City of Birmingham Firemen's and Policemen's Supplemental Pension System

Actuarial Valuation and Review as of July 1, 2020

This report has been prepared at the request of the Board of Trustees to assist in administering the Supplemental Pension System. This valuation report may not otherwise be copied or reproduced in any form without the consent of the Board and may only be provided to other parties in its entirety, unless expressly authorized by Segal. The measurements shown in this actuarial valuation may not be applicable for other purposes.

Segal

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April 13, 2021

Board of Managers
City of Birmingham Firemen's and Policemen's Supplemental Pension System
710 North 20th Street, GA 100 City Hall
Birmingham, Alabama 35203-2216

Dear Board Members:

We are pleased to submit this Actuarial Valuation and Review as of July 1, 2020. It summarizes the actuarial data used in the valuation, analyzes the preceding year's experience, and establishes the funding requirements for the 2020-2021 fiscal year.

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 Pension System. The census information on which our calculations were based was prepared by the City and the financial information was provided by the City's Finance Department. That assistance is gratefully acknowledged.

The actuarial calculations were directed under the supervision of Deborah K. Brigham, FCA, ASA, MAAA, Enrolled Actuary. Ms. Brigham is a member of the American Academy of Actuaries and meets 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 of Managers are reasonably related to the experience of and the expectations for the System.

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

Sincerely,
Segal

Leon F. (Rocky) Joyner, Jr., FCA, ASA, MAAA, EA
Senior Vice President and National Public Sector Retirement Practice Leader

Jeffrey S. Williams, FCA, ASA, MAAA, EA
Vice President and Consulting Actuary

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Section 1: Actuarial Valuation Summary

Purpose and basis

This report was prepared by Segal to present a valuation of the City of Birmingham Firemen's and Policemen's Supplemental Pension System as of July 1, 2020. The valuation was performed to determine whether the assets and contribution rates are sufficient to provide the prescribed benefits. 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 System assets to cover the estimated cost of settling the System'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 of Managers;
- The characteristics of covered active participants, retired participants and beneficiaries as of June 30, 2020, provided by the City;
- The assets of the Plan as of June 30, 2020, provided by the City's Finance Department;
- Economic assumptions regarding future salary increases and investment earnings;
- Other actuarial assumptions regarding employee terminations, retirement, death, etc.

The assumptions and methods used to value the Plan were approved by the Board of Managers based on a five-year experience study for the period ended June 30, 2015.

Disclosure information required by Governmental Accounting Standards Board (GASB) Statements No 67 and 68 as of June 30, 2020 for the Supplemental Pension System was provided in a separate report.

Valuation highlights

1. The actuarially determined contribution (ADC) for the upcoming year is $6.5 million, an increase of $0.8 million from last year. The contribution as a percentage of payroll increased from 6.81% of payroll to 7.68% of payroll, based on a 27-year level percent-of-payroll amortization of the unfunded actuarial accrued liability.
2. 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 (the cost of benefits accruing during the year), interest on the unfunded actuarial accrued liability and the principal balance. The City's contribution rate is 6.05% of pay, Fire Insurance Tax income is roughly 0.40% of pay, and employees contribute 5.22% of pay. **There is a deficit of 1.23% of pay between these rates and the ADC**, and as a result, contributions are projected to enable the System to reach 100% funding in approximately 53 years, well in excess of the targeted period of 27 years. The 53-year period is a substantial increase over last year's period of 33 years. The unfunded actuarial accrued liability is $73.6 million, which is an increase of $9.8 million since the prior valuation. These increases are primarily due to a significant experience loss, which is discussed below.
3. The funded ratio (the ratio of the actuarial value of assets to actuarial accrued liability) is 27.82%, compared to the prior year funded ratio of 36.03%. This ratio is one measure of funding status, and its history is a measure of funding progress. Using the market value of assets, the funded ratio is 25.55%, compared to 35.05% as of the prior valuation date. These measurements are not necessarily appropriate for assessing the sufficiency of System assets to cover the estimated cost of settling the System's benefit obligation or the need for or the amount of future contributions.
4. The rate of return on the market value of assets was -0.67% for the plan year ended June 30, 2020. The return on the actuarial value of assets was 3.55% for the same period due to the recognition of prior years' investment gains and losses. This resulted in an actuarial loss of $1.2 million when measured against the assumed rate of return of 7.50%. Given the low fixed income interest rate environment, target asset allocation and expectations of future investment returns for various classes, 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 7.50%. If the assumption were 7.00% in this valuation, the City's ADC would be 7.96% of pay.
5. The actuarial value of assets is 108.9% of the market value of assets. The investment experience in the past years has only been partially recognized in the actuarial value of assets. As the deferred net loss is recognized in future years, the cost of the Plan is likely to increase unless the net loss is offset by future experience. If the net deferred losses were recognized immediately in the actuarial value of assets, the ADC would increase from 7.68% to about 7.86% of payroll.
6. The net experience loss from sources other than investment experience was $7.8 million, or 7.7% of the actuarial accrued liability. Given the temporary nature of the benefits payable from this System, with payments beginning no earlier than 20 years of service and ending 30 years from hire, liabilities can fluctuate from year to year depending on the service of individuals at retirement. The System is therefore subject to larger gains and losses than it would be if benefits were payable over participants' lifetimes. Even so, this year's loss is significant, and there was a loss of similar magnitude in the 2019 valuation as well. (In the

previous five years, the experience gains and losses were between 0.0% and 2.1% of liability.) In both the plan year ended June 30, 2019 and the plan year ended June 30, 2020, there were many more retirements than were anticipated by the actuarial assumptions, particularly among the Police Officers, and these retirements occurred earlier than expected. In addition, there were several new retirees over the age of 60 who began receiving benefits from the Supplemental System; the retirement assumption being used to value plan liabilities expected that these individuals would retire directly into the Retirement and Relief System.

7. The enactment of House Bill 397 (H.B.397), permits the City to rehire retired public safety retirees in periods of critical personnel shortages. Under this Bill, rehired retirees continue to receive their pension benefits, but do not accrue additional service credit. Contributions are made by the City and by the rehired retirees.

   As of the valuation date, 68 Fire and Police retirees had been reemployed by the City under the provisions of H.B.397. Of these, there were 58 who had less than 30 years of service as of the valuation date and remain in the Supplemental System. For determination of liability and in headcounts in this valuation, these 58 individuals are included as retirees. However, their salaries are included in total payroll in the calculation of expected employee contributions and the City's ADC as a percentage of pay.

8. The assumption for administrative expenses increased from $60,000 to $70,000 for the year beginning July 1, 2020.

9. This report constitutes an actuarial valuation for the purpose of determining the ADC under the City's funding policy and measuring the progress of that funding policy. The Net Pension Liability (NPL) and Pension Expense under GASB Statements No. 67 and No. 68, for inclusion in the plan and employer's financial statements as of June 30, 2021, will be provided separately. The accounting disclosures will utilize different methodologies from those employed in the funding valuation, as required by GASB.

10. It is important to note that this actuarial valuation is based on plan assets as of June 30, 2020. Due to the COVID-19 pandemic, market conditions have changed significantly since the onset of the public health emergency. The Plan's funded status does not reflect short-term fluctuations of the market, but rather is based on the market values on the last day of the Plan Year. Moreover, this actuarial valuation does not include any possible short-term or long-term impacts on mortality of the covered population that may emerge after June 30, 2020. While it is impossible to determine how the pandemic will affect market conditions and other demographic experience of the System in future valuations, Segal is available to prepare projections of potential outcomes upon request.

11. 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. We have not been engaged to perform a detailed analysis of the potential range of the impact of risk relative to the System's future financial condition, but have included a brief discussion of some risks that may affect the System in Section 2, and deterministic projections of assets, contributions, and funding levels have been provided to the Board separately. A more detailed assessment would provide the Board with a better understanding of the inherent risks. As noted above, this could be important because the System is very susceptible to liability fluctuations due to the temporary payment period.

Summary of key valuation results

		2020	2019
Contributions for plan year beginning July 1:	• Actuarially determined employer contributions	$6,511,052	$5,676,004
	• Actuarially determined employer contributions as a percent of payroll	7.68%	6.81%
	• Actual employer contributions (Employer and Fire Tax Insurance)	--	$5,424,968
Actuarial accrued liability for plan year beginning July 1:	• Retired participants and beneficiaries	$47,516,945	$44,276,671
	• Active participants	53,652,750	54,883,077
	• Inactive participants due a refund of employee contributions	831,766	529,645
	• Total actuarial accrued liability	102,001,461	99,689,393
	• Total normal cost including administrative expenses	5,955,703	5,781,919
Assets for plan year beginning July 1:	• Market value of assets (MVA)	$26,065,460	$34,940,833
	• Actuarial value of assets (AVA)	28,374,837	35,922,207
	• Actuarial value of assets as a percentage of market value of assets	108.86%	102.81%
Funded status for plan year beginning July 1:	• Unfunded actuarial accrued liability on market value of assets	$75,936,001	$64,748,560
	• Funded percentage on MVA basis	25.55%	35.05%
	• Unfunded actuarial accrued liability on actuarial value of assets	$73,626,624	$63,767,186
	• Funded percentage on AVA basis	27.82%	36.03%
	• Effective amortization period on an AVA basis	53	33
Key assumptions	• Net investment return	7.50%	7.50%
	• Inflation rate	2.50%	2.50%
	• Payroll increase	2.50%	2.50%
Demographic data for plan year beginning July 1:	• Number of retired participants and beneficiaries	426	394
	• Number of active participants	1,348	1,345
	• Number of inactive participants due a refund of employee contributions	70	52
	• Total payroll[1]	$84,787,622	$83,333,196
	• Average payroll[1]	60,304	60,212

[1]The total and average payroll reflected in the chart above includes $3,629,350 in payroll as of June 30, 2020 for 58 retirees and $2,474,793 in salaries as of June 30, 2019 for 39 retirees that have returned to active employment with the City under the provisions of H.B.397. However, for purposes of headcounts and liabilities, these individuals are counted as retired participants.

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 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 City. 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 City's Finance Department. The System uses an "actuarial value of assets" that differs from market value to gradually reflect year-to-year changes in the market value of assets in determining the contribution requirements.
Actuarial assumptions	In preparing an actuarial valuation, Segal projects the benefits to be paid to existing plan 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 that does not mean that the previous assumptions were unreasonable.

Section 1: Actuarial Valuation Summary

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 City or 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.

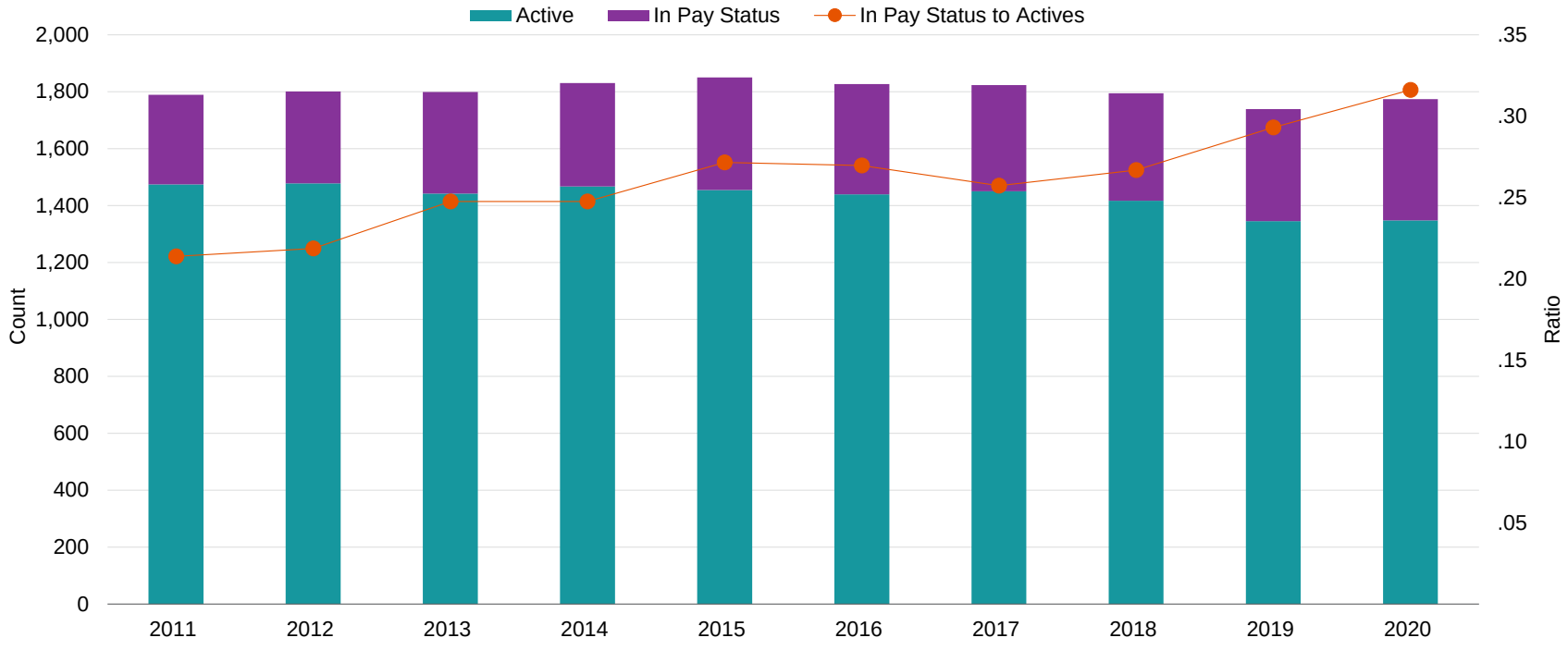
As Segal has no discretionary authority with respect to the management or assets of the System, it is not a fiduciary in its capacity as actuaries and consultants with respect to the System.

Section 2: Actuarial Valuation Results

Participant data

This section presents a summary of significant statistical data on the covered participants. More detailed information for this valuation year and the preceding valuation can be found in *Section 3, Exhibits A, B,* and *C*.

Participant Population: 2011 – 2020



	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
In Pay Status	315	323	357	363	395	388	373	378	394	426
Active	1,474	1,478	1,442	1,467	1,455	1,439	1,450	1,417	1,345	1,348
Ratio	0.21	0.22	0.25	0.25	0.27	0.27	0.26	0.27	0.29	0.32

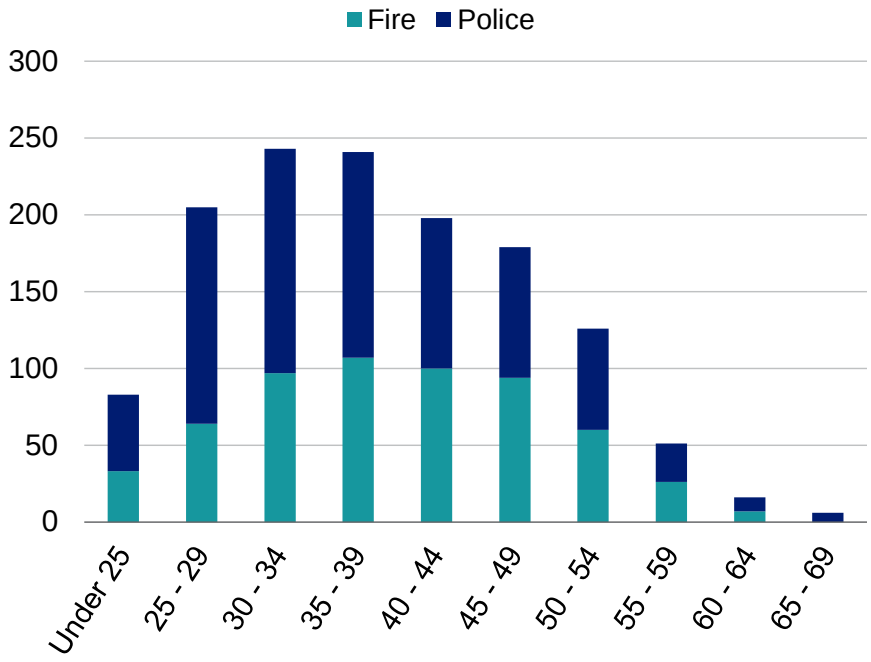
Note: Chart excludes terminated participants due a refund of employee contributions and includes any retirees or beneficiaries whose payments are suspended. Public safety retirees who were rehired under H.B.397 are not included in the active participant count, but are counted as retired.

Active participants

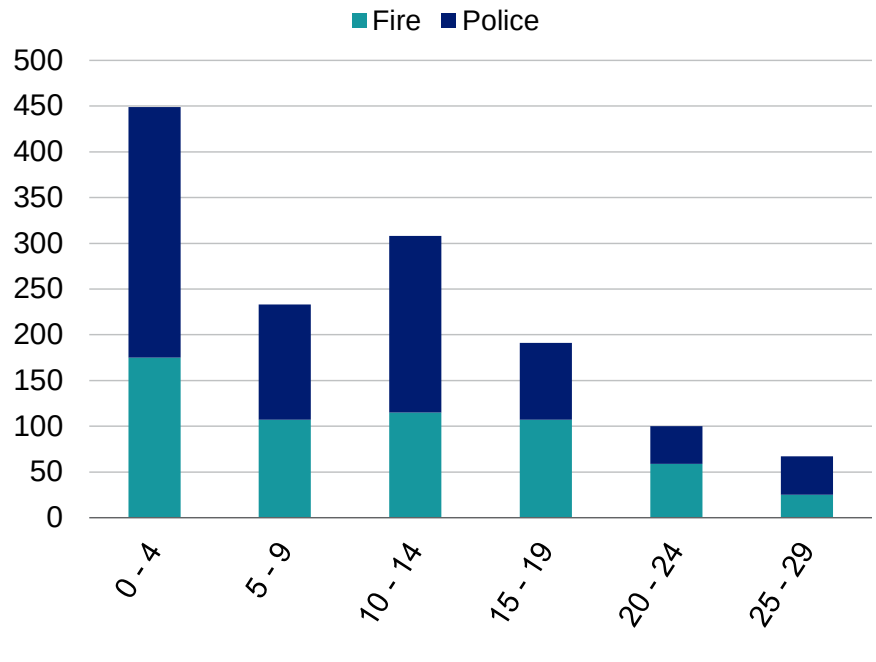
As of June 30,	2020	2019	Change
Active participants	1,348	1,345	0.2%
Average age	38.7	39.5	-0.8 years
Average years of service	10.3	11.0	-0.7 years
Average compensation	60,304	60,212	0.2%

Distribution of Active Participants as of June 30, 2020

By Age



By Years of Service

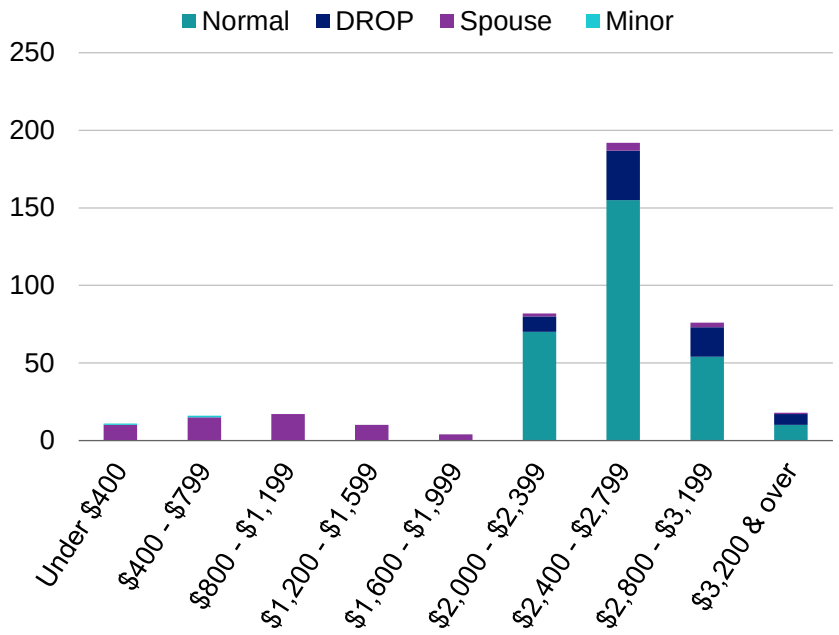


Retired participants and beneficiaries

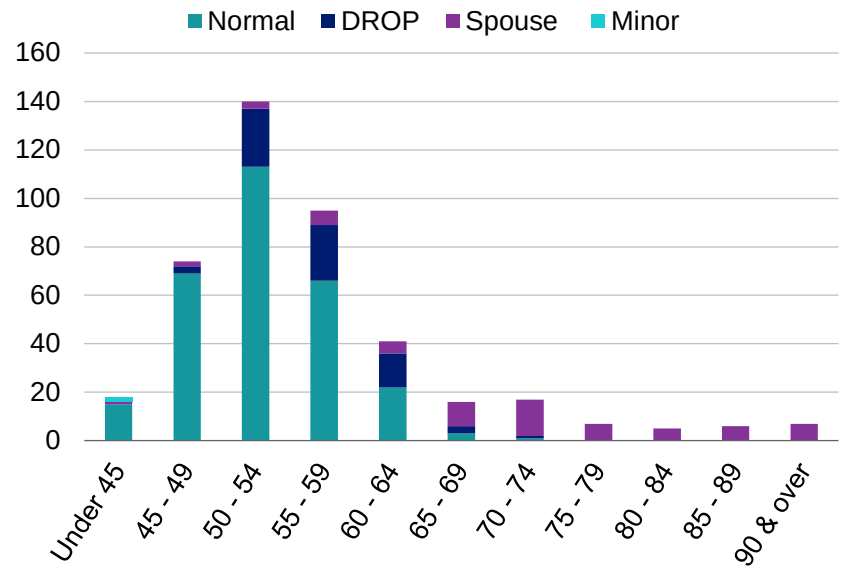
As of June 30,	2020	2019	Change
Retirees	357	323	10.5%
Beneficiaries	69	71	-2.8%
Average age	56.7	56.3	0.4 years
Average amount	$2,402	$2,329	3.1%
Total monthly amount	$1,023,396	917,683	11.5%

Distribution of Retired Participants and Beneficiaries as of June 30, 2020

By Type and Monthly Amount



By Type and Age



Historical plan population

Participant Data Statistics: 2011 – 2020

	Active Participants			Retired Participants and Beneficiaries		
Year Ended June 30	Count	Average Age	Average Service	Count	Average Age	Average Monthly Amount
2011	1,474	40.6	12.2	315	56.5	$1,765
2012	1,478	40.7	12.4	323	56.4	1,798
2013	1,442	40.8	12.5	357	57.0	1,913
2014	1,467	40.5	12.0	363	57.0	2,016
2015	1,455	40.5	12.3	395	57.2	2,072
2016	1,439	40.3	12.1	388	57.1	2,120
2017	1,450	40.1	11.8	373	57.0	2,158
2018	1,417	40.2	11.7	378	57.1	2,212
2019	1,345	39.5	11.0	394	56.3	2,329
2020	1,348	38.7	10.3	426	56.7	2,402

Note: Chart includes any retirees or beneficiaries whose payments are suspended.

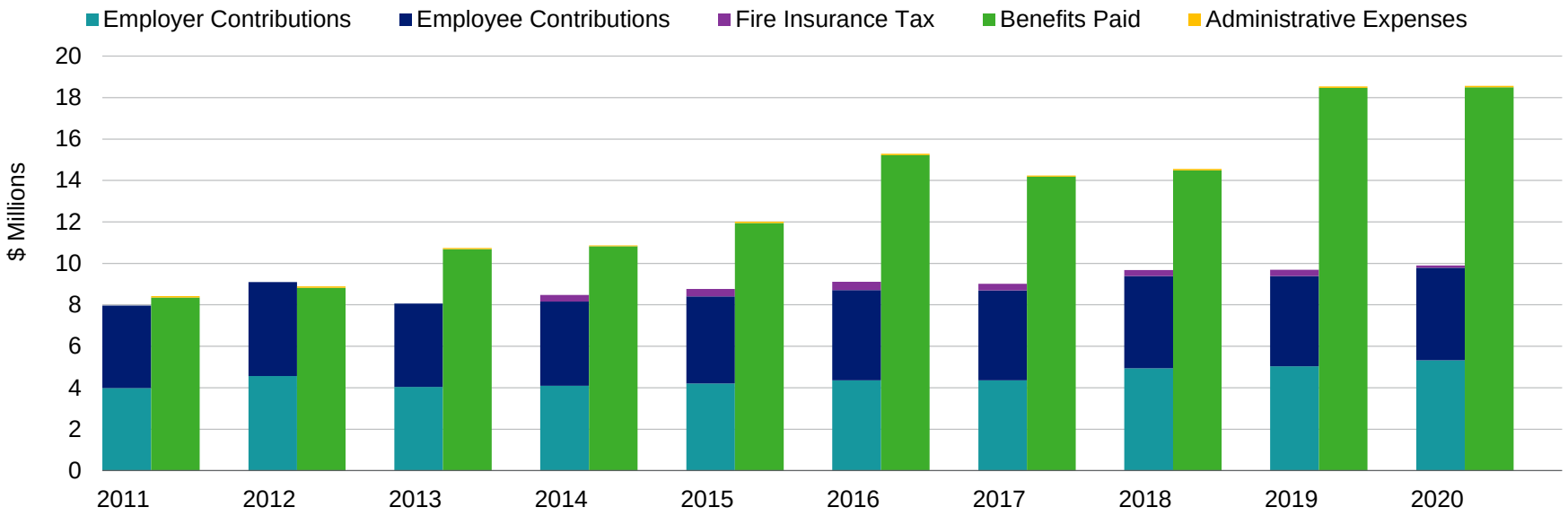
Financial information

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.

Total contributions, including Fire Insurance Tax income, were $9.9 million for the year ended June 30, 2020. Benefit payments, DROP lump sums, refunds and transfers to the Retirement and Relief Plan totaled $18.5 million. To the extent that future contributions are less than benefit payments, investment earnings or fund assets will be needed to cover the shortfall.

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 with Benefits and Expenses
for Years Ended June 30, 2011 – 2020



Section 2: Actuarial Valuation Results

It is desirable to have level and predictable plan costs from one year to the next. For this reason, the Board of Managers has approved an asset valuation method that gradually adjusts to market value. Under this valuation method, the full value of market fluctuations is not recognized in a single year and, as a result, the asset value and the plan costs are more stable. The amount of the adjustment to recognize market value is treated as income, which may be positive or negative. Realized and unrealized gains and losses are treated equally and, therefore, the sale of assets has no immediate effect on the actuarial value.

Determination of Actuarial Value of Assets for Year Ended June 30, 2020

1	Market value of assets, June 30, 2020				$26,065,460
2	Calculation of unrecognized return	**Original Amount[1]**	**Percent Deferred**	**Unrecognized Amount[2]**	
	(a) Year ended June 30, 2020	-$2,501,999	80%	-$2,001,599	
	(b) Year ended June 30, 2019	-1,707,549	60	-1,024,530	
	(c) Year ended June 30, 2018	1,266,069	40	506,428	
	(d) Year ended June 30, 2017	1,051,618	20	210,324	
	(e) Year ended June 30, 2016	-3,978,125	0	0	
	(f) Total unrecognized return				-$2,309,377
3	Preliminary actuarial value: **(1) - (2f)**				28,374,837
4	Adjustment to be within 20% corridor				0
5	Final actuarial value of assets as of June 30, 2020: **(3) + (4)**				28,374,837
6	Actuarial value as a percentage of market value: **(5) ÷ (1)**				108.9%
7	Amount deferred for future recognition[3]: **(1) - (5)**				-$2,309,377

[1]Total return minus expected return on a market value basis

[2]Recognition at 20% per year over five years

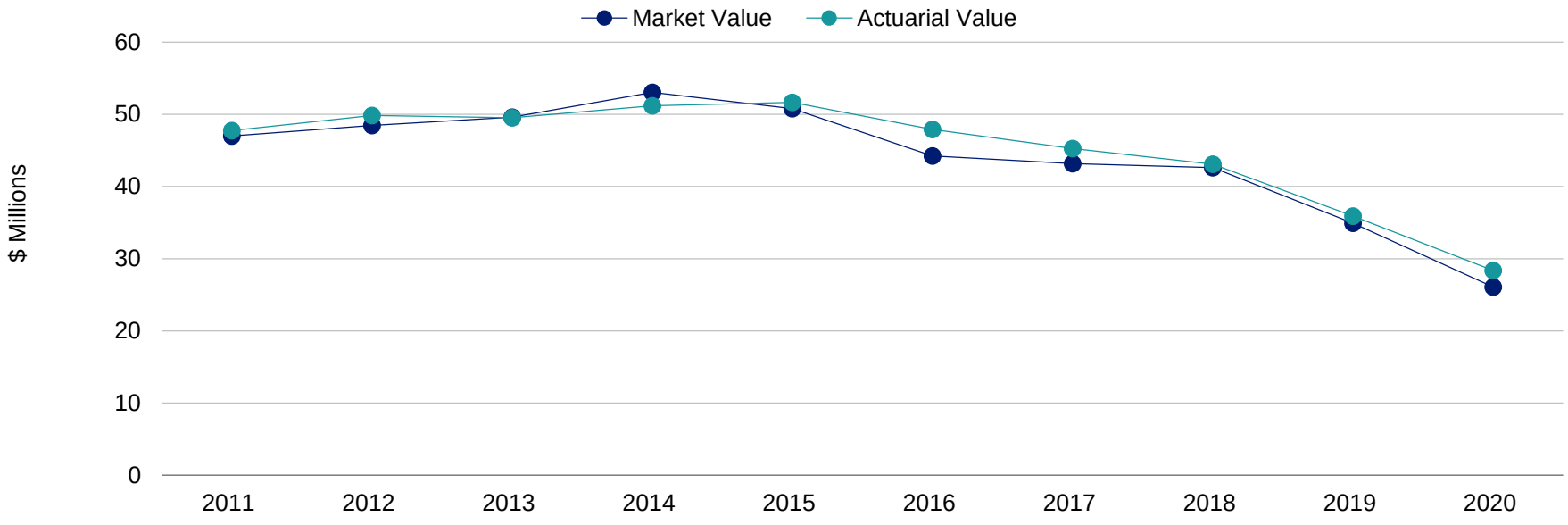
[3]Deferred return as of June 30, 2020 recognized in each of the next four years:

(a) Amount recognized on June 30, 2021	-$378,371
(b) Amount recognized on June 30, 2022	-588,696
(c) Amount recognized on June 30, 2023	-841,910
(d) Amount recognized on June 30, 2024	-500,400

Section 2: Actuarial Valuation Results

Both the actuarial value and market value of assets are representations of the System's financial status. As investment gains and losses are gradually taken into account, the actuarial value of assets tracks the market value of assets. The actuarial asset value is significant because the System'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.

Market Value of Assets vs. Actuarial Value of Assets



	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Market Value[1]	$47.02	$48.49	$49.62	$53.06	$50.80	$44.23	$43.18	$42.63	$34.94	$26.07
Actuarial Value[1]	47.78	49.85	49.52	51.18	51.65	47.92	45.29	43.10	35.92	28.37

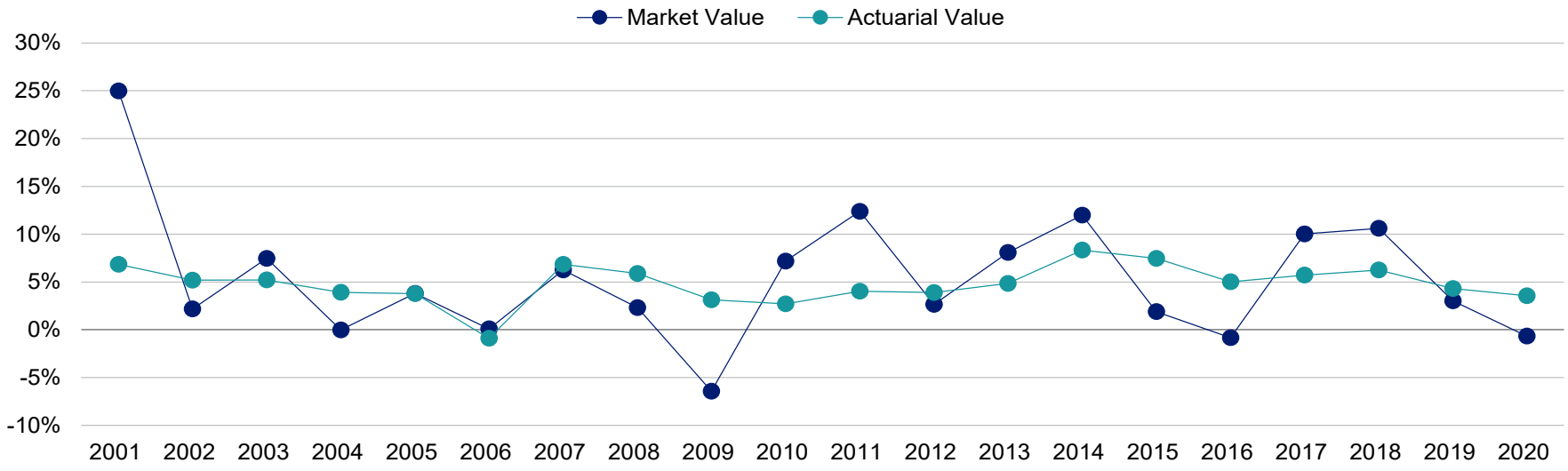
[1]In $ millions

Section 2: Actuarial Valuation Results

Because actuarial planning is long term, it is useful to see how the assumed investment rate of return has followed actual experience over time. The chart below shows the rate of return on an actuarial basis compared to the actual market value investment return for the last 20 years, including averages over select time periods.

As described earlier in this section, the actuarial asset valuation method gradually recognizes fluctuations in the market value rate of return. The goal of this is to stabilize the actuarial rate of return and to produce more level pension plan costs.

Market and Actuarial Rates of Return for Years Ended June 30, 2001 - 2020



	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Market	25.0%	2.2%	7.5%	0.0%	3.8%	0.1%	6.2%	2.3%	-6.4%	7.2%	12.4%	2.7%	8.1%	12.0%	1.9%	-0.8%	10.0%	10.6%	3.0%	-0.7%
Actuarial	6.9%	5.2%	5.2%	3.9%	3.8%	-0.9%	6.8%	5.9%	3.1%	2.7%	4.0%	3.9%	4.8%	8.3%	7.5%	5.0%	5.7%	6.3%	4.3%	3.6%
Assumed rate	7.5%	7.5%	7.5%	7.5%	7.5%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.5%	7.5%	7.5%	7.5%	7.5%

Average Rates of Return	Market Value	Actuarial Value
Most recent five-year average return:	4.55%	5.07%
Most recent ten-year average return:	6.00%	5.44%
Most recent fifteen-year average return:	4.69%	4.84%
20-year average return:	5.06%	4.85%

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.

Actuarial Experience for Year Ended June 30, 2020

1	Net loss from investments[1]	-$1,247,600
2	Net loss from administrative expenses	-11,498
3	Net loss from contributions	-306,407
4	Net loss from other experience	-7,840,644
5	Net experience loss: **1 + 2 + 3 + 4**	-$9,406,149

[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 System's investment policy. The rate of return on the market value of assets was -0.67% for the year ended June 30, 2020.

For valuation purposes, the assumed rate of return on the actuarial value of assets is 7.50%. The actual rate of return on an actuarial basis for the 2019-2020 plan year was 3.55%. Since the actual return for the year was less than the assumed return, the System experienced an actuarial loss during the year ended June 30, 2020 with regard to its investments.

Investment Experience

		Year Ended June 30, 2020	
		Market Value	**Actuarial Value**
1	Net investment income	-$206,519	$1,121,484
2	Average value of assets	30,606,406	31,587,780
3	Rate of return: **1 ÷ 2**	-0.67%	3.55%
4	Assumed rate of return	7.50%	7.50%
5	Expected investment income: **2 x 4**	2,295,480	2,369,084
6	Actuarial gain/(loss): **1 - 5**	-$2,501,999	-$1,247,600

Contributions

Total contributions for the year ended June 30, 2020 totaled $9,898,156, compared to the projected amount of $10,198,805. This resulted in a loss of $306,407 for the year, when adjusted for timing.

Non-investment experience

Administrative expenses

Administrative expenses for the year ended June 30, 2020 totaled $71,121, as compared to the assumption of $60,000. This resulted in a loss of $11,498 when adjusted for timing. Based on an average of the most recent three years, the assumption has been increased from $60,000 to $70,000 for the current year

Mortality experience

- Mortality experience (more or fewer than expected deaths) yields actuarial gains or losses.
- The average number of deaths for nondisabled retirees over the past five years was 1.20 per year compared to 1.94 projected deaths per year. However, the average number of deaths for retirees is too small to be statistically credible.

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),
- the number of disability retirements (more or fewer than projected), and
- salary increases (greater or smaller than projected).

The net loss from this other experience for the year ended June 30, 2020 amounted to $7,840,644, which is 7.7% of the actuarial accrued liability. There were many more retirements than were anticipated by the actuarial assumptions, particularly among the Police Officers, and these retirements occurred earlier than expected. In addition, there were several new retirees over the age of 60 who began receiving benefits from the Supplemental System; the retirement assumption being used to value plan liabilities expected that these individuals would retire directly into the Retirement and Relief System.

Actuarial assumptions

Assumed administrative expenses increased from $60,000 to $70,000 for the year beginning July 1, 2020. This is the only assumption change reflected this year. Details on actuarial assumptions and methods are in Section 4, Exhibit I.

The System undergoes an in-depth study every five years to compare the actuarial assumptions to actual experience, and the assumptions are updated as appropriate. The last experience review was completed for the five-year period ended June 30, 2015. The City is due for another experience study for the five-year period ended June 30, 2020.

Plan provisions

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

Section 2: Actuarial Valuation Results

Development of Unfunded Actuarial Accrued Liability for Year Ended June 30, 2020

1	Unfunded actuarial accrued liability at beginning of year	$63,767,186
2	Total normal cost at beginning of year, including administrative expenses	5,781,919
3	Total contributions	-9,898,156
4	Interest on 1, 2 & 3	4,875,933
5	Expected unfunded actuarial accrued liability	$64,526,882
6	Changes due to experience gains and losses	9,099,742
7	Unfunded actuarial accrued liability at end of year	$73,626,624

Actuarially determined contribution

The actuarially determined contribution shown in this section reflects the City's contribution, net of expected 5.22% of payroll contributions from employees. This contribution is equal to the employer normal cost payment and a 27-year payment on the unfunded actuarial accrued liability. As of July 1, 2020 the actuarially determined contribution is $6,511,052, or 7.68% of payroll.

Currently, the City contributes 6.05% of pay to the System. In addition, the System receives income from the Fire Insurance Tax, which is roughly 0.40% of pay. The net employer normal cost rate for the System, including administrative expenses, is 1.80% of pay. After paying the normal cost, the remaining contributions will effectively amortize the unfunded actuarial accrued liability over 53 years. This is a significant increase over last year's effective period of 33 years, and 23 years as of July 1, 2018.

The contribution requirement as of July 1, 2020 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 July 1

		2020		2019	
		Amount	% of Payroll	Amount	% of Payroll
1.	Total normal cost[1]	$5,888,378	6.94%	$5,724,211	6.87%
2.	Administrative expenses	67,325	0.08%	57,708	0.07%
3.	Expected employee contributions	-4,425,914	-5.22%	-4,349,993	-5.22%
4.	Employer normal cost: (1) + (2) + (3)	$1,529,790	1.80%	$1,431,926	1.72%
5.	Actuarial accrued liability	$102,001,461		$99,689,393	
6.	Actuarial value of assets	28,374,837		35,922,207	
7.	Unfunded actuarial accrued liability: (5) - (6)	$73,626,624		$63,767,186	
8.	Payment on unfunded actuarial accrued liability	4,732,487	5.58%	4,027,209	4.83%
9.	Adjustment for timing[2]	248,775	0.30%	216,869	0.26%
10.	Total actuarially determined contribution: (4) + (8) + (9)	$6,511,052	7.68%	$5,676,004	6.81%
11.	Total payroll[3]	$84,787,622		$83,333,196	

[1]Including net obligations to the Retirement and Relief System of $1,560,045 for July 1, 2020 and $1,416,702 for July 1, 2019 ($1,622,019 and $1,472,892 when adjusted for timing).
[2]Actuarially determined contributions are assumed to be paid at the beginning of every month.
[3]Includes $3,629,350 in payroll as of June 30, 2020 for 58 retirees and $2,474,793 in payroll as of June 30, 2019 for 39 retirees who were rehired under the provisions of H.B.397.

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.

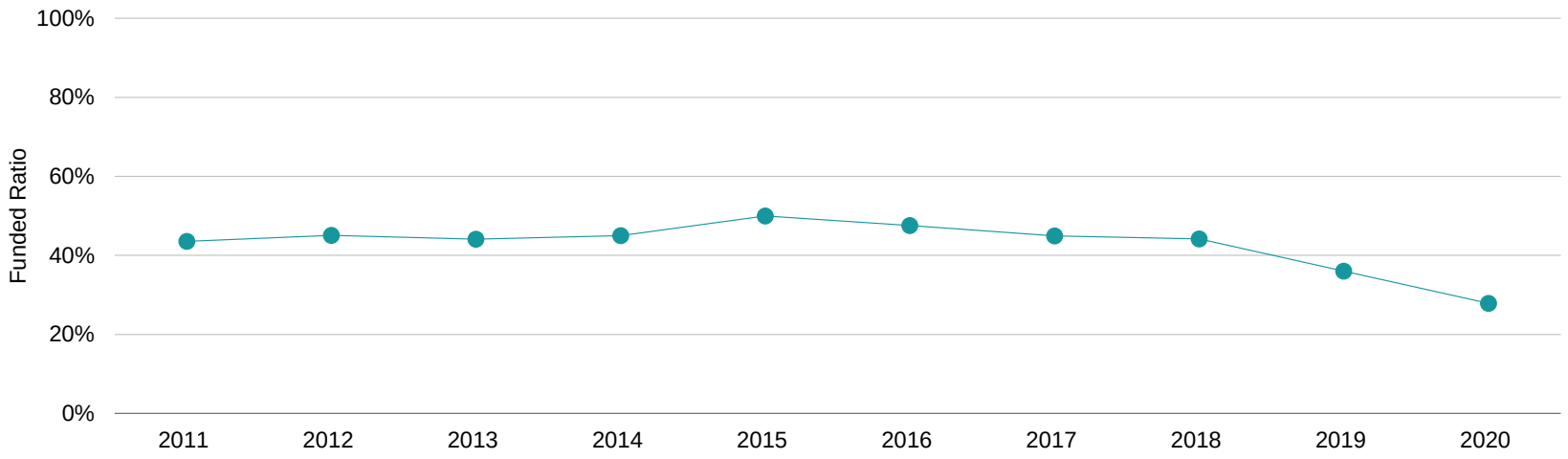
Reconciliation of Actuarially Determined Contribution from July 1, 2019 to July 1, 2020

	Amount	% of Payroll
Actuarially Determined Contribution as of July 1, 2019	$5,676,004	6.81%
• Effect of expected change in amortization payment due to payroll growth	104,680	0.13%
• Effect of change in administrative expense assumption	10,000	0.01%
• Effect of contributions less than actuarially determined contribution	20,477	0.02%
• Effect of investment loss	83,377	0.10%
• Effect of other gains and losses on accrued liability	327,783	0.39%
• Effect of employee contributions from retirees who returned to work	196,978	0.24%
• Net effect of other changes, including composition and number of participants	91,753	0.11%
Total change	$835,048	1.00%
Total change in percentage due to compensation change		-0.13%
Actuarially Determined Contribution as of July 1, 2020	$6,511,052	7.68%

Schedule of funding progress through June 30, 2020

Actuarial Valuation Date	Actuarial Value of Assets (a)	Actuarial Accrued Liability (AAL) (b)	Unfunded AAL (UAAL) (b) - (a)	Funded Ratio (a) / (b)	Covered Payroll (c)	UAAL as a Percentage of Covered Payroll [(b) - (a)] / (c)
07/01/2011	$47,775,761	$109,761,716	$61,985,955	43.53%	$79,533,564	77.94%
07/01/2012	49,847,983	110,597,569	60,749,586	45.07%	79,126,245	76.78%
07/01/2013	49,524,620	112,261,861	62,737,241	44.12%	77,188,613	81.28%
07/01/2014	51,184,673	113,804,271	62,619,598	44.98%	81,611,404	76.73%
07/01/2015	51,653,266	103,305,976	51,652,710	50.00%	83,650,291	61.75%
07/01/2016	47,918,217	100,803,611	52,885,394	47.54%	83,927,536	63.01%
07/01/2017	45,287,576	100,812,088	55,524,512	44.92%	85,269,937	65.12%
07/01/2018	43,100,200	97,654,121	54,553,921	44.14%	84,820,855	64.32%
07/01/2019	35,922,207	99,689,393	63,767,186	36.03%	83,333,196	76.52%
07/01/2020	28,374,837	102,001,461	73,626,624	27.82%	84,787,622	86.84%

Note: Beginning in 2019, covered payroll includes retirees who were rehired under the provisions of H.B.397.



History of employer contributions

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

History of Employer Contributions: 2012 – 2021

Fiscal Year Ended June 30	Actuarially Determined Employer Contribution (ADEC)[1]	Actual Employer Contribution	Percent Contributed
2012	$4,922,812	$4,561,000	92.65%
2013	4,899,785	4,039,735	82.45%
2014	5,839,810	4,090,689	70.05%
2015	6,038,436	4,212,776	69.77%
2016	4,960,548	4,364,213	87.98%
2017	5,092,012	4,354,660	85.52%
2018	5,276,401	4,942,429	93.67%
2019	5,044,341	5,040,631	99.93%
2020	5,676,004	5,320,565	93.74%
2021	6,511,052	- -	- -

[1]Prior to July 1, 2013, this amount was the Annual Required Contribution (ARC) and was calculated presuming that the employees would be responsible for an equal share of the cost of the System. However, if employee contribution rates were insufficient to cover half of the cost, the City was ultimately responsible for the funding of the System. Beginning July 1, 2013, the Actuarially Determined Employer Contribution (ADEC) is equal to the total calculated contribution in the most recent actuarial valuation, minus the portion expected to be covered by employee contributions.

Risk

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

This report does not contain a detailed analysis of the potential range of future measurements, but does include a brief discussion of some risks that may affect the Plan. A more detailed assessment would provide the Trustees with a better understanding of the risks inherent in the Plan. This assessment may include scenario testing, sensitivity testing, stress testing and stochastic modeling.

- Investment Risk (the risk that returns will be different than expected)

  The market value rate of return over the last 20 years has ranged from a low of -6.43% to a high of 24.97%.

  The annual investment gain/loss in the last decade has ranged from a loss of $2,501,199 to a gain of $1,266,069. If all investment returns were equal to the assumed return over the last ten years, the market value of assets as of the current valuation date would be approximately $41.0 million as opposed to the actual value of $26.1 million.

- Longevity Risk (the risk that mortality experience will be different than expected)

  The actuarial valuation includes an expectation of future improvement in life expectancy. Emerging plan experience that does not match these expectations will result in either an increase or decrease in the actuarially determined contribution. It is not yet known what short-term or long-term impact the COVID-19 pandemic may have on the System's mortality experience.

- Contribution Risk (the risk that actual contributions will be different from actuarially determined contribution)

  Plan contributions are set by statute, but the City can budget more than the statutory rate. If contribution rates are insufficient to amortize the unfunded liabilities, the long-term health of the System will suffer. Periodic projections comparing expected statutory contributions with the projected actuarially determined contributions may be developed to determine if the statutory amounts are sufficient to fund the System and to ensure the payment of promised benefits.

- Demographic Risk (the risk that participant experience will be different than assumed)

  Examples of this risk include:

  – Actual retirements occurring earlier or later than assumed. The Supplemental System pays benefits to retirees for a maximum of ten years, between 20 and 30 years of service. The current assumed retirement rates project that employees will retire, on average, with about 26 years of service. If employees retire earlier, that could lead to a significant increase in the System's liabilities. Also, participants who are over age 60 but have more than 20 but less than 30 years of service at retirement can choose whether to retire from Supplemental System or the Retirement and Relief System. The current assumption is that they

will retire from the Retirement and Relief System. When they choose to receive benefits from the Supplemental System instead, this System's liability increases, sometimes significantly.

- More or less active participant turnover than assumed.

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

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

  The non-investment gain/loss for a year has ranged from a loss of $7,852,142 to a gain of $4,183,554.

  The funded percentage on the actuarial value of assets has ranged from a low of 27.8% to a high of 50.0% since 2011. (The System currently has the lowest funded percentage it has had in the last decade.)

Section 3: Supplemental Information

Exhibit A: Table of Plan Demographics

Category	Year Ended June 30 2020	2019	Change From Prior Year
Active participants in valuation:			
• Number	1,348	1,345	0.2%
• Average age	38.7	39.5	-0.8
• Average years of service	10.3	11.0	-0.7
• Total payroll[1]	$84,787,622	$83,333,196	1.7%
• Average payroll[1]	60,304	60,212	0.2%
• Account balances	35,534,285	36,185,661	-1.8%
• Total active vested participants	175	212	-17.5%
Terminated participants due a refund of employee contributions	70	52	34.6%
Retired participants:			
• Number in pay status	357	322	10.9%
• Average age	53.7	53.3	0.4
• Average monthly benefit	$2,642	$2,594	1.9%
• Number in suspended status	0	1	-100.0%
Beneficiaries:			
• Number in pay status	69	71	-2.8%
• Average age	72.3	71.3	1.0
• Average monthly benefit	$1,161	$1,115	4.1%

[1]The total and average payroll includes $3,629,350 in payroll as of June 30, 2020 for 58 retirees and $2,474,793 in payroll for 39 retirees as of June 30, 2019 who have returned to active employment with the City under the provisions of H.B.397. However, these individuals are counted as retired participants elsewhere in this exhibit.

Exhibit B: Participants in Active Service as of June 30, 2020 by Age, Years of Service, and Average Payroll

B-1 Fire and Police

		Years of Service					
Age	**Total**	**0 - 4**	**5 - 9**	**10 - 14**	**15 - 19**	**20 - 24**	**25 - 29**
Under 25	83	83	- -	- -	- -	- -	- -
	$42,964	$42,964	- -	- -	- -	- -	- -
25 - 29	205	166	39	- -	- -	- -	- -
	47,726	45,625	$56,669	- -	- -	- -	- -
30 - 34	243	99	94	50	- -	- -	- -
	54,981	46,809	58,729	$64,115	- -	- -	- -
35 - 39	241	53	51	108	29	- -	- -
	61,047	47,564	60,770	65,418	$69,897	- -	- -
40 - 44	198	22	29	76	62	9	- -
	66,107	50,539	60,217	66,347	71,710	$82,507	- -
45 - 49	179	14	13	35	64	40	13
	70,049	57,099	62,317	66,784	69,675	78,800	$75,433
50 - 54	126	9	7	22	23	34	31
	73,008	61,857	67,755	65,053	65,176	75,411	86,250
55 - 59	51	1	- -	12	11	12	15
	68,880	66,248	- -	63,279	63,327	69,516	77,101
60 - 64	16	2	- -	3	1	3	7
	62,902	49,660	- -	64,804	60,691	73,027	61,847
65 - 69	6	- -	- -	2	1	2	1
	64,896	- -	- -	63,770	60,691	66,998	67,148
Total	1,348	449	233	308	191	100	67
	$60,206	$46,611	$59,488	$65,465	$69,368	$76,458	$79,268

Note: This chart excludes 58 retirees who have been reemployed by the City under the provisions of H.B.397.

Exhibit B: Participants in Active Service as of June 30, 2020 by Age, Years of Service, and Average Payroll

B-2 Fire

		Years of Service					
Age	**Total**	**0 - 4**	**5 - 9**	**10 - 14**	**15 - 19**	**20 - 24**	**25 - 29**
Under 25	33	33	- -	- -	- -	- -	- -
	$44,210	$44,210	- -	- -	- -	- -	- -
25 - 29	64	49	15	- -	- -	- -	- -
	50,232	47,643	$58,692	- -	- -	- -	- -
30 - 34	97	39	37	21	- -	- -	- -
	55,147	47,335	58,042	$64,555	- -	- -	- -
35 - 39	107	24	27	39	17	- -	- -
	61,139	48,052	60,530	65,137	$71,409	- -	- -
40 - 44	100	14	16	26	38	6	- -
	67,658	51,733	59,725	67,079	74,514	$85,068	- -
45 - 49	94	10	8	15	35	25	1
	71,326	60,792	62,150	67,737	71,875	79,757	$73,929
50 - 54	60	5	4	10	10	19	12
	74,156	62,903	67,902	66,670	66,275	78,987	86,085
55 - 59	26	1	- -	2	6	7	10
	72,601	66,248	- -	65,117	65,423	68,084	82,203
60 - 64	7	- -	- -	2	1	2	2
	67,784	- -	- -	66,860	60,691	77,548	62,489
65 - 69	- -	- -	- -	- -	- -	- -	- -
	- -	- -	- -	- -	- -	- -	- -
Total	588	175	107	115	107	59	25
	$62,665	$48,604	$59,688	$65,972	$71,748	$78,589	$82,158

Note: This chart excludes one retired firefighter who has been reemployed by the City under the provisions of H.B.397.

Exhibit B: Participants in Active Service as of June 30, 2020 by Age, Years of Service, and Average Payroll

B-3 Police

		Years of Service					
Age	**Total**	**0 - 4**	**5 - 9**	**10 - 14**	**15 - 19**	**20 - 24**	**25 - 29**
Under 25	50	50	- -	- -	- -	- -	- -
	$42,142	$42,142	- -	- -	- -	- -	- -
25 - 29	141	117	24	- -	- -	- -	- -
	46,589	44,780	$55,405	- -	- -	- -	- -
30 - 34	146	60	57	29	- -	- -	- -
	54,870	46,466	59,176	$63,796	- -	- -	- -
35 - 39	134	29	24	69	12	- -	- -
	60,974	47,160	61,041	65,577	$67,755	- -	- -
40 - 44	98	8	13	50	24	3	- -
	64,523	48,451	60,823	65,966	67,272	$77,387	- -
45 - 49	85	4	5	20	29	15	12
	68,637	47,865	62,583	66,070	67,021	77,206	$75,558
50 - 54	66	4	3	12	13	15	19
	71,964	60,549	67,558	63,705	64,331	70,882	86,355
55 - 59	25	- -	- -	10	5	5	5
	65,010	- -	- -	62,911	60,811	71,520	66,898
60 - 64	9	2	- -	1	- -	1	5
	59,105	49,660	- -	60,691	- -	63,986	61,590
65 - 69	6	- -	- -	2	1	2	1
	64,896	- -	- -	63,770	60,691	66,998	67,148
Total	760	274	126	193	84	41	42
	$58,304	$45,338	$59,318	$65,163	$66,336	$73,392	$77,548

Note: This chart excludes 57 retired police officers who have been reemployed by the City under the provisions of H.B.397.

Exhibit C: Reconciliation of Participant Data

	Active Participants	Retired Participants[1]	Beneficiaries	Total
Number as of July 1, 2019	**1,345**	**323**	**71**	**1,739**
• New participants	128	N/A	N/A	128
• Terminations – without vested rights[2]	-21	N/A	N/A	-21
• Retirements	-66	66	N/A	0
• Return to work	0	-1	N/A	0
• Deceased	0	0	0	-1
• New beneficiaries	0	0	1	1
• Lump sum cash-outs	-24	0	0	-24
• Rehire	0	0	N/A	0
• Certain period expired	N/A	0	-3	-3
• Data adjustments	0	0	0	0
• Transfer of actives with more than 30 years of service to Retirement & Relief System	-2	N/A	N/A	-2
• Retired in Retirement and Relief System	-12	-31	0	-43
Number as of July 1, 2020	**1,348**	**357**	**69**	**1,774**

[1]Includes retirees or beneficiaries whose payments are suspended.
[2]The data reflects terminated participants due a refund of employee contributions.

Exhibit D: Summary Statement of Income and Expenses on a Market Value Basis

	Year Ended June 30, 2020	Year Ended June 30, 2019
Net assets at market value at the beginning of the year	$34,940,833	$42,627,180
Contribution income:		
• Employer contributions	$5,320,565	$5,040,631
• Employee contributions	4,473,188	4,349,238
• Fire Insurance Tax contributions	104,403	300,386
• Less administrative expenses	-71,121	-61,286
Net contribution income	*$9,827,035*	*$9,628,969*
Investment income:		
• Interest, dividends and other income	$1,038,238	$1,063,451
• Asset appreciation	-1,097,772	333,538
• Less investment fees	-146,985	-239,156
Net investment income	*-$206,519*	*$1,157,833*
Total income available for benefits	**$9,620,516**	**$10,786,802**
Less benefit payments:		
• Benefits	-$12,111,747	-$10,877,381
• DROP payments	-4,147,043	-5,748,847
• Refunds	-643,518	-490,219
• R&R contribution for Supplemental retirees	-1,593,581	-1,356,702
Net benefit payments	*-$18,495,889*	*-$18,473,149*
Change in market value of assets	**-$8,875,373**	**-$7,686,347**
Net assets at market value at the end of the year	**$26,065,460**	**$34,940,833**

Exhibit E: Summary Statement of Plan Assets

		June 30, 2020		June 30, 2019
Cash equivalents		$1,089,102		$612,934
Total accounts receivable		$59,605		$84,692
Investments:				
• Domestic stocks	$19,026,468		$26,214,790	
• Domestic corporate bonds	3,303,197		4,184,699	
• Alternative investments	1,957,755		2,012,827	
• U.S. Government obligations	778,510		1,868,245	
Total investments at market value		$25,065,930		$34,280,561
Total assets		$26,214,637		$34,978,187
Total accounts payable		-149,177		-37,354
Net assets at market value		**$26,065,460**		**$34,940,833**
Net assets at actuarial value		**$28,374,837**		**$35,922,207**

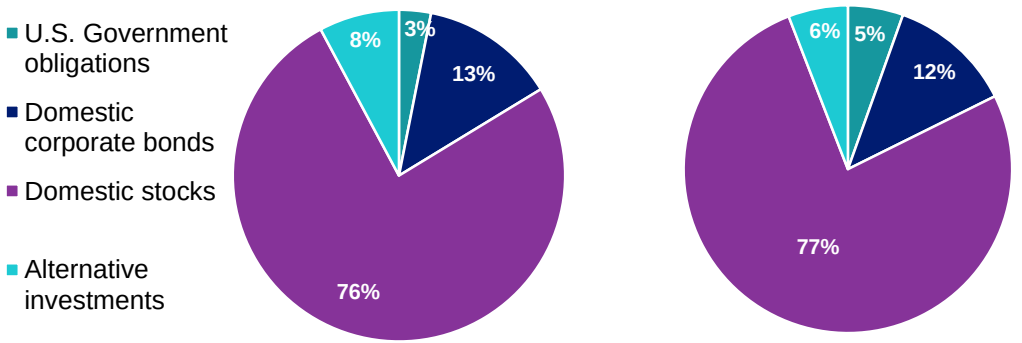


Exhibit F: Development of the Fund through June 30, 2020

Year Ended June 30	Employer Contributions	Employee Contributions	Fire Insurance Tax	Net Investment Return[1]	Admin. Expenses	Benefit Payments	Market Value of Assets at Year-End	Actuarial Value of Assets at Year-End	Actuarial Value as a Percent of Market Value
2011	$3,988,000	$3,974,000	$0	$5,208,000	$71,000	$8,350,000	$47,022,000	$47,775,761	101.6%
2012	4,561,000	4,543,000	0	1,256,000	74,000	8,822,000	48,486,000	49,847,983	102.8%
2013	4,039,735	4,024,743	0	3,815,769	60,299	10,681,296	49,624,652	49,524,620	99.8%
2014	4,090,689	4,074,251	313,899	5,819,742	36,850	10,823,354	53,063,029	51,184,673	96.5%
2015	4,212,776	4,197,254	362,196	982,275	75,251	11,943,335	50,798,944	51,653,266	101.7%
2016	4,364,213	4,348,710	404,462	-399,577	72,692	15,214,638	44,229,422	47,918,217	108.3%
2017	4,354,660	4,336,141	323,369	4,172,814	55,250	14,185,871	43,175,285	45,287,576	104.9%
2018	4,942,429	4,443,095	295,031	4,321,601	61,035	14,489,226	42,627,180	43,100,200	101.1%
2019	5,040,631	4,349,238	300,386	1,157,833	61,286	18,473,149	34,940,833	35,922,207	102.8%
2020	5,320,565	4,473,188	104,403	-206,519	71,121	18,495,889	26,065,460	28,374,837	108.9%

[1]On a market basis, net of investment fees

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 Retirees and Beneficiaries:	Actuarial Present Value of lifetime benefits to existing retirees 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. 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 actuarial liabilities that are larger than projected.
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.

Section 3: Supplemental Information

Actuarial Present Value of Future 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 Benefits includes the liabilities for active members, retired members, beneficiaries receiving benefits, and inactive members entitled to either a refund of member contributions 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, as well as Actuariallv Determined Contributions.
Actuarial Value of Assets (AVA):	The value of the Plan'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 Actuariallv Determined Contribution.
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 Plan.
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 Unfunded Actuarial Accrued Liability. 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 Unfunded Actuarial Accrued Liability. 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 intended to pay off the Unfunded Actuarial Accrued Liability.

Section 3: Supplemental Information

Assumptions or Actuarial Assumptions:	The estimates upon which the cost of the Plan is calculated, including: Investment return - the rate of investment yield that the Plan will earn over the long-term future; Mortality rates - the rate or probability of death at a given age for employees and retirees; Retirement rates - the rate or probability of retirement at a given age or service; Disability rates - the rate or probability of disability retirement at a given age; Withdrawal rates - the rate or probability 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, real wage growth and merit and promotion increases.
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 20 years, it is 19 years at the end of one year, 18 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 based on the member's compensation, age 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 Plan 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 based on recommendations from the Actuary.
Funded Ratio:	The ratio of the Actuarial Value of Assets (AVA) to the Actuarial Accrued Liability (AAL). Plans sometimes also calculate a market funded ratio, using the Market Value of Assets (MVA), rather than AVA.

Section 3: Supplemental Information

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 Plan 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:	The portion of the Actuarial Present Value of Future Benefits and expenses allocated to a valuation year by the Actuarial Cost Method. Any payment with respect to an Unfunded Actuarial Accrued Liability is not part of the Normal Cost (see Amortization Payment). For pension plan benefits that are provided in part by employee contributions, Normal Cost refers to the total of member 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 each future year in determining the Amortization Period.
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 or an Overfunded Actuarial Accrued Liability.
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 Benefits is determined. The expected benefits to be paid in the future are discounted to this date.

Section 4: Actuarial Valuation Basis

Exhibit I: Actuarial Assumptions, Actuarial Cost Method and Models

Rationale for Assumptions	The information and analysis used in selecting each demographic assumption that has a significant effect on this actuarial valuation is shown in the Experience Study Report for the five-year period ended June 30, 2015. Based on the results of that study as well as professional judgment, no additional demographic assumption changes are warranted at this time and will be assessed again in the next five-year review.
Net Investment Return:	7.50% The net investment return assumption was chosen by the Pension System's Board of Trustees, with input from the actuary. The net investment return 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 Increases:	See table below *Note: The salary increase rates include 2.50% inflation*
Payroll Growth:	2.50%, used to amortize the unfunded actuarial accrued liability as a level percentage of payroll.
Administrative Expenses:	$70,000 per year, payable monthly, equivalent to $67,325 at the beginning of the year. The annual administrative expenses were based on historical and current data and adjusted to reflect estimated future experience and professional judgment.

Years of Service	Rate (%)	Years of Service	Rate (%)
Less than 1	6.75	7-8	5.00
1-2	6.50	8-9	4.75
2-3	6.25	9-10	4.50
3-4	6.00	10-14	4.00
4-5	5.75	15-19	3.50
5-6	5.50	20-24	3.00
6-7	5.25	25-29	2.75

Section 4: Actuarial Valuation Basis

Mortality Rates:

Pre-retirement: RP-2014 Blue Collar Employee Mortality Table, set forward two years for males and four years for females, projected generationally using Scale MP-2015

Healthy annuitants: RP-2014 Blue Collar Employee Healthy Annuitant Mortality Table, set forward two years for males and four years for females, projected generationally using Scale MP-2015

Disabled annuitants: RP-2014 Disabled Retiree Mortality Table, 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 reflect future mortality improvement.

Annuitant Mortality Rates:

	Rate (%)			
	Healthy[1]		Disabled[1]	
Age	Male	Female	Male	Female
55	0.69	0.53	2.34	1.45
60	0.98	0.80	2.66	1.70
65	1.50	1.27	3.17	2.09
70	2.37	2.08	4.03	2.82
75	3.83	3.44	5.43	4.10
80	6.36	5.83	7.66	6.10
85	10.70	10.04	11.33	9.04
90	17.77	16.63	17.30	13.27

[1]Rates shown do not include generational projection.

Section 4: Actuarial Valuation Basis

Mortality and Disability Rates Before Retirement:

	Rate (%)			
	Mortality[1]		Disability	
Age	Male	Female	Fire	Police
20	0.06	0.02	0.15	0.15
25	0.06	0.02	0.15	0.15
30	0.06	0.03	0.15	0.15
35	0.07	0.04	0.95	0.15
40	0.09	0.07	0.95	0.50
45	0.16	0.11	0.95	0.50
50	0.27	0.17	0.95	0.50
55	0.44	0.25	0.95	0.50
60	0.76	0.38	0.95	0.50

[1]*Rates shown do not include generational projection.*

On the Job Disability:

Fire: 80%

Police: 100%

On the Job Death:

Fire and Police: 15%

Section 4: Actuarial Valuation Basis

Termination Rates Before Retirement:

Withdrawal			
Years of Service	Rate (%)	Years of Service	Rate (%)
1	5.00	9	2.50
2	4.50	10	2.00
3	4.25	11	1.75
4	4.00	12	1.50
5	3.75	13	1.25
6	3.50	14-16	1.00
7	3.25	17-20	0.50
8	3.00	20+	0.00

Retirement Rates:

Fire		Police	
Years of Service[1]	Rate (%)	Years of Service[1]	Rate (%)
20	15.0	20	30.0
21	10.0	21	15.0
22-25	5.0	22	7.5
26-27	20.0	23-25	2.5
28	10.0	26	20.0
29	50.0	27-28	10.0
30-32	0.0	29	40.0
33	50.0	30-32	0.0
34	20.0	33	100.0
35	100.0		

[1]Retirement is assumed to occur no later than age 65. Participants retiring over age 60 with 20 years of service or any age with more than 30 years of service are assumed to retire directly into the Retirement and Relief System.

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Section 4: Actuarial Valuation Basis

Weighted Average Retirement Age	Age 54.6, 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 July 1, 2020 actuarial valuation**.**
Interest on DROP Accounts:	5.00%
Utilization of BackDROP:	90% of retiring Firefighters are assumed to elect a three-year BackDROP. Firefighters who retire prior to 23 years of service are not assumed to utilize the BackDROP provisions of the plan. 70% of retiring Police Officers are assumed to elect a three-year BackDROP. Police Officers who retire prior to 23 years of service are not assumed to utilize the BackDROP provisions of the plan.
Unknown Data for Participants:	Same as those exhibited by participants with similar known characteristics. If not specified, participants are assumed to be male.
Percent Married:	75%
Age of Spouse:	Females three years younger than males
Actuarial Value of Assets:	Market value of assets less unrecognized returns in each of the last five years. Unrecognized return is equal to the difference between the actual market return and the expected return on the market value, and is recognized over a five-year period, further adjusted, if necessary, to be within 20% of the market value.
Actuarial Cost Method:	Entry Age Actuarial Cost Method. Entry Age is the age at the time the participant commenced employment. Normal Cost and Actuarial Accrued Liability are calculated on an individual basis, with Normal Cost determined as if the current benefit accrual rate had always been in effect. Actuarial Liability is allocated by salary.
Models:	Segal valuation results are based on proprietary actuarial modeling software. The actuarial valuation models generate a comprehensive set of liability and cost calculations that are presented to meet regulatory, legislative and client requirements. Deterministic cost projections are based on a proprietary forecasting model. Our Actuarial Technology and Systems unit, comprised of both actuaries and programmers, is responsible for the initial development and maintenance of these models. The models have a modular structure that allows for a high degree of accuracy, flexibility and user control. The client team programs the assumptions and the plan provisions, validates the models, and reviews test lives and results, under the supervision of the responsible actuary.
Justification for Change in Actuarial Assumptions:	The only change in assumptions was an increase in the administrative expense assumption from $60,000 to $70,000.

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.

Plan Year:	July 1 through June 30
Plan Status:	Ongoing
Normal Retirement:	
Service Requirement	20 years of credited service
Amount	50% of final average salary plus 0.5% of final average salary for each year over 20 years is paid for the period prior to eligibility for 30-year retirement under the General Fund. Final average salary is defined as the highest average of basic salary earned during any 42 consecutive month period in the last 10 years prior to termination.
Disability:	
Service Requirement	5 years of credited service
Amount	A supplement sufficient when added to the General disability allowance to total not less than 25% nor more than 50% of final average salary, payable for life.
Termination:	If a participant terminates prior to eligibility for a pension from the Supplemental Pension System, a lump sum of his/her own contributions without interest is payable.
Death Benefits:	
Pre-Retirement	For an active participant who has at least 5 years of credited service, the survivor's benefit is equal to 60% of final average salary, plus 5% for each child up to two children. No death benefit is payable if a death benefit is payable from the General Fund.
Post-Retirement	For a retired participant, the survivor's benefit is 60% of the monthly benefit plus 5% per dependent child to a maximum of 70% of the participant's monthly benefit.
Back DROP:	Participants with at least 26 years of credited service may elect a 36-month Back-DROP. They will receive a monthly benefit based on service and final average salary as of the date of the Back-DROP and a 36-month lump-sum benefit.
Participation:	All qualified full-time firemen and policemen must participate.
Contribution Rates:	
Employees	5.22% of compensation
City	6.05% of compensation
Changes in Plan Provisions:	There have been no changes in plan provisions since the last valuation.

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