



Actuarial Valuation Report

Educational Employees' Supplementary Retirement System of
Fairfax County

Annual Valuation as of December 31, 2020

Introduction

This report documents the results of the annual actuarial valuation as of December 31, 2020 for the Educational Employees' Supplementary Retirement System of Fairfax County ("ERFC"). The report was prepared at the request of the Executive Director and is intended for use by ERFC and those designated or approved by the Board.

This 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.

The purpose of the valuation was to measure the funding progress of the ERFC plan. It should be noted that future actuarial measurements may differ significantly from the current measurements presented in this report due (but not limited to) to such factors as the following:

- Plan experience differing from that anticipated by the economic or demographic assumptions;
- Changes in actuarial methods or in economic or demographic assumptions;
- 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); and
- Changes in plan provisions or applicable law.

Due to the limited scope of our assignment, 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, and asset information supplied by the ERFC staff as of the valuation date. While we cannot verify the accuracy of all the 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 or completeness of the information and believe that it has produced appropriate results.

The actuarial assumptions and methods used in this valuation are described in the Actuarial Assumptions and Methods section of this report. The Board selected the economic and demographic assumptions and prescribed them for use for purposes of these calculations. Aon provided guidance with respect to these assumptions, and it is our belief that the assumptions represent reasonable expectations of anticipated plan experience. The undersigned are familiar with the near-term and long-term aspects of pension valuations and collectively meet the Qualification Standards of the American Academy of Actuaries necessary to render the actuarial opinions contained herein.

The information provided in this report is dependent upon various factors as documented throughout this report, which may be subject to change. Each section of this report is considered to be an integral part of the actuarial opinions.



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Funding Requirements

Summary

The following table illustrates the unfunded pension liability under the plan's current funding policy, which is restated below.

	Valuation Date December 31, 2019	Valuation Date December 31, 2020
Actuarial (Pension) Liability		
Retired Participants and Beneficiaries Receiving Payment	\$ 1,841,321,939	\$ 1,903,321,336
Terminated Vested Participants	145,542,445	146,922,684
Active Participants	<u>1,481,285,944</u>	<u>1,585,000,290</u>
Total	3,468,150,328	3,635,244,310
Actuarial Value of Assets	<u>(2,582,582,541)</u>	<u>(2,786,297,490)</u>
Unfunded Accrued Liability	\$ 885,567,787	\$ 848,946,820
Funded Ratio		
Actuarial Value of Assets	74.5%	76.6%
Market Value of Assets	75.8%	82.1%
Discount Rate	7.25%	7.25%

Funding Policy

The ERFC Funding Policy, as stated in the ERFC Plan Document is “to establish and receive contributions which will remain approximately level from generation to generation of citizens and which, when combined with other assets and investment return thereon, will be sufficient to pay benefits when due, while providing a reasonable margin for adverse experience.”

For funding purposes, unfunded accrued liabilities are currently being amortized over a closed 30-year period ending on June 30, 2040. The remaining amortization period in the December 31, 2020 valuation is 18 years. Effective with valuations on/after December 31, 2019, unfunded accrued liabilities resulting from benefit and/or assumption changes will be amortized over 10 years (or less).

Contribution Rate

Actuarial funding valuations as of even-numbered years (2016, 2018, 2020, etc.) are used to develop an interim employer contribution rate that is then compared with the employer contribution rate that will be effective in July of the year following the valuation (2017, 2019, 2021, etc.) to ensure that the rate previously determined and adopted by ERFC remains appropriate for the plan based on the most recent plan experience.

Actuarial funding valuations as of odd-numbered years (2017, 2019, 2021, etc.) are used to develop the appropriate employer contribution rate for the two-year period beginning 18 months after the valuation date. As such, the results from the December 31, 2019 valuation were used to set the employer contribution rate of 6.70% for the period July 1, 2021 to June 30, 2023.

The results from each annual actuarial valuation are also used to develop the financial reporting results required under the Governmental Accounting Standards Board (GASB) Statements, in accordance with parameters specified by the GASB for the fiscal year ending June 30 following the valuation date.

Contribution Rate Percentage for Unfunded Accrued Liabilities

The employer contribution rate includes a charge intended to pay for the unfunded accrued liabilities. This charge is developed by projecting the unfunded liabilities from the valuation date to the beginning of the fiscal year in which the contributions will begin, and then amortizing this result over a set period as a level percent of the projected payroll.

For funding purposes, unfunded accrued liabilities are currently being amortized over a closed 30-year period ending on June 30, 2040. The remaining amortization period in the December 31, 2020 valuation is 18 years. Effective with valuations on/after December 31, 2019, unfunded accrued liabilities resulting from benefit and/or assumption changes will be amortized over 10 years (or less).

The following table illustrates the development of the charge for the current unfunded accrued actuarial liabilities. If ERFC contributes this amount and actual plan experience is equal to assumed, the plan would be expected to become fully funded on the funding basis within 18 years, and to have a lower ongoing contribution requirement in subsequent years.

	Valuation Date December 31, 2020
1. Unfunded Accrued Liability (UAL)	\$ 848,946,820
2. Expected Contribution	
a. January 1 – June 30, 2021	25,814,770
b. July 1, 2021 – June 30, 2022	52,233,094
3. Interest	<u>89,756,018</u>
4. UAL at June 30, 2022 (1 – 2a – 2b + 3) ¹	\$ 860,654,974
5. Projected Payroll for FY2023	1,741,103,121
6. Amortization Factor (18 years/10 years) ²	12.54609
7. Contribution rate for UAL (4 ÷ 5 ÷ 6)	3.94%

¹ Net UAL amount consisting of: (1) Ongoing UAL of \$877,656,000, amortized over 18-year using a factor of 12.41317; and (2) UAL gain of (\$17,001,026) due to assumption changes to be amortized over 10-year using a factor of 8.04772.

² Aggregate factor; see footnote 1 for details.

Computed Employer Contribution Rate

The following table illustrates the development of the employer contribution rate based on the current financial results of the plan and are shown for illustrative purposes. The actual employer contribution rate that will be effective in July 2021 was developed based on the results of the December 31, 2019 valuation.

Valuation Date	December 31, 2019	December 31, 2020
Contribution Rate as a Percent of Member Payroll for period ending June 30	2022 & 2023	N/A
Normal Cost (Current Cost) split by:		
Service Retirement	3.96%	3.53%
Reduced Service Retirement	0.10%	0.11%
Casualty Benefits	0.10%	0.05%
Separation Benefits	1.33%	1.53%
Administrative Expenses	<u>0.27%</u>	<u>0.26%</u>
Total	5.76%	5.48%
Less Member Contribution Rate	<u>(3.00)%</u>	<u>(3.00)%</u>
Employer Normal Cost	2.76%	2.48%
Add Contribution Rate for Unfunded Accrued Liability	<u>3.99%</u>	<u>3.94%</u>
Net Employer Contribution	6.75%	6.42%
Adjustment for ERFC 2001 Tier 2	<u>(0.05)%</u>	<u>(0.08)%</u>
Actuarially Determined Employer Contribution	<u><u>6.70%</u></u>	<u><u>6.34%</u></u>

Unfunded accrued liability was amortized as a level percent-of-payroll over 18 years in the December 31, 2020 valuation and 19 years in the December 31, 2019 valuation. If this schedule is continued, unfunded liabilities will be fully amortized on June 30, 2040. Effective with valuations on/after December 31, 2019, unfunded accrued liabilities resulting from benefit and/or assumption changes will be amortized over 10 years (or less).

The Funding Policy contribution for the two-year period beginning July 1, 2021 is determined by the December 31, 2019 valuation. The Board adopted a contribution rate of 6.70% of payroll.

Employer Contribution Rate History

Fiscal Year	Valuation Date	Employee Rate	Adopted Employer Rate		ADEC
			Support	Educational	
1991	1989	2.00%	5.08%	5.53%	
1992	1990	2.00%	5.08%	5.53%	
1993	1991	2.00%	5.08%	5.53%	
1994	1992	2.00%	5.08%	5.53%	
1995	1993	2.00%	5.08%	5.53%	
1996	1994	2.00%	5.08%	5.53%	
1997	1995	2.00%	5.58%	6.03%	
1998	1996	2.00%	5.58%	6.03%	
1999	1997	2.00%	5.58%	6.03%	
			Combined July 1, 1999		
2000	1998	2.00%	4.99%		
2001	1999	2.00%	3.69%		
2002	2000	2.00%	3.69%		
2003	2001	2.00%	4.00%		
2004	2002	2.00% / 4.00%	4.29% / 2.53%		
2005	2003	4.00%	3.37%		
2006	2004	4.00%	3.37%		
2007	2004	4.00%	3.37%		
2008	2005	4.00%	3.37%		3.37%
2009	2005	4.00%	3.37%		3.14%
2010	2007	4.00%	3.20%		2.97%
2011	2007	4.00%	4.04%		4.04%
2012	2009	4.00%	4.34%		4.16%
2013	2009	3.00%	5.34%		5.38%
2014	2011	3.00%	5.60%		5.51%
2015	2011	3.00%	5.60%		5.58%
2016	2013	3.00%	5.60%		5.54%
2017	2013	3.00%	5.60%		5.59%
2018	2015	3.00%	6.24%		6.34%
2019	2016	3.00%	6.26%		6.26%
2020	2017	3.00%	6.44%		6.44%
2021	2018	3.00%	6.44%		6.58%
2022	2019	3.00%	6.70%		6.70%
2023	2020	3.00%	TBD		6.34%

Market Value of Assets

Revenues and Expenditure	Plan Year Ending 12/31/2019	Plan Year Ending 12/31/2020
Fair Value of Assets at Beginning of Measurement Period	\$ 2,280,734,191	\$ 2,628,073,659
Revenue:		
Contributions—Employer	101,004,729	104,911,997
Contributions—Employee	47,875,901	49,167,029
Investment Return:		
Interest and Dividends	27,104,534	31,860,661
Net Appreciation	315,167,718	355,117,543
Investment Expense	(15,105,059)	(20,164,006)
Net Securities Lending	490,851	394,622
Real Estate	58,625,219	27,161,261
Miscellaneous	<u>0</u>	<u>0</u>
Total Investment Return	386,283,263	394,370,081
Total Revenue	535,163,893	548,449,107
Expenditures:		
Refunds of Member Contributions	(4,293,441)	(3,113,193)
Retirement Benefits Paid	(178,969,223)	(184,864,095)
Administrative Expenses	<u>(4,561,761)</u>	<u>(4,435,963)</u>
Total Expenditures	(187,824,425)	(192,413,252)
Net Change (Total Revenue less Total Expenditures)	<u>347,339,468</u>	<u>356,035,855</u>
Fair Value of Assets at End of Measurement Period	\$ 2,628,073,659	\$ 2,984,109,514
Receivable Contributions	<u>0</u>	<u>0</u>
Market Value of Assets at End of Measurement Period	<u>\$ 2,628,073,659</u>	<u>\$ 2,984,109,514</u>

Market Value of Assets

Asset Breakdown	Plan Year Ending 12/31/2019	Plan Year Ending 12/31/2020
Invested Assets		
Bonds	\$ 153,069,062	\$ 625,145,090
Stocks	502,005,363	500,587,766
Real Estate	180,870,517	160,917,837
Global Asset Allocation / Better Beta	390,282,081	286,707,073
Hedge Fund of Funds	168,376,982	117,711,528
Private Equity	121,065,696	174,445,074
Commingled Funds	<u>1,078,572,205</u>	<u>1,064,250,202</u>
Total Invested Assets	2,594,241,906	2,929,764,570
Short-term Investments and Cash	173,827,721	185,257,341
Receivables and Pre-Paid Expenses	4,792,130	5,718,578
Other Assets (furniture and equipment)	<u>26,816</u>	<u>19,979</u>
Total Assets	2,772,888,573	3,120,760,468
Liabilities	<u>(144,814,914)</u>	<u>(136,650,954)</u>
Net Assets	<u>2,628,073,659</u>	<u>2,984,109,514</u>

Portfolio Composition at Market Value	Year Ended December 31			
	2019		2020	
	Value	% of Total	Value	% of
Bonds	\$ 153,069,062	5.8 %	\$ 625,145,090	21.0 %
Stocks	502,005,363	19.1 %	500,587,766	16.8 %
Real Estate	180,870,517	6.9 %	160,917,837	5.4 %
Commingled Funds	1,078,572,205	41.0 %	1,064,250,202	35.7 %
Hedge Fund of Funds	168,376,982	6.4 %	117,711,528	3.9 %
Private Equity	121,065,696	4.6 %	174,445,074	5.8 %
Global Asset Allocation / Better Beta	390,282,081	14.9 %	286,707,073	9.6 %
Net Short-Term Investments and Cash	29,012,807	1.1 %	48,606,387	1.6 %
Receivables, Pre-Paid Expenses and Other	4,818,946	0.2 %	5,738,557	0.2 %
Total Assets	\$ 2,628,073,659	100.0 %	\$2,984,109,514	100.0 %

Actuarial Value of Assets

Year Ended December 31:	2020	2021	2022	2023	2024
A. Actuarial Value Beginning of Year	\$2,582,582,541	\$2,984,109,514			
B. Market Value End of Year	2,984,109,514				
C. Market Value Beginning of Year	2,628,073,659				
D. Non-Investment Net Cash Flow	(33,898,263)				
E. Investment Return Assumed Rate:	7.25%				
E1. Market Total: B-C-D	389,934,118				
E2. Amount for Immediate Recognition	186,008,422				
E3. Amount for Phased-in Recognition: E1-E2	203,925,696				
F. Phased-In Recognition of Investment Return:					
F1. Current year: 0.20 x E3	40,785,139				
F2. First Prior Year	40,836,508	40,785,139			
F3. Second Prior Year	(62,122,484)	40,836,508	40,785,139		
F4. Third Prior Year	36,406,910	(62,122,484)	40,836,508	40,785,139	
F5. Fourth Prior year	(4,301,283)	36,406,910	(62,122,484)	40,836,508	40,785,139
F6. Total Phased-In	51,604,790	55,906,075	19,499,163	81,621,647	40,785,139
G. Actuarial Value End of Year:					
G1. Preliminary Actuarial Value End of Year: A+D+E2+F6	2,786,297,490				
G2. Upper Corridor Limit: 125% x B	3,730,136,893				
G3. Lower Corridor Limit: 75% x B	2,238,082,136				
G4. Actuarial Value End of Year	2,786,297,490				
H. Actual/Projected Difference Between Market Value and Actuarial Value	197,812,023				
I. Market Rate of Return: E1 / (C + D/2)	14.93%				
J. Recognized Rate of Return: (E2 + F6) / (A + D/2)	9.26%				
K. Ratio of Actuarial Value to Market Value	93.37%				

The Actuarial Value of Assets recognizes assumed investment return (line E2) fully each year. Differences between actual and assumed investment returns (line E3) are phased-in over a closed 5-year period.

History of Actuarial Value of Assets

Year Ended December 31:	2016	2017	2018	2019
A. Actuarial Value Beginning of Year	\$2,188,037,003	\$2,279,741,119	\$2,398,667,997	\$2,466,004,272
B. Market Value End of Year	2,147,993,665	2,446,214,825	2,280,734,191	2,628,073,659
C. Market Value Beginning of Year	2,063,873,705	2,147,993,665	2,446,214,825	2,280,734,191
D. Non-Investment Net Cash Flow	(51,152,042)	(47,377,200)	(27,765,155)	(34,382,034)
E. Investment Return Assumed Rate:	7.25%	7.25%	7.25%	7.25%
E1. Market Total: B-C-D	135,272,002	345,598,360	(137,715,479)	381,721,502
E2. Amount for Immediate Recognition	156,778,421	163,563,808	172,896,943	177,538,961
E3. Amount for Phased-in Recognition: E1-E2	(21,506,419)	182,034,552	(310,612,422)	204,182,541
F. Phased-in Recognition of Investment Return:				
F1. Current year: 0.20 x E3	(4,301,284)	36,406,910	(62,122,484)	40,836,508
F2. First Prior Year	(37,398,310)	(4,301,284)	36,406,910	(62,122,484)
F3. Second Prior Year	(10,380,347)	(37,398,310)	(4,301,284)	36,406,910
F4. Third Prior Year	18,413,301	(10,380,347)	(37,398,310)	(4,301,284)
F5. Fourth Prior year	19,744,377	18,413,301	(10,380,345)	(37,398,308)
F6. Total Recognized Investment Gain or Loss	(13,922,263)	2,740,270	(77,795,513)	(26,578,658)
G. Actuarial Value End of Year:				
G1. Preliminary Actuarial Value End of Year: A+D+E2+F6	2,279,741,119	2,398,667,997	2,466,004,272	2,582,582,541
G2. Upper Corridor Limit: 125% x B	2,684,992,081	3,057,768,531	2,850,917,739	3,285,092,074
G3. Lower Corridor Limit: 75% x B	1,610,995,249	1,834,661,119	1,710,550,643	1,971,055,244
G4. Actuarial Value End of Year	2,279,741,119	2,398,667,997	2,466,004,272	2,582,582,541
H. Actual/Projected Difference Between Market Value and Actuarial Value	(131,747,454)	47,546,828	(185,270,081)	45,491,118
I. Market Rate of Return: $E1 / (C + D/2)$	6.6%	16.3%	(5.66%)	16.86%
J. Recognized Rate of Return: $(E2 + F6) / (A + D/2)$	5.6%	7.4%	3.99%	6.16%
K. Ratio of Actuarial Value to Market Value	106.1%	98.1%	108.12%	98.27%

Asset and Liabilities

Comparative Statement History

Valuation Date	Active Member Payroll	Computed Liabilities			Actuarial Value of Assets	Unfunded Accrued Liabilities	Funded %
		Retired	Other Members	Total			
(\$ in thousands)							
12/31/2011 ¹	1,246,973	1,401,877	1,069,087	2,470,964	1,866,952	604,012	75.6%
12/31/2012	1,297,537	1,448,291	1,117,837	2,566,128	1,935,292	630,836	75.4%
12/31/2013	1,320,309	1,482,770	1,162,730	2,645,500	2,029,005	616,495	76.7%
12/31/2014	1,340,344	1,510,717	1,223,128	2,733,845	2,123,910	609,935	77.7%
12/31/2015 ¹	1,373,096	1,590,489	1,290,214	2,880,703	2,188,037	692,666	76.0%
12/31/2016 ²	1,436,588	1,668,485	1,364,018	3,032,503	2,279,741	752,762	75.2%
12/31/2017	1,475,449	1,733,431	1,434,510	3,167,941	2,398,668	769,273	75.7%
12/31/2018	1,554,614	1,791,189	1,542,925	3,334,114	2,466,004	868,110	74.0%
12/31/2019	1,632,427	1,841,322	1,626,828	3,468,150	2,582,582	885,568	74.5%
12/31/2020	1,633,458	1,903,321	1,731,923	3,635,244	2,786,297	848,947	76.6%

Expressed as Percent of Active Member Payroll - Comparative Statement History

Valuation Date	Active Member Payroll (\$ thousands)	As Percent of Active Member Payroll		
		Computed Liabilities	Actuarial Value of Assets	Unfunded Liabilities
12/31/2011	1,246,973	198%	150%	48%
12/31/2012	1,297,537	198%	149%	49%
12/31/2013	1,320,309	200%	154%	46%
12/31/2014	1,340,344	204%	158%	46%
12/31/2015	1,373,096	210%	159%	51%
12/31/2016	1,436,588	211%	159%	52%
12/31/2017	1,475,449	215%	163%	52%
12/31/2018	1,554,614	214%	159%	56%
12/31/2019	1,632,427	212%	158%	54%
12/31/2020	1,633,458	223%	171%	52%

¹ After change in benefits or contribution rates.

² After change in benefits or contribution rates and actuarial assumptions or methods.

Summary of Risk Measures Based on Market Value of Assets

Actuarial Valuation Date	Funded Ratio (MVA)	Annuitant Liabilities / AAL	AAL / Payroll	UAAL / Payroll	Market Value of Assets / Payroll
12/31/16	70.83 %	0.55	2.11	0.62	1.50
12/31/17	77.22 %	0.55	2.15	0.49	1.66
12/31/18	68.41 %	0.54	2.14	0.56	1.47
12/31/19	75.78 %	0.53	2.12	0.54	1.61
12/31/20	82.09 %	0.52	2.23	0.52	1.83

Short-term fluctuations in the various Risk Measures noted above will occur due to plan experience, plan changes, and assumption and method changes being different from expected. Long-term expectations are described below:

MVA Funded Ratio: The funded ratio is expected to trend toward 100% by June 30, 2040 under the current amortization basis, which assumes that any currently remaining unfunded amounts will be contributed by that date. Note that beginning with the 2019 valuation, unfunded liabilities arising will be amortized over a 10-year period, which may cause the long term funded status to be something other than 100%.

Annuitant Liabilities / AAL: The ratio of annuitant (retiree) liabilities to total accrued liabilities gives an indication of the maturity of the system. As the ratio increases, cash flow needs increase, and liquidity needs of the portfolio change.

AAL / Payroll: This ratio is expected to grow as the System matures.

UAAL / Payroll: The ratio of the unfunded actuarial accrued liability to payroll is expected to trend toward 0% by June 30, 2040 under the current amortization basis, which assumes that any currently remaining unfunded amounts will be contributed by that date. Note that beginning with the 2019 valuation, unfunded liabilities arising from assumption and/or benefit changes will be amortized over a 10-year period, which may cause the long term funded status to be something other than 100%.

Market Value of Assets / Payroll: As the funded ratio increases, this ratio is expected to converge to the ratio of AAL / Payroll.

Change in Unfunded Accrued Liabilities During the Year

The following table illustrates the change in unfunded accrued liabilities during the year.

	Year Ending 12/31/2019 (\$ millions)	Year Ending 12/31/2020 (\$ millions)
1. Unfunded Accrued Liability (UAL) at Start of Year	\$ 868.1	\$ 885.6
2. Normal Cost	99.4	99.5
3. Member and Employer contributions	148.9	154.1
4. Interest Accrual	<u>61.1</u>	<u>65.8</u>
5. Expected UAL before changes: (1. + 2. - 3. + 4.)	879.7	896.8
6. Change from non-recurring activities, assumptions and/or benefit changes	<u>(34.8)</u>	<u>(15.3)</u>
7. Expected UAL after changes: (5. + 6.)	844.9	881.5
8. Actual UAL at end of year	<u>885.6</u>	<u>848.9</u>
9. Gain/(Loss) (7. - 8.)	\$ (40.7)	\$ 32.6
 Gain (loss) as percent of actuarial accrued liabilities at start of year.	 (1.2)%	 0.9%

Breakdown of Unfunded Liability Gain/Loss

The following table illustrates the breakdown of the unfunded gain/(loss) by source.

(\$ in Millions)	12/31/2019	12/31/2020
Economic Risks		
Pay Increases	\$ (12.0)	\$ (10.5)
Investment Return	(26.5)	51.6
Demographic Risk		
Retirement	(4.1)	1.9
Mortality	(2.4)	(4.3)
Disability	(0.3)	(0.4)
Terminations	6.3	1.9
Data Adjustments and Miscellaneous	<u>(1.7)</u>	<u>(7.6)</u>
Unfunded Accrued Liability Gain/(Loss)	\$ (40.7)	\$ 32.6

Experience Gains and Losses by Risk Area Comparative Statement (\$ in Millions)

Experience Period	Pay Increase	Investment Return	Retirement	Disability & Death-in-Service	Other Separations	Other &	Total Gain (Loss)	
							\$	Percent of Liabilities
1997-1998#	\$ (2.6)	\$ 81.1	\$ 5.9	\$ (0.5)	\$ 6.4	\$ (13.9)	\$ 76.4	6.3 %
1998-1999*	(8.4)	95.4	0.3	(1.0)	6.5	(3.8)	89.0	7.0 %
1999-2000	(17.6)	62.3	3.8	(1.2)	12.9	38.9	99.1	7.4 %
2000-2001	(9.1)	17.6	(0.3)	(1.0)	13.0	(19.5)	0.7	0.0 %
2001-2002	3.0	(50.4)	3.5	(1.1)	2.6	(29.9)	(72.3)	(4.7)%
2002-2003	18.5	(92.5)	11.0	(0.3)	4.0	(23.3)	(82.6)	(4.9)%
2003-2004#@								
2005	(7.1)	1.9	1.0	0.1	0.0	(3.2)	(7.3)	(0.4)%
2006	(4.7)	23.6	2.0	0.0	(0.8)	2.6	22.7	1.1 %
2007	10.0	25.1	1.9	(0.2)	(2.2)	(7.2)	27.4	1.4 %
2008	4.1	(277.5)	5.2	(0.4)	(4.0)	13.5	(259.1)	(11.8)%
2009	45.0	(34.6)	8.8	(0.8)	(10.0)	(11.6)	(3.2)	(0.1)%
2010#	53.1	(16.9)	5.2	0.2	(5.3)	(4.2)	32.1	1.4 %
2011	18.8	(30.6)	5.3	(0.2)	(4.2)	(4.8)	(15.7)	(0.7)%
2012	12.3	(10.8)	4.6	(0.3)	(3.4)	(10.2)	(7.8)	(0.3)%
2013	16.6	7.6	5.7	0.0	2.9	(5.1)	27.7	1.1 %
2014	8.5	(2.8)	5.8	(0.1)	0.6	2.8	14.8	0.6 %
2015#	17.7	(40.2)	5.9	(0.4)	1.0	(12.4)	(28.4)	(1.0)%
2016	(14.2)	(13.9)	5.1	0.2	6.6	(5.6)	(21.8)	(0.8)%
2017	8.8	2.7	3.3	(0.0)	2.6	(19.6)	(2.2)	(0.1)%
2018	(16.1)	(77.7)	(6.0)	(1.8)	4.3	(6.0)	(103.3)	(3.3)%
2019	(12.0)	(26.5)	(4.1)	(2.7)	6.3	(1.7)	(40.7)	(1.2)%
2020#	(10.5)	51.6	1.9	(4.7)	1.9	(7.6)	32.6	0.9%

Experience Study.
 * Updated Gain Formulas.
 @ Gain (Loss) Analysis not performed.
 & Includes post-retirement mortality.

Appendix

Participant Data

The actuarial valuation was based on personnel information from Plan Sponsor records as of December 31, 2020. Following are some of the pertinent characteristics from the personnel data as of that date. Prior year characteristics are also provided for comparison purposes. Both age and service have been determined using years and months as of the valuation date.

	December 31, 2019	December 31, 2020
Active Participants		
Number	22,176	22,360
Average Age	44.3	44.4
Average Service	9.6	9.8
Average Annual Pay	\$73,612	\$73,053
Inactives With Deferred Benefits		
Number	5,240	5,415
Average Current Age	45.1	45.6
Average Monthly Benefit ¹	\$3,644	\$3,732
Inactives Receiving Payment		
Number	12,482	12,842
Average Current Age	72.1	72.5
Average Monthly Benefit	\$14,158	\$14,191
Total Participants		
Number	39,898	40,617

¹ Before adjustment for assumed retirement age and payment form.

Population Statistics – Exhibit 1

ERFC Legacy Members
WOMEN Active Members in December 31, 2020 Valuation
by Attained Age and Years of Service

Age Group	Years of Completed Service at Valuation Date							Totals		Average (\$)
	0-4	5-9	10-14	15-19	20-24	25-29	30 & Up	No.	Salary (\$)	
35-39								185	17,777,254	96,093
40-44		8	23	45	109			568	55,989,846	98,574
45-49	3	22	57	102	338	46		709	68,628,261	96,796
50-54	6	31	48	90	311	191	32	499	44,609,455	89,398
55-59	1	17	29	64	254	96	38			
60	1		2	11	47	21	10	92	7,711,351	83,819
61	1	1	7	13	55	7	7	91	7,652,929	84,098
62		1	3	3	43	15	5	70	5,955,502	85,079
63		1	2	3	43	21	7	77	6,346,599	82,423
64			1	4	56	18	7	86	6,959,520	80,925
65			2	7	30	14	6	59	5,010,880	84,930
66			2	3	31	10	3	49	4,031,425	82,274
67				3	21	1	2	27	2,201,321	81,530
68				5	17	4	5	31	2,666,702	86,023
69	1		1		7	8	4	21	1,621,924	77,234
70				3	9	3	1	16	1,252,889	78,306
71				1	3	1	2	7	610,895	87,271
72			1		5	2	2	10	884,797	88,480
73					4			4	273,560	68,390
74				1		1		2	178,429	89,214
75 & Over					4	3	5	12	961,421	80,118
Totals	13	81	178	358	1,387	462	136	2,615	241,324,959	92,285

While not used in the financial computations the following group averages are computed and shown because of their general interest.

Age (Years)	54.7
Service (Years)	21.8
Annual Pay	\$ 92,285

Population Statistics – Exhibit 3

ERFC 2001 Tier 1 Members
WOMEN Active Members in December 31, 2020 Valuation
by Attained Age and Years of Service

Age Group	Years of Completed Service at Valuation Date							Totals		Average (\$)
	0-4	5-9	10-14	15-19	20-24	25-29	30 & Up	No.	Salary (\$)	
20-24	1							1	27,222	27,222
25-29	334	325						659	40,058,654	60,787
30-34	255	1257	162					1,674	114,391,499	68,334
35-39	144	635	686	177				1,642	127,916,920	77,903
40-44	148	472	387	475				1,482	121,308,129	81,854
45-49	176	476	289	314				1,255	96,928,657	77,234
50-54	153	504	360	296				1,313	96,241,668	73,299
55-59	110	426	389	341				1,266	86,076,882	67,991
60	10	50	68	70				198	13,308,195	67,213
61	7	45	50	84				186	13,446,016	72,290
62	9	38	43	51				141	9,641,208	68,377
63	8	22	50	58				138	9,923,548	71,910
64	2	24	41	38				105	7,161,330	68,203
65	5	16	36	40				97	6,626,253	68,312
66	1	7	23	26				57	3,873,285	67,952
67	1	8	16	22				47	3,005,292	63,942
68	6	4	10	10				30	2,358,908	78,630
69	1	6	5	14				26	1,670,844	64,263
70	3	4	5	12				24	1,679,999	70,000
71	1	2	2	8				13	783,414	60,263
72		2	4	2				8	478,889	59,861
73		2	1	1				4	159,308	39,827
74	1	2	2					5	330,147	66,029
75 & Over				5				5	311,970	62,394
Totals	1,376	4,327	2,629	2,044	0	0	0	10,376	757,708,237	73,025

While not used in the financial computations the following group averages are computed and shown because of their general interest.

Age (Years) 45.1
Service (Years) 10.1
Annual Pay \$ 73,025

Population Statistics – Exhibit 4

ERFC 2001 Tier 1 Members
MEN Active Members in December 31, 2020 Valuation
by Attained Age and Years of Service

Age Group	Years of Completed Service at Valuation Date							Totals		Average (\$)
	0-4	5-9	10-14	15-19	20-24	25-29	30 & Up	No.	Salary (\$)	
20-24	2							2	60,278	30,139
25-29	53	33						86	4,990,569	58,030
30-34	83	259	33					375	25,091,993	66,912
35-39	55	212	194	44				505	38,866,616	76,964
40-44	29	103	135	200				467	41,152,866	88,122
45-49	35	82	85	151				353	31,759,272	89,970
50-54	22	78	64	122				286	25,148,306	87,931
55-59	22	72	50	71				215	18,509,063	86,089
60	5	12	16	15				48	4,186,351	87,216
61	1	9	12	15				37	3,186,519	86,122
62	1	8	11	10				30	2,660,057	88,669
63	3	8	11	8				30	2,655,729	88,524
64	2	8	4	7				21	1,703,849	81,136
65	3	5	4	2				14	838,730	59,909
66	1	7	3	6				17	1,249,901	73,524
67	1	6	3	5				15	1,258,939	83,929
68	1	4	3	4				12	857,314	71,443
69		4		4				8	631,908	78,988
70		2	2	1				5	273,938	54,788
71		1	2					3	163,654	54,551
72		3						3	140,826	46,942
73	1	1						2	112,563	56,281
74		1		1				2	159,982	79,991
75 & Over	1	3		4				8	524,058	65,507
Totals	321	921	632	670	0	0	0	2,544	206,183,282	81,047

While not used in the financial computations the following group averages are computed and shown because of their general interest.

Age (Years) 44.8
Service (Years) 10.8
Annual Pay \$ 81,047

Population Statistics – Exhibit 5

ERFC 2001 Tier 2 Members WOMEN Active Members in December 31, 2020 Valuation by Attained Age and Years of Service

Age Group	Years of Completed Service at Valuation Date							Totals		Average (\$)
	0-4	5-9	10-14	15-19	20-24	25-29	30 & Up	No.	Salary (\$)	
15-19	1							1	21,506	21,506
20-24	524							524	25,915,407	49,457
25-29	1370							1,370	74,255,774	54,201
30-34	658							658	38,320,563	58,238
35-39	524							524	32,582,476	62,180
40-44	543							543	32,910,374	60,608
45-49	520							520	30,011,997	57,715
50-54	438							438	24,834,601	56,700
55-59	246							246	14,026,062	57,017
60	21							21	995,013	47,382
61	28							28	1,581,149	56,470
62	24							24	1,252,275	52,178
63	13							13	725,245	55,788
64	17							17	909,932	53,525
65	6							6	339,895	56,649
66	4							4	175,964	43,991
67	5							5	285,499	57,100
68	4							4	189,426	47,357
69	3							3	177,747	59,249
70										
71										
72										
73	3							3	103,951	34,650
74										
75 & Over	1							1	91,723	91,723
Totals	4,953	0	0	0	0	0	0	4,953	279,706,580	56,472

While not used in the financial computations the following group averages are computed and shown because of their general interest.

Age (Years) 37.1
 Service (Years) 1.8
 Annual Pay \$ 56,472

Population Statistics – Exhibit 7

ALL Active Members in December 31, 2020 Valuation by Attained Age and Years of Service

Age Group	Years of Completed Service at Valuation Date							Totals		Average (\$)
	0-4	5-9	10-14	15-19	20-24	25-29	30 & Up	No.	Salary (\$)	
15-19	2							2	50,607	25,303
20-24	612							612	29,672,998	48,485
25-29	2025	358						2,383	133,152,137	55,876
30-34	1185	1516	195					2,896	189,077,780	65,289
35-39	852	847	880	221	1			2,801	207,966,798	74,247
40-44	843	583	545	728	147			2,846	226,992,562	79,758
45-49	821	583	433	578	481	69		2,965	240,445,153	81,094
50-54	694	615	472	523	456	296	43	3,099	249,863,362	80,627
55-59	452	515	472	483	339	147	48	2,456	183,900,709	74,878
60	46	62	86	97	65	28	13	397	29,586,961	74,526
61	46	55	69	113	65	14	8	370	28,321,681	76,545
62	44	47	57	66	52	19	6	291	21,668,524	74,462
63	29	31	64	69	53	21	9	276	21,330,800	77,286
64	28	32	46	50	62	19	8	245	18,011,889	73,518
65	19	21	42	50	39	15	9	195	14,577,985	74,759
66	6	14	28	35	32	11	5	131	9,805,292	74,850
67	9	15	19	30	21	1	2	97	6,990,306	72,065
68	13	8	13	19	20	4	7	84	6,653,225	79,205
69	5	10	6	18	7	9	4	59	4,201,727	71,216
70	4	6	7	16	10	3	3	49	3,566,000	72,776
71	1	3	4	9	4	1	2	24	1,654,347	68,931
72		5	5	3	5	2	2	22	1,608,782	73,126
73	5	4	1	1	5			16	890,477	55,655
74	1	3	2	2	2	2		12	981,754	81,813
75 & Over	2	3		9	7	4	7	32	2,485,949	77,686
Totals	7,744	5,336	3,446	3,120	1,873	665	176	22,360	1,633,457,804	73,053

While not used in the financial computations the following group averages are computed and shown because of their general interest.

	ERFC Legacy	ERFC 2001 Tier 1	ERFC 2001 Tier 2	Total
Age (Years):	54.5	45	37.3	44.4
Service (Years)	22.2	10.2	1.8	9.8
Annual Pay	\$ 95,039	\$ 74,605	\$ 57,307	\$ 73,053

Population Statistics – Exhibit 8

**Active Members by Years of Service
December 31, 2020**

Service Years	Number of Members			Annual Pay (\$)	
	Males	Females	Total	Salary (\$)	Average (\$)
0	306	1325	1,631	90,612,656	55,557
1	297	1414	1,711	95,333,292	55,718
2	289	1326	1,615	94,763,304	58,677
3	234	1146	1,380	83,196,311	60,287
4	276	1131	1,407	88,396,504	62,826
5	230	1101	1,331	86,307,919	64,844
6	175	773	948	63,866,202	67,369
7	168	918	1,086	75,209,549	69,254
8	180	829	1,009	73,339,603	72,685
9	175	787	962	71,333,624	74,151
10	137	601	738	55,684,099	75,453
11	90	487	577	44,136,863	76,494
12	127	546	673	54,276,956	80,649
13	139	589	728	57,864,119	79,484
14	146	584	730	59,536,248	81,557
15	169	579	748	62,542,833	83,613
16	166	531	697	60,526,350	86,838
17	130	449	579	52,838,078	91,257
18	124	373	497	44,533,943	89,606
19	129	470	599	55,602,633	92,826
20	134	392	526	48,517,449	92,238
21	128	334	462	43,583,603	94,337
22	93	277	370	35,694,144	96,471
23	73	207	280	27,113,533	96,834
24	58	177	235	23,235,501	98,874
25	53	103	156	16,390,579	105,068
26	57	120	177	17,923,190	101,261
27	55	121	176	18,103,500	102,861
28	19	62	81	8,378,555	103,439
29	19	56	75	7,590,021	101,200
30 & Over	40	136	176	17,026,643	96,742
Totals	4,416	17,944	22,360	1,633,457,804	73,053

Population Statistics – Exhibit 9

Persons in Valuation - Comparative Statement Active Members

Valuation Date	Number				Average Pay	Annual Increase In Average Pay		Price Inflation (CPI-U) Last Yr
	ERFC Legacy	ERFC 2001 Tier 1	ERFC 2001 Tier 2	Total		Last Year	Last 5 Years	
2/28/1974	7,429			7,429	\$13,087			
2/28/1975	8,075			8,075	13,693			
2/28/1976	8,609			8,609	15,929			
2/29/1980	8,990			8,990	18,901			
6/30/1983	9,359			9,359	24,104			
6/30/1985	9,596			9,596	26,229			
6/30/1986	10,084			10,084	27,523	4.90%		1.80%
6/30/1987	10,560			10,560	28,887	5.00%		3.70%
6/30/1988	10,727			10,727	31,784	10.00%		4.00%
6/30/1989	11,019			11,019	33,540	5.50%		5.20%
6/30/1990	11,539			11,539	35,702	6.40%	6.40%	4.70%
6/30/1991	12,313			12,313	36,699	2.80%	5.90%	4.70%
6/30/1992	12,308			12,308	36,356	(0.90)%	4.70%	3.10%
6/30/1993	12,330			12,330	36,539	0.50%	2.80%	3.00%
6/30/1994	12,873			12,873	37,365	2.30%	2.20%	2.50%
6/30/1995	13,287			13,287	39,215	5.00%	1.90%	3.00%
6/30/1996	13,110			13,110	40,508	3.30%	2.00%	2.80%
6/30/1997	13,473			13,473	41,098	1.50%	2.50%	2.30%
6/30/1998	13,806			13,806	42,210	2.70%	2.90%	1.70%
6/30/1999	14,449			14,449	43,326	2.60%	3.00%	2.00%
6/30/2000	15,050			15,050	45,112	4.10%	2.80%	3.70%
6/30/2001	15,955			15,955	47,628	5.60%	3.30%	3.20%
6/30/2002	15,363	711		16,074	48,635	2.10%	3.40%	1.10%
6/30/2003	13,934	3,804		17,738	48,850	0.40%	3.00%	2.10%
12/31/2004	11,856	6,864		18,720	52,234	6.90%	3.80%	3.30%
12/31/2005	10,895	8,186		19,081	55,040	5.40%	4.10%	3.40%
12/31/2006	10,065	9,306		19,371	57,396	4.30%	3.80%	2.50%
12/31/2007	9,350	10,249		19,599	59,260	3.20%	4.00%	4.10%
12/31/2008	8,791	10,940		19,731	61,383	3.60%	4.70%	0.10%
12/31/2009	8,417	11,474		19,891	60,736	(1.10)%	3.10%	2.70%
12/31/2010	7,900	12,241		20,141	59,148	(2.60)%	1.40%	1.50%
12/31/2011	7,353	13,623		20,976	59,448	0.50%	0.70%	3.00%
12/31/2012	6,801	14,718		21,519	60,297	1.40%	0.30%	1.70%
12/31/2013	6,221	15,422		21,643	61,004	1.20%	-0.10%	1.50%
12/31/2014	5,754	15,598		21,352	62,774	2.90%	0.70%	0.80%
12/31/2015	5,292	16,293		21,585	63,613	1.30%	1.50%	0.70%
12/31/2016	4,892	16,856		21,748	66,056	3.80%	2.10%	2.10%
12/31/2017	4,488	15,629	1,724	21,841	67,554	2.30%	2.30%	2.10%
12/31/2018	4,115	14,451	3,482	22,048	70,510	4.37%	2.93%	1.90%
12/31/2019	3,761	13,533	4,882	22,176	73,612	4.40%	3.23%	2.30%
12/31/2020	3,408	12,920	6,032	22,360	73,053	-0.76%	2.82%	1.40%

Population Statistics – Exhibit 10

Persons in Valuations - Comparative Statement Retired Lives

Valuation Date	Number	Average Annual Benefit	Total Benefits	Active Member Payroll	Total Benefits as % of Payroll
2/28/1974	-	-	-	\$ 97,221,025	
2/28/1975	195	\$3,463	\$ 675,344	110,571,258	0.61%
2/28/1976	456	3,270	1,491,310	137,131,905	1.09%
2/29/1980	1,012	4,238	4,288,395	169,924,320	2.52%
6/30/1983	1,448	5,136	7,437,571	225,592,433	3.30%
6/30/1985	1,823	6,220	11,339,462	251,691,261	4.51%
6/30/1986	2,047	6,614	13,539,032	277,545,288	4.88%
6/30/1987	2,232	7,007	15,639,820	305,050,734	5.13%
6/30/1988	2,425	7,629	18,502,289	340,945,603	5.43%
6/30/1989	2,679	8,671	23,230,719	369,574,756	6.29%
6/30/1990	2,932	9,354	27,428,027	411,970,032	6.66%
6/30/1991	3,209	10,146	32,559,349	451,872,668	7.21%
6/30/1992	3,311	10,960	36,289,308	447,473,936	8.11%
6/30/1993	3,486	11,307	39,417,339	450,530,273	8.75%
6/30/1994	3,775	11,285	42,600,996	480,995,439	8.86%
6/30/1995	3,927	11,529	45,274,131	521,044,021	8.69%
6/30/1996	4,225	11,843	50,036,473	531,060,397	9.42%
6/30/1997	4,478	11,908	53,322,514	553,709,472	9.63%
6/30/1998	4,773	12,156	58,018,744	582,754,912	9.96%
6/30/1999	5,113	12,383	63,312,850	626,015,364	10.11%
6/30/2000	5,344	13,201	70,548,074	678,937,233	10.39%
6/30/2001	5,766	13,167	75,922,636	759,905,510	9.99%
6/30/2002	6,375	13,645	86,985,606	781,756,005	11.13%
6/30/2003	6,729	14,493	97,522,562	866,501,799	11.25%
12/31/2004	7,430	14,767	110,029,000	977,817,281	11.25%
12/31/2005	7,710	15,077	116,242,812	1,050,216,544	11.07%
12/31/2006	8,029	15,370	123,402,840	1,111,827,576	11.10%
12/31/2007	8,354	15,598	130,307,079	1,161,431,668	11.22%
12/31/2008	8,595	15,631	134,346,260	1,211,140,009	11.09%
12/31/2009	8,772	15,697	137,692,304	1,208,092,606	11.40%
12/31/2010	9,081	15,677	142,366,660	1,191,290,190	11.95%
12/31/2011	9,467	15,707	148,697,364	1,246,973,240	11.92%
12/31/2012	9,788	15,594	152,634,070	1,297,536,507	11.76%
12/31/2013	10,156	15,193	154,304,935	1,320,308,508	11.69%
12/31/2014	10,524	14,893	156,735,926	1,340,343,666	11.69%
12/31/2015	10,937	14,649	160,215,262	1,373,095,719	11.67%
12/31/2016	11,367	14,356	163,189,230	1,436,587,994	11.36%
12/31/2017	11,729	14,308	167,821,309	1,475,449,186	11.37%
12/31/2018	12,101	14,201	171,843,676	1,554,614,462	11.05%
12/31/2019	12,482	14,158	176,679,304	1,632,427,309	10.82%
12/31/2020	12,842	14,191	182,235,043	1,633,457,804	11.16%

	Average					
	All Retirees			2020 Retirees		
	At Retirement		Current Monthly Benefit	At Retirement		Current Monthly Benefit
	Age	Service		Age	Service	
ERFC Legacy	58.9	23.3	1,333.27	61.9	26.5	1,952.20
ERFC 2001 Tier 1	62.7	10.3	467.35	63.3	12.0	551.23

Population Statistics – Exhibit 11

ERFC Legacy
Original Benefit Formulas (Before July 1, 1988)
Retirees and Beneficiaries December 31, 2020
by Type of Benefit Being Paid

Type of Pension Being Paid	No.	Annual Payable For Life	Annual Temporary Supplement	Annual Current Benefits
Age and Service - Normal:				
Straight Life	206	4,791,388		4,791,388
Optional Form	12	287,193		287,193
Age and Service - Early:				
Straight Life	175	2,856,595		2,856,595
Optional Form	13	295,103		295,103
Age and Service Totals	406	8,230,278		8,230,278
Duty Disability				
Straight Life	3	117,885		117,885
Non-Duty Disability				
Straight Life	17	213,666		213,666
Age and Service Survivor				
Beneficiary, Duty Death and Non-Duty Death	29	329,208		329,208
Other Totals	49	660,760		660,760
Total Benefits	455	8,891,038		8,891,038

Population Statistics – Exhibit 12

ERFC Legacy
Benefit Formulas Effective July 1, 1988
Retirees and Beneficiaries December 31, 2020
by Type of Benefit Being Paid

Type of Pension Being Paid	No.	Annual Payable For Life	Annual Temporary Supplement	Annual Current Benefits
Age and Service - Normal:				
Straight Life	5335	60,060,038	45,221,405	105,281,443
Optional Form	956	11,271,643	6,991,727	18,263,370
Age and Service - Early:				
Straight Life	3,632	19,375,297	13,669,521	33,044,818
Optional Form	375	2,237,137	1,275,880	3,513,017
Age and Service Totals	10,298	92,944,114	67,158,533	160,102,648
Duty Disability				
Straight Life	14	61,389	0	61,389
Optional Form	1	2,306	0	2,306
Non-Duty Disability				
Straight Life	111	564,988	0	564,988
Optional Form	13	62,091	0	62,091
Age and Service Survivor				
Beneficiary, Duty Death and Non-Duty Death	173	1,431,201	186,601	1,617,802
Other Totals	312	2,121,975	186,601	2,308,576
Total Benefits	10,610	95,066,089	67,345,135	162,411,224

Population Statistics – Exhibit 13

**ERFC 2001 Tier 1
Retirees and Beneficiaries December 31, 2020
by Type of Benefit Being Paid**

Type of Pension Being Paid	No.	Annual Current Benefits
Age and Service - Normal:		
Straight Life	1384	8,308,933
Optional Form	338	2,087,219
Age and Service - Early:		
Straight Life		0
Optional Form		0
Age and Service Totals	1,722	10,396,153
Duty Disability		
Straight Life		0
Optional Form		0
Non-Duty Disability		
Straight Life		0
Optional Form		0
Age and Service Survivor Beneficiary, Duty Death and Non-Duty Death	28	137,470
Other Totals	28	137,470
Total Benefits	1,750	10,533,623

Population Statistics – Exhibit 14

ERFC Legacy
Original Benefit Formulas (Before July 1, 1988)
Retirees and Beneficiaries December 31, 2020
Current Annual Benefits - Tabulated by Attained Ages

Attained Ages	No.	Annual Amount
67	2	\$18,929
68	1	1,336
69	2	13,179
70	1	19,607
72	2	26,143
74	1	37,870
75	3	58,628
76	2	25,710
77	1	14,747
78	1	10,188
79	4	53,275
80-84	93	1,912,542
85-89	173	4,081,211
90 & Up	169	2,617,674
Total	455	8,891,038

Population Statistics – Exhibit 15

ERFC Legacy
Benefit Formulas Effective July 1, 1988
Retirees and Beneficiaries December 31, 2020
Current Annual Benefits - Tabulated by Attained Ages

Attained Ages	No.	Annual Amount
Under 40	1	\$3,383
40-44	3	11,164
46	1	7,045
49	2	8,648
50	6	163,844
51	6	119,215
52	10	292,679
53	10	443,012
54	24	683,424
55	53	1,504,173
56	90	2,332,426
57	124	3,154,072
58	134	3,821,310
59	137	3,502,083
60	153	4,012,710
61	162	4,569,180
62	234	6,337,389
63	282	7,891,112
64	299	7,882,113
65	363	9,351,757
66	418	4,993,310
67	417	4,412,215
68	493	5,286,655
69	490	5,231,508
70-74	2,973	36,129,527
75-79	2,020	26,788,056
80 & Up	1,732	23,876,333
Total	10,637	162,808,340

Population Statistics – Exhibit 16

ERFC 2001 Tier 1
Retirees and Beneficiaries December 31, 2020
Current Annual Benefits - Tabulated by Attained Ages

Attained Ages	No.	Annual Amount
Under 40	1	\$1,169
40-44	1	3,151
47	1	6,285
50	1	3,939
51	1	9,893
53	1	3,667
54	1	13,747
56	3	11,648
58	1	3,680
59	2	8,390
60	54	323,093
61	83	480,403
62	85	502,013
63	110	723,351
64	119	716,600
65	117	784,842
66	153	1,029,059
67	149	944,796
68	134	796,738
69	122	730,385
70-74	478	2,775,870
70-79	113	569,292
80 & Up	20	90,987
Total	1,750	10,532,997

Population Statistics – Exhibit 17

ERFC Legacy
Original Benefit Formulas (Before July 1, 1988)
Inactive Vested Members December 31, 2020
Annual Deferred Benefits – Tabulated by Attained Ages

Attained Ages	No.	Annual Amount
59	0	\$0
60	0	0
61	0	0
62	0	0
63	0	0
64	0	0
65 & Up	0	0
Total	0	0

* In addition, there are 13 members whose accumulated contributions exceed the present value of their estimated future benefits. Liabilities for these members were set equal to their accumulated contributions.

Population Statistics – Exhibit 18

ERFC Legacy
Benefit Formulas Effective July 1, 1988
Inactive Vested Members December 31, 2020
Annual Deferred Benefits – Tabulated by Attained Ages

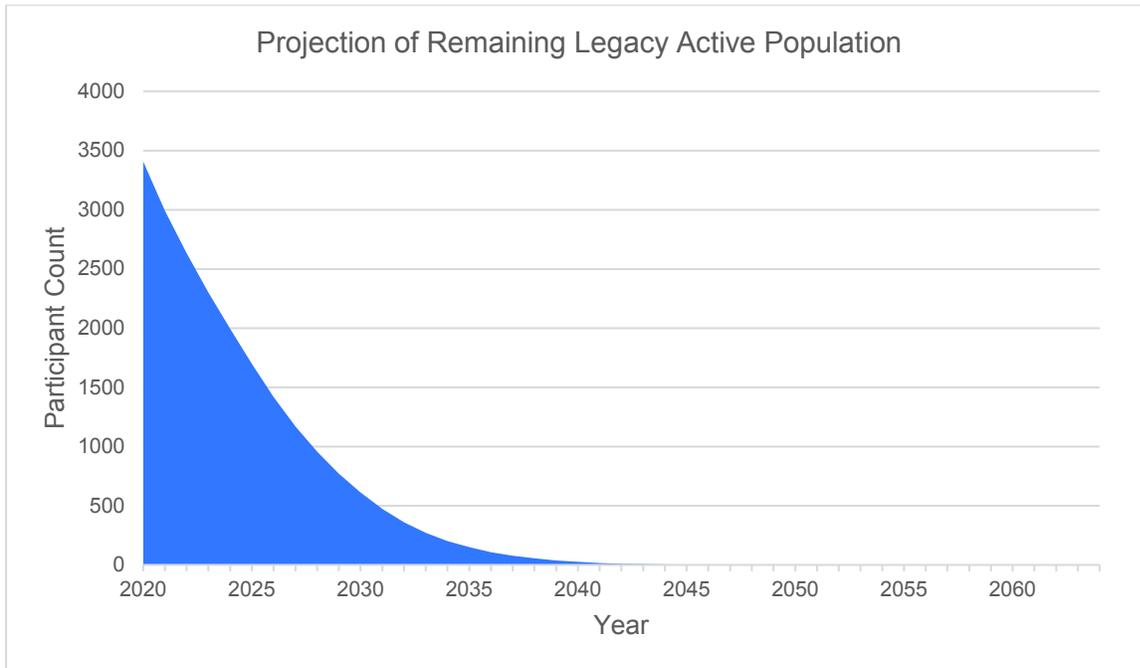
Attained Ages	No.	Annual Amount
41	2	10,329
42	37	134,745
43	54	157,889
44	67	174,866
45	65	168,788
46	97	239,230
47	93	281,376
48	95	269,498
49	115	379,788
50	113	334,322
51	103	329,857
52	94	349,941
53	92	287,623
54	85	359,013
55	63	197,142
56	43	116,738
57	40	179,485
58	34	128,859
59	31	153,673
60	30	139,707
61	29	157,229
62	19	83,915
63	27	107,266
64	19	103,347
65 & Up	63	178,101
Total	1,510	5,022,727

Population Statistics – Exhibit 19

ERFC 2001 Tier 1
Inactive Vested Members December 31, 2020
Annual Deferred Benefits – Tabulated by Attained Ages

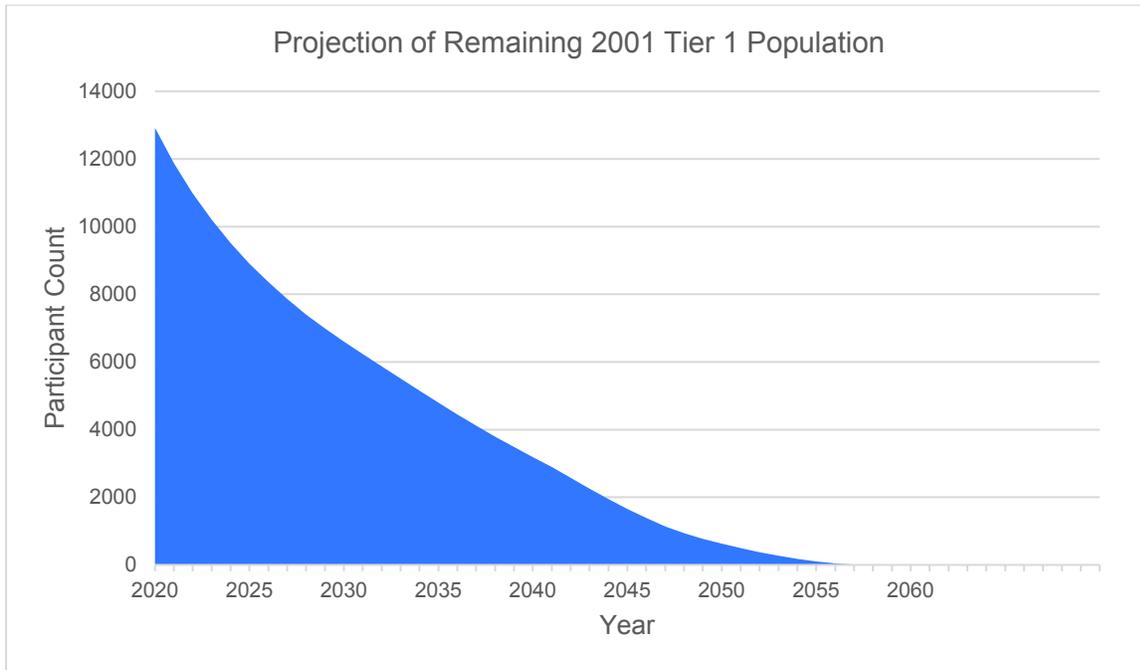
Attained Ages	No.	Annual Amount
27	4	\$8,895
28	12	25,186
29	34	87,643
30	74	198,665
31	111	311,006
32	132	378,545
33	156	470,523
34	172	534,684
35	168	559,388
36	189	677,358
37	212	793,564
38	214	805,105
39	250	963,375
40	244	1,027,896
41	237	977,723
42	189	758,092
43	135	551,941
44	114	499,742
45	106	457,096
46	85	398,670
47	79	349,637
48	64	294,360
49	84	360,106
50	59	244,245
51	58	273,976
52	59	257,410
53	62	315,762
54	55	221,445
55	59	315,996
56	69	302,649
57	75	356,780
58	92	392,599
59	100	446,107
60	48	160,068
61	20	86,735
62	20	85,711
63	14	58,419
64	12	47,734
65 & Up	25	123,571
Total	3,892	15,178,410

Expected Development of ERFC Legacy Present Population December 31, 2020



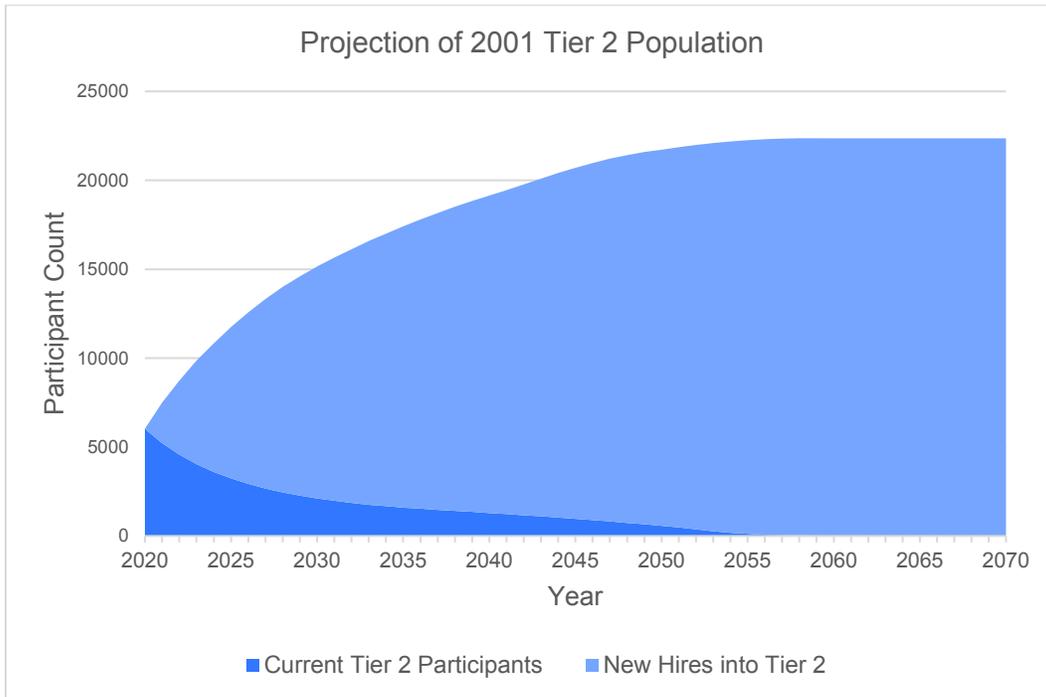
ERFC Legacy is a closed group that presently covers 3,408 active members. Approximately 99% of the present population is expected to receive monthly retirement benefits either by retiring directly from active service, or by separating from service without withdrawing contributions. Within 5 years, over half of the current membership will have left the group.

Expected Development of ERFC 2001 Tier 1 December 31, 2020



ERFC 2001 Tier 1 is a closed group that presently covers 12,920 active members. Within 11 years, over half of the current membership will have left the group.

Expected Development of ERFC 2001 Tier 2 December 31, 2020



The chart above shows the expected future development of the ERFC 2001 Tier 2 population assuming that new hires replace participants that exit the plan so as to maintain the total current active population at the December 31, 2020 level. The projection of the current ERFC Tier 2 population of 6,032 participants is shown separately from future new hires.

Actuarial Assumptions and Methods

Investment Return Rate	7.25%
Salary Increases	See Table 1
General Inflation	2.75%
Benefit and Compensation Limits	The IRC section 415 benefit limit, the IRC section 401(a)(17) compensation limit, and Social Security TWB have been projected at 2.50% per year.
Retirement Age	
Active Participants	See Table II
Terminated Vested Participants	
Members Hired After July 1, 1988 but Before July 1, 2001:	50% at age 55, 25% at age 60 and 25% at age 65.
Members Hired After July 1, 2001:	Age 60.
Mortality Rates	
Healthy and Disabled	The mortality table used to measure retired life mortality was 102% of the male rates and 99% of the female rates of the PUB-2010 Teachers table projected generationally with Scale MP-2020. The corresponding Disabled and Employee tables were used for disability and pre-retirement mortality, respectively.
Withdrawal Rates	See Table III
Disability Rates	See Table IV
Pay Increase Timing:	Nine months after the valuation date (October 1st).
Decrement Timing	Middle of year decrements, with 100% retirement occurring at beginning of year.
Surviving Spouse Benefit/Marriage Assumption	It is assumed that 80% of males and 80% of females have an eligible spouse for purposes of death-in-service benefits, and that males are 3 years older than their spouse.
Eligibility testing	Eligibility for benefits is determined based upon the age nearest birthday and service nearest whole year on the date the decrement is assumed to occur.
Administrative Expenses	Actual administrative expenses during the measurement period are recognized in expense.

COLA Adjustment	<p>Members hired prior to July 1, 2017: 3% (actual COLA).</p> <p>Members hired on/after July 1, 2017: 2.25% (long-term estimate of provision of 100% of CPI-U capped at 4%).</p>
Actuarial Value of Assets	<p>The actuarial value of assets is determined by adjusting the fair value of plan assets as of December 31 each year to reflect investment gains and losses during each of the last 5 years at 20% per year. The resulting value is required to be within 75% and 125% of the market value of assets as of the same date.</p>
Incidence of Contributions	<p>Contributions are assumed to be received continuously throughout the year based upon the computed percent of payroll shown in this report, and the actual payroll payable at the time contributions are made.</p>
Amortization Basis for Funding	<p>For funding purposes, unfunded accrued liabilities are currently being amortized over a closed 30-year period ending on June 30, 2040. The remaining amortization period in the December 31, 2020 valuation is 18 years. Effective with valuations on/after December 31, 2019, unfunded accrued liabilities resulting from benefit and/or assumption changes will be amortized over 10 years (or less).</p>
Actuarial Equivalence Factors (as of the date of this report):	<p>The interest rate is 7.25% for the Option D form of payment. For Small Pension payouts the interest rate is the lesser of 7.25% or the rate for 20-year Treasury Notes raised to the next highest integer, as of the December 1st preceding the Calendar year of retirement. Mortality is based upon a 20% unisex blend of the RP-2014 Total Data Set Healthy Annuitant Mortality Table.</p>

Form of Benefit	<p>Single Life Annuity: 80%</p> <p>Joint & 50% Survivor Annuity: 5%</p> <p>Joint & 100% Survivor Annuity: 15%</p>
Adjustments	<p>For members hired prior to July 1, 2001 computed liabilities and normal costs are increased by 3.25% to reflect service credit for unused sick leave that may be granted at retirement. Computed liabilities and normal costs for Normal and Early retirement are reduced by 0.5% to reflect a “negative subsidy” in the Plan Document option factors. Computed liabilities for retirees that elected optional forms of benefit (with beneficiaries) are increased by 1.81% to reflect the pop-up provision.</p> <p>To account for administrative expenses, 0.26% of pay was added to the otherwise computed normal cost. This amount will be adjusted each year based on actual administrative expenses during the year and pay as of the valuation date.</p> <p>For terminated vested records past social security age with no commencement age provided, immediate commencement is assumed. No other adjustments for missing or incomplete data are made; all data issues are fully resolved before commencing the valuation.</p>
Actuarial Cost Method	Entry Age Normal cost method
Discount Rate Method	Equal to the Expected Return on Assets
Measurement Date	December 31, 2020
Measurement Period	December 31, 2019 to December 31, 2020
Valuation Date	December 31, 2020
Census Data	As of December 31, 2019, and December 31, 2020.

Changes in Funding Methods/Assumptions Since the Prior Year

Method Changes

There have been no method changes in the funding valuation since the prior year.

Assumption Changes

The assumptions used in the funding valuation are based on an experience study conducted by Aon in 2020. The revised assumptions were approved by the Board of Trustees at the December 11, 2020 meeting.

The funding valuation reflects the following assumption changes:

- A change in the mortality assumption from the 90% of the male rates and 79% of the female rates of the RP-2014 mortality Total Data Set Healthy Annuitant Mortality tables, adjusted for mortality improvement back to the base year of 2006 to the 102% male rates and 99% female rates of the PUB-2010 Teachers table projected generationally with Scale MP-2020.
- A change in the active retirement rates.
- A change in the salary increases.
- A change in the withdrawal Rates.
- A change in the optional payment form election to reflect joint and survivor elections.
- A change in the marriage assumption from 100% to 80%.
- A change in the terminated vested retirement age assumption from age 59 to 50% at age 55, 25% at age 60 and 25% at age 65 which applies to members hired After July 1, 1988 but before July 1, 2001.
- A change in the COLA Adjustment from 2.59% to 2.25% which applies to members hired on or after July 1, 2017.

Actuarial Assumptions and Methods

Table I

Salary Increase Assumption

Pay Increase Assumption

Service Index	Merit & Seniority	Base (Economy)	Increase Next Year
0-1	4.50%	2.75%	7.25%
1-2	4.00%	2.75%	6.75%
2-3	4.00%	2.75%	6.75%
3-4	4.00%	2.75%	6.75%
4-5	4.00%	2.75%	6.75%
5-6	4.00%	2.75%	6.75%
6-7	4.00%	2.75%	6.75%
7-8	3.50%	2.75%	6.25%
8-9	3.50%	2.75%	6.25%
9-10	3.50%	2.75%	6.25%
10-11	3.00%	2.75%	5.75%
11-12	3.00%	2.75%	5.75%
12-13	2.50%	2.75%	5.25%
13-14	2.50%	2.75%	5.25%
14-15	2.00%	2.75%	4.75%
15-16	2.00%	2.75%	4.75%
16-17	1.50%	2.75%	4.25%
17-18	1.50%	2.75%	4.25%
18-19	1.50%	2.75%	4.25%
19-20	1.00%	2.75%	3.75%
20-21	1.00%	2.75%	3.75%
21-22	0.50%	2.75%	3.25%
22-23	0.50%	2.75%	3.25%
23-24	0.50%	2.75%	3.25%
24-25	0.50%	2.75%	3.25%
25+	0.00%	2.75%	2.75%

Table II
Retirement Rates

Ages	ERFC (Hired Before 7/1/2001) Type of Retirement		ERFC 2001 Tier 1 (Hired 7/1/2001-6/30/2017)			ERFC 2001 Tier 2 (Hired On/After 7/1/2017) Age Based	
	Age Based	25+ years of service	Age Based	Service	Service Based	Rule of 90 Met?	
						Yes	No
45		2.0%					
46		2.0%					
47		2.0%					
48		2.0%					
49		2.0%					
50		2.0%					
51		2.0%					
52		7.0%					
53		7.0%					
54		15.0%					
55	12.5%	40.0%		30	17.5%		
56	12.5%	25.0%		31	17.5%	35.0%	0.0%
57	12.5%	25.0%		32	12.5%	35.0%	0.0%
58	12.5%	15.0%		33	12.5%	35.0%	0.0%
59	12.5%	25.0%		34	12.5%	35.0%	0.0%
60	12.5%	25.0%	10.0%	35	10.0%	35.0%*	0.0%
61	17.5%	20.0%	10.0%	36	10.0%	35.0%	0.0%
62	20.0%	30.0%	10.0%	37	10.0%	35.0%	0.0%
63	20.0%	25.0%	15.0%	38	25.0%	35.0%	0.0%
64	25.0%	25.0%	15.0%	39	40.0%	35.0%	0.0%
65	40.0%	35.0%	25.0%	40 & Up	100.0%	35.0%	0.0%
66	40.0%	45.0%	30.0%			35.0%	0.0%
67	35.0%	35.0%	25.0%			35.0%	30.0%
68	30.0%	35.0%	20.0%			35.0%	15.0%
69	30.0%	35.0%	20.0%			35.0%	15.0%
70	40.0%	35.0%	45.0%			35.0%	15.0%
71	25.0%	35.0%	30.0%			35.0%	15.0%
72	35.0%	35.0%	30.0%			35.0%	15.0%
73	35.0%	35.0%	30.0%			35.0%	15.0%
74	35.0%	35.0%	30.0%			35.0%	15.0%
75 & Over	100.0%	100.0%	100.0%			100.0%	100.0%

* The probability is 60% at age 60 for people who first meet the Rule of 90 at age 60.

The age column index does not apply to the service based retirements. In ERFC 2001 Tier 1, an individual can retire at 30 years of service regardless of age. In ERFC 2001 Tier 2, an individual would be able to retire at FSSA with 5 years of service or when the sum of age and service is greater than or equal to 90. FSSA is assumed to be age 67 for members hired on/after July 1, 2017

Table III
Withdrawal Rates

Service	% of Active Participants Withdrawing	
	Males	Females
0 - 1	17%	16%
1 - 2	12%	14%
2 - 3	12%	13%
3 - 4	11%	12%
4 - 5	11%	12%
5 - 6	9%	11%
6 - 7	7%	10%
7 - 8	7%	10%
8 - 9	7%	8%
9 - 10	6%	8%
10 - 11	5%	7%
11 - 12	4%	7%
12 - 13	4%	6%
13 - 14	3%	5%
14 - 15	3%	5%
15 - 16	3%	4%
16 - 17	2%	3%
17 - 18	2%	2%
18 - 19	2%	2%
19 - 20	2%	2%
20 - 21	2%	2%
21 - 22	2%	2%
22 - 23	2%	2%
23 - 24	2%	2%
24 - 25	2%	2%

In addition, forfeiture occurs when a vested person separates from service and withdraws contributions thereby forfeiting future rights to an employer financed benefit. The total probability of forfeiture is obtained by multiplying the probability of withdrawal above by 10%. Forfeiture rates do not apply to individuals who are eligible for retirement at time of termination.

Table IV
Sample Rates of Separation From Active Employment

Ages	Disability			
	Ordinary		Duty	
	Men	Women	Men	Women
20	0.0117%	0.0048%	0.0029%	0.0012%
21	0.0117%	0.0048%	0.0029%	0.0012%
22	0.0117%	0.0048%	0.0029%	0.0012%
23	0.0142%	0.0074%	0.0036%	0.0018%
24	0.0149%	0.0081%	0.0037%	0.0020%
25	0.0146%	0.0082%	0.0036%	0.0020%
26	0.0142%	0.0082%	0.0035%	0.0021%
27	0.0140%	0.0086%	0.0035%	0.0022%
28	0.0142%	0.0094%	0.0036%	0.0024%
29	0.0149%	0.0106%	0.0037%	0.0027%
30	0.0158%	0.0122%	0.0040%	0.0031%
31	0.0171%	0.0140%	0.0043%	0.0035%
32	0.0186%	0.0158%	0.0046%	0.0040%
33	0.0202%	0.0178%	0.0050%	0.0044%
34	0.0218%	0.0196%	0.0054%	0.0049%
35	0.0234%	0.0214%	0.0059%	0.0054%
36	0.0252%	0.0232%	0.0063%	0.0058%
37	0.0271%	0.0250%	0.0068%	0.0062%
38	0.0291%	0.0268%	0.0073%	0.0067%
39	0.0314%	0.0287%	0.0078%	0.0072%
40	0.0339%	0.0308%	0.0085%	0.0077%
41	0.0367%	0.0331%	0.0092%	0.0083%
42	0.0399%	0.0357%	0.0100%	0.0089%
43	0.0435%	0.0386%	0.0109%	0.0097%
44	0.0475%	0.0419%	0.0119%	0.0105%
45	0.0520%	0.0456%	0.0130%	0.0114%
46	0.0570%	0.0498%	0.0143%	0.0124%
47	0.0626%	0.0545%	0.0157%	0.0136%
48	0.0689%	0.0598%	0.0172%	0.0149%
49	0.0760%	0.0658%	0.0190%	0.0164%
50	0.0842%	0.0726%	0.0210%	0.0181%
55	0.1469%	0.1228%	0.0367%	0.0307%
60	0.2447%	0.1770%	0.0612%	0.0443%

Actuarial Assumptions and Methods

Discussion of Actuarial Assumptions and Methods

For the funding valuation, ERFC selected the economic and demographic assumptions and prescribed them for use for purposes of compliance with the state's funding regulations. Aon provided guidance with respect to these assumptions, and it is our belief that the assumptions represent reasonable expectations of anticipated plan experience. The actuarial cost and amortization methods are not prescribed by state or local statute.

While the method used to value assets is prescribed by ERFC, Aon provided guidance with respect to the use of this method, and it is our belief that the method is appropriate for funding purposes.

Calculation of Normal Costs and Liabilities

The method used to calculate the normal cost and projected benefit obligation for determining the employer contribution rate is the entry age normal cost method. Under this cost method, the actuarial accrued liability is based on a prorated portion of the present value of all benefits earned to date over the expected future working life time of plan participants. The proration is determined so that the cost with respect to service accrued from date of hire is recognized as a level percentage of pay each year. The Normal Cost is equal to the prorated cost for the year of the valuation.

Normal Costs and projected benefit obligations are determined separately for ERFC Legacy, ERFC Tier 1 and ERFC Tier 2 participants and blended together to produce the results shown in this report. It is expected that over time, the plans Normal Cost will become the Normal Cost for the Tier 2 participants. Unfunded actuarial accrued liabilities are amortized to produce contribution amounts (principal and interest) which are level percent-of-payroll contributions, assuming payroll grows at the rate indicated elsewhere in this report.

Plan Provisions – ERFC Legacy

Eligibility to Participate	ERFC Members Hired After July 1, 1988 but Before July 1, 2001
Contributions	Effective July 1, 2012, members contribute 3% of their salaries. Interest credits are 5% annually through June 30, 2017, and 4% annually thereafter. If a member leaves covered employment before becoming eligible to retire, accumulated contributions are returned upon request. Members who receive a refund of contributions and are later rehired become members of ERFC 2001 Tier 2.
Eligibility for Retirement	
Normal Retirement	A member may retire any time after reaching the service retirement date, which is either (i) age 65 with 5 years of service or (ii) age 55 with 25 years of service
Early Retirement	A member with 25 years of service but younger than age 55 may retire after age 45. A member with less than 25 years of service and younger than age 65 may retire after age 55.
Disability Retirement	An active member with 5 or more years of service who becomes totally and permanently disabled may be retired and receive a disability pension. The 5-year service requirement is waived if the disability is service-connected.
Normal Retirement Benefit	For payment periods during the retired member's lifetime 103% times (i) minus (ii) where: <ul style="list-style-type: none">(i) means 1.85 percent of the FAC multiplied by years of credited service, and(ii) means 1.65 percent of the portion of VRS FAC in excess of \$1,200, multiplied by applicable years of creditable Virginia service; provided if the member is younger than age 65 and if creditable Virginia service is less than 30 years, the result of such multiplication shall be reduced for each month before the earlier of:<ul style="list-style-type: none">(1) attainment of age 65; and(2) the date when 30 years of service would have been completed.

The reduction shall be one-half of 1% for each of the first 60 months and four-tenths of one percent for each month beyond 60 months, if any.

For payment periods, if any, before the age the member becomes eligible for full Social Security benefits, an additional temporary benefit equals to 103% times 1.00 percent of the FAC multiplied by years of credited service.

Early Retirement Benefit

Accrued benefit to early retirement date payable at normal retirement date reduced according to the following schedule:

After 25 years of service: Service Retirement amount reduced to reflect retirement age younger than age 55.

After 5 years of service, but before 25 years of service: For payment periods during the retired member's lifetime, the Service Retirement amount payable at age 65 reduced to reflect retirement age younger than age 65. For payment periods before the age the member becomes eligible for full Social Security benefits, an additional temporary benefit equal to the Service Retirement temporary benefit reduced to reflect retirement age younger than age 65.

Disability Benefit

The amount is 103% times a lifetime pension equal to 0.25 percent of the FAC multiplied by years of credited service. Credited service shall be increased by the time period from disability retirement to the date when the member would have reached the service retirement date. The minimum pension payable is 2.5 percent of FAC.

Vested Deferred Benefit
Eligibility

An inactive member with 5 or more years of service will be entitled to a pension with payments beginning at age 55, provided she/he does not withdraw accumulated member contributions.

Amount

Calculated in the same manner as early retirement benefits.

Final Average Compensation (FAC)

A member's final average compensation is the average of the 3 highest consecutive years of salary during eligible employment.

Forms of Payment

Normal Form

The assumed normal form of benefit is the straight life form.

Optional Forms

Option A: 100% Joint and Survivor benefit. Benefit is 85% of the straight life amount adjusted for the difference in age between the retiree and beneficiary. The maximum benefit is 94% of the straight life amount.

Option B: 50% Joint and Survivor benefit. Benefit is 91% of the straight life amount adjusted for the difference in age between the retiree and beneficiary. The maximum benefit is 97% of the straight life amount.

Option C: 10 years Certain and Life. Benefit is 96% of the straight life amount.

Option D: Single sum payment not exceeding member's accumulated contribution balance, plus a single life annuity actuarially reduced from the pension amount otherwise payable.

Post-Retirement Increases

The amount of the monthly benefit is adjusted each March 31st, by 3% compounded annually, beginning with the March 31st which is more than three full months after the member's effective retirement date. Pensions of members that retire in the immediately preceding calendar year are increased by 1.489% (one-half a year's increase).

Spouse's Preretirement Death Benefit

Statutory Death Benefits

Eligibility

An active member with 5 or more years of service who dies will have benefits payable to the surviving spouse or other eligible beneficiary. The 5-year service requirement is waived if the death is service-connected.

Amount

If the member is eligible for a service or reduced service retirement then an eligible named beneficiary will receive such benefits reduced based upon an Option A (in the case of a spouse or an ex-spouse subject to a DRO) or Option B (in case of another eligible beneficiary) election. If not, the eligible named beneficiary will receive an amount equal to 103% times a lifetime pension equal of 0.25% of the FAC multiplied by years of credited service, and also reduced in connection with an Option A or Option B election. Credited service shall be increased by the time period from the date of death to the date when the member would have reached service retirement with a minimum of 10 years of service used, provided the death was service-connected. If a named beneficiary is not eligible for either of these types of benefits, the named beneficiary will receive a refund of the member's accumulated contributions.

Alternative Benefits Available to Members with Some Service Before July 1, 1988

Service Retirement: Alternate Amount
After Full Social Security Age

A member with service before 7/1/1988 may elect, at time of retirement, to receive an alternate benefit amount for payment periods after full Social Security age. The Alternative Guarantee amount is the amount that would have been received after the individual reached eligibility for full Social Security benefits under the Old Plan (pre – July 1, 1988) formulas. The amount is 103% of the total of:

- (i) the amount payable under June 30, 1987 benefit provisions,
- (ii) plus, if the retiring member is younger than full Social Security age and if creditable Virginia service is less than 30 years, 1.65 percent of VRS average final compensation in excess of \$1,200, multiplied by years of creditable Virginia service, and further multiplied by a certain percent based upon the number of months that retirement occurs before reaching the earlier of the above two conditions; such percent is one half of one percent for each of the first 60 such months and four-tenths of one percent for each of the next 60 such months, if any.

Reduced Service Retirement: Alternate
Amount with 25 Years or more Years of
Service

By election at time of retirement, such a member may elect to receive 103% of the following combination of benefits:

- (i) To age 55, 2.85 percent of the 3-year average annual salary multiplied by years of credited service, then actuarially reduced to reflect retirement age younger than age 55;
- (ii) From age 55 to 65, the amount to age 55 reduced by: 1.65 percent of the portion of VRS average final compensation in excess of \$1,200, multiplied by applicable years of creditable Virginia service; provided if creditable Virginia service is less than 30 years, the result of such multiplication shall be actuarially reduced for each month before the earlier of (1) attainment of age 65; and (2) the date when 30 years' service would have been completed; and
- (iii) From age 65 for life, the amount payable at age 65 according to June 30, 1987 provisions or the amount payable at age 65 according to July 1, 1988 provisions.

Plan Changes Since the Prior Year

The financial accounting valuation does not reflect any plan changes.

Plan Provisions – ERFC 2001 Tier 1

Eligibility to Participate	Members Hired On/After July 1, 2001 but Before July 1, 2017 (ERFC 2001 Tier 1)
Contributions	Effective July 1, 2012, members contribute 3% of their salaries. Interest credits are 5% annually through June 30, 2017, and 4% annually thereafter. If a member leaves covered employment before becoming eligible to retire, accumulated contributions are returned upon request. Members who receive a refund of contributions and are later rehired become members of ERFC 2001 Tier 2.
Eligibility for Retirement Normal Retirement	A member may retire at age 60 with 5 or more years of credited service, or after 30 years of credited service regardless of age.
Normal Retirement Benefit	The amount is a lifetime pension equal to 0.8% (eight-tenths of one percent) of FAC at retirement multiplied by years of credited service. If necessary, the pension will be increased to make the reserve value of the pension equal to the member's accumulated contributions as of the retirement effective date.
Vested Deferred Benefit Eligibility	Any member with 5 or more years of credited service who terminates employment prior to the service retirement date, will be eligible to receive a deferred vested pension commencing at age 60, provided accumulated contributions are left on deposit with the Plan.
Amount	The amount is a lifetime pension equal to 0.8% (eight-tenths of one percent) of FAC at termination multiplied by years of credited service. If necessary, the pension will be increased to make the reserve value of the pension equal to the member's accumulated contributions as of the effective retirement date
Final Average Compensation (FAC)	A member's Final Average Compensation is the average of the 3 highest years of salary during eligible employment.
Forms of Payment Normal Form	The assumed normal form of benefit is the straight life form.
Optional Forms	Option A: 100% Joint and Survivor benefit. Benefit is 85% of the straight life amount adjusted for the difference in age between the retiree and beneficiary. The maximum benefit is 94% of the straight life amount.

Option B: 50% Joint and Survivor benefit. Benefit is 91% of the straight life amount adjusted for the difference in age between the retiree and beneficiary. The maximum benefit is 97% of the straight life amount.

Option C: 10 years Certain and Life. Benefit is 96% of the straight life amount.

Post-Retirement Increases

The amount of the monthly benefit is adjusted each March 31st, by 3% compounded annually, beginning with the March 31st which is more than three full months after the member's effective retirement date. Pensions of members that retire in the immediately preceding calendar year are increased by 1.489% (one-half a year's increase).

Spouse's Preretirement Death Benefit

Statutory Death Benefits

Eligibility

Any member with 5 or more years of credited service who dies before beginning to receive a pension will have benefits payable to the named beneficiary.

Amount

The amount is a lifetime pension equal to 0.8% (eight-tenths of one percent) of FAC multiplied by years of credited service at the date of death. If necessary, the pension will be increased to make the reserve value of the pension equal to the member's accumulated contributions as of the date of death. The pension will be adjusted in accordance with an Option A (in the case of a spouse or an ex-spouse subject to a DRO) or Option B (in case of another eligible beneficiary) election payable immediately unless the member did not reach the service retirement eligibility prior to death, in which case the pension is reduced for each month that the member was younger than age 60 on the date of death in the following manner:

- a. One-half of 1% for each of the first 60 months and four-tenths of one percent for each month beyond 60 months (the number of months used for reduction is not to exceed the difference between the member's credited service at death and 30 years).

Plan Changes Since the Prior Year

The financial accounting valuation does not reflect any plan changes.

Plan Provisions – ERFC 2001 Tier 2

Eligibility to Participate	Members Hired On/After July 1, 2017 (ERFC 2001 Tier 2)
Contributions	Members contribute 3% of their salaries. Interest credits are 4% annually. If a member leaves covered employment before becoming eligible to retire, accumulated contributions are returned upon request.
Eligibility for Retirement Normal Retirement	A member may retire at Full Social Security Age (FSSA) with 5 or more years of credited service, or when the sum of age plus service is greater than or equal to 90 (i.e., “Rule of 90”).
Normal Retirement Benefit	The amount is a lifetime pension equal to 0.8% (eight-tenths of one percent) of FAC at retirement multiplied by years of credited service. If necessary, the pension will be increased to make the reserve value of the pension equal to the member’s accumulated contributions as of the retirement effective date.
Vested Deferred Benefit Eligibility	Any member with 5 or more years of credited service who terminates employment prior to the service retirement date, will be eligible to receive a deferred vested pension commencing at FSSA, provided accumulated contributions are left on deposit with the Plan.
Amount	The amount is a lifetime pension equal to 0.8% (eight-tenths of one percent) of FAC at termination multiplied by years of credited service. If necessary, the pension will be increased to make the reserve value of the pension equal to the member’s accumulated contributions as of the effective retirement date.
Final Average Compensation (FAC)	A member’s Final Average Compensation is the average of the 5 highest years of salary during eligible employment.
Forms of Payment Normal Form	The assumed normal form of benefit is the straight life form.
Optional Forms	Before the effective retirement date, a retiring member may elect one of the following options: Option A: 100% Joint and Survivor benefit. Benefit is 85% of the straight life amount adjusted for the

difference in age between the retiree and beneficiary. The maximum benefit is 94% of the straight life amount.

Option B: 50% Joint and Survivor benefit. Benefit is 91% of the straight life amount adjusted for the difference in age between the retiree and beneficiary. The maximum benefit is 97% of the straight life amount.

Option C: 10 years Certain and Life. Benefit is 96% of the straight life amount

Post-Retirement Increases

The amount of the monthly benefit is adjusted each March 31st, by 100% of the Consumer Price Index (CPI-U) (with a cap of 4%) compounded annually, beginning with the March 31st which is more than three full months after the member's effective retirement date. Pensions of members that retire in the immediately preceding calendar year are increased by one-half a year's increase.

Spouse's Preretirement Death Benefit Statutory Death Benefits Eligibility

Any member with 5 or more years of credited service who dies before beginning to receive a pension will have benefits payable to the named beneficiary.

Amount

The amount is a lifetime pension equal to 0.8% (eight-tenths of one percent) of FAC multiplied by years of credited service at the date of death. If necessary, the pension will be increased to make the reserve value of the pension equal to the member's accumulated contributions as of the date of death. The pension will be adjusted in accordance with Option A (in the case of a spouse or an ex-spouse subject to a DRO) or Option B (in case of another eligible beneficiary) election payable immediately unless the member did not reach the service retirement eligibility prior to death, in which case the pension is reduced for each month that the member was younger than service retirement eligibility on the date of death in the following manner:

One-half of 1% for each of the first 60 months and four-tenths of one percent for each month beyond 60 months (the number of months used for reduction is based on the lesser of FSSA or the age the member would have attained "Rule of 90").

Plan Changes Since the Prior Year

There were no plan changes during the year.

Sample Benefit Calculations

Sample Benefit Computation for ERFC Legacy Member Retiring After 30 Years of Service

Data:

A.	7/1/1963	Date of Birth
B.	7/1/2018	Effective Date
C.	7/1/1988	Membership Date
D.	30.00	ERFC Credited Service
E.	30.00	VRS Creditable Service
F.	55.00	Age
G.	Service	Retirement Type
H.	\$60,000.00	3-Year Average Salary
I.	\$60,000.00	5-Year Average Salary

The following table illustrates the calculation of the ERFC Monthly benefit

Lifetime Portion of Full Service Benefit

J.	ERFC Legacy Formula Benefit: $1.85\% \times 30 \text{ yrs.} \times \$60,000 =$	\$ 33,300.00
K.	minus VRS Adjustment of: $1.65\% \times 30 \text{ yrs.} \times (\$60,000 - \$1,200) \times 100\% =$ (100% is the VRS Early Service Retirement Reduction Factor for no years prior to the earlier of age 65 or 30 years of service)	<u>29,106.00</u>
L.	Sub Total	4,194.00
M.	plus additional 3% benefit adjustment	<u>125.82</u>
N.	Total of Lifetime Portion	4,319.82

Additional Temporary Benefit until age FSSA (Full Social Security Age)

O.	Temporary Benefit Formula: $1\% \times 30 \text{ yrs.} \times \$60,000 =$	18,000.00
P.	plus additional 3% benefit adjustment	<u>540.00</u>
Q.	Total of Additional Temporary Benefit	18,540.00
R.	Monthly benefit effective 07/01/2017 at age 55 payable until FSSA, $(N + Q)/12 =$	1,904.99
S.	Monthly benefit effective 07/01/2030 at FSSA payable for life, $N/12 =$	359.99

The above computation does not reflect the alternative "guarantee" benefit which this member might elect. Members are eligible for a Lifetime Level Benefit (LLB) that is calculated by determining the annuitized value of the greater of their accumulated contribution balance or the present value of the currently provided benefit.

Sample Benefit Computation for ERFC 2001 Tier 1 Member Retiring After 28 Years of Service

Data:

A.	7/1/1969	Date of Birth
B.	7/1/2029	Effective Date
C.	7/1/2001	Membership Date
D.	28.00	ERFC Credited Service
E.	N/A	VRS Creditable Service
F.	60.00	Age
G.	Service	Retirement Type
H.	\$60,000.00	3-Year Average Salary

The following table illustrates the calculation of the ERFC Monthly benefit

Lifetime Portion of Full Service Benefit

ERFC 2001 Tier 1 Formula Benefit: $0.80\% \times 28 \text{ yrs.} \times \$60,000/12 =$	\$1,120.00
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Sample Benefit Computation for ERFC 2001 Tier 2 Member Retiring After 30 Years of Service

Data:

A.	7/1/1985	Date of Birth
B.	7/1/2047	Effective Date
C.	7/1/2017	Membership Date
D.	30.00	ERFC Credited Service
E.	N/A	VRS Creditable Service
F.	62.00	Age
G.	Service	Retirement Type
H.	\$65,000.00	5-Year Average Salary

The following table illustrates the calculation of the ERFC Monthly benefit

Lifetime Portion of Full Service Benefit

ERFC 2001 Tier 2 Formula Benefit: $0.80\% \times 30 \text{ yrs.} \times \$65,000/12 =$	\$1,300.00
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ERFC Regulations – Funding Policy and Employer Contribution Rate

Adopted: March 21, 2006
Amended: May 28, 2009
Amended: May 17, 2012
Amended: June 27, 2013
Amended: May 29, 2014

ERFC Regulations – Funding Policy and Employer Contribution Rate

(Applicable to ERFC and ERFC 2001)

Pursuant to their authority under §15.03 of the ERFC Plan Document and §10.03 of the ERFC 2001 Plan Document, the Trustees have adopted the following regulations governing determination of the Employer contribution rate and implementation of the funding policy pursuant to §§3.05 and 16.03 of the ERFC Plan Document and §§3.05 and 11.03 of the ERFC 2001 Plan Document.

16.3 A Purpose of Regulations. The funding policy of the Plan is stated in §16.03 of the ERFC Plan Document and §11.03 of the ERFC 2001 Plan Document. That policy is “to establish and receive contributions which will remain approximately level from generation to generation of citizens and which, when combined with other assets and investment return thereon, will be sufficient to pay benefits when due, while providing a reasonable margin for adverse experience.” Section 3.05 in each Plan Document provides that the employer “shall contribute a percentage of each Member’s Salary, at a rate to be determined by the actuary in accordance with the funding policy set forth in [this Plan Document].” Within the broader context of the stated funding policy, the objectives of the Trustees are:

- (1) To make consistent progress toward 100% funding of the Plan and to maintain 100% funding once it has been attained;
- (2) To stabilize the Employer contribution rate and avoid sharp increases or decreases due to specific events or short-term conditions; and
- (3) To maintain the Plan’s funding in accordance with actuarial standards of practice that apply to public sector plans and with applicable federal, state, and local laws and regulations.

16.03B Frequency of Actuarial Valuations. The actuary shall prepare annual actuarial valuations based upon calendar-year data. Whenever possible, the valuation for a particular year should be presented to the Trustees within the first 120 days of the following calendar year.

16.03C Schedule for Setting the Employer Contribution Rate. The Trustees will determine the Employer contribution rate biennially, in consultation with the actuary, based upon the actuarial valuation for the most recently completed calendar year. The rate shall be set and communicated to the Employer at least 9 months in advance of the effective date so that it will be available for use in the Employer’s budgetary process. Each rate shall remain in effect for two consecutive fiscal years. For example, a rate will be set in accordance with this schedule based on the actuarial valuation as of December 31, 2013. It will become effective July 1, 2015, and will remain in effect through June 30, 2017.

16.3D The Employer Contribution Rate. The Employer contribution rate will be set at a level that is expected to:

- (1) pay all normal costs accruing under the Plan during the Fiscal Years for which the rate is effective; and
- (2) amortize any unfunded liabilities over a reasonable period.

16.03E The Amortization Period for Unfunded Liabilities. In the biennial determination of the Employer contribution rate, the amortization period for unfunded liabilities will be set within the parameters permitted by actuarial standards of practice that apply to public sector plans and by applicable federal, state, or local laws and regulations, and shall, if permitted, be based upon level percent of pay. If those standards, laws, and regulations and the other principles stated in Paragraphs 16.03A and 16.03D permit, the amortization period for unfunded liabilities shall be set with the objective that the Plan will be 100% funded by June 30, 2040. In conjunction with actuarial valuations dated December 31, 2019 and later, the Trustees may elect to create a new 20-year amortization schedule for unfunded liabilities arising during that valuation and subsequent valuations, and to continue the amortization of preexisting unfunded liabilities to their scheduled end date. In order to stabilize contributions, the Trustees may from time to time elect to combine separate amortization schedules into a single schedule over the average remaining amortization period being used. Unfunded liabilities associated with benefit changes or assumption changes shall be funded over a period not exceeding 10 years. However, unfunded liabilities arising in conjunction with early retirement incentive programs offered by the Employer after 2013 shall be separately funded over a period not exceeding five future years and shall not be subject to the combining of amortization schedules mentioned elsewhere in this Paragraph 16.03E.

16.03F The Valuation of Plan Assets. The actuarial value of Plan assets shall be determined as a 5-year smoothed market value of assets. The smoothing technique shall fully recognize the assumed return each year. It shall further spread the difference between the actual return and the assumed return in equal installments over the current year and four future years. In the event that the method would result in an actuarial value of assets that is less than 75% of market value or more than 125% of market value, the actuarial value of assets shall be reset to 75% of market value or 125% of market value, as the case may be, and the total difference between market and actuarial value shall be spread over four future years. Based upon consultation with the actuary, the Trustees may combine bases in order to reset the actuarial value to be equal to the market value when the difference between market value and actuarial value is 5% or less of market value.

16.03G The Valuation of Plan Liabilities. The actuarial liabilities of the Plan shall be determined using the entry age actuarial cost method, and an investment return assumption chosen by the Trustees in conjunction with the Plan actuary and investment consultant. The investment return assumptions shall be based upon the long term expected return on assets, although the Trustees may take other factors into account when determining this assumption. The Trustees shall also adopt other assumptions necessary for the valuation based upon the advice of the actuary and the judgment of the Trustees. The Trustees shall cause a study of actuarial experience under the Plan to be performed at least once in each five-year period and shall adjust all assumptions accordingly as deemed necessary for prudent operation of the Plan.

16.03H Overfunding. In the event that the Plan's assets exceed the Plan's liabilities, all amortization schedules other than those related to any post-2013 early retirement incentive programs offered by the Employer shall be considered completed, and the Employer contribution rate will be set based upon the normal cost and the completion of any remaining amortizations due to post-2013 early retirement incentive programs offered by the Employer, without regard to such overfunding. In such event, the Trustees shall review the Plan's asset allocation with a view toward de-risking the portfolio and potentially lowering the investment return assumption. Should such de-risking of the portfolio or future unfavorable experiences cause the unfunded liabilities to arise again, such liabilities shall be funded over a closed period of 20 future years and shall otherwise be subject to the regulations set forth in Paragraph 16.03E.

Glossary

Glossary

Accrued Service. Service credited under the system which was rendered before the date of the actuarial valuation.

Actuarial Accrued Liability. The difference between the actuarial present value of system benefits and the actuarial present value of future normal costs. Also referred to as “past service liability.”

Actuarial Assumptions. Estimates of future experience with respect to rates of mortality, disability, turnover, retirement, rate or rates of investment return and pay increases. Decrement assumptions (rates of mortality, disability, turnover and retirement) are generally based on past experience, often modified for projected changes in conditions. Economic assumptions (pay increases and investment return) consist of an underlying rate in an inflation-free environment plus a provision for a long-term average rate of inflation.

Actuarial Cost Method. A mathematical budgeting procedure for allocating the dollar amount of the “actuarial present value of future benefits” between future normal costs and actuarial accrued liability. Sometimes referred to as the “actuarial funding method.”

Actuarial Equivalent. One series of payments is said to be actuarially equivalent to another series of payments if the two series have the same actuarial present value.

Actuarial Gain (Loss). The difference between actual unfunded actuarial accrued liabilities and anticipated unfunded actuarial accrued liabilities -- during the period between two valuation dates. It is a measurement of the difference between actual and expected experience.

Actuarial Present Value. The single sum now which is equal to a payment or series of payments in the future. It is determined by discounting future payments at predetermined rates of interest, and by probabilities of payment.

Actuary. A person who is trained in the application of probability and compound interest to problems in business and finance that involve payment of money in the future, contingent upon the occurrence of future events. Most actuaries in the United States are Members of the American Academy of Actuaries. The Society of Actuaries is an international research, education and membership organization for actuaries in the life and health insurance, employee benefits, and pension fields. It administers a series of examinations leading initially to Associateship and the designation ASA, and ultimately to Fellowship with the designation FSA.

Amortization. Paying off an interest-bearing liability with periodic payments as opposed to paying it off with a single sum payment.

Normal Cost. The portion of the actuarial present value of future benefits that is assigned to the current year by the actuarial cost method. Sometimes referred to as “current cost.”

Unfunded Actuarial Accrued Liabilities. The difference between actuarial accrued liabilities and valuation assets (actuarial value of assets). Sometimes referred to as “unfunded past service liability” or simply as “unfunded liability.”

Valuation Assets (Actuarial Value of Assets). The value of plan assets recognized for valuation purposes. This may not be the same value that is used by the plan for financial reporting.