

**AUSTIN  
FIREFIGHTERS' RELIEF AND RETIREMENT FUND**

ACTUARIAL VALUATION  
AS OF DECEMBER 31, 2018

GASB 67/68 DISCLOSURE INFORMATION  
AS OF DECEMBER 31, 2018



**FOSTER & FOSTER**  
ACTUARIES AND CONSULTANTS

June 27, 2019

Mr. William E. Stefka  
Austin Firefighters'  
Relief and Retirement Fund  
4101 Parkstone Heights Drive, Suite 270  
Austin, TX 78746

*Re: Austin Firefighters' Relief and Retirement Fund*

Dear Bill:

We are pleased to present to the Board this report of the annual actuarial valuation of the Austin Firefighters' Relief and Retirement Fund (AFRRF). Included are the related results for GASB Statements No. 67 and No. 68. The funding valuation was performed to determine whether the assets and contributions are sufficient to provide the prescribed benefits and to develop the funding period required to amortize any existing Unfunded Actuarial Accrued Liability. The calculation of the liability for GASB results was performed for the purpose of satisfying the requirements of GASB Statements No. 67 and No. 68. Use of the results for other purposes may not be applicable and may produce significantly different results.

The valuation has been conducted in accordance with generally accepted actuarial principles and practices, including the applicable Actuarial Standards of Practice as issued by the Actuarial Standards Board, and reflects laws and regulations issued to date pursuant to the provisions of Article 6243e.1, Vernon's Texas Civil Statutes, as well as applicable federal laws and regulations. In our opinion, the assumptions used in this valuation, as adopted by the Board of Trustees, represent reasonable expectations of anticipated plan experience. Future actuarial measurements may differ significantly from the current measurements presented in this report for a variety of reasons including: changes in applicable laws, changes in plan provisions, changes in assumptions, or plan experience differing from expectations. Due to the limited scope of the valuation, we did not perform an analysis of the potential range of such future measurements.

In conducting the valuation, we have relied on personnel, plan design, financial reports, and asset information supplied by the AFRRF staff, and the actuarial assumptions and methods described in the Actuarial Assumptions section of this report. While we cannot verify the accuracy of all this information, the supplied information was reviewed for consistency and reasonableness. As a result of this review, we have no reason to doubt the substantial accuracy of the information and believe that it has produced

appropriate results. This information, along with any adjustments or modifications, is summarized in various sections of this report.

The total pension liability, net pension liability, and certain sensitivity information shown in this report are based on an actuarial valuation performed as of January 1, 2018. It is our opinion that the assumptions used for this purpose are internally consistent, reasonable, and comply with the requirements under GASB No. 67 and No. 68.

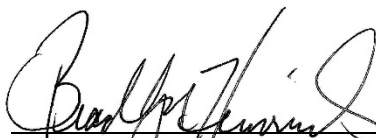
The undersigned is familiar with the immediate and long-term aspects of pension valuations, and meets the Qualification Standards of the American Academy of Actuaries necessary to render the actuarial opinions contained herein. All of the sections of this report are considered an integral part of the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

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

If there are any questions, concerns, or comments about any of the items contained in this report, please contact me at 239-433-5500.

Respectfully submitted,

Foster & Foster Inc.

By:   
Bradley R. Heinrichs, FSA, EA, MAAA  
Enrolled Actuary #17-6901

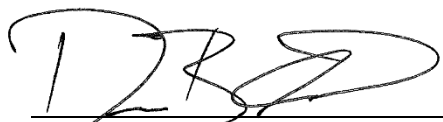
  
Drew D. Ballard, EA, MAAA  
Enrolled Actuary #17-8193

TABLE OF CONTENTS

**I. Introduction**

*Summary of Report*.....5

*Changes since Prior Valuation* .....7

**II. Report Information**

*Comparative Summary of Principal Valuation Results* .....8

*Gain/Loss Analysis*.....10

**III. Trust Fund**

*Statement of Fiduciary Net Position* .....11

*Statement of Changes in Fiduciary Net Position* .....12

*Actuarial Asset Valuation* .....13

*Changes in Net Assets Available for Benefits* .....14

**IV. Member Statistics**

*Statistical Data*.....15

*Age and Service Distribution* .....16

*Valuation Participant Reconciliation*.....17

**V. Valuation Basis**

*Actuarial Assumptions and Methods*.....18

*Summary of Benefit Provisions* .....21

*Discussion of Risk*.....24

*Valuation Notes*.....28

**VI. Governmental Accounting Standards Board Disclosure Statements**

*GASB 67*.....29

*GASB 68*.....41

## SUMMARY OF REPORT

The actuarial valuation of the Austin Firefighters' Relief and Retirement Fund, performed as of December 31, 2018, has been completed and the results are presented in this Report. The pension costs, compared with those developed in the December 31, 2017 actuarial valuation, are as follows:

	New Assump	Old Assump	
<u>Valuation Date</u>	<u>12/31/2018</u>	<u>12/31/2018</u>	<u>12/31/2017</u>
Current Normal Cost Rate % of Covered Annual Payroll	29.52%	29.74%	29.46%
<b>Funding Measurements</b>			
Actuarial Accrued Liability (AAL)	1,084,533,608	1,088,890,599	1,038,118,085
Actuarial Value of Assets (AVA)	954,574,840	954,574,840	916,931,534
Unfunded Actuarial Accrued Liability (UAAL = AAL - AVA)	129,958,768	134,315,759	121,186,551
Funded Ratio (AVA / AAL)	88.0%	87.7%	88.3%
Amortization Period <sup>2</sup>	17.9 years	19.3 years	17.0 years
<b>Contributions</b>			
Expected City Contribution Rate	22.05%	22.05%	22.05%
Expected Member Contribution Rate	18.70%	18.70%	18.70%
Total Expected Contribution Rate	40.75%	40.75%	40.75%
<b>Funding Costs</b>			
City 20-Year Funding Cost	21.23%	21.80%	20.85%
City 30-Year Funding Cost <sup>1</sup>	19.02%	19.51%	18.71%
City 40-Year Funding Cost	17.99%	18.46%	17.71%

<sup>1</sup> Per Section 802.101(a) of the Texas Government Code, the actuarial valuation must include a recommended contribution rate needed for the system to achieve and maintain an amortization period that does not exceed 30 years.

<sup>2</sup> If the actuarial smoothing technique was removed and the market value of assets was utilized to determine the amortization period, the result would be 29.2 years as of December 31, 2018.

Plan experience was unfavorable overall on the basis of the plan's actuarial assumptions. The primary source of unfavorable experience was an investment return of 6.23% (Actuarial Asset Basis) which fell short of the 7.70% assumption. This loss was offset in part by a gain associated with an average salary increase of 2.99% which fell short of the 5.72% assumption.

Please note that this valuation incorporates two changes to the actuarial assumptions, as described on the following page.

## CHANGES SINCE PRIOR VALUATION

### Benefit/Fund Changes

There have been no changes in benefit provisions or contribution rates since the prior valuation. It is important to point out that eligible retirees received a 2.30% cost-of-living adjustment, effective January 1, 2019, in accordance with the Fund's COLA adjustment policy.

### Actuarial Assumption/Method Changes

The valuation reflects the following changes to the actuarial assumptions:

- The assumed mortality rates were updated to reflect the PubS-2010 (above-median, amount-weighted) tables with mortality improvements projected five (5) years beyond the valuation date using scale MP-2018. Previously, the RP-2000 (fully generational using scale AA) with a set-back of two years for males and females was used for healthy lives and the RP-2000 disability mortality table was used for disabled lives. Given the recent release of a report by the Society of Actuaries on public pension mortality, we feel that these tables are the most representative of the population in question.
- The price inflation assumption was lowered from 3.50% to 2.75% per year.

COMPARATIVE SUMMARY OF PRINCIPAL VALUATION RESULTS

	New Assump <u>12/31/2018</u>	Old Assump <u>12/31/2018</u>	<u>12/31/2017</u>
A. Participant Data			
Actives	1,102	1,102	1,045
Service Retirees + DROP	679	679	650
Beneficiaries + Alt Payees	125	125	118
Disability Retirees	18	18	18
Terminated Vested	8	8	9
	<hr/>	<hr/>	<hr/>
Total	1,932	1,932	1,840
Covered Annual Payroll	92,083,218	92,058,633	88,209,122
Annual Rate of Payments to:			
Service Retirees + DROP	43,116,610	43,116,610	39,941,555
Beneficiaries + Alt Payees	3,807,781	3,807,781	3,744,765
Disability Retirees	758,015	758,015	744,706
Terminated Vested	252,192	252,192	317,466
B. Assets			
Actuarial Value (AVA)	954,574,840	954,574,840	916,931,534
Market Value (MVA)	909,117,796	909,117,796	953,798,227
C. Liabilities			
Present Value of Benefits			
Actives			
Retirement + Termination Benefits	710,792,605	715,607,490	692,205,014
Death Benefits	6,746,036	8,652,384	8,369,038
Disability Benefits	26,856,591	25,095,404	23,971,186
Service Retirees + DROP	578,880,785	580,997,027	532,178,906
Beneficiaries + Alt Payees	32,771,736	33,168,153	32,477,563
Disability Retirees	7,656,455	6,563,842	6,568,655
Terminated Vested	1,970,161	1,990,447	2,783,086
	<hr/>	<hr/>	<hr/>
Total	1,365,674,369	1,372,074,747	1,298,553,448



	New Assump <u>12/31/2018</u>	Old Assump <u>12/31/2018</u>	<u>12/31/2017</u>
C. Liabilities - (Continued)			
Present Value of Future Salaries	996,580,825	995,314,422	918,035,842
Normal Cost (Entry Age Normal)			
Retirement + Termination Benefits	24,313,431	24,470,503	23,316,755
Death Benefits	460,259	580,164	563,692
Disability Benefits	1,403,765	1,315,006	1,250,055
Total Normal Cost	<u>26,177,455</u>	<u>26,365,673</u>	<u>25,130,502</u>
Present Value of Future Normal Costs	281,140,761	283,184,148	260,435,363
Actuarial Accrued Liability			
Retirement + Termination Benefits	449,546,961	452,340,137	450,208,818
Death Benefits	1,866,269	2,805,755	2,865,171
Disability Benefits	11,841,241	11,025,238	11,035,886
Inactives	621,279,137	622,719,469	574,008,210
Total Actuarial Accrued Liability (AAL)	<u>1,084,533,608</u>	<u>1,088,890,599</u>	<u>1,038,118,085</u>
Unfunded Actuarial Accrued Liability (UAAL)	129,958,768	134,315,759	121,186,551
Funded Ratio (AVA / AAL)	88.0%	87.7%	88.3%
D. Actuarial Present Value of Accrued Benefits			
Inactives	621,279,137	622,719,469	574,008,210
Actives	348,743,560	351,225,611	345,230,441
Total Present Value Accrued Benefits (PVAB)	<u>970,022,697</u>	<u>973,945,080</u>	<u>919,238,651</u>
Funded Ratio (MVA / PVAB)	93.7%	93.3%	103.8%

## GAIN/LOSS ANALYSIS

### a. Total (Gain)/Loss

1. Unfunded Actuarial Accrued Liability as of December 31, 2017	\$121,186,551
2. Normal Cost applicable for 2017	25,130,502
3. Interest on (1) and (2)	11,266,413
4. Contributions made during 2017	37,117,830
5. Interest on (4)	1,429,036
6. Expected UAAL as of December 31, 2018: (1)+(2)+(3)-(4)-(5)	119,036,600
7. Actual UAAL as of December 31, 2018 (Before Assump Change)	134,315,759
 Total Actuarial (Gain)/Loss <sup>1</sup>	 15,279,159

### b. (Gain)/Loss on Assets

1. Actuarial Value of Assets as of December 31, 2017	916,931,534
2. Contributions Less Benefit Payments	(18,861,464)
3. Expected Investment Earnings	69,877,562
4. Expected AVA as of December 31, 2018: (1)+(2)+(3)	967,947,632
5. Actual Actuarial Value of Assets as of December 31, 2018	954,574,840
 (Gain)/Loss on Assets	 13,372,792

### c. (Gain)/Loss on Liabilities

1. Expected Actuarial Accrued Liability: a(6)+b(4)	1,086,984,232
2. Actual Actuarial Accrued Liability (Before Assump Change)	1,088,890,599
 (Gain)/Loss on Liabilities <sup>1</sup>	 1,906,367

<sup>1</sup> Includes increase in liabilities associated with the 2.3% cost-of-living adjustment that was granted to eligible retirees, effective January 1, 2019.

STATEMENT OF FIDUCIARY NET POSITION  
DECEMBER 31, 2018

<u>ASSETS</u>	MARKET VALUE
Total Cash and Equivalents	13,009,148.00
Receivables:	
From Broker for Investments Sold	156,076.00
Investment Income	167,710.00
Total Receivable	323,786.00
Investments:	
Public Equities	323,594,008.00
Private Equities	183,670,803.00
Public Fixed Income	279,541,963.00
Real Estate Funds	83,442,672.00
Private Natural Resources Funds	26,259,960.00
Total Investments	896,509,406.00
Total Assets	909,842,340.00
<u>LIABILITIES</u>	
Payables:	
To Broker for Investments Purchased	724,544.00
Total Liabilities	724,544.00
NET POSITION RESTRICTED FOR PENSIONS	909,117,796.00

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

ADDITIONS

Contributions:

Member	17,033,213
City	20,084,617

Total Contributions 37,117,830

Investment Income:

Miscellaneous Income	51,620
Net Realized Gain (Loss)	32,921,610
Unrealized Gain (Loss)	(65,286,390)
Net Increase in Fair Value of Investments	(32,313,160)
Interest & Dividends	9,864,740
Less Investment Expense <sup>1</sup>	(2,665,644)

Net Investment Income (25,114,064)

Total Additions 12,003,766

DEDUCTIONS

Distributions to Members:

Benefit Payments	45,808,645
Lump Sum DROP Distributions	9,936,387
Refunds of Member Contributions	234,262

Total Distributions 55,979,294

Administrative Expense 704,903

Total Deductions 56,684,197

Net Increase in Net Position (44,680,431)

NET POSITION RESTRICTED FOR PENSIONS

Beginning of the Year 953,798,227

End of the Year 909,117,796

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

ACTUARIAL ASSET VALUATION  
December 31, 2018

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

Plan Year Ending	Gain/(Loss)	<u>Gains/(Losses) Not Yet Recognized</u>				
		Amounts Not Yet Recognized by Valuation Year				
		2019	2020	2021	2022	2023
12/31/2014	N/A	0	0	0	0	0
12/31/2015	(54,636,462)	(10,927,294)	0	0	0	0
12/31/2016	(5,150,047)	(2,060,020)	(1,030,011)	0	0	0
12/31/2017	77,264,135	46,358,481	30,905,654	15,452,827	0	0
12/31/2018	(98,535,264)	(78,828,211)	(59,121,158)	(39,414,105)	(19,707,052)	0
<b>Total</b>		<b>(45,457,044)</b>	<b>(29,245,515)</b>	<b>(23,961,278)</b>	<b>(19,707,052)</b>	<b>0</b>

<u>Development of Investment Gain/(Loss)</u>	
Market Value of Assets, 12/31/2017	953,798,227
Contributions Less Benefit Payments	(18,861,464)
Expected Investment Earnings*	72,716,297
Actual Net Investment Earnings	(25,818,967)
Actuarial Investment Gain/(Loss)	<u>(98,535,264)</u>

\*Expected Investment Earnings = 0.077 \* [953,798,227 + 0.5 \* (18,861,464)]

<u>Development of Actuarial Value of Assets</u>	
(1) Market Value of Assets, 12/31/2018	909,117,796
(2) Gains/(Losses) Not Yet Recognized	(45,457,044)
(3) Actuarial Value of Assets, 12/31/2018, (1) - (2)	<u>954,574,840</u>
(A) 12/31/2017 Actuarial Assets:	916,931,534
(I) Net Investment Income:	
1. Interest and Dividends	9,916,360
2. Realized Gains (Losses)	32,921,610
3. Unrealized Gains (Losses)	(65,286,390)
4. Change in Actuarial Value	82,323,737
5. Investment & Administrative Expenses	(3,370,547)
Total	<u>56,504,770</u>
(B) 12/31/2018 Actuarial Assets:	954,574,840
Actuarial Assets Rate of Return = 2I/(A+B-I):	6.23%
Market Value of Assets Rate of Return:	-2.73%
Actuarial Gain/(Loss) due to Investment Return (Actuarial Asset Basis)	(13,372,792)
12/31/2018 Limited Actuarial Assets:	954,574,840

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

REVENUES

Contributions:		
Member	17,033,213	
City	20,084,617	
Total Contributions		37,117,830
Earnings from Investments:		
Interest & Dividends	9,864,740	
Miscellaneous Income	51,620	
Net Realized Gain (Loss)	32,921,610	
Unrealized Gain (Loss)	(65,286,390)	
Change in Actuarial Value	82,323,737	
Total Earnings and Investment Gains		59,875,317
EXPENDITURES		
Distributions to Members:		
Benefit Payments	45,808,645	
Lump Sum DROP Distributions	9,936,387	
Refunds of Member Contributions	234,262	
Total Distributions		55,979,294
Expenses:		
Investment related <sup>1</sup>	2,665,644	
Administrative	704,903	
Total Expenses		3,370,547
Change in Net Assets for the Year		37,643,306
Net Assets Beginning of the Year		916,931,534
Net Assets End of the Year <sup>2</sup>		954,574,840

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

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

STATISTICAL DATA

	<u>12/31/2015</u>	<u>12/31/2016</u>	<u>12/31/2017</u>	<u>12/31/2018</u>
<u>Actives</u>				
Number	1,050	990	1,045	1,102
Average Current Age	42.6	43.1	42.5	41.9
Average Age at Employment	28.4	28.6	28.9	29.0
Average Past Service	14.2	14.5	13.6	12.9
Average Annual Salary	\$86,181	\$90,088	\$89,026	\$87,933
<u>Service Retirees + DROP</u>				
Number				679
Average Current Age				64.3
Average Annual Benefit				\$63,500
<u>Beneficiaries + Alt Payees</u>				
Number				125
Average Current Age				67.4
Average Annual Benefit				\$30,462
<u>Disability Retirees</u>				
Number				18
Average Current Age				64.9
Average Annual Benefit				\$42,112
<u>Terminated Vested</u>				
Number				8
Average Current Age				42.3
Average Annual Benefit				\$31,524

AGE AND SERVICE DISTRIBUTION

ATTAINED AGE	PAST SERVICE											TOTAL
	0	1-4	5-9	10-19	20-24	25	26	27	28	29	30+	
15 - 24	8	1	0	0	0	0	0	0	0	0	0	9
25 - 34	80	94	60	4	0	0	0	0	0	0	0	238
35 - 44	12	68	147	185	5	0	0	0	0	0	0	417
45 - 49	0	0	8	135	49	2	0	0	0	0	0	194
50	0	0	0	17	24	1	2	2	0	0	0	46
51	0	0	0	15	12	4	1	0	3	0	0	35
52	0	0	0	4	11	2	1	0	3	2	3	26
53	0	0	0	3	11	2	0	1	2	0	2	21
54	0	0	0	4	12	2	1	3	4	0	3	29
55 - 59	0	0	0	5	18	5	2	5	4	2	36	77
60+	0	0	0	0	0	0	0	0	0	1	9	10
TOTAL	100	163	215	372	142	18	7	11	16	5	53	1,102



VALUATION PARTICIPANT RECONCILIATION

1. Active lives

a. Number in prior valuation 12/31/2017	1,045
b. Terminations	
i. Vested (partial or full) with deferred benefits	(1)
ii. Non-vested or full lump sum distribution received	(3)
c. Deaths	
i. Beneficiary receiving benefits	0
ii. No future benefits payable	0
d. Disabled	0
e. Retired	<u>(39)</u>
g. Continuing participants	1,002
h. New entrants	<u>100</u>
i. Total active life participants in valuation	1,102

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

	Service Retirees, DROP Receiving <u>Benefits</u>	Receiving Death <u>Benefits</u>	Receiving Disability <u>Benefits</u>	Receiving QDRO <u>Benefits</u>	Vested Deferred	<u>Total</u>
a. Number prior valuation	650	74	18	44	9	795
Retired	39	0	0	0	0	39
Vested Deferred	0	0	0	0	1	1
Death, With Survivor	(5)	5	0	0	0	0
Death, No Survivor	(5)	(6)	0	0	0	(11)
Disabled	0	0	0	0	0	0
Refund of Contributions	0	0	0	0	(2)	(2)
Rehires	0	0	0	0	0	0
Expired Annuities	0	0	0	0	0	0
New Dependent Child	0	3	0	0	0	3
New QDRO	0	0	0	5	0	5
b. Number current valuation	679	76	18	49	8	830

ACTUARIAL ASSUMPTIONS AND METHODS  
(Effective December 31, 2018)

Mortality Rates – Healthy Lives

*Active Lives:*

PubS-2010(A) Mortality Table for Employees.

*Retiree and Vested Terminated Lives:*

PubS-2010(A) Mortality Table for Healthy Retirees.

*Contingent Survivor Lives:*

PubS-2010(A) Mortality Table for Contingent Survivors.

*Disabled Lives:*

PubS-2010(A) Mortality Table for Disabled Retirees.

The mortality rates for all participants are sex distinct with mortality improvement projected 5 years beyond the valuation date using scale MP-2018 and a base year of 2010. We feel these assumptions sufficiently accommodate anticipated future mortality improvements.

Retirement Elections

See tables below. These assumptions were approved in conjunction with an actuarial experience study dated June 15, 2015.

Termination Rates

See tables below. These assumptions were approved in conjunction with an actuarial experience study dated June 15, 2015.

Disability Rates

See tables below. These assumptions were reviewed in conjunction with an actuarial experience study dated June 15, 2015.

Interest Rate

7.70% per year, compounded annually, net of all expenses. This is supported by the target asset allocation of the trust and the expected long-term return by asset class.

Salary Increases

See tables below. These assumptions were approved in conjunction with an actuarial experience study dated June 15, 2015.

General Wage Inflation

3.00% per year. This assumption was approved in conjunction with an actuarial experience study dated June 15, 2015.

Inflation

2.75% per year. We feel this is reasonable based upon long-term historical experience.

Payroll Growth

3.50% per year for amortization of the Unfunded Actuarial Accrued Liability. We feel this is reasonable based upon long-term historical experience.

Asset Valuation Method

All assets are valued at market value with an adjustment to uniformly spread investment gains and losses (as measured by actual market value investment return against expected market value investment return) over a five-year period.

Marital Status

100% of actives are assumed to be married at time of benefit commencement. Females are assumed to be 4 years younger than Males. Additionally, 50% are assumed to have dependent children. The age of the youngest child is assumed to be one year.

These assumptions were approved in conjunction with an actuarial experience study dated June 15, 2015.

Funding Method

Entry Age Normal Actuarial Cost Method.

Termination Rates

<u>Years of Service</u>	<u>Termination Probability</u>
0-4	1.0%
5-13	0.5
14+	0

Retirement Rates

<u>Number of Years After First Eligibility for Early Retirement</u>	<u>Probability of Retirement</u>
0	2.0%
1	2.0
2	2.0
3	2.0
4	2.0
5	5.0
6	7.5
7	7.5
8	10.0
9	16.7
10	16.7
11	16.7
12	20.0
13	20.0
14	30.0
15	40.0
16	50.0
17	75.0
18	100.0

Retro-DROP Elections

Number of Years After First Eligibility for <u>Early Retirement</u>	<u>No-DROP Elected</u>	<u>Duration 1 Election</u>	<u>Duration 2 Election</u>
0	90%	0.5 years (10%)	n/a
1	50%	1 year (50%)	n/a
2	50%	1 year (25%)	2 years (25%)
3	50%	1 year (25%)	2 years (25%)
4	20%	1 year (60%)	3 years (20%)
5	20%	2 years (40%)	4 years (40%)
6	20%	2 years (60%)	5 years (20%)
7	20%	2 years (50%)	5 years (30%)
8	20%	3 years (60%)	6 years (20%)
9	10%	3 years (50%)	6 years (40%)
10	10%	3 years (50%)	6 years (40%)
11	10%	3 years (60%)	6 years (30%)
12	10%	3 years (75%)	6 years (15%)
13	10%	3 years (40%)	6 years (50%)
14	10%	3 years (40%)	6 years (50%)
15	10%	3 years (20%)	6 years (70%)
16	10%	3 years (20%)	6 years (70%)
17	10%	3 years (20%)	6 years (70%)
18	10%	3 years (20%)	6 years (70%)

Disability Rates

<u>Age</u>	<u>Probability of Disablement</u>
20	0.014%
25	0.019
30	0.031
35	0.052
40	0.092
45	0.209
50	0.379
55	0.490
60	0.911

% Increase in Salary\*

<u>Years of Service</u>	<u>Increase</u>
0	6.00%
1	8.50
2	7.50
3	4.00
4	1.00
5	5.00
10	1.50
15	1.50
20	5.50
21+	1.00

\* Expected increase in salary in addition to general wage inflation assumption.

## SUMMARY OF BENEFIT PROVISIONS

<u>Service</u>	Total years and completed months during which a Member makes contributions to the Fund.
<u>Average Monthly Compensation</u>	Average Salary for the highest 36 months of service.
<u>Member Contributions</u>	18.70% of Salary.
<u>City Contributions</u>	22.05% or payroll.
<u>Normal Retirement</u>	
Date	Earlier of age 50 and 10 years of Service, or 25 years of Service, regardless of age.
Benefit	3.30% of Average Monthly Compensation <u>times</u> Service (\$1,200 minimum). Effective July 1, 2012, the minimum benefit was increased to \$2,000 per month for all retirees and surviving spouses currently receiving normal or disability retirement benefits which commenced prior to January 1, 1994.
Form of Benefit	<u>Married</u> : Life Annuity with 75% continued to Surviving Spouse  <u>Single</u> : Life Annuity with 75% continued to designated beneficiary.
<u>Early Retirement</u>	
Date	Earlier of age 45 and 10 years of Service, or 20 years of Service, regardless of age.
Benefit	Same for Normal Retirement as shown above. Members who retire under Early Retirement are not eligible to receive any COLA adjustments until the date they would have met Normal Retirement eligibility requirements.

Vesting

Schedule	100% after 10 years of Service.
Benefit Amount	Member will receive his (her) accrued benefit payable at age 50 or the date they would have completed 25 years of Service had they remained employed.  Non-vested members receive a refund of member contributions accumulated with 5.0% interest.

Disability

Eligibility	Disability preventing the Member from performing the duties of a firefighter during the two and one-half years after becoming disabled or any employment after the two and one-half years after becoming disabled.
Benefit	Accrued benefit at date of disability, but not less than 66% of Average Monthly Compensation.
Form of Benefit	<u>Married</u> : Life Annuity with 75% continued to Surviving Spouse  <u>Single</u> : Life Annuity

Death Benefits

Surviving Spouse of Member:	75% of Member's accrued benefit at date of death, but not less than 49.5% of Average Monthly Compensation.
Surviving Non-Spousal Beneficiary of Member:	75% of Member's accrued benefit at date of death, but may be actuarially reduced based on the age difference between the Member and the designated beneficiary.
Dependent Children of Member: (with Surviving Spouse)	Each child is entitled to 15% of Member's accrued benefit at date of death, but not less than 9.9% of Average Monthly Compensation.
Dependent Children of Member: (with no Surviving Spouse)	75% of Member's accrued benefit at date of death, but not less than 49.5% of Average Monthly Compensation, split equally among each dependent child.

Cost of Living Adjustment

Eligibility

Normal Retirement.

Amount

Determined by the actuary if providing a COLA will not impair financial stability of the Fund.

Retroactive DROP

Eligibility

Satisfaction of Early or Normal Retirement Eligibility.

Participation Period

Upon election to retroactively enter DROP, the Retro DROP period will not exceed 84 months.

Rate of Return

5.0%, compounded annually, on monthly benefits that would have been deposited into a DROP account and Member contributions deposited into the fund between the effective DROP entry date and the actual date of termination.

## DISCUSSION OF RISK

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

Throughout this report, actuarial results are determined under various assumption scenarios. These results are based on the premise that all future plan experience will align with the plan's actuarial assumptions; however, there is no guarantee that actual plan experience will align with the plan's assumptions.

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

- Investment Return: When the rate of return on the Actuarial Value of Assets falls short of the assumption, this produces a loss representing assumed investment earnings that were not realized. Further, it is unlikely that the plan will experience a scenario that matches the assumed return in each year as capital markets can be volatile from year to year. Therefore, amortization periods can vary in the future.
- Salary Increases: When a plan participant experiences a salary increase that was greater than assumed, this produces a loss representing the cost of an increase in anticipated plan benefits for the participant as compared to the previous year. The total gain or loss associated with salary increases for the plan is the sum of salary gains and losses for all active participants.



- Payroll Growth: The plan's payroll growth assumption, if one is used, causes a predictable annual increase in the plan's amortization payment in order to produce an amortization payment that remains constant as a percentage of payroll if all assumptions are realized. If payroll does not increase according to the plan's payroll growth assumption, the plan's amortization period can increase significantly even if all assumptions other than the payroll growth assumption are realized since anticipated contributions rely upon membership payroll.
- Demographic Assumptions: Actuarial results take into account various potential events that could happen to a plan participant, such as retirement, termination, disability, and death. Each of these potential events is assigned a liability based on the likelihood of the event and the financial consequence of the event for the plan. Accordingly, actuarial liabilities reflect a blend of financial consequences associated with various possible outcomes (such as retirement at one of various possible ages). Once the outcome is known (e.g. the participant retires) the liability is adjusted to reflect the known outcome. This adjustment produces a gain or loss depending on whether the outcome was more or less favorable than other outcomes that could have occurred.
- DROP Liquidity Risk: This risk results from the provision which allows retired members to continue to accrue a guaranteed rate of interest on their accumulated DROP balances following separation of employment with the City. The ratio of the accumulated DROP balances to the market value of assets as of each valuation date can present potential fund liquidity and actuarial liability risks.
- Amortization Period: Risks associated with the items outlined above will inherently create varying liabilities and assets resulting in volatility in the amortization period. Actuarial losses on assets and liabilities will lead to longer amortization periods, while actuarial gains on assets and liabilities will lead to shorter amortization periods.
- Contribution Risk: This risk results from the potential that the total annual contributions, based on fixed-rates for the City and membership, may deviate from actuarially determined contributions, as illustrated on page 5. The actuarially determined contributions are adjusted in conjunction with each actuarial valuation to take into account the deviation in actual versus expected experience between valuation dates. Fixed-rate contribution structures include the risk that scheduled contributions do not reflect the actual cost of plan benefits, meaning that in order to maintain actuarially sound funding levels, contribution rate increases or benefit reductions may be required.

### Impact of Plan Maturity on Risk

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

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

- The Support Ratio, determined as the ratio of active to inactive members has decreased from 147.9% to 132.8% over the last four years.
- The Accrued Liability Ratio, determined as the ratio of the Inactive Accrued Liability, which is the accrued liability associated with those receiving payments (inclusive of DROP Balances), to the Total Accrued Liability, has increased from 49.1% to 57.1% over the last four years.
- The Funded Ratio, determined as the ratio of the Actuarial Value of Assets to the Total Accrued Liability has decreased from 89.9% to 88.0% over the last four years. If all actuarial assumptions are realized, the funded ratio is expected to decrease in the next few years as the most recent investment experience loss is gradually recognized.
- The DROP Asset Ratio, determined as the ratio of the Accumulated DROP Balances to the Market Value of Assets has increased from 6.5% to 10.9% over the last four years.

It is important to note that the we have identified the risks above as the most significant risks based on the characteristics of the plan and the nature of the actuarial valuation, however, it is not an exhaustive list of potential risks that could be considered. Advanced modelling, as well as the identification of additional risks, can be helpful and can be provided upon request of the Board.

PLAN MATURITY MEASURES AND OTHER RISK METRICS

	<u>12/31/2015</u>	<u>12/31/2016</u>	<u>12/31/2017</u>	<u>12/31/2018</u>
<u>Support Ratio</u>				
Total Actives	1050	990	1045	1,102
Total Inactives	710	757	795	830
Actives / Inactives	147.9%	130.8%	131.4%	132.8%
<u>Accrued Liability (AL) Ratio</u>				
Inactive Accrued Liability <sup>1</sup>	452,302,712	515,619,455	571,225,124	619,308,976
Total Accrued Liability	921,875,579	981,771,267	1,038,118,085	1,084,533,608
Inactive AL / Total AL	49.1%	52.5%	55.0%	57.1%
<u>Funded Ratio</u>				
Actuarial Value of Assets (AVA)	828,920,231	866,512,111	916,931,534	954,574,840
Total Accrued Liability	921,875,579	981,771,267	1,038,118,085	1,084,533,608
AVA / Total Accrued Liability	89.9%	88.3%	88.3%	88.0%
<u>DROP Asset Ratio</u>				
Accumulated DROP Balances	51,207,560	69,354,195	86,322,683	99,360,841
Market Value of Assets (MVA)	785,211,061	829,610,196	953,798,227	909,117,796
DROP Balances / MVA	6.5%	8.4%	9.1%	10.9%

<sup>1</sup> Excludes liability attributable to terminated vested members.

## VALUATION NOTES

Covered Annual Payroll is the projected rate of pay as of the valuation date of all active participants who are not subject to a 100% probability of retirement in the first year following the valuation date, discounted to take into account the probability of remaining an active participant.

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

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

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

STATEMENT OF FIDUCIARY NET POSITION  
DECEMBER 31, 2018

<u>ASSETS</u>	MARKET VALUE
Cash and Cash Equivalents:	
Money Market	13,009,148
Total Cash and Equivalents	13,009,148
Receivables:	
From Broker for Investments Sold	156,076
Investment Income	167,710
Total Receivable	323,786
Investments:	
Public Equities	323,594,008
Private Equities	183,670,803
Public Fixed Income	279,541,963
Real Estate Funds	83,442,672
Private Natural Resources Funds	26,259,960
Total Investments	896,509,406
Total Assets	909,842,340
<u>LIABILITIES</u>	
Payables:	
To Broker for Investments Purchased	724,544
Total Liabilities	724,544
NET POSITION RESTRICTED FOR PENSIONS	909,117,796

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

ADDITIONS

## Contributions:

Member	17,033,213	
City	20,084,617	
Total Contributions		37,117,830
Investment Income:		
Miscellaneous Income	51,620	
Net Realized Gain (Loss)	32,921,610	
Unrealized Gain (Loss)	(65,286,390)	
Net Increase in Fair Value of Investments	(32,313,160)	
Interest & Dividends	9,864,740	
Less Investment Expense <sup>1</sup>	(2,665,644)	
Net Investment Income		(25,114,064)
Total Additions		12,003,766

DEDUCTIONS

## Distributions to Members:

Benefit Payments	45,808,645	
Lump Sum DROP Distributions	9,936,387	
Refunds of Member Contributions	234,262	
Total Distributions		55,979,294
Administrative Expense		704,903
Total Deductions		56,684,197
Net Increase in Net Position		(44,680,431)
NET POSITION RESTRICTED FOR PENSIONS		
Beginning of the Year		953,798,227
End of the Year		909,117,796

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

**NOTES TO THE FINANCIAL STATEMENTS**  
(For the Year Ended December 31, 2018)

Plan Description

*Plan Administration*

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

- a. The Mayor of the municipality,
- b. The city treasurer or, if there is no treasurer, the person who by law, charter provision, or ordinance performs the duty of city treasurer,
- c. Three Members of the fund to be selected by vote of the firefighters and retirees.

*Plan Membership as of December 31, 2017:*

Inactive Plan Members or Beneficiaries Currently Receiving Benefits	786
Inactive Plan Members Entitled to But Not Yet Receiving Benefits	9
Active Plan Members	1,045
	1,840
	1,840

*Benefits Provided*

The Plan provides retirement, disability, termination and death benefits.

Normal Retirement:

Earlier of age 50 and 10 years of Service, or 25 years of Service, regardless of age.

Benefit: 3.30% of Average Monthly Compensation times Service (\$1,200 minimum). Effective July 1, 2012, the minimum benefit was increased to \$2,000 per month for all retirees and surviving spouses currently receiving normal or disability retirement benefits which commenced prior to January 1, 1994.

Early Retirement:

Earlier of age 45 and 10 years of Service, or 20 years of Service, regardless of age.

Benefit: Same for Normal Retirement as shown above. Members who retire under Early Retirement are not eligible to receive any COLA adjustments until the date they would have met Normal Retirement eligibility requirements.

Vesting:

Schedule: 100% after 10 years of Service.

Benefit Amount: Member will receive his (her) accrued benefit payable at age 50 or the date they would have completed 25 years of Service had they remained employed.

Non-vested members receive a refund of member contributions accumulated with 5.0% interest.

Disability:

Disability preventing the Member from performing the duties of a firefighter during the two and one-half years after becoming disabled or any employment after the two and one-half years after becoming disabled.

Accrued benefit at date of disability, but not less than 66% of Average Monthly Compensation.

Death Benefits:

Surviving Spouse of Member: 75% of Member's accrued benefit at date of death, but not less than 49.5% of Average Monthly Compensation.

Surviving Non-Spousal Beneficiary of Member: 75% of Member's accrued benefit at date of death, but may be actuarially reduced based on the age difference between the Member and the designated beneficiary.

Dependent Children of Member (with Surviving Spouse): Each child is entitled to 15% of Member's accrued benefit at date of death, but not less than 9.9% of Average Monthly Compensation.

Dependent Children of Member (with no Surviving Spouse): 75% of Member's accrued benefit at date of death, but no less than 49.5% of Average Monthly Compensation, split equally among each dependent child.

Cost of Living Adjustment:

Eligibility: Normal Retirement

Amount: Determined by the actuary if providing a COLA will not impair financial stability of the Fund.

*Contributions*

Member Contributions: 18.70% of Salary.

City Contributions: 22.05% of payroll.

## Investments

*Investment Policy:*

The following was the Board's adopted asset allocation policy as of December 31, 2018:

Asset Class	Target Allocation
Public Domestic Equity	20%
Public Foreign Equity	22%
Private Equity Fund of Funds	15%
Investment Grade Bonds	13%
TIPS	5%
High Yield/Bank Loans	5%
Emerging Market Debt	7%
Core Real Estate	5%
Non-Core Real Estate	5%
Natural Resources	3%
Total	100%

*Concentrations:*

The Plan did not hold investments in any one organization that represent 5 percent or more of the Pension Plan's Fiduciary Net Position.

*Rate of Return:*

For the year ended December 31, 2018, the annual money-weighted rate of return on Pension Plan investments, net of Pension Plan investment expense, was -2.66 percent.

The money-weighted rate of return expresses investment performance, net of investment expense, adjusted for the changing amounts actually invested.

Deferred Retirement Option Program*Retroactive DROP*

Eligibility: Satisfaction of Early or Normal Retirement Eligibility.

Participation Period: Upon election to retroactively enter DROP, the Retro DROP period will not exceed 84 months.

Rate of Return: 5.0%, compounded annually, on monthly benefits that would have been deposited into a DROP account and Member contributions deposited into the fund between the effective DROP entry date and the actual date of termination.

The DROP balance as December 31, 2018 is \$99,360,841.



## NET PENSION LIABILITY OF THE SPONSOR

The components of the Net Pension Liability of the Sponsor on December 31, 2018 were as follows:

Total Pension Liability	\$1,107,220,715
Plan Fiduciary Net Position	<u>\$ (909,117,796)</u>
Sponsor's Net Pension Liability	<u><u>\$ 198,102,919</u></u>
Plan Fiduciary Net Position as a percentage of Total Pension Liability	82.11%

*Actuarial Assumptions:*

The Total Pension Liability was determined by an actuarial valuation as of December 31, 2017 updated to December 31, 2018 using the following actuarial assumptions:

Inflation	2.75%
General Wage Inflation	3.00%
Salary Increases	1.00% - 6.00%
Discount Rate	7.70%
Investment Rate of Return	7.70%

*Mortality Active Lives:*

PubS-2010 (Above-median, amount-weighted) employee rates with mortality improvement projected 5 years past the valuation date using Scale MP-2018.

*Mortality Retiree and Vested Terminated Lives:*

PubS-2010 (Above-median, amount-weighted) healthy retiree rates with mortality improvement projected 5 years past the valuation date using Scale MP-2018.

*Mortality Contingent Survivor Lives:*

PubS-2010 (Above-median, amount-weighted) contingent survivor rates with mortality improvement projected 5 years past the valuation date using Scale MP-2018.

*Mortality Disabled Lives:*

PubS-2010 (amount-weighted) disabled retiree rates with mortality improvement projected 5 years past the valuation date using Scale MP-2018.

The most recent actuarial experience study used to review the other significant assumptions was dated June 15, 2015.

The Long-Term Expected Rate of Return on Pension Plan investments can be determined using a building-block method in which best-estimate ranges of expected future real rates of return (expected returns, net of Pension Plan investment expenses and inflation) are developed for each major asset class.

For 2018, the inflation rate assumption of the investment advisor was 2.70%.

These ranges are combined to produce the Long-Term Expected Rate of Return by weighting the expected future real rates of return by the target asset allocation percentage and by adding expected inflation.

Best estimates of arithmetic real rates of return for each major asset class included in the Pension Plan's target asset allocation as of December 31, 2018 are summarized in the following table:

Asset Class	Long Term Expected Real Rate of Return
Public Domestic Equity	5.3%
Public Foreign Equity	6.9%
Private Equity Fund of Funds	5.6%
Investment Grade Bonds	1.1%
TIPS	0.8%
High Yield/Bank Loans	3.8%
Emerging Market Debt	3.6%
Core Real Estate	3.4%
Non-Core Real Estate	5.0%
Natural Resources	5.9%

## GASB 67

### Discount Rate:

The Discount Rate used to measure the Total Pension Liability was 7.70 percent.

The projection of cash flows used to determine the Discount Rate assumed that Plan Member contributions will be made at the current contribution rate and that Sponsor contributions will continue at the currently negotiated rate of 22.05% of payroll each year. Based on those assumptions, the Pension Plan's Fiduciary Net Position was projected to be available to make all projected future benefit payments of current plan members. Therefore, the Long-Term Expected Rate of Return on Pension Plan investments was applied to all periods of projected benefit payments to determine the Total Pension Liability.

For purpose of this valuation, the expected rate of return on pension plan investments is 7.70%; the municipal bond rate is 4.10% (based on the weekly rate closest to but not later than the measurement date of the Bond Buyer 20-Bond Index as published by the Bond Buyer); and the resulting single discount rate is 7.70%.

	1% Decrease 6.70%	Current Discount Rate 7.70%	1% Increase 8.70%
Sponsor's Net Pension Liability	\$ 304,086,801	\$ 198,102,919	\$ 108,598,230

**SCHEDULE OF CHANGES IN NET PENSION LIABILITY AND RELATED RATIOS**  
Last 10 Years

	12/31/2018	12/31/2017	12/31/2016
Total Pension Liability			
Service Cost	25,130,502	23,830,495	24,322,417
Interest	80,552,018	75,812,099	70,892,708
Changes of benefit terms	10,188,417	8,963,689	5,491,908
Differences between Expected and Actual Experience	13,306,782	4,360,239	8,893,371
Changes of assumptions	(4,778,539)	-	-
Benefit Payments, including Refunds of Employee Contributions	(55,979,294)	(51,888,455)	(45,495,681)
Net Change in Total Pension Liability	68,419,886	61,078,067	64,104,723
Total Pension Liability - Beginning	1,038,800,829	977,722,762	913,618,039
Total Pension Liability - Ending (a)	<u>\$1,107,220,715</u>	<u>\$1,038,800,829</u>	<u>\$ 977,722,762</u>
Plan Fiduciary Net Position			
Contributions - Employer	20,084,617	19,242,205	19,103,891
Contributions - Employee	17,033,213	16,318,769	15,884,261
Net Investment Income	(25,114,064)	141,915,000	55,569,165
Benefit Payments, including Refunds of Employee Contributions	(55,979,294)	(51,888,455)	(45,495,681)
Administrative Expense	(704,903)	(1,399,488)	(662,501)
Net Change in Plan Fiduciary Net Position	(44,680,431)	124,188,031	44,399,135
Plan Fiduciary Net Position - Beginning	953,798,227	829,610,196	785,211,061
Plan Fiduciary Net Position - Ending (b)	<u>\$ 909,117,796</u>	<u>\$ 953,798,227</u>	<u>\$ 829,610,196</u>
Net Pension Liability - Ending (a) - (b)	<u>\$ 198,102,919</u>	<u>\$ 85,002,602</u>	<u>\$ 148,112,566</u>
Plan Fiduciary Net Position as a percentage of the Total Pension Liability	82.11%	91.82%	84.85%
Covered Payroll	\$ 91,086,698	\$ 87,266,236	\$ 86,638,961
Net Pension Liability as a percentage of Covered Payroll	217.49%	97.41%	170.95%

**Notes to Schedule:***Changes of benefit terms:*

For measurement date 12/31/2018, amounts reported as changes of benefit terms resulted from a cost-of-living adjustment. Eligible retirees receive a 2.3% cost-of-living adjustment, effective January 1, 2019.

For measurement date 12/31/2017, amounts reported as changes of benefit terms resulted from a cost-of-living adjustment. Eligible retirees receive a 2.2% cost-of-living adjustment, effective January 1, 2018.

For measurement date 12/31/2016, amounts reported as changes of benefit terms resulted from a cost-of-living adjustment. Eligible retirees receive a 1.5% cost-of-living adjustment, effective January 1, 2017.

*Changes of assumptions:*

For measurement date 12/31/2018, amounts reported as changes of assumptions resulted from the following changes:

- The assumed mortality rates were updated to reflect the PubS-2010 (above-median, amount-weighted) tables.
- The price inflation assumption was lowered from 3.50% to 2.75% per year.

**SCHEDULE OF CHANGES IN NET PENSION LIABILITY AND RELATED RATIOS**  
Last 10 Years

	12/31/2015	12/31/2014	12/31/2013
Total Pension Liability			
Service Cost	23,309,543	25,318,456	23,497,407
Interest	66,404,730	62,976,839	59,249,151
Changes of benefit terms	-	-	-
Differences between Expected and Actual Experience	7,192,645	-	-
Changes of assumptions	-	4,883,207	-
Benefit Payments, including Refunds of Employee Contributions	(44,756,847)	(37,992,903)	(34,943,917)
Net Change in Total Pension Liability	52,150,071	55,185,599	47,802,641
Total Pension Liability - Beginning	861,467,968	806,282,369	758,479,728
Total Pension Liability - Ending (a)	<u>\$ 913,618,039</u>	<u>\$ 861,467,968</u>	<u>\$ 806,282,369</u>
Plan Fiduciary Net Position			
Contributions - Employer	19,222,329	18,669,944	17,786,494
Contributions - Employee	15,546,979	14,659,946	14,000,514
Net Investment Income	6,328,063	42,005,227	101,289,167
Benefit Payments, including Refunds of Employee Contributions	(44,756,847)	(37,992,903)	(34,943,917)
Administrative Expense	(562,687)	(530,816)	(363,050)
Net Change in Plan Fiduciary Net Position	(4,222,163)	36,811,398	97,769,208
Plan Fiduciary Net Position - Beginning	789,433,224	752,621,826	654,852,618
Plan Fiduciary Net Position - Ending (b)	<u>\$ 785,211,061</u>	<u>\$ 789,433,224</u>	<u>\$ 752,621,826</u>
Net Pension Liability - Ending (a) - (b)	<u>\$ 128,406,978</u>	<u>\$ 72,034,744</u>	<u>\$ 53,660,543</u>
Plan Fiduciary Net Position as a percentage of the Total Pension Liability	85.95%	91.64%	93.34%
Covered Payroll	\$ 87,836,040	\$ 84,670,948	\$ 83,279,101
Net Pension Liability as a percentage of Covered Payroll	146.19%	85.08%	64.43%

**Notes to Schedule:***Changes of assumptions:*

For measurement date 12/31/2014, amounts reported as changes of assumptions resulted from an actuarial experience study dated June 15, 2015, below a brief overview of the changes:

- A "fresh-start" on the actuarial asset value has been implemented. For all future valuations, the asset valuation method will utilize a new smoothing technique.
- The investment return assumption has been decreased from 7.75% to 7.70% per year compounded annually, net of all expenses.
- The general wage inflation rate has been decreased from 3.5% to 3.0% per year.
- The service-based table attributable to merit and longevity salary increases has been amended.
- The retirement rates have been amended.
- The Retro-DROP election assumptions have been amended.
- The withdrawal rates have been amended.
- The assumed spousal age difference has been amended.

**SCHEDULE OF CONTRIBUTIONS**  
Last 10 Years

Fiscal Year Ended	Actuarially Determined Contribution	Contributions in relation to the Actuarially Determined Contributions	Contribution Deficiency (Excess)	Covered Payroll	Contributions as a percentage of Covered Payroll
12/31/2018	N/A	N/A	N/A	\$ 91,086,698	22.05%
12/31/2017	N/A	N/A	N/A	\$ 87,266,236	22.05%
12/31/2016	N/A	N/A	N/A	\$ 86,638,961	21.36%
12/31/2015	N/A	N/A	N/A	\$ 87,836,040	21.36%
12/31/2014	N/A	N/A	N/A	\$ 84,670,948	21.36%
12/31/2013	N/A	N/A	N/A	\$ 83,279,101	21.36%

Notes to Schedule

Methods and assumptions used to determine liabilities:

Mortality Rates - Healthy Lives	RP-2000 (Fully Generational using Scale AA) set back two years for males and females - Sex Distinct. The assumed rates of mortality sufficiently accommodate expected mortality improvements.								
Mortality Rates - Disabled Lives	RP2000 Disability Mortality Table.								
Retirement Elections:	See tables on following page. These assumptions were approved in conjunction with an actuarial experience study dated June 15, 2015.								
Termination Rates:	See tables below. These assumptions were approved in conjunction with an actuarial experience study dated June 15, 2015.								
Disability Rates:	See tables on following pages. These assumptions were reviewed in conjunction with an actuarial experience study dated June 15, 2015.								
Interest Rate:	7.70% per year, compounded annually, net of all expenses. This is supported by the target asset allocation of the trust and the expected long-term return by asset class.								
Salary Increases:	See tables on following page. These assumptions were approved in conjunction with an actuarial experience study dated June 15, 2015.								
General Wage Inflation:	3.00% per year. This assumption was approved in conjunction with an actuarial experience study dated June 15, 2015.								
Inflation:	3.50% per year. This is reasonable based upon long-term historical experience.								
Payroll Growth:	3.50% per year for amortization of the Unfunded Actuarial Accrued Liability. This is reasonable based upon long-term historical experience.								
Asset Valuation Method:	All assets are valued at market value with an adjustment to uniformly spread investment gains and losses (as measured by actual market value investment return against expected market value investment return) over a five-year period.								
Marital Status:	100% of actives are assumed to be married at time of benefit commencement. Females are assumed to be 4 years younger than Males. Additionally, 50% are assumed to have dependent children. The age of the youngest child is assumed to be one year. These assumptions were approved in conjunction with an actuarial experience study dated June 15, 2015.								
Funding Method:	Entry Age Normal Actuarial Cost Method.								
Termination Rates:	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: center;">Years of Service</th> <th style="text-align: center;">Termination Probability</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">0-4</td> <td style="text-align: center;">1.0%</td> </tr> <tr> <td style="text-align: center;">5-13</td> <td style="text-align: center;">0.5%</td> </tr> <tr> <td style="text-align: center;">14+</td> <td style="text-align: center;">0.0%</td> </tr> </tbody> </table>	Years of Service	Termination Probability	0-4	1.0%	5-13	0.5%	14+	0.0%
Years of Service	Termination Probability								
0-4	1.0%								
5-13	0.5%								
14+	0.0%								

Retirement Rates:	Number of Years After First	Probability of Retirement
	Eligibility for Early Retirement	
	0	2.0%
	1	2.0%
	2	2.0%
	3	2.0%
	4	2.0%
	5	5.0%
	6	7.5%
	7	7.5%
	8	10.0%
	9	16.7%
	10	16.7%
	11	16.7%
	12	20.0%
	13	20.0%
	14	30.0%
	15	40.0%
	16	50.0%
	17	75.0%
	18	100.0%

Retro-DROP Elections:	Number of	No-DROP	Duration 1	Duration 2
	Years After			
	First Eligibility	Elected	Election	Election
	for Early			
	Retirement			
	0	90%	0.5 years (10%)	n/a
	1	50%	1 year (50%)	n/a
	2	50%	1 year (25%)	2 years (25%)
	3	50%	1 year (25%)	2 years (25%)
	4	20%	1 year (60%)	3 years (20%)
	5	20%	2 years (40%)	4 years (40%)
	6	20%	2 years (60%)	5 years (20%)
	7	20%	2 years (50%)	5 years (30%)
	8	20%	3 years (60%)	6 years (20%)
	9	10%	3 years (50%)	6 years (40%)
	10	10%	3 years (50%)	6 years (40%)
	11	10%	3 years (60%)	6 years (30%)
	12	10%	3 years (75%)	6 years (15%)
	13	10%	3 years (40%)	6 years (50%)
	14	10%	3 years (40%)	6 years (50%)
	15	10%	3 years (20%)	6 years (70%)
	16	10%	3 years (20%)	6 years (70%)
	17	10%	3 years (20%)	6 years (70%)
	18	10%	3 years (20%)	6 years (70%)

## GASB 67

Disability Rate Table:

Age	Probability of Disablement
20	0.014%
25	0.019%
30	0.031%
35	0.052%
40	0.092%
45	0.209%
50	0.379%
55	0.490%
60	0.911%

% Increase in Salary\*:

Years of Service	Increase
0	6.00%
1	8.50%
2	7.50%
3	4.00%
4	1.00%
5	5.00%
10	1.50%
15	1.50%
20	5.50%
21+	1.00%

\* Expected increase in salary in addition to general wage inflation assumption.

**SCHEDULE OF INVESTMENT RETURNS**  
Last 10 Years

Fiscal Year Ended	Annual Money-Weighted Rate of Return Net of Investment Expense
12/31/2018	-2.66%
12/31/2017	17.29%
12/31/2016	7.13%
12/31/2015	0.81%
12/31/2014	5.60%
12/31/2013	13.30%



NOTES TO THE FINANCIAL STATEMENTS  
(For the Year Ended September 30, 2019)

General Information about the Pension Plan

*Plan Description*

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

- a. The Mayor of the municipality,
- b. The city treasurer or, if there is no treasurer, the person who by law, charter provision, or ordinance performs the duty of city treasurer,
- c. Three Members of the fund to be selected by vote of the firefighters and retirees.

A person who begins service as a firefighter in a municipality to which this Act applies and who is not ineligible for Membership in the fund becomes a member of the fund as a condition of that person's appointment.

*Plan Membership as of December 31, 2017:*

Inactive Plan Members or Beneficiaries Currently Receiving Benefits	786
Inactive Plan Members Entitled to But Not Yet Receiving Benefits	9
Active Plan Members	1,045
	1,840

*Benefits Provided*

The Plan provides retirement, disability, termination and death benefits.

Normal Retirement:

Earlier of age 50 and 10 years of Service, or 25 years of Service, regardless of age.

Benefit: 3.30% of Average Monthly Compensation times Service (\$1,200 minimum). Effective July 1, 2012, the minimum benefit was increased to \$2,000 per month for all retirees and surviving spouses currently receiving normal or disability retirement benefits which commenced prior to January 1, 1994.

Early Retirement:

Earlier of age 45 and 10 years of Service, or 20 years of Service, regardless of age.

Benefit: Same for Normal Retirement as shown above. Members who retire under Early Retirement are not eligible to receive any COLA adjustments until the date they would have met Normal Retirement eligibility requirements.

Vesting:

Schedule: 100% after 10 years of Service.

Benefit Amount: Member will receive his (her) accrued benefit payable at age 50 or the date they would have completed 25 years of Service had they remained employed.

Non-vested members receive a refund of member contributions accumulated with 5.0% interest.

Disability:

Disability preventing the Member from performing the duties of a firefighter during the two and one-half years after becoming disabled or any employment after the two and one-half years after becoming disabled.

Accrued benefit at date of disability, but not less than 66% of Average Monthly Compensation.

Death Benefits:

Surviving Spouse of Member: 75% of Member's accrued benefit at date of death, but not less than 49.5% of Average Monthly Compensation.

Surviving Non-Spousal Beneficiary of Member: 75% of Member's accrued benefit at date of death, but may be actuarially reduced based on the age difference between the Member and the designated beneficiary.

Dependent Children of Member (with Surviving Spouse): Each child is entitled to 15% of Member's accrued benefit at date of death, but not less than 9.9% of Average Monthly Compensation.

Dependent Children of Member (with no Surviving Spouse): 75% of Member's accrued benefit at date of death, but no less than 49.5% of Average Monthly Compensation, split equally among each dependent child.

Cost of Living Adjustment:

Eligibility: Normal Retirement

Amount: Determined by the actuary if providing a COLA will not impair financial stability of the Fund.

## GASB 68

### Contributions

Member Contributions: 18.70% of Salary.

City Contributions: 22.05% of payroll.

### Net Pension Liability

The measurement date is December 31, 2018.

The measurement period for the pension expense was December 31, 2017 to December 31, 2018.

The reporting period is September 30, 2018 through September 30, 2019.

The Sponsor's Net Pension Liability was measured as of December 31, 2018.

The Total Pension Liability used to calculate the Net Pension Liability was determined as of that date.

### *Actuarial Assumptions:*

The Total Pension Liability was determined by an actuarial valuation as of December 31, 2017 updated to December 31, 2018 using the following actuarial assumptions:

Inflation	2.75%
Salary Increases	1.00% - 6.00%
Discount Rate	7.70%
Investment Rate of Return	7.70%

### *Mortality Active Lives:*

PubS-2010 (Above-median, amount-weighted) employee rates with mortality improvement projected 5 years past the valuation date using Scale MP-2018.

### *Mortality Retiree and Vested Terminated Lives:*

PubS-2010 (Above-median, amount-weighted) healthy retiree rates with mortality improvement projected 5 years past the valuation date using Scale MP-2018.

### *Mortality Contingent Survivor Lives:*

PubS-2010 (Above-median, amount-weighted) contingent survivor rates with mortality improvement projected 5 years past the valuation date using Scale MP-2018.

### *Mortality Disabled Lives:*

PubS-2010 (amount-weighted) disabled retiree rates with mortality improvement projected 5 years past the valuation date using Scale MP-2018.

The most recent actuarial experience study used to review the other significant assumptions was dated June 15, 2015.

The Long-Term Expected Rate of Return on Pension Plan investments can be determined using a building-block method in which best-estimate ranges of expected future real rates of return (expected returns, net of Pension Plan investment expenses and inflation) are developed for each major asset class.

For 2018, the inflation rate assumption of the investment advisor was 2.70%.

These ranges are combined to produce the Long-Term Expected Rate of Return by weighting the expected future real rates of return by the target asset allocation percentage and by adding expected inflation.

## GASB 68

Best estimates of arithmetic real rates of return for each major asset class included in the Pension Plan's target asset allocation as of December 31, 2018 are summarized in the following table:

Asset Class	Target Allocation	Long Term Expected Real Rate of Return
Public Domestic Equity	20%	5.3%
Public Foreign Equity	22%	6.9%
Private Equity Fund of Funds	15%	5.6%
Investment Grade Bonds	13%	1.1%
TIPS	5%	0.8%
High Yield/Bank Loans	5%	3.8%
Emerging Market Debt	7%	3.6%
Core Real Estate	5%	3.4%
Non-Core Real Estate	5%	5.0%
Natural Resources	3%	5.9%
Total	100%	

### Discount Rate:

The Discount Rate used to measure the Total Pension Liability was 7.70 percent.

The projection of cash flows used to determine the Discount Rate assumed that Plan Member contributions will be made at the current contribution rate and that Sponsor contributions will continue at the currently negotiated rate of 22.05% of payroll each year. Based on those assumptions, the Pension Plan's Fiduciary Net Position was projected to be available to make all projected future benefit payments of current plan members. Therefore, the Long-Term Expected Rate of Return on Pension Plan investments was applied to all periods of projected benefit payments to determine the Total Pension Liability.

For purpose of this valuation, the expected rate of return on pension plan investments is 7.70%; the municipal bond rate is 4.10% (based on the weekly rate closest to but not later than the measurement date of the Bond Buyer 20-Bond Index as published by the Bond Buyer); and the resulting single discount rate is 7.70%.

CHANGES IN NET PENSION LIABILITY

	Increase (Decrease)		
	Total Pension Liability	Plan Fiduciary Net Position	Net Pension Liability
	(a)	(b)	(a)-(b)
Reporting Period Ending September 30, 2018	\$1,038,800,829	\$ 953,798,227	\$ 85,002,602
Changes for a Year:			
Service Cost	25,130,502	-	25,130,502
Interest	80,552,018	-	80,552,018
Differences between Expected and Actual Experience	13,306,782	-	13,306,782
Changes of assumptions	(4,778,539)	-	(4,778,539)
Changes of benefit terms	10,188,417	-	10,188,417
Contributions - Employer	-	20,084,617	(20,084,617)
Contributions - Employee	-	17,033,213	(17,033,213)
Net Investment Income	-	(25,114,064)	25,114,064
Benefit Payments, including Refunds of Employee Contributions	(55,979,294)	(55,979,294)	-
Administrative Expense	-	(704,903)	704,903
Net Changes	68,419,886	(44,680,431)	113,100,317
Reporting Period Ending September 30, 2019	\$1,107,220,715	\$ 909,117,796	\$ 198,102,919

*Sensitivity of the Net Pension Liability to changes in the Discount Rate.*

	Current Discount		
	1% Decrease	Rate	1% Increase
	6.70%	7.70%	8.70%
Sponsor's Net Pension Liability	\$ 304,086,801	\$ 198,102,919	\$ 108,598,230

*Pension Plan Fiduciary Net Position.*

Detailed information about the pension Plan's Fiduciary Net Position is available in a separately issued Plan financial report.

**FINAL PENSION EXPENSE AND DEFERRED OUTFLOWS OF RESOURCES AND  
DEFERRED INFLOWS OF RESOURCES RELATED TO PENSIONS  
FISCAL YEAR SEPTEMBER 30, 2018**

For the year ended September 30, 2018, the Sponsor has recognized a Pension Expense of \$32,774,398.

On September 30, 2018, the Sponsor reported Deferred Outflows of Resources and Deferred Inflows of Resources related to pensions from the following sources:

	Deferred Outflows of Resources	Deferred Inflows of Resources
Differences between Expected and Actual Experience	14,902,778	-
Changes of assumptions	2,712,891	-
Net difference between Projected and Actual Earnings on Pension Plan investments	-	35,526,598
Employer contributions subsequent to the measurement date	14,558,110	-
Total	\$ 32,173,779	\$ 35,526,598

The outcome of the Deferred Outflows of resources related to pensions resulting from Employer contributions subsequent to the measurement date has been recognized as a reduction of the Net Pension Liability in the year ended September 30, 2018.

Other amounts reported as Deferred Outflows of Resources and Deferred Inflows of Resources related to pensions will be recognized in Pension Expense as follows:

Year ended September 30:		
2019		\$ 2,284,890
2020		\$ (864,450)
2021		\$ (11,674,872)
2022		\$ (12,567,280)
2023		\$ 3,176,221
Thereafter		\$ 1,734,562

**PRELIMINARY PENSION EXPENSE AND DEFERRED OUTFLOWS OF RESOURCES AND  
DEFERRED INFLOWS OF RESOURCES RELATED TO PENSIONS  
FISCAL YEAR SEPTEMBER 30, 2019**

For the year ended September 30, 2019, the Sponsor will recognize a Pension Expense of \$49,765,031.

On September 30, 2019, the Sponsor reported Deferred Outflows of Resources and Deferred Inflows of Resources related to pensions from the following sources:

	<u>Deferred Outflows of Resources</u>	<u>Deferred Inflows of Resources</u>
Differences between Expected and Actual Experience	23,912,570	-
Changes of assumptions	2,170,312	4,181,219
Net difference between Projected and Actual Earnings on Pension Plan investments	43,607,311	-
Employer contributions subsequent to the measurement date	TBD	-
Total	<u>TBD</u>	<u>\$ 4,181,219</u>

The outcome of the Deferred Outflows of resources related to pensions resulting from Employer contributions subsequent to the measurement date will be recognized as a reduction of the Net Pension Liability in the year ended September 30, 2019.

Other amounts reported as Deferred Outflows of Resources and Deferred Inflows of Resources related to pensions will be recognized in Pension Expense as follows:

Year ended September 30:	
2020	\$ 19,762,225
2021	\$ 8,951,803
2022	\$ 8,059,395
2023	\$ 23,802,896
2024	\$ 2,800,593
Thereafter	\$ 2,132,062

**SCHEDULE OF CHANGES IN NET PENSION LIABILITY AND RELATED RATIOS**  
Last 10 Fiscal Years

Reporting Period Ending Measurement Date	09/30/2019 12/31/2018	09/30/2018 12/31/2017	09/30/2017 12/31/2016
Total Pension Liability			
Service Cost	25,130,502	23,830,495	24,322,417
Interest	80,552,018	75,812,099	70,892,708
Changes of benefit terms	10,188,417	8,963,689	5,491,908
Differences between Expected and Actual Experience	13,306,782	4,360,239	8,893,371
Changes of assumptions	(4,778,539)	-	-
Benefit Payments, including Refunds of Employee Contributions	(55,979,294)	(51,888,455)	(45,495,681)
Net Change in Total Pension Liability	68,419,886	61,078,067	64,104,723
Total Pension Liability - Beginning	1,038,800,829	977,722,762	913,618,039
Total Pension Liability - Ending (a)	<u>\$1,107,220,715</u>	<u>\$1,038,800,829</u>	<u>\$ 977,722,762</u>
Plan Fiduciary Net Position			
Contributions - Employer	20,084,617	19,242,205	19,103,891
Contributions - Employee	17,033,213	16,318,769	15,884,261
Net Investment Income	(25,114,064)	141,915,000	55,569,165
Benefit Payments, including Refunds of Employee Contributions	(55,979,294)	(51,888,455)	(45,495,681)
Administrative Expense	(704,903)	(1,399,488)	(662,501)
Net Change in Plan Fiduciary Net Position	(44,680,431)	124,188,031	44,399,135
Plan Fiduciary Net Position - Beginning	953,798,227	829,610,196	785,211,061
Plan Fiduciary Net Position - Ending (b)	<u>\$ 909,117,796</u>	<u>\$ 953,798,227</u>	<u>\$ 829,610,196</u>
Net Pension Liability - Ending (a) - (b)	<u>\$ 198,102,919</u>	<u>\$ 85,002,602</u>	<u>\$ 148,112,566</u>
Plan Fiduciary Net Position as a percentage of the Total Pension Liability	82.11%	91.82%	84.85%
Covered Payroll	\$ 91,086,698	\$ 87,266,236	\$ 86,638,961
Net Pension Liability as a percentage of Covered Payroll	217.49%	97.41%	170.95%

**Notes to Schedule:***Changes of benefit terms:*

For measurement date 12/31/2018, amounts reported as changes of benefit terms resulted from a cost-of-living adjustment. Eligible retirees receive a 2.3% cost-of-living adjustment, effective January 1, 2019.

For measurement date 12/31/2017, amounts reported as changes of benefit terms resulted from a cost-of-living adjustment. Eligible retirees receive a 2.2% cost-of-living adjustment, effective January 1, 2018.

For measurement date 12/31/2016, amounts reported as changes of benefit terms resulted from a cost-of-living adjustment. Eligible retirees receive a 1.5% cost-of-living adjustment, effective January 1, 2017.

*Changes of assumptions:*

For measurement date 12/31/2018, amounts reported as changes of assumptions resulted from the following changes:

- The assumed mortality rates were updated to reflect the PubS-2010 (above-median, amount-weighted) tables.
- The price inflation assumption was lowered from 3.50% to 2.75% per year.

## SCHEDULE OF CHANGES IN NET PENSION LIABILITY AND RELATED RATIOS

Last 10 Fiscal Years

Reporting Period Ending Measurement Date	09/30/2016 12/31/2015	09/30/2015 12/31/2014	09/30/2014 12/31/2013
Total Pension Liability			
Service Cost	23,309,543	25,318,456	23,497,407
Interest	66,404,730	62,976,839	59,249,151
Changes of benefit terms	-	-	-
Differences between Expected and Actual Experience	7,192,645	-	-
Changes of assumptions	-	4,883,207	-
Benefit Payments, including Refunds of Employee Contributions	(44,756,847)	(37,992,903)	(34,943,917)
Net Change in Total Pension Liability	52,150,071	55,185,599	47,802,641
Total Pension Liability - Beginning	861,467,968	806,282,369	758,479,728
Total Pension Liability - Ending (a)	\$ 913,618,039	\$ 861,467,968	\$ 806,282,369
Plan Fiduciary Net Position			
Contributions - Employer	19,222,329	18,669,944	17,786,494
Contributions - Employee	15,546,979	14,659,946	14,000,514
Net Investment Income	6,328,063	42,005,227	101,289,167
Benefit Payments, including Refunds of Employee Contributions	(44,756,847)	(37,992,903)	(34,943,917)
Administrative Expense	(562,687)	(530,816)	(363,050)
Net Change in Plan Fiduciary Net Position	(4,222,163)	36,811,398	97,769,208
Plan Fiduciary Net Position - Beginning	789,433,224	752,621,826	654,852,618
Plan Fiduciary Net Position - Ending (b)	\$ 785,211,061	\$ 789,433,224	\$ 752,621,826
Net Pension Liability - Ending (a) - (b)	\$ 128,406,978	\$ 72,034,744	\$ 53,660,543
Plan Fiduciary Net Position as a percentage of the Total Pension Liability	85.95%	91.64%	93.34%
Covered Payroll	\$ 87,836,040	\$ 84,670,948	\$ 83,279,101
Net Pension Liability as a percentage of Covered Payroll	146.19%	85.08%	64.43%

**Notes to Schedule:***Changes of assumptions:*

For measurement date 12/31/2014, amounts reported as changes of assumptions resulted from an actuarial experience study dated June 15, 2015, below a brief overview of the changes:

- A "fresh-start" on the actuarial asset value has been implemented. For all future valuations, the asset valuation method will utilize a new smoothing technique.
- The investment return assumption has been decreased from 7.75% to 7.70% per year compounded annually, net of all expenses.
- The general wage inflation rate has been decreased from 3.5% to 3.0% per year.
- The service-based table attributable to merit and longevity salary increases has been amended.
- The retirement rates have been amended.
- The Retro-DROP election assumptions have been amended.
- The withdrawal rates have been amended.
- The assumed spousal age difference has been amended.



**SCHEDULE OF CONTRIBUTIONS**  
Last 10 Fiscal Years

Fiscal Year Ended	Actuarially Determined Contribution	Contributions in relation to the Actuarially Determined Contributions	Contribution Deficiency (Excess)	Covered Payroll	Contributions as a percentage of Covered Payroll
09/30/2019	N/A	N/A	N/A	TBD by City	22.05%
09/30/2018	N/A	N/A	N/A	TBD by City	22.05%
09/30/2017	N/A	N/A	N/A	TBD by City	22.05%
09/30/2016	N/A	N/A	N/A	TBD by City	22.05%
09/30/2015	N/A	N/A	N/A	TBD by City	22.05%

Notes to Schedule

Methods and assumptions used to determine liabilities:

Mortality Rates - Healthy Lives	RP-2000 (Fully Generational using Scale AA) set back two years for males and females - Sex Distinct. The assumed rates of mortality sufficiently accommodate expected mortality improvements.								
Mortality Rates - Disabled Lives	RP2000 Disability Mortality Table.								
Retirement Elections:	See tables on following page. These assumptions were approved in conjunction with an actuarial experience study dated June 15, 2015.								
Termination Rates:	See tables below. These assumptions were approved in conjunction with an actuarial experience study dated June 15, 2015.								
Disability Rates:	See tables on following pages. These assumptions were reviewed in conjunction with an actuarial experience study dated June 15, 2015.								
Interest Rate:	7.70% per year, compounded annually, net of all expenses. This is supported by the target asset allocation of the trust and the expected long-term return by asset class.								
Salary Increases:	See tables on following page. These assumptions were approved in conjunction with an actuarial experience study dated June 15, 2015.								
General Wage Inflation:	3.00% per year. This assumption was approved in conjunction with an actuarial experience study dated June 15, 2015.								
Inflation:	3.50% per year. This is reasonable based upon long-term historical experience.								
Payroll Growth:	3.50% per year								
Asset Valuation Method:	All assets are valued at market value with an adjustment to uniformly spread investment gains and losses (as measured by actual market value investment return against expected market value investment return) over a five-year period.								
Marital Status:	100% of actives are assumed to be married at time of benefit commencement. Females are assumed to be 4 years younger than Males. Additionally, 50% are assumed to have dependent children. The age of the youngest child is assumed to be one year. These assumptions were approved in conjunction with an actuarial experience study dated June 15, 2015.								
Funding Method:	Entry Age Normal Actuarial Cost Method.								
Termination Rates:	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: center;">Years of Service</th> <th style="text-align: center;">Termination Probability</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">0-4</td> <td style="text-align: center;">1.00%</td> </tr> <tr> <td style="text-align: center;">5-13</td> <td style="text-align: center;">0.50%</td> </tr> <tr> <td style="text-align: center;">14+</td> <td style="text-align: center;">0.00%</td> </tr> </tbody> </table>	Years of Service	Termination Probability	0-4	1.00%	5-13	0.50%	14+	0.00%
Years of Service	Termination Probability								
0-4	1.00%								
5-13	0.50%								
14+	0.00%								

GASB 68

Retirement Rates:

Number of Years After First Eligibility for Early Retirement	Probability of Retirement
0	2.00%
1	2.00%
2	2.00%
3	2.00%
4	2.00%
5	5.00%
6	7.50%
7	7.50%
8	10.00%
9	16.70%
10	16.70%
11	16.70%
12	20.00%
13	20.00%
14	30.00%
15	40.00%
16	50.00%
17	75.00%
18	100.00%

Retro-DROP Elections:

Years After First Eligibility for Early	No-DROP Elected	Duration 1 Election	Duration 2 Election
0	90%	0.5 years (10%)	n/a
1	50%	1 year (50%)	n/a
2	50%	1 year (25%)	2 years (25%)
3	50%	1 year (25%)	2 years (25%)
4	20%	1 year (60%)	3 years (20%)
5	20%	2 years (40%)	4 years (40%)
6	20%	2 years (60%)	5 years (20%)
7	20%	2 years (50%)	5 years (30%)
8	20%	3 years (60%)	6 years (20%)
9	10%	3 years (50%)	6 years (40%)
10	10%	3 years (50%)	6 years (40%)
11	10%	3 years (60%)	6 years (30%)
12	10%	3 years (75%)	6 years (15%)
13	10%	3 years (40%)	6 years (50%)
14	10%	3 years (40%)	6 years (50%)
15	10%	3 years (20%)	6 years (70%)
16	10%	3 years (20%)	6 years (70%)
17	10%	3 years (20%)	6 years (70%)
18	10%	3 years (20%)	6 years (70%)

## GASB 68

Disability Rate Table:

Age	Probability of Disablement
20	0.014%
25	0.019%
30	0.031%
35	0.052%
40	0.092%
45	0.209%
50	0.379%
55	0.490%
60	0.911%

% Increase in Salary\*:

Years of Service	Increase
0	6.00%
1	8.50%
2	7.50%
3	4.00%
4	1.00%
5	5.00%
10	1.50%
15	1.50%
20	5.50%
21+	1.00%

\* Expected increase in salary in addition to general wage inflation assumption.

EXPENSE DEVELOPMENT AND AMORTIZATION SCHEDULES

**The following information is not required to be disclosed but is provided for informational purposes.**

FINAL COMPONENTS OF PENSION EXPENSE  
FISCAL YEAR SEPTEMBER 30, 2018

	Net Pension Liability	Deferred Inflows	Deferred Outflows	Pension Expense
Beginning balance	\$ 148,112,566	\$ -	\$ 77,835,932	\$ -
Employer Contributions made after 12/31/2017	-	-	14,558,110	-
Total Pension Liability Factors:				
Service Cost	23,830,495	-	-	23,830,495
Interest	75,812,099	-	-	75,812,099
Changes in benefit terms	8,963,689	-	-	8,963,689
Differences between Expected and Actual Experience with regard to economic or demographic assumptions	4,360,239	-	4,360,239	-
Current year amortization of experience difference	-	-	(2,633,645)	2,633,645
Change in assumptions about future economic or demographic factors or other inputs	-	-	-	-
Current year amortization of change in assumptions	-	-	(542,579)	542,579
Benefit Payments, including Refunds of Employee Contributions	(51,888,455)	-	-	-
Net change	<u>61,078,067</u>	<u>-</u>	<u>15,742,125</u>	<u>111,782,507</u>
Plan Fiduciary Net Position:				
Contributions - Employer	19,242,205	-	(19,104,704)	-
Contributions - Employee	16,318,769	-	-	(16,318,769)
Projected Net Investment Income	63,197,497	-	-	(63,197,497)
Difference between projected and actual earnings on Pension Plan investments	78,717,503	78,717,503	-	-
Current year amortization	-	(15,743,499)	(14,852,168)	(891,331)
Benefit Payments, including Refunds of Employee Contributions	(51,888,455)	-	-	-
Administrative Expenses	(1,399,488)	-	-	1,399,488
Net change	<u>124,188,031</u>	<u>62,974,004</u>	<u>(33,956,872)</u>	<u>(79,008,109)</u>
Ending Balance	<u>\$ 85,002,602</u>	<u>\$ 62,974,004</u>	<u>\$ 59,621,185</u>	<u>\$ 32,774,398</u>

**PRELIMINARY COMPONENTS OF PENSION EXPENSE**  
**FISCAL YEAR SEPTEMBER 30, 2019**

	Net Pension Liability	Deferred Inflows	Deferred Outflows	Pension Expense
Beginning balance	\$ 85,002,602	\$ 62,974,004	\$ 59,621,185	\$ -
Employer Contributions made after 12/31/2018	-	-	TBD*	-
Total Pension Liability Factors:				
Service Cost	25,130,502	-	-	25,130,502
Interest	80,552,018	-	-	80,552,018
Changes in benefit terms	10,188,417	-	-	10,188,417
Differences between Expected and Actual Experience with regard to economic or demographic assumptions	13,306,782	-	13,306,782	-
Current year amortization of experience difference	-	-	(4,296,990)	4,296,990
Change in assumptions about future economic or demographic factors or other inputs	(4,778,539)	4,778,539	-	-
Current year amortization of change in assumptions	-	(597,320)	(542,579)	(54,741)
Benefit Payments, including Refunds of Employee Contributions	(55,979,294)	-	-	-
Net change	<u>68,419,886</u>	<u>4,181,219</u>	<u>8,467,213</u>	<u>120,113,186</u>
Plan Fiduciary Net Position:				
Contributions - Employer	20,084,617	-	(14,558,110)	-
Contributions - Employee	17,033,213	-	-	(17,033,213)
Projected Net Investment Income	72,689,158	-	-	(72,689,158)
Difference between projected and actual earnings on Pension Plan investments	(97,803,222)	-	97,803,222	-
Current year amortization	-	(15,743,501)	(34,412,814)	18,669,313
Benefit Payments, including Refunds of Employee Contributions	(55,979,294)	-	-	-
Administrative Expenses	(704,903)	-	-	704,903
Net change	<u>(44,680,431)</u>	<u>(15,743,501)</u>	<u>48,832,298</u>	<u>(70,348,155)</u>
Ending Balance	<u>\$ 198,102,919</u>	<u>\$ 51,411,722</u>	<u>TBD</u>	<u>\$ 49,765,031</u>

\* Employer Contributions subsequent to the measurement date made after December 31, 2018 but made on or before September 30, 2019 need to be added.

AMORTIZATION SCHEDULE - INVESTMENT

Increase (Decrease) in Pension Expense Arising from the Recognition of the of Differences Between Projected and Actual Earnings on Pension Plan Investments

Plan Year Ending	Differences Between Projected and Actual Earnings	Recognition Period (Years)	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
2014	\$ 15,746,691	5	\$ 3,149,338	\$ 3,149,338	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
2015	\$ 54,052,112	5	\$ 10,810,422	\$ 10,810,422	\$ 10,810,422	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
2016	\$ 4,462,041	5	\$ 892,408	\$ 892,408	\$ 892,408	\$ 892,408	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
2017	\$ (78,717,503)	5	\$ (15,743,499)	\$ (15,743,501)	\$ (15,743,501)	\$ (15,743,501)	\$ (15,743,501)	\$ -	\$ -	\$ -	\$ -	\$ -
2018	\$ 97,803,222	5	\$ -	\$ 19,560,646	\$ 19,560,644	\$ 19,560,644	\$ 19,560,644	\$ 19,560,644	\$ -	\$ -	\$ -	\$ -
Net Increase (Decrease) in Pension Expense			\$ (891,331)	\$ 18,669,313	\$ 15,519,973	\$ 4,709,551	\$ 3,817,143	\$ 19,560,644	\$ -	\$ -	\$ -	\$ -

AMORTIZATION SCHEDULE - CHANGES OF ASSUMPTIONS

Increase (Decrease) in Pension Expense Arising from the Recognition of the Effects of Changes of Assumptions

Plan Year Ending	Changes of Assumptions	Recognition Period (Years)	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
2014	\$ 4,883,207	9	\$ 542,579	\$ 542,579	\$ 542,578	\$ 542,578	\$ 542,578	\$ 542,578	\$ -	\$ -	\$ -	\$ -
2018	\$ (4,778,539)	8	\$ -	\$ (597,320)	\$ (597,317)	\$ (597,317)	\$ (597,317)	\$ (597,317)	\$ (597,317)	\$ (597,317)	\$ (597,317)	\$ -
Net Increase (Decrease) in Pension Expense			\$ 542,579	\$ (54,741)	\$ (54,739)	\$ (54,739)	\$ (54,739)	\$ (54,739)	\$ (597,317)	\$ (597,317)	\$ (597,317)	\$ -



AMORTIZATION SCHEDULE - EXPERIENCE

Increase (Decrease) in Pension Expense Arising from the Recognition of the Effects of Differences between Expected and Actual Experience

Plan Year Ending	Differences Between Expected and Actual Experience	Recognition Period (Years)	2018	2019	2020	2021	2022	2023	2024	2025	2026
2015	\$ 7,192,645	8	\$ 899,080	\$ 899,081	\$ 899,081	\$ 899,081	\$ 899,081	\$ 899,081	\$ -	\$ -	\$ -
2016	\$ 8,893,371	8	\$ 1,111,672	\$ 1,111,672	\$ 1,111,671	\$ 1,111,671	\$ 1,111,671	\$ 1,111,671	\$ 1,111,671	\$ -	\$ -
2017	\$ 4,360,239	7	\$ 622,893	\$ 622,891	\$ 622,891	\$ 622,891	\$ 622,891	\$ 622,891	\$ 622,891	\$ -	\$ -
2018	\$ 13,306,782	8	\$ -	\$ 1,663,346	\$ 1,663,348	\$ 1,663,348	\$ 1,663,348	\$ 1,663,348	\$ 1,663,348	\$ 1,663,348	\$ 1,663,348
Net Increase (Decrease) in Pension Expense			\$ 2,633,645	\$ 4,296,990	\$ 4,296,991	\$ 4,296,991	\$ 4,296,991	\$ 4,296,991	\$ 3,397,910	\$ 1,663,348	\$ 1,663,348