

CITY OF ROCHELLE  
POLICE PENSION FUND  
ACTUARIAL VALUATION  
AS OF JANUARY 1, 2019  
CONTRIBUTIONS APPLICABLE TO THE  
PLAN/FISCAL YEAR ENDING DECEMBER 31, 2020



**FOSTER & FOSTER**  
ACTUARIES AND CONSULTANTS

August 8, 2019

Board of Trustees  
Rochelle Police Department  
Police Pension Fund  
420 N. 6<sup>th</sup> Street  
Rochelle, IL 61068

Re: Actuarial Valuation Report – City of Rochelle Police Pension Fund

Dear Board:

We are pleased to present to the Board this report of the annual actuarial valuation of the City of Rochelle Police Pension Fund. The valuation was performed to determine whether the assets and contributions are sufficient to provide the prescribed benefits and to develop the appropriate funding requirements for the applicable plan year. Please note that this valuation may not be applicable for any other purposes.

The valuation has been conducted in accordance with generally accepted actuarial principles and practices, including the applicable Actuarial Standards of Practice as issued by the Actuarial Standards Board, and reflects laws and regulations issued to date pursuant to the provisions of Article 3, Illinois Pension Code, as well as applicable federal laws and regulations. In our opinion, the assumptions used in this valuation, as adopted by the Board of Trustees, represent reasonable expectations of anticipated plan experience. Future actuarial measurements may differ significantly from the current measurements presented in this report for a variety of reasons including: changes in applicable laws, changes in plan provisions, changes in assumptions, or plan experience differing from expectations. Due to the limited scope of the valuation, we did not perform an analysis of the potential range of such future measurements.

In conducting the valuation, we have relied on personnel, plan design, and asset information supplied by the Board, financial reports prepared by the custodian bank and the actuarial assumptions and methods described in the Actuarial Assumptions section of this report. While we cannot verify the accuracy of all this information, the supplied information was reviewed for consistency and reasonableness. As a result of this review, we have no reason to doubt the substantial accuracy of the information and believe that it has produced appropriate results. This information, along with any adjustments or modifications, is summarized in various sections of this report.


The undersigned is familiar with the immediate and long-term aspects of pension valuations and meets the Qualification Standards of the American Academy of Actuaries necessary to render the actuarial opinions contained herein. All of the sections of this report are considered an integral part of the actuarial opinions.

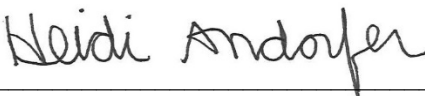
To our knowledge, no associate of Foster & Foster, Inc. working on valuations of the program has any direct financial interest or indirect material interest in the City of Rochelle, nor does anyone at Foster & Foster, Inc. act as a member of the Board of Trustees of the City of Rochelle Police Pension Fund. Thus, there is no relationship existing that might affect our capacity to prepare and certify this actuarial report.


If there are any questions, concerns, or comments about any of the items contained in this report, please contact us at 630-620-0200.

Respectfully submitted,

Foster & Foster, Inc.

By:   
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By:   
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Enclosures

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## SUMMARY OF REPORT

The regular annual actuarial valuation of the City of Rochelle Police Pension Fund, performed as of January 1, 2019, has been completed and the results are presented in this Report. The contribution amounts set forth herein are applicable to the plan/fiscal year ended December 31, 2020.

The contribution requirements, compared with those set forth in the January 1, 2018 actuarial report, are as follows:

Valuation Date Applicable to Fiscal Year Ending	1/1/2019 <u>12/31/2020</u>	1/1/2018 <u>12/31/2019</u>
Total Recommended Contribution	\$977,296	\$818,671
% of Projected Annual Payroll	64.9%	58.5%
Member Contributions (Est.)	149,130	138,615
% of Projected Annual Payroll	9.9%	9.9%
City Recommended Contribution	828,166	680,056
% of Projected Annual Payroll	55.0%	48.6%

As you can see, the Total Recommended Contribution shows an increase when compared to the results determined in the January 1, 2018 actuarial valuation report. The increase is attributable to changes in assumptions, increase in normal cost due to active headcount changes and unfavorable plan experience.

Plan experience was unfavorable overall on the basis of the plan's actuarial assumptions. Sources of unfavorable experience included an investment return of 2.61% (Actuarial Asset Basis) which fell short of the 6.75% assumption, lower than expected inactive mortality, and less turnover than expected. These losses were offset in part by a gain associated with an average salary increase of 3.00% which fell short of the 4.46% assumption.

## CHANGES SINCE PRIOR VALUATION

### Plan Changes Since Prior Valuation

No plan changes have occurred since the prior valuation.

### Actuarial Assumption/Method Changes Since Prior Valuation

The valuation reflects the following assumption change:

- The mortality rates were updated to reflect the PubS-2010 tables.

There were no method changes since the prior valuation.

COMPARATIVE SUMMARY OF PRINCIPAL VALUATION RESULTS

	New Assump <u>1/1/2019</u>	Old Assump <u>1/1/2019</u>	<u>1/1/2018</u>
A. Participant Data			
Number Included			
Actives	19	19	18
Service Retirees	11	11	11
Beneficiaries	7	7	7
Disability Retirees	0	0	0
Terminated Vested	<u>1</u>	<u>1</u>	<u>1</u>
Total	38	38	37
Total Annual Payroll	\$1,504,844	\$1,504,844	\$1,398,738
Payroll Under Assumed Ret. Age	1,504,844	1,504,844	1,398,738
Annual Rate of Payments to:			
Service Retirees	581,700	581,700	566,224
Beneficiaries	297,407	297,407	297,407
Disability Retirees	0	0	0
Terminated Vested	0	0	0
B. Assets			
Actuarial Value	11,586,805	11,586,805	11,491,222
Market Value	10,474,205	10,474,205	11,278,351
C. Liabilities			
Present Value of Benefits			
Actives			
Retirement Benefits	9,960,879	9,563,661	8,535,087
Disability Benefits	847,837	736,200	694,636
Death Benefits	93,110	205,168	195,735
Vested Benefits	667,577	650,651	653,339
Service Retirees	8,462,621	8,165,478	8,104,897
Beneficiaries	3,065,617	2,970,969	3,030,906
Disability Retirees	0	0	0
Terminated Vested	<u>28,835</u>	<u>28,835</u>	<u>28,835</u>
Total	23,126,476	22,320,962	21,243,435

C. Liabilities - (Continued)	New Assump <u>1/1/2019</u>	Old Assump <u>1/1/2019</u>	<u>1/1/2018</u>
Present Value of Future Salaries	14,485,436	14,400,123	13,958,832
Present Value of Future Member Contributions	1,435,507	1,427,052	1,383,320
Normal Cost (Retirement)	309,556	296,520	268,320
Normal Cost (Disability)	55,054	48,290	43,343
Normal Cost (Death)	4,747	9,684	9,431
Normal Cost (Vesting)	<u>34,121</u>	<u>33,315</u>	<u>34,873</u>
Total Normal Cost	403,478	387,809	355,967
Present Value of Future Normal Costs	3,594,477	3,430,904	3,232,487
Accrued Liability (Retirement)	7,124,622	6,861,538	6,009,852
Accrued Liability (Disability)	351,344	302,914	291,691
Accrued Liability (Death)	54,317	126,630	119,602
Accrued Liability (Vesting)	444,643	433,694	425,165
Accrued Liability (Inactives)	<u>11,557,073</u>	<u>11,165,282</u>	<u>11,164,638</u>
Total Actuarial Accrued Liability	19,531,999	18,890,058	18,010,948
Unfunded Actuarial Accrued Liability (UAAL)	7,945,194	7,303,253	6,519,726
Funded Ratio (AVA / AL)	59.3%	61.3%	63.8%

	New Assump <u>1/1/2019</u>	Old Assump <u>1/1/2019</u>	<u>1/1/2018</u>
D. Actuarial Present Value of Accrued Benefits			
Vested Accrued Benefits			
Inactives	11,557,073	11,165,282	11,164,638
Actives	1,741,533	1,636,000	1,015,102
Member Contributions	<u>1,515,543</u>	<u>1,515,543</u>	<u>1,372,543</u>
Total	14,814,149	14,316,825	13,552,283
Non-vested Accrued Benefits	<u>735,937</u>	<u>712,755</u>	<u>776,409</u>
Total Present Value Accrued Benefits	15,550,086	15,029,580	14,328,692
Funded Ratio (MVA / PVAB)	67.4%	69.7%	78.7%
Increase (Decrease) in Present Value of Accrued Benefits Attributable to:			
Plan Amendments	0	0	
Assumption Changes	520,506	0	
New Accrued Benefits	0	642,477	
Benefits Paid	0	(879,106)	
Interest	0	937,517	
Other	<u>0</u>	<u>0</u>	
Total	520,506	700,888	

Valuation Date	New Assump	Old Assump	
Applicable to Fiscal Year Ending	1/1/2019	1/1/2019	1/1/2018
	<u>12/31/2020</u>	<u>12/31/2020</u>	<u>12/31/2019</u>
<b>E. Pension Cost</b>			
Normal Cost <sup>1</sup>	\$430,713	\$413,986	\$379,995
% of Total Annual Payroll <sup>1</sup>	28.6	27.5	27.2
Administrative Expenses <sup>1</sup>	23,325	23,325	22,308
% of Total Annual Payroll <sup>1</sup>	1.5	1.5	1.6
Payment Required to Amortize Unfunded Actuarial Accrued Liability over 22 years (as of 1/1/2019) <sup>1</sup>	523,258	480,980	416,368
% of Total Annual Payroll <sup>1</sup>	34.8	32.0	29.7
Total Recommended Contribution	977,296	918,291	818,671
% of Total Annual Payroll <sup>1</sup>	64.9	61.0	58.5
Expected Member Contributions <sup>1</sup>	149,130	149,130	138,615
% of Total Annual Payroll <sup>1</sup>	9.9	9.9	9.9
Expected City Contribution	828,166	769,161	680,056
% of Total Annual Payroll <sup>1</sup>	55.0	51.1	48.6

**F. Past Contributions**

Plan Years Ending:	<u>12/31/2018</u>
Total Recommended Contribution	810,776
City	668,494
Actual Contributions Made:	
Members (excluding buyback)	142,282
City	<u>556,593</u>
Total	698,875

G. Net Actuarial (Gain)/Loss 665,198

<sup>1</sup> Contributions developed as of 1/1/2019 displayed above have been adjusted to account for assumed interest.

H. Schedule Illustrating the Amortization of the Total Unfunded Actuarial Accrued Liability as of:

<u>Year</u>	<u>Projected Unfunded Accrued Liability</u>
2019	7,945,194
2020	7,958,237
2021	7,953,846
2026	7,601,464
2031	6,470,246
2036	4,138,740
2041	0

I. (i) 3 Year Comparison of Actual and Assumed Salary Increases

		<u>Actual</u>	<u>Assumed</u>
Year Ended	12/31/2018	3.00%	4.46%
Year Ended	12/31/2017	5.47%	5.45%
Year Ended	12/31/2016	3.73%	5.58%

(ii) 3 Year Comparison of Investment Return on Actuarial Value

		<u>Actual</u>	<u>Assumed</u>
Year Ended	12/31/2018	2.61%	6.75%
Year Ended	12/31/2017	4.19%	6.75%
Year Ended	12/31/2016	2.96%	6.75%

DEVELOPMENT OF JANUARY 1, 2019 AMORTIZATION PAYMENT

(1) Unfunded Actuarial Accrued Liability as of January 1, 2018	\$6,519,726
(2) Sponsor Normal Cost developed as of January 1, 2018	217,352
(3) Expected administrative expenses for the year ended December 31, 2018	20,897
(4) Expected interest on (1), (2) and (3)	455,458
(5) Sponsor contributions to the System during the year ended December 31, 2018	556,593
(6) Expected interest on (5)	18,785
(7) Expected Unfunded Actuarial Accrued Liability as of December 31, 2018, (1)+(2)+(3)+(4)-(5)-(6)	6,638,055
(8) Change to UAAL due to Assumption Change	641,941
(9) Change to UAAL due to Actuarial (Gain)/Loss	665,198
(10) Unfunded Accrued Liability as of January 1, 2019	7,945,194
(11) UAAL Subject to Amortization (100% AAL less Actuarial Assets)	7,945,194

<u>Date</u> <u>Established</u>	<u>Years</u> <u>Remaining</u>	<u>1/1/2019</u> <u>Amount</u>	<u>Amortization</u> <u>Amount</u>
1/1/2019	22	7,945,194	490,171

## DETAILED ACTUARIAL (GAIN)/LOSS ANALYSIS

(1) Unfunded Actuarial Accrued Liability (UAAL) as of January 1, 2018	\$6,519,726
(2) Expected UAAL as of January 1, 2019	6,638,055
(3) Summary of Actuarial (Gain)/Loss, by component:	
Investment Return (Actuarial Asset Basis)	471,173
Salary Increases	(68,169)
Active Decrements	61,009
Inactive Mortality	108,945
Other	<u>92,240</u>
Change in UAAL due to (Gain)/Loss	665,198
Assumption Changes	<u>641,941</u>
(4) Actual UAAL as of January 1, 2019	\$7,945,194

## RECONCILIATION OF CHANGES IN CONTRIBUTION REQUIREMENT

(1) Contribution Determined as of January 1, 2018	\$680,056
(2) Summary of Contribution Impact by component:	
Change in Normal Cost	33,991
Change in Assumed Administrative Expense	1,017
Investment Return (Actuarial Asset Basis)	31,031
Salary Increases	(4,489)
New Entrants	0
Active Decrements	4,018
Inactive Mortality	7,175
Data Corrections	0
Contributions (More) or Less than Recommended	7,618
Increase in Amortization Payment Due to Payroll Growth Assumption	14,573
Change in Expected Member Contributions	(10,515)
Assumption Change	59,005
Other	<u>4,686</u>
Total Change in Contribution	148,110
(3) Contribution Determined as of January 1, 2019	\$828,166

## STATUTORY MINIMUM REQUIRED CONTRIBUTION

Contribution requirements shown on this page are calculated according to statutory minimum funding requirements of the Illinois Pension Code. We do not believe this method is sufficient to fund future benefits; as such, we recommend funding according to the contributions developed in Section E of this report.

	New Assump	Old Assump	
Valuation Date	1/1/2019	1/1/2019	1/1/2018
Applicable to Fiscal Year Ending	<u>12/31/2020</u>	<u>12/31/2020</u>	<u>12/31/2019</u>
Actuarial Accrued Liability (PUC)	18,660,349	18,030,230	17,175,592
Actuarial Value of Assets	<u>11,586,805</u>	<u>11,586,805</u>	<u>11,491,222</u>
Unfunded Actuarial Accrued Liability (UAAL)	7,073,544	6,443,425	5,684,370
UAAL Subject to Amortization	5,207,509	4,640,402	3,966,811
Normal Cost <sup>1</sup>	\$500,907	\$482,926	\$432,943
% of Total Annual Payroll <sup>1</sup>	33.3	32.1	31.0
Administrative Expenses <sup>1</sup>	23,325	23,325	22,308
% of Total Annual Payroll <sup>1</sup>	1.5	1.5	1.6
Payment Required to Amortize Unfunded Actuarial Accrued Liability over 22 years (as of 1/1/2019) <sup>1</sup>	342,958	305,610	253,332
% of Total Annual Payroll <sup>1</sup>	22.8	20.3	18.1
Total Required Contribution	867,190	811,861	708,583
% of Total Annual Payroll <sup>1</sup>	57.6	53.9	50.7
Expected Member Contributions <sup>1</sup>	149,130	149,130	138,615
% of Total Annual Payroll <sup>1</sup>	9.9	9.9	9.9
Expected City Contribution	718,060	662,731	569,968
% of Total Annual Payroll <sup>1</sup>	47.7	44.0	40.8

### Assumptions and Methods:

Actuarial Cost Method  
Amortization Method

Projected Unit Credit  
90% Funding by 2040

All other assumptions and methods are as described in the Actuarial Assumptions and Methods section.

<sup>1</sup> Contributions developed as of 1/1/2019 displayed above have been adjusted to account for assumed interest.

PROJECTION OF BENEFIT PAYMENTS

Year	Payments for Current Actives	Payments for Current Inactives	Total Payments
2019	17,633	902,072	919,705
2020	33,450	888,540	921,990
2021	47,741	898,871	946,612
2022	73,299	908,461	981,760
2023	124,928	917,131	1,042,059
2024	186,933	924,685	1,111,618
2025	253,905	930,908	1,184,813
2026	340,439	935,559	1,275,998
2027	422,688	938,389	1,361,077
2028	497,401	939,137	1,436,538
2029	574,546	937,541	1,512,087
2030	654,641	933,342	1,587,983
2031	731,996	926,304	1,658,300
2032	795,731	916,220	1,711,951
2033	853,087	902,920	1,756,007
2034	931,326	886,267	1,817,593
2035	1,015,247	866,155	1,881,402
2036	1,132,744	842,512	1,975,256
2037	1,222,514	815,335	2,037,849
2038	1,306,416	784,678	2,091,094
2039	1,396,339	750,665	2,147,004
2040	1,474,968	713,527	2,188,495
2041	1,552,640	673,610	2,226,250
2042	1,617,686	631,373	2,249,059
2043	1,676,565	587,359	2,263,924
2044	1,768,980	542,188	2,311,168
2045	1,833,100	496,554	2,329,654
2046	1,899,795	451,169	2,350,964
2047	1,945,988	406,713	2,352,701
2048	1,988,002	363,821	2,351,823
2049	2,026,875	323,032	2,349,907
2050	2,062,177	284,794	2,346,971
2051	2,093,707	249,444	2,343,151
2052	2,120,029	217,161	2,337,190
2053	2,141,182	187,993	2,329,175
2054	2,157,354	161,883	2,319,237
2055	2,166,990	138,682	2,305,672
2056	2,169,941	118,180	2,288,121
2057	2,165,305	100,146	2,265,451
2058	2,152,833	84,351	2,237,184

## ACTUARIAL ASSUMPTIONS AND METHODS

Interest Rate	6.75% per year compounded annually, net of investment related expenses.
Mortality Rate	<p><b><i>Active Lives:</i></b> PubS-2010 Employee mortality, projected 5 years past the valuation date with Scale MP-2018. 10% of active deaths are assumed to be in the line of duty.</p> <p><b><i>Inactive Lives:</i></b> PubS-2010 Healthy Retiree mortality, projected 5 years past the valuation date with Scale MP-2018.</p> <p><b><i>Beneficiaries:</i></b> PubS-2010 Survivor mortality, projected 5 years past the valuation date with Scale MP-2018.</p> <p><b><i>Disabled Lives:</i></b> PubS-2010 Disabled mortality, projected 5 years past the valuation date with Scale MP-2018.</p> <p>The mortality assumptions sufficiently accommodate anticipated future mortality improvements.</p>
Retirement Age	See table later in this section. This is based on a 2017 experience study performed for the State of Illinois Department of Insurance.
Disability Rate	See table later in this section. 60% of the disabilities are assumed to be in the line of duty. This is based on a 2017 experience study performed for the State of Illinois Department of Insurance.
Termination Rate	See table later in this section. This is based on a 2017 experience study performed for the State of Illinois Department of Insurance.
Inflation	2.50%.
Cost-of-Living Adjustment	<p><u>Tier 1:</u> 3.00% per year after age 55. Those that retire prior to age 55 receive an increase of 1/12 of 3.00% for each full month since benefit commencement upon reaching age 55.</p> <p><u>Tier 2:</u> 1.25% per year after the later of attainment of age 60 or first anniversary of retirement.</p>

Salary Increases

See table below. This is based on a 2017 experience study performed for the State of Illinois Department of Insurance.

Salary Scale	
Service	Rate
0	11.00%
1	10.75%
2	8.75%
3	8.50%
4	7.00%
5	6.25%
6	5.25%
7	4.25%
8 - 16	4.00%
17 - 32	3.75%
32+	3.50%

Marital Status

80% of Members are assumed to be married.

Spouse's Age

Males are assumed to be three years older than females.

Funding Method

Entry Age Normal Cost Method.

Actuarial Asset Method

Investment gains and losses are smoothed over a 5-year period.

Funding Policy Amortization Method

The UAAL is amortized according to a Level Percentage of Payroll method over a period ending in 2040. The initial amortization amount is 100% of the Accrued Liability less the Actuarial Value of Assets.

Payroll Growth

3.50% per year.

Administrative Expenses

Expenses paid out of the fund other than investment-related expenses are assumed to be equal to those paid in the previous year.

Decrement Tables

% Terminating During the Year		% Becoming Disabled During the Year		% Retiring During the Year (Tier 1)		% Retiring During the Year (Tier 2)	
Age	Rate	Age	Rate	Age	Rate	Age	Rate
20	14.00%	20	0.000%	50 - 51	15%	50 - 54	5%
25	10.40%	25	0.030%	52 - 54	20%	55	40%
30	5.60%	30	0.140%	55 - 64	25%	56 - 64	25%
35	3.10%	35	0.260%	65 - 69	40%	65 - 69	40%
40	1.90%	40	0.420%	70+	100%	70+	100%
45	1.50%	45	0.590%				
50	1.50%	50	0.710%				
56+	0.00%	55	0.900%				
		60	1.150%				

## GLOSSARY

Total Annual Payroll is the projected annual rate of pay for the fiscal year following the valuation date of all covered members.

Present Value of Benefits is the single sum value on the valuation date of all future benefits to be paid to current Members, Retirees, Beneficiaries, Disability Retirees and Vested Terminations.

Normal (Current Year's) Cost is the current year's cost for benefits yet to be funded.

Unfunded Accrued Liability is a liability which arises when a pension plan is initially established or improved and such establishment or improvement is applicable to all years of past service.

Total Recommended Contribution is equal to the Normal Cost plus an amount sufficient to amortize the Unfunded Accrued Liability over a period ending in 2040. The recommended amount is adjusted for interest according to the timing of contributions during the year.

Entry Age Normal Cost Method - Under this method, the normal cost is the sum of the individual normal costs for all active participants. For an active participant, the normal cost is the participant's normal cost accrual rate, multiplied by the participant's current compensation.

- (a) The normal cost accrual rate equals:
  - (i) the present value of future benefits for the participant, determined as of the participant's entry age, divided by
  - (ii) the present value of the compensation expected to be paid to the participant for each year of the participant's anticipated future service, determined as of the participant's entry age.
- (b) In calculating the present value of future compensation, the salary scale is applied both retrospectively and prospectively to estimate compensation in years prior to and subsequent to the valuation year based on the compensation used for the valuation.
- (c) The accrued liability is the sum of the individual accrued liabilities for all participants and beneficiaries. A participant's accrued liability equals the present value, at the participant's attained age, of future benefits less the present value at the participant's attained age of the individual normal costs payable in the future. A beneficiary's accrued liability equals the present value, at the beneficiary's attained age, of future benefits. The unfunded accrued liability equals the total accrued liability less the actuarial value of assets.
- (d) Under this method, the entry age used for each active participant is the participant's age at the time he or she would have commenced participation if the plan had always been in existence under current terms, or the age as of which he or she first earns service credits for purposes of benefit accrual under the current terms of the plan.

## DISCUSSION OF RISK

ASOP No. 51, Assessment and Disclosure of Risk Associated with Measuring Pension Obligations and Determining Pension Plan Contributions, states that the actuary should identify risks that, in the actuary's professional judgment, may reasonably be anticipated to significantly affect the plan's future financial condition.

Throughout this report, actuarial results are determined under various assumption scenarios. These results are based on the premise that all future plan experience will align with the plan's actuarial assumptions; however, there is no guarantee that actual plan experience will align with the plan's assumptions. Whenever possible, the recommended assumptions in this report reflect conservatism to allow for some margin of unfavorable future plan experience. However, it is still possible that actual plan experience will differ from anticipated experience in an unfavorable manner that will negatively impact the plan's funded position.

Below are examples of ways in which plan experience can deviate from assumptions and the potential impact of that deviation. Typically, this results in an actuarial gain or loss representing the current-year financial impact on the plan's unfunded liability of the experience differing from assumptions; this gain or loss is amortized over a period of time determined by the plan's amortization method. When assumptions are selected that adequately reflect plan experience, gains and losses typically offset one another in the long term, resulting in a relatively low impact on the plan's contribution requirements associated with plan experience. When assumptions are too optimistic, losses can accumulate over time and the plan's amortization payment could potentially grow to an unmanageable level.

- Investment Return: When the rate of return on the Actuarial Value of Assets falls short of the assumption, this produces a loss representing assumed investment earnings that were not realized. Further, it is unlikely that the plan will experience a scenario that matches the assumed return in each year as capital markets can be volatile from year to year. Therefore, contribution amounts can vary in the future.
- Salary Increases: When a plan participant experiences a salary increase that was greater than assumed, this produces a loss representing the cost of an increase in anticipated plan benefits for the participant as compared to the previous year. The total gain or loss associated with salary increases for the plan is the sum of salary gains and losses for all active participants.
- Payroll Growth: The plan's payroll growth assumption, if one is used, causes a predictable annual increase in the plan's amortization payment in order to produce an amortization payment that remains constant as a percentage of payroll if all assumptions are realized. If payroll does not increase according to the plan's payroll growth assumption, the plan's amortization payment can increase significantly as a percentage of payroll even if all assumptions other than the payroll growth assumption are realized.
- Demographic Assumptions: Actuarial results take into account various potential events that could happen to a plan participant, such as retirement, termination, disability, and death. Each of these potential events is assigned a liability based on the likelihood of the event and the financial consequence of the event for the plan. Accordingly, actuarial liabilities reflect a blend of financial consequences associated with various possible outcomes (such as retirement at one of various possible ages). Once the outcome is known (e.g. the participant retires) the liability is adjusted to reflect the known outcome. This adjustment produces a gain or loss depending on whether the outcome was more or less favorable than other outcomes that could have occurred.

- Contribution risk: Risks associated with the items outlined above will inherently create varying liabilities and assets resulting in volatility in contributions. Actuarial losses on assets and liabilities will lead to higher contribution amounts, while actuarial gains on assets and liabilities will lead to lower contribution amounts.

### Impact of Plan Maturity on Risk

For newer pension plans, most of the participants and associated liabilities are related to active members who have not yet reached retirement age. As pension plans continue in operation and active members reach retirement ages, liabilities begin to shift from being primarily related to active members to being shared amongst active and retired members. Plan maturity is a measure of the extent to which this shift has occurred. It is important to understand that plan maturity can have an impact on risk tolerance and the overall risk characteristics of the plan. For example, plans with a large amount of retired liability do not have as long of a time horizon to recover from losses (such as losses on investments due to lower than expected investment returns) as plans where the majority of the liability is attributable to active members. For this reason, less tolerance for investment risk may be warranted for highly mature plans with a substantial inactive liability. Similarly, mature plans paying substantial retirement benefits resulting in a small positive or net negative cash flow can be more sensitive to near term investment volatility, particularly if the size of the fund is shrinking, which can result in less assets being available for investment in the market.

To assist with determining the maturity of the plan, we have provided some relevant metrics in the table following titled “Plan Maturity Measures and Other Risk Metrics”. Highlights of this information are discussed below:

- The Support Ratio, determined as the ratio of active to inactive members, has stayed about the same from May 1, 2016 to January 1, 2019, indicating that the plan's maturity level has not significantly changed during the period.
- The Accrued Liability Ratio, determined as the ratio of the Inactive Accrued Liability, which is generally the accrued liability associated with those receiving payments, to the Total Accrued Liability, is 59.2%. With a plan of this maturity, losses due to lower than expected investment returns or demographic factors will need to be made up for over a shorter time horizon than would be needed for a less mature plan.
- The Funded Ratio, determined as the ratio of the Actuarial Value of Assets to the Total Accrued Liability, has decreased from 65.8% on May 1, 2016 to 59.3% on January 1, 2019, due partially to the shortfall in Actual Sponsor Contributions. If the contribution deficit continues, the funded ratio will continue to decrease even if all assumptions are met. In addition, the fund has not earned the 6.75% assumed rate of return during this time period, leading to a decrease in funded status.

It is important to note that the actuary has identified the risks above as the most significant risks based on the characteristics of the plan and the nature of the project, however, it is not an exhaustive list of potential risks that could be considered. Additional advanced modelling, as well as the identification of additional risks, can be provided at the request of the reader.

PLAN MATURITY MEASURES AND OTHER RISK METRICS

	<u>5/1/2016</u>	<u>1/1/2017</u>	<u>1/1/2018</u>	<u>1/1/2019</u>
<u>Support Ratio</u>				
Total Actives	19	19	18	19
Total Inactives	19	19	19	19
Actives / Inactives	100.0%	100.0%	94.7%	100.0%
 <u>Asset Volatility Ratio</u>				
Market Value of Assets (MVA)	10,160,860	10,384,619	11,278,351	10,474,205
Total Annual Payroll	1,349,905	1,400,253	1,398,738	1,504,844
MVA / Total Annual Payroll	752.7%	741.6%	806.3%	696.0%
 <u>Accrued Liability (AL) Ratio</u>				
Inactive Accrued Liability	11,316,598	11,159,417	11,164,638	11,557,073
Total Accrued Liability	17,036,327	17,600,771	18,010,948	19,531,999
Inactive AL / Total AL	66.4%	63.4%	62.0%	59.2%
 <u>Funded Ratio</u>				
Actuarial Value of Assets (AVA)	11,215,215	11,329,782	11,491,222	11,586,805
Total Accrued Liability	17,036,327	17,600,771	18,010,948	19,531,999
AVA / Total Accrued Liability	65.8%	64.4%	63.8%	59.3%

STATEMENT OF FIDUCIARY NET POSITION  
December 31, 2018

<u>ASSETS</u>	MARKET VALUE
Cash and Cash Equivalents:	
Checking Account	440,793
Total Cash and Equivalents	440,793
Receivables:	
Accrued Past Due Interest	36,826
Total Receivable	36,826
Investments:	
Corporate Bonds	1,897,732
U.S. Gov't and Agency Obligations	1,789,146
Stocks	3,008,035
Mutual Funds	3,301,673
Total Investments	9,996,586
Total Assets	10,474,205
<u>LIABILITIES</u>	
Total Liabilities	0
Net Assets:	
Active and Retired Members' Equity	10,474,205
NET POSITION RESTRICTED FOR PENSIONS	10,474,205
TOTAL LIABILITIES AND NET ASSETS	10,474,205

STATEMENT OF CHANGES IN FIDUCIARY NET POSITION  
 FOR THE YEAR ENDED December 31, 2018  
 Market Value Basis

ADDITIONS

Contributions:		
Member	142,282	
City	556,593	
Total Contributions		698,875
Investment Income:		
Net Increase in Fair Value of Investments		(912,029)
Interest & Dividends		335,792
Less Investment Expense <sup>1</sup>		(25,828)
Net Investment Income		(602,065)
Total Additions		96,810

DEDUCTIONS

Distributions to Members:		
Benefit Payments	879,106	
Refund of Contributions/Transfers	0	
Total Distributions		879,106
Administrative Expenses		21,850
Total Deductions		900,956
Net Increase in Net Position		(804,146)

NET POSITION RESTRICTED FOR PENSIONS

Beginning of the Year	11,278,351
End of the Year	10,474,205

<sup>1</sup> Investment Related expenses include investment advisory, custodial and performance monitoring fees.

ACTUARIAL ASSET VALUATION

December 31, 2018

Actuarial Assets for funding purposes are developed by recognizing the total actuarial investment gain or loss for each Plan Year over a five year period. In the first year, 20% of the gain or loss is recognized. In the second year 40%, in the third year 60%, in the fourth year 80%, and in the fifth year 100% of the gain or loss is recognized. The actuarial investment gain or loss is defined as the actual return on investments minus the actuarial assumed investment return. Actuarial Assets shall not be less than 80% nor greater than 120% of the Market Value of Assets.

Plan Year Ending	Gain/(Loss)	Gains/(Losses) Not Yet Recognized				
		Amounts Not Yet Recognized by Valuation Year				
		2019	2020	2021	2022	2023
4/30/2015	(240,118)	(16,008)	0	0	0	0
4/30/2016	(1,000,146)	(266,706)	(66,676)	0	0	0
12/31/2016	(126,760)	(50,704)	(25,352)	0	0	0
12/31/2017	510,073	306,044	204,029	102,015	0	0
12/31/2018	(1,356,533)	(1,085,226)	(813,920)	(542,613)	(271,307)	0
Total		(1,112,600)	(701,919)	(440,598)	(271,307)	0

Development of Investment Gain/Loss

Market Value of Assets, 12/31/2017	11,278,351
Contributions Less Benefit Payments & Administrative Expenses	(202,081)
Expected Investment Earnings <sup>1</sup>	754,468
Actual Net Investment Earnings	<u>(602,065)</u>
2018 Actuarial Investment Gain/(Loss)	(1,356,533)

<sup>1</sup> Expected Investment Earnings = 6.75% x (11,278,351 + 0.5 x -202,081)

Development of Actuarial Value of Assets

Market Value of Assets, 12/31/2018	10,474,205
(Gains)/Losses Not Yet Recognized	<u>1,112,600</u>
Actuarial Value of Assets, 12/31/2018	11,586,805
(A) 12/31/2017 Actuarial Assets:	11,491,222
(I) Net Investment Income:	
1. Interest and Dividends	335,792
2. Realized Gains (Losses)	0
3. Change in Actuarial Value	(12,300)
4. Investment Expenses	<u>(25,828)</u>
Total	297,664
(B) 12/31/2018 Actuarial Assets:	11,586,805
Actuarial Asset Rate of Return = (2 x I) / (A + B - I):	2.61%
Market Value of Assets Rate of Return:	-5.39%
12/31/2018 Limited Actuarial Assets:	11,586,805
Actuarial Gain/(Loss) due to Investment Return (Actuarial Asset Basis)	(471,173)

CHANGES IN NET ASSETS AVAILABLE FOR BENEFITS  
December 31, 2018  
Actuarial Asset Basis

INCOME		
Contributions:		
Member	142,282	
City	556,593	
Total Contributions		698,875
Earnings from Investments		
Interest & Dividends	335,792	
Change in Actuarial Value	(12,300)	
Total Earnings and Investment Gains		323,492
EXPENSES		
Administrative Expenses:		
Investment Related <sup>1</sup>	25,828	
Other	21,850	
Total Administrative Expenses		47,678
Distributions to Members:		
Benefit Payments	879,106	
Total Distributions		879,106
Change in Net Assets for the Year		95,583
Net Assets Beginning of the Year		11,491,222
Net Assets End of the Year <sup>2</sup>		11,586,805

<sup>1</sup> Investment Related expenses include investment advisory, custodial and performance monitoring fees.

<sup>2</sup> Net Assets may be limited for actuarial consideration.

STATISTICAL DATA

	<u>5/1/2016</u>	<u>1/1/2017</u>	<u>1/1/2018</u>	<u>1/1/2019</u>
<u>Actives - Tier 1</u>				
Number	16	16	15	16
Average Current Age	40.0	40.7	42.3	42.7
Average Age at Employment	27.5	27.3	27.7	27.8
Average Past Service	12.5	13.4	14.6	14.9
Average Annual Salary	\$73,972	\$76,808	\$80,870	\$82,021
<u>Actives - Tier 2</u>				
Number	3	3	3	3
Average Current Age	31.0	31.6	32.6	37.1
Average Age at Employment	28.7	28.6	28.6	33.4
Average Past Service	2.3	3.0	4.0	3.7
Average Annual Salary	\$55,453	\$57,110	\$61,894	\$64,168
<u>Service Retirees</u>				
Number	11	11	11	11
Average Current Age	66.1	66.7	67.7	68.7
Average Annual Benefit	\$50,109	\$50,109	\$51,475	\$52,882
<u>Beneficiaries</u>				
Number	7	7	7	7
Average Current Age	65.8	67.3	68.3	69.3
Average Annual Benefit	\$42,487	\$42,487	\$42,487	\$42,487
<u>Disability Retirees</u>				
Number	0	0	0	0
Average Current Age	N/A	N/A	N/A	N/A
Average Annual Benefit	N/A	N/A	N/A	N/A
<u>Terminated Vested</u>				
Number	1	1	1	1
Average Current Age	39.9	40.6	41.6	42.6
Average Annual Benefit <sup>1</sup>	N/A	N/A	N/A	N/A

<sup>1</sup> Average Annual Benefit for Terminated Vested members reflects the benefit for members entitled to a future annual benefit from the plan.

## AGE AND SERVICE DISTRIBUTION

### PAST SERVICE

AGE	0	1	2	3	4	5-9	10-14	15-19	20-24	25-29	30+	Total
15 - 19	0	0	0	0	0	0	0	0	0	0	0	0
20 - 24	0	0	0	0	0	0	0	0	0	0	0	0
25 - 29	0	0	0	0	0	0	0	0	0	0	0	0
30 - 34	0	0	0	1	1	0	2	0	0	0	0	4
35 - 39	0	0	0	0	0	1	2	0	0	0	0	3
40 - 44	1	0	0	0	0	0	1	1	1	0	0	4
45 - 49	0	0	0	0	0	0	1	5	1	0	0	7
50 - 54	0	0	0	0	0	0	0	0	1	0	0	1
55 - 59	0	0	0	0	0	0	0	0	0	0	0	0
60 - 64	0	0	0	0	0	0	0	0	0	0	0	0
65+	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>6</b>	<b>6</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>19</b>

## VALUATION PARTICIPANT RECONCILIATION

### 1. Active lives

a. Number in prior valuation 1/1/2018	18
b. Terminations	
i. Vested (partial or full) with deferred benefits	0
ii. Non-vested or full lump sum distribution received	0
iii. Transferred service to other fund	0
c. Deaths	
i. Beneficiary receiving benefits	0
ii. No future benefits payable	0
d. Disabled	0
e. Retired	<u>0</u>
f. Continuing participants	18
g. New entrants	<u>1</u>
h. Total active life participants in valuation	19

### 2. Non-Active lives (including beneficiaries receiving benefits)

	Service Retirees, Vested Receiving <u>Benefits</u>	Receiving Death <u>Benefits</u>	Receiving Disability <u>Benefits</u>	Vested <u>Deferred</u>	<u>Total</u>
a. Number prior valuation	11	7	0	1	19
Retired	0	0	0	0	0
Vested Deferred	0	0	0	0	0
Death, With Survivor	0	0	0	0	0
Death, No Survivor	0	0	0	0	0
Disabled	0	0	0	0	0
Refund of Contributions	0	0	0	0	0
Rehires	0	0	0	0	0
Expired Annuities	0	0	0	0	0
Data Corrections	0	0	0	0	0
Hired/Termed in Same Year	0	0	0	0	0
b. Number current valuation	11	7	0	1	19

## SUMMARY OF CURRENT PLAN

### Article 3 Pension Fund

The Plan is established and administered as prescribed by “Article 3. Police Pension Fund – Municipalities 500,000 and Under” of the Illinois Pension Code.

### Plan Administration

The Plan is a single employer defined benefit pension plan administered by a Board of Trustees comprised of:

- a) Two members appointed by the Municipality,
- b) Two active Members of the Police Department elected by the Membership, and
- c) One retired Member of the Police Department elected by the Membership.

### Credited Service

Complete years of service as a sworn police officer employed by the Municipality.

### Normal Retirement

Date

**Tier 1:** Age 50 and 20 years of Credited Service.

**Tier 2:** Age 55 with 10 years of Credited Service.

Benefit

**Tier 1:** 50% of annual salary attached to rank on last day of service plus 2.50% of annual salary for each year of service over 20 years, up to a maximum of 75% of salary. The minimum monthly benefit is \$1,000 per month.

**Tier 2:** 2.50% per year of service times the average salary for the eight consecutive years prior to retirement times the number of years of service, up to a maximum of 75% of average salary. The minimum monthly benefit is \$1,000 per month.

Form of Benefit

**Tier 1:** For married retirees, an annuity payable for the life of the Member; upon the death of the member, 100% of the Member’s benefit payable to the spouse until death. For unmarried retirees, the normal form is a Single Life Annuity.

**Tier 2:** Same as above, but with 66 2/3% of benefit continued to spouse.

### Early Retirement

Date

**Tier 1:** Age 60 and 8 years of Credited Service.

**Tier 2:** Age 50 with 10 years of Credited Service.

Benefit

**Tier 1:** Normal Retirement benefit with no minimum.

**Tier 2:** Normal Retirement benefit, reduced 6% each year before age 55, with no minimum benefit.

Form of Benefit

Same as Normal Retirement.

Disability Benefit

Eligibility Total and permanent as determined by the Board of Trustees.

Benefit Amount A maximum of:

- a.) 65% of salary attached to the rank held by Member on last day of service, and;
- b.) The monthly retirement pension that the Member is entitled to receive if he or she retired immediately.

For non-service connected disabilities, a benefit of 50% of salary attached to rank held by Member on last day of service.

Cost-of-Living Adjustment

**Tier 1:**

*Retirees:* An annual increase equal to 3.00% per year after age 55. Those that retire prior to age 55 receive an increase of 1/12 of 3.00% for each full month since benefit commencement upon reaching age 55.

*Disabled Retirees:* An annual increase equal to 3.00% per year of the original benefit amount beginning at age 60. Those that become disabled prior to age 60 receive an increase of 3.00% of the original benefit amount for each year since benefit commencement upon reaching age 60.

**Tier 2:** An annual increase each January 1 equal to 3.00% per year or one-half of the annual unadjusted percentage increase in the consumer price index-u for the 12 months ending with the September preceding each November 1, whichever is less, of the original pension after the attainment of age 60 or first anniversary of pension start date whichever is later.

Pre-Retirement Death Benefit

Service Incurred 100% of salary attached to rank held by Member on last day of service.

Non-Service Incurred A maximum of:

- a.) 50% of salary attached to the rank held by Member on last day of service, and;
- b.) The monthly retirement pension earned by the deceased Member at the time of death, regardless of whether death occurs before or after age 50.

For non-service deaths with less than 10 years of service, a refund of member contributions is provided.

Vesting (Termination)

Vesting Service Requirement	<b>Tier 1:</b> 8 years. <b>Tier 2:</b> 10 years.
Non-Vested Benefit	Refund of Member Contributions.
Vested Benefit	Either the termination benefit, payable upon reaching age 60 (55 for Tier 2), provided contributions are not withdrawn, or a refund of member contributions. The termination benefit is 2.50% of annual salary held in the year prior to termination (8-year final average salary for Tier 2) times creditable service.

Contributions

Employee	9.91% of Salary.
Municipality	Remaining amount necessary for payment of Normal (current year's) Cost and amortization of the accrued past service liability.