Dallas Police and Fire Pension System Supplemental Plan

Actuarial Valuation and Review as of January 1, 2019

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October 8, 2019

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Dear Board Members:

We are pleased to submit this Actuarial Valuation and Review as of January 1, 2019. It summarizes the actuarial data used in the valuation, analyzes the preceding year's experience, and establishes the funding requirements for fiscal 2019.

This report was prepared in accordance with generally accepted actuarial principles and practices at the request of the Board to assist in administering the Supplemental Plan. The census information on which our calculations were based was prepared by the System's IT Department, under the supervision of John Holt, and the financial information was provided by the System's Finance Department. That assistance is gratefully acknowledged.

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 this 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 Plan. Since the members in this Supplemental Plan are a subject of the Dallas Police and Fire Pension System Combined Pension Plan, and since the assests are invested together, the same assumptions are used for both. Changes impacting the larger plan will impact this one as well.

We look forward to reviewing this report at your next meeting and to answering any questions.

Sincerely,

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

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Dallas Police and Fire Pension System Supplemental Plan Actuarial Valuation and Review as of January 1, 2019

Section 1: Actuarial Valuation Summary

Purpose and Basis

This report was prepared by Segal Consulting to present a valuation of the Plan as of January 1, 2019. The valuation was performed to determine whether the assets and contributions are sufficient to provide the prescribed benefits and to provide information for required disclosures under Governmental Accounting Standards Board (GASB) Statement No. 67. The measurements shown in this actuarial valuation may not be applicable for other purposes. In particular, the measures herein are not necessarily appropriate for assessing the sufficiency of Plan assets to cover the estimated cost of settling the Plan's benefit obligations. 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.

The contribution requirements presented in this report are based on:

- The benefit provisions of the Pension Plan, as administered by the Board;
- The characteristics of covered active members, inactive vested members, inactive members due a refund of contributions and retired members and beneficiaries as of December 31, 2018, provided by the System's IT Department;
- The assets of the Plan as of December 31, 2018, provided by the System's Finance Department;
- Economic assumptions regarding future salary increases and investment earnings; and
- Other actuarial assumptions regarding employee terminations, retirement, death, etc.

The majority of assumptions and methods used to value the Plan were set by the Board based on recommendations made by Segal Consulting following a five-year experience study for the period ended December 31, 2014. Additional assumption changes were made as part of the plan changes effective September 1, 2017. The salary scale assumption was updated in this valuation to reflect the 2016 Meet and Confer Agreement, as amended in 2018. In addition, the COLA assumption is updated annually. Assumptions are reviewed and updated annually as needed.

Certain disclosure information required by GASB statement No.68 as of September 30, 2019 for the City is provided in a separate report.

Significant Issues

1. Segal Consulting ("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. The funding policy for the Plan reflects an open, or rolling, ten-year amortization period. A ten-year period is relatively short compared to other systems, and as long as the City pays the contribution on this basis, the normal cost, interest, and a portion of the principal will be covered. Therefore, the unfunded liability is expected to decrease if all assumptions are met. However, the unfunded liability will never be paid off in full because the remaining principal is re-amortized annually. Thus, the funded ratio should approach 100% over time, but full funding will not occur unless there are experience gains from other sources.
2. The City's actuarially determined contribution for the upcoming year is $1,881,055, a decrease of $392,526 from last year. The contribution is based on a rolling ten-year level percent-of-payroll amortization of the unfunded actuarial accrued liability.
3. Actual City contributions made during the fiscal year ending December 31, 2018 were $1,979,285, or 87.06% of the actuarially determined contribution. In the prior fiscal year, actual City contributions were $2,077,059, or 99.54% of the prior year actuarially determined contribution.
4. The funded ratio (the ratio of assets to actuarial accrued liability) is 57.56%, compared to the prior year funded ratio of 51.53%. This ratio is one measure of funding status, and its history is a measure of funding progress. These measurements are not necessarily appropriate for assessing the sufficiency of Plan assets to cover the estimated cost of settling the Plan's benefit obligation or the need for or the amount of future contributions.
5. The rate of return on the market value of assets was 6.99% for the 2018 plan year. This resulted in an actuarial loss of $44,736, or 0.14% of actuarial accrued liability, when measured against the assumed rate of return of 7.25%. Given the low fixed income interest rate environment, we advise the Board to continue to monitor actual and anticipated investment returns relative to the assumed long-term rate of return on investments of 7.25%.
6. The net experience gain from sources other than investment experience was 8.59% of the actuarial accrued liability, prior to reflection of assumption changes. This gain was primarily due to participants whose DROP annuities are now being paid out of the 415 Excess Plan.
7. The unfunded actuarial accrued liability is $13,506,880, a decrease of $3,238,073 since the prior year. This significant decrease is primarily the result of the experience gains noted above.

8. The following actual assumptions were changed with this valuation:
   - The salary scale assumption was updated to reflect the 2016 Meet and Confer Agreement, as amended in 2018.
   - The ad-hoc COLA assumption was updated to begin October 1, 2050 based on the updated projection of the unfunded actuarial accrued liability; last year, the COLA was assumed to begin October 1, 2053.

   As a result of these assumption changes, the total normal cost decreased by $4,912 and the actuarial accrued liability increased by $28,444. The total impact was a decrease in the actuarially determined contribution of $2,502.
9. Since the actuarial valuation results are dependent on a given set of assumptions, there is a risk that emerging results may differ significantly as actual experience proves to be different from the assumptions.
10. This report constitutes an actuarial valuation for the purpose of determining the City's actuarially determined contribution (ADC) under the Plan's funding policy and measuring the progress of that funding policy. The information contained in Section 5 provides the accounting information for Governmental Accounting Standards Board (GASB) Statement No. 67, for inclusion in the plan and employer's financial statements as of December 31, 2018. The Net Pension Liability (NPL) and Pension Expense under GASB Statement No. 68, for inclusion in the plan and employer's financial statements as of September 30, 2019, will be provided separately.
11. The Net Pension Liability (NPL) is equal to the difference between the Total Pension Liability (TPL) and the Plan's fiduciary net position (equal to the market value of assets). The NPL as of December 31, 2018 is $13.5 million, a decrease from $15.9 million as of December 31, 2017.
12. This actuarial report as of January 1, 2019 is based on financial and demographic data as of December 31, 2018. Changes subsequent to that date are not reflected and will affect future actuarial costs of the plan.

Summary of Key Valuation Results

		2019	2018
Contributions for plan year beginning January 1, adjusted for timing:	• Total actuarially determined contribution (City and Member)	$1,973,154	$2,407,912
	• Expected member contributions	92,099	134,331
	• City's actuarially determined contribution (ADC)	1,881,055	2,273,581
	• Actual City contributions	--	1,979,285
	• Amortization period for determination of ADC	10 years	10 years
Actuarial accrued liability for plan year beginning January 1:	• Retired members and beneficiaries	$28,621,814	$30,668,245
	• Inactive vested participants	81,227	11,861
	• Active participants	3,068,054	3,870,000
	• Inactive participants due a refund of employee contributions	53,678	- -
	• Total	31,824,773	34,550,106
	• Employer normal cost including administrative expenses	190,672	179,963
Assets for plan year beginning January 1:	• Actuarial (market) value of assets	$18,317,893	$17,805,153
Funded status for plan year beginning January 1:	• Unfunded actuarial accrued liability	$13,506,880	$16,744,953
	• Funded percentage	57.56%	51.53%
Key assumptions:	• Net investment return	7.25%	7.25%
	• Inflation rate/payroll increase	2.75%	2.75%
GASB information	• Discount rate	7.25%	7.25%
	• Total pension liability	$31,830,733	$33,670,180
	• Plan fiduciary net position	18,317,893	17,805,153
	• Net pension liability	13,512,840	15,865,027
	• Plan fiduciary net position as a percentage of total pension liability	57.55%	52.88%
Demographic data for plan year beginning January 1	• Number of retired members and beneficiaries	138	140
	• Number of inactive vested members	2	1
	• Number of active members	39	44
	• Number of inactive participants entitled to a refund of employee contributions	1	- -
	• Total supplemental computation pay[1]	$658,757	$960,825
	• Average supplemental computation pay	16,891	21,837

[1] Total computation pay, or valuation pay, is the active members' actual payroll for the preceding year, increased by the salary scale applicable for each member to account for their anticipated salary increases in the upcoming year.

Important Information About Actuarial Valuations

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

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 a plan is based on data provided to the actuary by the System. 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 market value of assets as of the valuation date, as provided by the System.
Actuarial assumptions	In preparing an actuarial valuation, Segal projects the benefits to be paid to existing plan participants 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 participant 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 plan'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, which does not mean that the previous assumptions were unreasonable.

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 plan'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 plan will be determined by the actual benefits and expenses paid and the actual investment experience of the plan.
- Actuarial results in this report are not rounded, but that does not imply precision.
- If the Board is aware of any event or trend that was not considered in this 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 plan's provisions, but they may be subject to alternative interpretations. The Board should look to their other advisors for expertise in these areas.

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

Member Data

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

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

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

MEMBER POPULATION: 2009 – 2018

Year Ended December 31	Active Members	Inactive Vested Members[1]	Retired Members and Beneficiaries	Total Non-Actives	Ratio of Non-Actives to Actives
2009	40	- -	112	112	2.80
2010	39	- -	113	113	2.90
2011	37	- -	113	113	3.05
2012	39	- -	120	120	3.08
2013	38	- -	120	120	3.16
2014	39	- -	122	122	3.13
2015	45	- -	124	124	2.76
2016	47	- -	128	128	2.72
2017	44	1	140	141	3.20
2018	39	2	138	140	3.59

[1]Excludes non-vested terminated members due a refund of employee contributions

Active Members

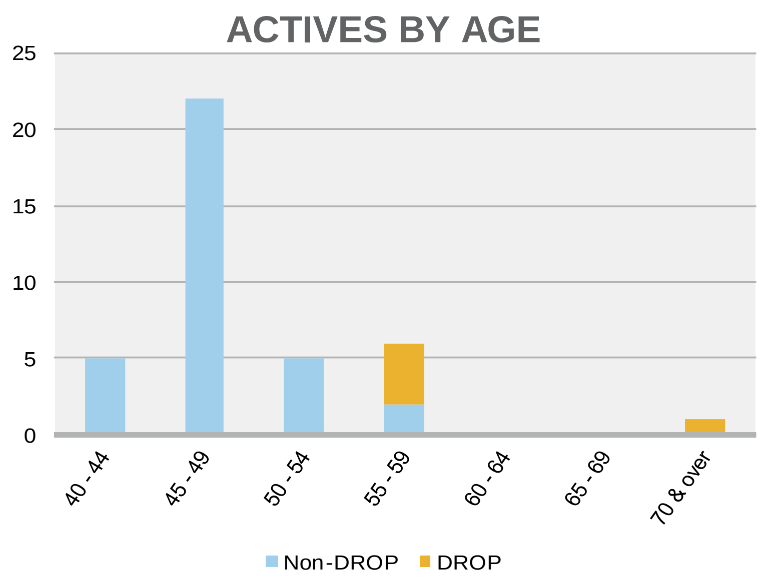
Plan costs are affected by the age, years of service and supplemental computation of active members. In this year's valuation, there were 39 active members with an average age of 49.8, average years of service of 24.2 years and average supplemental computation pay of $16,891. The 44 active members in the prior valuation had an average age of 49.8, average service of 24.3 years and average supplemental computation pay of $21,837.

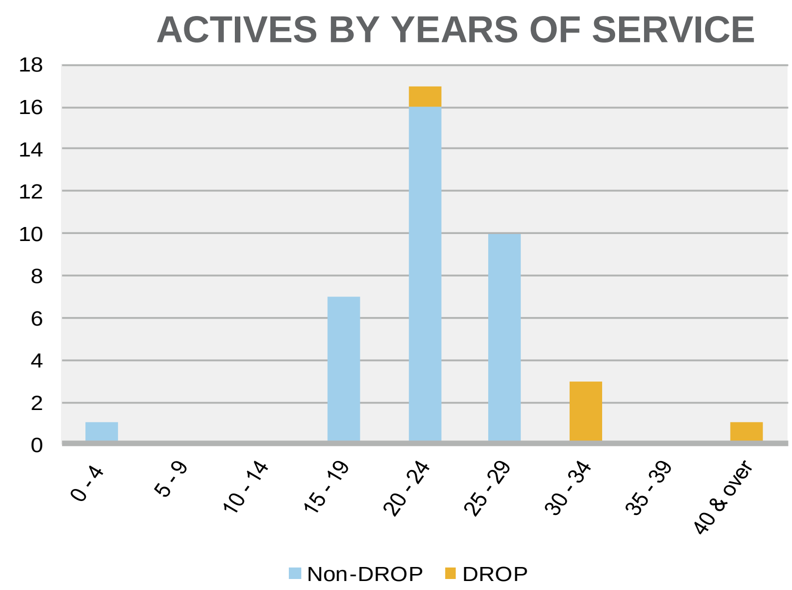
The number of active Firefighters decreased from 17 to 16 as of December 31, 2018. The average of this group is 49.2, the average years of service is 23.8 and the average supplemental computation pay is $11,082. Last year, these averages were 49.8, 22.8 and $24,106, respectively.

The number of active Police Officers decreased from 27 to 23 as of December 31, 2018. The average of this group is 50.2, the average years of service is 24.5 and the average supplemental computation pay is $20,932. Last year, these averages were 49.7, 25.2 and $20,408, respectively.

The number of active participants participating in DROP decreased from 7 at the end of 2017 to 5 at the end of 2018.

Distribution of Active Participants as of December 31, 2018





Inactive Members

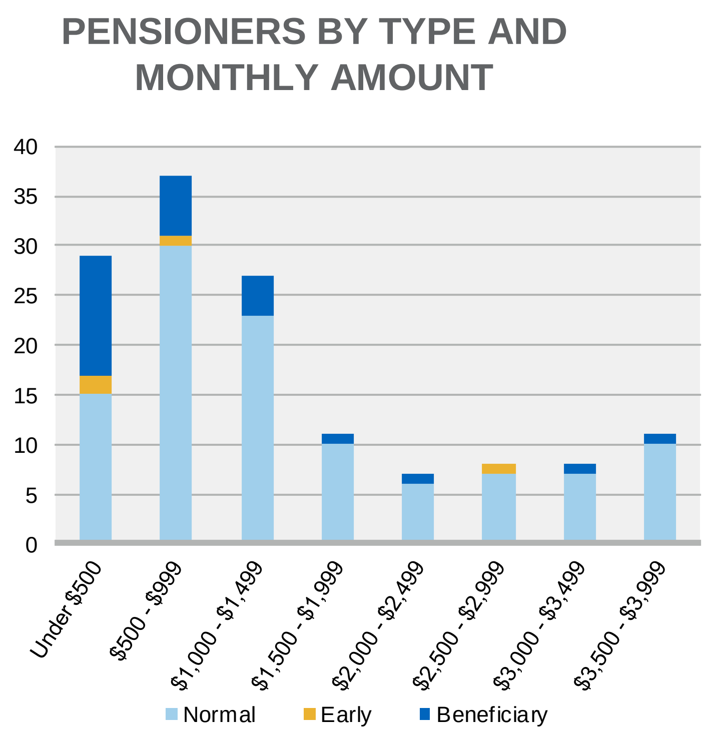
In this year's valuation, there were two members with a vested right to a deferred or immediate vested benefit, compared to one last year. In addition, there was one member entitled to a return of their employee contributions, compared to none last year.

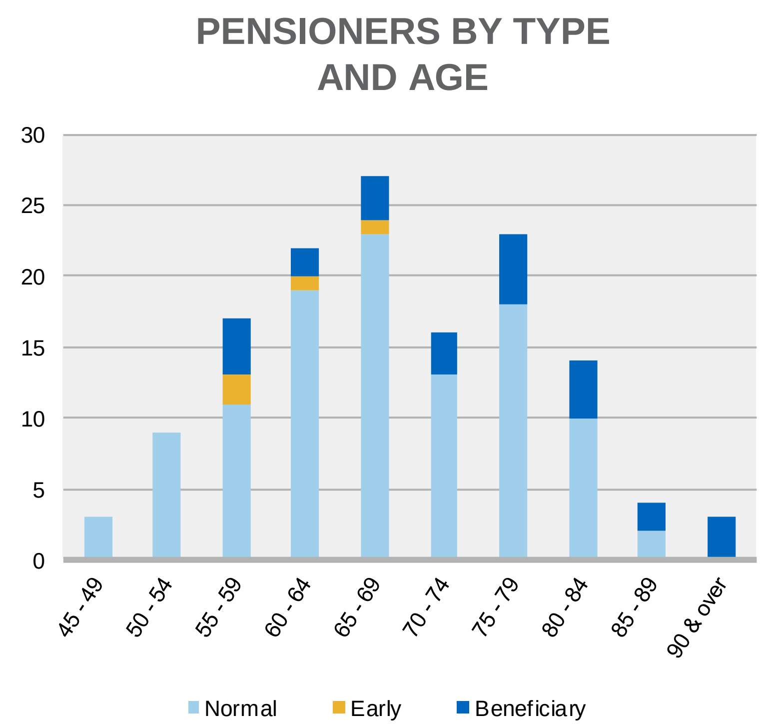
Retired Members and Beneficiaries

As of December 31, 2018, 112 retired members and 26 beneficiaries were receiving total monthly benefits of $204,514. For comparison, in the previous valuation, there were 110 retired members and 30 beneficiaries receiving monthly benefits of $205,026.

As of December 31, 2018, the average monthly benefit for retired members is $1,482, compared to $1,464 in the previous valuation. The average age for retired members is 68.7 in the current valuation, compared with 69.5 in the prior valuation.

Distribution of Pensioners as of December 31, 2018





Historical Plan Population

The chart below demonstrates the progression of the active population over the last ten years. The chart also shows the growth among the retired population over the same time period.

MEMBER DATA STATISTICS: 2009 – 2018

	Active Participants			Retired Members and Beneficiaries		
Year Ended December 31	Count	Average Age	Average Service	Count	Average Age	Average Monthly Amount
2009	40	51.7	26.6	112	--	$1,264
2010	39	52.1	27.5	113	--	1,331
2011	37	53.1	29.0	113	--	1,384
2012	39	49.9	24.2	120	--	1,381
2013	38	49.6	26.0	120	--	1,402
2014	39	50.2	26.6	122	--	1,406
2015	45	50.5	26.7	124	69.3	1,452
2016	47	50.1	26.4	128	69.5	1,548
2017	44	49.8	24.3	140	69.5	1,464
2018	39	49.8	24.2	138	68.7	1,482

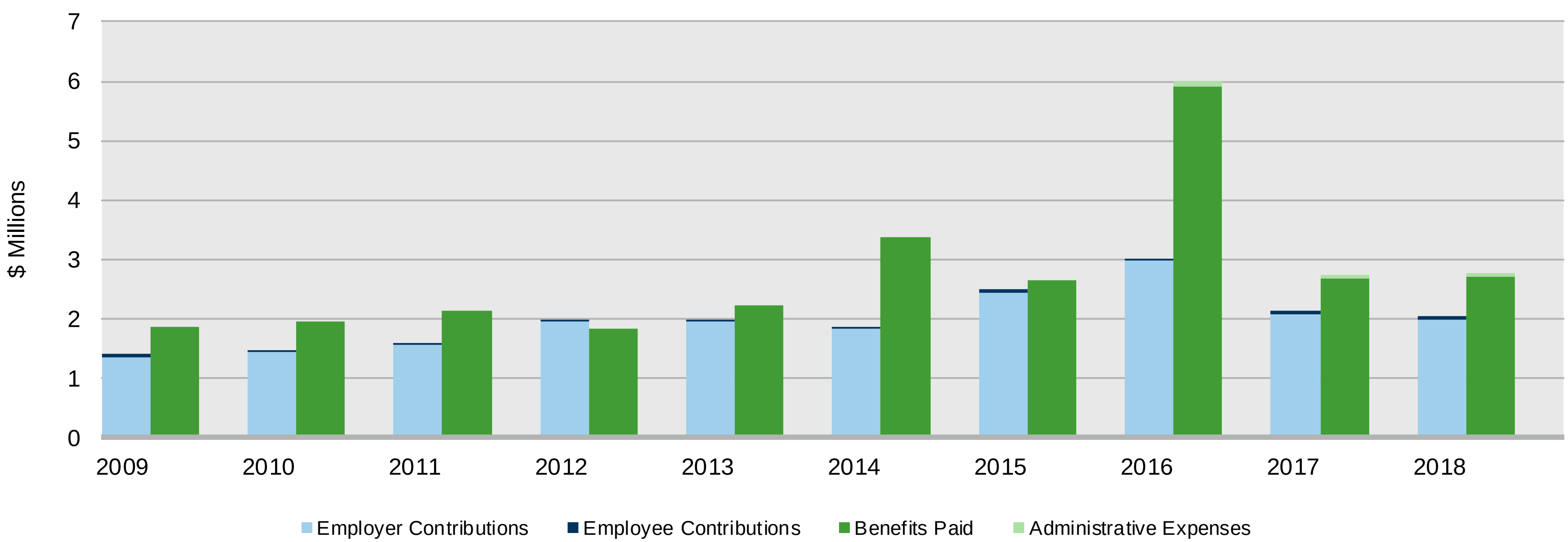
Financial Information

Retirement plan funding anticipates that, over the long term, both contributions (less administrative expenses) and investment earnings (less investment fees) will be needed to cover benefit payments. Retirement plan assets change as a result of the net impact of these income and expense components.

Benefit payments in 2016 totaled $5.9 million, of which $3.8 million were DROP lump sum payments. This was a one-time event, as members reacted to pending changes in the plan provisions. DROP balances have been annuitized, resulting in more stable projected benefit payment levels going forward.

Additional financial information, including a summary of transactions for the valuation year, is presented in *Section 3, Exhibits D, E* and *F*.

COMPARISON OF CONTRIBUTIONS MADE WITH BENEFITS AND EXPENSES PAID FOR YEARS ENDED DECEMBER 31, 2009 – 2018



It is desirable to have level and predictable plan costs from one year to the next. However, the Board has approved an asset valuation method that uses market value. Under this valuation method, the full value of market fluctuation is recognized in a single year and, as a result, the asset value and the plan costs are relatively volatile. The Supplemental Plan is small compared to the combined Pension Plan, and City contributions to this plan are less than 2% of the total amount that the City contributes to the System. Thus, some volatility can be withstood. The Board has the option to adopt an asset "smoothing" method in the future should they decide the current method (using market value) is producing undesirable fluctuations.

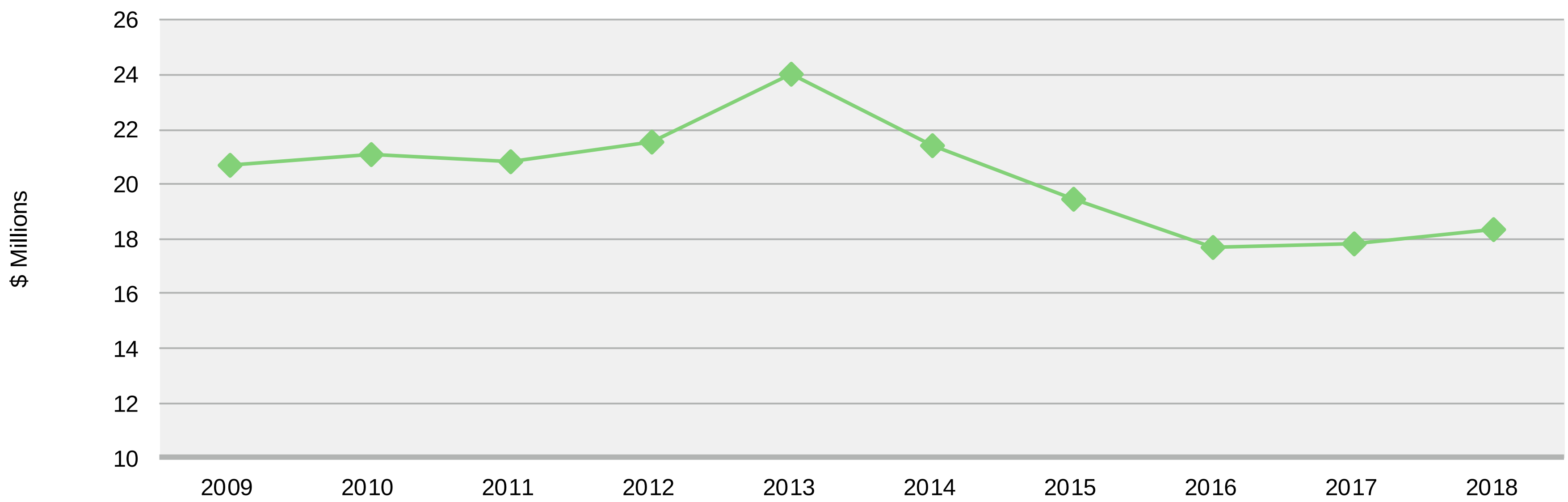
DETERMINATION OF ACTUARIAL VALUE OF ASSETS FOR YEAR ENDED DECEMBER 31, 2018

1.	Actuarial value of assets = Market value of assets	$18,317,893

The actuarial value (equal to the market value of assets) is a representation of the Plan's financial status. The actuarial asset value is significant because the Plan'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.

The decline in asset values from 2013 to 2015 was primarily the result of significant write-downs in the system's asset holdings. The decline from 2015 to 2016 reflects the unusually large number of DROP payments made in 2016.

ACTUARIAL VALUE OF ASSETS (EQUAL TO MARKET VALUE OF ASSETS) AS OF DECEMBER 31, 2009 – 2018



Actuarial Experience

To calculate any actuarially determined contribution, 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), any contribution requirement will decrease from the previous year. On the other hand, any 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 gain is $2,685,930, which includes $2,730,666 in gains from non-investment sources that were partially offset by $44,736 from investment losses. The net experience variation from individual sources other than investments was 8.6% of the actuarial accrued liability. A discussion of the major components of the actuarial experience is on the following pages.

ACTUARIAL EXPERIENCE FOR YEAR ENDED DECEMBER 31, 2018

1	Net gain from investments[1]	-$44,736
2	Net gain from administrative expenses	12,804
3	Net gain from other experience	2,717,862
4	Net experience gain: 1 + 2 + 3	$2,685,930

[1]Details on next page.

Investment Experience

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 Plan's investment policy.

For valuation purposes, the assumed rate of return on the actuarial value of assets is 7.25%. The actual rate of return on an actuarial basis for the 2018 plan year was 6.99%. Since the actual return for the year was less than the assumed return, the Plan experienced an actuarial loss during the year ended December 31, 2018 with regard to its investments.

INVESTMENT EXPERIENCE

		Year Ended December 31, 2018	Year Ended December 31, 2017
		Actuarial (Market) Value	Actuarial (Market) Value
1	Net investment income	$1,220,482	$735,567
2	Average value of assets	17,451,282	17,366,563
3	Rate of return: 1 ÷ 2	6.99%	4.24%
4	Assumed rate of return	7.25%	7.25%
5	Expected investment income: 2 x 4	1,265,218	1,259,076
6	Actuarial gain/(loss): 1 – 5	-$44,736	-$523,509

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 for the last 11 years, including averages over select time periods.

INVESTMENT RETURN – ACTUARIAL VALUE OF ASSETS (EQUAL TO MARKET VALUE OF ASSETS): 2008 - 2018

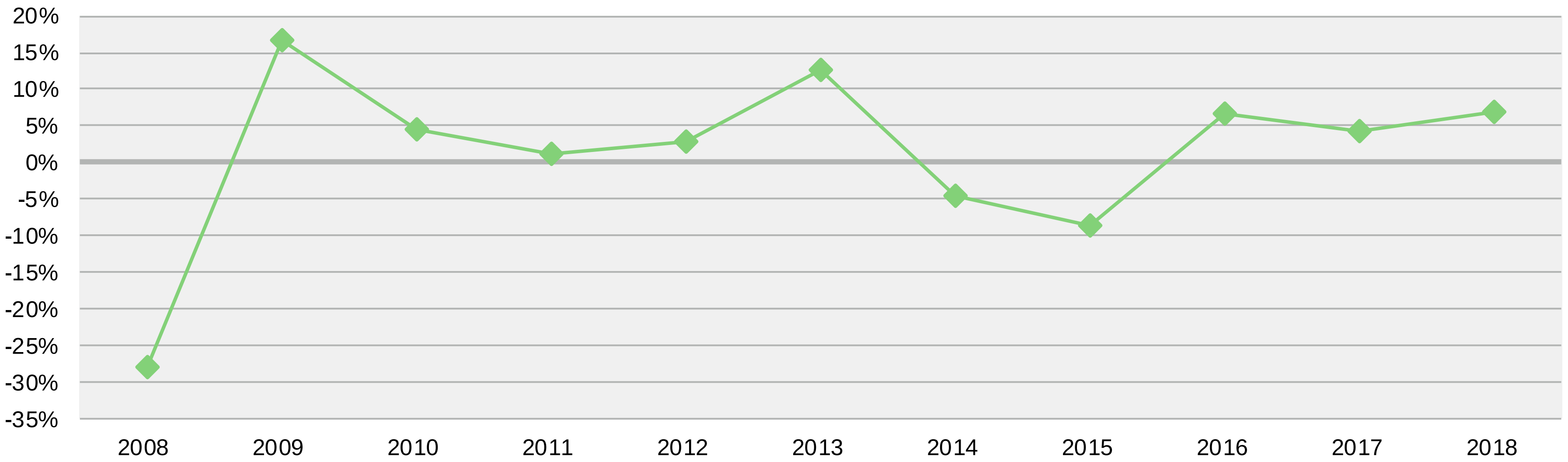
	Actuarial Market Value Investment Return	
Year Ended December 31	Amount[1]	Percent
2008	-$7,039,494	-27.92%
2009	2,985,884	16.66
2010	924,634	4.52
2011	252,054	1.21
2012	578,432	2.77
2013	2,712,000	12.65
2014	-1,091,374	-4.69
2015	-1,828,695	-8.56
2016	1,176,323	6.55
2017	735,567	4.24
2018	1,220,482	6.99
Total	$625,813	
	Most recent five-year average return	0.22%
	Most recent ten-year average return	3.85%
	Most recent 11-year average return	0.28%

Note: Each year's yield is weighted by the average asset value in that year.

[1] Returns for years 2014 and 2015 include significant write-downs of the Plan's assets.

The actuarial value of assets has been equal to market value for the last 11 years. This combined with recent asset write-downs, has resulted in relatively volatile actuarial rates of return and pension plan cost.

ACTUARIAL RATES OF RETURN (EQUAL TO MARKET VALUE RATES OF RETURN) FOR YEARS ENDED DECEMBER 31, 2008 - 2018



Administrative Expenses

Administrative expenses for the year ended December 31, 2018 totaled $52,636 compared to the assumption of $65,000, payable monthly. This resulted in a gain of $12,804 for the year, when adjusted for timing. We have maintained the assumption of $65,000 for the current year.

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 participants,
- retirement experience (earlier or later than projected),
- mortality (more or fewer deaths than projected),
- the number of disability retirements (more or fewer than projected), and
- salary increases (greater or smaller than projected).

The net gain from this other experience for the year ended December 31, 2018 amounted to $2,717,862, which is 8.5% of the actuarial accrued liability. The primary reason for the gain this year is the fact that five retired members now have a significant portion of their benefit being paid from the 415 Excess Plan rather than from this Plan. The excess nature of the Supplemental Plan lends itself to potentially significant gains and losses in a single year.

Changes in the Actuarial Accrued Liability

The actuarial accrued liability as of January 1, 2019 is $31,824,773, a decrease of $2,725,333, or 7.9%, from the actuarial accrued liability as of the prior valuation date. The liability is expected to grow each year with normal cost and interest, and to decline due to benefit payments made. Additional fluctuations can occur due to actual experience that differs from expected (as discussed in the previous subsection). The liability also includes the impact of actuarial assumption and plan provision changes, if any.

Actuarial Assumptions

- The assumption changes reflected in this report are:
  - The salary scale was updated to reflect the 2016 Meet and Confer Agreement, as amended in 2018.
  - The COLA is assumed to begin October 1, 2050 based on the year the System is projected to be 70% funded on a market value basis; last year's assumption was that the COLA would begin October 1, 2053.
- These changes increased the actuarial accrued liability by 0.09% and decreased the normal cost by 2.22%.
- Details on actuarial assumptions and methods are in *Section 4, Exhibit I*.

Plan Provisions

- There were no changes in plan provisions since the prior valuation.
- A summary of plan provisions is in *Section 4, Exhibit II*.

Development of Unfunded Actuarial Accrued Liability

DEVELOPMENT FOR YEAR ENDED DECEMBER 31, 2018

1	Unfunded actuarial accrued liability at beginning of year		$16,744,953
2	Normal cost at beginning of year, including administrative expenses		309,674
3	Total contributions		-2,053,165
4	Interest		
	• For whole year on 1 + 2	$1,236,460	
	• For half year on 3	-73,556	
	Total interest		1,162,904
5	Expected unfunded actuarial accrued liability		$16,164,366
6	Changes due to:		
	• Net experience gain	-$2,685,930	
	• Assumptions	28,444	
	Total changes		-$2,657,486
7	Unfunded actuarial accrued liability at end of year		$13,506,880

Actuarially Determined Contribution

The actuarially determined contribution is equal to the employer normal cost payment and a payment on the unfunded actuarial accrued liability. As of January 1, 2019, the actuarially determined contribution is $1,881,055.

The funding policy used to calculate the actuarially determined contribution based on an open amortization period of ten years. The payment on the unfunded actuarial accrued liability accounts for nearly 90% of the City's recommended contribution.

The contribution requirement as of January 1, 2019 are based on the data previously described, the actuarial assumptions and Plan provisions described in *Section 4*, including all changes affecting future costs adopted at the time of the actuarial valuation, actuarial gains and losses, and changes in the actuarial assumptions.

ACTUARIALLY DETERMINED CONTRIBUTION FOR YEAR BEGINNING JANUARY 1

		2019	2018
1.	Total normal cost	$216,839	$246,909
2.	Assumed administrative expenses	62,765	62,765
3.	Expected member contributions	-88,932	-129,711
4.	Employer normal cost: (1) + (2) - (3)	$190,672	$179,963
5.	Actuarial accrued liability	$31,824,773	$34,550,106
6.	Actuarial value of assets	18,317,893	17,805,153
7.	Unfunded actuarial accrued liability: (5) - (6)	$13,506,880	$16,744,953
8.	Payment on unfunded actuarial accrued liability, 10 year amortization	1,625,692	2,015,427
9.	Adjustment for timing[1]	64,691	78,190
10.	Actuarially determined employer contribution: (4) + (8) + (9)	1,881,055	$2,273,581
11.	Total supplemental computation pay[2]	$658,757	$960,825

[1] Actuarially determined contributions are assumed to be paid at the middle of every year.
[2] Total computation pay, or valuation pay, is the active members' actual payroll for all preceding year, increased by the salary scale applicable for each member to account for their anticipated salary increases in the upcoming year.

Reconciliation of Actuarially Determined Contribution

The chart below details the changes in the actuarially determined contribution from the prior valuation to the current year's valuation.

RECONCILIATION OF ACTUARIALLY DETERMINED CONTRIBUTION FROM JANUARY 1, 2018 TO JANUARY 1, 2019

	Amount
Actuarially Determined Contribution as of January 1, 2018	$2,273,581
• Effect of expected change in amortization payment due to payroll growth	57,398
• Effect of maintaining 10-year amortization period	-149,743
• Effect of change in actuarial assumptions	-2,503
• Effect of contributions less than actuarially determined contribution	49,816
• Effect of investment loss	6,073
• Effect of other gains and losses on accrued liability	-370,706
• Net effect of other changes, including composition and number of participants	17,139
Total change	-$392,526
Actuarially Determined Contribution as of January 1, 2019	$1,881,055

History of Employer Contributions

A history of the most recent years of contributions is shown below.

HISTORY OF EMPLOYER CONTRIBUTIONS: 2011 – 2019

Fiscal Year Ended December 31	City's Actuarially Determined Contribution (ADC)[1]	Actual Employer Contribution	Percent Contributed
2011	$1,543,717	$1,543,717	100.00%
2012	1,954,022	1,954,022	100.00%
2013	1,935,588	1,935,588	100.00%
2014	1,817,136	1,817,136	100.00%
2015	2,442,790	2,442,790	100.00%
2016	3,063,584	3,063,584	100.00%
2017	2,086,639	2,077,059	99.54%
2018	2,273,581	1,979,285	87.06%
2019	1,881,055	N/A	N/A

[1]Prior to 2015, this amount was the Annual Required Contribution (ARC)

The contribution deficiencies for calendar years 2017 and 2018 represent contributions directed to the Excess Benefit Plan and Trust.

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.

The contributions of this Plan can fluctuate significantly from year to year, due to its nature as an excess pay plan and the fact the covered population is small. The assets are likely to fluctuate considerably from year to year as well, since there is no smoothing method in place. As mentioned previously, City contributions to this Plan are less than 2% of the total amount that the City contributes to the System, and therefore some volatility can be withstood.

This report does not contain a detailed analysis of the potential range of future measurements; the combined Plan valuation report includes a discussion of risks that may affect the System, and as a result, this Plan. Upon request, a more detailed assessment of the risks can be provided to enable a better understanding of the risks inherent in the Plan. This assessment may include scenario testing, sensitivity testing, stress testing and stochastic modeling.

GFOA Solvency Test

The Actuarial Accrued Liability represents the present value of benefits earned, calculated using the plan's actuarial cost method. The Actuarial Value of Assets reflects the financial resources available to liquidate the liability. The portion of the liability covered by assets reflects the extent to which accumulated plan assets are sufficient to pay future benefits, and is shown for liabilities associated with employee contributions, pensioner liabilities, and other liabilities.

The Government Finance Officers Association (GFOA) recommends that the funding policy aim to achieve a funded ratio of 100 percent. As noted previously, the use of a rolling ten-year amortization period means the unfunded actuarial accrued liability is projected to decline each year, but will never truly be paid off.

GFOA SOLVENCY TEST AS OF DECEMBER 31

	2019	2018
Actuarial accrued liability (AAL)		
• Active member contributions	$202,006	$170,398
• Retirees and beneficiaries	28,621,814	30,668,245
• Active and inactive members (employer-financed)	3,000,953	3,711,463
Total	$31,824,773	$34,550,106
Actuarial value of assets	$18,317,893	$17,805,153
Cumulative portion of AAL covered		
• Active member contributions	100.00%	100.00%
• Retirees and beneficiaries	63.29%	57.50%
• Active and inactive members (employer-financed)	0.00%	0.00%

Actuarial Balance Sheet

An overview of the Plan's funding is given by an Actuarial Balance Sheet. In this approach, first the amount and timing of all future payments that will be made by the Plan for current participants is determined. Then these payments are discounted at the valuation interest rate to the date of the valuation, thereby determining the present value, referred to as the "liability" of the Plan.

Second, this liability is compared to the assets. The "assets" for this purpose include the net amount of assets already accumulated by the Plan, the present value of future member contributions, the present value of future employer normal cost contributions, and the present value of future employer amortization payments for the unfunded actuarial accrued liability.

ACTUARIAL BALANCE SHEET

	Year Ended	
	December 31, 2018	December 31, 2017
Liabilities		
• Present value of benefits for retired members and beneficiaries (non-DROP)	$24,325,849	$23,148,147
• Present value of benefits for retired members and beneficiaries (DROP)	4,295,965	7,520,098
• Present value of benefits for inactive vested members	134,905	11,861
• Present value of benefits for active members	4,069,700	4,925,368
Total liabilities	**$32,826,419**	**$35,605,474**
Assets		
• Total valuation value of assets	$18,317,893	$17,805,153
• Present value of future contributions by members	423,947	547,393
• Present value of future employer contributions for:		
» Entry age cost	577,699	507,975
» Unfunded actuarial accrued liability	13,506,880	16,744,953
Total of current and future assets	**$32,826,419**	**$35,605,474**

EXHIBIT A – TABLE OF PLAN COVERAGE

Category	Year Ended December 31		Change From Prior Year
	2018	2017	
Total active members in valuation:			
• Number	39	44	-11.4%
• Average age	49.8	49.8	0.0
• Average years of service	24.2	24.3	-0.1
• Total covered pay	$658,757	$960,825	-31.4%
• Average supplemental computation pay	16,891	21,837	-22.6%
• Accumulated contribution balances	202,006	170,398	18.5%
• Total active vested members	38	42	-9.5%
Active members (excluding DROP):			
• Number	34	37	-8.1%
• Average age	48.3	47.8	0.5
• Average years of service	22.6	21.8	0.8
• Total covered pay	$598,297	$856,055	-30.1%
• Average supplemental computation pay	17,597	23,137	-23.9%
Active members (DROP):			
• Number	5	7	-28.6%
• Average age	59.9	60.3	-0.4
• Average years of service	35.3	37.1	-1.8
• Total covered pay	$60,461	$104,770	-42.3%
• Average supplemental computation pay	12,092	14,967	-19.2%
• DROP account balances	174,807	589,633	-70.4%
Inactive vested members:			
• Number	2	1	100.0%
• Average age	47.3	47.0	0.3
• Average monthly benefit	$319	$95	235.8%

Terminated members due a refund of contributions:			
• Number	1	0	N/A
• Accumulated contribution balance	$53,678	N/A	N/A
Retired members:			
• Number in pay status	112	110	1.8%
• Average age	67.3	67.9	-0.6
• Average monthly benefit	$1,615	$1,633	-1.1%
Beneficiaries:			
• Number in pay status	26	30	-13.3%
• Average age	74.7	75.3	-0.6
• Average monthly benefit	$910	$846	7.6%

EXHIBIT B-1 – TOTAL MEMBERS IN ACTIVE SERVICE AS OF DECEMBER 31, 2018
BY AGE, YEARS OF SERVICE, AND AVERAGE SUPPLEMENTAL COMPUTATION PAY

		Years of Service								
Age	Total	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 & over
40 - 44	5	- -	- -	- -	4	1	- -	- -	- -	- -
	$4,518	- -	- -	- -	$5,308	$1,357	- -	- -	- -	- -
45 - 49	22	1	- -	- -	2	14	5	- -	- -	- -
	19,721	$245,633	- -	- -	8,449	9,260	$8,340	- -	- -	- -
50 - 54	5	- -	- -	- -	- -	1	4	- -	- -	- -
	19,880	- -	- -	- -	- -	15,592	20,952	- -	- -	- -
55 - 59	6	- -	- -	- -	1	1	1	3	- -	- -
	17,151	- -	- -	- -	6,050	- -	36,396	$20,154	- -	- -
60 - 64	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
65 - 69	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
70 & over	1	- -	- -	- -	- -	- -	- -	- -	- -	1
	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Total	39	1	- -	- -	7	17	10	3	- -	1
	$16,891	$245,633	- -	- -	$6,311	$8,623	$16,190	$20,154	- -	- -

Note: Chart includes members eligible for supplemental benefits based on prior supplemental computation pay but with zero excess supplemental computation pay in 2018.

EXHIBIT B-2 – POLICE MEMBERS IN ACTIVE SERVICE AS OF DECEMBER 31, 2018 BY AGE, YEARS OF SERVICE, AND AVERAGE SUPPLEMENTAL COMPUTATION PAY

		Years of Service								
Age	Total	0-4	5-9	10-14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 & over
40 - 44	2	- -	- -	- -	1	1	- -	- -	- -	- -
	$8,110	- -	- -	- -	$14,864	$1,357	- -	- -	- -	- -
45 - 49	13	1	- -	- -	1	8	3	- -	- -	- -
	25,748	$245,633	- -	- -	2,833	7,615	$8,444	- -	- -	- -
50 - 54	4	- -	- -	- -	- -	1	3	- -	- -	- -
	21,092	- -	- -	- -	- -	15,592	22,926	- -	- -	- -
55 - 59	3	- -	- -	- -	- -	1	1	1	- -	- -
	15,380	- -	- -	- -	- -	- -	36,396	$9,744	- -	- -
60 - 64	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
65 - 69	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
70 & over	1	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Total	23	1	- -	- -	2	11	7	1	- -	- -
	$20,932	$245,633	- -	- -	$8,848	$7,079	$18,644	$9,744	- -	- -

Note: Chart includes members eligible for supplemental benefits based on prior supplemental computation pay but with zero excess supplemental computation pay in 2018.

EXHIBIT B-3 – FIRE MEMBERS IN ACTIVE SERVICE AS OF DECEMBER 31, 2018
BY AGE, YEARS OF SERVICE, AND AVERAGE SUPPLEMENTAL COMPUTATION PAY

		Years of Service								
Age	Total	0-4	5-9	10-14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 & over
40 - 44	3	- -	- -	- -	3	- -	- -	- -	- -	- -
	$2,123	- -	- -	- -	$2,123	- -	- -	- -	- -	- -
45 - 49	9	- -	- -	- -	1	6	2	- -	- -	- -
	11,016	- -	- -	- -	14,064	$11,452	$8,184	- -	- -	- -
50 - 54	1	- -	- -	- -	- -	- -	1	- -	- -	- -
	15,029	- -	- -	- -	- -	- -	15,029	- -	- -	- -
55 - 59	3	- -	- -	- -	1	- -	- -	2	- -	- -
	18,922	- -	- -	- -	6,050	- -	- -	$25,358	- -	- -
60 - 64	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
65 - 69	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
70 & over	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Total	16	- -	- -	- -	5	6	3	2	- -	- -
	$11,082	- -	- -	- -	$5,296	$11,452	$10,466	$25,358	- -	- -

Note: Chart includes members eligible for supplemental benefits based on prior supplemental computation pay but with zero excess supplemental computation pay in 2018.

EXHIBIT C – RECONCILIATION OF MEMBER DATA

	Active Members	Inactive Vested Members[1]	Retired Members	Beneficiaries	Total
Number as of January 1, 2018	**44**	**1**	**110**	**30**	**185**
• New members	5	N/A	N/A	N/A	5
• Terminations – with vested rights	-1	1	0	0	0
• Terminations – without vested rights	-1	N/A	N/A	N/A	-1
• Retirements	-7	0	7	N/A	0
• Return to work	0	0	0	N/A	0
• Deceased	0	0	-5	-5	-10
• New beneficiaries	0	0	0	2	2
• Lump sum payouts[2]	-1	0	0	0	-1
• Certain period expired	N/A	N/A	0	-1	-1
• Data adjustments	0	0	0	0	0
Number as of January 1, 2019	**39**	**2**	**112**	**26**	**179**

[1] Excludes terminated members due a refund of contributions.
[2] Members who terminated and requested a refund of member contributions.

EXHIBIT D – SUMMARY STATEMENT OF INCOME AND EXPENSES ON A MARKET VALUE BASIS

	Year Ended December 31, 2018		Year Ended December 31, 2017	
Net assets at market value at the beginning of the year[1]		$17,805,153		$17,663,539
Contribution income:				
• Employer contributions	$1,979,285		$2,077,059	
• Member contributions	73,880		66,095	
• Less administrative expenses	-52,636		-68,528	
Net contribution income		*$2,000,529*		*$2,074,626*
Investment income:				
• Interest, dividends and other income	$406,350		$280,393	
• Asset appreciation	886,129		535,462	
• Less interest expense	0		-10,839	
• Adjustment to beginning of year value[2]	0		6,788	
• Less investment fees	-71,997		-76,449	
Net investment income		*$1,220,482*		*$735,567*
Total income available for benefits		**$3,221,011**		**$2,810,193**
Less benefit payments:				
• Benefits paid to members	-$2,707,773		-$2,668,579	
• Refunds to members	-498		0	
Net benefit payments		*-$2,708,271*		*-$2,668,579*
Change in reserve for future benefits		**$512,740**		**$141,614**
Net assets at market value at the end of the year		**$18,317,893**		**$17,805,153**

[1] Based on preliminary unaudited assets

[2] Adjustment from draft financial statement used in the prior valuation to the final audited statements.

EXHIBIT E – SUMMARY STATEMENT OF PLAN ASSETS

	December 31, 2018		December 31, 2017	
Cash equivalents and prepaid expenses		$449,481		$999,789
Invested securities lending collateral		182,979		102,083
Capital assets		111,152		106,608
Total accounts receivable		351,588		269,604
Investments:				
• Real assets	$6,242,503		$6,730,133	
• Equity securities	3,879,822		3,948,680	
• Private equity	2,784,586		1,865,692	
• Alternative investments	0		1,217,387	
• Fixed income securities	4,590,396		2,755,315	
• Other	365,312		203,850	
Total investments at market value		$17,862,619		$16,721,057
Total assets		$18,957,819		$18,199,341
Total liabilities		-639,926		-394,188
Net assets at market value		**$18,317,893**		**$17,805,153**
Net assets at actuarial value		**$18,317,893**		**$17,805,153**

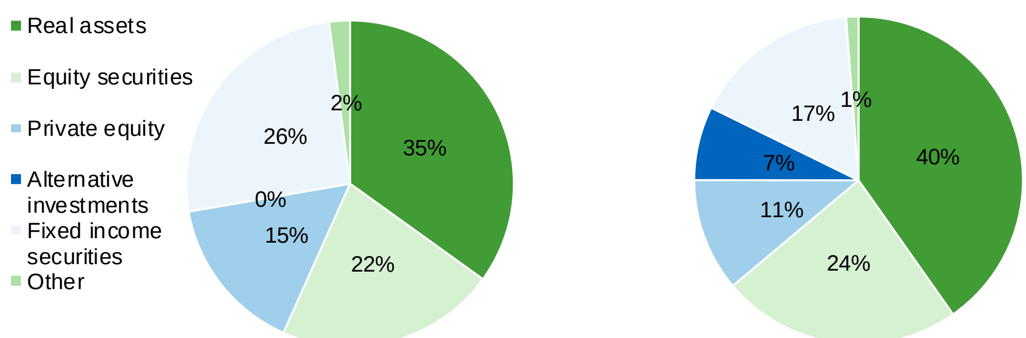


EXHIBIT F – DEVELOPMENT OF THE FUND THROUGH DECEMBER 31, 2018

Year Ended December 31	Employer Contributions	Member Contributions	Net Investment Return[1]	Administrative Expenses[2]	Benefit Payments	Actuarial (Market) Value of Assets at Year-End
2009	$1,343,717	$56,261	$2,985,884	$0	$1,844,905	$20,680,752
2010	1,443,717	34,355	924,634	0	1,964,422	21,119,036
2011	1,543,717	26,791	252,054	0	2,119,029	20,822,569
2012	1,954,022	26,688	578,432	0	1,819,155	21,562,556
2013	1,935,588	34,039	2,712,000	0	2,207,338	24,036,845
2014	1,817,136	49,104	-1,091,374	0	3,372,841	21,438,870
2015	2,442,790	43,358	-1,828,695	0	2,639,617	19,456,706
2016[3]	2,985,478	34,612	1,176,323	78,047	5,911,533	17,663,539
2017	2,077,059	66,095	735,567	68,528	2,668,579	17,805,153
2018	1,979,285	73,880	1,220,482	52,636	2,708,271	18,317,893

[1] Net of investment fees and administrative expenses prior to 2016. Returns for years ended 2008-2014 were estimated based on prior actuarial valuations.

[2] Administrative expenses were subtracted from net investment return prior to the 2016 valuation.

[3] Unaudited assets were used for the January 1, 2017 actuarial valuation. When the audited financial statements were competed, there were updates to the employer contribution and investment return amounts, resulting in a revision to the market value of assets. Thus, the amounts shown above as of December 31, 2016 differ from the System's and City's Comprehensive Annual Financial Reports. The differences are immaterial to the System's actuarial results.

EXHIBIT G – DEFINITION 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 and Beneficiaries:	The single-sum value of lifetime benefits to existing pensioners and beneficiaries. This sum takes account of life expectancies appropriate to the ages of the annuitants 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 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., 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.
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):	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: 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, withdrawal, etc.) on which the payment is conditioned, and Discounted according to an assumed rate (or rates) of return to reflect the time value of money.

Actuarial Present Value of Future Plan Benefits:	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 provide sufficient assets to pay all projected benefits and expenses when due.
Actuarial Valuation:	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).
Actuarial Value of Assets (AVA):	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.
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 Plan'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:	The estimates upon which the cost of the Fund is calculated, including: Investment return - the rate of investment yield that the Fund will earn over the long-term future; Mortality rates - the death rates of employees and pensioners; life expectancy is based on these rates; Retirement rates - the rate or probability of retirement at a given age or service; Disability rates – the probability of disability retirement at a given age; Withdrawal rates - the rates at which employees of various ages are expected to leave employment for reasons other than death, disability, or retirement; Salary increase rates - the rates of salary increase due to inflation and productivity growth.
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 withdrawal.
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 employer. 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 market value of assets (MVA), rather than the AVA.
GASB 67 and GASB 68:	Governmental Accounting Standards Board (GASB) 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.
Plan Fiduciary Net Position:	Market value of assets.
Total Pension Liability (TPL):	The actuarial 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.

EXHIBIT I – ACTUARIAL ASSUMPTIONS AND ACTUARIAL COST METHOD

Rationale for Assumptions:

The information and analysis used by the Board in selecting each assumption that has a significant effect on this actuarial valuation is shown in the Experience Study Report for the five-year period ended December 31, 2014, with subsequent changes related to the plan changes and modifications based on the 2016 Meet and Confer Agreement, as amended in 2018.

Net Investment Return:

7.25%

The net investment return assumption was chosen by the System’s Board of Trustees, with input from the actuary. This assumption is a long-term estimate derived from historical data, current and recent market expectations, and professional judgment. As part of the analysis, a building block approach was used that reflects inflation expectations and anticipated risk premiums for each of the portfolio’s asset classes, as well as the System’s target asset allocation.

Salary Scale:

Years of Service	Rate (%)					
	Officers & Officer Trainees	Corporals, Drivers & Senior Officers	Sergeants, Lieutenants, Captains & Majors	Deputy Chiefs	Assistant Chiefs	Chiefs
1	0.00	0.00	5.00	5.00	5.00	5.00
2	0.00	2.75	5.00	5.00	5.00	5.00
3	2.75	5.00	5.00	5.00	5.00	5.00
4-6	5.00	5.00	5.00	5.00	5.00	5.00
7	5.00	5.00	5.00	2.00	5.00	5.00
8	2.00	5.00	2.00	2.00	5.00	5.00
9-11	2.00	2.00	2.00	2.00	5.00	5.00
12-14	2.00	2.00	2.00	2.00	2.00	5.00
15+	2.00	2.00	2.00	2.00	2.00	2.00

Rates above include allowance for inflation of 2.75% per year.

The salary scale assumption is based on the City’s pay plan, along with analysis completed in conjunction with an Experience Study Report for the five-year period ended December 31, 2014 and the 2016 Meet and Confer Agreement, as amended in 2018.

	Between October 1, 2018 and September 30, 2019, members received or are scheduled to receive two step raises based on their anniversary date. Members with anniversary dates between October 1 and December 31 had their two step raises accounted for in the valuation payroll. Members with anniversary dates between January 1 and September 30 are assumed to receive two step raises in 2019.
Payroll Growth:	2.75%, used to amortize the unfunded actuarial accrued liability as a level percentage of payroll.
Cost-of-Living Adjustments:	
Prior to October 1, 2050	0.00%
Beginning October 1, 2050	2.00%, on original benefit
	The assumption for the year the COLA begins will be updated on an annual basis and set equal to the year the System is projected to be 70% funded on a market value basis after the COLA is reflected.
Administrative Expenses:	$65,000 per year, payable monthly (equivalent to $62,765 at the beginning of the year) or 1% of computation pay, if greater
Mortality Rates:	
Pre-retirement	RP-2014 Employee Mortality Table, set back two years for males, projected generationally using Scale MP-2015
Healthy annuitants	RP-2014 Blue Collar Healthy Annuitant Mortality Table, set forward two years for females, projected generationally using Scale MP-2015
Disabled annuitants	RP-2014 Disabled Retiree Mortality Table, set back three years for males and females, projected generationally using Scale MP-2015
	The tables above, with adjustments as shown, reasonably reflect the mortality experience of the System as of the measurement date. The mortality tables were then generationally projected using Scale MP-2015 to anticipate future mortality improvement.

Mortality and Disability Rates Before Retirement:

	Rate (%)			
	Mortality[1]		Disability[2]	
Age	Male	Female	Male	Female
20	0.03	0.02	0.010	0.010
25	0.05	0.02	0.015	0.015
30	0.04	0.02	0.020	0.020
35	0.05	0.03	0.025	0.025
40	0.06	0.04	0.030	0.030
45	0.08	0.07	0.035	0.035
50	0.14	0.11	0.040	0.040

55	0.23	0.17	--	--
60	0.38	0.24	--	--
65	1.26	1.05	--	--
70	1.97	1.70	--	--
75	3.15	2.81	--	--
80	5.19	4.71	--	--

[1]Rates shown do not include generational projection; rates beginning at age 65 are for healthy annuitants
[2]100% of disabilities are assumed to be service-related

Withdrawal Rates Before Retirement:

Years of Service	Rate (%)	
	Police	Fire
0	14.00	5.50
1	6.00	4.50
2	5.50	4.00
3	5.00	3.50
4	4.50	3.00
5	4.00	1.50

Years of Service	Rate (%)	
	Police	Fire
6	3.50	1.00
7	3.00	0.75
8	2.50	0.50
9	2.00	0.50
10-37	1.00	0.50
38 & over	0.00	0.00

Retirement Rates:

DROP Active Members

Police	
Age	Rate (%)
Under 50	1.00
50-52	3.00
53-54	7.00
55	15.00
56-57	20.00
58-64	25.00
65-66	50.00
67	100.00

Fire	
Age	Rate (%)
Under 50	0.75
50-54	2.50
55-58	12.00
59-64	25.00
65-66	30.00
67	100.00

Non-DROP Active Members

Members hired prior to March 1, 2011 with less than 20 years of service as of September 1, 2017		Members hired prior to March 1, 2011 with at least 20 years of service as of September 1, 2017		Members hired on or after March 1, 2011	
Age	Rate (%)	Age	Rate (%)	Age	Rate (%)
Under 50	0	Under 50	1	Under 50	1
50	10	50	20	50	5
51	5	51	10	51	5
52	5	52	10	52	5
53	5	53	10	53	5
54	5	54	20	54	10
55	15	55	40	55	20
56	10	56	50	56	30
57	5	57	50	57	40
58	60	58	60	58	50
59	50	59	60	59	50
60	50	60	60	60	50
61	50	61	60	61	50
62 & over	100	62 & over	100	62 & over	100

100% retirement rate once benefit multiplier hits 90% maximum.

Weighted Average Retirement Age: Age 55, determined as follows: The weighted average retirement age for each participant is calculated as the sum of the product of each potential current or future retirement age times the probability of surviving from current age to that age and then retiring at that age, assuming no other decrements. The overall weighted retirement age is the average of the individual retirement ages based on all the active participants included in the January 1, 2019 actuarial valuation.

Retirement Rates for Inactive Vested Participants: Terminated vested members who terminated prior to September 1, 2017 are assumed to retire at age 50

Terminated vested members who terminated on or after September 1, 2017 are assumed to retire at age 58

DROP Utilization: No members are assumed to elect to enter the DROP

Interest on DROP Accounts:	3.00% on account balances as of September 1, 2017, payable upon retirement 0.0% on account balances accrued after September 1, 2017
DROP Payment Period:	Based on expected lifetime as of the later of September 1, 2017 or retirement date. Expected lifetime determined based on an 85% male/15% female blend of the current healthy annuitant mortality tables.
DROP Annuitization Interest:	3.00%. Based on United States Department of Commerce Daily Treasury Yield Curve Rates for durations between 5 and 30 years.
Actuarial Equivalence:	Actuarial equivalence for optional forms of benefit payments are based on an 85% male/15% female blend of the current healthy annuitant mortality tables, along with an interest rate of 7.25%
Unknown Data for Participants:	Same age and service as those exhibited by members with similar known characteristics. If not specified, members are assumed to be male.
Family Composition:	75% of participants are assumed to be married. Females are assumed to be three years younger than males. The youngest child is assumed to be ten years old.
Benefit Election:	Married participants are assumed to receive the Joint and Survivor annuity form of payment and non-married participants are assumed to receive a Life Only annuity.
Actuarial Value of Assets:	Market value of assets
Actuarial Cost Method:	Entry Age Normal Actuarial Cost Method. Entry Age is the age at the time the member commenced employment. Normal Cost and Actuarial Accrued Liability are calculated on an individual basis, with Normal Cost determined using the plan of benefits applicable to each participant. Actuarial Liability is allocated by salary.
Amortization Methodology:	The actuarially determined contribution is calculated using a rolling 10-year amortization of unfunded actuarially accrued liability.
Justification for Changes in Actuarial Assumptions:	The following assumptions were updated with this valuation: › The salary scale assumption was updated to reflect the 2016 Meet and Confer Agreement, as amended in 2018. › Annual 2.00% COLAs are assumed to be payable beginning October 1, 2050, based on an updated projection of unfunded actuarial accrued liability. In the prior valuation, these COLAs were assumed to begin October 1, 2053.

EXHIBIT II – SUMMARY OF PLAN PROVISIONS

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

MEMBERS WHOSE PARTICIPATION BEGAN BEFORE MARCH 1, 2011

Plan Year:	January 1 through December 31
Plan Status:	Ongoing
Normal Retirement:	
Benefit Earned Prior to September 1, 2017	
Age Requirement	50
Service Requirement	5
Amount	The greater of 3% of Average Supplemental Computation Pay times years of Pension Service (maximum 96.0%).
Average Supplemental Computation Pay	Supplemental Computation Pay is the current rate of pay received by the member, minus the rate of pay the member would receive for the highest civil service rank the member held. Average Supplemental Computation Pay is determined based on the highest 36 consecutive months of Supplemental Computation Pay.
Benefit Earned Beginning September 1, 2017	
Age Requirement	58
Service Requirement	5
Amount	The greater of 2.5% of Average Supplemental Computation Pay times years of Pension Service (maximum 90.0%).
Average Supplemental Computation Pay	Supplemental Computation Pay is the current rate of pay received by the member, minus the rate of pay the member would receive for the highest civil service rank the member held. Average Supplemental Computation Pay is determined based on the highest 60 consecutive months of Supplemental Computation Pay.

20 and Out Reduced Retirement:

If Eligible as of September 1, 2017

Age Requirement None

Service Requirement 20 years

Amount 20 & Out Multiplier times 36-month (Table 1) or 60-Month (Table 2) Average Supplemental Computation Pay times years of Pension Service

Benefit Accrued by September 1, 2017 20 & Out Table 1	
Age	20 & Out Multiplier
45 & under	2.00%
46	2.25%
47	2.50%
48	2.75%
49	2.75%
50 & above	3.00%

Benefit Accrued by September 1, 2017 20 & Out Table 2	
Age	20 & Out Multiplier
53 & under	2.00%
54	2.10%
55	2.20%
56	2.30%
57	2.40%
58 & above	2.50%

If Not Eligible as of September 1, 2017

Age Requirement None

Service Requirement 20 years

Amount 20 & Out Multiplier times 60-month Average Supplemental Computation Pay times years of Pension Service

20 & Out Table 2	
Age	20 & Out Multiplier
53 & under	2.00%
54	2.10%
55	2.20%
56	2.30%
57	2.40%
58 & above	2.50%

Early Retirement:	
If at least age 45 and less than age 50 as of September 1, 2017	
Age Requirement	45
Service Requirement	5
Amount	Normal pension accrued prior to September 1, 2017 plus the benefit accrued based on the 20 & Out Table 2 for service beginning September 1, 2017, reduced by 2/3 of 1% for each whole month by which the benefit commencement date precedes the normal retirement date.
If reach age 53 after September 1, 2017	
Age Requirement	53
Service Requirement	5
Amount	Normal pension accrued prior to September 1, 2017 plus the benefit accrued based on the 20 & Out Table 2 for service beginning September 1, 2017. The benefit will be reduced by 2/3 of 1% per month from age 58 for the post-September 1, 2017 benefit.
Non-Service Connected Disability:	
Eligibility	Injury or illness (lasting more than 90 days) not related to or incurred while in the performance of the member's job, preventing the member from performing their departmental duties.
Amount	3% of Average Computation Pay for service earned prior to September 1, 2017 and the applicable benefit multiplier from 20 & Out Table 2 times Average Supplemental Computation Pay for service earned beginning September 1, 2017
Service-Connected Disability:	
Eligibility	Injury or illness (lasting more than 90 days) obtained while on duty in the performance of the member's job.
Amount	3% of Average Computation Pay for service earned prior to September 1, 2017 and the applicable benefit multiplier from 20 & Out Table 2 times Average Supplemental Computation Pay for service earned beginning September 1, 2017; if the member has less than 20 years of service, the benefit will be calculated as if they had 20 years at the time of disability.
Benefit Supplement:	
Age Requirement	55
Service Requirement	20 years, waived if member is receiving a service-connected disability
Amount	3% of the total monthly benefit (including any applicable COLAs) payable to the Member when the Member attains age 55. The benefit supplement shall not be less than $75 per month.

	Beginning September 1, 2017, only those annuitants already receiving the supplement will be eligible to maintain their current supplement, which will not change ongoing; future retirees will not be eligible for the supplement.
Termination Benefit:	
With less than five years of pension service	Upon request, the member's contributions will be returned without interest.
With at least five years of pension service	The member may either withdraw contributions or leave contributions in the Plan and receive a monthly benefit to commence no earlier than the member's earliest eligibility for retirement benefits. Retirement benefit is equal to the accrued benefit as of the date of termination.
Pre-Retirement Death Benefit:	
While in active service	The greater of 50% of the Member's accrued benefit or a benefit based on 20 years of service. The benefit may not exceed 45% of Average Supplemental Computation Pay.
After leaving active service, with fewer than five years	A lump sum benefit equal to the return of member contributions without interest.
After leaving active service, with at least five years	50% of the Member's accrued benefit, with no early retirement reduction
Post-Retirement Death Benefit:	50% or 100% of the pension the Member was receiving at the time of their death, depending on the form of joint and survivor annuity chosen; if a life only annuity was chosen, no further benefits will be paid
Qualified Surviving Children Benefit:	50% of the pension the Member was receiving at the time of their death, divided equally among the children, paid until the youngest child is 19 years old or for life if the child becomes handicapped prior to age 23
Special Survivor Benefit:	
Eligibility	Upon leaving active service or joining DROP: a) the Member was at least 55 years old with at least 20 years of pension service, or b) the sum of the Member's age plus Pension Service was at least 78; **and** Has no Qualified Surviving Children or handicapped children currently eligible for survivor benefits; **and** Whose Qualified Surviving Spouse is at least 55 years old. The Qualified Surviving Spouse does not have to be 55 years old at the time of the Member's death.
Amount	Once all the eligibility conditions are met, the amount the Qualified Surviving Spouse will receive increases from 50% of the Member's pension benefit to a percentage of the Member's pension benefit based on 3% times the number of years of Pension Service the Member worked.
Survivor Benefit if No Qualified Surviving Spouse:	A lump sum that is the actuarial equivalent of 120 monthly payments of the greater of: 50% of the Member's pension benefit at the time of their death, or a benefit based on 20 years of the Member's service.

DROP:	
Eligibility	Members in active service who are retirement eligible may elect to enter the Deferred Retirement Option Plan (DROP).
Distribution	The DROP account balance will be paid over the expected future lifetime of annuitants.
Interest	Based on United States Department of Commerce Daily Treasury Yield Curve Rates for durations between 5 and 30 years; interest rate is based on the expected lifetime of the members at the time they retire. Interest is only paid on DROP account balances as of September 1, 2017.
Cost of Living:	The Board may grant an ad hoc COLA based on the actual market return over the prior five years less 5%, not to exceed 4% of the base benefit, if, after granting a COLA, the funded ratio on a market value of assets basis is no less than 70%.
Member Contributions:	13.5% of supplemental computation pay for all members
City Contributions:	The City will contribute the Actuarially Determined Employer Contribution based on a 10-year rolling amortization period.
Optional Forms of Benefits:	Life Only Annuity, 50% or 100% Joint and Survivor Pension
Changes in Plan Provisions:	None.

MEMBERS WHOSE PARTICIPATION BEGAN ON OR AFTER MARCH 1, 2011

Normal Retirement:	
Age Requirement	55
Service Requirement	5
Amount	2.5% of Average Supplemental Computation Pay for each year of Pension Service, maximum 90%
Average Supplemental Computation Pay	Supplemental Computation Pay is the current rate of pay received by the member, minus the rate of pay the member would receive for the highest civil service rank the member held. Average Supplemental Computation Pay is determined based on the highest 60 consecutive months of Supplemental Computation Pay
Early Retirement:	
Age Requirement	53
Service Requirement	5
Amount	Normal pension accrued, reduced by 2/3 of 1% for each whole month by which the benefit commencement date precedes the normal retirement date.
20 and Out Reduced Retirement:	
Requirement	None
Service Requirement	20 years
Amount	20 & Out Multiplier times Average Supplemental Computation Pay times years of Pension Service

20 & Out Table 2

Age	20 & Out Multiplier
53 & under	2.00%
54	2.10%
55	2.20%
56	2.30%
57	2.40%
58 & above	2.50%

Non-Service Connected Disability:	
Eligibility	Injury or illness (lasting more than 90 days) not related to or incurred while in the performance of the member's job, preventing the member from performing their departmental duties.
Amount	The Member's accrued benefit, but not less than a pro-rated minimum benefit.
Service-Connected Disability:	
Eligibility	Injury or illness (lasting more than 90 days) obtained while on duty in the performance of the member's job.
Amount	The greater of 50% of Average Supplemental Computation Pay and the Member's accrued benefit.
Termination Benefit:	
With less than five years of service	Upon request, the member's contributions will be returned without interest.
With at least five years of service	The member may either withdraw contributions or leave contributions in the Plan and receive a monthly benefit to commence no earlier than the member's earliest eligibility for retirement benefits. Retirement benefit is equal to the accrued benefit as of the date of termination.
Pre-Retirement Death Benefit:	
While in active service	The greater of 50% of the Member's accrued benefit or a benefit based on 20 years of service. The benefit may not exceed 45% of Average Supplemental Computation Pay.
After leaving active service, with less than five years	A lump sum benefit equal to the return of member contributions without interest.
After leaving active service, with at least five years	50% of the Member's accrued benefit, with no early retirement reduction
Post-Retirement Death Benefit:	50% or 100% of the pension the Member was receiving at the time of their death, depending on the form of joint and survivor annuity chosen; if a life only annuity was chosen, no further benefits will be paid
Qualified Surviving Children Benefit:	50% of the pension the Member was receiving at the time of their death, divided equally among the children, paid until the youngest child is 19 years old or for life if the child becomes handicapped prior to age 23
Special Survivor Benefit:	
Eligibility	Upon leaving active service or joining DROP: a) the Member was at least 55 years old with at least 20 years of pension service, or b) the sum of the Member's age plus Pension Service was at least 78; **and** Has no Qualified Surviving Children or handicapped children currently eligible for survivor benefits; **and** Whose Qualified Surviving Spouse is at least 55 years old. The Qualified Surviving Spouse does not have to be 55 years old at the time of the Member's death.

Amount	Once all the eligibility conditions are met, the amount the Qualified Surviving Spouse will receive increases from 50% of the Member's pension benefit to a percentage of the Member's pension benefit based on 3% times the number of years of Pension Service the Member worked.
Survivor Benefit if No Qualified Surviving Spouse:	A lump sum that is the actuarial equivalent of 120 monthly payments of the greater of: 50% of the Member's pension benefit at the time of their death, or a benefit based on 20 years of the Member's service.
DROP:	
Eligibility	Members in active service who are retirement eligible may elect to enter the Deferred Retirement Option Plan (DROP).
Distribution	The DROP account balance will be paid over the expected future lifetime of annuitants.
Interest	Based on United States Department of Commerce Daily Treasury Yield Curve Rates for durations between 5 and 30 years; interest rate is based on the expected lifetime of the members at the time they retire. Interest is only paid on DROP account balances as of September 1, 2017.
Cost of Living:	The Board may grant an ad hoc COLA based on the actual market return over the prior five years less 5%, not to exceed 4% of the base benefit, if, after granting a COLA, the funded ratio on a market value of assets basis is no less than 70%.
Member Contributions:	13.5% of supplemental computation pay for all members
City Contributions:	The City will contribute the Actuarially Determined Employer Contribution based on a 10-year rolling amortization period.
Optional Forms of Benefits:	Life Only Annuity, 50% or 100% Joint and Survivor Pension
Changes in Plan Provisions:	None.

Section 5: GASB 67 Information

EXHIBIT 1 – NET PENSION LIABILITY

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

Total pension liability	$31,830,733
Plan fiduciary net position	18,317,893
Net pension liability	13,512,840
Plan fiduciary net position as a percentage of the total pension liability	57.55%

Actuarial assumptions. The total pension liability was determined by an actuarial valuation as of January 1, 2019, using the following actuarial assumptions, applied to all periods included in the measurement:

Inflation	2.75%
Real rate of return	4.50%
Investment rate of return	7.25%, net of pension plan investment expense, including inflation

The actuarial assumptions used in the January 1, 2019 valuation were based on the results of an experience study for the period January 1, 2010 to December 31, 2014, plus assumption changes included in the January 1, 2017, 2018 and 2019 valuations. Assumptions are detailed in *Section 4, Exhibit I* of this report.

The long-term expected rate of return on pension plan investments was determined using a building-block method in which best-estimate ranges of expected future real rates of return (expected returns, net of pension plan investment expense and inflation) are developed for each major asset class. These ranges are combined to produce the long-term expected rate of return by weighting the expected future real rates of return by the target asset allocation percentage and by adding expected inflation. Best estimates of arithmetic real rates of return for each major asset class included in the pension plan's target asset allocation as of December 31, 2018 are summarized in the following table:

Asset Class	Target Allocation	Long-Term Expected Real Rate of Return*
Global Equity	40%	6.40%
Emerging Market Equity	10%	9.47%
Private Equity	5%	10.00%
Short-Term Investment Grade Bonds	12%	1.31%
Investment Grade Bonds	4%	1.89%
High Yield Bonds	4%	4.00%
Bank Loans	4%	3.52%
Global Bonds	4%	1.69%
Emerging Markets Debt	4%	4.48%
Real Estate	5%	4.58%
Natural Resources	5%	7.44%
Cash	3%	1.12%
Total	100%	

[1]The real rates of return are net of inflation provided by Segal Marco Advisors, a member of The Segal Group.

Discount rate: The discount rate used to measure the total pension liability was 7.25%. The projection of cash flows used to determine the discount rate assume that City contributions will equal the employer's normal cost plus a ten-year amortization payment on the unfunded actuarial accrued liability and member contributions will equal 13.50% of supplemental computation pay. Based on those assumptions, the System's fiduciary net position was projected to be available to make all projected future benefit payments of current plan members. Therefore, the long-term expected rate of return on pension plan investments was applied to all periods of projected benefit payments to determine the total pension liability.

Actuarial cost method: In accordance with GASB 67, the Total Pension Liability for active members is valued as the total present value of benefits once they enter the DROP. For the funding valuation, the liability for these members accumulates from their entry age until they are assumed to leave active service.

Sensitivity of the net pension liability to changes in the discount rate. The following presents the net pension liability, calculated using the discount rate of 7.25%, as well as what the net pension liability would be if it were calculated using a discount rate that is one-percentage-point lower (6.25%) or one-percentage-point higher (8.25%) than the current rate:

	1% Decrease (6.25%)	Current Discount (7.25%)	1% Increase (8.25%)
Net pension liability	$16,362,973	$13,512,840	$11,068,973

EXHIBIT 2 – SCHEDULE OF CHANGES IN NET PENSION LIABILITY

	2018	2017
Total pension liability		
• Service cost	$222,231	$111,485
• Interest	2,359,025	2,799,166
• Change of benefit terms	887,898	-5,305,618
• Differences between expected and actual experience	-2,628,276	-1,434,786
• Changes of assumptions	27,946	-479,159
• Benefit payments, including refunds of employee contributions	-2,708,271	-2,668,579
Net change in total pension liability	**-$1,839,447**	**-$6,977,491**
Total pension liability – beginning	**33,670,180**	**40,647,671**
Total pension liability – ending (a)	**$31,830,733**	**$33,670,180**
Plan fiduciary net position		
• Contributions – employer	$1,979,285	$2,077,059
• Contributions – employee	73,880	66,095
• Net investment income	1,220,482	739,618
• Benefit payments, including refunds of employee contributions	-2,708,271	-2,668,579
• Administrative expense	-52,636	-68,528
• Interest expense	0	-10,839
Net change in plan fiduciary net position	**$512,740**	**$134,826**
Plan fiduciary net position – beginning	**17,805,153**	**17,670,327**
Plan fiduciary net position – ending (b)	**$18,317,893**	**$17,805,153**
Net pension liability – ending (a) – (b)	**$13,512,840**	**$15,865,027**
Plan fiduciary net position as a percentage of the total pension liability	**57.55%**	**52.88%**
Covered employee payroll	**$621,622**	**$916,199**
Net pension liability as percentage of covered employee payroll	**2,173.80%**	**1,731.61%**

Notes to Schedule:

Benefit changes: Plan changes effective September 1, 2017 that were signed into law May 31, 2017 as HB 3158 are reflected for the first time in the December 31, 2017 total pension liability, along with assumption changes that were implemented as part of the plan changes. The provision allowing members who entered DROP before June 1, 2017 to revoke the DROP election during a window from September 1, 2017 through February 28, 2018 is reflected in the December 31, 2018 total pension liability.

Change of Assumptions: The blended discount rate increased from 4.12% to 7.25% as of December 31, 2017. The assumption changes in 2018 include updates to the salary scale to reflect the 2016 Meet and Confer Agreement, as amended in 2018, and a change in the expected COLA date from October 1, 2053 to October 1, 2050.

EXHIBIT 3 – SCHEDULE OF EMPLOYER CONTRIBUTIONS

Year Ended December 31	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
2015	$2,442,790	$2,442,790	$0	$556,725	$438.78%
2016	3,063,584	3,063,584	0	724,503	422.85%
2017	2,086,639	2,077,059	9,580	525,048	395.59%
2018	2,273,581	1,979,285	294,296	916,199	216.03%

The contribution deficiencies for calendar years 2017 and 2018 represent contributions directed to the Excess Benefit Plan and Trust.

Notes to Schedule:

Methods and assumptions used to determine contribution rates for the year ended December 31, 2018:

Valuation date	Actuarially determined contribution is calculated as of January 1, 2018 the beginning of the fiscal year in which contributions are reported
Actuarial cost method	Entry age
Amortization method	10-year level percent of payroll, using 2.75% annual increases
Remaining amortization period	10 years, open
Asset valuation method	At market value.
Investment rate of return	7.25%, including inflation, net of pension plan investment expense
Inflation rate	2.75%
Projected salary increases	Inflation plus merit increases, Varying by group and service Group specific rates based on age.
Retirement rates	Group specific rates based on age
Cost of Living adjustments	2.00% simple increases starting October 1, 2053.

Mortality:	
Pre-retirement	Sex-distinct RP-2014 Employee Mortality Table, set back two years for males, projected generationally using Scale MP-2015
Healthy annuitant	Sex-distinct RP-2014 Healthy Annuitant Mortality Table, set forward two years for females, projected generationally using Scale MP-2015
Disabled	Sex-distinct RP-2014 Disabled Retiree Mortality Table, set back three years for males and females, projected generationally using Scale MP-2015
Other information	See Section 4 of the January 1, 2018 actuarial valuation for a full outline of assumptions. See Exhibit 2 of this Section for the history of changes to plan provisions and assumptions over the last two years.
DROP utilization	0% of Police and Fire members are assumed to elect to enter DROP
Interest on DROP Accounts	Beginning September 1, 2017: – 2.75% on annuitant account balances – 2.75% payable upon retirement on active account balances as of September 1, 2017 – 0.00% on active account balances accrued after September 1, 2017 Beginning January 1, 2018: – 3.00% payable upon retirement on active account balances as of September 1, 2017

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