

Park Employees' Annuity and Benefit Fund of Chicago

**Actuarial Valuation and Review as of
December 31, 2018**





101 North Wacker Drive, Suite 500 Chicago, IL 60606
T 312.984.8500 www.segalco.com

June 6, 2019

Board of Trustees
Park Employees' Annuity and Benefit Fund of Chicago
55 East Monroe Street, Suite 2720
Chicago, Illinois 60603

Dear Board Members:

We are pleased to submit this annual Actuarial Valuation and Review as of December 31, 2018. It summarizes the actuarial data used in the valuation, establishes the net pension liability under Governmental Accounting Standards Board (GASB) Statement No. 67 and the funding requirements for the fiscal year ending December 31, 2019, and analyzes the preceding year's experience.

This report was prepared in accordance with generally accepted actuarial principles and practices at the request of the Board to assist in administering the Park Employees' Annuity and Benefit Fund of Chicago.

Asset and Membership Data

The census information and financial information on which our calculations were based was prepared by the Fund staff. That assistance is gratefully acknowledged. We have not subjected the census data to any auditing procedures, but have examined the data for reasonableness and consistency with the prior year's data.

Plan Changes

The plan provisions are unchanged since the last actuarial valuation.

Actuarial Assumptions and Methods

The actuarial assumptions and methods are set by the Board of Trustees, based upon recommendations made by the Fund's actuary. The assumptions and methods used for the December 31, 2018 actuarial valuation were based on an experience analysis covering the five-year period ending December 31, 2017 and were adopted by the Board, effective for the December 31, 2018 valuation. These actuarial assumptions and methods comply with the parameters set by the Actuarial Standards of Practice and the parameters for disclosure in GASB Statement No. 67. The investment return assumption is based on the Fund being invested according to the target asset allocation in the Investment Policy Statement. To the extent that the liquidation of assets to pay benefit payments and expenses requires a shift in investment allocation to more liquid, lower return asset classes, a lower discount rate may be required in the future.

Funding Adequacy

The funding policy of the Fund, adopted by the Board, is to have contributions sufficient to amortize the unfunded liability over the 30-year period ending December 31, 2042. However, the actual amount of employer contributions each year is set by statute. For Fiscal 2019, actual employer contributions come from a property tax levied by the Chicago Park District equal to the total amount of contributions made by employees in the calendar year two years prior to the year of the levy, multiplied by 1.1. The 1.1 factor is known as the tax multiple.

The employer contributions mandated by the Illinois Pension Code are insufficient to avoid insolvency, and without a change, the Fund is in imminent danger of insolvency and the assets are projected to be depleted in the next eight years (during 2026). Segal strongly recommends an actuarial funding method that targets 100% funding of the actuarial accrued liability. Generally, this implies payments that are ultimately at least enough to cover normal cost, interest on the unfunded actuarial accrued liability and the principal balance. If the Fund becomes insolvent, the employer will be required to make contributions on a “pay as you go” basis, which means the employer would have to pay all benefits as they become due.

Financial Results and Membership Data

This report includes the following schedules for the financial section of the Comprehensive Annual Financial Report:

- Actuarial
 - Active Member Valuation Data
 - Retirees and Beneficiaries Added to and Removed from Rolls
 - Solvency Test
 - Analysis of Financial Experience

- Financial
 - Schedule of Changes in Employer's Net Pension Liability
 - Schedule of Employer's Net Pension Liability
 - Schedule of Employer Contributions

Limitation of Actuarial Measurements

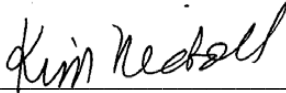
The measurements shown in this actuarial valuation may not be applicable for other purposes. Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic 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; and changes in plan provisions or applicable law.

Qualifications

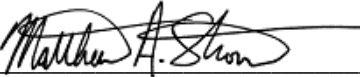
The actuarial calculations were directed under our supervision. We are members of the American Academy of Actuaries and we meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion herein. To the best of our knowledge, the information supplied in the actuarial valuation is complete and accurate. Further, in our opinion, the assumptions as approved by the Board are reasonably related to the experience of and the expectations for the Fund.

Sincerely,

Segal Consulting, a Member of The Segal Group, Inc.

By: 

Kim Nicholl, FSA, MAAA, EA, FCA
Senior Vice President and Actuary



Matthew A. Strom, FSA, MAAA, EA
Vice President and Actuary

SECTION 1**VALUATION SUMMARY**

Purpose	i
Valuation Highlights.....	i
Summary of Key Valuation Results	v
Important Information about Actuarial Valuations	vi

SECTION 2**VALUATION RESULTS**

A. Member Data	1
B. Financial Information ..	4
C. Actuarial Experience....	6
D. Development of Employer Costs.....	11
E. Risk	13

SECTION 3**SUPPLEMENTAL INFORMATION**

EXHIBIT A Table of Fund Coverage.....	15
EXHIBIT B Participants in Active Service as of December 31, 2018.....	16
EXHIBIT C History of Active Member Valuation Data.....	17
EXHIBIT D Reconciliation of Participant Data	18
EXHIBIT E Schedule of Pensioners and Beneficiaries Added to and Removed from Rolls	19
EXHIBIT F Summary Statement of Income and Expenses on a Fair value Basis at December 31.....	20
EXHIBIT G Summary Statement of Fund Assets at December 31.....	21
EXHIBIT H Development of the Fund Through December 31, 2018.....	22
EXHIBIT I Development of Unfunded Actuarial Accrued Liability	23
EXHIBIT J Definitions of Pension Terms.....	24

SECTION 4**REPORTING INFORMATION**

EXHIBIT I Summary of Actuarial Valuation Results.....	30
EXHIBIT II Schedule of Employer Contributions	32
EXHIBIT III Schedule of Funding Progress	33
EXHIBIT IV Solvency Test at December 31.....	34
EXHIBIT V Projection of Contributions, Liabilities, and Assets.....	35
EXHIBIT VI Actuarial Assumptions and Actuarial Cost Method.....	38
EXHIBIT VII Summary of Plan Provisions	42

SECTION 5**GASB INFORMATION**

EXHIBIT 1 Net Pension Liability ...	47
EXHIBIT 2 Schedule of Changes in Net Pension Liability ...	49
EXHIBIT 3 Schedule of Employer Contribution – Last Ten Fiscal Years	50

SECTION 1: Valuation Summary for the Park Employees' Annuity and Benefit Fund of Chicago

Purpose

This report has been prepared by Segal Consulting to present a valuation of the Park Employees' Annuity and Benefit Fund of Chicago (the Fund) as of December 31, 2018. The valuation was performed to determine whether the assets and contributions are sufficient to provide the prescribed benefits. The contribution requirements presented in this report are based on:

- The benefit provisions of the Fund, as outlined in 40 ILCS 5/12 and administered by the Board;
- The characteristics of covered active participants, inactive vested participants, and retired participants and beneficiaries as of December 31, 2018, provided by Fund staff;
- The assets of the Fund as of December 31, 2018, provided by Fund staff;
- Economic assumptions regarding future salary increases and investment earnings; and
- Other actuarial assumptions, regarding employee terminations, retirement, death, etc.

Valuation Highlights

The following key findings were the result of this actuarial valuation:

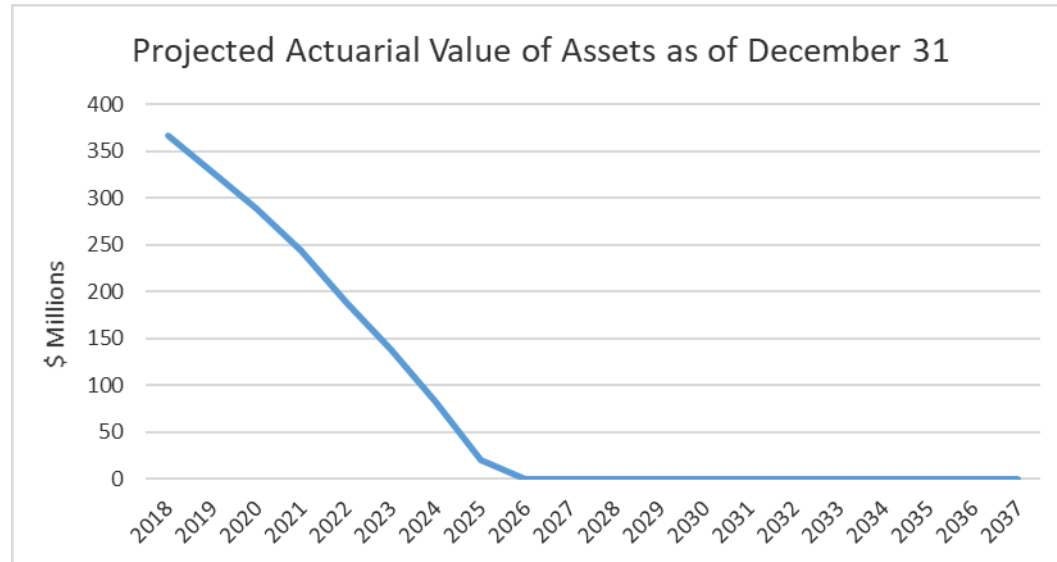
1. Since the last valuation, an experience analysis covering the five-year period ending December 31, 2017 has been performed. The proposed assumption changes were adopted by the Board. The following changes have been reflected, effective with this valuation:
 - Inflation decreased from 2.75% to 2.50%;
 - Tier 2 COLA and pay cap decreased from 1.375% to 1.250%;
 - Assumed rate of return on investments decreased from 7.50% to 7.25%;
 - Salary scale decreased due to merit/seniority rates as well as lower inflation;
 - Administrative expenses annual increase assumption decreased from 5.0% to 3.5% of prior year's expenses;
 - Mortality rates adjusted from RP-2000 with mortality improvements projected generationally from 2003 using Scale AA to 110% of PubG-2010 with mortality improvements projected generationally using MP-2017;
 - Assumed rates of termination from active employment increased for most ages;

SECTION 1: Valuation Summary for the Park Employees' Annuity and Benefit Fund of Chicago

- Tier 1 rates of active retirement lowered at younger ages and raised at older ages.
- No changes in Tier 2 rates of active retirement, incidence of disability, percent married assumption, or spousal age difference assumption were recommended.

These changes increased the actuarial accrued liability by \$84.0 million, decreased the funded ratio by 2.6%, and increased the actuarially determined contribution requirement by 13.7%.

2. **The Fund is now projected to become insolvent during 2026. The graph below shows a 20-year projection of the actuarial value of assets. A 40-year projection of the Fund's financial status is shown in Exhibit V.**



3. **The funding methods mandated by the Illinois Pension Code are inadequate to appropriately fund the Park Employees' Annuity and Benefit Fund of Chicago. Segal strongly recommends an actuarial funding method that targets 100% funding of the actuarial accrued liability. Generally, this implies payments that are ultimately at least enough to cover normal cost, interest on the unfunded actuarial accrued liability and the principal balance.**

SECTION 1: Valuation Summary for the Park Employees' Annuity and Benefit Fund of Chicago

4. The funded ratio based on the actuarial value of assets over the actuarial accrued liability as of December 31, 2018, is 32.1%, compared to 37.1% as of December 31, 2017. Before reflecting the assumption changes, this year's funded ratio is 32.3%. This ratio is a measure of funding status, its history is a measure of funding progress. Using the fair value of assets, the funded ratio as of December 31, 2018, is 30.0%, compared to 38.3% as of December 31, 2017. These measurements are not necessarily appropriate for assessing the sufficiency of Fund assets to cover the estimated cost of settling the Fund's benefit obligation or the need for or the amount of future contributions.
5. Employer contributions to the Fund come from a tax levied upon all taxable property in the City of Chicago. The amount of tax that is levied is 1.1 times the amount of employee contributions made two years prior. The 1.1 factor is known as the tax multiple. As shown in Chart 13, for the fiscal year beginning January 1, 2019, the actuarially determined contribution amount (ADC) is \$61,887,790. Based on the 1.1 tax multiple, and using the Fund's assumption of 3% loss on collections (the Park District has been absorbing this loss, however, the Park District is not guaranteed to do so in the future), we have estimated the employer contribution for the fiscal year beginning January 1, 2019, to be \$14,135,549. **Compared to the ADC of \$61,887,790, the contribution deficiency is \$47,752,241 as of January 1, 2019. In the prior fiscal year, actual contributions were \$23,291,332 less than the ADC. Each year of a contribution deficiency leads to an increased deficiency in all future years.**
6. The Park District has been making supplemental contributions since 2015 and has budgeted additional supplemental contributions for fiscal year 2019.
7. For the year ended December 31, 2018, Segal has determined that the asset return on a fair value basis was -4.5%. After gradual recognition of investment gains and losses under the actuarial smoothing method, the actuarial rate of return was 5.4%. This represents an experience loss when compared to the assumed rate of 7.5%, effective for the year ending December 31, 2018. As of December 31, 2018, the actuarial value of assets (\$366.8 million) represents 107.2% of the fair value (\$342.3 million).
8. The portion of deferred investment gains and losses recognized in the calculation of the December 31, 2018, actuarial value of assets resulted in a loss of \$7,820,631. Additionally, the demographic and liability experience resulted in a \$3,635,253 net loss.

SECTION 1: Valuation Summary for the Park Employees' Annuity and Benefit Fund of Chicago

9. The total unrecognized investment loss as of December 31, 2018, is \$24,551,862. This investment loss will be recognized in the determination of the actuarial value of assets for funding purposes in the next few years, to the extent it is not offset by recognition of investment gains derived from future experience. This implies that earning the assumed rate of investment return of 7.25% per year (net of expenses) on a **fair value** basis will result in investment losses on the actuarial value of assets in the next few years. Therefore, if the actual fair value return is equal to the assumed 7.25% rate and all other actuarial assumptions are met, the contribution requirements would increase over the next few years.
10. As mentioned above, the current method used to determine the actuarial value of assets yields an amount that is 107.2% of the fair value of assets as of December 31, 2018. Guidelines in Actuarial Standard of Practice No. 44 (Selection and Use of Asset Valuation Methods for Pension Valuations) recommend that asset values fall within a reasonable range around the corresponding fair value. We believe the actuarial asset method currently complies with these guidelines.
11. When measuring pension liability for GASB purposes, the same actuarial cost method (Entry Age method) is used for funding purposes. However, as of December 31, 2018, the GASB blended discount rate calculation results in a lower discount rate (4.21%) than is used for funding purposes (7.25%). This means that the total pension liability (TPL) measure for financial reporting shown in this report will differ from the actuarial accrued liability (AAL) measure for funding. We note that the same is true for the normal cost component of the annual plan cost for funding and financial reporting.
12. The net pension liability (NPL) is equal to the difference between the Total Pension Liability (TPL) and the Plan's fiduciary net position. The Plan's fiduciary net position is equal to the fair value of assets. The NPL as of December 31, 2018, is \$1,304,712,148.
13. This actuarial report as of December 31, 2018, is based on financial data as of that date. Changes in the value of assets subsequent to that date are not reflected. Declines in asset values will increase the cost of the plan, while increases in asset values (in excess of expected) will decrease the cost of the plan.

SECTION 1: Valuation Summary for the Park Employees' Annuity and Benefit Fund of Chicago

Summary of Key Valuation Results

	2019		2018
	Pre-Assumption Changes	Post-Assumption Changes	
Contributions for fiscal year beginning:			
Actuarially determined contribution requirement	\$54,437,797	\$61,887,790	\$50,929,734
Estimated employer contributions (provided by the Fund, reflecting 3% loss on collections)	14,135,549	14,135,549	12,798,291
Actual employer contribution	--	--	27,638,402
Funding elements for fiscal year beginning:			
Employer normal cost, including administrative expenses	\$4,378,491	\$5,750,766	\$4,640,403
Fair value of assets	342,255,873	342,255,873	397,648,758
Actuarial value of assets	366,806,612	366,806,612	385,419,506
Actuarial accrued liability	1,058,316,305	1,142,297,965	1,039,279,444
Unfunded actuarial accrued liability	691,509,693	775,491,353	653,859,938
Funded ratio	32.34%	32.11%	37.09%
GASB Information:			
Long-term expected rate of return		7.25%	7.50%
Municipal bond index		4.10%	3.44%
Single equivalent discount rate		4.21%	3.65%
Total pension liability		\$1,646,968,021	\$1,624,571,524
Plan fiduciary net position		342,255,873	397,648,758
Net pension liability		1,304,712,418	1,226,922,766
Plan fiduciary net position as a percentage of total pension liability		20.78%	24.48%
Demographic data for plan year beginning:			
Number of retired participants and beneficiaries		2,854	2,876
Number of vested former participants		145	150
Number of active participants		3,187	3,543
Total salary supplied by the Fund		\$129,923,175	\$134,258,328
Average salary		40,767	37,894

SECTION 1: Valuation Summary for the Park Employees' Annuity and Benefit Fund of Chicago

Important Information About Actuarial Valuations

An actuarial valuation is a budgeting tool with respect to the financing of future projected benefit obligations. It is an estimated forecast – the actual long-term cost of the Fund will be determined by the actual benefits and expenses paid and the actual investment experience of the Fund.

In order to prepare a valuation, Segal Consulting (“Segal”) relies on a number of input items. These include:

- **Plan of benefits** Plan provisions define the rules that will be used to determine benefit payments, and those rules, or the interpretation of them, may change over time. Even where they appear precise, outside factors may change how they operate. It is important to keep Segal informed with respect to plan provisions and administrative procedures, and to review the plan summary included in our report to confirm that Segal has correctly interpreted the plan of benefits.
- **Participant data** An actuarial valuation for the Fund is based on data provided to the actuary by Fund staff. Segal does not audit such data for completeness or accuracy, other than reviewing it for obvious inconsistencies compared to prior data and other information that appears unreasonable. It is important for Segal to receive the best possible data and to be informed about any known incomplete or inaccurate data.
- **Assets** The valuation is based on the fair value of assets as of the valuation date, as provided by Fund staff, and uses an “actuarial value of assets” that differs from fair value to gradually reflect year-to-year changes in the fair value of assets in determining the contribution requirements.
- **Actuarial assumptions** In preparing an actuarial valuation, Segal projects the benefits to be paid to existing plan members for the rest of their lives and the lives of their beneficiaries. This projection requires actuarial assumptions as to the probability of death, disability, withdrawal, and retirement of each member for each year. In addition, the benefits projected to be paid for each of those events in each future year reflect actuarial assumptions as to salary increases and cost-of-living adjustments. The projected benefits are then discounted to a present value, based on the assumed rate of return that is expected to be achieved on the Fund’s assets. There is a reasonable range for each assumption used in the projection and the results may vary materially based on which assumptions are selected. It is important for any user of an actuarial valuation to understand this concept. Actuarial assumptions are periodically reviewed to ensure that future valuations reflect emerging plan experience. While future changes in actuarial assumptions may have a significant impact on the reported results, that does not mean that the previous assumptions were unreasonable.

SECTION 1: Valuation Summary for the Park Employees' Annuity and Benefit Fund of Chicago

The user of Segal's actuarial valuation (or other actuarial calculations) should keep the following in mind:

- The actuarial valuation is prepared at the request of the Board. Segal is not responsible for the use or misuse of its report, particularly by any other party.
- An actuarial valuation is a measurement of the Fund's assets and liabilities at a specific date. Accordingly, except where otherwise noted, Segal did not perform an analysis of the potential range of future financial measures. The actual long-term cost of the Fund will be determined by the actual benefits and expenses paid and the actual investment experience of the Fund.
- If the Board is aware of any event or trend that was not considered in the valuation that may materially change the results of the valuation, Segal should be advised, so that we can evaluate it.
- Segal does not provide investment, legal, accounting, or tax advice. Segal's valuation is based on our understanding of applicable guidance in these areas and of the Fund's provisions, but they may be subject to alternative interpretations. The Board should look to their other advisors for expertise in these areas.
- The measurements shown in this actuarial valuation may not be applicable for other purposes. 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); and changes in plan provisions or applicable law.

As Segal has no discretionary authority with respect to the management or assets of the Fund, it is not a fiduciary in its capacity as actuaries and consultants with respect to the Fund.

SECTION 2: Valuation Results for the Park Employees' Annuity and Benefit Fund of Chicago

A. MEMBER DATA

The Actuarial Valuation and Review considers the number and demographic characteristics of covered members, including active members, inactive members, retirees and beneficiaries.

This section presents a summary of significant statistical data on these participant groups.

More detailed information for this valuation year and the preceding valuation can be found in Section 3, Exhibits A, B, and C.

A historical perspective of how the member population has changed over the past ten valuations can be seen in this chart.

CHART 1
Member Population: 2010 – 2018

Census Date	Active Members	Vested Terminated Members*	Retirees and Beneficiaries**	Ratio of Actives to Retirees and Beneficiaries
June 30, 2010	2,816	160	2,956	0.95
June 30, 2011	2,795	141	2,913	0.96
June 30, 2012	2,977	153	2,921	1.02
December 31, 2012	3,053	152	2,906	1.05
December 31, 2013	3,076	148	2,904	1.06
December 31, 2014	2,973	147	2,891	1.03
December 31, 2015	3,063	145	2,876	1.07
December 31, 2016	3,114	149	2,870	1.09
December 31, 2017	3,543	150	2,876	1.23
December 31, 2018	3,187	145	2,854	1.12

* Excludes terminated members due a refund of employee contributions.

** Excludes QILDROs

SECTION 2: Valuation Results for the Park Employees' Annuity and Benefit Fund of Chicago

Active Members

Plan costs are affected by the age, years of service and payroll of active members. In this year's valuation, there were 3,187 active members with an average age of 41.5, average years of service of 9.9 years and average salary of \$40,767. The 3,543 active participants in the prior valuation had an average age of 41.0, average years of service of 9.8 years and average salary of \$37,894.

Inactive Participants

In this year's valuation, there were 145 members with a vested right to a deferred or immediate vested benefit.

In addition, there were 4,634 members entitled to a return of their employee contributions.

These graphs show a distribution of active members by age and by years of service.

CHART 2

Distribution of Active Members by Age as of December 31, 2018

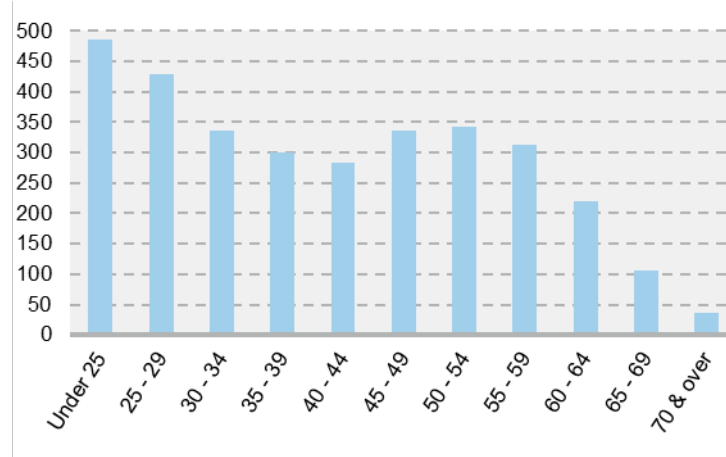
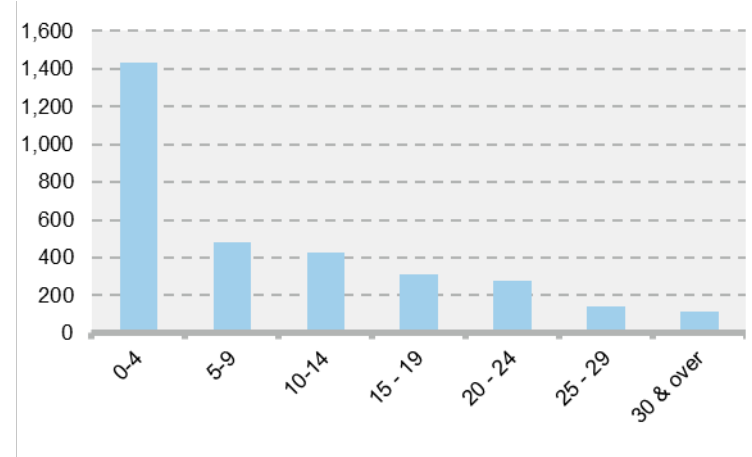


CHART 3

Distribution of Active Members by Years of Service as of December 31, 2018



SECTION 2: Valuation Results for the Park Employees' Annuity and Benefit Fund of Chicago

Retirees and Beneficiaries

As of December 31, 2018, 2,136 retirees, 706 beneficiaries, and 12 dependent children were receiving total monthly benefits of \$6,192,223. For comparison, in the previous valuation, there were 2,115 retirees, 745 beneficiaries, and 16 dependent children receiving monthly benefits of \$6,007,570.

These graphs show a distribution of the current retirees based on their monthly amount and age.

CHART 4
Distribution of Retirees by Monthly Amount as of December 31, 2018

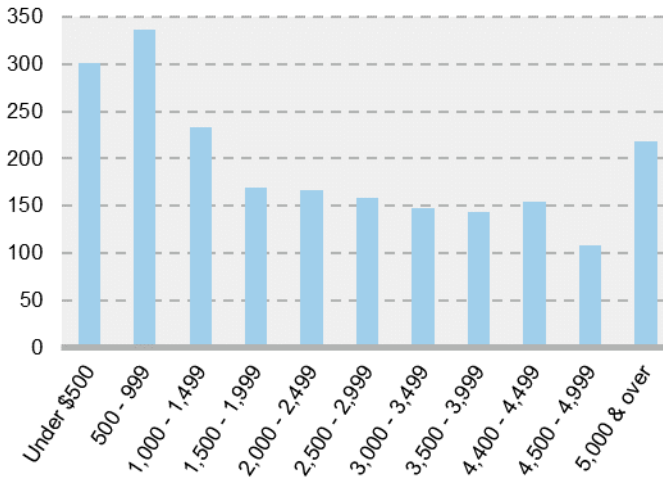
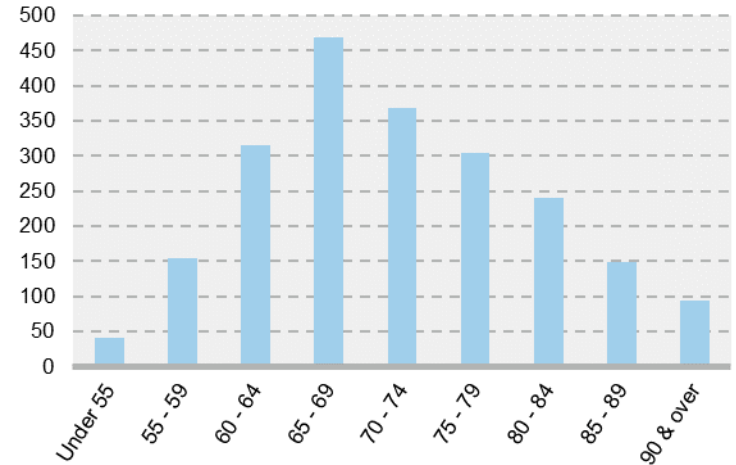


CHART 5
Distribution of Retirees by Age as of December 31, 2018



SECTION 2: Valuation Results for the Park Employees' Annuity and Benefit Fund of Chicago

B. FINANCIAL INFORMATION

It is desirable to have level and predictable plan costs from one year to the next. For this reason, the Board has approved an asset valuation method that gradually adjusts to fair value. Under this valuation method, the full value of market fluctuations is not recognized in a single year and, as a result, the asset value and the plan costs are more stable.

The amount of the adjustment to recognize fair value is treated as income, which may be positive or negative. Realized and unrealized gains and losses are treated equally and, therefore, the sale of assets has no immediate effect on the actuarial value.

The chart shows the determination of the actuarial value of assets as of the valuation date.

CHART 6

Determination of Actuarial Value of Assets for Fiscal Years Ended December 31

		2018		2017	
1.	Actuarial value of assets as of prior valuation date		\$385,419,506		\$393,604,997
2.	Employer and employee contributions and other income		39,763,859		34,599,674
3.	Benefits and expenses		78,027,859		79,820,163
4.	Expected investment income		27,471,569		27,824,606
5.	Total investment income, including income for securities lending		-17,129,052		51,170,325
6.	Investment gain/(loss): (5) – (4)		-44,600,621		23,345,719
7.	Expected actuarial value of assets: (1) + (2) – (3) + (4)		374,627,243		376,209,114
8.	Calculation of unrecognized return				
		<u>Original Amount*</u>	<u>% Recognized</u>	<u>% Recognized</u>	
(a)	Year ended December 31, 2018	-\$44,600,621	20%	--	--
(b)	Year ended December 31, 2017	23,345,719	20%	20%	4,669,144
(c)	Year ended December 31, 2016	2,566,234	20%	20%	513,247
(d)	Year ended December 31, 2015	-19,526,450	20%	20%	-3,905,290
(e)	Year ended December 31, 2014	-888,039	20%	20%	-177,608
(f)	Year ended December 31, 2013	36,656,285	0%	20%	7,331,257
(g)	6-month period ended December 31, 2012	7,796,423		10%**	779,642
(h)	Total recognized return		<u>-7,820,631</u>		<u>9,210,392</u>
9.	Actuarial value of assets as of current valuation date: (7) + (8h)		<u>\$366,806,612</u>		<u>\$385,419,506</u>

* Total return minus expected return on actuarial value

** 10% was recognized, instead of 20%, due to the short fiscal year ended December 31, 2012 in order to maintain a 5-year smoothing period.

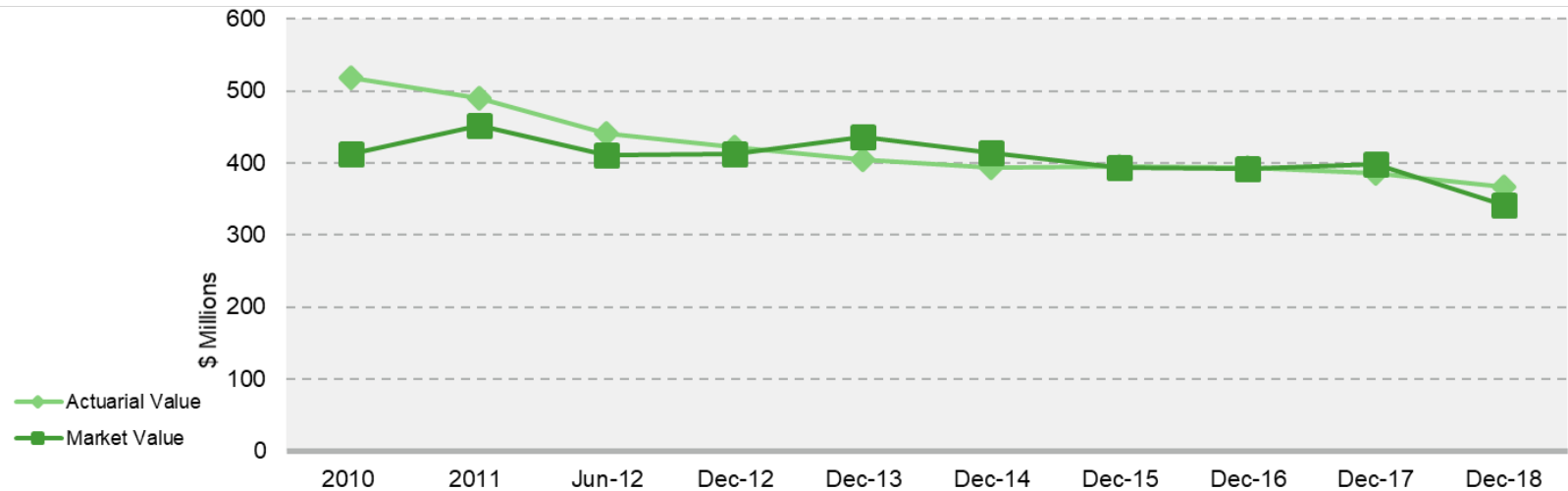
SECTION 2: Valuation Results for the Park Employees' Annuity and Benefit Fund of Chicago

Both the actuarial value and fair value of assets are representations of the fund's financial status. As investment gains and losses are gradually taken into account, the actuarial value of assets tracks the fair value of assets. The actuarial asset value is significant because the Fund's liabilities are compared to these assets to determine what portion, if any, remains unfunded. Amortization of the unfunded actuarial accrued liability is an important element in determining the contribution requirement.

This chart shows the change in the actuarial value of assets versus the fair value over the past ten valuation dates.

CHART 7

Actuarial Value of Assets vs. Fair value of Assets as of June 30, 2010 – December 31, 2018



SECTION 2: Valuation Results for the Park Employees' Annuity and Benefit Fund of Chicago

C. ACTUARIAL EXPERIENCE

To calculate the actuarially determined contribution requirement, assumptions are made about future events that affect the amount and timing of benefits to be paid and assets to be accumulated. Each year actual experience is measured against the assumptions. If overall experience is more favorable than anticipated (an actuarial gain), the contribution requirement will decrease from the previous year. On the other hand, the contribution requirement will increase if overall actuarial experience is less favorable than expected (an actuarial loss).

Taking account of experience gains or losses in one year without making a change in assumptions reflects the belief that the single year's experience was a short-term

development and that, over the long term, experience will return to the original assumptions. For contribution requirements to remain stable, assumptions should approximate experience.

If assumptions are changed, the contribution requirement is adjusted to take into account a change in experience anticipated for all future years.

The total loss is \$11,175,327; \$7,820,631 from investment losses and \$3,354,696 in losses from all other sources. The net experience variation from individual sources other than investments was 0.3% of the actuarial accrued liability. A discussion of the major components of the actuarial experience is on the following pages.

This chart provides a summary of the actuarial experience during the past year.

CHART 8
Actuarial Experience for Year Ended December 31, 2018

1. Net loss from investments*	(\$7,820,631)
2. Net gain from administrative expenses	280,557
3. Net loss from other experience**	<u>(3,635,253)</u>
4. Net experience gain: (1) + (2) + (3)	(\$11,175,327)

* Details in Chart 9.

** Details in Chart 12.

SECTION 2: Valuation Results for the Park Employees' Annuity and Benefit Fund of Chicago

Investment Rate of Return

A major component of projected asset growth is the assumed rate of return. The assumed return should represent the expected long-term rate of return, based on the Fund's investment policy. For valuation purposes, the assumed rate of return on the actuarial value of assets for the year ended December 31, 2018 was 7.50%. The actual rate of return on an actuarial basis for the year ended December 31, 2018, was 5.36%.

Since the actual return for the year was less than the assumed return, the Fund experienced an actuarial loss during the fiscal year ended December 31, 2018, with regard to its investments.

This chart shows the gain/(loss) due to investment experience.

CHART 9

Actuarial Value Investment Experience for Year Ended December 31, 2018

1. Actual return	\$19,650,938
2. Average value of assets	366,287,590
3. Actual rate of return: (1) ÷ (2)	5.36%
4. Assumed rate of return	7.50%
5. Expected return: (2) x (4)	\$27,471,569
6. Actuarial loss: (1) – (5)	<u>(\$7,820,631)</u>

SECTION 2: Valuation Results for the Park Employees' Annuity and Benefit Fund of Chicago

Because actuarial planning is long term, it is useful to see how the assumed investment rate of return has followed actual experience over time. The chart below shows the rate of return on an actuarial basis compared to the fair value investment return for the last ten valuation years, including five-year and ten-year averages.

Chart 10
Investment Return

Fiscal Year Ended	Fair value	Actuarial Value
June 30, 2010	11.3%	1.5%
June 30, 2011	21.0%	3.1%
June 30, 2012	0.9%*	-0.6%*
December 31, 2012	6.3%*	1.0%*
December 31, 2013	16.9%**	6.5%*
December 31, 2014	6.9%**	10.4%*
December 31, 2015	1.9%**	8.2%*
December 31, 2016	8.4%**	8.0%*
December 31, 2017	14.2%**	10.0%*
December 31, 2018	-5.1%**	5.4%*
Average Returns		
Last 5 valuation years:	5.1%	8.4%
Last 10 valuation years:	8.5%	5.6%

* As determined by Segal

** As determined by Investment Consultant

SECTION 2: Valuation Results for the Park Employees' Annuity and Benefit Fund of Chicago

Subsection B described the actuarial asset valuation method that gradually takes into account fluctuations in the fair value rate of return. The effect of this is to stabilize the actuarial rate of return, which contributes to leveling the actuarially required contribution.

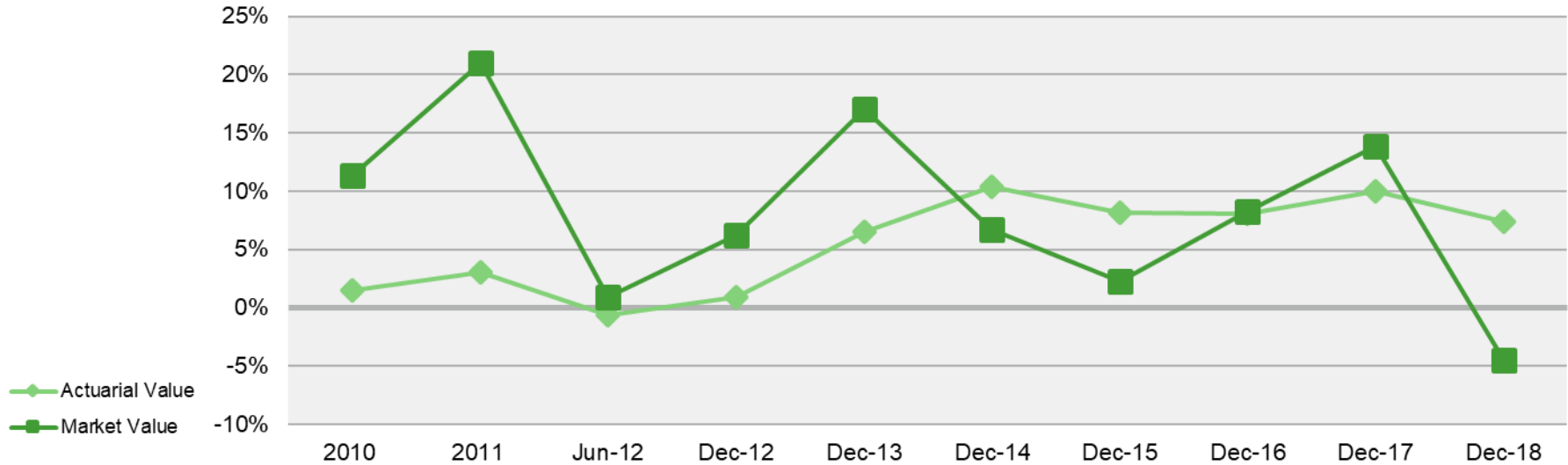
Administrative Expenses

Administrative expenses for the year ended December 31, 2018 totaled \$1,501,039 compared to the assumption of \$1,709,027. This resulted in a gain of \$280,557 for the year when adjusted for timing.

This chart illustrates how this leveling effect has actually worked over the years 2010 - 2018.

CHART 11

Fair and Actuarial Rates of Return for Years Ended June 30, 2010 – December 31, 2018



SECTION 2: Valuation Results for the Park Employees' Annuity and Benefit Fund of Chicago

Other Experience

There are other differences between the expected and the actual experience that appear when the new valuation is compared with the projections from the previous valuation. These include:

- the extent of turnover among the participants,
- retirement experience (earlier or later than expected),
- mortality (more or fewer deaths than expected),

- the number of disability retirements, and
- salary increases different than assumed.

The net loss from this other experience for the year ended December 31, 2018, amounted to \$3,635,253, which is 0.3% of the actuarial accrued liability.

A brief summary of the demographic gain/(loss) experience of the Fund for the year ended December 31, 2018 is shown in the chart below.

The chart shows elements of the experience gain/(loss) for the most recent year.

CHART 12
Experience Due to Changes in Demographics for Year Ended December 31, 2018

1. Turnover	-\$1,090,613
2. Retirement	-2,107,249
3. Experience among retired members and beneficiaries related to mortality	1,570,611
4. Salary/service increase for continuing actives	595,216
5. Other	<u>-2,603,218</u>
6. Total	-\$3,635,253

SECTION 2: Valuation Results for the Park Employees' Annuity and Benefit Fund of Chicago

D. DEVELOPMENT OF EMPLOYER COSTS

At the discretion of the Board, the actuarial valuation includes the calculation of a funding policy benchmark contribution amount referred to as the actuarially determined contribution. The amount of actuarially determined contribution is comprised of an employer normal cost payment and a payment on the unfunded actuarial accrued liability. This total amount is then divided by the projected payroll for active members to determine the actuarially determined contribution of 45.43% of payroll.

The actuarially determined contribution is calculated on a level percentage of pay basis and is based on a closed 30-year period, which ends on December 31, 2042. As of January 1, 2019, there are 24 years remaining on the amortization period.

The chart compares this valuation's actuarially determined contribution with the prior valuation.

CHART 13
Actuarially Determined Contribution

	Year Beginning January 1			
	2019		2018	
	Amount	% of Payroll	Amount	% of Payroll
1. Total normal cost	\$16,447,693	12.07%	\$15,544,766	11.08%
2. Administrative expenses	1,504,833	1.10%	1,709,027	1.22%
3. Expected employee contributions	<u>-12,398,408</u>	<u>-9.10%</u>	<u>-12,777,222</u>	<u>-9.11%</u>
4. Employer normal cost: (1) + (2) + (3)	5,554,118	4.08%	4,476,571	3.19%
5. Employer normal cost, adjusted for timing*	5,750,767	4.22%	4,640,403	3.31%
6. Actuarial accrued liability	1,142,297,965		1,039,279,444	
7. Actuarial value of assets	<u>366,806,612</u>		<u>385,419,506</u>	
8. Unfunded actuarial accrued liability: (6) - (7)	775,491,353		653,859,938	
9. Payment on unfunded actuarial accrued liability	56,137,023	41.21%	46,289,331	33.00%
10. Actuarially determined contribution, adjusted for timing*: (5) + (9)	<u>61,887,790</u>	<u>45.43%</u>	<u>50,929,734</u>	<u>36.31%</u>
11. Projected payroll	\$136,230,328		\$140,268,490	

* Recommended contributions are assumed to be paid at the middle of every month.

SECTION 2: Valuation Results for the Park Employees' Annuity and Benefit Fund of Chicago

The actuarially determined contribution as of January 1, 2019, is based on all of the data described in the previous sections, the actuarial assumptions described in Section 4, and the Plan provisions adopted at the time of preparation of the Actuarial Valuation. They include all changes affecting future costs, adopted benefit changes, actuarial gains and losses and changes in the actuarial assumptions.

The chart reconciles the actuarially determined contribution from the prior valuation to the amount determined in this valuation.

CHART 14
Reconciliation of Actuarially Determined Contribution from January 1, 2018 to January 1, 2019

Actuarially Determined Contribution as of January 1, 2018	\$50,929,734
Effect of expected change in amortization payment due to payroll growth	1,272,957
Effect of change in administrative expense assumption	-211,423
Effect of change in other actuarial assumptions	7,442,098
Effect of contributions less than recommended contribution	1,760,200
Effect of investment losses	541,130
Effect of other gains and losses on accrued liability	232,120
Effect of net other changes	<u>-79,026</u>
Total change	<u>\$10,958,056</u>
Actuarially Determined Contribution as of January 1, 2019	<u>\$61,887,790</u>

SECTION 2: Valuation Results for the Park Employees' Annuity and Benefit Fund of Chicago

E. RISK

Since the actuarial valuation results are dependent on a given set of assumptions and data as of a specific date, there is a risk that emerging results may differ significantly as actual experience differs from the assumptions.

This report does not contain a detailed analysis of the potential range of future measurements, but does include a brief discussion of some risks that may affect the Fund. Upon request, a more detailed assessment of the risks can be provided to enable a better understanding of the risks specific to this Fund.

Investment Risk

Since the Plan's assets are much larger than contributions, investment performance may create significant volatility in contribution requirements. For example, if the actual return on the market value of assets for the next Plan Year were 1% different from the assumed (either higher or lower), the projected unfunded actuarial liability would change by 0.1%, or about \$0.6 million and the actuarially determined contribution requirements would increase or decrease by approximately \$1.5 million.

The market value rate of return over the last 10 years has ranged from a low of -5.1% to a high of 21.0%, with an average of 8.5%.

Longevity Risk

The actuarial valuation includes an expectation of future improvement in life expectancy. Emerging plan experience that does not match these expectations will result in either

an increase or decrease in the Plan's funding policy and actuarially determined contribution requirement.

Contribution Risk

The Plan's funding policy contribution requires payment of the Employer's normal cost and an amortization payment according to a schedule sufficient to pay down unfunded actuarial liability over time. If the Plan's funding policy contribution were adhered to, contribution risk would be negligible.

However, Plan contributions are set by statute. The statutorily-required amount systematically underfunds the Plan. For Fiscal 2019, actual employer contributions come from a property tax levied by the Chicago Park District equal to the total amount of contributions made by employees in the calendar year two years prior to the year of the levy, multiplied by 1.1, the tax multiple.

If contributions remain at current level and future experience matches the current assumptions, we project the unfunded actuarial accrued liability will not be paid off and the Fund faces the risk of insolvency.

Demographic Risk

Examples of this risk include:

- Actual retirements occurring earlier or later than assumed. The value of retirement plan benefits is sensitive to the rate of benefit accruals and any early retirement subsidies that apply.

SECTION 2: Valuation Results for the Park Employees' Annuity and Benefit Fund of Chicago

- More or less active participant turnover than assumed.
- Individual salary increases higher or lower than assumed.

Actual Experience Over the Last 10 years and Implications for the Future

Past experience can help demonstrate the sensitivity of key results to the Plan's actual experience. Over the past ten years:

- The investment gain/(loss) for a year has ranged from a gain of \$45 million to a loss of \$44 million.
- The non-investment gain/(loss) for a year has ranged from a gain of \$5 million to a loss of \$7 million.
- The funded percentage on the actuarial value of assets has ranged from a low of 32.11% to a high of 62.25%.

SECTION 3: Supplemental Information for the Park Employees' Annuity and Benefit Fund of Chicago

EXHIBIT A

Table of Fund Coverage

Category	December 31		Change From Prior Year
	2018	2017	
Active members in valuation:			
Number	3,187	3,543	-10.0%
Average age	41.5	41.0	+0.5
Average years of service	9.9	9.8	+0.1
Total salary	\$129,923,175	\$134,258,328	-3.2%
Average salary	\$40,767	\$37,894	+7.6%
Total active vested members with at least 10 years of service	1,271	1,352	-6.0%
Vested terminated members	145	150	-3.3%
Non-vested terminated members eligible for a return of contributions	4,634	4,148	+11.7%
Service retirees:			
Number in pay status	2,136	2,115	+1.0%
Average age	72.2	72.1	+0.1
Average monthly benefit	\$2,441	\$2,366	+3.2%
Beneficiaries (including children) in pay status:			
Number in pay status	718	761	-5.7%
Average age	78.0	77.9	+0.1
Average monthly benefit	\$1,364	\$1,317	+3.6%
Total number of members	10,820	10,717	+1.0%

SECTION 3: Supplemental Information for the Park Employees' Annuity and Benefit Fund of Chicago

EXHIBIT B

**Participants in Active Service as of December 31, 2018
By Age, Years of Service, and Average Payroll**

Age	Years of Service									
	Total	0-4	5-9	10-14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 & over
Under 25	484	480	4	--	--	--	--	--	--	--
	\$19,433	\$19,009	\$23,701	--	--	--	--	--	--	--
25 - 29	429	291	129	9	--	--	--	--	--	--
	28,426	26,789	31,939	\$30,987	--	--	--	--	--	--
30 - 34	337	137	100	91	9	--	--	--	--	--
	39,207	35,528	44,374	38,230	\$47,686	--	--	--	--	--
35 - 39	300	100	52	73	68	7	--	--	--	--
	45,082	41,261	40,951	49,142	48,462	\$55,190	--	--	--	--
40 - 44	284	84	59	54	45	39	3	--	--	--
	50,353	39,610	55,709	56,286	51,789	54,565	\$62,722	--	--	--
45 - 49	335	79	41	69	66	58	21	1	--	--
	49,984	34,286	59,126	53,240	51,611	53,441	65,504	\$56,800	--	--
50 - 54	344	58	37	58	74	59	42	15	1	--
	49,496	31,713	45,703	44,064	49,801	63,323	59,360	64,011	\$65,901	--
55 - 59	313	60	32	48	57	59	30	19	8	--
	50,799	38,828	44,281	42,752	52,068	55,760	67,106	70,214	62,065	--
60 - 64	219	33	22	37	43	34	22	11	13	4
	47,636	30,173	40,343	45,093	49,315	49,276	58,892	54,097	70,801	\$68,375
65 - 69	105	9	9	19	17	24	16	5	5	1
	54,531	43,299	61,271	51,371	47,311	54,330	68,629	49,858	55,222	76,870
70 & over	37	1	5	3	7	8	6	2	1	4
	44,380	9,771	22,595	22,487	49,219	48,088	56,703	68,092	42,440	50,941
Total	3,187	1,332	490	461	386	288	140	53	28	9
	\$40,767	\$28,163	\$43,169	\$46,373	\$50,218	\$55,569	\$62,885	\$62,860	\$64,335	\$61,571

SECTION 3: Supplemental Information for the Park Employees' Annuity and Benefit Fund of Chicago

EXHIBIT C

History of Active Member Valuation Data

Actuarial Valuation Date	Active Members	Percent Increase	Annual Salaries	Percent Increase	Average Salary	Percent Increase
06/30/2010	2,816	(1.71%)	\$107,361,021	(1.40%)	\$38,125	0.32%
06/30/2011	2,795	(0.75%)	107,686,693	0.30%	38,528	1.06%
06/30/2012	2,977	6.51%	109,798,508	1.96%	36,882	(4.27%)
12/31/2012	3,053	2.55%	113,934,756*	3.77%	37,319	1.18%
12/31/2013	3,076	0.75%	115,617,428	1.48%	37,587	0.72%
12/31/2014	2,973	(3.35%)	120,376,477	4.12%	40,490	7.72%
12/31/2015	3,063	3.03%	126,294,812	4.92%	41,232	1.83%
12/31/2016	3,114	1.67%	124,502,908	(1.42%)	39,982	(3.03%)
12/31/2017	3,543	13.78%	134,258,328	7.84%	37,894	(5.22%)
12/31/2018	3,187	(10.05%)	129,923,175	(3.23%)	40,767	7.58%
Average Increase/(Decrease) Last 5 years		1.02%		2.45%		1.78%
Last 10 years		1.24%		1.83%		0.79%

* Annualized for short plan year.

SECTION 3: Supplemental Information for the Park Employees' Annuity and Benefit Fund of Chicago

EXHIBIT D

Reconciliation of Member Data

	Active Members	Inactive Members	Retirees	Beneficiaries	Total
Number as of December 31, 2017	3,543	4,298	2,115	761	10,717
New participants	420	N/A	N/A	N/A	420
Terminations	(559)	559	0	0	0
Retirements	(75)	(27)	102	N/A	0
New disabilities	0	0	N/A	N/A	0
Died with beneficiary	(2)	(1)	(28)	31	0
Died without beneficiary	(4)	0	(53)	(74)	(131)
Refunds	(146)	(45)	0	0	(191)
Rehire	10	(10)	0	0	0
Certain period expired	N/A	N/A	0	0	0
Data adjustments	<u>0</u>	<u>5</u>	<u>0</u>	<u>0</u>	<u>5</u>
Number as of December 31, 2018	3,187	4,779	2,136	718	10,820

SECTION 3: Supplemental Information for the Park Employees' Annuity and Benefit Fund of Chicago

EXHIBIT E

Schedule of Pensioners and Beneficiaries Added to and Removed from Rolls

<u>Fiscal Year</u>	<u>Added to Rolls</u>		<u>Removed from Rolls</u>		<u>Rolls – End of Year</u>		<u>% Increase in Avg. Annual Allowances</u>	<u>Average Annual Allowances</u>
	<u>Number</u>	<u>Annual Allowances</u>	<u>Number</u>	<u>Annual Allowances</u>	<u>Number*</u>	<u>Annual Allowances</u>		
2010	113	\$3,442,389	167	\$2,903,979	2,942	\$61,189,590	2.7	\$20,799
2011	124	3,735,377	167	2,828,495	2,899	62,096,472	3.0	21,420
6/2012	167	4,681,195	158	2,797,326	2,908	63,980,341	2.7	22,001
12/2012	71	2,470,960	91**	1,290,060	2,888	65,161,241	2.6	22,563
12/2013	147	4,594,883	147	2,788,285	2,888	66,967,839	2.8	23,188
12/2014	126	4,085,581	138	2,781,597	2,876	68,271,823	2.4	23,738
12/2015	94	1,823,238	106	2,271,591	2,864	67,823,470	-0.7	23,681
12/2016	126	5,283,834	133	2,711,190	2,857	70,396,114	4.0	24,640
12/2017	107	3,628,199	104	1,952,677	2,860	72,071,636	2.3	25,200
12/2018	135	5,446,939	153	2,967,901	2,842	74,550,674	4.1	26,232

* Does not include child beneficiaries receiving a pension.

** Includes removal of 20 QILDROs for participant count purposes.

SECTION 3: Supplemental Information for the Park Employees' Annuity and Benefit Fund of Chicago

EXHIBIT F

Summary Statement of Income and Expenses on a Fair value Basis at Fiscal Year Ended December 31

	2018	2017
Net position at fair value at the beginning of the year	\$397,648,758	\$391,698,922
Contribution income:		
Employer contributions	\$27,638,402	\$20,920,614
Employee contributions	12,125,457	13,675,292
Less administrative expenses	<u>-1,501,039</u>	<u>-1,682,136</u>
Net contribution income	38,262,820	32,913,770
Securities lending income	67,760	88,011
Other income	167	3,768
Investment income:		
Interest, dividends and other income	\$12,194,461	\$13,095,788
Asset appreciation	-27,559,554	39,842,188
Less investment and administrative fees	<u>-1,831,719</u>	<u>-1,855,662</u>
Net investment income	<u>-17,196,812</u>	<u>51,082,314</u>
Total income available for benefits	\$21,133,935	\$84,087,863
Less benefit payments:		
Annuity payments	-\$73,303,464	-\$71,756,876
Disability & death	-497,389	-495,464
Refund of contributions	-2,725,967	-2,025,805
Refund of excess contributions	<u>0</u>	<u>-3,859,882</u>
Net benefit payments	-\$76,526,820	-\$78,138,027
Change in reserve for future benefits	-\$55,392,885	\$5,949,836
Net position at fair value at the end of the year	\$342,255,873	\$397,648,758

SECTION 3: Supplemental Information for the Park Employees' Annuity and Benefit Fund of Chicago

EXHIBIT G

Summary Statement of Fund Assets at Fiscal Year Ended December 31

	2018	2017
Accounts receivable	\$16,127,092	\$23,268,082
Investments, at fair value:		
Collective investment funds	\$72,315,985	\$108,036,902
Risk parity	1,348,182	10,388,615
Bonds	61,043,992	65,382,838
Common and preferred stocks	45,332,504	56,254,103
Real estate	37,225,201	36,104,891
Private equity partnerships	19,232,200	22,366,679
Hedged equity	24,437,510	25,160,062
Infrastructure	22,774,008	23,328,660
Mutual funds	15,420,085	20,340,559
International equity	18,093,650	--
Short-term investments	<u>6,181,608</u>	<u>8,939,984</u>
Total investments at fair value	323,404,925	376,303,293
Invested securities lending collateral	24,113,674	33,992,926
Prepaid annuity benefits	5,061,599	4,777,637
Furniture and fixtures, net	138,555	110,539
Prepaid expenses	<u>80,359</u>	<u>75,503</u>
Total assets	<u>\$368,926,204</u>	<u>\$438,527,980</u>
Less accounts payable:		
Accounts payable	-\$418,365	-\$489,443
Accrued benefits and member contributions payable	-588,867	-4,567,550
Securities lending collateral	-24,113,674	-33,992,926
Due to broker	-1,494,289	-1,766,195
Deferred rent	<u>-55,136</u>	<u>-63,108</u>
Total accounts payable	-\$26,670,331	-\$40,879,222
Net position at fair value	<u>\$342,255,873</u>	<u>\$397,648,758</u>
Net position at actuarial value	<u>\$366,806,612</u>	<u>\$385,419,506</u>

SECTION 3: Supplemental Information for the Park Employees' Annuity and Benefit Fund of Chicago

EXHIBIT H

Development of the Fund Through December 31, 2018

Fiscal Year Ended	Employer Contributions	Employee Contributions	Net Investment Return*	Administrative Expenses	Benefit Payments	Actuarial Value of Assets at End of Year
June 30, 2010	\$10,829,339	\$9,829,998	\$8,194,551	\$1,465,562	\$62,560,242	\$518,582,601
June 30, 2011	10,981,419	9,791,650	15,218,630	1,498,905	63,704,890	489,370,505
June 30, 2012	10,868,361	10,404,827	-2,804,426	1,644,603	65,502,658	440,692,006
December 31, 2012	5,268,363	5,371,084	4,121,362	723,802	33,281,012	421,448,001
December 31, 2013	15,707,814	10,732,730	26,107,300	1,367,443	68,335,967	404,292,435
December 31, 2014	11,225,438	10,831,434	39,408,258	1,458,831	70,536,042	393,762,692
December 31, 2015	30,588,976	12,368,636	31,067,518	1,533,700	70,602,016	395,652,106
December 31, 2016	30,890,241	12,246,115	30,432,110	1,537,699	74,077,876	393,604,997
December 31, 2017	20,920,614	13,675,292	37,038,766	1,682,136	78,138,027	385,419,506
December 31, 2018	27,638,402	12,125,457	19,651,105	1,501,039	76,526,820	366,806,612

* On an actuarial basis, net of investment fees, and includes other income.

SECTION 3: Supplemental Information for the Park Employees' Annuity and Benefit Fund of Chicago

EXHIBIT I

Development of Unfunded Actuarial Accrued Liability

	Plan Year Ended December 31	
	2018	2017
1. Unfunded actuarial accrued liability at beginning of year	\$653,859,938	\$611,888,096
2. Normal cost (including administrative expenses) at beginning of year	17,253,792	15,850,168
3. Total contributions	39,763,859	34,595,906
4. Interest		
(a) Unfunded actuarial accrued liability and normal cost	\$50,333,530	\$47,080,370
(b) Total contributions	<u>1,349,035</u>	<u>1,173,707</u>
(c) Total interest: (4a) – (4b)	<u>48,984,495</u>	<u>45,906,663</u>
5. Expected unfunded actuarial accrued liability: (1) + (2) – (3) + (4c)	\$680,334,366	\$639,049,021
6. Changes due to (gain)/loss from:		
(a) Investments	\$7,820,631	-\$9,210,392
(b) Demographics and other	<u>3,354,696</u>	<u>3,115,773</u>
(c) Total changes due to (gain)/loss: (6a) + (6b)	\$11,175,327	-\$6,094,619
7. Assumption changes	83,981,660	0
8. Change due to remaining portions of Public Act 098-0622 being declared unconstitutional	<u>0</u>	<u>20,905,536</u>
9. Unfunded accrued liability at end of year: (5) + (6c) + (7) + (8)	<u>\$775,491,353</u>	<u>\$653,859,938</u>

SECTION 3: Supplemental Information for the Park Employees' Annuity and Benefit Fund of Chicago

EXHIBIT J

Definitions of Pension Terms

The following list defines certain technical terms for the convenience of the reader:

Actuarial Accrued Liability

For Actives:

The equivalent of the accumulated normal costs allocated to the years before the valuation date.

Actuarial Accrued Liability

For Pensioners:

The single-sum value of lifetime benefits to existing pensioners. This sum takes account of life expectancies appropriate to the ages of the pensioners and the interest that the sum is expected to earn before it is entirely paid out in benefits.

Actuarial Cost Method:

A procedure allocating the Actuarial Present Value of Future Benefits to various time periods; a method used to determine the Normal Cost and the Actuarial Accrued Liability that are used to determine the actuarially determined contribution.

Actuarial Gain or Actuarial Loss:

A measure of the difference between actual experience and that expected based upon a set of Actuarial Assumptions, during the period between two Actuarial Valuation dates. Through the actuarial assumptions, rates of decrements, rates of salary increases, and rates of fund earnings have been forecasted. To the extent that actual experience differs from that assumed, Actuarial Accrued Liabilities emerge which may be the same as forecasted, or may be larger or smaller than projected. Actuarial gains are due to favorable experience, e.g., the Fund's assets earn more than projected, salary increases are less than assumed, members retire later than assumed, etc. Favorable experience means actual results produce actuarial liabilities not as large as projected by the actuarial assumptions. On the other hand, actuarial losses are the result of unfavorable experience, i.e., actual results yield in actuarial liabilities that are larger than projected. Actuarial gains will shorten the time required for funding of the actuarial balance sheet deficiency while actuarial losses will lengthen the funding period.

SECTION 3: Supplemental Information for the Park Employees' Annuity and Benefit Fund of Chicago

Actuarially Equivalent:	Of equal actuarial present value, determined as of a given date and based on a given set of Actuarial Assumptions.
Actuarial Present Value (APV):	<p>The value of an amount or series of amounts payable or receivable at various times, determined as of a given date by the application of a particular set of Actuarial Assumptions. Each such amount or series of amounts is:</p> <ol style="list-style-type: none">Adjusted for the probable financial effect of certain intervening events (such as changes in compensation levels, marital status, etc.)Multiplied by the probability of the occurrence of an event (such as survival, death, disability, termination of employment, etc.) on which the payment is conditioned, andDiscounted according to an assumed rate (or rates) of return to reflect the time value of money.
Actuarial Present Value of Future Plan Benefits:	<p>The Actuarial Present Value of benefit amounts expected to be paid at various future times under a particular set of Actuarial Assumptions, taking into account such items as the effect of advancement in age, anticipated future compensation, and future service credits. The Actuarial Present Value of Future Plan Benefits includes the liabilities for active members, retired members, beneficiaries receiving benefits, and inactive members entitled to either a refund or a future retirement benefit. Expressed another way, it is the value that would have to be invested on the valuation date so that the amount invested plus investment earnings would be provide sufficient assets to pay all projected benefits and expenses when due.</p>
Actuarial Valuation:	<p>The determination, as of a valuation date, of the Normal Cost, Actuarial Accrued Liability, Actuarial Value of Assets, and related Actuarial Present Values for a plan. An Actuarial Valuation for a governmental retirement system typically also includes calculations of items needed for compliance with GASB, such as the Actuarially Determined Contribution (ADC) and the Net Pension Liability (NPL).</p>
Actuarial Value of Assets:	<p>The value of the Fund's assets as of a given date, used by the actuary for valuation purposes. This may be the market or fair value of plan assets, but commonly plans use a smoothed value in order to reduce the year-to-year volatility of calculated results, such as the funded ratio and the ADC.</p>

SECTION 3: Supplemental Information for the Park Employees' Annuity and Benefit Fund of Chicago

Actuarially Determined:	Values that have been determined utilizing the principles of actuarial science. An actuarially determined value is derived by application of the appropriate actuarial assumptions to specified values determined by provisions of the law.
Actuarially Determined Contribution (ADC):	The employer's periodic required contributions, expressed as a dollar amount or a percentage of covered plan compensation, determined under the Fund's funding policy. The ADC consists of the Employer Normal Cost and the Amortization Payment.
Amortization Method:	A method for determining the Amortization Payment. The most common methods used are level dollar and level percentage of payroll. Under the Level Dollar method, the Amortization Payment is one of a stream of payments, all equal, whose Actuarial Present Value is equal to the UAAL. Under the Level Percentage of Pay method, the Amortization Payment is one of a stream of increasing payments, whose Actuarial Present Value is equal to the UAAL. Under the Level Percentage of Pay method, the stream of payments increases at the assumed rate at which total covered payroll of all active members will increase.
Amortization Payment:	The portion of the pension plan contribution, or ADC, that is designed to pay interest on and to amortize the Unfunded Actuarial Accrued Liability.
Assumptions or Actuarial Assumptions:	<p>The estimates on which the cost of the Fund is calculated including:</p> <ul style="list-style-type: none">(a) <u>Investment return</u> - the rate of investment yield that the Fund will earn over the long-term future;(b) <u>Mortality rates</u> - the death rates of employees and pensioners; life expectancy is based on these rates;(c) <u>Retirement rates</u> - the rate or probability of retirement at a given age;(d) <u>Turnover rates</u> - the rates at which employees of various ages are expected to leave employment for reasons other than death, disability, or retirement;(e) <u>Salary increase rates</u> - the rates of salary increase due to inflation and productivity growth.

SECTION 3: Supplemental Information for the Park Employees' Annuity and Benefit Fund of Chicago

Closed Amortization Period:	A specific number of years that is counted down by one each year, and therefore declines to zero with the passage of time. For example, if the amortization period is initially set at 30 years, it is 29 years at the end of one year, 28 years at the end of two years, etc. See Open Amortization Period.
Decrements:	Those causes/events due to which a member's status (active-inactive-retiree-beneficiary) changes, that is: death, retirement, disability, or termination.
Defined Benefit Plan:	A retirement plan in which benefits are defined by a formula applied to the member's compensation and/or years of service.
Defined Contribution Plan:	A retirement plan, such as a 401(k) plan, a 403(b) plan, or a 457 plan, in which the contributions to the plan are assigned to an account for each member, the plan's earnings are allocated to each account, and each member's benefits are a direct function of the account balance.
Employer Normal Cost:	The portion of the Normal Cost to be paid by the employers. This is equal to the Normal Cost less expected member contributions.
Experience Study:	A periodic review and analysis of the actual experience of the Fund that may lead to a revision of one or more actuarial assumptions. Actual rates of decrement and salary increases are compared to the actuarially assumed values and modified as deemed appropriate by the Actuary.
Funded Ratio:	The ratio of the actuarial value of assets (AVA) to the actuarial accrued liability (AAL). Plans sometimes calculate a market funded ratio, using the fair value of assets (MVA), rather than the AVA.

SECTION 3: Supplemental Information for the Park Employees' Annuity and Benefit Fund of Chicago

GASB:	Governmental Accounting Standards Board.
GASB 67 and GASB 68:	Governmental Accounting Standards Board Statements No. 67 and No. 68. These are the governmental accounting standards that set the accounting rules for public retirement systems and the employers that sponsor or contribute to them. Statement No. 68 sets the accounting rules for the employers that sponsor or contribute to public retirement systems, while Statement No. 67 sets the rules for the systems themselves.
Investment Return:	The rate of earnings of the Fund from its investments, including interest, dividends and capital gain and loss adjustments, computed as a percentage of the average value of the fund. For actuarial purposes, the investment return often reflects a smoothing of the capital gains and losses to avoid significant swings in the value of assets from one year to the next.
Net Pension Liability (NPL):	The Net Pension Liability is equal to the Total Pension Liability minus the Plan Fiduciary Net Position.
Normal Cost:	That portion of the Actuarial Present Value of pension plan benefits and expenses allocated to a valuation year by the Actuarial Cost Method. Any payment in respect of an Unfunded Actuarial Accrued Liability is not part of Normal Cost (see Amortization Payment). For pension plan benefits that are provided in part by employee contributions, Normal Cost refers to the total of employee contributions and employer Normal Cost unless otherwise specifically stated.
Open Amortization Period:	An open amortization period is one which is used to determine the Amortization Payment but which does not change over time. If the initial period is set as 30 years, the same 30-year period is used in determining the Amortization Period each year. In theory, if an Open Amortization Period with level percentage of payroll is used to amortize the Unfunded Actuarial Accrued Liability, the UAAL will never decrease, but will become smaller each year, in relation to covered payroll, if the actuarial assumptions are realized.

SECTION 3: Supplemental Information for the Park Employees' Annuity and Benefit Fund of Chicago

Plan Fiduciary Net Position:	Fair value of assets.
Total Pension Liability (TPL):	The actuarially accrued liability under the entry age normal cost method and based on the blended discount rate as described in GASB 67 and 68.
Unfunded Actuarial Accrued Liability:	The excess of the Actuarial Accrued Liability over the Actuarial Value of Assets. This value may be negative in which case it may be expressed as a negative Unfunded Actuarial Accrued Liability, also called the Funding Surplus.
Valuation Date or Actuarial Valuation Date:	The date as of which the value of assets is determined and as of which the Actuarial Present Value of Future Plan Benefits is determined. The expected benefits to be paid in the future are discounted to this date.

SECTION 4: Reporting Information for the Park Employees' Annuity and Benefit Fund of Chicago

EXHIBIT I

Summary of Actuarial Valuation Results

The valuation was made with respect to the following data supplied to us:

1. Pensioners as of the valuation date (including 706 beneficiaries and 12 dependent children)		2,854
2. Members inactive as of the valuation date with vested rights		145
3. Members active as of the valuation date		3,187
Fully vested	1,271	
Not vested	1,916	
4. Other non-vested inactive members as of the valuation date		4,634

The actuarial factors as of the valuation date are as follows:

1. Employer normal cost, including administrative expenses		\$5,750,766
2. Actuarial accrued liability		1,142,297,965
Retirees and beneficiaries	\$778,565,525	
Inactive members with vested rights	22,122,226	
Active members	341,610,214	
3. Actuarial value of assets (\$342,255,873 at fair value)		366,806,612
4. Unfunded actuarial accrued liability		\$775,491,353
5. Funded ratio: (3) ÷ (2)		32.1%

SECTION 4: Reporting Information for the Park Employees' Annuity and Benefit Fund of Chicago

EXHIBIT I (continued)

Summary of Actuarial Valuation Results

The determination of the actuarially determined contribution is as follows:

1. Total normal cost	\$16,447,693
2. Administrative expenses	1,504,833
3. Expected employee contributions	<u>-12,398,408</u>
4. Employer normal cost: (1) + (2) + (3)	\$5,554,118
5. Employer normal cost projected, adjusted for timing	5,750,767
6. Payment on projected unfunded/(overfunded) actuarial accrued liability, adjusted for timing	56,137,023
7. Total actuarially determined contribution: (5) + (6)	<u>\$61,887,790</u>
8. Estimated employer contributions provided by the Fund, reflecting 3% loss on collections*	\$14,135,549
9. Projected payroll	136,230,328
10. Total actuarially determined contribution as a percentage of projected payroll: (7) ÷ (9)	45.43%

* The Park District has been absorbing the 3% loss on collections, however, the Park District is not guaranteed to do so in the future.

SECTION 4: Reporting Information for the Park Employees' Annuity and Benefit Fund of Chicago

EXHIBIT II

Comparison of Employer Contribution to Actuarially Determined Contribution

Fiscal Year Ended	Actuarially Determined Contribution (ADC)*	Actual Contributions	Percentage Contributed
June 30, 2010	\$22,399,740	\$10,829,339	48.3%
June 30, 2011	25,319,145	10,981,419	43.4%
June 30, 2012	28,051,528	10,868,361	38.7%
December 31, 2012	16,786,671	5,268,636	31.4%
December 31, 2013	41,834,857	15,707,814	37.5%
December 31, 2014	35,307,186	11,225,438	31.8%
December 31, 2015	36,273,994	30,588,976	84.3%
December 31, 2016	37,130,268	30,890,241	83.2%
December 31, 2017	45,253,238	20,920,614	46.2%
December 31, 2018	50,929,734	27,638,402	54.3%
December 31, 2019	61,887,790	--	--

**Prior to 2015, this amount was the Annual Required Contribution (ARC)*

SECTION 4: Reporting Information for the Park Employees' Annuity and Benefit Fund of Chicago

EXHIBIT III

Schedule of Funding Progress

Actuarial Valuation Date	Actuarial Value of Assets (a)	Actuarial Accrued Liability (AAL) (b)	Unfunded/ (Overfunded) AAL (UAAL) (b) - (a)	Funded Ratio (a) / (b)	Covered Payroll (c)	UAAL as a Percentage of Covered Payroll* [(b) - (a)] / (c)
06/30/2010	\$518,582,601	\$833,025,948	\$314,443,347	62.25%	\$107,361,021	292.88%
06/30/2011	489,370,505	843,943,240	354,572,735	57.99%	107,686,693	329.26%
06/30/2012	440,692,006	866,370,565	425,678,559	50.87%	114,223,909	372.67%
12/31/2012	421,448,001	971,807,222	550,359,221	43.37%	58,231,511	472.56%**
12/31/2013	404,292,435	888,023,364	483,730,929	45.53%	117,781,596	410.70%
12/31/2014	393,762,692	900,840,617	507,077,925	43.71%	118,987,507	426.16%
12/31/2015	395,652,106	910,260,360	514,608,254	43.47%	122,382,584	420.49%
12/31/2016	393,604,997	1,005,493,093	611,888,096	39.15%	121,126,918	505.16%
12/31/2017	385,419,506	1,039,279,444	653,859,938	37.09%	135,315,008	483.21%
12/31/2018	366,806,612	1,142,297,965	775,491,353	32.11%	133,112,100	582.59%

* Not less than zero

** Adjusted for annualized covered payroll

SECTION 4: Reporting Information for the Park Employees' Annuity and Benefit Fund of Chicago

EXHIBIT IV

Solvency Test at December 31

	12/31/2018	12/31/2017	12/31/2016	12/31/2015	12/31/2014	12/31/2013
1. Actuarial accrued liability (AAL)						
a. Active member contributions	\$164,316,381	\$173,903,043	\$172,808,623	\$173,241,768	\$169,952,178	\$171,065,449
b. Retirees and beneficiaries	778,565,525	706,084,520	694,881,116	625,396,307	625,641,580	621,827,982
c. Active and inactive members (employer financed)	<u>199,416,059</u>	<u>159,291,881</u>	<u>137,803,354</u>	<u>111,622,285</u>	<u>105,246,859</u>	<u>95,129,933</u>
d. Total	\$1,142,297,965	\$1,039,279,444	\$1,005,493,093	\$910,260,360	\$900,840,617	\$888,023,364
2. Actuarial value of assets	366,806,612	385,419,506	393,604,997	395,652,106	393,762,692	404,292,435
3. Cumulative portion of AAL covered						
a. Active member contribution	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
b. Retirees and beneficiaries	26.0%	30.0%	31.8%	35.6%	35.8%	37.5%
c. Active and inactive members (employer financed)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

SECTION 4: Reporting Information for the Park Employees' Annuity and Benefit Fund of Chicago

EXHIBIT V

Projection of Contributions, Liabilities, and Assets

Based on the results of the December 31, 2018, actuarial valuation, we have projected valuation results for a 40-year period commencing with Fiscal Year 2019.

For purposes of the projections, all assets, contributions, and benefit payments have been included. Our projections of contributions, liabilities, and assets are based on the actuarial assumptions, membership data and benefit provisions that were used for the regular actuarial valuation.

In order to determine projected contributions, liabilities, and assets, certain calculations needed to be made that are not normally required in a regular actuarial valuation. Benefit payout requirements, actuarial liabilities, and payroll were estimated over the 40-year period from 2019 through 2057 by projecting the membership of the Fund over the 40-year period, taking into account the impact of new entrants into the Fund over the 40-year period.

To make the required projections, assumptions needed to be made regarding the age and salary distribution of new entrants as well as the size of the active membership of the Fund. The assumptions regarding the profile of new entrants to the Fund were based on the recent experience of the Fund with regard to new entrants. The size of the active membership of the Fund was assumed to remain constant over the 40-year projection period. The results of our projections are shown on the following pages.

For purposes of this projection, we have assumed that all available assets, including accumulated contributions made by existing active members, will be used to pay benefits until insolvency; at that point, request for refund of contributions from terminating active members will be treated as benefit payments that must be funded by employer contributions. However, the legality of this situation is undetermined at this time, and if it is determined that the reserve for accumulated active member contributions cannot be paid to existing annuitants, the Fund would become insolvent earlier than 2026.

The fair value of assets is assumed to earn the assumption of 7.25% each year of the projection until the projected date of insolvency. In reality, as the insolvency date approaches, invested assets will likely be rebalanced into more liquid, lower return assets in order to pay the benefits that are due. To the extent that actual returns are less than the 7.25% assumption as a result of this rebalancing, the Fund would become insolvent earlier than 2026.

SECTION 4: Reporting Information for the Park Employees' Annuity and Benefit Fund of Chicago

EXHIBIT V (continued)

Projection of Contributions, Liabilities, and Assets

Fiscal Year	Employee Contributions	Employer Contributions	Payroll	Normal Cost	Benefit Payouts	Estimated Expenses	Total Actuarial Liability	Actuarial Value of Assets	Unfunded Actuarial Liability	Funded Ratio
2018							1,142,298.0	366,806.6	775,491.4	32.1%
2019	12,398.4	14,135.5	136,230.3	16,447.7	80,011.6	1,553.6	1,159,842.7	328,376.2	831,466.5	28.3%
2020	12,222.8	12,937.9	134,278.8	16,188.7	81,148.9	1,608.0	1,177,203.1	288,140.0	889,063.1	24.5%
2021	12,141.2	13,229.1	133,372.5	16,055.3	82,256.7	1,664.2	1,194,531.1	243,262.4	951,268.7	20.4%
2022	12,096.4	13,041.7	132,874.6	15,964.5	83,422.7	1,722.5	1,211,809.8	188,788.7	1,023,021.1	15.6%
2023	12,066.3	12,954.7	132,540.1	15,868.4	84,703.3	1,782.8	1,228,911.1	137,742.8	1,091,168.3	11.2%
2024	12,050.9	12,906.9	132,369.2	15,760.2	86,106.4	1,845.2	1,245,682.2	81,748.7	1,163,933.5	6.6%
2025	12,047.8	12,874.7	132,334.3	15,659.3	87,566.0	1,909.7	1,262,048.5	20,334.4	1,241,714.1	1.6%
2026	12,049.6	49,151.8	132,354.5	15,534.7	89,019.9	1,976.6	1,277,961.1	0.0	1,277,961.1	0.0%
2027	12,048.6	79,735.5	132,343.7	15,387.9	90,681.0	2,045.8	1,293,148.6	0.0	1,293,148.6	0.0%
2028	12,050.7	81,453.4	132,367.0	15,250.2	92,329.3	2,117.4	1,307,581.5	0.0	1,307,581.5	0.0%
2029	12,054.1	83,205.2	132,404.4	15,098.7	94,010.4	2,191.5	1,321,156.2	0.0	1,321,156.2	0.0%
2030	12,073.9	85,059.5	132,624.5	14,965.1	95,807.8	2,268.2	1,333,709.2	0.0	1,333,709.2	0.0%
2031	12,089.1	86,921.5	132,794.1	14,811.3	97,605.7	2,347.6	1,345,144.3	0.0	1,345,144.3	0.0%
2032	12,115.5	88,659.0	133,087.4	14,662.4	99,287.4	2,429.7	1,355,506.1	0.0	1,355,506.1	0.0%
2033	12,155.3	90,312.7	133,529.3	14,526.5	100,895.9	2,514.8	1,364,806.6	0.0	1,364,806.6	0.0%
2034	12,210.9	91,969.3	134,146.8	14,408.1	102,520.0	2,602.8	1,372,971.4	0.0	1,372,971.4	0.0%
2035	12,264.0	93,310.7	134,736.4	14,269.7	103,823.4	2,693.9	1,380,229.0	0.0	1,380,229.0	0.0%
2036	12,340.7	94,804.6	135,588.7	14,160.5	105,299.7	2,788.2	1,386,365.9	0.0	1,386,365.9	0.0%
2037	12,406.8	94,789.6	136,323.3	14,027.4	104,310.6	2,885.7	1,393,830.0	0.0	1,393,830.0	0.0%
2038	12,492.3	95,849.2	137,273.4	13,917.6	105,354.8	2,986.8	1,400,635.4	0.0	1,400,635.4	0.0%
2039	12,586.6	96,551.5	138,321.8	13,815.1	106,046.9	3,091.3	1,407,107.1	0.0	1,407,107.1	0.0%
2040	12,704.8	97,017.7	139,634.2	13,739.8	106,522.9	3,199.5	1,413,474.0	0.0	1,413,474.0	0.0%
2041	12,838.5	97,221.0	141,120.7	13,686.6	106,748.1	3,311.5	1,420,012.0	0.0	1,420,012.0	0.0%
2042	12,991.6	97,117.4	142,821.3	13,667.7	106,681.6	3,427.4	1,427,072.7	0.0	1,427,072.7	0.0%
2043	13,164.3	96,603.1	144,740.5	13,680.4	106,220.1	3,547.3	1,435,137.1	0.0	1,435,137.1	0.0%
2044	13,360.7	95,811.6	146,921.9	13,721.3	105,500.7	3,671.5	1,444,575.5	0.0	1,444,575.5	0.0%
2045	13,580.7	94,814.2	149,367.4	13,811.0	104,594.9	3,800.0	1,455,733.0	0.0	1,455,733.0	0.0%
2046	13,815.9	93,623.6	151,980.6	13,919.4	103,506.5	3,933.0	1,468,943.6	0.0	1,468,943.6	0.0%

SECTION 4: Reporting Information for the Park Employees' Annuity and Benefit Fund of Chicago

Fiscal Year	Employee Contributions	Employer Contributions	Payroll	Normal Cost	Benefit Payouts	Estimated Expenses	Total Actuarial Liability	Actuarial Value of Assets	Unfunded Actuarial Liability	Funded Ratio
2047	14,066.8	92,392.4	154,767.7	14,054.8	102,388.6	4,070.6	1,484,415.7	0.0	1,484,415.7	0.0%
2048	14,325.9	91,054.6	157,646.4	14,202.8	101,167.4	4,213.1	1,502,433.6	0.0	1,502,433.6	0.0%
2049	14,600.2	89,611.3	160,694.6	14,371.1	99,850.9	4,360.6	1,523,302.5	0.0	1,523,302.5	0.0%
2050	14,885.6	88,116.1	163,866.3	14,556.1	98,488.5	4,513.2	1,547,294.6	0.0	1,547,294.6	0.0%
2051	15,186.0	86,667.4	167,203.7	14,751.5	97,182.3	4,671.1	1,574,589.4	0.0	1,574,589.4	0.0%
2052	15,498.5	85,361.4	170,675.6	14,973.2	96,025.2	4,834.6	1,605,299.7	0.0	1,605,299.7	0.0%
2053	15,814.8	84,013.0	174,190.7	15,180.5	94,824.0	5,003.8	1,639,703.6	0.0	1,639,703.6	0.0%
2054	16,149.6	82,657.6	177,910.5	15,422.4	93,628.2	5,179.0	1,678,100.5	0.0	1,678,100.5	0.0%
2055	16,498.2	81,488.8	181,783.8	15,672.7	92,626.8	5,360.2	1,720,587.2	0.0	1,720,587.2	0.0%
2056	16,863.6	80,369.3	185,843.4	15,951.3	91,685.0	5,547.9	1,767,428.9	0.0	1,767,428.9	0.0%
2057	17,245.9	79,185.4	190,091.5	16,252.1	90,689.3	5,742.0	1,819,021.1	0.0	1,819,021.1	0.0%

SECTION 4: Reporting Information for the Park Employees' Annuity and Benefit Fund of Chicago

EXHIBIT VI

Actuarial Assumptions and Actuarial Cost Method

Rationale for Assumptions: The information and analysis used in supporting each assumption that has a significant effect on this actuarial valuation is shown in the Experience Review dated October 25, 2018. Current data is reviewed in conjunction with each annual valuation.

Mortality Rates:

Healthy Post-Retirement Mortality: 110% of PubG-2010 Healthy Annuitant Table, with mortality improvements projected generationally using scale MP-2017

Active Mortality: 110% of PubG-2010 Healthy Employee Table, with mortality improvements projected generationally using scale MP-2017

The mortality tables specified above were determined to contain provisions appropriate to reasonably reflect future mortality improvement, based on a review of mortality experience as of the most recent experience study date.

Termination:

Select and ultimate termination rates are based on recent experience of the Fund. Ultimate rates applicable for members with eight or more years of service are shown for sample ages in the table on the next page. Select rates are as follows:

Years of Service	Rate (%)
0 - 0.99	17.5
1 - 1.99	13.0
2 - 2.99	13.0
3 - 3.99	12.5
4 - 4.99	12.5
5 - 5.99	10.0
6 - 6.99	10.0
7 - 7.99	10.0

SECTION 4: Reporting Information for the Park Employees' Annuity and Benefit Fund of Chicago

Ultimate rates:

Age	Rate (%)
20	7.0
25	7.0
30	6.0
35	4.0
40	4.0
45	4.0
50	3.0
55	3.0

Retirement Rates:

For employees first hired prior to January 1, 2011, rates of retirement for each age from 50 to 75 based on the recent experience of the Fund were used. Sample rates are shown below.

Age	Rate (%)	
	<30 Years of Service	30+ Years of Service
50	2.5	30.0
55	2.5	20.0
60	5.0	5.0
65	15.0	15.0
70	20.0	20.0
75	100.0	100.0

SECTION 4: Reporting Information for the Park Employees' Annuity and Benefit Fund of Chicago

For employees first hired on or after January 1, 2011, rates of retirement for each age from 62 to 75 were used. Sample rates are shown below.

Age	Rate (%)
62	50.0
65	20.0
67	50.0
70	20.0
75	100.0

Salary Increases:

Assumed salary increases are based on the recent experience of the Fund were used. Rates are shown below.

Years of Service	Rate (%)
0 - 0.99	20.00
1 - 1.99	7.50
2 - 2.99	5.00
3 - 3.99	3.50
4 - 4.99	3.50
5+	2.75

Valuation of Inactive Vested Participants:

The liability for an inactive member is equal to his or her existing account balance, or, if the participant has at least 10 years of service, twice the existing account balance.

Unknown Data for Participants:

Same as those exhibited by participants with similar known characteristics. If not specified, participants are assumed to be male.

Spouses:

75% of participants were assumed to be married and females are assumed to be 2 years younger than males.

Disability Benefit Valuation:

Disability benefits are valued in normal cost by annualizing the actual monthly disability payment amounts for the month prior to the valuation date.

SECTION 4: Reporting Information for the Park Employees' Annuity and Benefit Fund of Chicago

Investment Return:	7.25% per year, net of investment expenses
Inflation:	2.50% per year
Payroll Growth:	2.50% per year
Administrative Expenses:	Equal to actual expenses for the prior year, increased by 3.5%.
Actuarial Value of Assets:	The actuarial value of assets was determined by smoothing unexpected gains and losses over a period of 5 years. The gain or loss for a year is calculated as the total investment income on the fair value of assets, minus expected investment return on the prior actuarial value of assets. The final actuarial value is equal to the expected actuarial value plus (or minus) 20% of the calculated gain (or loss) in the prior 5 years.
Actuarial Cost Method:	Entry Age Normal. Under this method, a normal cost is calculated for each employee that is the level annual contribution as a percent of pay required to be made from the employee's date of hire for as long as he/she remains active so that sufficient assets will be accumulated to provide his/her benefit. The accrued liability is the difference between the present value of all future benefits and the present value of all future normal costs.

SECTION 4: Reporting Information for the Park Employees' Annuity and Benefit Fund of Chicago

EXHIBIT VII

Summary of Plan Provisions

This exhibit summarizes the major provisions of the Fund included in the valuation. It is not intended to be, nor should it be interpreted as, a complete statement of all plan provisions.

Membership:	Any person employed by the Chicago Park District in a position requiring service for 6 months or more in a calendar year is required to become a member of the Fund as a condition of employment.
Employee Contributions:	All members of the Fund are required to contribute 9% of salary to the Fund as follows: 7% for the retirement pension, 1% for the spouse's pension, and 1% for the automatic increases in the retirement pension. In addition, employees are required to contribute \$3.60 per month toward the cost of the single sum death benefit.
Tiers:	Tier 1: First hired before January 1, 2011. Tier 2: First hired on or after January 1, 2011.
Retirement Pension:	<p>a. Eligibility – An employee may retire at age 50 with at least 10 years of service or at age 60 with 4 years of service. If retirement occurs before age 60, the retirement pension is reduced $\frac{1}{4}$ of 1% of each month that the age of the member is below 60. However, there is no reduction if the employee has at least 30 years of service.</p> <p>b. Amount – The retirement pension is based on the average of the 4 highest consecutive years of salary within the last 10 years. For an employee who withdraws from service on or after December 31, 2003, the amount of the retirement pension is 2.4% of highest average salary for each year of service.</p> <p>The maximum pension payable is 80% of the highest annual salary.</p>

SECTION 4: Reporting Information for the Park Employees' Annuity and Benefit Fund of Chicago

An employee who was a participant before July 1, 1971 is entitled to the pension provided under the money purchase formula if it provides a greater pension than that provided under the above fixed benefit formula.

An employee who first becomes a participant on or after January 1, 2011 is subject to the following provisions:

1. The highest salary for annuity purposes is equal to the average monthly salary obtained by dividing the participant's total salary during the 96 consecutive months of service within the last 120 months of service in which the total compensation was the highest by the number of months in that period.
2. For 2019, the annual salary is limited to \$113,644.91. Limitations for future years shall automatically be increased by the lesser of 3% or one-half the percentage change in the Consumer Price Index-U during the preceding calendar year.
3. A participant is eligible to retire with unreduced benefits after attainment of age 67 with at least 10 years of service credit. However, a participant may elect to retire at age 62 with at least 10 years of service credit and receive a retirement annuity reduced by $\frac{1}{2}$ of 1% for each month that the age of the member is below 67.

Post-Retirement Increase:

An employee retiring at age 60 or over, or an employee with 30 or more years of service, is entitled to automatic annual increases of 3% of the originally granted pension following one year's receipt of pension payments. In the case of an employee with less than 30 years of service who retires before age 60, the increases begin following the later of attainment of age 60 and receipt of one year's pension payments.

Automatic annual increases (AAI) in the retirement annuity for employees who first became a participant on or after January 1, 2011 are equal to the lesser of 3% or one-half the annual change in the Consumer Price Index-U, whichever is less, based on the originally granted retirement annuity.

SECTION 4: Reporting Information for the Park Employees' Annuity and Benefit Fund of Chicago

Surviving Spouse's Pension:

A surviving spouse is entitled to a pension upon the death of an employee while in service or on retirement. If the surviving spouse is age 60 or over and the employee or retiree had at least 20 years of service, the minimum surviving spouse's pension is 50% of the deceased employee's or retired employee's pension at the date of death. If the age of the surviving spouse is less than 60, the pension is reduced ½ of 1% for each month the surviving spouse is under age 60. If the employee had less than 20 years of service, the surviving spouse is entitled to a pension under the money purchase formula, taking into account employee and employer contributions toward the surviving spouse's pension.

Surviving spouse's pensions are subject to annual increases of 3% per year based on the current amount of pension.

For employees who first become a participant on or after January 1, 2011, the initial survivor's annuity is equal to 66 2/3% of the participant's earned retirement annuity at the date of death, subject to automatic annual increases of the lesser of 3% or one-half of the increase in the Consumer Price Index-U during the preceding calendar year, based on the originally granted survivor's annuity.

Children's Pension:

Unmarried children of a deceased employee under the age of 18 are entitled to a children's pension. If either parent is living, the pension is \$100.00 per month. If no parent survives, the pension for each child is \$150.00 per month. The total amount payable to a spouse or children may not exceed 60% of the employee's final salary.

Single Sum Death Benefit:

A death benefit is payable upon the death of an employee in service in addition to any other benefits payable to the surviving spouse or minor children. The death benefit payable is as follows:

\$3,000 benefit during the first year of service,
\$4,000 benefit during the second year of service,
\$5,000 benefit during the third year of service,
\$6,000 benefit during the fourth through ninth year of service, and
\$10,000 benefit if death occurs after ten or more years of service.

SECTION 4: Reporting Information for the Park Employees' Annuity and Benefit Fund of Chicago

Upon the death of a retired member with ten or more years of service, the \$10,000 maximum benefit is reduced to \$6,000 if death occurs during the first year of retirement. Thereafter, it is reduced by \$1,500 for each year or fraction of a year while on retirement, but shall not be less than \$3,000.

Ordinary Disability Benefit: An ordinary disability benefit is payable after eight consecutive days of absence for illness without pay. The amount of the benefit is 45% of salary. The benefit is payable for a period not to exceed $\frac{1}{4}$ of the length of service or five years, whichever is less.

Occupational Disability Benefit: Upon disability resulting from an injury incurred while on duty, an employee is entitled to a disability benefit of 75% of salary from the first day of absence without pay. The benefit is payable during the period of disability until the employee attains age 65 if disability is incurred before age 60, or for a period of five years if disability is incurred after age 60.

Occupational Death Benefit: Upon the death of an employee resulting from an accident incurred in the performance of duty, the surviving spouse is entitled to an occupational death benefit of 50% of salary. Each unmarried child under the age of 18 is entitled to a benefit of \$100 per month. The combined payments to a family may not exceed 75% of the employee's final salary. The total payments are reduced by Workmen's Compensation benefits.

SECTION 4: Reporting Information for the Park Employees' Annuity and Benefit Fund of Chicago

Refunds:	An employee who terminates employment before qualifying for a pension is entitled to a refund of employee contributions. The refund is payable to any employee who withdraws before age 55, regardless of the length of service. It is also payable to an employee who withdraws between age 55 and 60 with less than 10 years of service, and to an employee who withdraws after age 60 with less than 5 years of service. An employee who is unmarried at date of retirement is entitled to a refund of the full amount contributed for the spouse's pension, without interest.
Plan Year:	January 1 through December 31. Prior to December 31, 2012, the plan year was July 1 through June 30.
Employer Contributions:	The tax multiple is 1.1 for 2019 and thereafter.

SECTION 5: GASB Information for Park Employees' Annuity and Benefit Fund of Chicago

EXHIBIT 1

Net Pension Liability

The components of the net pension liability of the Fund at December 31, 2018 were as follows:

Total pension liability	\$1,646,968,021
Plan fiduciary net position	342,255,873
Net pension liability	1,304,712,148
Plan fiduciary net position as a percentage of the total pension liability	20.78%

Actuarial assumptions. The total pension liability was determined by an actuarial valuation as of December 31, 2018, using the following actuarial assumptions, applied to all periods included in the measurement:

Inflation	2.50%
Salary increases	Service-based ranging from 20% to 2.75%
Single equivalent discount rate	4.21%, net of pension plan investment expense, including inflation
Cost of living adjustments	3% of original benefit for employees who first became a participant before January 1, 2011; the lesser of 3% and 1/2 of CPI of original benefit for employees and beneficiaries of employees who first became a participant on or after January 1, 2011; 3% compounded for beneficiaries of employees who first became a participant by January 1, 2011.

For healthy annuitants, mortality rates were based on 110% of PubG-2010 Healthy Annuitant Table, with mortality improvements projected generationally using scale MP-2017. For active participants, mortality rates were based on 110% of PubG-2010 Healthy Employee Table, with mortality improvements projected generationally using scale MP-2017.

The actuarial assumptions used in the December 31, 2018, valuation were based on the results of an experience study for the five-year period ending December 31, 2018.

Discount rate: The discount rate used to measure the total pension liability was 4.21%. The projection of cash flows used to determine the discount rate assumed member contributions will be made at the 9% contribution rate for 2019 and thereafter.

SECTION 5: GASB Information for Park Employees' Annuity and Benefit Fund of Chicago

Employer contributions will be made at the 1.1 multiple of member contributions from two years prior for 2019 and thereafter. For this purpose, only employer contributions that are intended to fund benefits of current plan members and their beneficiaries are included. Projected employer contributions and contributions from future plan members that are intended to fund the service costs of future plan members and their beneficiaries are not included. Based on those assumptions, the pension plan's fiduciary net position was not projected to be available to make all projected future benefit payments of current plan members. The projected benefit payments through 2024 were discounted at the expected long-term rate of return (7.25%). Starting in 2025, the projected benefit payments were discounted at the municipal bond index (4.10%). Therefore, a single equivalent, blended discount rate of 4.21% was calculated using the long-term expected rate of return and the municipal bond index.

Sensitivity of the net pension liability to changes in the discount rate. The following presents the net pension liability of the Fund, calculated using the discount rate of 4.21%, as well as what the Fund's net pension liability would be if it were calculated using a discount rate that is 1-percentage-point lower (3.21%) or 1-percentage-point higher (5.21%) than the current rate:

	1% Decrease (3.21%)	Current Discount Rate (4.21%)	1% Increase (5.21%)
Net pension liability as of December 31, 2018	\$1,551,957,537	\$1,304,712,148	\$1,104,251,891

SECTION 5: GASB Information for Park Employees' Annuity and Benefit Fund of Chicago

EXHIBIT 2

Schedule of Changes in Net Pension Liability

	2018	2017
Total pension liability		
Service cost	\$38,102,341	\$20,115,813
Interest	59,290,982	68,982,467
Change of benefit term	0	36,183,940
Differences between expected and actual experience	5,001,084	2,785,815
Changes of assumptions	-3,471,090	370,422,560
Benefit payments, including refunds of employee contributions	<u>-76,526,820</u>	<u>-78,138,027</u>
Net change in total pension liability	22,396,497	420,352,568
Total pension liability – beginning	<u>1,624,571,524</u>	<u>1,204,218,956</u>
Total pension liability – ending (a)	<u>1,646,968,021</u>	<u>1,624,571,524</u>
Plan fiduciary net position		
Contributions – employer	27,638,402	20,920,614
Contributions – employee	12,125,457	13,675,292
Net investment income	-17,196,812	51,082,314
Benefit payments, including refunds of employee contributions	-76,526,820	-78,138,027
Administrative expense	-1,501,039	-1,682,136
Other	<u>67,927</u>	<u>91,779</u>
Net change in plan fiduciary net position	-55,392,885	5,949,836
Plan fiduciary net position – beginning	<u>397,648,758</u>	<u>391,698,922</u>
Plan fiduciary net position – ending (b)	<u>342,255,873</u>	<u>397,648,758</u>
Fund’s net pension liability – ending (a) – (b)	<u>1,304,712,148</u>	<u>1,226,922,766</u>
Plan fiduciary net position as a percentage of the total pension liability	20.78%	24.48%
Covered employee payroll	\$133,112,100	\$135,315,008
Fund’s net pension liability as percentage of covered employee payroll	980.16%	906.72%

SECTION 5: GASB Information for Park Employees' Annuity and Benefit Fund of Chicago

EXHIBIT 3

Schedule of Employer Contribution – Last Ten Fiscal Years

Fiscal Year Ended	Actuarially Determined Contributions	Contributions in Relation to the Actuarially Determined Contributions	Contribution Deficiency (Excess)	Covered-Employee Payroll	Contributions as a Percentage of Covered Employee Payroll
June 30, 2010	\$22,399,740	\$10,829,339	\$11,570,401	\$107,361,021	10.09%
June 30, 2011	25,319,145	10,981,419	14,337,726	107,686,693	10.20%
June 30, 2012	28,051,528	10,868,361	17,183,167	114,223,909	9.51%
December 31, 2012	16,786,671	5,268,363	11,518,308	58,231,511	9.05%
December 31, 2013	41,834,857	15,707,814	26,127,043	117,781,596	13.34%
December 31, 2014	35,307,186	11,225,438	24,081,748	118,987,507	9.43%
December 31, 2015	36,273,994	30,588,976	5,685,018	122,382,584	24.99%
December 31, 2016	37,130,268	30,890,241	6,240,027	121,126,918	25.50%
December 31, 2017	45,253,238	20,920,614	24,332,624	135,315,008	15.46%
December 31, 2018	50,929,734	27,638,402	23,291,332	133,112,100	20.76%

SECTION 5: GASB Information for Park Employees' Annuity and Benefit Fund of Chicago

Notes to EXHIBIT 3

Valuation date	Actuarially determined contribution amount is determined as of December 31, with appropriate interest to the middle of the year.
Methods and assumptions used to establish “actuarially determined contribution” for the fiscal year ended December 31, 2018:	
Actuarial cost method	Entry Age Actuarial cost method
Amortization method	25-year closed, level percentage of payroll amortization
Asset valuation method	5-year smoothed market
Actuarial assumptions:	
Investment rate of return	7.50%, net of investment expense
Projected salary increases	Service-based ranging from 15% to 2.75%
Mortality	Post-retirement mortality rates were based on the RP-2000 Combined Healthy Mortality Tables set forward 1 year for females with generational projection from 2003 using scale AA for mortality improvements. Pre-retirement mortality rates are the same as post-retirement rates.
Cost of living adjustments	3% of original benefit for employees who first became a participant before January 1, 2011; the lesser of 3% and 1/2 of CPI of original benefit for employees and beneficiaries of employees who first became a participant on or after January 1, 2011; 3% compounded for beneficiaries of employees who first became a participant by January 1, 2011.
Other assumptions:	Same as those used in the December 31, 2017, actuarial funding valuations.

5852849v5/13806.005