

City of Jacksonville General Employees Retirement Plan

Actuarial Valuation and Review

As of October 1, 2019



This report has been prepared at the request of the Board of Trustees to assist in administering the Plan. This valuation report may not otherwise be copied or reproduced in any form without the consent of the Board of Trustees 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.

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March 24, 2020

Board of Trustees
City of Jacksonville General Employees Retirement Plan
117 West Duval Street, Suite 330
Jacksonville, FL 32202

Dear Board Members:

We are pleased to submit this Actuarial Valuation and Review as of October 1, 2019. The census information on which our calculations were based was prepared by the Plan and the financial information was provided by the The City's Finance Department. That assistance is gratefully acknowledged .

Statement by Enrolled Actuary: This actuarial valuation and/or cost determination was prepared and completed by me, or under my direct supervision, and I acknowledge responsibility for the results. To the best of my knowledge, the results are complete and accurate, and in my opinion, the techniques and assumptions used are reasonable and meet the requirements and intent of part VII, Chapter 112, Florida Statutes. There is no benefit or expense to be provided by the plan and/or paid from the plan's assets for which liabilities or current costs have not been established or otherwise taken into account in the valuation. All known events or trends which may require a material increase in plan costs or required contribution rates have been taken into account in the valuation.

The actuarial calculations were directed under the supervision of Jeffrey S. Williams. I am a member of the American Academy of Actuaries and I meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion herein. To the best of my knowledge, the information supplied in this actuarial valuation is complete and accurate. Further, in my opinion, the assumptions as approved by the Board are reasonably related to the experience of and the expectations for the Plan.

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

Sincerely,
Segal

A handwritten signature in black ink that reads "Jeffrey S. Williams".

Jeffrey S. Williams, FCA, ASA, MAAA, EA
Vice President and Actuary
Enrolled Actuary No. 17-7009

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Actuarial Valuation Summary

Purpose and basis

This report was prepared by Segal to present a valuation of the Plan as of October 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) Statements No. 67 and 68. 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 participants, inactive vested participants, and retired participants and beneficiaries as of September 30, 2019, provided by the Retirement System Administrative Office;
- The assets of the Plan as of September 30, 2019, 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. and
- The funding policy adopted by the Board, subject to the requirements of Part VII, Chapter 112, Florida Statutes.

Section 1: Actuarial Valuation Summary

Valuation highlights

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.
2. The City’s minimum required contribution calculated in the October 1, 2019 actuarial valuation is for the plan year beginning October 1, 2020.
3. Actual contributions made during the fiscal year ending September 30, 2019 were \$70,338,000, 101.57% of the City’s required minimum contribution for fiscal 2019.
4. The funded ratio (the ratio of the actuarial value of assets to actuarial accrued liability) is 61.11%, compared to the prior year funded ratio of 63.24%. 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 59.95%, compared to 65.23% as of the prior valuation date. 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. Actuarial Standard of Practice No. 4, Measuring Pension Obligations and Determining Pension Plan Costs or Contributions, states that an actuary preparing calculations of actuarially determined contributions should assess the material implications of the funding policy. This report includes two distinct contribution amounts, each with different implications.
 - a. The **Florida Chapter 112 Determined Employer Contribution** is an amount consistent with a funding policy which seeks to stabilize the unfunded actuarial accrued liability (UAAL) as a percentage of total General Employees Retirement Plan (GERP) payroll, including Defined Contribution participants, where UAAL is measured relative to assets currently available to make benefit payments. Under this policy, assuming that all assumptions are met in aggregate, the UAAL is expected to be reduced to zero over a period of 27 years after reflecting an amortization period reset as of October 1, 2016. Over the short term, this contribution policy would be expected to keep the UAAL roughly level over the next few years, primarily making payments on interest, and begin paying down the UAAL after that point.
 - b. The **City’s required minimum contribution**, which is the Chapter 112 contribution adjusted to comply with state law, reduced by amortization of discounted allocated surtax revenue, is an amount consistent with a funding policy which seeks to stabilize the contribution requirement as a percentage of total GERP payroll, including General Employee Defined Contribution Plan participants, relative to an anticipated increase in contribution income set to begin January 1, 2031. Under this policy, assuming that all assumptions are met in aggregate, the UAAL is expected to be reduced to zero by December 31, 2060, after all of the surtax revenue allocated to the plan is collected and contributed. Over the short term, this contribution policy is expected to lead to an increase in the UAAL, prior to the revenue stream commencing and paying it down.

Use of this contribution policy has been authorized by the Florida State Legislature and Jacksonville City Council.

Section 1: Actuarial Valuation Summary

6. The “City’s minimum required contribution” refers to the cumulative minimum required contribution for all contributing employers.
7. The City’s minimum required contribution (the amount which will be contributed) for fiscal 2021 is \$76,832,977, an increase of \$5,583,298 from the amount being contributed in fiscal 2020.
8. The unfunded actuarial accrued liability (UAAL) is \$1,278,140,150, which is an increase of \$103,004,940 since the prior valuation.
9. The actuarial gain from investment and other experience was \$69,707,205, or 2.12% of actuarial accrued liability.
 - The actuarial loss from investment experience was \$20,705,851, or 0.63% of actuarial accrued liability.
 - The net experience loss from sources other than investment experience was \$49,001,354, or 1.49% of the actuarial accrued liability.
10. The rate of return on the market value of assets was 0.73% for the October 1, 2018 to September 30, 2019 plan year. The return on the actuarial value of assets was 5.94% for the same period due to the recognition of prior years’ investment gains and losses. This resulted in an actuarial loss when measured against the assumed rate of return of 7.00%.
11. The following changes in actuarial assumptions are first reflected with this valuation.
 - The discount rate was lowered from 7.00% to 6.90%.
 - The mortality assumptions were changed from being based on the FRS mortality tables used in the July 1, 2018 FRS actuarial valuation for the non-special risk personnel to the FRS mortality tables used in the July 1, 2019 FRS actuarial valuation for personnel other than special risk and K-12 instructional personnel. The set forward used to adjust for the plan’s experience was changed for healthy pre- and post-retirement lives from 2.5 years to 2.0 years with the adoption of the new base table. The mortality improvement scale was changed from scale BB to scale MP2018 in conjunction with this change.

As a result of these assumption changes, the total normal cost increased by \$678,371 and the actuarial accrued liability increased by \$4,913,569. The present value of surtax revenue allocated to GERP increased by \$12,100,053 as a result of the discount rate change. The total impact was a decrease in the City’s minimum required contribution of \$390,986.
12. The City changed the surtax allocation percentage from the prior valuation to the current valuation. In the 2018 valuation, GERP’s allocation percentage was 33.40%; in the 2019 valuation, the allocation percentage has been increased to 34.57%. This change was directed by the City based on its updated calculation of the General Employees Retirement Plan’s share of the City’s unfunded liabilities. The change in the surtax allocation percentage caused the City’s minimum required contribution to decrease by \$1,246,577.
13. The City is solely responsible for the assumption as to what percentage the surtax revenue will grow and Segal relies on the City for this assumption. This rate was set at 4.25% by the City for the projection period January 1, 2019 through December 31, 2060, and will be recalculated by the City every year and adopted by the City Council. Segal will ask the City each year to provide actual surtax revenue for the preceding fiscal year and an assumption as to future growth. The difference in actual and projected

Section 1: Actuarial Valuation Summary

surtax revenue each year will be amortized over the period by which each year's gain or loss is being amortized. If surtax revenue grows more slowly or more quickly than expected, contribution requirements will increase or decrease accordingly.

14. The present value of the projected surtax revenue was determined and used in determination of the City's required contribution as follows:
 - a. Actual 2019 surtax revenue was projected to increase by 4.25% each year thereafter through 2060.
 - b. A share of 34.57% of the projected revenue for January 1, 2031 through December 31, 2060 was allocated to GERP.
 - c. The revenue allocated to GERP was discounted at the valuation discount rate of 6.90% to October 1, 2019.
 - d. The original allocated present value amount of \$332,190,859 was amortized over a 30-year initial period (Section 3, Exhibit F), with subsequent charges amortized over new periods. The present value of projected surtax revenue as of October 1, 2019 allocated to GERP is \$537,466,213.
 - e. After the amortized value amount was adjusted for the timing of contributions and projected to October 1, 2020, this amount was used as an offset to the Florida Chapter 112 Determined Employer Contribution to determine the City's minimum required contribution for fiscal 2020.
15. The present value of projected surtax revenue does not decrease the UAAL. The amortized value of the projected surtax revenue is used as an offset to the Chapter 112 contribution.
16. This report constitutes an actuarial valuation for the purpose of determining the actuarially determined contribution under the Plan's funding policy and measuring the progress of that funding policy. The Net Pension Liability (NPL) and Pension Expense under Governmental Accounting Standards Board (GASB) Statements No. 67 and No. 68, for inclusion in the plan and employer's financial statements as of September 30, 2019 are also included in this report.
17. GASB accounting does not permit any recognition of the allocated surtax revenue in determining the Net Pension Liability or Pension Expense. It is Segal's understanding that the City has discussed this issue with their external auditors and does not include any recognition of allocated surtax revenue in its audited financial statements.
18. This actuarial report as of October 1, 2019 is based on financial and demographic data as of that date. Changes subsequent to that date are not reflected and will affect future actuarial costs of the plan.
19. 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.
20. The financial information received states all results rounded to the nearest thousand. The results in this valuation are shown to the nearest dollar. Therefore, occasionally rounded numbers are combined with unrounded ones

Section 1: Actuarial Valuation Summary

Summary of key valuation results

		2020	2019	2018
Contributions for fiscal year beginning October 1:	• Florida Chapter 112 determined employer contribution	\$108,568,188	\$100,620,425	\$95,290,428
	• Less amortized value of discounted value of projected surtax revenue	<u>-31,735,211</u>	<u>-29,370,746</u>	<u>-26,042,904</u>
	• City's required minimum contribution*	\$76,832,977	\$71,249,679	\$69,247,524
	• Actual employer contributions	--	--	70,338,000
Actuarial accrued liability	• Retired participants and beneficiaries		\$2,235,258,792	\$2,179,539,282
	• Inactive vested participants		28,631,348	25,251,691
	• Active participants		1,022,423,341	991,889,543
	• Total actuarial accrued liability		3,286,313,481	3,196,680,516
	• Total normal cost including administrative expenses		40,918,741	41,097,477
Assets	• Market value of assets (MVA)		\$1,970,206,000	\$2,085,056,000
	• Actuarial value of assets (AVA)		2,008,173,331	2,021,545,306
	• Actuarial value of assets as a percentage of market value of assets		101.93%	96.95%
Funded status	• Unfunded actuarial accrued liability on market value of assets		1,316,107,481	\$1,111,624,516
	• Funded percentage on MVA basis		59.95%	65.23%
	• Unfunded actuarial accrued liability on actuarial value of assets		1,278,140,150	\$1,175,135,210
	• Funded percentage on AVA basis		61.11%	63.24%
Key assumptions	• Net investment return		6.90%	7.00%
	• Inflation rate		2.50%	2.50%
	• Payroll growth for amortization purposes		1.50%	1.50%
Demographic data	• Number of retired participants and beneficiaries		5,215	5,176
	• Number of inactive vested participants		196	185
	• Number of active participants		3,937	4,234
	• Covered payroll		\$249,982,877	\$253,982,175
	• Average payroll		63,496	59,986
	• Projected payroll for next fiscal year		253,732,620	257,791,908

*Pursuant to State Law Chapter 2016-146 and City of Jacksonville Ordinance 2017-257-E and 2017-258-E.

Section 1: Actuarial Valuation Summary

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 Retirement Administrative Office. 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 State 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 Retirement 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 Retirement 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 Retirement 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 Plan, it is not a fiduciary in its capacity as actuaries and consultants with respect to the Plan.

Actuarial Valuation Results

Participant data

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

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

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

Participant Population: 2010 – 2019

Year Ended September 30	Active Participants	Inactive Vested Participants ¹	Retired Participants and Beneficiaries	Total Non- Actives	Ratio of Non-Actives to Actives
2010	6,280	97	4,504	4,601	0.73
2011	6,109	90	4,603	4,693	0.77
2012	5,485	81	4,783	4,864	0.89
2013	5,139	78	4,896	4,974	0.97
2014	5,026	76	4,907	4,983	0.99
2015	4,817	65	4,976	5,041	1.05
2016	4,678	217	5,065	5,282	1.13
2017	4,644	195	5,105	5,300	1.14
2018	4,234	185	5,176	5,361	1.27
2019	3,937	196	5,215	5,411	1.37

¹ Excludes terminated participants due a refund of employee contributions

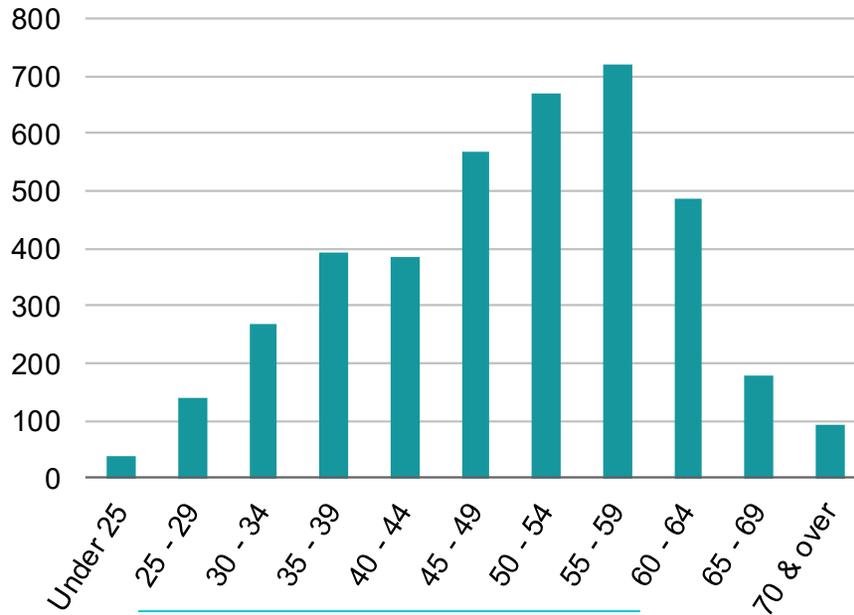
Section 2: Actuarial Valuation Results

Active participants

Plan costs are affected by the age, years of service and payroll of active participants. In this year's valuation, there were 3,937 active participants with an average age of 50.1, average years of service of 14.0 years and average payroll of \$63,496. The 4,234 active participants in the prior valuation had an average age of 49.3, average service of 13.2 years and average payroll of \$59,986.

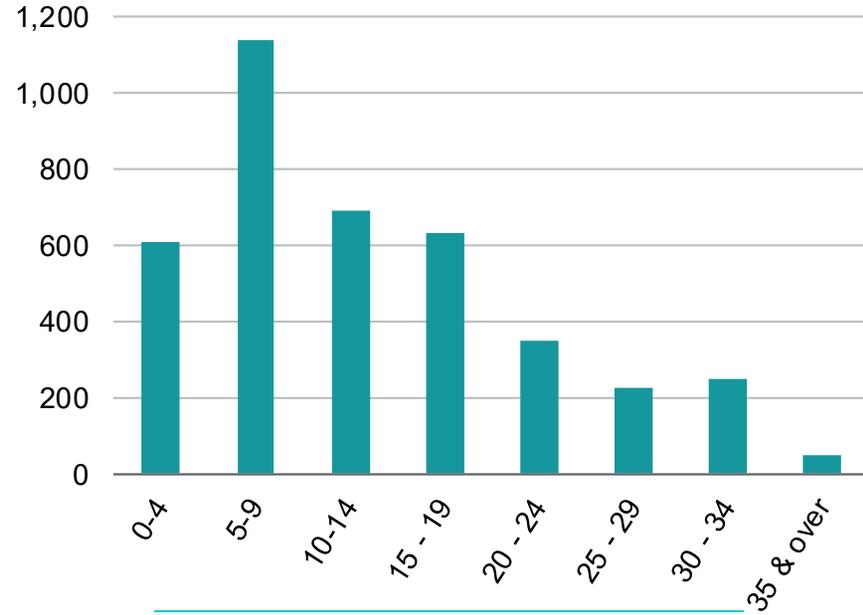
Distribution of Active Participants as of September 30, 2019

Actives by Age



Average age	50.1
Prior year average age	49.3
Difference	0.8

Actives by Years of Service



Average years of service	14.0
Prior year average years of service	13.2
Difference	0.8

Section 2: Actuarial Valuation Results

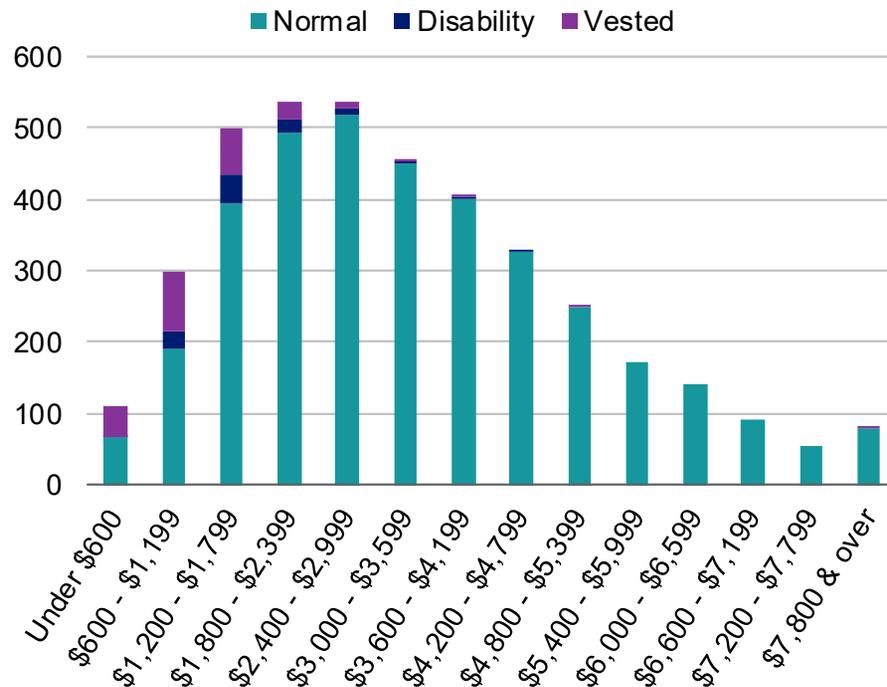
Retired participants and beneficiaries

As of September 30, 2019, 3,966 retired participants and 1,249 beneficiaries were receiving total monthly benefits of \$15,686,733. For comparison, in the previous valuation, there were 3,958 retired participants and 1,218 beneficiaries receiving monthly benefits of \$15,107,674.

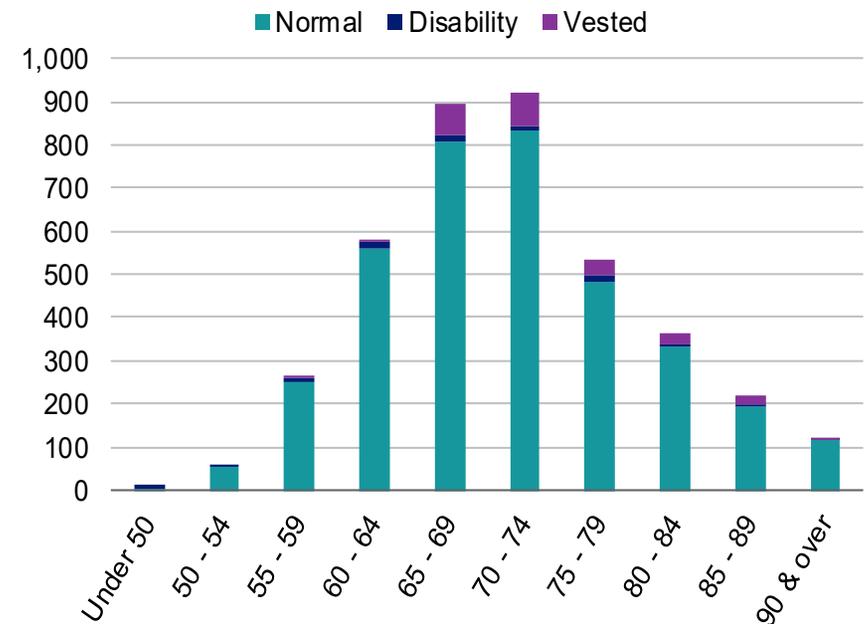
As of September 30, 2019, the average monthly benefit excluding supplement for retired participants is \$2,892, compared to \$2,919 in the previous valuation. The average age for retired participants is 72.4 in the current valuation, compared with 72.1 in the prior valuation.

Distribution of Pensioners as of September 30, 2019

Pensioners by Type and Monthly Amount Including Supplement



Pensioners by Type and Age



Section 2: Actuarial Valuation Results

Historical plan population

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

Participant Data Statistics: 2010 – 2019

Year Ended September 30	Active Participants			Retired Participants and Beneficiaries		
	Count	Average Age	Average Service	Count	Average Age	Average Monthly Amount Excluding Supplement
2010	6,280	47.0	10.5	4,504	70.4	\$2,240
2011	6,109	47.4	10.8	4,603	70.6	2,335
2012	5,485	47.7	11.2	4,783	70.5	2,441
2013	5,139	48.1	11.6	4,896	70.7	2,528
2014	5,026	48.3	11.8	4,907	70.9	2,606
2015	4,817	48.5	12.1	4,976	71.2	2,675
2016	4,678	48.5	12.5	5,065	71.4	2,756
2017	4,644	48.6	12.5	5,105	71.7	2,845
2018	4,234	49.3	13.2	5,176	72.1	2,919
2019	3,937	50.1	14.0	5,215	72.4	2,892

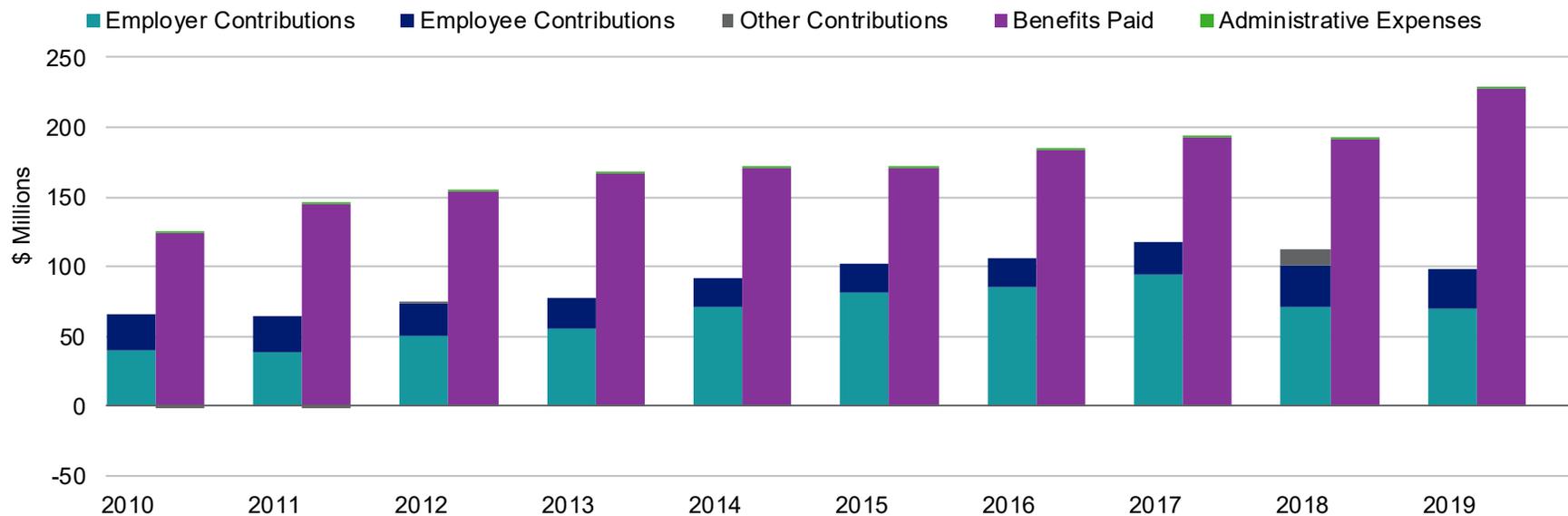
Section 2: Actuarial Valuation Results

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.

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 September 30, 2010 – 2019



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 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 September 30, 2019

1	Market value of assets, September 30, 2019			\$1,970,206,000
2	Calculation of unrecognized return	Original Amount *	Percent Deferred	Unrecognized Amount**
(a)	Year ended September 30, 2019	-\$126,629,625	80%	-\$101,303,700
(b)	Year ended September 30, 2018	3,347,148	60	2,008,290
(c)	Year ended September 30, 2017	133,575,436	40	53,430,174
(d)	Year ended September 30, 2016	39,489,525	20	7,897,905
(e)	Year ended September 30, 2015	-175,540,475	0	<u>0</u>
(f)	Total unrecognized return			-37,967,331
3	Preliminary actuarial value:	(1) - (2f)		\$2,008,173,331
4	Adjustment to be within 20% corridor			0
5	Final actuarial value of assets as of September 30, 2019:	(3) + (4)		<u>2,008,173,331</u>
6	Actuarial value as a percentage of market value:	(5) ÷ (1)		101.9%
7	Amount deferred for future recognition***:	(1) - (5)		-\$37,967,331

*Total return minus expected return on a market value basis

**Recognition at 20% per year over four years

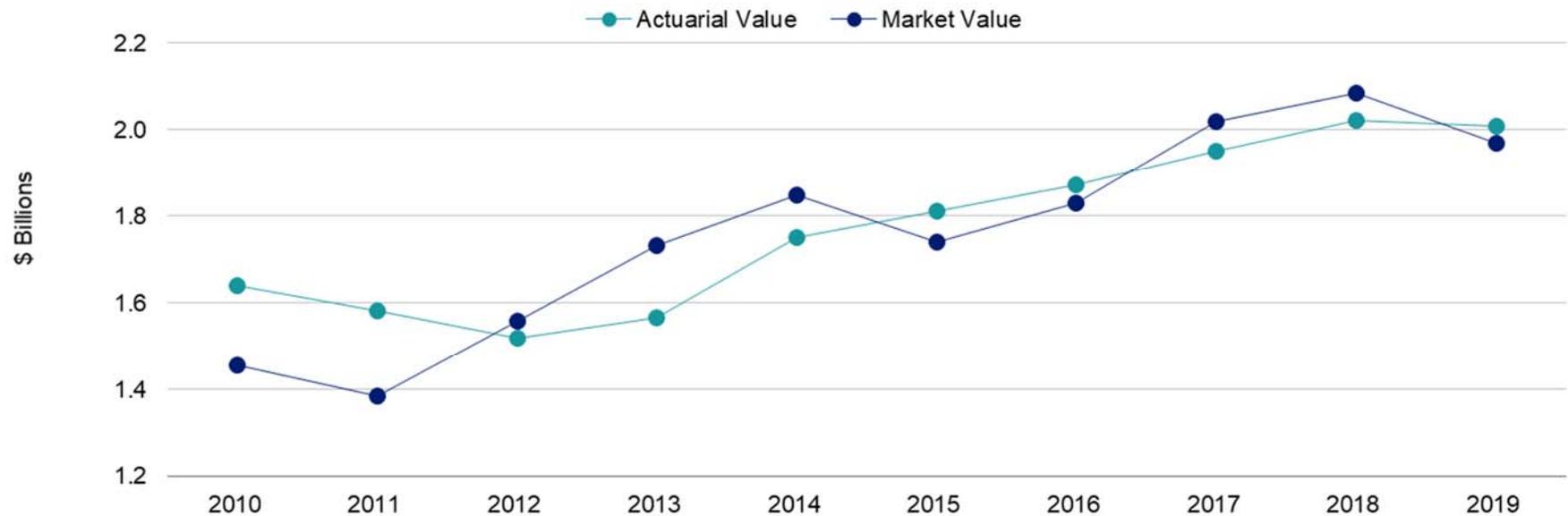
***Deferred return as of September 30, 2019 recognized in each of the next four years:

(a) Amount recognized on September 30, 2020	\$9,956,497
(b) Amount recognized on September 30, 2021	2,058,592
(c) Amount recognized on September 30, 2022	-24,656,495
(d) Amount recognized on September 30, 2023	-25,325,925

Section 2: Actuarial Valuation Results

Both the actuarial value and market value of assets are representations of the Plan'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 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.

Actuarial Value of Assets vs. Market Value of Assets as of September 30, 2010 – 2019



Section 2: Actuarial Valuation Results

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 loss is \$69,707,205, which includes \$20,705,851 from investment losses and \$49,001,354 in losses from all other sources. The net experience variation from individual sources other than investments was 1.5% 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 September 30, 2019

1	Net loss from investments*	-\$20,705,851
2	Net gain from administrative expenses	287,118
3	Net loss from other experience	-49,288,472
4	Net experience loss: 1 + 2 + 3	-\$69,707,205

Section 2: Actuarial Valuation Results

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. The rate of return on the market value of assets was 0.73% for the year ended September 30, 2019.

For valuation purposes, the assumed rate of return on the actuarial value of assets is 7.00% for the year ended September 30, 2019. The actual rate of return on an actuarial basis for the 2019 plan year was 5.94%. Since the actual return for the year was less than the assumed return, the Plan experienced an actuarial loss during the year ended September 30, 2019 with regard to its investments.

Investment Experience

	Year Ended September 30, 2019		Year Ended September 30, 2018	
	Market Value	Actuarial Value	Market Value	Actuarial Value
1 Net investment income	\$14,787,000	\$116,265,025	\$145,470,000	\$149,294,449
2 Average value of assets	2,020,237,500	1,956,726,806	1,973,928,500	1,906,593,357
3 Rate of return: 1 + 2	0.73%	5.94%	7.37%	7.83%
4 Assumed rate of return	7.00%	7.00%	7.20%	7.20%
5 Expected investment income: 2 x 4	141,416,625	136,970,876	142,122,852	137,274,722
6 Actuarial gain/(loss): 1 - 5	<u>-\$126,629,625</u>	<u>-\$20,705,851</u>	<u>\$3,347,148</u>	<u>\$12,019,727</u>

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 12 years, including averages over select time periods.

Investment Return – Actuarial Value vs. Market Value: 2008 - 2019

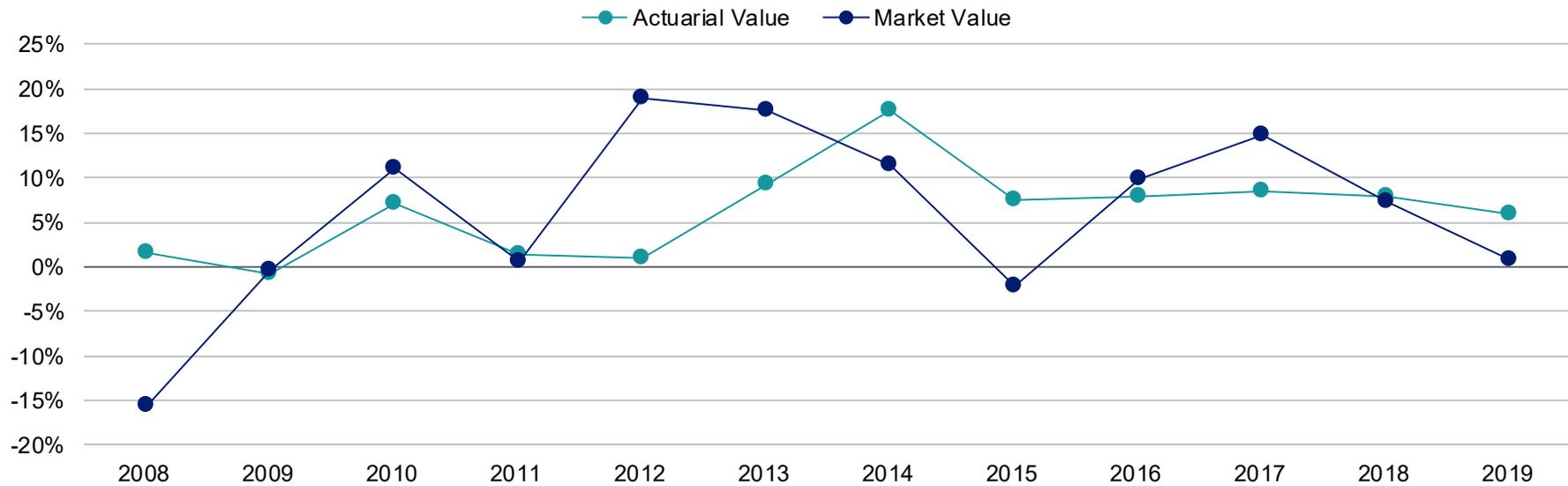
Year Ended September 30	Actuarial Value Investment Return		Market Value Investment Return	
	Amount	Percent	Amount	Percent
2008	--	1.59%	--	-15.65%
2009	--	-0.70	--	-0.31
2010	\$110,280,623	7.07	\$148,054,000	11.07
2011	22,313,906	1.39	9,313,000	0.66
2012	16,512,253	1.07	254,394,000	18.92
2013	136,580,384	9.27	264,541,000	17.48
2014	266,591,200	17.48	194,864,000	11.51
2015	128,075,601	7.46	-39,506,000	-2.18
2016	139,333,989	7.86	167,067,000	9.82
2017	155,254,757	8.46	266,138,000	14.86
2018	149,294,449	7.81	145,470,000	7.37
2019	116,265,025	5.94	14,787,000	0.73
Most recent five-year average return		7.49%	5.95%	
Most recent ten-year average return		7.34%	8.58%	

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

Section 2: Actuarial Valuation Results

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 September 30, 2008 - 2019



Section 2: Actuarial Valuation Results

Non-investment experience

Administrative expenses

- Administrative expenses for the year ended September 30, 2019 totaled \$959,000, as compared to the assumption of \$1,193,000. The resulted in a gain of \$287,118, due to timing.

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 loss from this other experience for the year ended September 30, 2019 amounted to \$49,288,472, which is 1.5% of the actuarial accrued liability.

Actuarial assumptions

- The mortality assumption, including an allowance for future longevity improvement, was updated to match that which is used for the Florida Retirement System Pension Plan for personnel who are neither Special Risk nor K-12 School Instructional Personnel.
- The discount rate was lowered from 7.00% to 6.90%.
- These changes increased the actuarial accrued liability by 0.15% and increased the total normal cost by 1.73%.

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.

Section 2: Actuarial Valuation Results

Development of Unfunded Actuarial Accrued Liability for Year Ended September 30, 2019

1	Unfunded actuarial accrued liability at beginning of year	\$1,175,135,210
2	Normal cost at beginning of year	17,468,984
3	Employer contributions	-70,338,000
4	Interest	
	• For whole year on 1 + 2	\$83,482,294
	• For half year on 3	<u>-2,229,112</u>
	Total interest	<u>81,253,182</u>
5	Expected unfunded actuarial accrued liability	\$1,203,519,376
6	Changes due to:	
	• (Gain)/loss	69,707,205
	• Assumptions	<u>4,913,569</u>
	Total changes	<u>\$74,620,774</u>
7	Unfunded actuarial accrued liability at end of year	<u>\$1,278,140,150</u>

Section 2: Actuarial Valuation Results

Florida's Chapter 112 Determined Employer Contribution and City's Minimum Required Contribution

The chart below shows the calculations of the Florida Chapter 112 determined employer contribution and the City's minimum required contribution pursuant to State Law Chapter 2016-146 and City of Jacksonville Ordinances 2017-257-E and 2017-258-E.

The contribution requirement as of October 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.

Florida Chapter 112 Determined Contribution and City's Minimum Required Contribution for Year Beginning October 1

	2019		2018	
	Amount	% of Projected Payroll	Amount	% of Projected Payroll
1. Total normal cost	\$39,959,741	15.75%	\$39,904,477	15.48%
2. Administrative expenses	959,000	0.37%	1,193,000	0.46%
3. Expected employee contributions	<u>-23,166,958</u>	<u>-9.12%</u>	<u>-23,628,493</u>	<u>-9.17%</u>
4. Employer normal cost: (1) + (2) + (3)	\$17,751,783	7.00%	\$17,468,984	6.78%
5. Actuarial accrued liability	\$3,286,313,481		\$3,196,680,516	
6. Actuarial value of assets	<u>2,008,173,331</u>		<u>2,021,545,306</u>	
7. Unfunded actuarial accrued liability: (5) - (6)	\$1,278,140,150		\$1,175,135,210	
8. Payment on unfunded actuarial accrued liability	85,434,101	33.67%	78,115,225	30.30%
9. Florida Chapter 112 determined employer contribution: (4) + (8) ¹	108,568,188	42.79%	100,620,425	39.03%
10. Discounted and amortized value of projected surtax revenue ^{1,2}	-31,735,211	-12.51%	-29,370,746	-11.39%
11. City's minimum required contribution: (9) + (10) ²	<u>\$76,832,977</u>	<u>30.28%</u>	<u>\$71,249,679</u>	<u>27.64%</u>
12. Projected payroll	\$253,732,620		\$257,791,908	

¹Adjusted for timing and projected to next fiscal year; contributions are assumed to be paid at the end of every month.

²Pursuant to State Law Chapter 2016-146 and City of Jacksonville ordinances 2017-257-E and 2017-258-E

Section 2: Actuarial Valuation Results

Reconciliation of City's Minimum Required Contribution

The chart below details the changes in the City's Minimum required contribution from the prior valuation to the current year's valuation.

Reconciliation of City's Minimum Required Contribution from October 1, 2019 to October 1, 2020

	Amount
City's Minimum Required Contribution as of October 1, 2019	\$71,249,679
• Effect of expected change in amortization payment due to payroll growth	792,904
• Effect of change in administrative expense assumption	-246,329
• Effect of contribution deferral to budget year and balancing amortization bases for surtax credit	2,082,782
• Effect of investment loss	1,451,656
• Effect of other gains and losses on accrued liability	3,435,410
• Effect of gain on updated surtax projection	-143,186
• Effect of updated surtax allocation	-1,246,577
• Effect of change in actuarial assumptions	-390,986
• Net effect of other changes, including composition and number of participants	-152,376
Total change	\$5,583,298
City's Minimum Required Contribution as of October 1, 2020	\$76,832,977

Section 2: Actuarial Valuation Results

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 September 30	City's Minimum Required	Actual Employer Contribution	Percent Contributed
2012	\$39,123,971	\$39,378,000	83.09%
2013	66,659,915	55,386,000	83.09%
2014	81,351,295	71,000,000	87.28%
2015	86,069,361	81,751,000	94.98%
2016	89,058,931	84,898,000	95.33%
2017	94,526,754	94,700,000	100.18%
2018	70,166,221	71,024,000	101.22%
2019	69,247,524	70,338,000	101.57%
2020	71,249,679	--	--
2021	76,832,977	--	--

Section 2: Actuarial Valuation Results

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. Upon request, a more detailed assessment of the risk 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.

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

The market value rate of return over the last 10 years has ranged from a low of -2.18% to a high of 18.92%.

- **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.

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

The Plan's funding policy requires payment of the City's minimum required contribution, which is the Florida Chapter 112 determined contribution reduced for anticipated funding from allocated surtax income. This policy produces a risk that this reduction in immediate funding might be either too large or too small, depending on whether the surtax income grows as quickly as expected.

If the City paid the Florida Chapter 112 determined contribution, the effective amortization period would be 27 years, meaning that the current contribution level, with amortization payments growing 1.5%, would be adequate to be expected to reduce the unfunded liability to zero over 27 years. Under the City's current policy of paying the City's required contribution, over the immediate term, the unfunded liability has an expected growth rate of 2.3% and increases at this level can be expected to continue until the surtax income becomes payable to the Plan's trust. If plan experience is less favorable than anticipated, the unfunded liability will grow faster than 2.3% per year. By comparison, the surtax revenue is assumed to grow 4.25% per year.

If the surtax revenue for fiscal 2019 had been 1% lower, the City's required contribution would increase by \$373,045 or 0.15% of projected payroll. For comparison purposes, the allocated surtax revenue is 27.3% of the market value of assets and 16.4% of the actuarial accrued liability.

Section 2: Actuarial Valuation Results

- **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 value of retirement plan benefits is sensitive to the rate of benefit accruals and any early retirement subsidies that apply.
- More or less active participant turnover than assumed.
- Participants' use of plan provisions allowing conversion of benefits from the DB plan to the DC plan.

- **Actual Experience** Over the Last Ten years and Implications for the Future

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

The investment gain/loss on a market value basis for a year has ranged from a loss of \$175,540,475 to a gain of \$147,228,359. If all investment returns were equal to the assumed return over the last years, the market value of assets as of the current valuation date would be approximately \$1,879,386,386 as opposed to the actual value of \$1,970,206,000. Over the past ten years, the Plan's market value performance has, on average, exceeded the expected annual return.

The non-investment gain/loss for a year has ranged from a loss of \$55,702,357 to a gain of \$20,285,622.

The funded percentage on the actuarial value of assets has ranged from a low of 61.1% to a high of 75.9% since 2010. There has been a downward trend in funded percentage that has come from a combination of reducing the discount rate assumption and implementation of a funding policy that defers some funding until surtax revenue is allocated to the plan at the end of 2030.

Segal Consulting has only been provided with data on surtax income for fiscal 2016, 2017, 2018 and 2019, and over this period, the surtax revenue grew by 3.9% for fiscal 2017, 6.2% for fiscal 2018 and 4.7% for fiscal 2019. We encourage the City to consider reviewing any additional historical data on growth of their tax base to develop a sense of a range of possible outcomes for the surtax revenue that will be paid to the plan.

- **Maturity Measures**

As pension plans mature, the cash need to fulfill benefit obligations will increase over time. Therefore, cash flow projections and analysis should be performed to assure that the Plan's asset allocation is aligned to meet emerging pension liabilities.

Currently the Plan has a non-active to active participant ratio of 1.37. For the prior year benefits and expenses paid were \$129.6 million more contributions received. As the Plan matures, more cash will be needed from the investment portfolio to meet benefit payments.

Section 2: Actuarial Valuation Results

GFOA funded liability by type

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.

GFOA Solvency Test as of September 30

	2019	2018
Actuarial accrued liability (AAL)		
• Active member contributions	\$193,534,210	\$185,538,727
• Retirees and beneficiaries	2,235,258,792	2,179,539,282
• Active and inactive members (employer-financed)	857,520,479	831,602,507
Total	\$3,286,313,481	\$3,196,680,516
Actuarial value of assets	\$2,008,173,331	\$2,021,545,306
Cumulative portion of AAL covered		
• Active member contributions	100.00%	100.00%
• Retirees and beneficiaries	81.18%	84.24%
• Active and inactive members (employer-financed)	0.00%	0.00%

Supplemental Information

Exhibit A: Table of Plan Coverage

Category	Year Ended September 30		Change From Prior Year
	2019	2018	
Active participants in valuation:			
• Number	3,937	4,234	-7.0%
• Average age	50.1	49.3	0.8
• Average years of service	14.0	13.2	0.8
• Projected total payroll	\$249,982,877	\$253,982,175	-1.6%
• Projected average payroll	63,496	59,986	5.9%
• Account balances	193,534,210	185,538,727	4.3%
• Total active vested participants	3,331	3,366	-1.0%
Inactive vested participants	196	185	5.9%
Retired participants:			
• Number in pay status	3,860	3,856	0.1%
• Average age	71.2	70.8	0.4
• Average monthly benefit	\$3,364	\$3,266	3.0%
Disabled participants:			
• Number in pay status	106	102	3.9%
• Average age	66.7	67.2	-0.5
• Average monthly benefit	\$1,696	\$1,631	4.0%
Beneficiaries:			
• Number in pay status	1,249	1,218	2.5%
• Average age	76.6	76.3	0.3
• Average monthly benefit	\$2,018	\$1,929	4.6%

Section 3: Supplemental Information

Exhibit B: Participants in Active Service as of September 30, 2019 by Age, Years of Service, and Average Payroll

Age	Years of Service									
	Total	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 & over
Under 25	39	39	--	--	--	--	--	--	--	--
	\$34,482	\$34,482	--	--	--	--	--	--	--	--
25 - 29	139	89	49	1	--	--	--	--	--	--
	50,427	46,344	\$57,437	\$70,366	--	--	--	--	--	--
30 - 34	267	92	128	45	2	--	--	--	--	--
	60,098	52,204	64,192	65,037	\$50,098	--	--	--	--	--
35 - 39	392	98	129	122	42	1	--	--	--	--
	61,980	52,652	60,157	71,298	62,296	\$61,194	--	--	--	--
40 - 44	386	55	140	88	70	31	2	--	--	--
	66,675	58,604	65,537	71,353	68,272	68,372	\$80,169	--	--	--
45 - 49	569	74	174	116	105	70	25	5	--	--
	64,938	56,945	61,039	73,803	65,842	65,568	69,434	\$62,957	--	--
50 - 54	671	71	157	100	122	93	62	64	2	--
	68,280	57,169	62,252	66,591	70,077	71,842	85,811	72,985	\$51,087	--
55 - 59	719	58	174	91	126	81	71	99	19	--
	64,566	59,727	55,854	64,700	65,065	66,941	74,267	70,558	77,568	--
60 - 64	486	19	118	85	107	46	41	55	13	2
	62,908	58,419	55,323	59,542	69,127	68,015	58,478	65,254	98,988	\$37,618
65 - 69	177	9	42	31	37	19	15	18	3	3
	60,697	74,975	41,858	60,102	68,081	58,462	75,340	61,236	53,329	141,761
70 & over	92	2	25	15	19	11	8	7	1	4
	54,840	55,299	41,909	47,129	64,910	68,676	44,803	67,367	90,938	67,579
Total	3,937	606	1,136	694	630	352	224	248	38	9
	\$63,496	\$53,280	\$59,343	\$67,311	\$67,152	\$67,809	\$73,105	\$69,088	\$81,940	\$85,648

Section 3: Supplemental Information

Exhibit C: Reconciliation of Participant Data

	Active Participants	Inactive Vested Participants	Disableds	Retired Participants	Beneficiaries	Total
Number as of October 1, 2018	4,234	185	102	3,856	1,218	9,595
• New participants	0	N/A	N/A	N/A	N/A	0
• Terminations – with vested rights	-10	10	0	0	0	0
• Terminations – without vested rights	-91	N/A	N/A	N/A	N/A	-91
• Retirements	-143	-3	N/A	146	N/A	0
• New disabilities	-5	0	5	N/A	N/A	0
• Deceased	-12	0	-4	-144	-57	-217
• New beneficiaries	0	0	0	0	88	88
• Lump sum cash-outs	-43	-1	0	0	0	-44
• Rehire	25	-2	N/A	0	N/A	23
• Certain period expired	N/A	N/A	0	0	0	0
• Data adjustments	0	7	3	2	0	12
• Net transfers (to)/from DC Plan or Corrections	-18	0	0	0	0	-18
Number as of October 1, 2019	3,937	196	106	3,860	1,249	9,348

Section 3: Supplemental Information

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

	Year Ended September 30, 2019	Year Ended September 30, 2018
Net assets at market value at the beginning of the year	\$2,085,056,000	\$2,019,668,000
Contribution income:		
• Employer contributions	\$70,338,000	\$71,024,000
• Employee contributions	28,334,000	29,919,000
• Transfers	0	11,397,000
• Less administrative expenses	<u>-959,000</u>	<u>-1,193,000</u>
<i>Net contribution income</i>	<i>\$97,713,000</i>	<i>\$111,147,000</i>
Investment income:		
• Interest, dividends and other income	\$20,071,000	\$19,788,000
• Asset appreciation	4,197,000	134,552,000
• Less investment fees	<u>-9,481,000</u>	<u>-8,870,000</u>
<i>Net investment income</i>	<i>\$14,787,000</i>	<i>\$145,470,000</i>
Total income available for benefits	\$112,500,000	\$256,617,000
Less benefit payments:		
• Benefit payments	-\$185,078,000	-\$175,217,000
• Refunds	-42,272,000	-16,012,000
<i>Net benefit payments</i>	<i>-\$227,350,000</i>	<i>-\$191,229,000</i>
Change in market value of assets	-\$114,850,000	\$65,388,000
Net assets at market value at the end of the year	\$1,970,206,000	\$2,085,056,000

Section 3: Supplemental Information

Exhibit E: Development of the Fund through September 30, 2019

Year Ended September 30	Employer Contributions	Employee Contributions	Other Contributions	Net Investment Return*	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
2010	\$40,551,000	\$25,196,000	-\$2,000	\$148,054,000	\$775,000	\$124,656,000	\$1,456,079,000	\$1,640,892,767	112.7%
2011	39,378,000	25,051,000	-6,000	9,313,000	701,000	144,899,000	1,384,227,000	1,582,041,673	114.3%
2012	49,899,000	24,098,000	1,040,000	254,394,000	705,000	154,308,000	1,558,645,000	1,518,577,926	97.4%
2013	55,386,000	21,878,000	0	264,541,000	671,000	166,460,000	1,733,319,000	1,565,291,310	90.3%
2014	71,000,000	20,961,000	0	194,864,000	828,000	171,127,000	1,848,189,000	1,751,888,510	94.8%
2015	81,751,000	20,893,000	0	-39,506,000	762,000	170,674,000	1,739,891,000	1,811,172,111	104.1%
2016	84,898,000	21,840,000	0	167,067,000	762,000	183,692,000	1,829,242,000	1,872,790,100	102.4%
2017	94,700,000	23,037,000	0	266,138,000	787,000	192,662,000	2,019,668,000	1,952,332,857	96.7%
2018	71,024,000	29,919,000	11,397,000	145,470,000	1,193,000	191,229,000	2,085,056,000	2,021,545,306	97.0%
2019	70,338,000	28,334,000	0	14,787,000	959,000	227,350,000	1,970,206,000	2,008,173,331	101.9%

* On a market basis, net of investment fees

Section 3: Supplemental Information

Exhibit F: Table of Amortization Bases

Type*	Date Established	Initial Period	Initial Amount	Annual Payment*	Years Remaining	Outstanding Balance
Fresh start	10/01/2016	30	\$1,024,497,072	\$68,753,772	27	\$1,025,281,737
Experience gain	10/01/2017	30	-5,594,096	-369,422	28	-5,600,095
Plan change	10/01/2017	30	-3,528,667	-233,025	28	-3,532,451
Change in assumptions	10/01/2017	30	64,164,450	4,237,280	28	64,233,259
Experience gain	10/01/2018	29	-922,806	-60,863	28	-922,627
Change in assumptions	10/01/2018	29	88,449,536	5,833,621	28	88,432,323
Plan change	10/01/2018	29	5,920,390	390,475	28	5,919,238
Experience loss	10/01/2019	28	99,415,197	6,558,129	28	99,415,197
Change in assumptions	10/01/2019	28	4,913,569	324,134	28	4,913,569
Total				\$85,434,101		\$1,278,140,150

Surtax Amortization Bases

Type*	Date Established	Initial Period	Initial Amount	Annual Payment*	Years Remaining	Outstanding Balance
Discounted surtax revenue applied	10/01/2016	30	-\$322,190,859	-\$22,293,255	27	-\$332,445,285
Surtax offset gain	10/01/2017	30	-7,927,401	-523,508	28	-7,935,903
Allocation change	10/01/2017	30	-10,588,075	-699,213	28	-10,599,430
Discount rate change	10/01/2017	30	-18,720,570	-1,236,265	28	-18,740,646
Surtax offset gain	10/01/2018	29	-8,089,137	-533,516	28	-8,087,613
Allocation change	10/01/2018	29	-20,241,389	-1,335,005	28	-20,237,450
Discount rate change	10/01/2018	29	-21,761,957	-1,435,293	28	-21,757,722
Surtax offset gain	10/01/2019	28	-2,042,344	-134,727	28	-2,042,344
Allocation change	10/01/2019	28	-17,780,689	-1,172,940	28	-17,780,689
Discount rate change	10/01/2019	28	-12,100,053	-798,205	28	-12,100,053
Total				-\$30,161,927		-\$451,727,135

* Level percentage of payroll; per Part VII, Chapter 112.64 (5)(b) of Florida Statutes, outstanding balances were amortized using a 1.50% payroll growth rate for October 1, 2019 valuation.

Section 3: Supplemental Information

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):	<p>The value of an amount or series of amounts payable or receivable at various times, determined as of a given date by the application of a particular set of Actuarial Assumptions. Each such amount or series of amounts is:</p> <p>Adjusted for the probable financial effect of certain intervening events (such as changes in compensation levels, marital status, etc.)</p> <p>Multiplied by the probability of the occurrence of an event (such as survival, death, disability, withdrawal, etc.) on which the payment is conditioned, and</p> <p>Discounted according to an assumed rate (or rates) of return to reflect the time value of money.</p>

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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.

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Assumptions or Actuarial Assumptions:	<p>The estimates upon which the cost of the Fund is calculated, including:</p> <p><u>Investment return</u> - the rate of investment yield that the Fund will earn over the long-term future;</p> <p><u>Mortality rates</u> - the death rates of employees and pensioners; life expectancy is based on these rates;</p> <p><u>Retirement rates</u> - the rate or probability of retirement at a given age or service;</p> <p><u>Disability rates</u> - the probability of disability retirement at a given age;</p> <p><u>Withdrawal rates</u> - the rates at which employees of various ages are expected to leave employment for reasons other than death, disability, or retirement;</p> <p><u>Salary increase rates</u> - the rates of salary increase due to inflation and productivity growth.</p>
Closed Amortization Period:	<p>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.</p>
Decrements:	<p>Those causes/events due to which a member's status (active-inactive-retiree-beneficiary) changes, that is: death, retirement, disability, or withdrawal.</p>
Defined Benefit Plan:	<p>A retirement plan in which benefits are defined by a formula applied to the member's compensation and/or years of service.</p>
Defined Contribution Plan:	<p>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.</p>
Employer Normal Cost:	<p>The portion of the Normal Cost to be paid by the employer. This is equal to the Normal Cost less expected member contributions.</p>
Experience Study:	<p>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.</p>
Funded Ratio:	<p>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.</p>

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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.

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Exhibit H: Section 415

Section 415 of the Internal Revenue Code (IRC) specifies the maximum benefits that may be paid to an individual from a defined benefit plan and the maximum amounts that may be allocated each year to an individual's account in a defined contribution plan.

A qualified pension plan may not pay benefits in excess of the Section 415 limits. The ultimate penalty for non-compliance is disqualification: active participants could be taxed on their vested benefits and the IRS may seek to tax the income earned on the plan's assets.

In particular, Section 415(b) of the IRC limits the maximum annual benefit payable at the Normal Retirement Age to a dollar limit of \$160,000 indexed for inflation. That limit is \$225,000 for 2019. Normal Retirement Age for these purposes is age 62. These are the limits in simplified terms. They must be adjusted based on each participant's circumstances, for such things as age at retirement, form of benefits chosen and after tax contributions.

Benefits in excess of the limits may be paid through a qualified governmental excess plan that meets the requirements of Section 415(m).

Legal Counsel's review and interpretation of the law and regulations should be sought on any questions in this regard.

Section 3: Supplemental Information

Exhibit I: Supplementary State of Florida Information Summary of Salary Changes

Year Ended September 30	Total Salary	Percent Change in Total Salary	Percent Change in Salary of Employees Remaining Active	Expected Percent Change in Salary of Employees Remaining Active
2009	\$276,257,000	5.30%	3.16%	5.42%
2010*	275,173,962	-0.39%	0.61%	5.36%
2010	322,530,502	17.21%	N/A	N/A
2011	314,054,361	-2.63%	0.94%	5.62%
2012	283,020,575	-9.88%	2.31%	5.83%
2013	265,404,735	-6.22%	1.60%	2.84%
2014	262,368,813	-1.14%	0.04%	2.84%
2015	254,034,479	-3.18%	3.85%	2.48%
2016	250,894,295	-1.24%	2.76%	4.27%
2017	257,850,484	2.77%	4.64%	5.30%
2018	253,982,175	-1.50%	7.33%	5.13%
2019	249,982,877	-1.57%	5.78%	5.03%

Note: The Plan was closed to new entrants as of October 1, 2017.

The average total payroll growth for the most recent ten years was -0.99% per year. Additional analysis of pay of DC Plan participants was used support a payroll increases assumption of 1.50%.

Salary history prior to October 1, 2010 was taken from the City's Comprehensive Annual Financial Report.

*Prior to the inclusion of new participants with greater than one year of employment.

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Exhibit J: Supplementary State of Florida Information Recent History of Recommended and Actual Contributions

Fiscal Year Ended September 30	Valuation Date October 1	Contribution Rate as Percent of Valuation Payroll	Valuation Payroll	Florida Chapter 112 Recommended Contribution	City's Minimum Required Contribution	Actual Contribution
2011	2008*	13.50%	\$289,807,191	\$39,123,971	--	\$39,378,000
2012	2010	17.22%	333,819,070	57,497,706	--	49,899,000
2013	2011	20.51%	325,046,264	66,659,915	--	55,386,000
2014	2012	27.91%	291,511,192	81,351,295	--	71,000,000
2015	2013	31.60%	272,358,339	86,069,361	--	81,751,000
2016	2014	33.20%	268,245,874	89,058,931	--	84,898,000
2017	2015	36.79%	256,930,472	94,526,764	--	94,700,000
2018	2016	36.81%	254,657,709	93,743,647	\$70,166,211	71,024,000
2019	2017	36.41%	261,718,241	95,290,428	69,247,529	70,338,000
2020	2018	39.03%	257,791,908	100,620,425	71,249,679	--
2021	2019	42.79%	253,732,620	108,568,188	76,832,977	--

All amounts prior to the 2010 valuation date were prepared by the prior actuary.

* An actuarial valuation was not performed for the Plan year beginning October 1, 2009. The recommended contribution is based on the 2008 valuation's contribution rate.

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Exhibit K: Supplementary State of Florida Information Comparative Summary of Principal Valuation Results

	Year Ended September 30, 2019		Year Ended September 30, 2018
	New Assumptions	Old Assumptions	
Participant data			
• Active members	3,937	3,937	4,234
• Total annual payroll	\$249,982,877	\$249,982,877	\$253,982,175
• Retired members and beneficiaries	5,215	5,215	5,176
• Total annualized benefit	\$188,240,796	\$188,240,796	\$181,292,088
• Terminated vested members	196	196	185
• Total annualized benefit	\$3,478,032	\$3,478,032	\$3,344,160
Actuarial value of assets	\$2,008,173,331	\$2,008,173,331	\$2,021,545,306
Present value of all future expected benefit payments:			
• Active members:			
• Retirement benefits	\$1,108,155,598	\$1,076,605,142	\$1,074,750,796
• Vesting benefits	25,046,540	24,824,405	26,569,658
• Disability benefits	18,270,892	17,160,922	17,377,689
• Death benefits	25,901,928	38,895,882	39,378,770
• Return of contributions	<u>193,534,210</u>	<u>193,534,210</u>	<u>185,538,727</u>
• Total	\$1,370,909,168	\$1,351,020,561	\$1,343,613,640
• Terminated vested members	28,631,348	28,099,453	25,251,691
• Retired members and beneficiaries	<u>2,235,258,792</u>	<u>2,240,907,247</u>	<u>2,179,539,282</u>
Total	\$3,634,799,308	\$3,620,027,261	\$3,548,404,613

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Exhibit K: Supplementary State of Florida Information Comparative Summary of Principal Valuation Results (Cont'd)

	Year Ended September 30, 2019		Year Ended September 30, 2018
	New Assumptions	Old Assumptions	
Unfunded actuarial accrued liability	\$1,278,140,150	\$1,273,226,581	\$1,175,135,210
Actuarial present value of accrued benefits			
Vested accrued benefits			
Active members	\$711,142,885	\$707,164,239	\$685,187,700
Inactive members	28,631,348	28,099,453	25,251,691
Pensioners and beneficiaries	2,235,258,792	2,240,907,247	2,179,539,282
Nonvested active members	<u>35,524,495</u>	<u>35,647,116</u>	<u>39,787,473</u>
Total	\$3,010,557,520	\$3,011,818,055	\$2,929,766,146
Pension cost			
Normal cost, including administrative expenses	\$40,918,741	\$40,240,370	\$41,097,477
Expected employee contributions	-23,166,958	-23,150,135	-23,628,493
Level % of payroll payment to amortize unfunded actuarial accrued liability	85,434,101	85,907,950	78,115,225
Discounted and amortized value of allocated surtax revenue	-30,161,927	-28,455,223	-27,900,692
Total minimum annual cost payable monthly at valuation date	73,023,957	74,542,962	70,196,729
Total employer cost projected to budget year	76,832,977	78,470,540	71,249,679
Projected payroll	253,732,620	253,732,620	257,791,908
As % of payroll	30.28%	30.93%	27.64%
Present value of active members' future salaries at attained age	\$1,987,797,845	\$1,962,984,855	\$2,049,771,913
Present value of expected future employee contributions	\$198,779,785	196,298,485	\$204,977,191

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Exhibit L: Supplementary State of Florida Information Actuarial Present Value of Accumulated Plan Benefits

Factors	Change in Actuarial Present Value of Accumulated Plan Benefits
Actuarial present value of accumulated benefits as of October 1, 2018	\$2,929,766,146
Benefits accumulated, net experience gain or loss, changes in data	\$112,275,529
Benefits paid	-227,350,000
Interest	197,126,380
Changes in assumptions	-1,260,535
Plan changes	<u>0</u>
Net increase	\$80,791,374
As % of payroll	31.84%
Actuarial present value of accumulated benefits as of October 1, 2019	\$3,010,557,520

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Exhibit M: Actuarial Projections through Fiscal 2062

Plan Year Beginning	Actuarial Accrued Liability	Actuarial Value of Assets	Unfunded Actuarial Accrued Liability	Funded Ratio	Fiscal Year Ending	Surtax Contribution	% of Total Contribution	Required City Contribution	% of Total Contribution	Total Contribution
					2020	0	0.0%	71,249,679	100.0%	71,249,679
2019	3,286,313,481	2,008,173,331	1,278,140,150	61.11%	2021	0	0.0%	76,832,977	100.0%	76,832,977
2020	3,340,357,970	2,035,246,972	1,305,110,998	60.93%	2022	0	0.0%	76,585,529	100.0%	76,585,529
2021	3,390,570,896	2,056,604,762	1,333,966,134	60.66%	2023	0	0.0%	76,919,244	100.0%	76,919,244
2022	3,435,655,151	2,044,402,320	1,391,252,831	59.51%	2024	0	0.0%	79,193,810	100.0%	79,193,810
2023	3,475,245,739	2,024,856,400	1,450,389,339	58.27%	2025	0	0.0%	81,493,751	100.0%	81,493,751
2024	3,509,792,424	2,026,241,540	1,483,550,884	57.73%	2026	0	0.0%	81,825,974	100.0%	81,825,974
2025	3,539,308,997	2,023,316,679	1,515,992,318	57.17%	2027	0	0.0%	82,154,687	100.0%	82,154,687
2026	3,563,624,335	2,013,982,402	1,549,641,933	56.52%	2028	0	0.0%	82,519,930	100.0%	82,519,930
2027	3,583,141,161	1,998,476,221	1,584,664,940	55.77%	2029	0	0.0%	82,944,791	100.0%	82,944,791
2028	3,598,272,565	1,977,077,584	1,621,194,981	54.95%	2030	0	0.0%	83,355,984	100.0%	83,355,984
2029	3,608,308,200	1,949,167,525	1,659,140,675	54.02%	2031	40,931,765	32.8%	83,837,036	67.2%	124,768,801
2030	3,613,580,130	1,957,137,607	1,656,442,523	54.16%	2032	56,895,154	40.3%	84,245,893	59.7%	141,141,047
2031	3,612,259,190	1,976,495,848	1,635,763,342	54.72%	2033	59,313,198	41.2%	84,701,131	58.8%	144,014,329
2032	3,603,998,112	1,993,849,436	1,610,148,676	55.32%	2034	61,834,009	42.1%	85,180,522	57.9%	147,014,531
2033	3,588,737,146	2,009,657,788	1,579,079,358	56.00%	2035	64,461,954	42.9%	85,653,300	57.1%	150,115,254
2034	3,565,808,580	2,023,832,603	1,541,975,977	56.76%	2036	67,201,587	43.8%	86,160,904	56.2%	153,362,491
2035	3,535,621,313	2,037,231,218	1,498,390,095	57.62%	2037	70,057,654	44.7%	86,688,387	55.3%	156,746,041
2036	3,498,178,395	2,050,479,372	1,447,699,023	58.62%	2038	73,035,105	45.6%	87,245,260	54.4%	160,280,365
2037	3,454,138,048	2,064,846,534	1,389,291,514	59.78%	2039	76,139,097	46.4%	87,853,268	53.6%	163,992,365
2038	3,403,699,364	2,081,161,652	1,322,537,712	61.14%	2040	79,375,008	47.3%	88,505,873	52.7%	167,880,881
2039	3,346,879,242	2,100,190,117	1,246,689,125	62.75%	2041	82,748,446	48.1%	89,220,565	51.9%	171,969,011
2040	3,284,089,026	2,123,091,101	1,160,997,925	64.65%	2042	86,265,255	48.9%	89,967,846	51.1%	176,233,101
2041	3,215,469,772	2,150,925,772	1,064,544,000	66.89%	2043	89,931,528	49.8%	90,740,682	50.2%	180,672,210
2042	3,140,025,361	2,183,632,596	956,392,765	69.54%	2044	93,753,618	50.6%	91,581,745	49.4%	185,335,363
2043	3,059,205,486	2,223,546,705	835,658,781	72.68%	2045	97,738,147	51.4%	92,491,531	48.6%	190,229,678
2044	2,974,276,367	2,272,991,836	701,284,531	76.42%	2046	101,892,018	52.2%	93,438,757	47.8%	195,330,775
2045	2,884,207,900	2,332,152,656	552,055,244	80.86%	2047	106,222,429	52.9%	94,428,327	47.1%	200,650,756
2046	2,790,894,452	2,404,141,006	386,753,446	86.14%	2048	110,736,882	83.2%	22,424,758	16.8%	133,161,640
2047	2,695,999,395	2,491,854,200	204,145,195	92.43%	2049	115,443,200	97.3%	3,152,001	2.7%	118,595,201
2048	2,599,130,502	2,520,783,997	78,346,505	96.99%	2050	120,349,536	97.6%	2,933,955	2.4%	123,283,491
2049	2,501,357,588	2,542,785,224	(41,427,636)	101.66%	2051	0	0.0%	2,779,452	100.0%	2,779,452
2050	2,404,137,211	2,448,938,897	(44,801,686)	101.86%	2052	0	0.0%	2,646,364	100.0%	2,646,364
2051	2,306,721,463	2,355,071,757	(48,350,294)	102.10%	2053	0	0.0%	2,524,671	100.0%	2,524,671
2052	2,209,140,404	2,261,251,089	(52,110,685)	102.36%	2054	0	0.0%	2,461,701	100.0%	2,461,701
2053	2,114,263,878	2,170,247,424	(55,983,546)	102.65%	2055	0	0.0%	2,428,817	100.0%	2,428,817
2054	2,021,806,689	2,081,855,163	(60,048,474)	102.97%	2056	0	0.0%	2,432,154	100.0%	2,432,154
2055	1,932,670,352	1,996,975,569	(64,305,217)	103.33%	2057	0	0.0%	2,471,172	100.0%	2,471,172
2056	1,847,398,717	1,916,168,643	(68,769,926)	103.72%	2058	0	0.0%	2,521,300	100.0%	2,521,300
2057	1,765,070,047	1,838,587,975	(73,517,928)	104.17%	2059	0	0.0%	2,578,804	100.0%	2,578,804
2058	1,685,673,983	1,764,252,283	(78,578,300)	104.66%	2060	0	0.0%	2,643,215	100.0%	2,643,215
2059	1,609,344,096	1,693,318,156	(83,974,060)	105.22%	2061	0	0.0%	2,709,295	100.0%	2,709,295
2060	1,535,922,185	1,625,663,517	(89,741,332)	105.84%	2062	0	0.0%	2,777,028	100.0%	2,777,028
Total:						\$1,654,325,590	40.4%	\$2,436,502,070	59.6%	\$4,090,827,660
Total Present Value at 6.9%:						\$397,088,075	28.8%	\$979,710,416	71.2%	1,376,798,491

Assumptions	
Investment Return Assumption	6.9% per year
Actuarial Value of Assets	5-year smoothed market value
Payroll Growth Assumption	1.50% per year
Pension Liability Surtax Proceeds	34.57%, projected to increase 4.25% annually
Administrative Expenses	Projected to increase 2.5% annually

Projections are not a guarantee of future results. They are intended to serve as estimates of future financial outcomes that are based on assumptions about future experience and the information available at the time the modeling is undertaken and completed. Projected results will change if demographic or economic assumptions, or plan provisions, change in the future, or if the contributing employers make contributions other than expected.

Actuarial Valuation Basis

Exhibit I: Actuarial Assumptions and Actuarial Cost Method

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 September 30, 2017.					
Net Investment Return:	6.90%. The net investment return assumption was chosen by the Retirement System's Board of Trustees with input from the actuary. The 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 provided by Segal Marco Advisors, as well as the Plan's target asset allocation.					
Salary Increases (including inflation):	COJ/JHA/NFTPO				JEA	
	Service	Rate (%)	Service	Rate (%)	Service	Rate (%)
	0	6.5	11	3.9	0-4	7.5
	1	6.1	12	3.8	5	5.1
	2	5.7	13	3.7	6	4.9
	3	5.3	14	3.6	7	4.7
	4	4.9	15	3.5	8	4.5
	5	4.5	16	3.4	9	4.3
	6	4.4	17	3.3	10	4.1
	7	4.3	18	3.2	11	3.9
	8	4.2	19	3.1	12	3.7
	9	4.1	20	3.0	13-24	3.5
10	4.0			25+	3.0	
Inflation Rate:	2.50%					

Section 4: Actuarial Valuation Basis

Payroll Growth: 1.50% used for amortization of unfunded liability amounts, based on the requirement in the Florida Statutes that the assumption for this purpose may not exceed the average annual growth for the preceding ten years. Negotiated pay level increases and pay of DC Plan participants were taken into consideration in setting a payroll growth that is expected to be achieved and maintained on a ten-year average basis. The Fund's long-term payroll growth assumption is equal to the inflation assumption of 2.50%.

Mortality Rates:

Healthy pre-retirement: FRS pre-retirement mortality tables for personnel other than special risk and K-12 instructional personnel, set forward 2 years, projected generationally from 2010 with Scale MP2018

Healthy post-retirement: FRS healthy post-retirement mortality tables for personnel other than special risk and K-12 instructional personnel, set forward 2 years, projected generationally from 2010 with Scale MP2018

Disabled: FRS disabled mortality tables for personnel other than special risk, with no set forward, projected generationally from 2010 with Scale MP2018

The FRS tables for personnel other than special risk and K-12 instructional personnel, set forward 2 years, reasonably reflect the healthy annuitant mortality experience of the General Employees Retirement Plan as of the measurement date. The FRS disabled mortality tables for personnel other than special risk reasonably reflect the disabled annuitant mortality experience as of the measurement date.

Annuitant Mortality Rates:	Rate (%) ¹			
	Healthy		Disabled	
	Male	Female	Male	Female
Age				
55	1.04	0.55	2.53	1.91
60	1.16	0.61	3.08	2.27
65	1.45	0.88	3.93	2.83
70	2.34	1.51	5.08	3.79
75	3.90	2.62	6.98	5.46
80	6.63	4.65	10.12	8.31
85	11.21	8.64	14.68	12.60
90	18.13	15.47	21.29	17.72

Mortality rates shown for base table.

Section 4: Actuarial Valuation Basis

Termination Rates Before Retirement:

Age	Rate (%)			
	Mortality ¹		Disability	Withdrawal ²
	Male	Female		
20	0.04	0.01	0.01	0.01
25	0.05	0.02	0.01	0.01
30	0.06	0.03	0.02	0.02
35	0.08	0.04	0.03	0.03
40	0.11	0.06	0.04	0.04
45	0.16	0.09	0.06	0.06
50	0.25	0.13	0.10	0.10
55	0.36	0.20	0.16	0.16
60	0.52	0.29	0.25	0.25
65	0.75	0.47	0.00	0.00

* Mortality rates shown for base table.

** 100% of disabilities are assumed to be non-service incurred.

Section 4: Actuarial Valuation Basis

Termination Retirement before Retirement (continued)

Service	Withdrawal*	
	COJ	JEA
0	16.00	6.00
1	15.00	5.50
2	13.00	4.50
3	10.00	3.50
4	9.50	3.25
5	9.00	3.00
6	8.50	2.75
7	8.00	2.50
8	7.50	2.25
9	7.00	2.00
10	6.50	2.00
11	5.60	2.00
12	4.70	2.00
13	3.80	2.00
14	2.90	2.00
15	2.00	2.00
16	1.80	1.80
17	1.60	1.60
18	1.40	1.40
19	1.20	1.20
20	1.00	1.00
21	0.80	0.80
22	0.60	0.60
23	0.40	0.40
24+	0.20	0.20

**All withdrawal rates are set to 0% after eligibility for retirement.*

Section 4: Actuarial Valuation Basis

Retirement Rates:	Fewer Than 31 Years of Service		31 or More Years of Service	
	Age	Rate (%)*	Service	Rate (%)*
	45-54	5	31-33	15
	55	15	34-35	30
	56-60	7	36	35
	61-63	10	37	60
	64-65	30	38-39	50
	66-69	20	40	100
	70 & Over	100		

* 100% retirement is assumed at the earlier of age 70 or 40 years of service.

Interest on BACKDROP Account:	4.00%
Refund of Contributions:	95% of participants that are vested and terminate are assumed to take a refund of their employee contributions in lieu of their accrued benefit deferred to age 65
Retirement Age for Inactive Vested Participants:	65, or date of retirement as provided in data
Unknown Data for Participants:	Same as those exhibited by participants with similar known characteristics. If not specified, participants are assumed to be male.
Value of Applicable Tax Revenue:	Actual revenue of \$95,804,756 for fiscal 2019 is used as the basis of the City's revenue projection. This amount is prior to application of the allocation percentage.
Tax Revenue Growth Rate:	4.25%. This assumption is determined by the City. Segal has not reviewed the information used to set this assumption, but Segal previously reviewed the sensitivity of this assumption when it was initially set.
Projected Tax Revenue Allocation:	34.57%. This percentage is determined by the City.
Administrative Expenses:	Previous year's actual expenses; \$959,000 for October 1, 2019.
Family Composition:	75% of males and 55% of females are assumed to be married. None are assumed to have dependent children. Females are assumed to be three years younger than their spouses.
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 and the expected market return, and is recognized over a five-year period, further adjusted, if necessary, to be within 20% of the market value.

Section 4: Actuarial Valuation Basis

Actuarial Cost Method:

Entry Age Normal 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 based on each member's benefit accrual rate and are allocated by compensation.

Normal Cost is not included for participants who are assumed to retire with 100% certainty in the upcoming plan year based on the retirement assumptions.

Justification for Change in Actuarial Assumptions and Methods:

Following ongoing board review of discount rate options and newly released FRS mortality assumptions:

- The discount rate was lowered from 7.00% to 6.90%.
- The mortality assumptions were changed from being based on the FRS mortality tables used in the July 1, 2018 FRS actuarial valuation for the non-special risk personnel to the FRS mortality tables used in the July 1, 2019 FRS actuarial valuation for personnel other than special risk and K-12 instructional personnel. The set forward used to adjust for the plan's experience was changed for healthy pre- and post-retirement lives was changed from 2.5 years to 2.0 years with the adoption of the new base table. The mortality improvement scale was changed from scale BB to scale MP2018 in conjunction with this change.

Section 4: Actuarial Valuation Basis

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:	October 1 through September 30	
Plan Status:	Closed as of October 1, 2017	
Normal Retirement:	<i>Age Requirement</i>	Age 65 with five years of Credited Service, age 55 with 20 years of Credited Service or any age with 30 years of Credited Service.
	<i>Regular Benefit Amount</i>	2.5% of Final Monthly Compensation times years of Credited Service, not more than 80% of Final Monthly Compensation.
	<i>Supplemental Benefit Amount</i>	Monthly benefit of \$5 times years of Credited Service, not less than \$25 per month or more than \$150 per month.
	<i>Minimum Benefit Amount</i>	\$66.65 per whole year of Credited Service, not to exceed 30. Minimum accrual rate increases 4% each October 1 st .
Early Retirement:	<i>Age Requirement</i>	Age 50 with 20 years of Credited Service
	<i>Regular Benefit Amount</i>	Accrued Service Retirement Regular Benefit Amount reduced by 0.5 percent for each month the benefit commencement precedes age 55.
	<i>Supplemental Benefit Amount</i>	Monthly benefit of \$5 times years of Credited Service, not less than \$25 per month or more than \$150 per month.
	<i>Minimum Benefit Amount</i>	\$66.65 per whole year of Credited Service, not to exceed 30. Minimum accrual rate increases 4% each October 1 st .
	<i>Age Requirement</i>	Any age with 25 years of Credited Service
	<i>Regular Benefit Amount</i>	2.0% of Final Monthly Compensation times years of Credited Service
	<i>Supplemental Benefit Amount</i>	Monthly benefit of \$5 times years of Credited Service, not less than \$25 per month or more than \$150 per month.
	<i>Minimum Benefit Amount</i>	\$66.65 per whole year of Credited Service, not to exceed 30. Minimum accrual rate increases 4% each October 1 st .
Off-the-job Disability:	<i>Service Requirement</i>	5 years of Credited Service
	<i>Regular Benefit Amount</i>	Final Monthly Compensation times 25% plus 2.5% per year of Credited Service in excess of 5, not to exceed 50% of Final Monthly Compensation
	<i>Supplemental Benefit Amount</i>	Monthly benefit of \$5 times years of Credited Service, not less than \$25 per month or more than \$150 per month.

Section 4: Actuarial Valuation Basis

	<i>Minimum Benefit Amount</i>	\$66.65 per whole year of Credited Service, not to exceed 30. Minimum accrual rate increases 4% each October 1 st .
Off-the-job Disability:	<i>Service Requirement</i>	Immediate eligibility
	<i>Regular Benefit Amount</i>	Final Monthly Compensation times 25% plus 2.5% per year of Credited Service in excess of 5, not to exceed 50% of Final Monthly Compensation
	<i>Supplemental Benefit Amount</i>	Monthly benefit of \$5 times years of Credited Service, not less than \$25 per month or more than \$150 per month.
	<i>Minimum Benefit Amount</i>	\$66.65 per whole year of Credited Service, not to exceed 30. Minimum accrual rate increases 4% each October 1 st .
Vesting:	<i>Age Requirement</i>	None
	<i>Service Requirement</i>	5 years of Credited Service
	<i>Regular Benefit Amount</i>	Accrued Service Retirement Regular Benefit payable at age 65.
	<i>Supplemental Benefit Amount</i>	Monthly benefit of \$5 times years of Credited Service, not less than \$25 per month or more than \$150 per month. Payable at Age 65.
	<i>Minimum Benefit Amount</i>	\$66.65 per whole year of Credited Service, not to exceed 30. Minimum accrual rate increases 4% each October 1 st .
Spouse's Pre-Retirement Death Benefit:	<i>Age Requirement</i>	None
	<i>Service Requirement</i>	None
	<i>Regular Benefit Amount</i>	If the Member is eligible for retirement, the surviving spouse is entitled to 75% of the member's accrued regular benefit. If the Member is not eligible for retirement, the surviving spouse is entitled to 75% of the pension the Member would have received if the Member had worked to eligibility for a Service Retirement at current salary with the benefit based on a 2% accrual rate.
	<i>Supplemental Benefit Amount</i>	Monthly benefit of \$5 times years of Member's Credited Service, not less than \$25 per month or more than \$150 per month.
	<i>Minimum Benefit Amount</i>	75% of \$66.65 per whole year of Member's Credited Service, not to exceed 30.
Member:	All full-time JEA, JHA, NFTPO, and City General Employees hired prior to October 1, 2017.	
Member Contributions:	10.0% of Earnable Compensation	
Credited Service:	The number of full years and months worked from date of participation to date of termination or retirement, plus any prior service purchased.	

Section 4: Actuarial Valuation Basis

Final Monthly Compensation:	Average monthly rate of Earnable Compensation during the highest 36 consecutive months (78 pay periods) out of the last ten years of employment.
Earnable Compensation:	Base pay for regular hours worked as an employee, plus service raises and excluding bonuses, adjusted compensation, overtime or any extra compensation over and above regularly budgeted salaries.
Cost of Living Adjustment:	On the April 1 st nearest the fifth anniversary of the initial benefit commencement date, and on each April 1 st thereafter, the regular benefit is increased by 3%.
BackDROP:	Members with 30 or more years of service may elect to have their retirement benefits calculated as if the member had retired up to 5 years earlier on or after October 1, 2005. Benefits that would have been payable are accumulated with interest to date of termination and paid or rolled over in a single sum, and payments are made directly to the Member thereafter. The 5-year wait to receive COLA increases starts at termination of employment rather than at the start of BackDROP.
Partial Lump-sum Option (PLOP):	Members who are eligible for retirement may elect to receive a lump-sum benefit of up to 15% of the benefit value and a reduced life annuity actuarially equivalent to the benefit that would otherwise be payable.
Changes in Plan Provisions:	There have been no changes in plan provisions since the prior valuation.