AUSTIN FIREFIGHTERS' RELIEF AND RETIREMENT FUND

ACTUARIAL VALUATION
AS OF DECEMBER 31, 2020

GASB 67/68 DISCLOSURE INFORMATION
AS OF DECEMBER 31, 2020

FOSTER & FOSTER
ACTUARIES AND CONSULTANTS

FOSTER & FOSTER
ACTUARIES AND CONSULTANTS

June 18, 2021

Board of Trustees
Austin Firefighters'
Relief and Retirement Fund
4101 Parkstone Heights Drive, Suite 270
Austin, TX 78746

Re: Austin Firefighters' Relief and Retirement Fund

Dear Board:

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.

The funding percentages and unfunded accrued liability as measured based on the actuarial value of assets will differ from similar measures based on the market value of assets. These measures, as provided, are appropriate for determining the adequacy of future contributions, but may not be appropriate for the purpose of settling a portion or all of its liabilities. 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, 2020. 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.

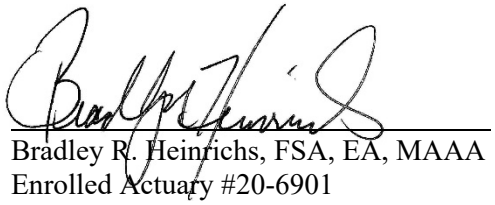
The undersigned are familiar with the immediate and long-term aspects of pension valuations, and meet the Qualification Standards of the American Academy of Actuaries necessary to render the actuarial opinions contained herein. All of the sections of this report are considered an integral part of the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

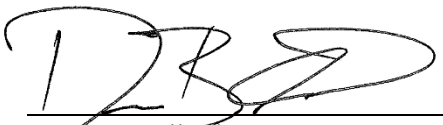
If there are any questions, concerns, or comments about any of the items contained in this report, please contact me at 239-433-5500.

Respectfully submitted,

Foster & Foster Inc.

By: 

Bradley R. Heinrichs, FSA, EA, MAAA
Enrolled Actuary #20-6901



Drew D. Ballard, EA, MAAA
Enrolled Actuary #20-8193

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SUMMARY OF REPORT

The actuarial valuation of the Austin Firefighters' Relief and Retirement Fund, performed as of December 31, 2020, has been completed and the results are presented in this Report. The pension costs, compared with those developed in the December 31, 2019 actuarial valuation, are as follows:

Valuation Date	New Assump 12/31/2020	Old Assump 12/31/2020	12/31/2019
Current Normal Cost Rate % of Covered Annual Payroll	29.64%	28.48%	28.38%
Funding Measurements			
Actuarial Accrued Liability (AAL)	1,233,739,575	1,212,411,270	1,154,365,629
Actuarial Value of Assets (AVA)	1,079,202,794	1,079,202,794	1,001,980,211
Unfunded Actuarial Accrued Liability (UAAL = AAL - AVA)	154,536,781	133,208,476	152,385,418
Funded Ratio (AVA / AAL)	87.5%	89.0%	86.8%
Amortization Period [1]	23.3 years	16.8 years	21.9 years
Contributions			
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%
Funding Costs			
City 20-Year Funding Cost	23.10%	20.84%	22.68%
City 30-Year Funding Cost [2]	20.70%	18.85%	20.34%
City 40-Year Funding Cost	19.62%	17.98%	19.31%

[1] If the actuarial smoothing technique was removed and the market value of assets was utilized to determine the amortization period, the result would be 7.9 years as of December 31, 2020.

[2] 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.

Plan experience was favorable overall on the basis of the plan's actuarial assumptions. Sources of favorable experience included an investment return of 10.24% (Actuarial Asset Basis) which exceeded the 7.50% assumption and an average salary increase of 3.70% which fell short of the 5.44% assumption. These gains were offset in part by a loss associated with more retirements than expected and the 1.40% COLA granted to eligible retirees effective January 1, 2021.

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 1.40% cost-of-living adjustment, effective January 1, 2021, in accordance with the Fund's COLA adjustment policy.

Actuarial Assumption/Method Changes

The actuarial assumptions that were changed in conjunction with this valuation are listed below:

- Investment Return (lowered from 7.50% to 7.30%)
- Payroll Growth (increased from 2.00% to 2.50%)

There have been no changes of methods since the prior valuation.

COMPARATIVE SUMMARY OF PRINCIPAL VALUATION RESULTS

	New Assump 12/31/2020	Old Assump 12/31/2020	12/31/2019
A. Participant Data			
Actives	1,154	1,154	1,130
Service Retirees + DROP	732	732	700
Beneficiaries + Alt Payees	139	139	136
Disability Retirees	17	17	18
Terminated Vested	24	24	10
Total	2,066	2,066	1,994
Covered Annual Payroll	98,222,771	98,222,771	95,642,391
Annual Rate of Payments to:			
Service Retirees + DROP	49,263,045	49,263,045	45,668,939
Beneficiaries + Alt Payees	4,541,323	4,541,323	4,371,623
Disability Retirees	748,037	748,037	768,925
Terminated Vested	326,619	326,619	292,601
B. Assets			
Actuarial Value (AVA)	1,079,202,794	1,079,202,794	1,001,980,211
Market Value (MVA)	1,162,023,673	1,162,023,673	1,029,892,806
C. Liabilities			
Present Value of Benefits			
Actives			
Retirement + Termination Benefits	780,968,197	753,980,029	748,148,185
Death Benefits	8,397,761	8,099,163	7,882,158
Disability Benefits	7,040,515	6,791,462	6,599,300
Service Retirees + DROP	699,304,031	689,548,167	629,675,807
Beneficiaries + Alt Payees	40,008,937	39,426,657	38,013,700
Disability Retirees	7,535,897	7,417,310	7,696,375
Terminated Vested	3,049,869	2,961,256	2,280,803
Total	1,546,305,207	1,508,224,044	1,440,296,328

	New Assump 12/31/2020	Old Assump 12/31/2020	12/31/2019
C. Liabilities - (Continued)			
Present Value of Future Salaries	1,097,463,485	1,081,883,592	1,048,081,656
Normal Cost (Entry Age Normal)			
Retirement + Termination Benefits	26,922,942	25,824,678	25,073,812
Death Benefits	573,330	558,338	531,590
Disability Benefits	593,806	579,247	555,327
Total Normal Cost	28,090,078	26,962,263	26,160,729
Present Value of Future Normal Costs	312,565,632	295,812,774	285,930,699
Actuarial Accrued Liability			
Retirement + Termination Benefits	481,202,564	470,468,362	473,974,567
Death Benefits	2,108,494	2,060,545	2,133,475
Disability Benefits	529,783	528,973	590,902
Inactives	749,898,734	739,353,390	677,666,685
Total Actuarial Accrued Liability (AAL)	1,233,739,575	1,212,411,270	1,154,365,629
Unfunded Actuarial Accrued Liability (UAAL)	154,536,781	133,208,476	152,385,418
Funded Ratio (AVA / AAL)	87.5%	89.0%	86.8%
D. Actuarial Present Value of Accrued Benefits			
Inactives	749,898,734	739,353,390	677,666,685
Actives	356,071,466	346,463,446	349,681,286
Total Present Value Accrued Benefits (PVAB)	1,105,970,200	1,085,816,836	1,027,347,971
Funded Ratio (MVA / PVAB)	105.1%	107.0%	100.2%

GAIN/LOSS ANALYSIS

a. Total (Gain)/Loss

1. Unfunded Actuarial Accrued Liability as of December 31, 2019	$152,385,418
2. Normal Cost applicable for 2020	26,160,729
3. Interest on (1) and (2)	13,390,961
4. Contributions made during 2020	39,384,313
5. Interest on (4)	1,476,912
6. Expected UAAL as of December 31, 2020: (1)+(2)+(3)-(4)-(5)	151,075,883
7. Actual UAAL as of December 31, 2020 (Before Changes)	133,208,476
Total Actuarial (Gain)/Loss [1]	(17,867,407)

b. (Gain)/Loss on Assets

1. Actuarial Value of Assets as of December 31, 2019	1,001,980,211
2. Contributions Less Benefit Payments	(24,099,336)
3. Expected Investment Earnings	74,244,791
4. Expected AVA as of December 31, 2020: (1)+(2)+(3)	1,052,125,666
5. Actual Actuarial Value of Assets as of December 31, 2020	1,079,202,794
(Gain)/Loss on Assets	(27,077,128)

c. (Gain)/Loss on Liabilities

1. Expected Actuarial Accrued Liability: a(6)+b(4)	1,203,201,549
2. Actual Actuarial Accrued Liability (Before Changes)	1,212,411,270
(Gain)/Loss on Liabilities [1]	9,209,721

[1] Includes increase in liabilities associated with the 1.4% cost-of-living adjustment that was granted to eligible retirees, effective January 1, 2021.

COMPARISON OF CONTRIBUTION RATES TO
ACTUARIALLY DETERMINED CONTRIBUTION BENCHMARK

Pursuant to the adopted Funding Policy, an Actuarially Determined Contribution (ADC) benchmark has been created for comparative purposes only and was constructed under the actuarial assumptions and methods identical to those disclosed in this report, except as follows:

Amortization Period – The ADC benchmark is determined in conjunction with each actuarial valuation by determining the fixed-rate contribution rates that would result in a 30-year amortization period as of the valuation date.

Payroll Growth Assumption – The ADC benchmark is calculated using a payroll growth assumption that is the lesser of 3.0% and the average payroll growth of the Austin Fire Department over the last ten (10) years.

Determination of ADC Benchmark Payroll Growth Assumption

Covered Payroll as of:	
12/31/2020	98,222,771
12/31/2009 [1]	78,979,991
(a) Average Annual Rate [1]	2.00%
(b) ADC Assumption	3.00%
Lesser of (a) and (b)	**2.00%**

Valuation as of December 31,	*City of Austin Contribution Rate*	*30-Year ADC Benchmark*	*City Contribution Excess/(Shortfall)*
2020	22.05%	21.24%	0.81%
2019	22.05%	20.42%	1.63%

[1] A valuation was not performed as of December 31, 2010. Therefore, the Average Annual Rate shown is the average payroll growth over the last eleven (11) years.

STATEMENT OF FIDUCIARY NET POSITION
DECEMBER 31, 2020

ASSETS	MARKET VALUE
Cash and Cash Equivalents:	
Cash Equivalents	7,469,870
Cash	3,240,464
Total Cash and Equivalents	10,710,334
Receivables:	
From Broker for Investments Sold	205,778
Investment Income	49,614
Total Receivable	255,392
Investments:	
Domestic Equity	204,544,472
International Equity	265,016,866
Private Equities	241,194,646
Fixed Income	319,903,971
Real Estate Funds	94,126,660
Natural Resources Funds	26,271,332
Total Investments	1,151,057,947
Total Assets	1,162,023,673
LIABILITIES	
Total Liabilities	0
NET POSITION RESTRICTED FOR PENSIONS	1,162,023,673

STATEMENT OF CHANGES IN FIDUCIARY NET POSITION
FOR THE YEAR ENDED DECEMBER 31, 2020
Market Value Basis

ADDITIONS			
Contributions:			
Member		18,073,292	
City		21,311,021	
Total Contributions			39,384,313
Investment Income:			
Miscellaneous Income	119,898		
Net Realized Gain (Loss)	23,163,966		
Unrealized Gain (Loss)	113,865,807		
Net Increase in Fair Value of Investments		137,149,671	
Interest & Dividends		12,724,234	
Less Investment Expense[1]		(2,847,998)	
Net Investment Income			147,025,907
Total Additions			186,410,220
DEDUCTIONS			
Distributions to Members:			
Benefit Payments		52,802,629	
Lump Sum DROP Distributions		10,474,689	
Refunds of Member Contributions		206,331	
Total Distributions			63,483,649
Administrative Expense			1,092,299
Total Deductions			64,575,948
Net Increase in Net Position			121,834,272
NET POSITION RESTRICTED FOR PENSIONS			
Beginning of the Year			1,029,892,806
Adjustment to Beginning of Year assets			10,296,595
End of the Year			1,162,023,673

[1]Investment related expenses include investment advisory, custodial and performance monitoring fees.

ACTUARIAL ASSET VALUATION
December 31, 2020

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.

Gains/(Losses) Not Yet Recognized

Plan Year Ending	Gain/(Loss)	Amounts Not Yet Recognized by Valuation Year 2021	2022	2023	2024	2025
12/31/2016	(5,150,047)	0	0	0	0	0
12/31/2017	77,264,135	15,452,827	0	0	0	0
12/31/2018	(98,535,264)	(39,414,105)	(19,707,052)	0	0	0
12/31/2019	71,447,637	42,868,583	28,579,056	14,289,529	0	0
12/31/2020	79,891,968	63,913,574	47,935,180	31,956,786	15,978,392	0
Total		82,820,879	56,807,184	46,246,315	15,978,392	0

Development of Investment Gain/(Loss)

Market Value of Assets, 12/31/2019	1,029,892,806
Contributions Less Benefit Payments	(24,099,336)
Expected Investment Earnings*	76,338,235
Actual Net Investment Earnings	156,230,203
Actuarial Investment Gain/(Loss)	79,891,968

*Expected Investment Earnings = 0.075 * [1,029,892,806 + 0.5 * (24,099,336)]

Development of Actuarial Value of Assets

(1) Market Value of Assets, 12/31/2020	1,162,023,673
(2) Gains/(Losses) Not Yet Recognized	82,820,879
(3) Actuarial Value of Assets, 12/31/2020, (1) - (2)	1,079,202,794
(A) 12/31/2019 Actuarial Assets:	1,001,980,211
(I) Net Investment Income:	
1. Interest and Dividends	12,844,132
2. Realized Gains (Losses)	23,163,966
3. Unrealized Gains (Losses)	124,162,402
4. Change in Actuarial Value	(54,908,284)
5. Investment & Administrative Expenses	(3,940,297)
Total	101,321,919
(B) 12/31/2020 Actuarial Assets:	1,079,202,794
Actuarial Assets Rate of Return = 2I/(A+B-I):	10.24%
Market Value of Assets Rate of Return:	15.35%
Actuarial Gain/(Loss) due to Investment Return (Actuarial Asset Basis)	27,077,128
12/31/2020 Limited Actuarial Assets:	1,079,202,794

CHANGES IN NET ASSETS AVAILABLE FOR BENEFITS
DECEMBER 31, 2020
Actuarial Asset Basis

REVENUES		
Contributions:		
Member	18,073,292	
City	21,311,021	
Total Contributions		39,384,313
Earnings from Investments:		
Interest & Dividends	12,724,234	
Miscellaneous Income	119,898	
Net Realized Gain (Loss)	23,163,966	
Unrealized Gain (Loss)	124,162,402	
Change in Actuarial Value	(54,908,284)	
Total Earnings and Investment Gains		105,262,216
EXPENDITURES		
Distributions to Members:		
Benefit Payments	52,802,629	
Lump Sum DROP Distributions	10,474,689	
Refunds of Member Contributions	206,331	
Total Distributions		63,483,649
Expenses:		
Investment related[1]	2,847,998	
Administrative	1,092,299	
Total Expenses		3,940,297
Change in Net Assets for the Year		77,222,583
Net Assets Beginning of the Year		1,001,980,211
Net Assets End of the Year[2]		1,079,202,794

[1]Investment related expenses include investment advisory, custodial and performance monitoring fees.
[2]Net Assets may be limited for actuarial consideration.

STATISTICAL DATA

	12/31/2017	12/31/2018	12/31/2019	12/31/2020
Actives				
Number	1,045	1,102	1,130	1,154
Average Current Age	42.5	41.9	41.8	41.6
Average Age at Employment	28.9	29.0	29.1	29.2
Average Past Service	13.6	12.9	12.7	12.4
Average Annual Salary	$89,026	$87,933	$88,328	$88,469
Service Retirees + DROP				
Number		679	700	732
Average Current Age		64.3	64.7	65.2
Average Annual Benefit		$63,500	$65,241	$67,299
Beneficiaries + Alt Payees				
Number		125	136	139
Average Current Age		67.4	67.6	67.9
Average Annual Benefit		$30,462	$32,144	$32,671
Disability Retirees				
Number		18	18	17
Average Current Age		64.9	66.3	66.2
Average Annual Benefit		$42,112	$42,718	$44,002
Terminated Vested				
Number		8	10	24
Average Current Age		42.3	41.1	38.7
Average Annual Benefit [1]		$31,524	$32,511	$36,291

[1] Average Annual Benefit for Terminated Vested members reflects the benefit for members entitled to a future annual benefit from the plan.

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	7	2	0	0	0	0	0	0	0	0	0	9
25 - 34	53	167	48	1	0	0	0	0	0	0	0	269
35 - 44	10	98	167	155	16	0	0	0	0	0	0	446
45 - 49	0	0	11	93	56	8	10	1	0	0	0	179
50	0	0	0	18	16	5	2	1	0	0	0	42
51	0	0	1	11	14	2	3	0	0	0	0	31
52	0	0	0	9	13	7	12	1	1	2	0	45
53	0	0	0	8	9	5	4	3	1	0	3	33
54	0	0	0	0	6	4	2	1	1	0	7	21
55 - 59	0	0	0	3	16	4	22	6	3	7	11	72
60+	0	0	0	0	0	0	0	0	0	0	7	7
TOTAL	70	267	227	298	146	35	55	13	6	9	28	1,154

VALUATION PARTICIPANT RECONCILIATION

1. Active lives

a. Number in prior valuation 12/31/2019	1,130
b. Terminations	
i. Vested (partial or full) with deferred benefits	(1)
ii. Non-vested, full lump sum distribution received	(1)
iii. Non-vested, awaiting refund	(3)
c. Deaths	
i. Beneficiary receiving benefits	(1)
ii. No future benefits payable	(1)
d. Disabled	0
e. Retired	(39)
g. Continuing participants	1,084
h. New entrants	70
i. Total active life participants in valuation	1,154

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

	Service Retirees, DROP Receiving Benefits	Receiving Death Benefits	Receiving Disability Benefits	Receiving QDRO Benefits	Vested Deferred	Total
a. Number prior valuation	700	85	18	51	10	864
Retired	39	0	0	0	0	39
Vested Deferred	0	0	0	0	4	4
Death, With Survivor	(4)	6	(1)	0	0	1
Death, No Survivor	(3)	(3)	0	0	0	(6)
Disabled	0	0	0	0	0	0
Refund of Contributions	0	0	0	0	0	0
Rehires	0	0	0	0	0	0
Expired Annuities	0	0	0	(2)	0	(2)
Data Corrections	0	0	0	0	10	10
New QDRO	0	0	0	2	0	2
b. Number current valuation	732	88	17	51	24	912

ACTUARIAL ASSUMPTIONS AND METHODS
(Effective December 31, 2020)

Mortality Rates	*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-2020 (previously MP-2019) 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 April 21, 2020.
Termination Rates	See tables below. These assumptions were approved in conjunction with an actuarial experience study dated April 21, 2020.
Disability Rates	See tables below. These assumptions were approved in conjunction with an actuarial experience study dated April 21, 2020.
Interest Rate	7.30% (previously 7.50%) 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 April 21, 2020.
General Wage Inflation	3.00% per year. This assumption was reviewed in conjunction with an actuarial experience study dated April 21, 2020.
Inflation	2.50% per year. This assumption was approved in conjunction with an actuarial experience study dated April 21, 2020.

Payroll Growth	2.50% (previously 2.00%) 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

Years of Service	Termination Probability
0-7	1.0%
8-13	0.5
14+	0

Retirement Rates

Number of Years After First Eligibility for Early Retirement	Probability of Retirement
0	1.5%
1	1.5
2	1.5
3	1.5
4	2.0
5	4.0
6	5.0
7	5.0
8	7.5
9	10.0
10	16.7
11	16.7
12	20.0
13	20.0
14	30.0
15	30.0
16	30.0
17	50.0
18	100.0

Retro-DROP Elections

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

Disability Rates

Age	Probability of Disablement
<30	0.020%
30-39	0.060
40-49	0.100
50+	0.050

% Increase in Salary*

Years of Service	Increase
0	5.50%
1	7.00
2	7.00
3	2.50
4	0.50
5	4.00
10	1.00
15	1.00
20	4.50
21	0.50
22+	0.25

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

SUMMARY OF BENEFIT PROVISIONS

Service	Total years and completed months during which a Member makes contributions to the Fund.
Average Monthly Compensation	Average Salary for the highest 36 months of service.
Member Contributions	18.70% of Salary.
City Contributions	22.05% or payroll.
Normal Retirement	
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 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.
Form of Benefit	Married: Life Annuity with 75% continued to Surviving Spouse Single: Life Annuity with 75% continued to designated beneficiary.
Early Retirement	
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	Married: Life Annuity with 75% continued to Surviving Spouse Single: 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	Fixed interest credited at the end of each calendar month with interest at a rate equal to one-twelfth (1/2) of five percent (5%) 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 actuarial assumptions. 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. It is possible that actual plan experience will differ from anticipated experience in an unfavorable manner that will negatively impact the plan's funded position.

Below are 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, is 126.5% and has stayed about the same over the last four years.
- The Accrued Liability Ratio, determined as the ratio of the Inactive Accrued Liability, which is the liability associated with members who are no longer employed but are due a benefit from the plan (inclusive of DROP Balances), to the Total Accrued Liability, has increased from 55.3% to 60.8% over the last four years.
- The Funded Ratio, determined as the ratio of the Actuarial Value of Assets to the Total Accrued Liability, is 87.5% and has stayed about the same over the last four years. If all actuarial assumptions are realized, the funded ratio is expected to increase in the next few years as the most recent investment experience gains are gradually recognized.
- The DROP Asset Ratio, determined as the ratio of the Accumulated DROP Balances to the Market Value of Assets has increased from 9.1% to 11.9% over the last four years.
- The Net Cash Flow Ratio, determined as the ratio of the Net Cash Flow (contributions minus benefit payments and administrative expenses) to the Market Value of Assets, is -2.2%. This indicates that contributions are not currently covering the plan’s benefit payments and administrative expenses.

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. Additional 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

	12/31/2017	12/31/2018	12/31/2019	12/31/2020
Support Ratio				
Total Actives	1,045	1,102	1,130	1,154
Total Inactives	795	830	864	912
Actives / Inactives	131.4%	132.8%	130.8%	126.5%
Accrued Liability (AL) Ratio				
Inactive Accrued Liability	574,008,210	621,279,137	677,666,685	749,898,734
Total Accrued Liability	1,038,118,085	1,084,533,608	1,154,365,629	1,233,739,575
Inactive AL / Total AL	55.3%	57.3%	58.7%	60.8%
Funded Ratio				
Actuarial Value of Assets (AVA)	916,931,534	954,574,840	1,001,980,211	1,079,202,794
Total Accrued Liability	1,038,118,085	1,084,533,608	1,154,365,629	1,233,739,575
AVA / Total Accrued Liability	88.3%	88.0%	86.8%	87.5%
DROP Asset Ratio				
Accumulated DROP Balances	86,322,683	99,360,841	115,350,197	138,472,897
Market Value of Assets (MVA)	953,798,227	909,117,796	1,029,892,806	1,162,023,673
DROP Balances / MVA	9.1%	10.9%	11.2%	11.9%
Net Cash Flow Ratio				
Net Cash Flow [1]	(17,726,969)	(19,566,367)	(20,760,422)	(25,191,635)
Market Value of Assets (MVA)	953,798,227	909,117,796	1,029,892,806	1,162,023,673
Ratio	-1.9%	-2.2%	-2.0%	-2.2%

[1] Determined as total contributions minus benefit payments and administrative expenses.

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.

Actuarial Value of Assets is the asset value used in the valuation to determine contribution requirements. It represents the plan's Market Value of Assets (see below), with adjustments according to the plan's Actuarial Asset Method. These adjustments produce a "smoothed" value that is likely to be less volatile from year to year than the Market Value of Assets.

Market Value of Assets is the fair market value of plan assets as of the valuation date. This amount may be adjusted to produce an Actuarial Value of Assets for plan funding purposes.

Unfunded Actuarial Accrued Liability (UAAL) is the difference between the actuarial accrued liability (described above) and the actuarial value of assets.