,645,212	8,165,862	8,165,862	11,479,350	41.57%	1,995,737	96,858	1,137,363	57.0%	189,849	1,405,809	7,960
2039	19,902,327	8,604,005	8,604,005	11,298,322	43.23%	2,021,568	95,189	1,152,084	57.0%	192,061	1,424,503	8,179
2040	20,160,335	9,071,458	9,071,458	11,088,877	45.00%	2,046,583	93,675	1,166,340	57.0%	194,236	1,442,326	8,404
2041	20,420,529	9,572,426	9,572,426	10,848,103	46.88%	2,073,180	92,208	1,181,497	57.0%	196,461	1,459,062	8,635
2042	20,684,285	10,110,790	10,110,790	10,573,495	48.88%	2,100,664	90,967	1,197,160	57.0%	198,850	1,475,027	8,872
2043	20,952,276	10,689,840	10,689,840	10,262,435	51.02%	2,128,801	89,904	1,213,195	57.0%	201,269	1,490,807	9,116
2044	21,224,853	11,312,433	11,312,433	9,912,421	53.30%	2,157,047	89,013	1,229,292	57.0%	203,743	1,506,778	9,367
2045	21,501,625	11,980,837	11,980,837	9,520,789	55.72%	2,185,324	88,282	1,245,407	57.0%	206,225	1,523,624	9,624
2046	21,782,429	12,698,501	12,698,501	9,083,929	58.30%	2,215,022	87,741	1,262,332	57.0%	208,822	1,541,235	9,889
2047	22,067,112	13,468,883	13,468,883	8,598,229	61.04%	2,245,826	87,454	1,279,887	57.0%	211,550	1,559,675	10,161
2048	22,354,988	14,295,201	14,295,201	8,059,787	63.95%	2,277,704	87,376	1,298,054	57.0%	214,372	1,579,365	10,440
2049	22,644,618	15,179,961	15,179,961	7,464,657	67.04%	2,310,280	87,535	1,316,619	57.0%	217,297	1,601,018	10,728
2050	22,934,578	16,126,047	16,126,047	6,808,530	70.31%	2,343,702	87,943	1,335,667	57.0%	220,279	1,624,486	11,023
2051	23,224,288	17,137,534	17,137,534	6,086,754	73.79%	2,377,916	88,537	1,355,165	57.0%	223,302	1,648,772	11,326
2052	23,514,062	18,219,690	18,219,690	5,294,371	77.48%	2,412,879	89,330	1,375,090	57.0%	226,366	1,672,987	11,637
2053	23,804,913	19,378,819	19,378,819	4,426,093	81.41%	2,448,494	90,292	1,395,387	57.0%	229,473	1,696,447	11,957
2054	24,097,709	20,621,400	20,621,400	3,476,309	85.57%	2,484,637	91,418	1,415,985	57.0%	232,623	1,719,358	12,286
2055	24,393,268	21,954,316	21,954,316	2,438,951	90.00%	2,521,357	92,688	1,436,911	57.0%	235,816	1,741,809	12,624

[1] *The funded ratio includes receivable contributions.*

[2] *Contribution receivable to be paid in the following fiscal year.*

Development of Statutory Contribution

Table 3b

	Total
(1) Total Normal Cost for 2020	$ 236,072,393
(2) Actuarial Accrued Liability (AAL) at 12/31/2019 [1]	$ 13,595,697,436
(3) Unfunded AAL (UAAL)	
(a) Actuarial Value of Assets at 12/31/2019	$ 3,116,086,747
(b) UAAL (2-3(a))	10,479,610,689
(4) Estimated Member Contributions during 2020	$ 124,317,000
(5) Estimated City Contribution for Tax Levy Year 2020	$ 737,527,285

[1] *Pension liabilities were discounted at 7.25% per year.*

Development of Actuarially Determined Contribution under GASB Statement Nos. 67 and 68 for 2019

Table 4

	Total
(1) Total Normal Cost for 2019	$ 231,774,186
(2) Actuarial Accrued Liability (AAL) at 12/31/2018	$ 13,214,658,111
(3) Unfunded AAL (UAAL)	
(a) Actuarial Value of Assets at 12/31/2018	$ 3,145,136,204
(b) UAAL (2-3(a))	10,069,521,907
(4) Amortization Payable at Beginning of Year [1]	$ 775,701,691
(5) Estimated Member Contributions in 2019	$ 110,897,606
(6) Actuarially Determined Contribution (ADC) for 2019	
(a) Interest Adjustment for Semimonthly Payment	37,191,643
(b) Annual Required Contribution (1 + 4 - 5 + 6(a))	$ 933,769,914
(c) Annual Required Contribution (Percent of Pay)	74.73%
(7) Estimated City Contribution for Tax Levy Year 2019	
(a) in Dollars	$ 579,000,000
(b) as a Percentage of Pay	46.34%
(8) Estimated Deficiency/(Excess) for 2019	
(a) in Dollars (6(b)-7(a))	$ 354,769,914
(b) as a Percentage of Pay	28.39%

[1] *Amortization is over a 30-year period as a level dollar amount.*

Development of Actuarial Gains and Losses for 2018

Table 5

UNFUNDED ACTUARIAL ACCRUED LIABILITY - BEGINNING OF 2018		
(1)	Actuarial Accrued Liability - 12/31/2017	$13,093,882,568
(2)	Actuarial Value of Assets - 12/31/2017	3,103,989,602
(3)	Unfunded Accrued Actuarial Liability - 12/31/2017	$9,989,892,966
EXPECTED UNFUNDED ACTUARIAL ACCRUED LIABILITY - END OF 2018		
(4)	Normal Cost for 2018	$ 224,238,368
(5)	Total Contributions for 2018	696,821,770
(6)	Interest on (3), (4), & (5) at Valuation Rates	715,706,686
(7)	Expected Unfunded Actuarial Accrued Liability - 12/31/2018 ((3)+(4)-(5)+(6))	$10,233,016,250
DEVIATIONS FROM EXPECTED		
(8)	(Gain)/Loss on Investment Return (Smoothed (Actuarial) Value)	$106,964,339
(9)	(Gain)/Loss from Salary Changes	(136,041,297)
(10)	(Gain)/Loss from Retirement	(29,865,357)
(11)	(Gain)/Loss from Turnover	5,238,913
(12)	(Gain)/Loss from Mortality	(13,936,553)
(13)	(Gain)/Loss from Disability	(14,707,645)
(14)	(Gain)/Loss from New Entrants and Rehired Members	3,146,691
(15)	(Gain)/Loss from All Other Sources	(84,293,434)
(16)	Composite Actuarial (Gain)/Loss	**($163,494,343)**
(17)	(Gain)/Loss as a percentage of Expected UAAL (16)/(7)	**(1.6)%**
(18)	(Gain)/Loss from Actuarial Cost Method Change	$0
(19)	(Gain)/Loss from Provision Changes	$0
(20)	(Gain)/Loss from Assumption Changes	$0
UNFUNDED ACTUARIAL ACCRUED LIABILITY - END OF 2018		
(21)	Unfunded Accrued Actuarial Liability - 12/31/2018 ((7)+(16)+(18)+(19)+(20))	$10,069,521,907

History of Recommended Employer Multiples*

Table 6

Year of Report	Statutory Multiple	P.A. 99-0506 Multiple	Normal Cost Plus Interest	Normal Cost Plus Amortization [4] Level $	Normal Cost Plus Amortization [4] Level % of Salary
1989 [1,2]	2.00	N/A	3.79	3.91	2.85
1990 [3]	2.00	N/A	3.58	3.68	2.73
1991	2.00	N/A	3.80	3.91	2.98
1992 [1]	2.00	N/A	3.23	3.36	2.11
1993	2.00	N/A	3.23	3.37	2.10
1994	2.00	N/A	3.05	3.18	1.98
1995	2.00	N/A	3.34	3.49	2.17
1996	2.00	N/A	3.19	3.32	2.10
1997	2.00	N/A	3.10	3.23	2.04
1998 [1,2]	2.00	N/A	3.63	3.77	2.56
1999	2.00	N/A	3.15	3.27	2.24
2000 [1]	2.00	N/A	3.27	3.39	2.32
2001 [2]	2.00	N/A	3.63	3.78	2.56
2002	2.00	N/A	4.62	4.79	3.33
2003 [1,2]	2.00	N/A	4.46	4.63	3.23
2004 [2]	2.00	N/A	4.99	5.18	3.60
2005 [1,2]	2.00	N/A	5.33	5.56	3.85
2006	2.00	N/A	4.95	5.40	3.94
2007	2.00	N/A	4.98	5.43	3.97
2008	2.00	N/A	5.43	5.94	4.30
2009 [1]	2.00	N/A	5.87	6.42	4.61
2010	2.00	N/A	6.19	6.78	4.85
2011	2.00	N/A	5.71	6.26	4.45
2012 [1]	2.00	N/A	6.73	7.43	5.25
2013 [2]	2.00	N/A	6.92	7.60	5.44
2014 [1]	2.00	N/A	7.94	8.88	6.49
2015 [5]	N/A	4.57	7.76	8.68	6.35
2016 [1,2,6]	N/A	4.49	7.89	8.82	6.33
2017 [6]	N/A	5.13	8.49	9.49	6.80
2018 [6]	N/A	5.63	8.45	9.44	6.77

[1] *Change in actuarial assumptions.*
[2] *Change in benefits.*
[3] *Change in actuary.*
[4] *Prior to 2005, amortizations were over a 40-year period. In 2005, pension unfunded liability was amortized over a 40-year period and OPEB liability over a 30-year period. Starting in 2006, both pension and OPEB amortizations are over a 30-year period. Starting in 2013, OPEB amortizations are over a closed 3-year period as a level percent of pay.*
[5] *Funding based on P.A. 96-1495, plan provisions in effect as of December 31, 2015.*
[6] *Funding based on P.A. 99-0506.*
**Based on book value of assets through 2013, then Actuarial Value of assets starting in 2014. Assumes 4% Tax Levy Loss.*

Table 7

Actuarial Balance Sheet – 6% Basis

December 31, 2018

ASSETS	
Fund Balance	(39,856,412)
Present Values of Future Contributions:	
Contributions by Members at $30.00 per Year	4,954,131
Annual City Contribution of $224,000	2,752,705
Unfunded Liability	67,828,646
TOTAL ASSETS	**$ 35,679,070**
LIABILITIES	
Present Value of Future Death Benefits (6%, 83 GAM)	
Active & Disabled Members	6,670,980
Retired Members	29,008,090
TOTAL LIABILITIES	**$ 35,679,070**

Actuarial Accrued Liability Prioritized Solvency Test

Table 8

Valuation Date 12/31	(1) Active and Inactive Member Contribution	(2) Retirees and Beneficiaries	(3) Active and Inactive Members (ER Financed Portion)	Actuarial Value of Assets	Portion (%) of Present Value Covered By Assets (1)	(2)	(3)
2004 [2]	$ 910,480,098	$ 4,313,531,046	$ 1,810,260,330	$ 3,933,031,342	100.00%	70.07%	0.00%
2005 [1,2]	950,764,942	4,677,632,909	2,094,339,296	3,914,431,654	100.00%	63.36%	0.00%
2006	1,016,217,810	4,858,554,051	2,241,771,313	3,997,990,919	100.00%	61.37%	0.00%
2007	1,082,742,927	5,006,931,293	2,309,718,259	4,231,681,817	100.00%	62.89%	0.00%
2008	1,144,380,257	5,208,199,833	2,299,966,099	4,093,719,894	100.00%	56.63%	0.00%
2009 [1]	1,217,645,647	5,391,373,730	2,291,882,108	3,884,978,241	100.00%	49.47%	0.00%
2010	1,251,147,487	5,717,654,520	2,406,050,870	3,718,954,539	100.00%	43.16%	0.00%
2011	1,286,345,939	6,041,684,411	2,360,319,555	3,444,690,362	100.00%	35.72%	0.00%
2012 [1]	1,309,825,828	6,475,282,318	2,435,530,363	3,148,929,770	100.00%	28.40%	0.00%
2013 [2]	1,358,193,244	6,594,792,197	2,127,620,103	3,053,881,777	100.00%	25.71%	0.00%
2014 [1]	1,410,544,951	7,159,705,456	2,477,941,780	2,954,318,954	100.00%	21.56%	0.00%
2015	1,484,316,625	7,279,289,531	2,524,630,892	3,186,423,762	100.00%	23.38%	0.00%
2016 [1,2]	1,518,846,208	8,018,211,337	3,319,492,854	3,052,056,555	100.00%	19.12%	0.00%
2017	1,532,514,218	8,344,902,504	3,216,465,846	3,103,989,602	100.00%	18.83%	0.00%
2018	1,602,674,638	8,390,112,363	3,221,871,110	3,145,136,204	100.00%	18.38%	0.00%

[1] *Change in actuarial assumptions.*
[2] *Change in benefits.*

APPENDIX 2

ASSETS OF THE PLAN

Reconciliation of Assets as of December 31, 2018

The book value of the plan assets, net of accounts payable, increased from $2.750 billion as of December 31, 2017, to $2.872 billion as of December 31, 2018. The market value of the plan assets, net of accounts payable, decreased from $3.122 billion as of December 31, 2017, to $2.905 billion as of December 31, 2018. Table 9 details the development of asset values during 2018 and Table 10 shows the development of the actuarial value of assets as of December 31, 2018. In each future fiscal year, investment gains and losses will be phased in over a five-year period to determine the actuarial value of assets.

Table 9

	2017	2018
1. Market Value of assets beginning of year[1]	$2,865,018,804	$3,122,066,293
2. Income for plan year:		
a) Member contributions	$ 103,011,250	$ 107,186,492
b) City contributions	494,483,191	588,034,930
c) Investment income net of expenses[1]	412,190,404	(137,977,182)
d) Miscellaneous revenue	97,239	1,600,348
e) Total income	$ 1,009,782,084	$ 558,844,588
3. Disbursements for plan year:		
a) Benefit payments		
i) Pension, disability and death benefit payments	$ 737,873,928	$ 764,367,368
ii) Healthcare premiums	-	-
b) Refunds	10,017,655	6,737,073
c) Administration	4,843,012	4,626,599
d) Total disbursements	$ 752,734,595	$ 775,731,040
4. Market Value of assets end of year[1]	$3,122,066,293	$2,905,179,841
5. Estimated rate of return in 2017:[2]		
a) Gross	15.16%	-4.17%
b) Net of investment expense (Investment expense of $10,129,378 in 2017 and $9,615,537 in 2018)	14.77%	-4.48%

[1]*Book value of assets as of December 31, 2017, is $2,750,013,384, Investment income net of expenses used for Book value for plan year 2018 is $200,634,126 and book value as of December 31, 2018, is $2,871,738,240.*

[2]*Method used for calculating rate of return does not reflect specific timing of income and outflows. It is also based on total assets, not invested assets.*

Development of Actuarial (Market-Related) Value of Assets as of December 31, 2018

Table 10

Year Ending December 31	2017	2018	2019	2020	2021	2022
Beginning of Year:						
(1) Market Value of Assets	$2,865,018,804	$3,122,066,293				
(2) Actuarial Value of Assets	3,052,056,555	3,103,989,602				
End of Year:						
(3) Market Value of Assets	3,122,066,293	2,905,179,841				
(4) Contributions and Disbursements						
(4a) City Contributions & Misc.	494,580,430	589,635,278				
(4b) Member Contributions	103,011,250	107,186,492				
(4c) Benefit Payouts & Refunds	(747,891,583)	(771,104,441)				
(4d) Administrative Expenses	(4,843,012)	(4,626,599)				
(4e) Net of Contributions and Disbursements	(155,142,915)	(78,909,270)				
(5) Total Investment Income						
=(3)-(1)-(4e)	412,190,404	(137,977,182)				
(6) Projected Rate of Return	7.25%	7.25%				
(7) Projected Investment Income						
=(1)x(6)+([1+(6)]^.5-1)x(4e)	202,188,331	223,539,393				
(8) Investment Income in						
Excess of Projected Income	210,002,073	(361,516,575)				
(9) Excess Investment Income Recognized						
This Year (5-year recognition)						
(9a) From This Year	$42,000,415	($72,303,315)				
(9b) From One Year Ago	(14,865,333)	42,000,415	($72,303,315)			
(9c) From Two Years Ago	(47,013,680)	(14,865,333)	42,000,415	($72,303,315)		
(9d) From Three Years Ago	(11,301,607)	(47,013,680)	(14,865,333)	42,000,415	($72,303,315)	
(9e) From Four Years Ago	36,067,836	(11,301,608)	(47,013,680)	(14,865,333)	42,000,413	($72,303,315)
(9f) Total Recognized Investment Gain	4,887,631	(103,483,521)	(92,181,913)	(45,168,233)	(30,302,902)	(72,303,315)
(10) Change in Actuarial Value of Assets						
=(4e)+(7)+(9f)	51,933,047	41,146,602				
End of Year:						
(3) Market Value of Assets	**$3,122,066,293**	**$2,905,179,841**				
(11) Actuarial Value of Assets = (2)+(10)	**$3,103,989,602**	**$3,145,136,204**				

APPENDIX 3

DATA REFLECTING PLAN MEMBERS

Exhibit A
Summary of Changes in Active Participants
For Fiscal Year Ending December 31, 2018

	Male	Female	Total
Number of Active Participants at Beginning of Fiscal Year[2]	**9,772**	**2,861**	**12,633**
Increases:			
Participants Added During Year	907	346	1,253
Participants Returning From Inactive or Disability Status	18	6	24
Totals	10,697	3,213	13,910
Decreases:			
Terminations During Year[3]	374	98	472
Number of Active Participants at End of Fiscal Year	**10,323**	**3,115**	**13,438**
Total Inactive Participants			721
Terminations:			
Withdrawal (With Refunds)[1]	15	5	20
Withdrawal (Without Refunds)	85	15	100
Ordinary Disability Benefit	3	7	10
Occupational Disease Disability Benefit	0	0	0
Duty Disability Benefit	3	0	3
Retirements	247	67	314
Deaths (Occupational)	4	0	4
Deaths (Non-occupational)	17	4	21
Totals	**374**	**98**	**472**

[1] *This total differs from the total of 93 shown in Exhibit D due to the fact that only 20 of the refunds were paid to participants who were considered to be active as of December 31, 2017.*
[2] *Includes five active members reclassified from male to female and five active members reclassified from female to male.*
[3] *Includes data correction for one female.*

Exhibit B
Summary of Changes in Annuitants and Beneficiaries
For Fiscal Year Ending December 31, 2018

	Number at Beginning of Year	Additions During Year	Terminations During Year	Number at End of Year
Service Retirement Annuities	9,899	343 [1]	312	9,930
Widow Annuities	3,059	179	184	3,054
Children's Annuities	185	22	17	190
Ordinary Disability Benefit (Non-Occupational)	40	11	15	36
Occupational Disease Disability Benefit	31	2	4	29
Duty Disability Benefit (Occupational)	197	8	23	182
Children's Disability Benefit	154	18	25	147
Widows' Compensation Annuities (Service Connected Death)	63	2	2	63
Totals	**13,628**	**585**	**582**	**13,631**
Annual Benefits	**$738,460,675**	**$ 45,340,881**	**$ 23,913,307**	**$759,888,249**

[1] *Includes four retirees whose benefit was previously classified as suspended annuities.*

Exhibit C – Part I
Total Lives and Annual Salaries of Active Male Participants
Classified by Age and Years of Service as of December 31, 2018

	Years of Service										
AGE	Under 1 year	1 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 and over	Total	Annual Salary
Under 20										0	
											$ 0
20 to 24	309	187								496	
	14,856,102	13,284,336									28,140,438
25 to 29	347	778	6							1,131	
	16,703,130	57,758,994	525,924								74,988,048
30 to 34	174	492	441	46						1,153	
	8,393,760	37,447,194	39,192,252	4,349,892							89,383,098
35 to 39	69	248	356	681	175					1,529	
	3,317,382	19,023,936	31,586,058	64,025,676	17,297,508						135,250,560
40 to 44	8	63	158	411	763	93				1,496	
	384,624	4,913,820	13,971,024	38,251,596	75,335,772	9,656,778					142,513,614
45 to 49		2	30	223	649	989	174			2,067	
		159,222	2,646,588	20,472,240	62,955,336	102,593,676	19,205,418				208,032,480
50 to 54			3	70	273	671	553	90		1,660	
			260,926	6,398,520	26,176,518	68,057,046	60,081,332	10,059,704			171,034,046
55 to 59				2	89	235	192	93	2	613	
				181,212	8,463,966	23,436,792	20,722,894	11,467,872	199,320		64,472,056
60 to 63					23	58	52	36	9	178	
					2,197,392	5,745,318	5,376,300	4,024,672	1,164,552		18,508,234
Total Active	**907**	**1,770**	**994**	**1,433**	**1,972**	**2,046**	**971**	**219**	**11**	**10,323**	
Annual Salary	**$43,654,998**	**$132,587,502**	**$88,182,772**	**$133,679,136**	**$192,426,492**	**$209,489,610**	**$105,385,944**	**$25,552,248**	**$ 1,363,872**		**$ 932,322,574**

Exhibit C – Part II
Total Lives and Annual Salaries of Active Female Participants
Classified by Age and Years of Service as of December 31, 2018

	Years of Service										
AGE	Under 1 year	1 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 and over	Total	Annual Salary
Under 20										**0**	
											$ 0
20 to 24	86	48								**134**	
	4,134,708	3,413,430									**7,548,138**
25 to 29	131	193								**324**	
	6,322,644	14,295,954									**20,618,598**
30 to 34	84	201	84	14						**383**	
	4,038,552	14,993,298	7,430,490	1,334,688							**27,797,028**
35 to 39	38	118	105	216	34					**511**	
	1,826,964	8,890,092	9,305,082	20,060,196	3,313,212						**43,395,546**
40 to 44	8	30	49	126	216	19				**448**	
	384,624	2,350,356	4,319,208	11,620,236	21,197,532	1,977,678					**41,849,634**
45 to 49			15	99	190	218	42			**564**	
			1,327,536	9,177,336	18,258,342	22,204,380	4,472,472				**55,440,066**
50 to 54				35	107	177	132	21		**472**	
				3,182,658	10,186,890	17,860,150	14,276,614	2,346,652			**47,852,964**
55 to 59					44	77	58	13	2	**194**	
					4,169,580	7,685,214	6,143,592	1,484,790	214,734		**19,697,910**
60 to 63					12	41	16	13	3	**85**	
					1,127,988	3,992,136	1,816,512	1,550,958	314,394		**8,801,988**
Total Active	**347**	**590**	**253**	**490**	**603**	**532**	**248**	**47**	**5**	**3,115**	
Annual Salary	**$16,707,492**	**$43,943,130**	**$22,382,316**	**$45,375,114**	**$58,253,544**	**$53,719,558**	**$26,709,190**	**$5,382,400**	**$ 529,128**		**$ 273,001,872**

Exhibit C – Part III
Total Lives and Annual Salaries of All Active Participants
Classified by Age and Years of Service as of December 31, 2018

AGE	Years of Service: Under 1 year	1 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 and over	Total	Annual Salary
Under 20										**0**	
											$ 0
20 to 24	395	235								**630**	
	18,990,810	16,697,766									**35,688,576**
25 to 29	478	971	6							**1,455**	
	23,025,774	72,054,948	525,924								**95,606,646**
30 to 34	258	693	525	60						**1,536**	
	12,432,312	52,440,492	46,622,742	5,684,580							**117,180,126**
35 to 39	107	366	461	897	209					**2,040**	
	5,144,346	27,914,028	40,891,140	84,085,872	20,610,720						**178,646,106**
40 to 44	16	93	207	537	979	112				**1,944**	
	769,248	7,264,176	18,290,232	49,871,832	96,533,304	11,634,456					**184,363,248**
45 to 49		2	45	322	839	1,207	216			**2,631**	
		159,222	3,974,124	29,649,576	81,213,678	124,798,056	23,677,890				**263,472,546**
50 to 54			3	105	380	848	685	111		**2,132**	
			260,926	9,581,178	36,363,408	85,917,196	74,357,946	12,406,356			**218,887,010**
55 to 59				2	133	312	250	106	4	**807**	
				181,212	12,633,546	31,122,006	26,866,486	12,952,662	414,054		**84,169,966**
60 to 63					35	99	68	49	12	**263**	
					3,325,380	9,737,454	7,192,812	5,575,630	1,478,946		**27,310,222**
Total Active	**1,254**	**2,360**	**1,247**	**1,923**	**2,575**	**2,578**	**1,219**	**266**	**16**	**13,438**	
Annual Salary	**$60,362,490**	**$176,530,632**	**$110,565,088**	**$179,054,250**	**$250,680,036**	**$263,209,168**	**$132,095,134**	**$30,934,648**	**$ 1,893,000**		**$ 1,205,324,445**

Exhibit D – Part I
Showing Number of Refund Payments Made during Year To Male Employees for Fiscal Year Ending December 31, 2018

Age at Date of Refund	Length of Service at Date of Refund						
	Under 1 Year	Between 1 and 2	Between 2 and 3	Between 3 and 4	Between 4 and 5	5 and over	Total
Under 20							**0**
20 to 24							**0**
25 to 29	2	4	1				**7**
30 to 34	3	1	2	2	2	7	**17**
35 to 39	1					9	**10**
40 to 44	1					7	**8**
45 to 49	3					6	**9**
50 to 54	2						**2**
55 to 59	1				1		**2**
60 to 63	3			1	1	1	**6**
64 or older						6	**6**
Totals	**16**	**5**	**3**	**3**	**4**	**36**	**67**

Includes only number of actual refunds paid or accrued during fiscal year reported.
Includes members previously classified as refunded as of December 31, 2018, who were previously reported as inactive as of December 31, 2017.

Exhibit D – Part II
Showing Number of Refund Payments Made during Year
To Female Employees for Fiscal Year Ending December 31, 2018

Age at Date of Refund	Length of Service at Date of Refund: Under 1 Year	Between 1 and 2	Between 2 and 3	Between 3 and 4	Between 4 and 5	5 and over	Total
Under 20							**0**
20 to 24							**0**
25 to 29			1				**1**
30 to 34	1					1	**2**
35 to 39					1	2	**3**
40 to 44						2	**2**
45 to 49	3					1	**4**
50 to 54	3					1	**4**
55 to 59	2					1	**3**
60 to 63	3				1		**4**
64 or older	3						**3**
Totals	**15**	**0**	**1**	**0**	**2**	**8**	**26**

Includes only number of actual refunds paid or accrued during fiscal year reported.
Includes members previously classified as refunded as of December 31, 2018, who were previously reported as inactive as of December 31, 2017.

Exhibit E
Showing Statistics on Service Retirement Annuities Classified by Age as of December 31, 2018

	MALE		FEMALE		TOTAL	
AGE	No.	Annual Payments	No.	Annual Payments	No.	Annual Payments
UNDER 50	3	$ 42,950	4	$ 56,453	**7**	**$ 99,403**
50	14	761,292	3	172,980	**17**	**934,272**
51	39	2,245,293	11	602,609	**50**	**2,847,902**
52	36	1,930,843	15	871,521	**51**	**2,802,364**
53	53	3,386,324	35	2,085,043	**88**	**5,471,367**
54	76	4,855,904	31	1,809,038	**107**	**6,664,942**
55	128	9,066,549	46	2,885,577	**174**	**11,952,126**
56	147	10,183,027	60	3,952,041	**207**	**14,135,068**
57	164	11,343,849	81	5,476,993	**245**	**16,820,842**
58	197	14,267,703	82	5,721,148	**279**	**19,988,851**
59	171	12,483,189	79	5,198,608	**250**	**17,681,797**
60	146	10,823,074	87	5,899,591	**233**	**16,722,665**
61	181	13,112,330	97	6,551,995	**278**	**19,664,325**
62	150	10,660,614	87	5,490,212	**237**	**16,150,826**
63	216	15,698,078	84	5,210,956	**300**	**20,909,034**
64	239	17,932,344	91	5,719,260	**330**	**23,651,604**
65	253	18,288,765	89	5,805,056	**342**	**24,093,821**
66	273	19,826,565	99	6,454,160	**372**	**26,280,725**
67	376	28,360,875	96	6,260,046	**472**	**34,620,921**
68	414	31,482,165	106	6,615,398	**520**	**38,097,563**
69	438	32,000,432	74	4,655,287	**512**	**36,655,719**
70	478	35,008,737	102	6,019,684	**580**	**41,028,421**
71	527	38,250,211	70	4,246,273	**597**	**42,496,484**
72	491	34,606,938	45	2,219,199	**536**	**36,826,137**
73	309	21,404,969	33	1,777,521	**342**	**23,182,490**
74	313	21,463,743	36	2,042,453	**349**	**23,506,196**
75	337	22,488,935	34	1,626,978	**371**	**24,115,913**
76	289	18,817,748	20	1,006,631	**309**	**19,824,379**
77	251	15,612,610	16	927,798	**267**	**16,540,408**
78	194	12,324,330	14	745,755	**208**	**13,070,085**
79	174	10,646,343	2	47,613	**176**	**10,693,956**
80	179	10,771,842	3	190,657	**182**	**10,962,499**
81	133	7,595,351	4	226,110	**137**	**7,821,461**
82	104	5,915,469	5	308,221	**109**	**6,223,690**
83	100	5,852,313	1	45,271	**101**	**5,897,584**
84	76	4,448,235	0	0	**76**	**4,448,235**
85 to 89	368	20,054,312	0	0	**368**	**20,054,312**
90 to 94	129	5,862,808	0	0	**129**	**5,862,808**
95 to 99	22	814,185	0	0	**22**	**814,185**
100+	0	0	0	0	**0**	**0**
Totals	**8,188**	**$560,691,244**	**1,742**	**$108,924,136**	**9,930**	**$669,615,380**

Exhibit F
Showing Statistics on Widow's Annuities
Classified by Age as of December 31, 2018

Age	No.	Annual Payments	Age	No.	Annual Payments
Under 30	0	$ 0	65	55	$ 1,616,301
30	0	0	66	55	1,521,573
31	0	0	67	66	1,613,180
32	1	24,490	68	77	1,967,643
33	0	0	69	101	2,505,980
34	2	54,455	70	103	2,780,829
35	3	71,215	71	119	3,041,134
36	1	20,953	72	121	2,960,329
37	0	0	73	100	2,321,526
38	2	46,121	74	84	2,005,036
39	1	19,399	75	118	2,773,188
40	1	25,216	76	126	2,874,594
41	2	50,519	77	101	2,498,166
42	1	55,111	78	97	2,247,041
43	3	62,088	79	96	2,163,896
44	3	98,422	80	116	2,308,806
45	3	67,124	81	113	2,346,812
46	6	138,144	82	107	2,343,743
47	8	207,252	83	87	1,843,500
48	10	264,125	84	89	2,008,407
49	9	175,177	85	81	1,688,639
50	8	217,862	86	86	1,740,102
51	11	244,147	87	86	1,697,888
52	8	224,989	88	88	1,703,272
53	14	382,635	89	59	1,149,454
54	13	310,667	90	56	1,059,802
55	15	406,202	91	64	1,201,124
56	9	237,759	92	55	1,009,491
57	15	322,759	93	34	576,051
58	24	598,781	94	34	615,098
59	23	568,900	95	27	464,336
60	29	757,736	96	17	295,744
61	39	1,063,267	97	10	165,546
62	36	887,374	98	16	250,786
63	37	952,884	99	4	74,293
64	63	1,660,316	100+	6	91,050
			Total	**3,054**	**$69,740,449**

Exhibit G
Showing Statistics on Miscellaneous Annuities
For Fiscal Year Ending December 31, 2018

	No.	Annual Payments
Children's Annuities	190	$1,365,451
Widows' Compensation Annuities	63	4,270,161
Ordinary Disability Benefits	36	1,714,127
Occupational Disease Disability Benefits	29	1,692,078
Duty Disability Benefits	182	11,314,203
Children's Disability Benefits	147	176,400
Totals	**647**	**$20,532,420**

Exhibit H – Part I
Showing Male Participants Receiving Duty Disability
Classified by Age and Length of Service as of December 31, 2018

	Length of Service as of December 31, 2018													
	Under 1 Year		1 to 4		5 to 9		10 to 14		15 to 19		20 & Over		Total	
ATTAINED AGE	No.	Annual Payments	No.	Annual Payments	No.	Annual Payments	No.	Annual Payments	No.	Annual Payments	No.	Annual Payments	No.	Annual Payments
UNDER 30													**0**	**$ 0**
30 to 34													**0**	**0**
35 to 39					1	63,149	2	126,464					**3**	**189,613**
40 to 44					5	298,822	5	285,723	4	252,716			**14**	**837,261**
45 to 49			4	224,050	6	338,850	7	416,882	10	651,528	4	304,722	**31**	**1,936,032**
50 to 54			3	184,070	2	114,347	7	429,046	15	983,106	5	374,010	**32**	**2,084,579**
55 to 59			4	227,297	1	57,636	5	289,789	5	308,004	4	268,984	**19**	**1,151,710**
60 to 63			1	54,014	1	58,172	5	310,126	4	268,997	3	167,855	**14**	**859,164**
Totals	**0**	**$0**	**12**	**$ 689,431**	**16**	**$ 930,976**	**31**	**$ 1,858,030**	**38**	**$ 2,464,351**	**16**	**$ 1,115,571**	**113**	**$ 7,058,359**

Exhibit H – Part II
Showing Female Participants Receiving Duty Disability
Classified by Age and Length of Service as of December 31, 2018

Length of Service as of December 31, 2018

ATTAINED AGE	Under 1 Year No.	Under 1 Year Annual Payments	1 to 4 No.	1 to 4 Annual Payments	5 to 9 No.	5 to 9 Annual Payments	10 to 14 No.	10 to 14 Annual Payments	15 to 19 No.	15 to 19 Annual Payments	20 & Over No.	20 & Over Annual Payments	Total No.	Total Annual Payments
UNDER 30													**0**	**$ 0**
30 to 34													**0**	**0**
35 to 39			1	52,204			1	63,338					**2**	**115,542**
40 to 44			2	108,801			2	126,573		-		-	**4**	**235,374**
45 to 49			3	164,203	2	113,075	5	302,097	6	392,415	1	67,732	**17**	**1,039,522**
50 to 54			1	54,014	2	130,888	2	117,830	6	376,842	5	346,062	**16**	**1,025,636**
55 to 59			1	57,636	4	227,297	8	478,871	5	309,827	3	204,342	**21**	**1,277,973**
60 to 63					2	129,681	4	232,123	2	129,681	1	70,312	**9**	**561,797**
Totals	**0**	**$0**	**8**	**$436,858**	**10**	**$600,941**	**22**	**$1,320,832**	**19**	**$1,208,765**	**10**	**$688,448**	**69**	**$ 4,255,844**

Exhibit I – Part I
Showing Male Participants Receiving Ordinary Disability
Classified by Age and Length of Service as of December 31, 2018

Length of Service as of December 31, 2018

ATTAINED AGE	Under 1 Year No.	Under 1 Year Annual Payments	1 to 4 No.	1 to 4 Annual Payments	5 to 9 No.	5 to 9 Annual Payments	10 to 14 No.	10 to 14 Annual Payments	15 to 19 No.	15 to 19 Annual Payments	20 & Over No.	20 & Over Annual Payments	Total No.	Total Annual Payments
UNDER 30													**0**	**$ 0**
30 to 34													**0**	**0**
35 to 39													**0**	**0**
40 to 44									1	51,432			**1**	**51,432**
45 to 49									2	93,624	1	54,542	**3**	**148,166**
50 to 54									3	138,549	3	157,161	**6**	**295,710**
55 to 59									1	46,812	2	94,985	**3**	**141,797**
60 to 63													**0**	**0**
Totals	**0**	**$0**	**0**	**$0**	**0**	**$0**	**0**	**$0**	**7**	**$330,417**	**6**	**$306,688**	**13**	**$ 637,105**

Exhibit I – Part II
Showing Female Participants Receiving Ordinary Disability
Classified by Age and Length of Service as of December 31, 2018

Length of Service as of December 31, 2018

ATTAINED AGE	Under 1 Year No.	Under 1 Year Annual Payments	1 to 4 No.	1 to 4 Annual Payments	5 to 9 No.	5 to 9 Annual Payments	10 to 14 No.	10 to 14 Annual Payments	15 to 19 No.	15 to 19 Annual Payments	20 & Over No.	20 & Over Annual Payments	Total No.	Total Annual Payments
UNDER 30													**0**	**$ 0**
30 to 34													**0**	**0**
35 to 39					1	43,827			2	93,624			**3**	**137,451**
40 to 44							1	43,518	3	140,436	3	148,095	**7**	**332,049**
45 to 49									5	233,148	7	330,773	**12**	**563,921**
50 to 54											1	43,601	**1**	**43,601**
55 to 59													**0**	**0**
60 to 63													**0**	**0**
Totals	**0**	**$0**	**0**	**$0**	**1**	**$43,827**	**1**	**$43,518**	**10**	**$467,208**	**11**	**$522,469**	**23**	**$ 1,077,022**

Exhibit J – Part I
Showing Male Participants Receiving Occupational Disease Disability Classified by Age and Length of Service as of December 31, 2018

Length of Service as of December 31, 2018

	Under 1 Year		1 to 4		5 to 9		10 to 14		15 to 19		20 & Over		Total	
ATTAINED AGE	No.	Annual Payments	No.	Annual Payments	No.	Annual Payments	No.	Annual Payments	No.	Annual Payments	No.	Annual Payments	No.	Annual Payments
UNDER 30													**0**	**$ 0**
30 to 34													**0**	**0**
35 to 39													**0**	**0**
40 to 44													**0**	**0**
45 to 49							1	61,019			1	58,516	**2**	**119,535**
50 to 54											4	253,586	**4**	**253,586**
55 to 59									3	156,981	8	494,305	**11**	**651,286**
60 to 63									2	104,346	5	301,912	**7**	**406,258**
Totals	**0**	**$0**	**0**	**$0**	**0**	**$0**	**1**	**$61,019**	**5**	**$261,327**	**18**	**$1,108,319**	**24**	**$ 1,430,665**

Exhibit J – Part II
Showing Female Participants Receiving Occupational Disease Disability
Classified by Age and Length of Service as of December 31, 2018

Length of Service as of December 31, 2018

ATTAINED AGE	Under 1 Year No.	Under 1 Year Annual Payments	1 to 4 No.	1 to 4 Annual Payments	5 to 9 No.	5 to 9 Annual Payments	10 to 14 No.	10 to 14 Annual Payments	15 to 19 No.	15 to 19 Annual Payments	20 & Over No.	20 & Over Annual Payments	Total No.	Total Annual Payments
UNDER 30													**0**	**$ 0**
30 to 34													**0**	**0**
35 to 39													**0**	**0**
40 to 44													**0**	**0**
45 to 49									1	60,267			**1**	**60,267**
50 to 54							1	46,677			1	56,609	**2**	**103,286**
55 to 59							1	48,030	1	49,830			**2**	**97,860**
60 to 63													**0**	**0**
Totals	**0**	**$0**	**0**	**$0**	**0**	**$0**	**2**	**$94,707**	**2**	**$110,097**	**1**	**$56,609**	**5**	**$ 261,413**

Exhibit K
History of Average Annual Salaries

Year End	Members in Service	Increase	Current Year Salary	Increase	Average Salary	Increase	Actuarial Assumptions	CPI Chicago
1989	12,060	(3.5)%	$ 437,121,504	(1.5)%	$ 36,246	2.1 %	6.00	5.1 %
1990	12,039	(0.2)	471,544,173	7.9	39,168	8.1	6.00	5.5
1991	12,513	3.9	520,015,930	10.3	41,558	6.1	6.00	3.0
1992	12,570	0.5	538,404,098	3.5	42,832	3.1	5.80	3.3
1993	12,591	0.2	561,156,282	4.2	44,568	4.1	5.80	2.3
1994	13,095	4.0	599,073,276	6.8	45,748	2.6	5.80	2.9
1995	13,437	2.6	622,413,737	3.9	46,321	1.3	5.80	2.2
1996	13,475	0.3	654,149,310	5.1	48,545	4.8	5.80	3.8
1997	13,435	(0.3)	675,515,532	3.7	50,280	3.6	5.80	1.7
1998 [1]	13,586	1.1	736,401,756	9.0	54,203	7.8	5.50	1.5
1999	13,829	1.8	755,303,667	2.6	54,617	0.8	5.50	2.6
2000	13,858	0.2	759,343,026	0.5	54,795	0.3	5.50	4.0
2001	13,889	0.2	763,352,475	0.5	54,961	0.3	5.50	0.8
2002	13,720	(1.2)	866,531,789	13.5	63,158	14.9	5.50	2.5
2003	13,746	0.2	887,555,791	2.4	64,568	2.2	5.50	1.7
2004	13,569	(1.3)	874,301,958	(1.5)	64,434	(0.2)	5.50	2.2
2005	13,462	(0.8)	948,973,732	8.5	70,493	9.4	5.50	3.6
2006	13,749	2.1	1,012,983,635	6.7	73,677	4.5	5.50	0.7
2007	13,748	0.0	1,038,957,026	2.6	75,572	2.6	5.50	4.7
2008	13,373	(2.7)	1,023,580,667	(1.5)	76,541	1.3	5.50	(0.6)
2009	13,154	(1.6)	1,011,205,359	(1.2)	76,874	0.4	5.50	2.5
2010	12,737	(3.2)	1,048,084,301	3.6	82,287	7.0	5.50	1.2
2011	12,236	(3.9)	1,034,403,526	(1.3)	84,538	2.7	5.50	2.1
2012	12,026	(1.7)	1,015,170,686	(1.9)	84,415	(0.1)	5.50	1.7
2013	12,161	1.1	1,015,426,126	0.0	83,499	(1.1)	5.50	0.5
2014	12,020	(1.2)	1,074,333,318	5.8	89,379	7.0	4.80	1.5
2015	12,061	0.3	1,086,607,979	1.1	90,093	0.8	4.80	0.0
2016	12,177	1.0	1,119,526,987	3.0	91,938	2.0	4.80	1.9
2017	12,633	3.7	1,150,406,094	2.8	91,064	(1.0)	4.80	1.7
2018	13,438	6.4	1,205,324,445 [2]	4.8	89,695	(1.5)	4.80 [3]	1.1
Average Increase (Decrease) for the last 5 years:		**2.0 %**		**3.5 %**		**1.5 %**		**1.2 %**

[1] *Figures do not include retroactive raise.*
[2] *See Appendix 4 for a complete description of the current assumptions.*
[3] *Pay definition changed to include duty availability pay. Of the $1,205,324,445 current year salary, $37,578,279 is duty availability pay.*

Exhibit L
New Annuities Granted during 2018

	Annuitants[4]	Widows/ Widowers of Deceased Employees[1]	Widows/ Widowers of Deceased Annuitants	Compensation Widows/ Widowers
Number retired/deceased	339	12	167	2
Average age attained	57.7	48.8	72.9	41.5
Average length of service	26.6	N/A	N/A	N/A
Average annual salary [2]	$ 102,505	N/A	N/A	N/A
Average annual final salary	$ 106,077	N/A	N/A	N/A
Total annual annuity	23,351,724	346,061	5,141,869	172,851
Average annual annuity	68,884	28,838	30,789	86,425
Total liability	$ 388,743,560	6,099,313	46,818,855	3,092,294
[(Based on 3% Comb. and 4% Amer. Exp.)]				
Average liability	$ 1,146,736	508,276	280,352	1,546,147
Total investment	$ 63,708	N/A	N/A	N/A
[Employee-paid for tax purposes]				
Average investment [3]	$ 188	N/A	N/A	N/A
Liability/cost	6,101.9	N/A	N/A	N/A
Liability/final pay	$ 10.81	N/A	N/A	N/A

[1] *Not including compensation or supplemental.*
[2] *Average annual salary is 4 out of 10 years for members hired before January 1, 2011, and 8 out of 10 years for members hired on or after January 1, 2011.*
[3] *Based on previously-taxed contributions.*
[4] *Excludes four retirees whose benefit was previously classified as suspended.*

Exhibit M
Retirees and Beneficiaries by Type of Benefit

	ANNUITANTS			DISABILITY				Widow	
Years	Employee	Spouse[1]	Child	Ordinary	Duty	Occup.	Child[2]	Comp.	Total
1989	4,772	3,202	335	58	179			71	8,617
1990	4,936	3,214	335	51	187			66	8,789
1991	5,033	3,137	329	75	192			68	8,834
1992	5,109	3,129	310	83	204			66	8,901
1993	5,195	3,151	294	59	211		160	66	9,136
1994	5,309	3,123	281	51	221		159	64	9,208
1995	5,510	3,133	254	51	231	1	144	60	9,384
1996	5,714	3,120	252	67	256	12	158	59	9,638
1997	5,945	3,104	240	59	270	36	130	59	9,843
1998	6,241	3,093	228	56	279	57	150	57	10,161
1999	6,520	3,118	249	57	291	76	150	58	10,519
2000	6,876	3,107	267	48	274	87	149	59	10,867
2001	7,192	3,114	255	52	265	95	143	59	11,175
2002	7,392	3,092	235	38	289	103	150	59	11,358
2003	7,498	3,083	247	29	285	97	139	63	11,441
2004	7,815	3,133	249	44	287	85	130	65	11,808
2005	8,026	3,107	247	35	298	82	139	65	11,999
2006	8,083	3,093	255	39	291	69	132	64	12,026
2007	8,155	3,137	242	52	284	65	136	64	12,135
2008	8,210	3,148	237	39	286	58	139	66	12,183
2009	8,227	3,111	232	44	284	52	138	66	12,154
2010	8,495	3,079	222	37	284	40	155	69	12,381
2011	8,763	3,091	214	43	270	36	176	70	12,663
2012	9,035	3,122	214	47	263	36	180	69	12,966
2013	9,194	3,130	206	46	269	35	213	66	13,159
2014	9,311	3,109	197	48	259	36	204	66	13,230
2015	9,385	3,078	198	41	230	35	178	65	13,210
2016	9,603	3,102	186	40	202	33	164	64	13,394
2017	9,899	3,059	185	40	197	31	154	63	13,628
2018	9,930	3,054	190	36	182	29	147	63	13,631

[1] *Includes reversionary.*
[2] *Children's Disability Benefit not tracked before 1993.*

Exhibit N
Average Employee Retirement Benefits Payable

Years Ended	Average Annual Benefit	Average Current Age of Retirees	Average Age at Retirement Current Year[1]	Average Years of Benefit Service at Retirement Current Year[1]
1989	$ 19,315	67	58.6	30.7
1990	21,120	68	58.9	30.2
1991	21,782	68	58.4	30.8
1992	23,128	68	57.7	30.3
1993	24,724	68	56.9	29.6
1994	25,636	68	55.7	29.5
1995	26,996	67	55.3	29.2
1996	28,412	67	55.5	29.8
1997	29,867	67	55.0	29.3
1998	31,682	66	54.6	30.0
1999	33,220	66	54.8	29.9
2000	34,880	66	56.3	31.6
2001	36,428	66	56.4	29.8
2002	38,199	66	55.6	29.4
2003	38,998	66	57.1	30.2
2004	41,914	66	57.5	30.4
2005	43,930	67	57.3	30.6
2006	45,680	67	58.0	29.6
2007	47,392	67	58.1	29.3
2008	49,239	68	58.3	29.4
2009	50,799	68	59.2	28.6
2010	53,060	68	59.1	28.1
2011	55,104	68	59.5	27.4
2012	56,896	69	58.7	26.7
2013	58,556	69	58.2	26.1
2014	60,111	69	57.6	26.2
2015	61,702	69	57.5	26.5
2016	63,381	69	57.5	26.9
2017	65,615	69	57.5	26.6
2018	67,434	70	57.7	26.6

[1] *Averages for New Annuitants in 2018.*

Exhibit O – Part 1
History of Annuities Employee Annuitants (Male and Female)

Year End	Number of Annuitants	Total Annuities	Average Annuities
1989	4,772	$ 92,170,354	$ 19,315
1990	4,936	104,221,349	21,114
1991	5,033	109,629,175	21,782
1992	5,109	118,162,135	23,128
1993	5,195	128,443,550	24,724
1994	5,309	136,102,089	25,636
1995	5,510	148,748,836	26,996
1996	5,714	162,343,898	28,412
1997	5,945	177,557,655	29,867
1998	6,241	197,728,489	31,682
1999	6,520	216,593,933	33,220
2000	6,876	239,833,436	34,880
2001	7,192	261,991,891	36,428
2002	7,392	282,368,164	38,199
2003	7,498	292,407,321	38,998
2004	7,815	327,560,253	41,914
2005	8,026	352,579,199	43,930
2006	8,083	369,228,619	45,680
2007	8,155	386,485,701	47,392
2008	8,210	404,254,060	49,239
2009	8,227	417,924,766	50,799
2010	8,495	450,742,884	53,060
2011	8,763	482,875,300	55,104
2012	9,035	514,053,838	56,896
2013	9,194	538,368,228	58,556
2014	9,311	559,689,145	60,111
2015	9,385	579,069,731	61,702
2016	9,603	608,646,498	63,381
2017	9,899	649,527,055	65,615
2018	9,930	669,615,380	67,434

Exhibit O – Part II
History of Annuities Spouse Annuitants
(Not Including Compensation Widows)

Year End	Number of Annuitants	Total Annuities	Average Annuities
1989	3,202	$ 16,304,771	$ 5,092
1990	3,214	16,779,894	5,221
1991	3,137	17,342,488	5,528
1992	3,129	20,773,699	6,639
1993	3,151	24,711,076	7,842
1994	3,123	28,041,269	8,979
1995	3,133	28,792,959	9,190
1996	3,120	30,778,518	9,865
1997	3,104	31,492,268	10,146
1998	3,093	32,285,743	10,438
1999	3,118	36,134,606	11,589
2000	3,107	37,022,962	11,916
2001	3,114	38,316,493	12,305
2002	3,092	40,086,748	12,965
2003	3,083	39,924,324	12,950
2004	3,133	44,609,535	14,239
2005	3,107	47,658,776	15,339
2006	3,093	49,187,928	15,903
2007	3,137	51,646,225	16,464
2008	3,148	53,489,665	16,992
2009	3,111	53,381,986	17,159
2010	3,079	53,621,501	17,415
2011	3,091	55,323,666	17,898
2012	3,122	57,650,477	18,466
2013	3,130	59,360,519	18,965
2014	3,109	60,248,462	19,379
2015	3,078	61,439,136	19,961
2016	3,102	63,731,123	20,545
2017	3,059	67,469,456	22,056
2018	3,054	69,740,449	22,836

Exhibit P
Counts of Retirees and Beneficiaries with Healthcare Coverage Subsidies

Year End	Employee	Spouse [1]	Total
2008	7,731	2,286	10,017
2009	7,763	2,285	10,048
2010	7,878	2,240	10,118
2011	8,111	2,257	10,368
2012	8,458	2,280	10,738
2013	8,539	2,270	10,809
2014	8,450	2,226	10,676
2015	8,278	2,127	10,405
2016	8,189	2,079	10,268
2017	0	0	0
2018	0	0	0

[1] *Includes children.*

Exhibit Q

Schedule of Retired Members by Types of Benefit and Monthly Benefit Levels

Monthly	Retirement		Disability		Widow [1]		Child		Totals	
Benefit	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Under $100	4								**4**	**0**
$100 to under $250	9	3					93	71	**102**	**74**
$250 to under $500	18	9					25	20	**43**	**29**
$500 to under $750	20	5					50	45	**70**	**50**
$750 to under $1,000	7	4					12	4	**19**	**8**
$1,000 to under $2,000	53	39			37	1,858	11	6	**101**	**1,903**
$2,000 to under $3,000	187	22			22	920			**209**	**942**
$3,000 to under $4,000	660	186	12	19	3	182			**675**	**387**
$4,000 to under $5,000	1,548	546	65	43	1	39			**1,614**	**628**
$5,000 to under $6,000	2,081	404	59	27	4	30			**2,144**	**461**
$6,000 to under $7,000	2,347	356	10	8		14			**2,357**	**378**
$7,000 to under $8,000	814	112	4			3			**818**	**115**
$8,000 to under $9,000	231	31				1			**231**	**32**
$9,000 to under $10,000	89	5				1			**89**	**6**
$10,000 and over	120	20				2			**120**	**22**
Totals:	**8,188**	**1,742**	**150**	**97**	**67**	**3,050**	**191**	**146**	**8,596**	**5,035**

[1] *Includes reversionary.*

Exhibit R

Schedule of Average Benefit Payments for New Annuities Granted during 2018

	Years of Service:	0-9	10-14	15-19	20-24	25-29	30-34	>= 35	Total
	Number of Retired Members	0	1	13	105	161	140	131	**551**
2010	Average annual salary used	$0	$81,122	$70,339	$80,639	$88,735	$91,739	$92,194	**$88,330**
	Average Monthly Benefit	$0	$2,535	$2,667	$3,837	$5,385	$5,734	$5,762	**$5,199**
	Number of Retired Members	1	8	16	95	175	103	102	**500**
2011	Average annual salary used	$18,730	$76,848	$70,140	$82,778	$92,829	$93,780	$98,280	**$91,097**
	Average Monthly Benefit	$390	$2,158	$2,728	$3,949	$5,497	$5,861	$6,142	**$5,257**
	Number of Retired Members	0	9	22	123	217	88	80	**539**
2012	Average annual salary used	$0	$72,245	$65,305	$85,175	$92,825	$94,854	$98,415	**$90,773**
	Average Monthly Benefit	$0	$2,066	$2,511	$4,002	$5,408	$5,928	$6,151	**$5,108**
	Number of Retired Members	0	6	20	118	161	62	34	**401**
2013	Average annual salary used	$0	$62,730	$75,088	$86,979	$94,193	$99,759	$102,980	**$92,252**
	Average Monthly Benefit	$0	$1,809	$2,857	$4,164	$5,427	$6,235	$6,436	**$5,084**
	Number of Retired Members	0	4	18	122	180	44	24	**392**
2014	Average annual salary used	$0	$64,795	$72,985	$87,586	$95,372	$94,991	$104,035	**$92,097**
	Average Monthly Benefit	$0	$1,907	$2,815	$4,230	$5,746	$6,052	$6,634	**$5,189**
	Number of Retired Members	0	7	14	105	184	42	11	**363**
2015	Average annual salary used	$0	$34,263	$85,670	$90,037	$100,124	$104,876	$102,529	**$96,001**
	Average Monthly Benefit	$0	$951	$3,334	$4,271	$6,005	$6,555	$6,408	**$5,379**
	Number of Retired Members [1]	1	5	14	124	257	80	12	**493**
2016	Average annual salary used	$50,400	$23,820	$78,131	$91,293	$101,855	$108,887	$109,058	**$98,945**
	Average Monthly Benefit	$1,050	$622	$2,966	$4,292	$6,123	$6,805	$6,816	**$5,634**
	Number of Retired Members	1	2	21	166	258	118	15	**581**
2017	Average annual salary used	$94,501	$19,905	$74,798	$93,477	$98,445	$103,641	$104,267	**$97,099**
	Average Monthly Benefit	$5,709	$630	$2,904	$4,456	$5,735	$6,478	$6,517	**$5,421**
	Number of Retired Members [2]	0	1	15	105	112	95	11	**339**
2018	Average annual salary used	$0	$96,236	$85,713	$95,577	$100,721	$111,692	$130,922	**$102,505**
	Average Monthly Benefit	$0	$2,606	$3,301	$4,569	$5,901	$6,981	$8,183	**$5,740**

[1] *Excludes data correction for one retiree previously valued as deceased.*

[2] *Excludes four retirees whose annuities were reinstated after previously being classified as suspended.*

Exhibit S
History of Retirees and Beneficiaries
Added to and Removed from Benefit Payroll

Yr.	Added		Removed		End of Year		Average Annual Benefits	Increase to Avg. Benefits
	No.	Annual Benefits.	No.	Annual Benefits	No.	Annual Benefits		
Employee Annuitants (Male and Female)								
2010	551	$ 44,873,260	283	$ 12,055,142	8,495	$ 450,742,884	$ 53,060	4.5%
2011	500	42,603,517	232	10,471,101	8,763	482,875,300	55,104	3.9%
2012	539	43,830,960	267	12,652,422	9,035	514,053,838	56,896	3.3%
2013	401	36,004,890	242	11,690,500	9,194	538,368,228	58,556	2.9%
2014	392	34,915,092	275	13,594,175	9,311	559,689,145	60,111	2.7%
2015	363	34,830,781	289	15,450,195	9,385	579,069,731	61,702	2.6%
2016	494	44,891,597	276	15,314,830	9,603	608,646,498	63,381	2.7%
2017	581	56,599,441	285	15,718,884	9,899	649,527,055	65,615	3.5%
2018	343	37,905,119	312	17,816,794	9,930	669,615,380	67,434	2.8%
Widow/Widower Annuitants (Not Including Compensation) [1]								
2010	145	$ 2,838,113	177	$ 2,598,598	3,079	$ 53,621,501	$ 17,415	1.5%
2011	144	3,709,829	132	2,007,664	3,091	55,323,666	17,898	2.8%
2012	174	4,436,964	143	2,110,153	3,122	57,650,477	18,466	3.2%
2013	157	3,969,877	149	2,259,835	3,130	59,360,519	18,965	2.7%
2014	128	3,403,918	149	2,515,975	3,109	60,248,462	19,379	2.2%
2015	147	4,022,206	178	2,831,532	3,078	61,439,136	19,961	3.0%
2016	140	4,231,504	116	1,939,517	3,102	63,731,123	20,545	2.9%
2017	158	7,074,268	201	3,335,935	3,059	67,469,456	22,056	7.4%
2018	179	5,804,968	184	3,533,975	3,054	69,740,449	22,836	3.5%

[1] *Not including Compensation Annuitants.*

APPENDIX 4

ACTUARIAL METHODS AND ASSUMPTIONS AS OF DECEMBER 31, 2018

Actuarial Methods and Assumptions as of December 31, 2018

I. 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 valuation for statutory funding and State reporting purposes and GASB accounting purposes is the Entry-Age Normal actuarial 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 associated with pay prior to the valuation date. The Normal Cost is the portion of the present value associated with pay during the current plan year.

To the extent that current assets and future Normal Costs do not support participants' expected future benefits, 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.

II. Current Actuarial Assumptions

The current actuarial assumptions except for the investment return and general inflation assumptions were adopted and became effective December 31, 2014, and were based on an experience study for the period January 1, 2009 to December 31, 2013. The investment return and general inflation assumptions were adopted and became effective December 31, 2016.

A. Demographic Assumptions

Mortality:	**Pre-Retirement mortality rates:** Sex distinct Retirement Plans 2014 Total Employee mortality table weighted 85% for males and 115% for females. **Post-Retirement Healthy mortality rates:** Sex distinct Retirement Plans 2014 Healthy Annuitant mortality table weighted 108% for males and 97% for females. When compared to observed experience, the recommended rates include a 23% margin for future mortality improvements when the experience study was performed.
Disabled Mortality:	Sex distinct Retirement Plans 2014 Healthy Annuitant mortality table weighted 115% for males and 115% for females.

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

Attained Age	Rate
22	.0003
27	.0007
32	.0007
37	.0020
42	.0030
47	.0040
52	.0050
57	.0060
62	.0060

The assumed distribution of disability types is assumed to be as follows:

Duty Disability	55%
Occupational Disease Disability	10%
Ordinary Disability	35%

Rate of Retirement: Rates at which members are assumed to retire under the provisions of the Fund. The rates assumed are as follows:

For members hired before January 1, 2011:

Attained Age	Rate [1]
50	.05
51	.05
52	.05
53	.05
54	.05
55	.19
56	.19
57	.19
58	.25
59	.25
60	.25
61	.30
62	.30
63	1.00

[1] *Only for members eligible for a formula annuity.*

For members hired on or after January 1, 2011:

Attained Age	Rate [1]
50	.02
51	.02
52	.02
53	.02
54	.03
55	.21
56	.21
57	.21
58	.27
59	.27
60	.25
61	.30
62	.30
63	1.00

[1] *Only for members eligible for a formula annuity.*

Turnover Rates: The following sample rates exemplify the table:

Years of Service	Rate
0	0.030
1	0.028
2	0.020
3	0.015
4-5	0.010
6-10	0.009
11	0.008
12	0.007
13-24	0.006

B. Economic Assumptions

Investment Return Rate: 7.25% per annum effective as of December 31, 2016.

General Inflation: The 7.25% Investment Return Rate assumption is comprised of a 2.75% inflation assumption and a 4.50% real rate of return assumption for pension.

Future Salary Increases: Assumed rates of individual salary increase at 3.75% per year, plus an additional percentage based on the following service scale:

Completed Years of Service*	Scale
1	0.3625
2	0.0325
3	0.0325
4	0.0325
5	0.0225
6-9	0.0000
10	0.0225
11-14	0.0000
15	0.0225
16-19	0.0000
20	0.0225
21-24	0.0000
25	0.0225
26-29	0.0000
30	0.0225
Over 30	0.0000

* *Includes increases at 12 and 18 months of service.*

Asset Value: For Book-value of Assets, bonds are at amortized value and stocks are at cost.

For statutory funding, the actuarial value of assets is smoothed by recognizing each year's difference between actual and expected investment return at the rate of 20% per year over a five-year period.

The actuarial value of assets was marked to the market value as of January 1, 2012, and is smoothed by using a five-year phase-in of each year's unexpected investment gains and losses.

C. Other Assumptions

Marital Status: It is assumed that 85% of 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.

Beneficiary COLA Approximation: For current retirees with eligible reversionary annuitants, liabilities are calculated for the beneficiary's benefit by using 50 percent of the retiree's benefit as of the valuation date plus 35 percent of the retiree's future increase in benefit from the COLA each year after the valuation date.

D. Projection Assumptions

The projections under the provisions of P.A. 99-0506 were based on the following assumptions and methods:

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 valuation at December 31, 2018 is 13,438.

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, 2018. These members were hired from January 1, 2014 through December 31, 2017.

Entry Age	Number
20 to 25	624
25 to 30	986
30 to 35	505
35 to 40	234
40 to 55	6

Approximately 75% 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 $48,078 for the plan year ending December 31, 2018. This amount does not include duty availability pay. The new entrant pay for members hired after 2018 is assumed to increase by the wage inflation assumption of 3.75% plus duty availability pay after three years, increased by CPI compounded.

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 increases disclosed in this actuarial valuation.

The projections assume a pay cap of $114,951.83 for plan year 2019, increasing by 1.375% per year after plan year 2019. The annual increase of 1.375% per year is based on 50% of the CPI-U increase which is assumed to be 2.75% per year.

Administrative Expenses:	Statutory funding projections include an explicit administrative expense assumption of $4,627,000 for plan year end December 31, 2018, increased by 2.75% per year.

APPENDIX 5

SUMMARY OF PROVISIONS OF THE FUND AS OF DECEMBER 31, 2018

PARTICIPANTS	An employee in the police department of the City of Chicago appointed and sworn or designated by law as a peace officer with the title of policeman, policewoman, chief surgeon, police surgeon, police dog catcher, police kennelman, police matron and members of the police force of the police department.
SERVICE	In computing service rendered by a police officer, the following periods shall be counted, in addition to all periods during which he performed the duties of his position, as periods of service for annuity purposes only: All periods of (a) vacation; (b) leave of absence with pay; (c) military service; (d) disability for which the police officer receives disability benefit. The calculation of service is based on a day-to-day basis for most purposes. For the purpose of calculating benefits under the Dominant Formula, one year of Service is credited for a year in any portion of which a police officer is compensated.

RETIREMENT

Eligibility	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	Effective in plan year 2003, retirement is mandatory for a participant who has attained age 63.
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, the employee is entitled to an annuity based on all sums accumulated.
Formula Minimum Annuity	While there are several alternative formulas available with 20 or more years of service, the Dominant Formula is 50% of highest average salary (including duty availability pay) in 48 consecutive months within the last 10 years of service plus 2.5% for each year or fraction of service over 20 years, limited to 75% of average salary.

Summary of Principal Eligibility and Benefit Provisions As of December 31, 2018

Mandatory Retirement Minimum Annuity	A police officer who is required to withdraw from service due to attainment of mandatory retirement age who has less than 20 years of service credit may elect to receive an annuity equal to 30% of average salary for the first 10 years of service, plus 2% of average salary for each completed year of service in excess of 10, to a maximum of 48% of average salary. This benefit qualifies for post-retirement increases.
Post-Retirement Increase	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% 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% maximum increase. For retirees born on and after January 1, 1966, automatic increases are 1.5% of the original annuity, commencing at age 60, or the first anniversary of retirement, if later, to a maximum of 30%. *For participants who first became members on or after January 1, 2011, increases are equal to the lesser of 3.00% and 50% of CPI-U of the original benefit, commencing at age 60.*

Summary of Principal Eligibility and Benefit Provisions
As of December 31, 2018

Minimum Annuity

Beginning with the monthly annuity payment due on January 1, 2016, the fixed and granted monthly annuity payment for any policeman who retired from the service before January 1, 2016, at age 50 or over with 20 or more years of service, and for any policeman who retired from service due to termination of disability and who is entitled to an annuity on January 1, 2016, shall be no less than 125% of the Federal Poverty Level.

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% of the final average salary for each fraction of service. Maximum is 75% 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% 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% 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%.

Reversionary Annuity

A member, prior to retirement, may elect to reduce his own annuity, and provide a reversionary annuity, to begin upon the officer's death, for the officer's spouse.

SURVIVOR INCOME BENEFITS PAYABLE ON DEATH

Death in Service (Non-Duty):

Generally, a money-purchase benefit is provided, based on total salary deductions and City contributions. However, if a policeman dies in service after December 31, 1985, with at least 1.5 years of service, the widow's annuity is the greater of (a) 30% of the annual maximum salary attached to the classified civil service position of a first class patrolman at the time of his death (without dollar limit) or (b) 50% of the benefit accrued by the policeman at date of death.

The lifetime benefit is payable until death.

Death in Service (Duty Related)

Compensation Annuity	75% of the member's salary attached to the civil service position that would ordinarily have been paid to such member as though in active discharge of his duties at the time of death payable until the date the policeman would have attained age 63.
Supplemental Annuity	Payable for life and is equal to the difference between the money purchase annuity for the spouse and an amount equal to 75% of the annual salary (including all salary increases and longevity raises) the police officer would have been receiving when he attained age 63 if the police officer had continued in service at the same rank last held in the department.
Death after Retirement	If a police officer retires on or after January 1, 1986, and subsequently dies, the widow's annuity is 40% before 1988 and 50% on and after January 1, 1988 of the retired policeman's annuity at the time of death (without dollar limit).
Maximum Annuity	$500 a month (after discount for age difference) under both the accumulation method and the old formula method. There is no dollar limit on the 30%, 40% or 50% benefit.
Minimum Annuity	The minimum widow's annuity shall be no less than 125% 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% of the officer's earned annuity at the date of death. Automatic increases to the annuity are equal to the lesser of 3.00% and 50% of CPI-U, commencing when the survivor reaches age 60, and applied to the original granted retirement annuity.*

CHILDREN'S ANNUITIES

Eligibility	Payable at death of the policeman to all unmarried children less than 18 years of age.
Benefit	10% of the annual maximum salary of a first class patrolman during widow (widower) life, 15% otherwise.

Payable Until	Age 18. If the child is disabled, benefit is payable for life or as long as such disablement exists.
Family Maximum	60% (non-duty death) or 100% (duty death) of the salary that would ordinarily been paid to the policeman, if he had been in the active discharge of his duties.
Parent's Annuities Eligibility	Payable to a dependent parent at the death of a policeman who is in either active service, or receiving a disability benefit, or on leave of absence, or in receipt of an annuity granted after 20 years of service, or waiting to start receiving an annuity granted for 20 years of service. The benefit is only payable if there are no surviving spouses or children eligible for benefits.
Benefit	18% of the current salary attached to the rank at separation from service.
Payable until	Death of the dependent parent.

DUTY DISABILITY BENEFIT

Eligibility	Disabling condition incurred in the performance of duty.
Benefit	75% of salary at the time the disability is allowed plus $100.00 per month for each unmarried child less than age 18, (total amount of child's benefits shall not exceed 25% of salary). Beginning January 1, 2000, after seven years of payment, the benefit shall not be less than 60% of the current salary attached to the rank held by the policemen at the time of disability. Payable to employee's age 63 or by operation of law, whichever is later. Salary deductions are contributed by the City.

OCCUPATIONAL DISEASE DISABILITY BENEFIT

Eligibility	Heart attack or any disability heart disease after 10 years of service.

Benefit	65% of salary attached to the rank held by the police officer at the time of his or her removal from the police department payroll with a minimum after 10 years of 50% of the current salary attached to the rank. Each natural or legally adopted unmarried child of the officer under the age of 18 is entitled to a benefit of $100 per month. This benefit is not terminated at age 18 if the child is then dependent by reason of physical or mental disability. Salary deductions are contributed by the City.

ORDINARY DISABILITY BENEFIT

Eligibility	Disabling condition other than duty or occupational related.
Benefit	50% of salary at the time of injury, payable for a period not more than 25% of service (excluding any previous disability time) rendered prior to injury, nor more than five years. Disability shall cease at age 63. Salary deductions are contributed by the City.

DEATH BENEFIT

Eligibility	Payable upon the death of a police officer whose death occurs while in active service; on authorized leave of absence; within 60 days of receipt of salary; while 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 20 years of service. This benefit is payable to beneficiaries or, if none, to estate.

Benefit

Death in Service:

Age at Death	Benefit
49 and under	$12,000
50-62	$12,000 less $400 for each year by which age at death exceeds 49

Death after Retirement:

Age at Death	Benefit
50 and over	$6,000

If death results from injury incurred in performance of duty before retirement on annuity, the benefit payable is $12,000 regardless of the attained age.

REFUNDS

Policemen	Without regard to service and under age 50, or with less than 10 years of service and under age 57 at withdrawal: a refund of all salary deductions together with 1.5% simple interest until the date of withdrawal.
For Spouse's Annuity	Upon retirement an unmarried policeman will receive a refund of contributions for spouse's annuity, accumulated at 3% compounded annually.
Of Remaining Amounts	If at death of a retired policeman the total member contributions paid while active exceed the total retirement benefits paid to date of death, the difference is payable.

CONTRIBUTIONS

Salary Deductions	Employee	7 %	
	Spouse	1½%	
	Annuity Increase	½%	
		9 %	
City Contributions [1]	Employee	9-5/7%	
	Spouse	2%	
	Annuity Increase	½%	Unallocated
		12-3/14%	

[1] *Credited to Participant's Accumulation Annuity and Widow's Annuity Account*

In addition to the above contributions, a contribution is made to support the Death Benefit. Policemen contribute $2.50 per month. City contributes a total of $224,000 for all policemen.

Prior to 2015, the total City contribution was generated by a tax equal to double the contributions by the policemen to the Fund two years prior to the year of the tax levy.

Under P.A. 99-0506, City contributions are equal to $420 million in payment year 2016, $464 million in payment year 2017, $500 million in payment year 2018, $557 million in payment year 2019 and $579 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% by plan year end 2055.

"PICK UP" OF EMPLOYEE SALARY DEDUCTIONS

Beginning January 1, 1982, the employee contributions were "picked up" 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 contributions, these contributions will be treated as employee contributions.

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
2019	2.30%	1.15%	1.15%	$114,951.83

APPENDIX 6

LEGISLATIVE CHANGES 1979 THROUGH 2018

Legislative Changes 1979 through 2018

1979 Session

HB 2128
Refund repayment provided at least three years of service after reentry, surviving spouse may pay in the case of death of the employee.

HB 2012
Under IRS Code Section 414(h), employer may pick up the employee contributions for all compensation earned after December 31, 1981, by a reduction in the cash salary or an offset to a future salary increase or by a combination of both.

HB 2160
Duty disability benefit based on the salary when the benefit is payable in the case of a disabled policeman who returns to active service for a period of at least two years.

1980 Session

HB 3635
Reversed all changes made by HB 2012 and put the pick-up section as a new paragraph; they are treated as employee contributions for all purposes, including refunds and determination of the tax levy.

1981 Session

SB 21
Actuarial reporting standards.

SB 851
Authorizes investments in conventional mortgage pass-through securities.

SB 879
Financial statement required by Department of Insurance within six months and actuarial statement within 9 months; $100 penalty per day if late.

SB 1126
Duty disability benefits based on salary at time disability is allowed; salary for policeman on leave of absence; definition of heart attack.

HB 291
Minimum survivor's annuity from $200 to $250.

Spring 1982 Session

SB 740
Minimum employee annuity from $350 to $400 effective July 1, 1982, for policemen who retired before September 1, 1976.

SB 1127
3% post-retirement increase for employees born before January 1, 1930, without 30% maximum, effective January 1, 1983.

Group health hospital and surgical insurance premium $55 for annuitant not qualified to receive Medicare; $21 if annuitant is qualified, effective January 1, 1983.

SB 1147
Actuarial reporting to Insurance Department and Pension Laws Commission. Actuarial statements prepared by a qualified actuary for plan years ending after December 31, 1984, including actuarial present value of credited projected benefits.

SB 1579
Permitted investment list moved to general section of the statute. Expanded fiduciary standards, prohibited transactions, civil action may be brought by Attorney General or by a participant.

Spring 1983 Session

SB 22
Delegation of investment authority restrictions.

HB 514
10% prudent person investment category.

HB 1412
Heart attack; need not result from an injury.

HB 1413
Wrongful death of a police officer bars benefit.

HB 1414
50/20 50%, plus 2% minimum formula; if retire in 1984 qualify with 52 and 22; in 1985, 51 and 21; in 1986 and after, 50 and 20.

HB 2003
Reversionary annuity. Securities lending.

City Ordinance

Changes compulsory retirement from 63 to 70.

1984 Court Decision

Kaner case awarding widow compensation annuity 75% of the salary attached to the civil service position that would have ordinarily have been paid to him as though he were in active discharge of his duties for widows of policemen who died a duty death after January 1, 1970.

1984 Session

Illinois Public Employees' Pension Laws Commission abolished.

1985 Session

HB 1529
30% (of maximum first class patrolman salary) widow's benefit for death in service, with 1.5 years of service, eliminated the excess spouse refund.

40% (of policeman annuity at the time of death) widow's benefit for death after retirement (for retirements after January 1, 1986, only).

Death benefit increase: retirees $2,250 to $6,000, actives $12,000 before 50 graded down to $6,000.

Minimum widow pension from $250 to $325 under certain conditions.

3% increase for the closed group receiving 2%.

Widow compensation annuity for duty deaths after September 17, 1969.

1986 Session

HB 2630
Expands the widow compensation annuity category to include duty deaths after January 1, 1940.

1987 Session

HB 2715
Beginning January 1, 1988, 50% of employees' annuity at death for widows (present and future) whose spouse retired on or after January 1, 1986.

3% annual increase for life to all employee annuitants (present and future) born before 1940 instead of 1930.

1988 Session

No legislative changes.

1989 Session

SB 95
Signed August 23, 1989. Changed the amount of fund paid health insurance "supplement" from January 1, 1988 until December 31, 1992, to $65 per month for each annuitant not qualified to receive Medicare benefits (and $35 if qualified) and from January 1, 1995 until December 31, 1997, the amounts are $75 and $45, respectively. Widows will now be supplemented also. The City will be required to pay

50% of the aggregated cost of health care claims for the retired group under all health care plans offered by the City. A procedure was established for the City to determine, with the help of an independent actuary, the aggregate cost of claims and premiums for each calendar year from 1989 through 1997 for the retired group.

$150 to $200 minimum widow's benefit.

Beginning January 1, 1990, minimum widow's annuity shall be $400.

Transfer of credits to IMRF for a County Sheriff upon application and payment by the Fund.

HB 332

Signed August 23, 1989, age discrimination changes. Removed the age 63 limitations in determining benefits for money purchase employee and widow annuities, disability benefits and refunds. The change requires contributions (deductions from salary) and concurrent City contributions from January 1, 1988, until withdrawal but not for the period between the attainment of age 63 and January 1, 1988.

Allow transfer credits and creditable service under any other pension fund if police officer has 10 years of service and payment before January 1, 1990.

Provides for a transfer of credits to the Municipal Fund or State Fund of any police officer with at least 10 years of service.

1990 Session

SB 1951

Allows policemen to withdraw at age under 50 with at least 20 years of service to receive benefit based on minimum formula commencing at age 50.

Widows of active policemen receive benefit not less than 50% of annuity payable to the policeman had he retired on the date of death.

Compensation and supplemental widows' annuities do not cease upon remarriage.

1991 Session

HB 969

Increases the minimum monthly benefit to retirees who had at least 20 years of service prior to January 1, 1992, to $650.

Increases the minimum monthly widow's annuity payable upon death after January 1, 1992 of:

- An active policeman with at least 10 years of service; or
- A policeman who had at least 20 years of service at withdrawal from the Fund to $500.

1992 Session

No legislative changes.

1993 Session

SB 1650

Increases the minimum monthly benefit to retirees who had at least 20 years of service prior to January 1, 1995, to $750, and after January 1, 1995, to $850.

Increases the minimum monthly widow's annuity payable upon death after January 1, 1995 of:

- An active policeman with at least 10 years of service; or
- A policeman who had at least 20 years of service at withdrawal from the Fund to $600, and after January 1, 1995, to $700.

1994 Session

No legislative changes.

1995 Session

SB 99

Beginning January 1, 1996, supplemental annuity changed to the difference between the annuity for the widow and an amount equal to 50% of the annual salary (including all salary increases and longevity raises) the policeman would have been receiving when he attained age 63 if the policeman had continued in service at the same rank (whether career service or exempt) that he last held in the police department.

Beginning January 1, 1996, duty disability minimum benefit is stated such that after 10 years of payment the benefit shall not be less than 50% of the current salary attached to the rank held by the policeman at the time of removal from police department payroll.

An occupational disease disability benefit has been added for any policeman with at least 10 years of service who suffers a heart attack or any other disability heart disease. The benefit shall be 65% of salary attached to the rank held by the officer at the time of his or her removal from the police department payroll, with a minimum after 10 years of 50% of the current salary attached to the rank. Each natural or legally adopted unmarried child of the officer under age 18 is entitled to a benefit of $50 per month. This benefit is not terminated at age 18 if child is then dependent by reason of a physical or mental disability.

Beginning January 1, 1996, the age of the commencement of automatic increases in annuities has been lowered to age 55 for policemen born on or after January 1, 1940, but before January 1, 1945. Any policemen born before January 1, 1945, who qualifies for a minimum annuity and retires after September 1, 1967, not receiving the initial increases before January 1, 1996, will receive the initial increase on (1) January 1, 1996, (2) the first anniversary of the date of retirement, or (3) attainment of age 55, whichever occurs last.

Beginning January 1, 1996, the minimum monthly widow's annuity payable upon death increases to $700.00 for all widow's not previously eligible for the minimum.

1996 Session

SB 1456

Effective August 9, 1996, a parent's annuity equal to 18% of the current salary attached to the rank at separation from service will be provided to each of the natural parents of a police officer who dies under certain conditions. Those conditions include: death in active service, while receiving a disability benefit, during leave of absences or after 20 years of service and eligible or receiving an annuity. The benefit is payable only if there are no surviving spouse or children eligible for benefits.

1997 Session

P.A. 90-551

Effective December 12, 1997, the law was amended to include on prospective basis duty availability in the definition of salary. The law also allows policemen who retired or were at least age 50 and had at least 20 years of service between July 1, 1994, and December 31, 1997, to count duty availability pay in the calculation of final average salary. In order for this to happen, the policemen must elect to do so and must contribute the employee contributions (9%) without interest from the duty availability pay that is to be considered in the final average salary calculation.

Effective June 27, 1997, P.A. 90-0031 was enacted. This law extends the hospitalization plan through June 30, 2002, for annuitants and their eligible dependents.

Effective July 1, 1997, P.A. 89-643 was amended. This provision extended the parent's annuity eligibility to apply to dependent parents of police officers who died prior to August 9, 1996.

1998 Session

P.A. 90-0766

Effective August 16, 1998, this law increased the minimum monthly widow's annuity payable from $700.00 to $800.00, effective January 1, 2018. This law also increased the earnings limit maximum for those receiving disability benefits such that the sum of the disability benefit and outside compensation may be up to 150% of the rate of salary which the participant would be receiving if working in his regularly appointed civil service position as a policeman.

1999 Session

No legislative changes.

2000 Session

In 2000 the City of Chicago has enacted mandatory retirement for Policemen upon attainment of age 63.

2001 Session

P.A. 92-0052

Effective July 12, 2001.

Beginning on January 1, 2000, the minimum duty disability after seven years of payment shall be 60% of the current salary attached to the rank held by the policeman at the time of removal from police department payroll. If the Board finds that the disability permanently renders the policeman totally disabled for any service of a remunerative character, the minimum disability benefit shall be 75% of the current salary attached to the rank held by the policeman at the time of removal from payroll.

The child's benefit for both duty disability and occupational disease disability was increased to $100 per month.

The law removed the earnings limit of 150% of regular salary to be eligible to receive disability benefits.

With effect from January 1, 2000, the age of the commencement of the automatic 3% increases in annuities has been lowered to age 55 for policemen born on or after January 1, 1945, but before January 1, 1950. Any policeman born before January 1, 1950, who qualifies for a minimum annuity and retires after September 1, 1967, not receiving the initial increase before January 1, 2000, will receive the initial increase at the latest of (1) January 1, 2000, (2) the first anniversary of the date of retirement, or (3) attainment of age 55.

2002 Session

HB 5168

- Effective June 28, 2002.

- A police officer who is required to withdraw from service due to attainment of mandatory retirement age and who has less than 20 years of service credit, may elect to receive an annuity equal to 30% of average salary for the first 10 years of service, plus 2% of average salary for each completed year of service in excess of 10, to a maximum of 48% of average salary. This benefit qualifies for post-retirement increases.

- The supplemental annuity payable to the widow of an officer on account of a duty-related death is increased to the difference between the money purchase annuity for the spouse and 75% (previously 50%) of the annual salary the police officer would have been receiving when he attained age 63 if the police officer had continued in service at the same rank last held in the department.

- The pension fund subsidy for retiree health insurance was extended through June 30, 2003. For annuitants (other than child annuitants) taking the employer-provided plan, the subsidy is $75 per month if the annuitant is not eligible for Medicare and $45 per month if the annuitant is eligible for Medicare.

2003 Session

SB 1701
- Effective July 1, 2003.

- The healthcare benefits were increased to $85 per month for non-Medicare eligible participants and $55 per month for Medicare eligible participants for the period from July 1, 2003 through June 30, 2008. Thereafter, the benefits are increased from $85 to $95 and $55 to $65 for the period July 1, 2008 to June 30, 2013.

- The healthcare benefits referred to above are not and shall not be construed to be pension or retirement benefits for the purposes of Section 5 of Article XIII of the Illinois Constitution of 1970.

2004 Session

P.A. 93-0654
- Effective January 16, 2004.

- The minimum annuity formula accrual rate for service after 20 years was increased from 2.0% to 2.5% with total benefits limited to 75% of final average pay.

- The minimum benefit for age-service retirements was increased to $950 per month during 2004 and $1,050 per month thereafter.

- The minimum widow annuity was increased to $900 per month during 2004 and $1,000 per month thereafter.

2005 Session

P.A. 94-0624
- Effective August 18, 2005.

- Beginning January 1, 2000, removes the limitation for maintaining benefits for non-civil service positions when assigned within three years of retirement for non-civil service positions with the title of Captain.

HB 1009

- Effective January 1, 2005, any policeman born after January 1, 1950, but before January 1, 1955, shall receive a benefit increase of 3% compounded annually. Any policeman born before January 1, 1955, who qualifies for a minimum annuity and retires after September 1, 1967, not receiving the initial increase before January 1, 2005, will receive the initial increase at the latest of (1) January 1, 2005, (2) the first anniversary of the date of retirement, or (3) attainment of age 55.

SB 23

- Approved June 27, 2005.

- Prohibits the investment or deposit from the retirement system or pension fund to certain entities doing business in or with the government of the Republic of the Sudan. Fund managing companies must certify that under Section 1-110.5 of the pension code that they have not loaned to, invested in or otherwise transferred any of the pension fund assets to a forbidden entity.

SB 1446

- Approved August 22, 2005.

- Provides for various changes in provisions and procedures concerning Qualified Illinois Domestic Relations Orders. Allows for alternate payee's benefit to be based on a percentage of employee's benefit. Effective July 1, 2006.

2006 Session

No legislative changes.

2007 Session

P.A. 95-0279

- Effective January 1, 2008.

- Removes restriction that a child be born or legally adopted before withdrawal from service for a child's annuity. Removes restriction requiring that adoption proceedings must have been initiated 6 months prior to the policeman's death.

P.A. 95-0504

- Effective August 28, 2007.

- Beginning on the effective date, a widow's annuity shall no longer be subject to termination or suspension due to remarriage. Any widow's annuities previously terminated or suspended due to remarriage shall be resumed upon application, but the resumption shall not be retroactive.

- At the discretion of the Board, a widow's annuity may be granted to a widow who was denied a benefit for having been married less than one year at the time of the member's death.

- Removes age limitation on child's annuity for children who are so physically or mentally handicapped as to be unable to support themselves.

2008 Session

No legislative changes.

2009 Session

P.A. 95-1036

- Effective February 17, 2009.

- For purposes of tax levy, contributions by the policeman to the Fund shall not include payments made by a policeman to establish credit under Section 5-214.2.

- An officer with prior service credit under article 3,7,9,10,13,14,15 Funds may transfer up to 10 years of service in 6 month increments provided the transfer of service results in no increase to the unfunded actuarial accrued liability of the Fund.

P.A. 96-0006

- Effective April 3, 2009.

- The Illinois Governmental Ethics Act.

P.A. 96-285

- Effective August 11, 2009.

- Extends P.A. 95-1036 service purchase eligibility to include members of article 8 Funds and law enforcement officers with any agency of the United States Government.

P.A. 96-727

- Effective August 25, 2009.

- Allows an officer with at least 10 years of PABF service to transfer up to 48 months of eligible service as a County Correctional Officer. The officer is required to pay to the Fund the difference between contributions transferred by the County on behalf of the officer and the amount of employee and employer contributions that would have been contributed had the officer been a member of this Fund plus interest at the actuarially assumed rate.

P.A. 96-745

- Effective August 25, 2009.

- Transfer of service to Article 14 (State Employees' Retirement System) now includes investigators for the Office of the Attorney General and investigators for The Department of Revenue. Interest on the repayment of refund is changed from 6% to the actuarially assumed rate.

P.A. 96-753

- Effective August 25, 2009.

- Encourages the public pension funds, and any State entity investing on behalf of the public pension funds, to promote the economy of Illinois through the use of economic opportunity investments.

- Instructs the fund's investment advisors to utilize investment strategies designed to ensure that all securities transactions are executed in such a manner that the total explicit and implicit costs and total proceeds in every transaction are the most favorable under the circumstances.

2010 Session

P.A. 96-1260

- Effective July 23, 2010.

- A policeman may purchase benefit service for all periods of service in the military before beginning service as an active policeman. The total amount of such service shall not exceed two years.

P.A. 96-1495 (HB 3538)

- Effective January 1, 2011.

- Changes the financing for the Fund. Assets are marked to market at March 30, 2011. For fiscal years ending after March 30, 2011, the actuarial value of assets is based on a five-year smoothing of investment gains and losses incurred in fiscal years ending after March 30, 2011. The City levies a new tax starting in FY2015. Each year, employer contributions combined with member contributions and other fund revenue must be equal to the amount that is sufficient to produce 90% funding by the end of fiscal year 2040. The projections are based on an open group projection and level percent of pay financing and actuarial liabilities are based on the Projected Unit Credit cost method. If the City does not make the statutorily required contributions, then the State, starting in FY 2016, could withhold State grants to the City, and directly deposit the withheld funds into the PABF. The withheld funds are limited to 33% of total State grants to the City in FY 2016, 67% in FY 2017, and 100% on and after FY 2018.

- Changes benefits for members hired on or after January 1, 2011. For these employees the minimum retirement eligibility is at age 55 with 10 years of service with the annuity based on an accrual rate of 2.5%, subject to a maximum of 75%. Employees may retire at age 50 with 10 years of service with the annuity based on accrual rate of 2.5%, reduced by one half of one percent per month for retirement prior to age 55, subject to a maximum of 75%. The final average salary is based on 96 consecutive months within the last 120 months. Annual salary is capped at $106,800, indexed annually at the lesser of 3.0% and 50% of CPI-U. COLA is equal to the lesser of 3.0% and

50% of CPI-U, commencing at age 60, with no 30% cap, applied to the original granted retirement annuity. Widow benefits are 66-2/3% of the policemen's earned annuity at the date of death. Widow COLA is equal to the lesser of 3.0% and 50% of CPI-U, commencing when the survivor reached age 60, and applied to the original granted retirement annuity.

2011 Session

P.A. 97-326 (HB 1872)

- Effective August 12, 2011.

- A policeman may transfer up to 10 years of credible service to a fund covered under Article 3. The PABF will pay the Article 3 fund an amount consisting of (1) the amounts credited to the applicant through employee contributions, plus accumulated interest plus (2) an amount representing municipality contributions equal to the amount determined in (1) plus (3) any interest paid to the PABF in order to reinstate credits and credible service.

- A policeman may reinstate credits and credible service that was terminated upon receipt of a refund, by paying the Fund the amount of the refund plus interest thereon at the actuarially assumed rate, compounded annually, from the date of the refund to the date of the payment.

P.A. 97-344 (HB 3376)

- Effective August 12, 2011.

- Makes changes concerning annual increases to the monthly annuities of persons who first become a policeman on or after January 1, 2011 and deletes repetitive language concerning annual increases in survivor's annuities for Tier 2.

P.A. 97-530 (SB 1672)

- Effective August 23, 2011.

- Requires all pension funds and retirement systems subject to the Code to comply with the federal Heroes Earnings Assistance and Relief Tax Act of 2008.

P.A. 97-609 (SB 1831)

- Effective August 26, 2011.

- Applies to those members hired on or after January 1, 2012.

    - Provides that if a new hire is receiving a retirement annuity or pension and accepts a contractual position to provide services to a governmental entity from which he or she has retired, then that person's annuity or pension will be suspended during that contractual service.

    - Makes it a Class A misdemeanor for a pensioner who is seeking contractual employment to fail to notify certain persons about his or her retirement status before accepting an employment contract.

P.A. 97-504 (HB 1670)

- Approved August 23, 2011.
- Amends the Open Meetings Act.
  - Requires each elected or appointed member of a public body subject to this Act who is such a member on the effective date of the amendatory Act to successfully complete the electronic training curriculum developed and administered by the Public Access Counselor.
  - Requires those members to complete the training not later than one year after the effective date of the amendatory Act.
  - Requires each elected or appointed member of a public body subject to the Act who becomes such a member after the effective date of the amendatory Act to successfully complete the electronic training curriculum developed and administered by the Public Access Counselor.
  - Requires those members to complete the training not later than the 90th day after the date the member either (i) takes the oath of office, if the member is required to take an oath of office to assume the person's duties as a member of the public body or (ii) otherwise assumes responsibilities as a member of the public body, if the member is not required to take an oath of office to assume the person's duties as a member of the governmental body.
  - Requires each member who successfully completes the curriculum to file a copy of the certificate of completion with the public body.
  - Provides that the failure of one or more members of a public body to complete the training required by this Section does not affect the validity of an action taken by the public body.
  - Provides that an elected or appointed member of a public body subject to this Act who has successfully completed the required training and filed a copy of the certificate of completion with the public body is not required to subsequently complete that training.

2012 Session

P.A. 97-0651

- Approved and effective January 5, 2012.
- Requires any reasonable suspicion of fraud against the Fund to be reported to the State’s Attorney for investigation.
- Changes provisions for Union Leaves of Absence.

P.A. 97-813

- Effective July 13, 2012.
- Clarifies provisions of widow's annuity.

2013 Session

P.A. 98-0043 (SB 1584)

- Approved and effective June 28, 2013.
- Changes the duration of health insurance supplement payments to eligible employee annuitants to “Beginning July 1, 2008 and until such time as the city no longer provides a health care plan for such annuitants or December 31, 2016, whichever comes first.”

P.A. 98-0433 (HB 2620)

- Approved and effective August 16, 2013.
- Allows for an additional exception to the RFP process for obtaining investment services for "contracts for follow-on funds with the same fund sponsor through close-end funds."

2014 Session

No legislative changes.

2015 Session

No legislative changes.

2016 Session

P.A. 99-0506

- Approved and effective May 30, 2016.
- Changes the funding policy.
    - For payment years 2016 through 2020, specifies the amount for the City of Chicago's required annual contribution to the Fund as follows: $420 million in payment year 2016, $464 million in payment year 2017, $500 million in payment year 2018, $557 million in payment year 2019 and $579 million in payment year 2020.
    - Beginning in payment year 2021, the City's total required contribution to the Fund shall be an amount that is equal to the normal cost of the fund, plus an amount sufficient to bring the total assets of the fund up to 90% of the total actuarial liabilities of the fund by payment year 2055 (instead of 2040).
- Changes the actuarial cost method to entry age normal.
- Includes provisions for funding from any proceeds received by the City in relation to the operation of a casino within the City.
- Provides a mechanism to enforce funding through a mandamus action.
- Creates a new minimum retirement annuity provision equal to 125% of the federal poverty level for certain persons.

P.A. 99-0905

- Approved and effective November 29, 2016.
- Specifies the manner of calculating the Tier 2 surviving spouse's annuity for Tier 2 policemen who die in service with at least 1 1/2 years of service.

- Specifies the manner of computing duty-death benefits for Tier 2 surviving spouses and provides that Tier 2 duty-death benefits are not payable where the death is the result of an intervening cause.
- Includes provisions for a minimum surviving spouse's annuity equal to 125% of the federal poverty level.
- Increases the Tier 1 automatic annual increase in retirement annuity for persons born after December 31, 1954 but before January 1, 1966.
- Amends the State Mandates Act to require implementation without reimbursement.

2017 Session

P.A. 100-0334

- Approved and effective August 25, 2017
- States a person otherwise entitled to a survivor benefit and who has been convicted of a felony in connection with the service rendered by the member, is not eligible for such survivor benefit, if such conviction was after the effective date
- It further states for participants that first becomes members after the effective date the change is a condition of employment

2018 Session

P.A. 100-1148

- Approved and effective December 10, 2018
- Technical correction related to filing copies of the report as required by Section 3.1 of the General Assembly Organizational Act and with the State Government Report Distribution Center for the General Assembly.