

Fire and Police Pension Association Colorado Springs New Hire Pension Plan – Fire Component

Actuarial Valuation Report

For the Year Beginning January 1, 2020





To: Board of Directors for the Fire and Police Pension Association
CC: Administrative Heads and Finance Officers of the City of Colorado Springs
Date: June 2020
Subject: **Actuarial Valuation Results as of January 1, 2020**

This report contains the actuarial valuation results as of January 1, 2020 for the Colorado Springs New Hire Pension Plan – Fire Component (the Plan) as determined by Gabriel, Roeder, Smith & Company (GRS), actuary for the Fire and Police Pension Association (FPPA). Questions about this report should be directed to FPPA, rather than to GRS.

Financing Objectives

This valuation was prepared to determine the actuarially determined contribution (ADC) for fiscal year 2021. The ADC for FY2021 is \$6,047,482 and is shown in Table 1, Item 10.

The calculated employer contribution consists of the sum of two pieces: the normal cost and the amortization of the unfunded actuarial accrued liability (UAAL). The calculated contribution is shown in Table 1, Item 10. The normal cost (shown in Table 1, Item 2) can be viewed as the regular, ongoing cost of the Plan.

The UAAL is the amount by which the actuarial value of assets falls short of, or exceeds, the actuarial accrued liability for this Plan. Under the current statutes, the UAAL must be amortized under a level dollar method over a period of 18 years. The determined payment to amortize the UAAL is shown in Table 1, Item 9

The Actuarially Determined Contribution may be considered as a minimum contribution rate that complies with state statute. Users of this report should be aware that contributions made at that rate do not guarantee benefit security. Given the importance of benefit security to any retirement system, we suggest that contributions to the Plan in excess of those presented in this report be considered.

The contribution rate in this report is determined using the actuarial assumptions and methods disclosed in Table 13 of this report. Page 3 of this letter includes short-term projections assuming alternate investment returns. With the exception of these short term funding projections, this report does not include an assessment of the risks of future experience not meeting the actuarial assumptions. Additional assessment of risks was outside the scope of this assignment. We encourage a review and assessment of investment and other significant risks that may have a material effect on the Plan's financial condition.

For 2020, from April through June, the employer contribution rate is expected to match the employee contribution rate of 10%. It is expected that the Plan will return to contributing the actuarially determined contribution in July of 2020.

Benefit Provisions

This actuarial valuation reflects the provisions that were applicable to the Colorado Springs New Hire Pension Plan-Fire Component as of the valuation date. The details of the actuarial calculations, based on the current benefit provisions, are described in Table 14 of this report.

Stabilization Reserve Account (SRA) Contributions

As of January 1, 2020, the combined member/employer contribution rate is over 16.00% and therefore we recommend the SRA contribution rate be set to 0.00% as of January 1, 2021.

Actuarial Assumptions and Methods

The current actuarial methods and assumptions were adopted by the Board of Directors of FPPA for first use in the actuarial valuation as of January 1, 2019, based upon the actuary's analysis and recommendations from the 2018 Experience Study. For information regarding the rationale for the assumptions chosen, please see the experience study report dated September 21, 2018. There have been no changes in assumptions or methods since the prior valuation.

The assumptions and methods are detailed in Table 13 of the Report. The Board of Directors has sole authority to determine the actuarial assumptions used for the Plan. The assumptions that are based upon the actuary's recommendations are internally consistent and are reasonably based on the actual past experience of the Plan.

Because the Plan is closed to new members, the amortization period was closed at 30 years effective January 1, 2008.

The results of the actuarial valuation are dependent on the actuarial assumptions used. Actual results can and almost certainly will differ, as actual experience deviates from the assumptions. Even seemingly minor changes in the assumptions can materially change the liabilities, calculated contribution and funding periods. The actuarial calculations are intended to provide information for rational decision making.

Assets

Table 4 shows the market value of assets for this department and Table 5 shows the development of the actuarial value. The actuarial value of assets is equal to the market value of assets less a five-year phase in of the excess (shortfall) between expected investment return and actual income. The actual calculation is based on the difference between actual earnings and expected earnings each year, and recognizes the cumulative excess return (or shortfall)



over at a minimum rate of 20% per year. This smoothed average approach is intended to ensure the smoothed value of assets will converge towards the market value in a reasonable amount of time.

Member Data

Member data as of January 1, 2020 was supplied by FPPA. GRS reviewed the data and tested it for reasonableness and consistency. The member count is shown in Table 3.

Experience

The Plan experienced an increase in its calculated contribution between the 2019 actuarial valuation and this valuation. This increase was primarily due to the higher than expected increase in salaries for the active members, and reduced anticipated contributions during 2020.

Deferred Losses and Projected Actuarial Results

To allow the City to anticipate future contribution requirements for the Plan, we have projected the actuarial status of the Plan as of January 1, 2020. The table below provides the ADC for Fiscal Years 2021 - 2025 based on the January 1, 2020 actuarial valuation.

Fiscal Year (FY)	Actuarially Determined Contribution (ADC)		
	Assuming 3.0% return in FY	Assuming 7.0% return in FY	Assuming 11.0% return in FY
2021	\$6,047,482	\$6,047,482	\$6,047,482
2022	6,580,304	5,930,439	5,280,574
2023	7,113,619	5,794,457	4,424,320
2024	7,641,880	5,623,340	3,442,413
2025	8,188,664	5,435,922	2,343,006

The projected liabilities are calculated by rolling forward the liabilities as of January 1, 2020, taking into account interest and benefit payments for the year, including mortality incidence and anticipated cost of living increases. The 7.0% scenario above coincides with the actuarial investment return assumption of 7.0%. The 3.0% and 11.0% scenarios were selected because there is statistically a high probability of the return for a two-year period being inside the expected return +/- 4%.

The scenarios above are for illustration purposes only and are in no way to be used as expected investment performance. There are no other deviations from the expected taken into consideration besides the asset performance. Careful consideration of this projected contribution should be taken into account before any benefit enhancement is adopted.



Trends

As of January 1, 2020, there remains \$3.6 million of deferred asset gains that will decrease future contribution levels, in the absence of offsetting losses. Additionally, it is anticipated that the dollar normal cost will decrease over time.

Tables

This report includes the following sections:

- The executive summary includes a condensed summary of the demographic, financial, and actuarial data.
- Table 1 provides the details of the development of the actuarially determined contribution.
- Table 2 shows the sources of change in the calculated contribution since the prior valuation.
- Table 3 shows historical actuarial and demographic data for the department.
- Tables 4, 5, and 6 show the development of the financial information.
- Table 7 provides historical funding information.
- Table 8 provides the solvency test.
- Table 9 shows historical cash flow information.
- Tables 10, 11, and 12 show demographic data for the department.
- Table 13 shows the actuarial assumptions and methods used to calculate the liabilities.
- Table 14 is a summary of the benefit provisions for the department.
- Table 15 provides definitions of several terms used throughout the report.
- Table 16 provides Supplemental Studies
- Table 17 provides Risks Associated with Measuring the Accrued Liability and Actuarially Determined Contribution

GASB Accounting

The Governmental Accounting Standards Board (GASB) Statement No. 67, Financial Reporting for Pension Plans (Issued 6/2012), has replaced the requirements under GASB Statement No. 25, Financial Reporting for Defined Benefit Pension Plans and Note Disclosures for Defined Contribution Plans (Issued 11/1994), effective for financial statements for fiscal years beginning after June 15, 2013. GASB Statement No. 68, Accounting and Financial Reporting for Pensions (Issued 6/2012), has replaced GASB Statement No. 27, Accounting for Pensions by State and Local Governmental Employers (Issued 11/1994), effective for fiscal years beginning after June 15, 2014. Plan reporting information for GASB Statement No. 67 can be found in the FPPA Comprehensive Annual Financial Report at FPPA's website - FPPAco.org. Colorado Springs receives a separate accounting report in order to meet their financial reporting requirements under GASB 68.

Certification

We certify that the information included herein and contained in the 2020 Actuarial Valuation Report is accurate and fairly presents the actuarial position of the Colorado Springs New Hire Pension Plan-Fire Component of January 1, 2020.

All calculations have been made in conformity with generally accepted actuarial principles and practices, and with the Actuarial Standards of Practice issued by the Actuarial Standards Board. In our opinion, the results presented comply with the requirements of the State of Colorado statutes and, where applicable, the Internal Revenue Code, and ERISA.

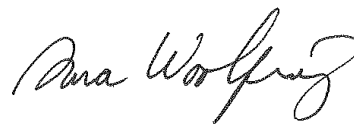
The undersigned are independent actuaries and consultants. Joseph Newton, Dana Woolfrey and Thomas Lyle are Enrolled Actuaries and all are Members of the American Academy of Actuaries, and meet the Qualification Standards of the American Academy of Actuaries. Finally, all of the undersigned are experienced in performing valuations for large public retirement systems.

Respectfully submitted,

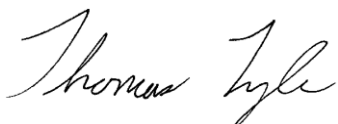
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Consultant



Executive Summary

Item	January 1, 2020	January 1, 2019
Membership		
• Number of:		
- Active members	91	96
- Terminated vested members	5	3
- Inactive members	3	3
- Members in DROP	28	30
- Disabled members	0	0
- Retired members	140	135
- Beneficiaries	9	9
- Total	276	276
• Annualized payroll supplied by FPPA	\$ 9,213,019	\$ 8,932,505
• Annualized monthly benefits paid	\$ 8,874,823	\$ 8,502,238
Assets		
• Market value	\$ 154,007,661	\$ 138,638,938
• Actuarial value	\$ 150,430,401	\$ 143,943,543
• Return on market value	14.4 %	0.0 %
• Return on actuarial value	7.6 %	6.0 %
• Contribution	\$ 4,519,669	\$ 4,981,787
• Ratio of actuarial value to market value	97.7 %	103.8 %
Actuarial Information		
• Actuarial accrued liability	\$ 191,759,280	\$ 182,354,848
• Actuarial Value Basis		
- Unfunded actuarial accrued liability/(surplus)	\$ 41,328,878	\$ 38,411,304
- Funded ratio	78.4 %	78.9 %
• Market Value Basis		
- Unfunded actuarial accrued liability/(surplus)	\$ 37,751,619	\$ 43,715,910
- Funded ratio	80.3 %	76.0 %
• Amortization period (years)	18	19
Annual Determined Contribution (ADC)		
• For year ending December 31,	2021	2020
• Estimated contribution amount	\$ 6,047,482	\$ 5,560,716



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Table 1 – Development of Actuarially Determined Contribution

	January 1, 2020	January 1, 2019
1. Valuation payroll	\$ 9,213,019	\$ 8,932,505
2. Normal cost	\$ 1,841,322	\$ 1,792,636
3. Administrative Expenses	\$ 74,091	\$ 74,266
4. Actuarial accrued liability for active members		
a. Present value of future benefits for active members	\$ 70,414,741	\$ 66,898,978
b. Less: present value of future normal costs	(10,861,783)	(11,356,754)
c. Actuarial accrued liability (a. + b.)	\$ 59,552,958	\$ 55,542,224
5. Total actuarial accrued liability for:		
a. Retirees and beneficiaries	\$ 102,587,113	\$ 96,480,533
b. Terminated vested members	2,154,949	1,434,688
c. Inactive members	287,729	398,276
d. Members in DROP	27,176,530	28,499,126
e. Active members (4c.)	59,552,958	55,542,224
f. Total	\$ 191,759,280	\$ 182,354,848
6. Actuarial value of assets	\$ 150,430,401	\$ 143,943,543
7. Unfunded actuarial accrued liability (UAAL)/(surplus) (5f. - 6.)	\$ 41,328,878	\$ 38,411,304
8. Funded ratio	78.45 %	78.94 %
9. Determined payment to amortize the UAAL/(surplus) over 18 years from January 1, 2020	\$ 4,132,069	\$ 3,693,814
10. Total calculated annual contribution for Fiscal Year:	<u>2021</u>	<u>2020</u>
Actuarially Determined Contribution (2. + 3. + 9.)	\$ 6,047,482	\$ 5,560,716
11. Total present value of benefits (5f. - 4b.)	\$ 202,621,063	\$ 193,711,602



Table 2 – Actuarial Gain/(Loss) on UAAL

1. Unfunded actuarial accrued liability (UAAL)	\$	38,411,304
2. Total normal cost for 2019		1,902,086
3. Non Service Purchase Contributions during 2019		(4,519,669)
4. Administrative Expenses 2019		74,091
5. a) Interest on Item 1 for one year		2,688,791
b) Interest on Item 2, 3, and Item 4 for one-half year *		(89,022)
6. Change in UAAL due to:		
a. Benefit Improvements		0
b. Assumption Changes		0
7. Expected UAAL as of this valuation (1.+2.+3.+4.+5.)		38,467,581
8. Actual UAAL at end of period		41,328,879
9. Actuarial gain/(loss) for the period (8. – 7.)		(2,861,298)
SOURCE OF GAINS/(LOSSES)		
10. Asset gain/(loss) (See Table 6)	\$	894,315
11. Salary/rank liability gain/(loss) for the period		(2,823,174)
12. Net liability gain/(loss) for the period (9. - 10. - 11.)		(932,440)

Change in Calculated Contribution

1. Calculated contribution in 2019 valuation		\$ 5,560,716
2. Benefit changes	0	
3. Assumption/method changes	0	
4. Change in Normal Cost**	48,686	
5. Investment experience	(94,673)	
6. Salary/rank experience	298,865	
7. Contribution Shortfall	135,162	
8. Other liability experience ***	98,727	
9. Total change	486,766	
10. Calculated contribution in 2020 valuation	\$	6,047,482

* Assume Normal Cost, contributions and administrative expense occurred in the mid-year.

** The normal cost is a measure of the rate at which active member benefits are accruing and directly relates to the active member payroll. The increase in normal cost is due to the increase in active member payroll due to pay increases outpacing pay reduction through terminations.

*** includes losses from fewer disabilities than expected



Table 3 – Actuarial Experience

	<u>2020</u>	<u>2019</u>	<u>2018</u>	<u>2017</u>	<u>2016</u>	<u>2015</u>	<u>2014</u>	<u>2013</u>	<u>2012</u>	<u>2011</u>
1. Number of members										
a. Active	91	96	103	110	130	149	155	161	165	264
b. Retired	140	135	122	118	108	101	86	80	71	58
c. DROP	28	30	38	37	27	18	27	29	36	36
d. Beneficiaries	9	9	7	6	4	2	2	1	1	1
e. Terminated vested	5	3	6	7	9	9	9	10	10	10
f. Inactive	3	3	3	3	2	1	2	1	3	3
g. Total	276	276	279	281	280	280	281	282	286	372
2. Covered payroll										
	\$ 9,213,019	\$ 8,932,505	\$ 9,310,153	\$ 9,619,561	\$ 11,167,162	\$ 12,537,370	\$ 12,468,196	\$ 12,349,627	\$ 12,497,987	\$ 19,664,027
3. Average compensation										
	\$ 101,242	\$ 93,047	\$ 90,390	\$ 87,451	\$ 85,901	\$ 84,143	\$ 80,440	\$ 76,706	\$ 75,745	\$ 74,485
4. Valuation results										
a. Normal cost	\$ 1,841,322	\$ 1,792,636	\$ 1,706,597	\$ 1,818,795	\$ 2,050,714	\$ 2,256,072	\$ 2,310,185	\$ 2,308,265	\$ 2,361,981	\$ 3,516,328
b. Accrued liability	191,759,280	182,354,848	168,492,702	163,542,442	157,971,179	145,875,351	138,255,953	129,466,329	124,211,363	127,909,057
c. Actuarial value of assets	150,430,401	143,943,543	139,084,637	131,529,543	126,813,938	120,350,555	111,882,235	103,516,709	98,326,872	108,848,941
d. Unfunded liability	41,328,878	38,411,304	29,408,065	32,012,899	31,157,241	25,524,796	26,373,718	25,949,620	25,884,491	19,060,116
e. Remaining amortization	18	19	20	21	22	23	24	25	26	27
f. Funded ratio	78.4%	78.9%	82.5%	80.4%	80.3%	82.5%	80.9%	80.0%	79.2%	85.1%
5. Actuarially Determined										
Estimated dollar contribution	\$ 6,047,482	\$ 5,560,716	\$ 4,519,669	\$ 4,981,787	\$ 5,132,890	\$ 4,522,810	\$ 4,628,508	\$ 4,546,999	\$ 4,685,823	\$ 5,199,980

Item 5 above is the calculated contribution as it is described throughout the report: normal cost plus the amortization of the UAAL under the policy as described in the current statutes. There is a one-year lag. As an example, the contribution shown in valuation year 2020 is payable in fiscal year 2021.



Table 4 – Reconciliation of Net Plan Assets

	Year Ending	
	December 31, 2019	December 31, 2018
1. Market value of assets at beginning of year	\$ 138,638,938	\$ 142,035,779
2. Revenue for the year		
a. Contributions		
i. Member contributions	\$ 936,275	\$ 923,455
ii. Employer contributions	3,583,394	4,058,332
iii. State contributions	0	0
iv. Contributions from the SWDD Plan	0	0
v. Total	<u>\$ 4,519,669</u>	<u>\$ 4,981,787</u>
b. Net investment income		
i. Interest	\$ 701,070	\$ 590,046
ii. Dividends	916,981	1,085,613
iii. Net change in accrued income	32,018	69,526
iv. Unrealized gain/(loss)	6,230,640	(8,105,084)
v. Realized gain/(loss)	12,484,777	6,853,943
vi. Defined contribution earnings (net)	(5,621)	(6,625)
vii. Investment expense	(1,229,764)	(1,248,136)
viii. Direct allocated plan expense/(income)	(16,552)	(14,256)
ix. Allocated fees and expenses	(57,538)	(60,009)
x. Other Income	<u>570,510</u>	<u>794,666</u>
c. Total revenue	<u>\$ 24,146,190</u>	<u>\$ 4,941,471</u>
3. Expenditures for the year		
a. Benefit payments	\$ (8,777,467)	\$ (8,338,312)
b. Refunds	0	0
c. Plan directed expenses	0	0
d. Total expenditures	<u>(8,777,467)</u>	<u>(8,338,312)</u>
4. Increase in net assets (2c. + 3d.)	\$ 15,368,723	\$ (3,396,841)
5. Market value of assets at end of year (1. + 4.)	\$ 154,007,661	\$ 138,638,938



Table 5 – Development of Actuarial Value of Assets

1.	Actuarial value of assets at beginning of year	\$ 143,943,543
2.	Net new investments	
a.	Contributions	4,519,669
b.	Benefits paid	(8,777,467)
c.	Refunds	0
d.	Administrative Expenses	<u>(74,091)</u>
e.	Subtotal	(4,331,889)
3.	Assumed investment return rate for fiscal year	7.0%
4.	Assumed investment return for fiscal year	\$ 9,924,432
5.	Expected Actuarial Value at end of year	\$ 149,536,086
6.	Market value of assets at end of year	\$ 154,007,661
7.	Excess return (6-5)	\$ 4,471,575
8.	Development of amounts to be recognized as of January 1, 2020:	

Fiscal Year End	Remaining Deferrals of Excess (Shortfall) of Investment Income (1)	Offsetting of Gains/(Losses) (2)	Net Deferrals Remaining (3) = (1) + (2)	Years Remaining (4)	Recognized for this valuation (5) = (3) / (4)	Remaining after this valuation (6) = (3) - (5)
2015	\$ 0	\$ 0	\$ 0	1	\$ 0	\$ 0
2016	0	0	0	2	0	0
2017	0	0	0	3	0	0
2018	(5,304,605)	5,304,605	0	4	0	0
2019	<u>9,776,180</u>	<u>(5,304,605)</u>	<u>4,471,575</u>	5	<u>894,315</u>	<u>3,577,260</u>
Total	\$ 4,471,575	\$ 0	\$ 4,471,575		\$ 894,315	\$ 3,577,260

9.	Actuarial value of assets as of January 1, 2020 (Item 6 - Item 8)	\$ 150,430,401
10.	Ratio of actuarial value to market value	97.7%

Amounts in column (1) for fiscal years ending 2015 through 2018 are from the prior valuation. The column (1) amount for fiscal year 2019 is developed using item 7 less the total of column (1) for fiscal years ending 2015 through 2018. To the extent possible, the 2019 excess or shortfall is used to reduce prior bases. In this case, the 2018 base is offset by the 2019 excess. The fiscal year 2015 through 2017 bases are \$0 because they were previously offset.



Table 6 – Gain/(Loss) on Actuarial Value of Assets

	Year Ending	
	December 31, 2019	December 31, 2018
1. Actuarial assets as of January 1	\$ 143,943,543	\$ 139,084,637
2. Total contributions since prior valuation	\$ 4,519,669	\$ 4,981,787
3. Benefits, refunds, and administrative expense since prior valuation	\$ (8,851,558)	\$ (8,412,578)
4. Assumed net investment income		
a. Beginning assets	\$ 10,076,048	\$ 9,735,925
b. Contributions	158,188	174,363
c. Benefits, refunds, and administrative expense	(309,805)	(294,440)
d. Total	\$ 9,924,432	\$ 9,615,847
5. Expected actuarial assets (1. + 2. + 3. + 4.)	\$ 149,536,086	\$ 145,269,693
6. Actual actuarial assets as of December 31	\$ 150,430,401	\$ 143,943,543
7. Net asset gain/(loss) since prior valuation (6. - 5.)	\$ 894,315	\$ (1,326,150)
	Gain	Loss



Table 7 – Statement of Funding Progress

Date	Actuarial Value of Assets (AVA)	Actuarial Accrued Liability (AAL)	Unfunded (Surplus) Actuarial Accrued Liability (UAAL) (3) - (2)	Funded Ratio (2)/(3)	Annual Covered Payroll	UAAL as a % of payroll (4)/(6)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
January 1, 1998	\$ 36,847,022	\$ 30,351,861	\$ (6,495,161)	121.4 %	\$ 11,972,174	(54.3) %
January 1, 2000	50,722,513	40,520,761	(10,201,752)	125.2	14,279,040	(71.4)
January 1, 2002	57,728,219	52,687,510	(5,040,709)	109.6	18,282,885	(27.6)
January 1, 2004	62,859,916	66,756,828	3,896,912	94.2	21,214,606	18.0
January 1, 2005	71,474,295	81,608,422	10,134,127	87.6	23,344,108	43.0
January 1, 2006	84,519,478	86,903,116	2,383,638	97.3	26,640,305	9.0
January 1, 2007	98,290,761	99,137,903	847,142	99.1	26,867,827	3.0
January 1, 2008	104,946,386	107,389,381	2,442,995	97.7	23,827,770	10.3
January 1, 2009	92,515,096	113,068,434	20,553,338	81.8	22,483,956	91.4
January 1, 2010	100,709,022	121,361,624	20,652,602	83.0	21,535,495	95.9
January 1, 2011	108,848,941	127,909,057	19,060,116	85.1	19,664,027	96.9
January 1, 2012	98,326,872	124,211,363	25,884,491	79.2	12,497,987	207.1
January 1, 2013	103,516,709	129,466,329	25,949,620	80.0	12,349,627	210.1
January 1, 2014	111,882,235	138,255,953	26,373,718	80.9	12,468,196	211.5
January 1, 2015	120,350,555	145,875,351	25,524,796	82.5	12,537,370	203.6
January 1, 2016	126,813,938	157,971,179	31,157,241	80.3	11,167,162	279.0
January 1, 2017	131,529,543	163,542,442	32,012,899	80.4	9,619,561	332.8
January 1, 2018	139,084,637	168,492,702	29,408,065	82.5	9,310,153	315.9
January 1, 2019	143,943,543	182,354,848	38,411,304	78.9	8,932,505	430.0
January 1, 2020	150,430,401	191,759,280	41,328,878	78.4	9,213,019	448.6

Limitations of Funded Status Measurements:

Unless otherwise indicated, a funded status measurement presented in this report is based upon the actuarial accrued liability and the actuarial value of assets. With regard to any funded status measurements presented in this report:

- (1) The measurement is inappropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the Plan's benefit obligations.
- (2) The measurement alone is inappropriate for assessing the need for or the amount of future employer contributions.
- (3) The measurement would produce a different result if the market value of assets were used instead of the actuarial value of assets, unless the market value of assets is used in the measurement.



Table 8 – Solvency Test

Valuation Date	Aggregated Accrued Liabilities for				Actuarial Value of Assets	Portion of Accrued Liabilities Covered by Reported Assets		
	Active Members Contribution	Retirees		Members (Employer Financed Portion)		(5)/(2)	[(5)-(2)-(3)]/	
		Beneficiaries and Vested Terminations						(4)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	
January 1, 2007	\$ 17,106	\$ 21,479	\$ 60,554	\$ 98,291	100.0%	100.0%	98.6%	
January 1, 2008	16,186	29,492	61,711	104,946	100.0%	100.0%	96.0%	
January 1, 2009	17,117	36,551	59,400	92,515	100.0%	100.0%	65.4%	
January 1, 2010	17,531	46,439	57,391	100,709	100.0%	100.0%	64.0%	
January 1, 2011	17,297	59,509	51,103	108,849	100.0%	100.0%	62.7%	
January 1, 2012	12,800	70,830	40,581	98,327	100.0%	100.0%	36.2%	
January 1, 2013	13,989	72,425	43,053	103,517	100.0%	100.0%	39.7%	
January 1, 2014	14,705	75,027	48,525	111,882	100.0%	100.0%	45.6%	
January 1, 2015	15,131	78,621	52,124	120,351	100.0%	100.0%	51.0%	
January 1, 2016	13,776	97,364	46,831	126,814	100.0%	100.0%	33.5%	
January 1, 2017	11,906	112,324	39,312	131,530	100.0%	100.0%	18.6%	
January 1, 2018	12,055	116,601	39,837	139,085	100.0%	100.0%	26.2%	
January 1, 2019	12,038	126,813	43,505	143,944	100.0%	100.0%	11.7%	
January 1, 2020	12,113	132,206	47,440	150,430	100.0%	100.0%	12.9%	

\$ amounts in 000s



Table 9 – Cash Flow Analysis

Year Ending December 31,	Contributions for the Year	Expenditures During the Year			Transfer to FPPA Statewide DB	External Cash Flow for the Year	Market Value of Assets	External Cash Flow as Percent of Market Value
		Benefit Payments **	Expenses ***	Total				
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
2005	\$ 4,246,521	\$ (433,572)	\$ (609,593)	\$ (1,043,165)	\$ 0	\$ 3,203,356	\$ 86,245,371	3.7 %
2006	4,635,325	(1,194,578)	(668,843)	(1,863,421)	0	2,771,904	102,563,833	2.7
2007	4,853,098	(1,904,689)	(776,908)	(2,681,598)	(7,126,881)	(4,955,381)	107,836,784	(4.6)
2008	3,823,945	(2,493,071)	(779,983)	(3,273,054)	0	550,891	77,095,913	0.7
2009	4,025,461	(3,075,980)	(654,327)	(3,730,307)	(174,888)	120,267	93,245,608	0.1
2010	5,123,834	(4,102,856)	(742,245)	(4,845,101)	0	278,733	106,862,046	0.3
2011	4,604,275	(5,047,853)	(818,801)	(5,866,654)	(14,827,301)	(16,089,679)	91,528,868	(17.6)
2012	4,017,079	(5,260,141)	(873,250)	(6,133,391)	0	(2,116,312)	100,831,706	(2.1)
2013	4,879,867	(5,230,250)	(973,410)	(6,203,660)	0	(1,323,793)	115,691,126	(1.1)
2014	4,627,045	(5,317,236)	(1,026,942)	(6,344,178)	0	(1,717,133)	122,730,229	(1.4)
2015	4,640,109	(6,228,574)	(194,094)	(6,422,668)	0	(1,782,559)	123,154,436	(1.4)
2016	4,569,688	(7,389,735)	(209,340)	(7,599,075)	0	(3,029,387)	126,527,898	(2.4)
2017	5,264,542	(7,983,856)	(58,095)	(8,041,951)	0	(2,777,408)	142,035,779	(2.0)
2018	4,981,787	(8,338,312)	(74,266)	(8,412,578)	0	(3,430,791)	138,638,938	(2.5)
2019	4,519,669	(8,777,467)	(74,091)	(8,851,558)	0	(4,331,889)	154,007,661	(2.8)
2020*	4,414,870	(9,167,962)	(75,943)	(9,243,905)	0	(4,829,035)	159,790,146	(3.0)
2021*	6,047,482	(9,744,844)	(77,841)	(9,822,685)	0	(3,775,203)	167,068,120	(2.3)

* Cash flow estimated based on expected contributions and expected benefit payments. Assets are assumed to increase at the annual return of 7.0% with all cash flow occurring in the middle of the year.

** Expected Benefit Payments for 2020 and beyond include expected retirements, expected mortality and if applicable, future cost of living increases.

*** Beginning in fiscal year ending December 31, 2015, expenses reflect administrative expense only. Prior years include investment expenses.



Table 10 – Membership Data

	<u>January 1, 2020</u>	<u>January 1, 2019</u>	<u>January 1, 2018</u>
1. Active members			
a. Number	91	96	103
b. Total payroll	\$ 9,213,019	\$ 8,932,505	\$ 9,310,153
c. Average annual salary	\$ 101,242	\$ 93,047	\$ 90,390
d. Average age	49.2	48.4	47.8
e. Average service	20.3	19.7	18.9
2. Terminated vested			
a. Number	5	3	6
b. Total annual benefits	\$ 195,153	\$ 125,217	\$ 186,947
c. Average annual benefit	\$ 39,031	\$ 41,739	\$ 31,158
d. Average age	50.7	51.2	52.3
3. Members In DROP			
a. Number	28	30	38
b. Total annual benefits	\$ 1,806,749	\$ 1,903,965	\$ 2,249,418
c. Average annual benefit	\$ 64,527	\$ 63,466	\$ 59,195
d. Average age	58.4	58.4	57.8
4. Service retirees			
a. Number	140	135	122
b. Total annual benefits	\$ 6,846,628	\$ 6,415,976	\$ 5,763,800
c. Average annual benefit	\$ 48,904	\$ 47,526	\$ 47,244
d. Average age	65.0	64.2	63.7
5. Beneficiaries			
a. Number	9	9	7
b. Total annual benefits	\$ 221,446	\$ 182,297	\$ 124,498
c. Average annual benefit	\$ 24,605	\$ 20,255	\$ 17,785
d. Average age	53.0	48.3	50.1
6. Inactive members			
a. Number	3	3	3



Table 11 – Summary of Retirees by Age and Type

Age	Retirees		Disabled Members		Beneficiaries		Members in DROP		All	
	Number	Average	Number	Average	Number	Average	Number	Average	Number	Average
		Monthly Pension		Monthly Pension		Monthly Pension		Monthly Pension		Monthly Pension
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Less than 50	0	\$ 0	0	\$ 0	2	\$ 2,655	0	\$ 0	2	\$ 2,655
50-54	3	3,586	0	0	0	0	0	0	3	3,586
55-59	22	3,938	0	0	4	2,148	21	5,243	47	4,368
60-64	48	4,399	0	0	1	1,804	7	5,781	56	4,525
65-69	45	4,103	0	0	1	1,808	0	0	46	4,053
70-74	21	3,609	0	0	0	0	0	0	21	3,609
75-79	1	1,578	0	0	1	940	0	0	2	1,259
Greater than 80	0	0	0	0	0	0	0	0	0	0
All	140	4,075	0	0	9	2,050	28	5,377	177	4,178



Table 12 – Schedule of Retirants & Annuitants Added to and Removed from Rolls

Valuation Year	Added to Rolls		Removed from Rolls		Rolls-End of Year		% Increase in Annual Benefits	Average Annual Benefits	Average Age
	Numbe	Annual Benefits*	Number	Annual Benefits	Number	Annual Benefits			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
2006	3	\$ 106,428	0	\$ 0	16	\$ 379,356	39.0 %	\$ 23,710	57.7
2007	26	1,160,157	0	0	42	1,539,513	305.8	36,655	57.6
2008	12	592,154	0	0	54	2,131,667	38.5	39,475	56.8
2009	11	536,669	0	0	65	2,668,336	25.2	41,051	57.2
2010	14	725,800	0	0	79	3,394,136	27.2	42,964	57.6
2011	16	901,143	0	0	95	4,295,279	26.5	45,213	58.7
2012	14	711,103	1	18,613	108	4,987,769	16.1	46,183	59.2
2013	2	96,704	0	0	110	5,084,473	1.9	46,222	60.1
2014	7	275,015	2	71,310	115	5,288,178	4.0	45,984	60.7
2015	6	257,233	0	0	121	5,545,411	4.9	45,830	61.4
2016	19	1,149,542	1	37,545	139	6,657,408	20.1	47,895	61.0
2017	23	1,149,453	1	30,677	161	7,776,184	16.8	48,299	61.1
2018	7	390,886	1	29,354	167	8,137,716	4.6	48,729	61.8
2019	9	456,116	2	91,594	174	8,502,238	4.5	48,863	62.3
2020	6	816,514	3	79,407	177	8,874,823	4.4	50,140	63.4

* Includes cost-of-living adjustments granted since the prior valuation.



c) Pre-Retirement Mortality

2006 central rates from the RP-2014 Employee Mortality Tables for males and females projected to 2018 using the MP-2017 projection scales, and then projected prospectively using the ultimate rates of the scale for all years, 50% multiplier for off-duty mortality. Increased by 0.00015 for on-duty experience.

Annual Rate per 1,000 Members

Attained

Age in 2020	Males	Females
20	0.34	0.23
25	0.39	0.24
30	0.40	0.26
35	0.45	0.31
40	0.49	0.37
45	0.64	0.48
50	0.98	0.68
55	1.54	1.02

d) Withdrawal (any reason other than retirement, death, or disability) rates at selected ages are shown:

Annual Rate per 1,000 Members

<u>Years of Service</u>	<u>Termination Rates</u>	<u>Years of Service</u>	<u>Termination Rates</u>
0	108.4	12	14.6
1	93.1	13	12.9
2	79.5	14	11.8
3	67.5	15	10.9
4	57.1	16	10.3
5	48.0	17	10.0
6	40.2	18	9.7
7	33.6	19	9.4
8	28.1	20	8.9
9	23.4	21	8.3
10	19.7	22	7.2
11	16.8	23	5.7



3. Post-Retirement Mortality

Healthy Retirees, Beneficiaries

2006 central rates from the RP-2014 Annuitant Mortality Tables for males and females projected to 2018 using the MP-2017 projection scales, and then projected prospectively using the ultimate rates of the scale for all years.

Annual Rate per 1,000 Members

Attained		
Age in 2020	Males	Females
50	3.98	2.68
55	5.71	3.77
60	8.01	5.64
65	11.47	8.32
70	17.00	12.87
75	27.15	21.14
80	45.85	36.18
85	80.33	64.64

4. Salary Increase Rate

A service-related component shown below, plus a 2.5% inflation component and 1.75% productivity component, as follows:

<u>Years of Service</u>	<u>Service-Related Component</u>	<u>Total Annual Rate of Increase Including 2.5% Inflation and 1.75% Productivity Component</u>
1	7.00%	11.25%
2	7.00%	11.25%
3	6.50%	10.75%
4	6.00%	10.25%
5	3.50%	7.75%
6	1.50%	5.75%
7	1.50%	5.75%
8	1.00%	5.25%
9	0.75%	5.25%
10	0.75%	5.00%
11	0.75%	5.00%
12	0.50%	4.75%
13	0.50%	4.75%
14	0.25%	4.50%
15	0.00%	4.25%



Salary increases are assumed to occur once a year, on January 1st. Therefore, the pay used for the period between the valuation date and the first anniversary of the valuation date is equal to the reported pay for the prior year, annualized if necessary, and then increased by the salary increase assumption.

5. Marital Status

- a) Percent married 85% male and female
- b) Age difference Males are assumed to be two years older than females.

6. Benefit Escalation 2.4%

7. Payroll Growth 0.00% - The Plan is closed to New Entrants. Therefore, no payroll growth was assumed in the amortization calculation.

8. Third Week Pay Impact To account for third week pay, an additional salary increase of 2% is included after 10 years of service. Also, the final average pay is increased by 0.50% at the time of retirement. This is representative of a member beginning to receive third-week checks in their 11th year of service, continuing to receive them until retirement, and receiving two third-week checks in the final 18 months of employment (the period used in the final average compensation calculation).

9. Administrative Expense An explicit administrative expense equal to the prior year actual expenses.

10. Changes in Actuarial Assumptions There were no changes in the actuarial assumptions since the prior valuation.



11. Actuarial Cost Method

Under the entry age actuarial cost method, the normal cost is computed as the level percent of pay, which, if paid from the earliest time each member would have been eligible to join the Plan if it then existed (thus, entry age) until his retirement or termination, would accumulate with interest at the rate assumed in the valuation to a fund sufficient to pay all benefits under the Plan. The normal cost for the Plan is determined by summing the normal cost of all members.

The actuarial accrued liability under this method at any point in time is the theoretical amount of the fund that should have been accumulated had annual contributions been made in prior years equaling to the normal cost. The unfunded actuarial accrued liability/(surplus) is the excess of the actuarial accrued liability over the actuarial value of the Plan assets as of the valuation date.

The contribution requirements determined by this valuation will not be effective until one year later, and the determination of the requirement reflects this deferral. It is assumed that there will be no change in the normal cost due to the deferral, and it is assumed that payments are made in the middle of the year. The reflection of the one year lag is a change from the methodology of prior valuations.

Under this method, experience gains and losses (i.e. decreases or increases in accrued liabilities), attributable to deviations in experience from the actuarial assumptions, adjust the unfunded actuarial accrued liability.

12. Asset Valuation Method

The actuarial value of assets is equal to the market value of assets less a five-year phase in of the excess (shortfall) between expected investment return and actual income. The actual calculation is based on the difference between actual earnings and expected earnings each year, and recognizes the cumulative excess return (or shortfall) over at a minimum rate of 20% per year. The speed of the recognition will increase if the Plan continues to be in the same net deferred position (net gain or net loss) from one year to the next. This is intended to ensure the smoothed value of assets will converge towards the market value in a reasonable amount of time. In addition, a gain or loss that is in the opposite direction of the current net position will be immediately recognized.

Expected earnings are determined using the assumed investment return rate and the beginning of year actuarial value of assets (adjusted for receipts and disbursements during the year). The returns are computed net of administrative and investment expenses.



Table 14 – Summary of Benefit Provisions

Plan Description

Two plans from the City of Colorado Springs joined the Fire & Police Pension Association Defined Benefit System as of October 1, 2006. They are now one single-employer defined benefit pension plan, Colorado Springs New Hire Pension Plan (“Plan”), but with a fire component and a police component for fire and police employees hired by the City of Colorado Springs on or after April 8, 1978 but prior to October 1, 2006. The Plans are closed to new members as of October 1, 2006.

Employers may not withdraw from the Fire & Police Pension Association Defined Benefit System once elected. The Plan members had opportunities to transfer to the Fire & Police Pension Association Defined Benefit System - Statewide Defined Benefit Plan in conjunction with the administrative change. The Plan assets are included in the Fire & Police Members’ Benefit Investment Fund and the Fire & Police Members’ Self-Directed Investment Fund (for Deferred Retirement Option Plan “DROP” assets and Separate Retirement Account assets from eligible retired members).

Plan Year

A twelve-month period ending December 31.

Members Included

Members included are active employees hired on or after April 8, 1978 but prior to October 1, 2006. As of October 1, 2006, administration of the Plan has been transferred to the Fire & Police Pension Association and the Plan has been closed. All members hired on or after October 1, 2006 will become members of the Fire & Police Pension Association Defined Benefit System - Statewide Defined Benefit Plan.

Compensation Considered

Basic salary, including longevity pay, sick pay taken in the normal course of employment, vacation leave pay taken in the normal course of employment, third week pay, and mandatory overtime (including Annual Pay in lieu of leave) that is part of the members annual fixed periodic compensation. Also, all salary amounts deferred for 457 or Section 125 “cafeteria plan” are included.

Contribution Rates

The Plan sets contribution rates at a level that enables all benefits to be fully funded at the retirement date of all members within each component as determined by the actuarial study. Effective January 1, 2019, the Fire Component’s actuarially determined contribution is



\$4,519,669. Of this amount the members of the Plan contribute 10 percent of basic salary and the employer remitted the remainder. Effective January 1, 2020, the actuarially determined contribution is \$5,560,716.

Final Average Salary

Final Average Salary is the average of monthly basic salary compensation awarded to the member during the 18 months immediately preceding termination or retirement.

Normal Retirement Date

A member's Normal Retirement Date shall be the date on which the member has completed at least 25 years of credited service and has attained age 55.

Normal Retirement Benefit

Any member who elects to retire on or after his Normal Retirement Date shall be eligible for a monthly pension equal to 2 percent of Final Average Salary for each year of service for the first 10 years, plus 2.85 percent of Final Average Salary for each year of service in excess of 10 years. The maximum monthly pension is 77 percent of Final Average Salary. The maximum pension is earned upon completing 30 years of service.

Early Retirement Benefit

A member shall be eligible for an Early Retirement Benefit payable on or after the attainment of age 50 and completion of 20 years of service. The Early Retirement Benefit is 2 percent of Final Average Salary for each year of service for the first 10 years, plus 2.85 percent of Final Average Salary for each year of service in excess of 10 years. The maximum monthly pension is 77 percent of Final Average Salary. The Early Retirement Benefit shall be reduced 4.615 percent for each year that the benefit commences before age 55.

Deferred Retirement Benefit

Any member retiring and eligible for a Normal Retirement Benefit may elect to defer receipt of such pension until attaining the age of 65 years. In the case of such an election, the annual deferred retirement pension shall be actuarially equivalent to the normal retirement pension.

Terminated Vested Benefit

A member who terminates with at least 10 years of active service may leave the contributions in the Plan and when the member attains age 55 be eligible to receive a monthly vested benefit equal to 2 percent of Final Average Salary for each year of credited service for the first 10 years, plus 2.85 percent of Final Average Salary for each year of credited service in excess of 10 years. The maximum benefit is 77 percent of Final Average Salary.



Severance Benefit

In lieu of a future pension, a member may upon termination elect to have the accumulated member contributions refunded in a lump sum. Interest is credited at 5 percent per annum.

Death & Disability Benefit of Active Members

Disabled members and survivors (spouse or dependent children) of active members who die prior to retirement eligibility are covered by the benefits provided by the Fire & Police Pension Association Statewide Death & Disability Plan.

Post-Retirement Death Benefit

If a retired member dies, the “qualified surviving spouse” shall receive, until death, a monthly pension equal to 70 percent of the monthly benefit the member was receiving prior to death, including cost-of-living increases. If there is no “qualified surviving spouse” or if the qualified surviving spouse dies, each qualified surviving child should receive equal shares of the qualified surviving spouses benefit, as long as the child remains a “qualified child.” For purposes of this Plan, a spouse includes a partner in a civil union.

Cost-of-Living Adjustment (COLA)

Benefits are increased to reflect increases in the consumer price index but in no case may benefits be increased by more than 3 percent for any one year. Cost-of-living adjustments begin on October 1 immediately prior to the earlier of attainment of age 65 or 10 years after benefit payments commenced.

Deferred Retirement Option Plan (DROP)

A member may elect to participate in the DROP after reaching eligibility for Normal Retirement or the “Rule of 75” with a minimum age of 50 years. This means that a member must attain age 50 and the sum of his or her credited service and age must total 75 or greater at date of severance in order to qualify for the DROP program. A member continues to work while participating in the DROP, but must terminate employment within five years of entry into the DROP. The member's percentage of retirement benefit is frozen at the time of entry into the DROP. The monthly payments that begin at entry into the DROP are accumulated until the member terminates service, at which time the DROP accumulated benefits can be paid as a lump sum, if desired. The member continues contributing the member contribution rate which is credited to the DROP. The member shall self-direct the investments of their DROP funds.



Purchase of Service Credit

Active members of this Plan may purchase service credit for other employment completed within the United States not covered by this Plan. The cost of such service credit purchase shall be determined by the Fire & Police Pension Association Board of Directors and shall be on an actuarially equivalent basis. A member shall not be allowed to purchase service credit to the extent that the additional accrued benefits derived from the purchased service credit would result in the annual amount of the member's benefit exceeding the annual benefit limitation for defined benefit plans as determined under section 415 of the Internal Revenue Code (Ord. 04-107).

Stabilization Reserve Account (SRA)

Annually, at the discretion of the Fire & Police Pension Association Board of Directors, a contribution may be allocated to the SRA based on the actuarial study for the previous year. Amounts set aside in the SRA are allocated to individual accounts for each member. A member may receive the amounts in this individual account upon election of normal, vested, early, disability, deferred retirement, or in the event of the active member's death. If the cost of the defined benefit plan exceeds the combined member/employer contribution rate, funds from the SRA may be used to make up the shortfall. Effective January 1, 2008, the Separate Retirement Account contribution rate for members of the Fire Component was set at 0 percent. The rate will remain at 0 percent for calendar years 2019 and 2020.

There were no changes to the benefit provisions since the prior valuation.



Table 15 – Definition of Terms

1. Actuarial Cost Method

A method for determining the actuarial present value of future benefits and allocating such value to time periods in the form of a normal cost and an actuarial accrued liability.

2. Present Value of Future Benefits

This is computed by projecting the total future benefit cash flow from the Plan, using actuarial assumptions, and then discounting the cash flow to the valuation date.

3. Normal Cost

Computed differently under different actuarial cost methods, the normal cost generally represents the value of the portion of the participant's anticipated retirement, termination, and/or death and disability benefits accrued during a year.

4. Actuarial Accrued Liability

Computed differently under different actuarial cost methods. Generally actuarial accrued liability represents the value of the portion of the participant's anticipated retirement, termination, and/or death and disability benefits accrued as of the valuation date.

5. Entry Age Actuarial Cost Method

A method under which a participant's actuarial present value of future benefits is allocated on a level basis over the earnings of the participant between his/her entry into the Plan and his/her assumed exit.

6. Unfunded Actuarial Accrued Liability

The difference between total actuarial present value of future benefits over the sum of the tangible assets of the Plan and the actuarial present value of the members' future normal costs. The Plan is underfunded if the difference is positive and overfunded if the difference is negative.

7. Actuarial Value of Assets

The value of cash, investments, and other property belonging to the Plan, as valued by the actuary for purposes of the actuarial valuation.



8. Actuarial Gain or Loss

From one valuation to the next, if the experience of the Plan differs from that anticipated by the actuarial assumptions, an actuarial gain or loss occurs. For example, an actuarial gain would occur if the assets in the trust had a yield of 12% based on actuarial value, while the assumed yield on



Table 16 – Supplemental Studies

A. Costs associated with Closing the Plan to New Entrants

1. Amendment

The City of Colorado Springs has agreed to fund the additional funding requirements of closing the New Hire Fire Pension Plan. An actuarial valuation was performed in order to determine the difference between the New Hire Fire Pension Plan as an open and a closed plan. This difference will be funded annually by the City of Colorado Springs. All other costs of the New Hire Fire Pension Plan will continue to be equally shared by the members of the Plan and the City of Colorado Springs, capped at 10%.

The difference between the open and closed plan is the difference in payments on the Unfunded Accrued Liability for a payment assuming a growing payroll vs. a payment with non-increasing payroll.

2. Analysis

Item (1)	Closed Plan (2)	Open Plan (3)	Difference (4)
a. Unfunded Actuarial			
Accrued Liability	\$ 41,328,878	\$ 41,328,878	\$ 0
b. Calculated			
Contribution	70.607%	33.409%	37.198%

3. Comments

The Plan has an underfunded position and this creates a cost associated with closing the Plan. If the Plan reaches a surplus position again in the future due to better than expected experience, then at that time there would be no additional cost to the City.

For 2020, the employee contribution rate is 50% of the determined contribution rate based on an open plan but not more than 10.00%. The employer contribution rate is the remainder of the cost, or 60.607%. Therefore, the total employee/employer contribution rate will be 70.607% (10% + 60.607%).

B. 5-year Deterministic Projection

Because the Plan is closed to new members, the amortization policy was changed to be level dollar effective January 1, 2008. As the payroll for the closed group diminishes, it is expected that the normal cost for the group will decrease over time. The amortization payment decreases over the five-year projection period as the outstanding asset gains of \$3.6 million are recognized.

The following exhibit provides an illustration of how the current valuation would expect the contribution amount to change over the next few valuations if all actuarial assumptions are met.

Year	Amortization Cost		Administrative	Total
	for UAAL	Normal Cost	Expenses	Contribution
2021	\$ 4,132,069	\$ 1,841,322	\$ 74,091	\$ 6,047,482
2022	4,132,686	1,728,066	69,687	5,930,439
2023	4,139,388	1,590,734	64,335	5,794,457
2024	4,145,992	1,419,682	57,666	5,623,340
2025	4,152,221	1,233,386	50,315	5,435,922



Table 17 – Risks Associated with Measuring the Accrued Liability and Actuarially Determined Contribution

The determination of the accrued liability and the actuarially determined contribution requires the use of assumptions regarding future economic and demographic experience. Risk measures, as illustrated in this report, are intended to aid in the understanding of the effects of future experience differing from the assumptions used in the course of the actuarial valuation. Risk measures may also help with illustrating the potential volatility in the accrued liability and the actuarially determined contribution that result from the differences between actual experience and the actuarial assumptions.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions due to changing conditions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period, or additional cost or contribution requirements based on the Plan's funded status); and changes in plan provisions or applicable law. The scope of an actuarial valuation does not include an analysis of the potential range of such future measurements. Examples of risk that may reasonably be anticipated to significantly affect the Plan's future financial condition include:

1. Investment risk – actual investment returns may differ from the expected returns;
2. Asset/Liability mismatch – changes in asset values may not match changes in liabilities, thereby altering the gap between the accrued liability and assets and consequently altering the funded status and contribution requirements;
3. Contribution risk – actual contributions may differ from expected future contributions. For example, actual contributions may not be made in accordance with the Plan's funding policy;
4. Longevity risk – members may live longer or shorter than expected and receive pensions for a period of time other than assumed;

The effects of certain trends in experience can generally be anticipated. For example, if the investment return is less (or more) than the assumed rate, the cost of the Plan can be expected to increase (or decrease). Likewise if longevity is improving (or worsening), increases (or decreases) in cost can be anticipated.

The computed contribution rate shown on page 5 may be considered as a minimum contribution rate that complies with the Plan's funding policy. The timely receipt of the actuarially determined contributions is critical to support the financial health of the Plan. Users of this report should be aware that contributions made at the actuarially determined rate do not necessarily guarantee benefit security.



Plan Maturity Measures

Risks facing a pension plan evolve over time. A young plan with virtually no investments and paying few benefits may experience little investment risk. An older plan with a large number of members in pay status and a significant trust may be much more exposed to investment risk. Generally accepted plan maturity measures include the following:

	<u>January 1, 2020</u>	<u>January 1, 2019</u>
Ratio of actives to retirees and beneficiaries	0.5	0.6
Ratio of net cash flows to market value of assets	-2.8%	-2.5%
Duration of the present value of future benefits	13.2	13.4

Ratio of Actives to Retirees and Beneficiaries

A young plan with many active members and few retirees will have a high ratio of active to retirees. A mature open plan may have close to the same number of actives to retirees resulting in a ratio near 1.0. A super-mature or closed plan may have significantly more retirees than actives resulting in a ratio below 1.0.

Ratio of net Cash Flow to Market Value of Assets

A positive net cash flow means contributions exceed benefits and expenses. A negative cash flow means existing funds are being used to make payments. A certain amount of negative net cash flow is generally expected to occur when benefits are prefunded through a qualified trust. Large negative net cash flows as a percent of assets may indicate a super-mature plan or a need for additional contributions.

Duration of Actuarial Accrued Liability

The duration of the actuarial accrued liability may be used to approximate the sensitivity to a 1% change in the assumed rate of return. For example, duration of 10 indicates that the liability would increase approximately 10% if the assumed rate of return were lowered 1%.

Additional Risk Assessment

Additional risk assessment is outside the scope of the annual actuarial valuation. Additional assessment may include scenario tests, sensitivity tests, stochastic modeling, stress tests, and a comparison of the present value of accrued benefits at low-risk discount rates with the actuarial accrued liability.

