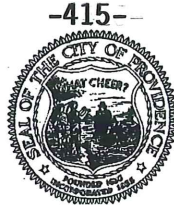


Lawrence J. Mancini  
Finance Director



Jorge O. Elorza  
Mayor

**Finance Department**  
*"Building Pride In Providence"*

August 29, 2019

Honorable Members of the Providence City Council  
C/o City Clerk Shawn Selleck  
25 Dorrance Street  
Providence, RI 02903

Dear Council Members:

In accordance with Section 17-183 of the Providence Code of Ordinances, I am, this day, submitting the annual Actuarial Valuation and Review as of July 1, 2018 of the Employee Retirement System of the City of Providence.

Very truly yours

A handwritten signature in blue ink that reads "Lawrence J. Mancini".

Lawrence J. Mancini,  
Finance Director and Chairman of Retirement Board

IN CITY COUNCIL

SEP 05 2019

READ  
WHEREUPON IT IS ORDERED THAT  
THE SAME BE RECEIVED.

A handwritten signature in blue ink that reads "Shawn Selleck".  
CLERK

**The Employee Retirement  
System of the City of Providence**  
Actuarial Valuation and Review as of  
July 1, 2018



This report has been prepared at the request of the Retirement Board to assist in administering The Employee Retirement System of the City of Providence. This valuation report may not otherwise be copied or reproduced in any form without the consent of the Retirement 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.

Copyright © 2019 by The Segal Group, Inc. All rights reserved.



116 Huntington Ave., 8th Floor Boston, MA 02116-5744  
T 617.424.7300 www.segalco.com

August 7, 2019

Retirement Board  
The Employee Retirement System of the City of Providence  
City Hall  
Providence, RI 02903

Dear Board Members:

We are pleased to submit this Actuarial Valuation and Review as of July 1, 2018. It summarizes the actuarial data used in the valuation, analyzes the preceding year's experience, and establishes the funding requirements for fiscal 2021 and later years (fiscal 2019 and 2020 have already been budgeted).

This report was prepared in accordance with generally accepted actuarial principles and practices at the request of the Board to assist in administering the Retirement System. The census information and financial information on which our calculations were based was prepared by the staff of the System. That assistance is gratefully acknowledged.

The actuarial calculations were directed under the supervision of Kathleen A. Riley, FSA, MAAA, EA. She 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 her knowledge, the information supplied in this actuarial valuation is complete and accurate. Further, in her opinion, the assumptions as approved by the Board are reasonably related to the experience of and the expectations for the System.

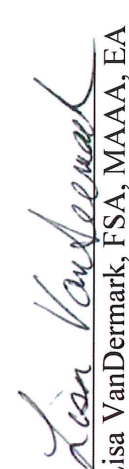
We look forward to reviewing this report at your next meeting and to answering any questions.


Sincerely,

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

By:   
Kathleen A. Riley, FSA, MAAA, EA  
Senior Vice President and Actuary

8914521v2/13958.017

  
Lisa VanDermark, FSA, MAAA, EA  
Vice President and Consulting Actuary

  
Bridget P. Orr, ASA, MAAA, EA  
Consulting Actuary



## Section 1: Actuarial Valuation Summary

### Purpose and Basis

This report was prepared by Segal Consulting to present a valuation of The Employee Retirement System of the City of Providence as of July 1, 2018. The valuation was performed to determine whether the assets and contributions 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.

Certain disclosure information required by GASB Statements No 67 and 68 as of July 1, 2018 for the System is provided in a separate report.

The contribution requirements presented in this report are based on:

- The benefit provisions of The Employee Retirement System of the City of Providence, as administered by the Board;
- The characteristics of covered active participants, inactive participants, and retired participants and beneficiaries as of July 1, 2018, provided by the Board;
- The assets of the System as of June 30, 2018;
- Economic assumptions regarding future salary increases and investment earnings; and
- Other actuarial assumptions regarding employee terminations, retirement, death, etc.



8. 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*. A more detailed assessment of the risks would provide the Board with a better understanding of the inherent risks.

## Important Information About Actuarial Valuations

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

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

**Plan of benefits** Plan provisions define the rules that will be used to determine benefit payments, and those rules, or the interpretation of them, may change over time. Even where they appear precise, outside factors may change how they operate. It is important to keep Segal informed with respect to plan provisions and administrative procedures, and to review the plan summary included in our report to confirm that Segal has correctly interpreted the plan of benefits.

**Participant data** An actuarial valuation for a plan is based on data provided to the actuary by The Employee Retirement System of the City of Providence. 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 Employee Retirement System of the City of Providence. The Employee Retirement System of the City of Providence 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 2: Actuarial Valuation Results

### Participant Data

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

#### PARTICIPANT POPULATION: 2008 – 2018

Year Ended June 30	Active Participants	Inactive Participants	Retired Participants and Beneficiaries	Total Non- Actives	Ratio of Non-Actives to Actives
2008	3,008	237	2,875	3,112	1.03
2009	2,955	455	2,883	3,338	1.13
2010	2,998	432	2,929	3,361	1.12
2011	2,987	435	2,999	3,434	1.15
2013	2,998	407	3,094	3,501	1.17
2014	2,986	428	3,108	3,536	1.18
2015	3,012	432	3,094	3,526	1.17
2016	2,889	473	3,185	3,658	1.27
2017	2,891	533	3,234	3,767	1.30
2018	2,993	465	3,220	3,685	1.23



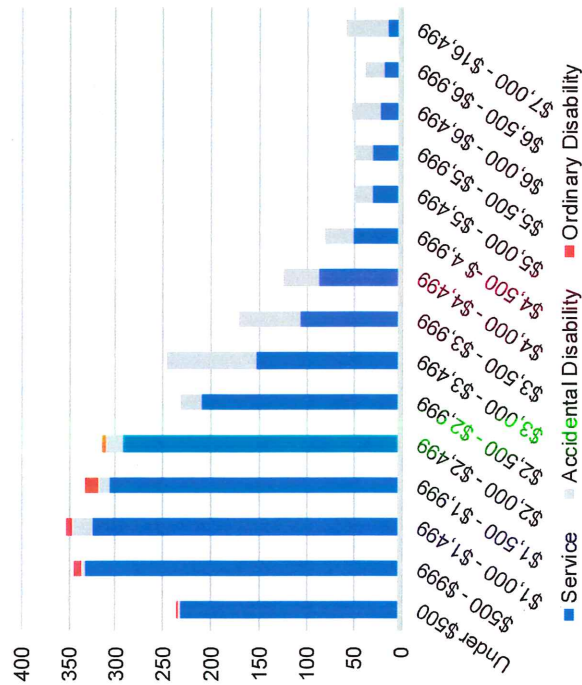
## Retired Participants and Beneficiaries

As of June 30, 2018, 2,683 retired participants and 537 beneficiaries were receiving total monthly benefits of \$7,875,635. For comparison, in the previous valuation, there were 2,687 retired participants and 547 beneficiaries receiving monthly benefits of \$7,885,376. There were two retired participants in suspended status this year compared to three retired participants in suspended status in the prior valuation.

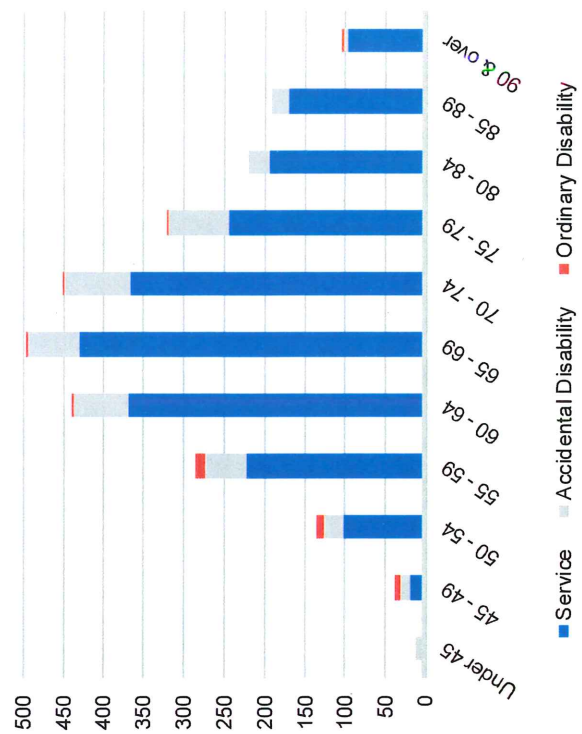
As of June 30, 2018, the average monthly benefit for retired participants and beneficiaries is \$2,447, compared to \$2,438 in the previous valuation. The average age for retired participants and beneficiaries is 70.7 in the current valuation, compared with 70.5 in the prior valuation.

### Distribution of Pensioners as of June 30, 2018

#### BY TYPE AND MONTHLY AMOUNT



#### BY TYPE AND AGE



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 JUNE 30, 2018

<b>1</b>	Market value of assets, June 30, 2018				\$358,997,000
<b>2</b>	Calculation of unrecognized return				
	(a) Year ended June 30, 2018	Original Amount <sup>1</sup>	Percent Deferred	Unrecognized Amount <sup>2</sup>	
	(b) Year ended June 30, 2017	8,737,960	60	5,242,776	
	(c) Year ended June 30, 2016	-19,402,600	40	-7,761,040	
	(d) Year ended June 30, 2015	-16,214,261	20	-3,242,852	
	(e) Year ended June 30, 2014	18,753,464	0	0	
	(f) Total unrecognized return				-8,602,364
<b>3</b>	Preliminary actuarial value: (1) - (2f)				\$367,599,364
<b>4</b>	Adjustment to be within 20% corridor				0
<b>5</b>	Final actuarial value of assets as of June 30, 2018: (3) + (4)				367,599,364
<b>6</b>	Actuarial value as a percentage of market value: (5) ÷ (1)				102.4%
<b>7</b>	Amount deferred for future recognition: (1) - (5)				-8,602,364

<sup>1</sup> Total return minus expected return on a market value basis.

<sup>2</sup> Recognition at 20% per year over five years.

## 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 net experience loss is \$886,099, which includes \$2,926,295 from investment losses and \$2,040,196 in gains from all other sources. The net experience variation from individual sources other than investments was 0.1% 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 JUNE 30, 2018

1	Net loss from investments	-\$2,926,295
2	Net gain from other experience	2,040,196
3	Net experience loss: 1 + 2	-\$886,099



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 eight years.

## INVESTMENT RETURN – ACTUARIAL VALUE VS. MARKET VALUE: 2011 - 2018

Year Ended June 30	Actuarial Value Investment Return		Market Value Investment Return	
	Amount	Percent	Amount	Percent
2011	N/A	3.42%	N/A	21.33%
2012	\$3,391,254	0.97	\$5,100,797	1.49
2013	18,132,553	5.70	35,563,000	11.35
2014	38,601,141	12.39	45,484,000	14.04
2015	34,418,220	10.47	12,507,000	3.59
2016	21,019,880	6.17	7,665,000	2.27
2017	26,208,775	7.72	34,630,000	10.70
2018	<u>25,018,161</u>	7.16	<u>23,802,000</u>	6.96
Total	\$166,789,984		\$164,751,797	
Most recent five-year average return		8.70%	7.40%	
Most recent seven-year average return		6.98%	7.07%	

## Other Experience

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

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

The net gain from this other experience for the year ended June 30, 2018 amounted to \$2,040,196, which is 0.1% of the actuarial accrued liability.

### LIABILITY CHANGES DUE TO DEMOGRAPHIC EXPERIENCE FOR YEAR ENDED JUNE 30, 2018

Salary increase greater than expected for continuing actives	<b>-\$2,567,616</b>
Miscellaneous gains including disability and mortality experience	<u>4,607,812</u>
<b>Total</b>	<b>\$2,040,196</b>

## Development of Unfunded Actuarial Accrued Liability

### DEVELOPMENT FOR YEAR ENDED JUNE 30, 2018

<b>1</b>	Unfunded actuarial accrued liability at beginning of year	\$1,000,141,709
<b>2</b>	Normal cost at beginning of year	18,852,441
<b>3</b>	Employer contributions	-78,123,000
<b>4</b>	Employee contributions	-12,246,000
<b>5</b>	Interest	
	• For whole year on <b>1 + 2</b>	\$81,519,532
	• For half year on <b>4</b>	<u>-442,781</u>
	Total interest	<u>81,076,751</u>
<b>6</b>	Expected unfunded actuarial accrued liability	\$1,009,701,901
<b>7</b>	Changes due to:	
	• Net loss from investments	\$2,926,295
	• Net gain from other experience	<u>-2,040,196</u>
	Total changes	<u>886,099</u>
<b>8</b>	Unfunded actuarial accrued liability at end of year	\$1,010,588,000



## Funding Schedule

(1) Fiscal Year Ended June 30:	(2) Employer Normal Cost	(3) Amortization of Deferral Liability	(4) Amortization of Remaining Unfunded Liability	(5) Actuarially Determined Contribution (2)+(3)+(4)	(6) Increase	(7) Payroll	(8) Contributions as a % of Payroll	(9) Actuarial Accrued Liability	(10) Actuarial Value of Assets	(11) Total Unfunded Actuarial Accrued Liability	(12) Funded Ratio
2019	\$8,659,755	\$464,222	\$74,233,390	\$83,357,367	--	\$155,595,815	53.57%	\$1,378,187,364	\$367,599,364	\$1,010,588,000	26.67%
2020	8,997,040	464,222	77,262,142	86,723,404	4.04%	161,041,669	53.85%	1,399,587,369	376,075,659	1,023,511,710	26.87%
2021	9,347,381	464,222	80,672,324	90,483,926	4.34%	166,678,127	54.29%	1,428,761,106	398,050,282	1,030,710,824	27.86%
2022	9,711,279	464,222	83,409,558	93,585,059	3.43%	172,511,861	54.25%	1,459,293,007	428,325,299	1,030,967,707	29.35%
2023	10,089,256	464,222	86,393,398	96,946,876	3.59%	178,549,777	54.30%	1,491,668,631	461,330,150	1,030,338,481	30.93%
2024	10,481,854	464,222	89,417,167	100,363,242	3.52%	184,799,019	54.31%	1,525,183,631	499,275,693	1,025,907,939	32.74%
2025	10,889,636	464,222	92,546,768	103,900,625	3.52%	191,266,984	54.32%	1,559,212,184	541,112,999	1,018,099,185	34.70%
2026	11,313,186	464,222	95,785,905	107,563,312	3.53%	197,961,329	54.34%	1,593,791,686	587,255,555	1,006,536,131	36.85%
2027	11,753,111	464,222	99,138,411	111,355,744	3.53%	204,889,975	54.35%	1,629,027,680	638,218,786	990,808,895	39.18%
2028	12,210,039	464,222	102,608,256	115,282,517	3.53%	212,061,124	54.36%	1,665,088,271	694,617,298	970,470,973	41.72%
2029	12,684,627	464,222	106,199,545	119,348,393	3.53%	219,483,264	54.38%	1,701,867,042	756,830,868	945,036,174	44.47%
2030	13,177,551	464,222	109,916,529	123,558,301	3.53%	227,165,178	54.39%	1,739,543,240	825,567,939	913,975,301	47.46%
2031	13,689,517	464,222	113,763,607	127,917,346	3.53%	235,115,959	54.41%	1,778,275,427	901,562,852	876,712,575	50.70%
2032	14,221,259	0	117,745,334	131,966,592	3.17%	243,345,018	54.23%	1,818,417,898	985,796,145	832,621,753	54.21%
2033	14,773,532	0	121,866,420	136,639,952	3.54%	251,882,093	54.25%	1,860,713,703	1,079,227,543	781,486,160	58.00%
2034	15,347,129	0	126,131,745	141,478,875	3.54%	260,677,267	54.27%	1,905,636,825	1,183,498,192	722,138,633	62.11%
2035	15,942,888	0	130,546,356	146,489,225	3.54%	269,800,971	54.30%	1,953,940,594	1,300,162,615	653,777,979	66.54%
2036	16,561,599	0	135,115,479	151,677,078	3.54%	279,244,005	54.32%	2,006,049,788	1,430,515,926	575,533,862	71.31%
2037	17,204,207	0	139,844,521	157,048,727	3.54%	289,017,545	54.34%	2,062,609,664	1,576,148,572	486,461,092	76.42%
2038	17,871,606	0	144,739,079	162,610,685	3.54%	299,133,159	54.36%	2,124,088,969	1,738,555,510	385,533,458	81.85%
2039	18,564,749	0	149,804,947	168,369,696	3.54%	309,602,820	54.38%	2,191,325,702	1,919,688,646	271,637,057	87.60%
2040	19,284,624	0	155,048,120	174,332,744	3.54%	320,438,919	54.40%	2,264,658,301	2,121,095,227	143,563,074	93.66%
2041	20,032,258	0	0	20,032,258	-88.51%	331,654,281	6.04%	2,344,753,511	2,344,753,511	0	100.00%

Notes: Fiscal 2019 and 2020 contributions set at budgeted amounts.

Contributions are assumed to be paid on June 30. If the contribution is made on a different date, Segal will adjust the interest charge based on the actual date of payment.

Item (2) reflects 3.5% growth in payroll as well as a 0.15% adjustment to total normal cost to reflect the effects of mortality improvements due to the generational mortality assumption.

Amortization payments of remaining unfunded liability increase at 3.5% per year beginning with fiscal year 2021.

Projected unfunded actuarial accrued liability reflects deferred investment losses. Recognizing deferred investment losses means the System is anticipating investment losses on an actuarial basis.

Normal cost is projected based on plan of benefits of current employees and does not reflect different benefits for new hires, if applicable.

The chart below shows the contribution for fiscal 2020 and fiscal 2021 for the departments of Class A.

### CLASS A CONTRIBUTION BY DEPARTMENT

	Fiscal 2020		Fiscal 2021	
	Total Contribution	Projected Compensation	Total Contribution	Projected Compensation
General	\$11,366,427	\$39,130,587	\$11,864,996	\$40,500,158
School	11,638,743	40,068,071	12,149,255	41,470,455
School Crossing Guards	301,445	1,037,768	314,667	1,074,089
Water	4,082,911	14,056,017	4,262,000	14,547,977
Workforce Development (JTPA)	252,290	868,547	263,357	898,946
Fire Civilians	365,570	1,258,528	381,605	1,302,576
Police Civilians	<u>1,306,359</u>	<u>4,497,330</u>	<u>1,363,660</u>	<u>4,654,737</u>
Total	\$29,313,745	\$100,916,848	\$30,599,540	\$104,448,938

Note: Contribution is allocated in proportion to projected compensation.



➤ Actual Experience in Recent 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 several years:

The investment gain(loss) over the past six years has ranged from a loss of \$19,402,600 to a gain of \$18,753,464.

The non-investment gain(loss) over the past six years has ranged from a loss of \$15,267,386 to a gain of \$6,663,794.

Since 2009, the funded percentage on the actuarial value of assets has ranged from a low of 26.2% as of July 1, 2016 to a high of 34.1% as of July 1, 2010.

➤ 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.

For the prior year, benefits paid were \$13.4 million more than contributions received.



## Section 3: Supplemental Information

EXHIBIT A – TABLE OF PLAN COVERAGE – CLASS A

Category	Year Ended June 30		Change From Prior Year
	2018	2017	
Active participants in valuation:			
• Number	2,113	2,107	0.3%
• Average age	48.8	48.7	0.1
• Average years of service	12.2	12.1	0.1
• Total compensation	\$94,062,687	\$90,590,009	3.8%
• Average compensation	44,516	42,995	3.5%
• Participant contributions	102,819,381	98,965,790	3.9%
Inactive participants in the valuation:			
• Inactive entitled to a refund of employee contributions	381	446	-14.6%
• Inactive participants with a vested right to a deferred or immediate benefit	57	51	11.8%
Retired participants:			
• Number in pay status	1,494	1,494	0.0%
• Average age	72.5	72.3	0.2
• Average monthly benefit	\$1,551	\$1,541	0.6%
• Number in suspended status	2	3	-33.3%
Disabled participants:			
• Number in pay status	81	84	-3.6%
• Average age	69.1	69.1	0.0
• Average monthly benefit	\$1,682	\$1,671	0.7%
Beneficiaries:			
• Number in pay status	189	197	-4.1%
• Average age	76.8	77.8	-1.0
• Average monthly benefit	\$1,284	\$1,275	0.7%

Note: Includes elected officials

**EXHIBIT C – PARTICIPANTS IN ACTIVE SERVICE DURING YEAR ENDED JUNE 30, 2018 – CLASS A**  
**BY AGE, YEARS OF SERVICE, AND AVERAGE COMPENSATION**

Age	Total	Year of Service											
		0-4	5-9	10-14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 & over			
Under 25	40	39	1	--	--	--	--	--	--	--	--	--	--
	\$32,365	\$31,927	\$49,439	--	--	--	--	--	--	--	--	--	--
25 - 29	115	95	20	--	--	--	--	--	--	--	--	--	--
	\$40,256	\$41,137	\$36,074	--	--	--	--	--	--	--	--	--	--
30 - 34	175	87	69	19	--	--	--	--	--	--	--	--	--
	\$44,628	\$46,096	\$42,768	\$44,668	--	--	--	--	--	--	--	--	--
35 - 39	175	60	60	29	24	2	--	--	--	--	--	--	--
	\$43,531	\$42,156	\$42,901	\$46,963	\$44,193	\$45,960	--	--	--	--	--	--	--
40 - 44	225	59	45	41	46	34	--	--	--	--	--	--	--
	\$46,890	\$47,471	\$41,053	\$48,348	\$49,674	\$48,084	--	--	--	--	--	--	--
45 - 49	334	67	68	46	63	72	17	1	--	--	--	--	--
	\$46,187	\$41,525	\$43,418	\$46,710	\$44,960	\$50,148	\$60,348	\$74,072	--	--	--	--	--
50 - 54	356	66	53	49	67	66	46	9	--	--	--	--	--
	\$45,972	\$41,872	\$34,392	\$40,897	\$45,259	\$47,305	\$67,010	\$59,857	--	--	--	--	--
55 - 59	325	50	71	53	70	49	23	7	2	--	--	--	--
	\$43,547	\$39,128	\$39,276	\$45,613	\$40,616	\$44,748	\$56,660	\$77,514	\$54,386	--	--	--	--
60 - 64	232	33	40	33	38	52	22	9	2	3	--	--	--
	\$45,013	\$41,821	\$38,727	\$39,885	\$43,892	\$46,128	\$53,623	\$68,955	\$52,491	\$75,238	--	--	--
65 - 69	98	11	13	19	21	15	12	5	2	--	--	--	--
	\$44,292	\$35,054	\$41,420	\$47,346	\$43,741	\$39,965	\$51,233	\$50,549	\$65,695	--	--	--	--
70 & over	38	1	4	5	6	7	8	1	2	4	--	--	--
	\$37,682	\$41,726	\$40,797	\$25,345	\$40,035	\$41,615	\$35,146	\$51,546	\$39,498	\$39,260	--	--	--
Total	2,113	568	444	294	335	297	128	32	8	7	--	--	--
	\$44,516	\$41,907	\$40,446	\$44,576	\$44,419	\$46,942	\$58,494	\$65,008	\$53,017	\$54,679	--	--	--



# EXHIBIT E – SERVICE RETIREES AS OF JUNE 30, 2018

Age	Class A		Class B		Total	
	Number	Amount	Number	Amount	Number	Amount
40 - 44	0	\$0	1	\$24,938	1	\$24,938
45 - 49	4	86,501	14	363,951	18	450,452
50 - 54	14	441,437	86	2,671,976	100	3,113,412
55 - 59	89	1,996,819	133	4,700,404	222	6,697,224
60 - 64	225	5,131,881	143	6,050,740	368	11,182,621
65 - 69	314	6,352,625	115	4,863,964	429	11,216,589
70 - 74	269	4,848,925	95	4,487,403	364	9,336,328
75 - 79	208	3,283,832	36	1,622,733	244	4,906,565
80 - 84	156	2,122,356	37	1,586,237	193	3,708,592
85 - 89	135	2,368,643	36	1,349,583	171	3,718,226
90 - 94	68	986,182	12	621,312	80	1,607,494
95 - 99	10	156,974	5	187,964	15	344,938
100 & over	2	26,401	0	0	2	26,401
Total	1,494	\$27,802,575	713	\$28,531,205	2,207	\$56,333,780



# EXHIBIT G – CLASS B DISABLED RETIREES AS OF JUNE 30, 2018

Age	Ordinary		Accidental		Total	
	Number	Amount	Number	Amount	Number	Amount
25 - 29	0	\$0	0	\$0	0	\$0
30 - 34	0	0	1	36,028	1	36,028
35 - 39	0	0	1	50,365	1	50,365
40 - 44	0	0	7	287,502	7	287,502
45 - 49	5	97,451	12	498,593	17	596,044
50 - 54	4	89,160	24	973,928	28	1,063,088
55 - 59	5	105,410	43	1,938,600	48	2,044,010
60 - 64	2	35,991	63	3,133,120	65	3,169,112
65 - 69	0	0	55	3,132,680	55	3,132,680
70 - 74	0	0	74	4,698,855	74	4,698,855
75 - 79	0	0	55	3,843,039	55	3,843,039
80 - 84	0	0	18	1,578,030	18	1,578,030
85 - 89	0	0	18	1,428,966	18	1,428,966
90 - 94	1	19,104	4	363,382	5	382,486
95 - 99	0	0	0	0	0	0
100 & over	0	0	1	38,951	1	38,951
Total	17	\$347,116	376	\$22,002,038	393	\$22,349,154

# **EXHIBIT I – SUMMARY STATEMENT OF INCOME AND EXPENSES** **ON A MARKET VALUE BASIS**

	Year Ended June 30, 2018	Year Ended June 30, 2017
Net assets at market value at the beginning of the year	\$348,644,000	\$333,287,000
<b>Contribution income:</b>		
• Employer contributions	\$78,123,000	\$72,396,000
• Employer contributions	<u>12,246,000</u>	<u>11,419,000</u>
Net contribution income	90,369,000	83,815,000
Net investment income	<u>23,802,000</u>	<u>34,630,000</u>
Total income available for benefits	\$114,171,000	\$118,445,000
Less benefit payments	<b>-\$103,818,000</b>	<b>-\$103,088,000</b>
Change in reserve for future benefits	<b>\$10,353,000</b>	<b>\$15,357,000</b>
Net assets at market value at the end of the year	\$358,997,000	\$348,644,000

## EXHIBIT K – DEFINITIONS OF PENSION TERMS

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

<b>Actuarial Accrued Liability for Actives:</b>	The equivalent of the accumulated normal costs allocated to the years before the valuation date.
<b>Actuarial Accrued Liability for Pensioners and Beneficiaries:</b>	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.
<b>Actuarial Cost Method:</b>	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.
<b>Actuarial Gain or Loss:</b>	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.
<b>Actuarially Equivalent:</b>	Of equal actuarial present value, determined as of a given date and based on a given set of Actuarial Assumptions.
<b>Actuarial Present Value (APV):</b>	<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> <ul style="list-style-type: none"> <li>Adjusted for the probable financial effect of certain intervening events (such as changes in compensation levels, marital status, etc.)</li> <li>Multiplied by the probability of the occurrence of an event (such as survival, death, disability, withdrawal, etc.) on which the payment is conditioned, and</li> <li>Discounted according to an assumed rate (or rates) of return to reflect the time value of money.</li> </ul>



<b>Closed Amortization Period:</b>	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.
<b>Decrements:</b>	Those causes/events due to which a member's status (active-inactive-retiree-beneficiary) changes, that is: death, retirement, disability, or withdrawal.
<b>Defined Benefit Plan:</b>	A retirement plan in which benefits are defined by a formula applied to the member's compensation and/or years of service.
<b>Defined Contribution Plan:</b>	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.
<b>Employer Normal Cost:</b>	The portion of the Normal Cost to be paid by the employer. This is equal to the Normal Cost less expected member contributions.
<b>Experience Study:</b>	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.
<b>Funded Ratio:</b>	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.
<b>GASB 67 and GASB 68:</b>	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.
<b>Investment Return:</b>	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.
<b>Net Pension Liability (NPL):</b>	The Net Pension Liability is equal to the Total Pension Liability minus the Plan Fiduciary Net Position.
<b>Normal Cost:</b>	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.

## Section 4: Actuarial Valuation Basis

### EXHIBIT I – ACTUARIAL ASSUMPTIONS AND ACTUARIAL COST METHOD

#### Rationale for Demographic and Noneconomic Assumptions:

The information and analysis used in selecting each assumption that has a significant effect on this actuarial valuation is shown in the Actuarial Experience Review as of June 30, 2015, dated March 25, 2016.

Net Investment Return: 8.00%

Interest on Employee Contributions:

4.00%, compounded weekly. No interest for inactive members after five years.

Salary Increases:

3.5% per year, before reflecting longevity.

Base wages are increased by the following percentages to reflect longevity compensation:

Class A Years of Service	Rate of base wage increase (%) Hired on or before October 23, 1999
-----------------------------	---

5 – 10	4%
10 – 15	5%
15 – 20	6%
20+	7%

Years of Service	Hired after October 23, 1999
------------------	------------------------------

7 – 12	3%
12 – 17	4%
17 – 20	5%
20+	6%

Class B – Fire Years of Service	Rate of base wage increase (%) Hired on or before June 30, 1996
------------------------------------	--

5 – 10	8%
10 – 15	9%
15 – 20	10%
20+	11%

Years of Service	Hired after June 30, 1996
------------------	---------------------------

5 – 10	7%
10 – 15	8%
15 – 20	9%
20+	10%



#### Annuitant Mortality Rates:

		Rate per year (%)			
		Class A			
Age		Healthy		Disabled	
		Male	Female	Male	Female
55		0.64	0.41	0.77	0.54
60		0.89	0.66	1.18	0.88
65		1.39	1.07	1.96	1.40
70		2.23	1.72	3.19	2.26
75		3.66	2.76	5.23	3.70
80		6.11	4.62	8.60	6.26
85		10.45	8.15	14.19	10.82
90		17.77	14.26	22.40	17.84
		Class B			
Age		Healthy		Disabled	
		Male	Female	Male	Female
55		0.68	0.45	0.77	0.54
60		0.98	0.72	1.18	0.88
65		1.60	1.16	1.96	1.40
70		2.63	1.87	3.19	2.26
75		4.29	3.03	5.23	3.70
80		7.05	5.05	8.60	6.26
85		11.61	8.71	14.19	10.82
90		19.01	14.81	22.40	17.84

Note: Mortality rates do not reflect generational projection.



**Withdrawal Rates:**

Age	Rate per year (%)	
	Class A	Class B
20	14.00	2.50
25	11.50	1.90
30	9.00	1.40
35	6.50	0.90
40	5.00	0.55
45	3.75	0.35
50	2.50	0.15
55	1.25	0.00
60	0.00	0.00

#### Retirement Age for Vested Former Participants:

- Vested former participants who terminated after June 30, 2013: Assumed to retire at minimum age for a Normal Service Retirement.
- Vested participants who terminated prior to June 30, 2013: Assumed to take an immediate refund of their employee contributions.
- Current active participants who terminate after valuation date:
  - Participants in the Fire department who terminate with 20 or more years of service are assumed to retire on their 25th anniversary of employment. Other participants who terminate at age 45 or older and are vested are assumed to retire at their minimum age for a Normal Service Retirement and who terminate prior to age 45 or without vesting are assumed to take an immediate refund of their employee contributions.

The retirement age for inactive vested participants was based on historical and current demographic data, adjusted to reflect economic conditions of the area and estimated future experience and professional judgment.

#### Unknown Data for Participants:

Same as those exhibited by participants with similar known characteristics. For retirees missing beneficiary information, Class A members who elected Option 2 or 3 are assumed to have a beneficiary of the opposite sex with males three years older than females. Class B members who did not elect Option 1 are assumed to be married to someone the same age.

**Percent Married:** 80%.

**Age of Spouse:** Females three years younger than males for Class A. Females and males the same age for Class B.

**Total Service:** Total service is based on date of hire provided in the data. In addition, 1.0 and 0.5 years of service were added to the service totals for participants of the Police and Fire departments, respectively, to estimate the impact of Purchased Service.

#### 2018 Salary:

Salaries for the year ending June 30, 2018 are equal to the total of pensionable wages earned during the plan year as provided in the data, except for participants who were hired during the plan year, those who were in transition from active to retiree status as of July 1, 2018 and participants receiving worker's compensation, for whom current rate of pay was provided.

**Benefit Election:** All participants are assumed to elect the Maximum Retirement Option.

#### Actuarial Value of Assets:

Market value of assets as reported in the City's Financial Statement 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 market return, 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 Normal Actuarial Cost Method. Entry Age is the age of the participant at date of hire. Normal Cost and Actuarial Accrued Liability are calculated on an individual basis and are allocated by salary. Normal Cost is determined by using the plan of benefits applicable to each participant.

There have been no changes in actuarial assumptions since the last valuation.

#### Justification for Change in Actuarial Assumptions:

Section 4: Actuarial Valuation Basis as of July 1, 2018 for  
The Employee Retirement System of the City of Providence

» Class A members hired on or after July 1, 1996: A pension which, when added to the annuity, exclusive of any excess annuity, will give a total retirement allowance of 2% of final compensation for each year of total service credited, limited to 100% of final compensation.

» Fire: A pension which, when added to the annuity, exclusive of any excess annuity, will give a total retirement allowance of 2.5% of final compensation for each year of total service credited not in excess of 20 years, plus 2% of final compensation for each year of total service credited in excess of 20 years, limited to 75% of final compensation.

» Police: A pension which, when added to the annuity, exclusive of any excess annuity, equals:

- Members hired prior to September 1, 2001:

Years of Service	Percentage of Final Compensation	Years of Service	Percentage of Final Compensation
Prior to 20	2.5% per year	26	62%
20	50%	27	64%
21	52%	28	66%
22	54%	29	68%
23	56%	30	75%
24	58%	31	72%
25	65%	32	80%

- Members hired on or after September 1, 2001 and prior to July 1, 2011:

Years of Service	Percentage of Final Compensation	Years of Service	Percentage of Final Compensation
Prior to 20	2.5% per year	26	62%
20	50%	27	64%
21	52%	28	66%
22	54%	29	68%
23	56%	30	70%
24	58%	31	72%
25	60%	32	75%



### Ordinary Disability Retirement:

- Age Requirement: None
- Service Requirement: For members of the Police Department, 10 years of service, but fewer than 20. For all others, 10 years of service.
- Amount:
  - Annuity Based on Member Contributions: An annuity which is the actuarial equivalent of his or her accumulated contributions at the time of his retirement.
  - Pension Based on City Contributions:
    - » Class A members: A pension which, when added to the annuity, exclusive of any excess annuity, will give a total retirement allowance of 90% of 2% of final compensation for each year of total service which would have been credited had the member continued in service to the minimum age for a Normal Service Retirement. Such retirement allowance, exclusive of any excess annuity, is not to exceed 45% of final compensation.
    - » Police: A pension which, when added to the annuity, will give a total retirement allowance equal to a percentage of final compensation, as described in the following table:

Years of Service	Percentage of Final Compensation	Years of Service	Percentage of Final Compensation
10	22.50%	15	33.75%
11	24.75%	16	36.00%
12	27.00%	17	38.25%
13	29.25%	18	40.50%
14	31.50%	19	42.75%

- » Fire: A pension which, when added to the annuity, exclusive of any excess annuity, will give a total retirement allowance of 90% of 2.5% of final compensation for each year of total service which would have been credited had the member continued in service to the minimum age for a Normal Service Retirement. Such retirement allowance, exclusive of any excess annuity, is not to exceed 45% of the member's final compensation.

#### Options at Retirement:

- **Maximum Retirement Option:** An unreduced retirement allowance payable during the retired member's life, where no monthly payments will continue to the member's beneficiary, but where, upon the member's death, any unpaid portion of his or her accumulated contributions will be paid to his or her beneficiary.
- **Option 1:** A reduced retirement allowance payable during the retired member's life, where no monthly payments will continue to the member's beneficiary, but where, upon the member's death, any amount that payments made are less than the present value of his or her retirement allowance at his or her date of retirement will be paid to his or her beneficiary.
- **Option 2:** A reduced retirement allowance payable during the retired member's life, where upon the member's death, the entire monthly benefit will continue to be paid to his or her beneficiary for the remainder of his or her life.
- **Option 3:** A reduced retirement allowance payable during the retired member's life, where upon the member's death, 50% of the monthly benefit will continue to be paid to his or her beneficiary for the remainder of his or her life.
- **Option 4:** An unreduced retirement allowance payable during the retired member's life, where the member's accumulated contributions are paid immediately as a lump sum payment, with the pension portion of his or her benefit payable during the retired member's life, where no monthly payments will continue to the member's beneficiary.

Class B members who retire on an Accidental Disability Retirement may not elect Option 4.

Class B members may not elect Options 2 or 3.

Married Class B members may not elect Option 1.

#### Contribution Rates

- Class A: 8% of compensation.
  - Police: 8% of compensation
  - Firefighters hired before July 1, 2011: 8% of compensation.
  - Firefighters hired on or after July 1, 2011: 9% of compensation.
  - Elected Officials: \$350 per year.
- Class B member contributions may cease after 32.5 years of service.

#### Changes in Plan Provisions:

There have been no changes in plan provisions since the last valuation.