Classic Values, Innovative Advice

Fairfax County Uniformed Retirement System

Actuarial Valuation as of June 30, 2019

Produced by Cheiron

October 2019

www.cheiron.us 1.877.CHEIRON (243.4766)

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October 29, 2019

Board of Trustees
Fairfax County Uniformed Retirement System
12015 Lee Jackson Memorial Highway, Suite 350
Fairfax, Virginia 22033

Re: Fairfax County Uniformed Retirement System
Actuarial Valuation as of June 30, 2019

Dear Members of the Board:

At your request, we have conducted our annual actuarial valuation of the Fairfax County Uniformed Retirement System as of June 30, 2019. The results of the valuation are contained in this report. The purpose of this report is to present the annual actuarial valuation of the Fairfax County Uniformed Retirement System. This report is for the use of the Fairfax County Uniformed Retirement System Board of Trustees and its auditors in preparing financial reports in accordance with applicable law and accounting requirements.

Your attention is called to the Foreword in which we refer to the general approach employed in the preparation of this report. We also comment on the sources and reliability of both the data and the actuarial assumptions on which our findings are based. Those comments are the basis for our certification that this report is complete to the best of our knowledge and belief. The results of this report are only applicable to the County contribution for Fiscal Year 2021 and rely on future plan experience conforming to the underlying assumptions. To the extent that actual plan experience deviates from the underlying assumptions, the results would vary accordingly.

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 assumptions, changes in assumptions, and changes in plan provisions or applicable law.

In preparing our report, we relied on information (some oral and some written) supplied by the Retirement System. This information includes, but is not limited to, plan provisions, employee data, and financial information. We performed an informal examination of the obvious characteristics of the data for reasonableness and consistency in accordance with Actuarial Standards of Practice No. 23.

This report was prepared exclusively for the Fairfax County Uniformed Retirement System for the purpose described herein. Other users of this report are not intended users as defined in the Actuarial Standards of Practice, and Cheiron assumes no duty or liability to any other user.

This report and its contents have been prepared in accordance with generally recognized and accepted actuarial principles and practices and our understanding of the Code of Professional Conduct and applicable Actuarial Standards of Practice set out by the Actuarial Standards Board as well as applicable laws and regulations. Furthermore, as credentialed actuaries, we meet the Qualification Standards of the American Academy of Actuaries to render the opinions contained in this report. This report does not address any contractual or legal issues. We are not attorneys, and our firm does not provide any legal services or advice.

Sincerely,
Cheiron

Fiona E. Liston, FSA, MAAA, EA
Principal Consulting Actuary

Coralie A. Taylor, FSA, MAAA, EA
Consulting Actuary

FOREWORD

Cheiron has performed the actuarial valuation of the Fairfax County Uniformed Retirement System as of June 30, 2019. The purpose of this report is to:

1) **Measure and disclose**, as of the valuation date, the financial condition of the System,

2) **Indicate trends** in the financial progress of the System,

3) **Determine the contribution rate** to be paid by the County for Fiscal Year 2021, and

4) **Provide specific information** and documentation required for the System's financial reporting.

An actuarial valuation establishes and analyzes system assets and liabilities on a consistent basis and traces the progress of both from one year to the next. It includes measurement of the system's investment performance, as well as an analysis of actuarial liability gains and losses.

Section I presents a summary containing our findings and disclosing important trends experienced by the System in recent years.

Section II presents risk factors to consider in the future outlook of the Plan.

Section III contains details on various asset measures, together with pertinent performance measurements.

Section IV shows similar information on the System's liabilities, measured for actuarial, accounting, and governmental reporting purposes.

Section V develops the County contribution rate, determined using actuarial techniques and compares that to the rate developed using the corridor method of funding.

Section VI includes the required items to be included in the System's Comprehensive Annual Financial Report (CAFR).

The appendices to this report contain a summary of the System's membership at the valuation date, a summary of the major provisions of the System, and the actuarial methods and assumptions used in the valuations.

In preparing our report, we relied on information (some oral and some written) supplied by the System's staff. This information includes, but is not limited to, plan provisions, employee data, and financial information. We performed an informal examination of the obvious characteristics of the data for reasonableness and consistency in accordance with Actuarial Standards of Practice No. 23.

FOREWORD

The actuarial assumptions reflect our understanding of the likely future experience of the System, and the assumptions taken individually represent our best estimate for the future experience of the System. The results of this report are dependent upon future experience conforming to these assumptions. To the extent that future experience deviates from the actuarial assumptions, the true cost of the System could vary from our results.

Finally, in preparing this report, we have conformed to generally accepted actuarial principles and practices and our understanding of the Code of Professional Conduct and applicable Actuarial Standards of Practice set out by the Actuarial Standards Board as well as applicable laws and regulations.

SECTION I - BOARD SUMMARY

General Comments

The employer's annual contribution to this System is determined by using an amortization layer method. Under this funding approach, the employer's contribution rate consists of the normal cost rate plus expense rate plus layered amortization UAL bases. The UAL rates are summarized in Section V. The normal cost rate and actuarial accrued liability will be measured using the entry age funding method. The UAL is amortized over a series of fixed 15-year periods as a level percentage of payroll. Future gains and losses and changes in actuarial assumptions will be amortized in layers over separate 15-year periods.

The employer contribution rate for Fiscal Year (FY) 2021, as calculated under this method, decreased from 38.44% for FY 2019 to 37.14% of payroll. However, the County has adopted a policy to not reduce the contribution rate until such time that the UAL has been exhausted, thus the contribution rate for FY 2020 and FY 2021 will remain at a minimum rate of 38.84% first paid for FY 2017.

This valuation contains information reported in the June 30, 2019 Comprehensive Annual Financial Report (CAFR) of the System. Additional information regarding GASB Statement No. 67 can be found in a separate report.

Trends

The System underperformed the investment assumption during the fiscal year ending in 2019, causing an actuarial loss on the asset side of the System. The actual return on a market value basis was 4.47%. On an actuarial value basis, the assets returned 5.96% compared with an assumed rate of return of 7.25%. The actuarial loss recognized for funding purposes was $23 million.

The measurement of liabilities produced a gain this year in the amount of $8 million. This gain was due to experience compared to our assumptions about salary increases, retirement behavior, COLA, and death, etc. Specific components of the gain include:

- The average salary increase was 4.1% for active participants who were in both the June 30, 2018 and June 30, 2019 valuations. This was less than expected based on the actuarial assumption, creating a liability gain of $9 million.

- The valuation assumed a 2.50% cost-of-living adjustment in 2018 for benefits in pay status. The actual CPI-based COLA was 1.60% last year, creating a liability gain of $11 million.

- An annual component of liability loss is the delayed recognition of new hires throughout the year. This does not contribute to an increase in the System's unfunded liability because both the member and employer contribute from the date of hire. However, when we look only at the liability side, they are a component of the annual liability loss. This year they account for a $1 million loss.

SECTION I - BOARD SUMMARY

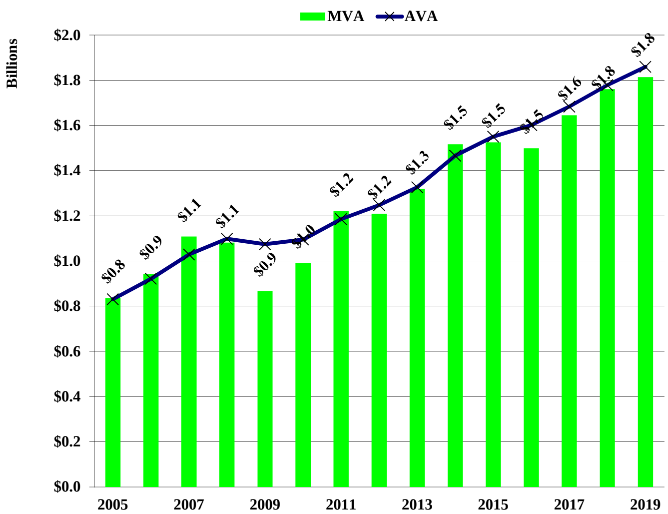
- Finally, there was a $12 million liability loss component that is made up of various other causes such as members terminating, retiring, dying, or becoming disabled in a way contrary to the assumption.

The combination of liability and investment experience, together with County plus member contributions over the last year, led to the System's funding ratio (actuarial value of assets over actuarial accrued liability) increasing from 83.6% at June 30, 2018 to 84.2% at June 30, 2019.

It is important to take a step back from the latest results and view them in the context of the System's recent history. On the next three pages, we present a series of charts that display key factors in the valuations over the last 15 years. After the historical review, we present a few projection graphs, showing the possible condition of the System over the next 15 years under various market return scenarios.

SECTION I - BOARD SUMMARY

Growth in Assets

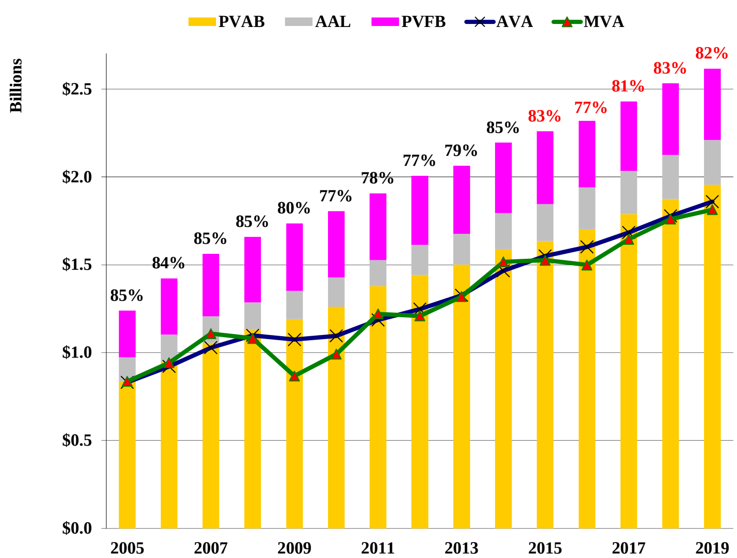


There was an increase in the market value of assets (MVA) (amount in billions shown above bars) over last year due to a return of 4.47%. The actuarial value of assets (AVA) increased due to the continued recognition of recent asset gains. The System has $45.5 million in unrecognized losses that will be phased in over the next few years.

Over the period of July 1, 2005 to June 30, 2019, the System's assets returned approximately 6.36% per year measured at actuarial value, compared to the valuation assumption of 7.25% per year.

Assets and Liabilities

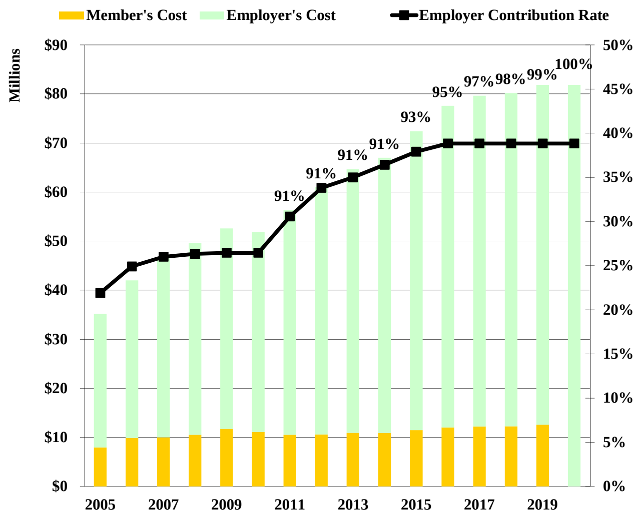
The three colored bars represent the three different measures of liability mentioned in this report. The amount represented by the top of the pink bars, the present value of future benefits (PVFB), is the amount needed to provide all benefits for the current participants and their beneficiaries. If the System had assets equal to the PVFB, no contributions would, in theory, be needed for the current members. For funding purposes, the target amount is represented by the top of the gray bar. Through the 2013 valuation, we compare the actuarial value of assets to this measure of liability in developing the funded percent (black numbers). Starting in 2014, the comparison uses the market value of assets (red numbers). These are the percentages shown in the graph labels.



SECTION I - BOARD SUMMARY

Contribution Rates

The stacked bars in this graph show the contributions made by both the County and the members (left-hand scale). The black line shows the County contribution rate as a percent of payroll (right-hand scale).

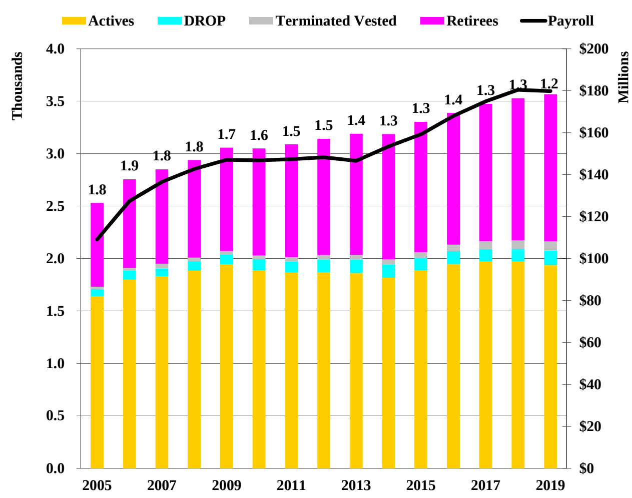


The member contribution rate is set by the County Ordinance. The County contribution rate is set by the actuarial process, as constrained by the corridor method. Note there is a lag in the rate shown. For example, the 2019 value is the rate prepared by the 2017 valuation and implemented for the period June 30, 2018 to June 30, 2019. Starting with FY 2011, the County contribution has been based on a corridor floor greater than 90%. The data labels show the change in this metric.

Participant Trends

As with many systems in this country, there has been a steady growth in the number of retired members as the System has matured. The active-to-inactive ratio has decreased from 1.8 actives to each inactive in 2005 to 1.2 actives for each inactive today. While this would be an alarming trend in a pay-as-you-go system, the pool of invested assets has been established in anticipation of this development.

The chart also shows the number of DROP participants. Neither County nor member contributions are made on their behalf, which leads to a slightly lower growth in effective covered payroll for this system.



SECTION I - BOARD SUMMARY

Cash Flow

The graph shows the annual cash flows into and out of the System. The graph shows the magnitude of the investment returns on the market value (green bars) compared to the contributions (yellow bars). The net cash flow (line) is comparing the contributions to benefits and expenses (red bar). Negative cash flow is expected for a mature system such as this one. The implications of a system with negative cash flow are that the impact of market fluctuations can be more severe. This is, because as assets are being depleted to pay benefits in down markets, less principal is available to be reinvested during periods of favorable returns.

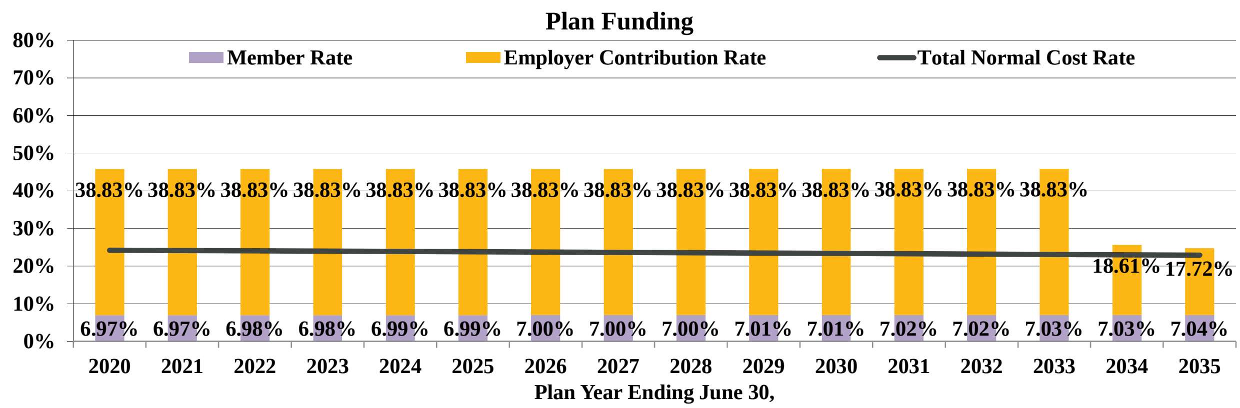
Future Outlook

Base-line Projections

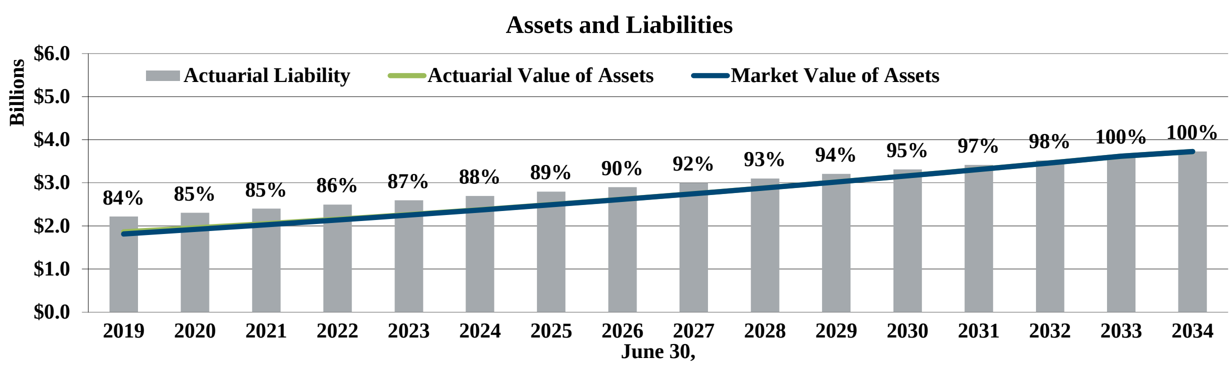
The two graphs below show the expected progress of the System over the next 15 years, assuming the System's assets earn 7.25% on their *market value.*

The floor of the County's corridor contribution calculation was increased to 100% for FY 2020, and contributions from FY 2021 forward are calculated using a full actuarial calculation instead of the corridor method. The County does not intend to reduce the contribution rate until the System is 100% funded.

The graph entitled "Plan Funding" illustrates future County and member contribution rates.



The "Assets and Liabilities" graph shows the projected funding status over the next 15 years. The funded ratio based on the actuarial value of assets slowly increases over the entire period until reaching 100% funded by 2033.



SECTION I - BOARD SUMMARY

The future funding status of this system will be influenced by the investment earnings. The prior projection assumed the System would earn 7.25% each and every year, which is extremely unlikely.

In the projections that follow, we show the risk to the System under volatile markets. The System has averaged an 8.96% return per year since 1980. In the following charts, we show results assuming returns over the next 15 years average 4.75%, 7.25%, and 9.75%. Different patterns of returns will produce different results from those shown here.

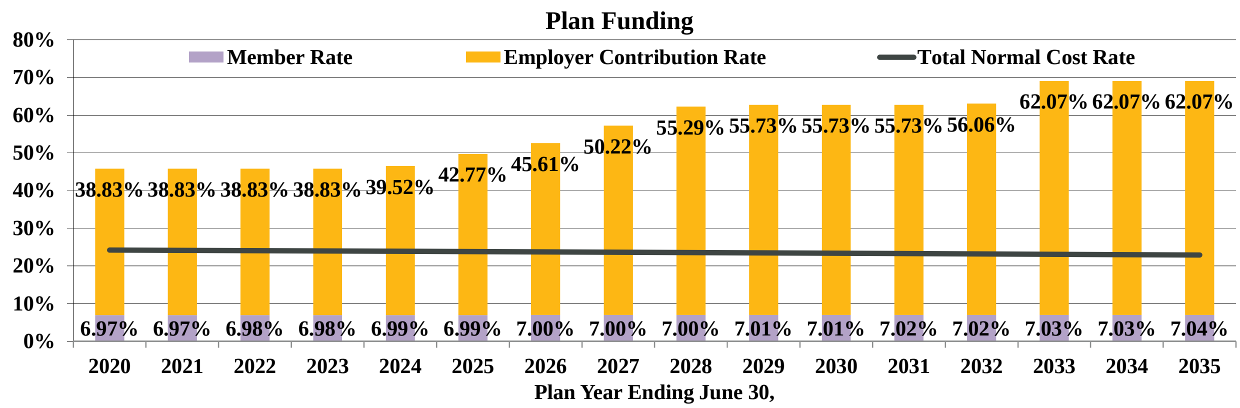
Table I-1

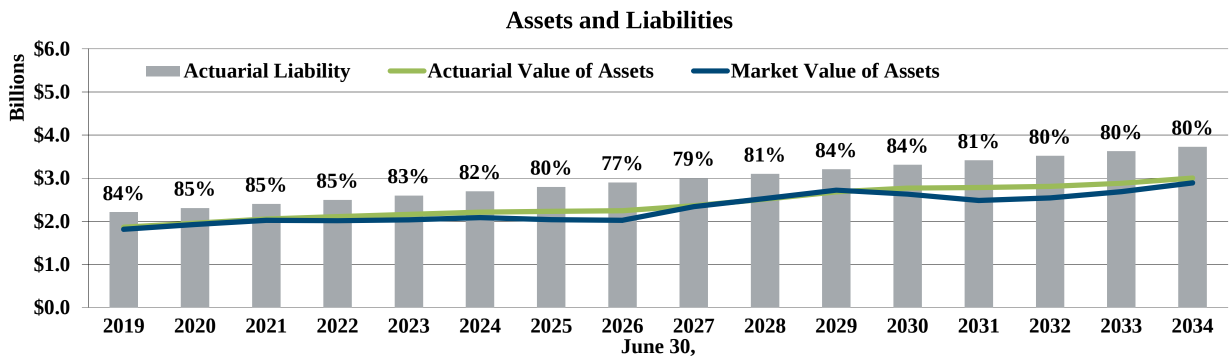
Fiscal Year Ending June 30,	Average 4.75%	Average 7.25%	Average 9.75%
2020	7.42%	2.09%	(6.10)%
2021	6.80	6.92	4.29
2022	1.42	17.47	17.90
2023	2.73	29.76	32.31
2024	4.91	19.17	(9.23)
2025	(0.44)	5.36	10.22
2026	1.23	10.78	15.56
2027	17.34	4.05	(12.69)
2028	9.25	15.35	14.94
2029	9.00	(0.69)	14.58
2030	(2.36)	1.80	30.53
2031	(4.00)	(8.62)	24.67
2032	3.95	4.40	3.70
2033	7.02	(0.84)	7.12
2034	8.92	7.58	9.97
Average	**4.75%**	**7.25%**	**9.75%**

SECTION I - BOARD SUMMARY

Alternative Projection – with average return of 4.75% in the period

Under this scenario, the corridor contribution rate increases from 39% to about 62% of payroll. The System's funding drops to as low as 77% on an actuarial value basis, even with the ramping up of contributions.

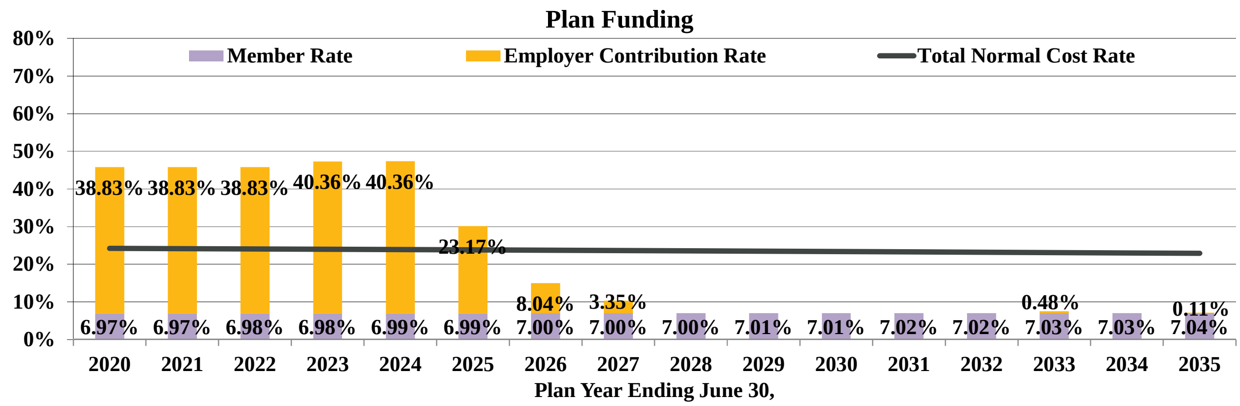


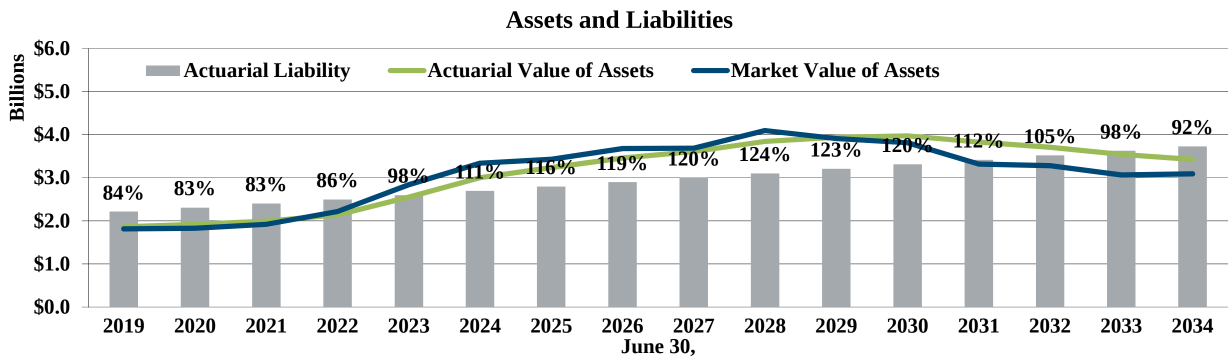


SECTION I - BOARD SUMMARY

Alternative Projection – with average return of 7.25% in the period

Under this scenario, in which the System is assumed to experience lower than expected returns for the first two years followed by higher than average returns in the next few years, the corridor contribution rate remains level over the next few years as the asset losses are phased in and the funding ratio remains below 100%. After that time, the contribution drops dramatically as returns continue to push the funded percent over the 120% top of the corridor.

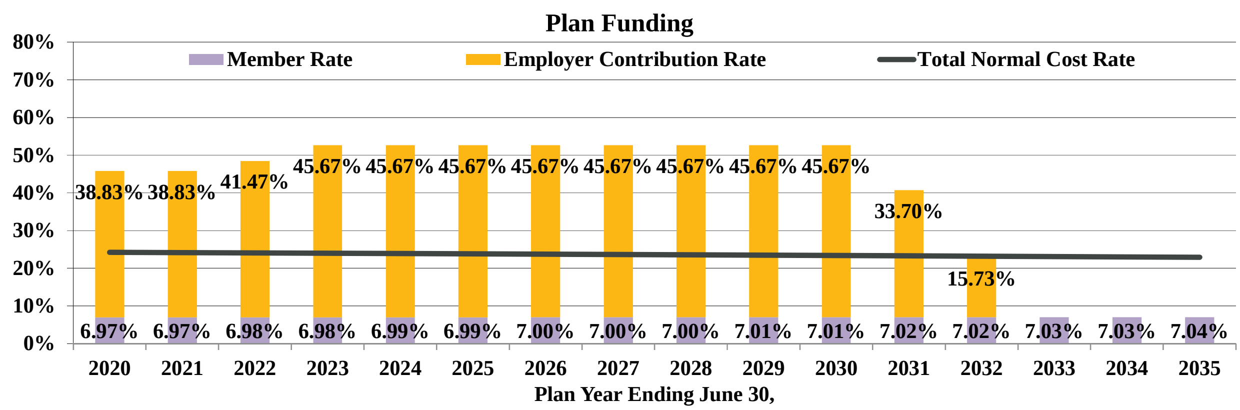


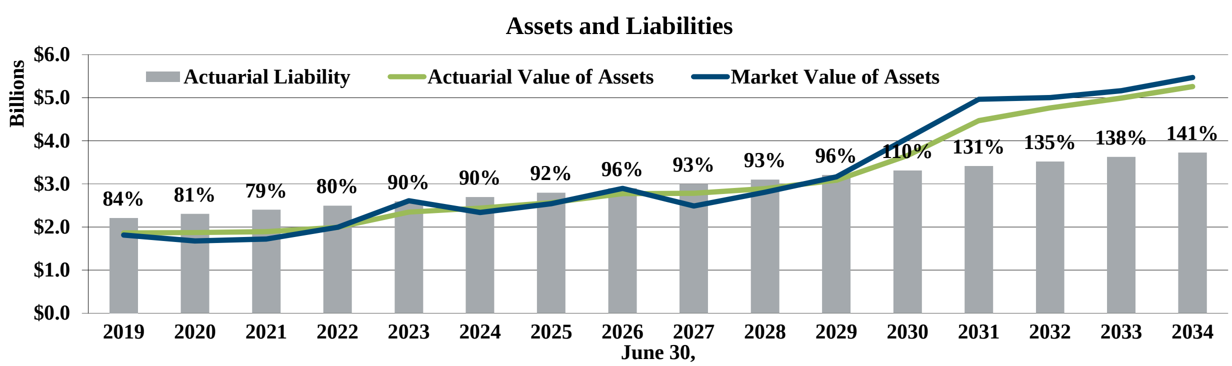


SECTION I - BOARD SUMMARY

Alternative Projection – with average return of 9.75% in the period

Similar to the prior scenario, the corridor contribution rate increases in the early years due to the assumed underperformance. The highest contribution rate of 45.67% is maintained until the System reaches full funding. This determination is made using the corridor assets. By the end of the projection period, the member contribution rate is the only amount being contributed.





SECTION I - BOARD SUMMARY

Table I-2
Summary of Prinicpal Plan Results

Valuation as of:	**June 30, 2018**	**June 30, 2019**	**% Chg.**
Participant Counts			
Actives (excluding DROP)	1,974	1,939	(1.8)%
DROPs	117	137	17.1%
Terminated Vesteds	83	89	7.2%
In Pay Status	1,354	1,402	3.5%
Total	3,528	3,567	1.1%
Annual Salaries of Active Members	$ 180,446,949	$ 179,819,293	(0.3)%
Annual Retirement Allowances for Retired Members and Beneficiaries (Base amount only – not supplements)	$ 84,236,762	$ 89,186,503	5.9%
Assets and Liabilities			
Actuarial Accrued Liability (AAL)	$ 2,125,849,930	$ 2,209,429,796	3.9%
Assets for Valuation Purposes (AVA)	1,778,267,298	1,859,253,613	4.6%
Unfunded Actuarial Liability	$ 347,582,632	$ 350,176,183	0.7%
Actuarial Value Funding Ratio (AVA / AAL)	83.6%	84.2%	
Market Value Funding Ratio (MVA / AAL)	82.8%	82.1%	
Present Value of Accrued Benefits	$ 1,873,545,105	$ 1,954,762,039	4.3%
Market Value of Assets	1,759,902,734	1,813,732,776	3.1%
Unfunded Accrued Liability (not less than $0)	$ 113,642,371	$ 141,029,263	24.1%
Accrued Benefit Funding Ratio	93.9%	92.8%	
Contributions as a Percentage of Payroll	**Fiscal Year 2020**	**Fiscal Year 2021**	
Employer Normal Cost	17.12%	17.16%	
UAL Amortization	21.07%	19.64%	
Administrative Expense	0.25%	0.25%	
County Rate	38.44%	37.05% [1]	

[1] The County has a policy of not paying any less than the existing rate until such a time as the UAL has been exhausted. Both the FY 2020 and FY 2021 rates will be held at the 38.84% rate in effect for FY 2018.

SECTION II - IDENTIFICATION AND ASSESSMENT OF RISK

Actuarial valuations are based on a set of assumptions about future economic and demographic experience. These assumptions represent a reasonable estimate of future experience, but actual future experience will undoubtedly be different and may be significantly different. This section of the report is intended to identify the primary risks to the Plan, provide some background information about those risks, and provide an assessment of those risks.

Identification of Risks

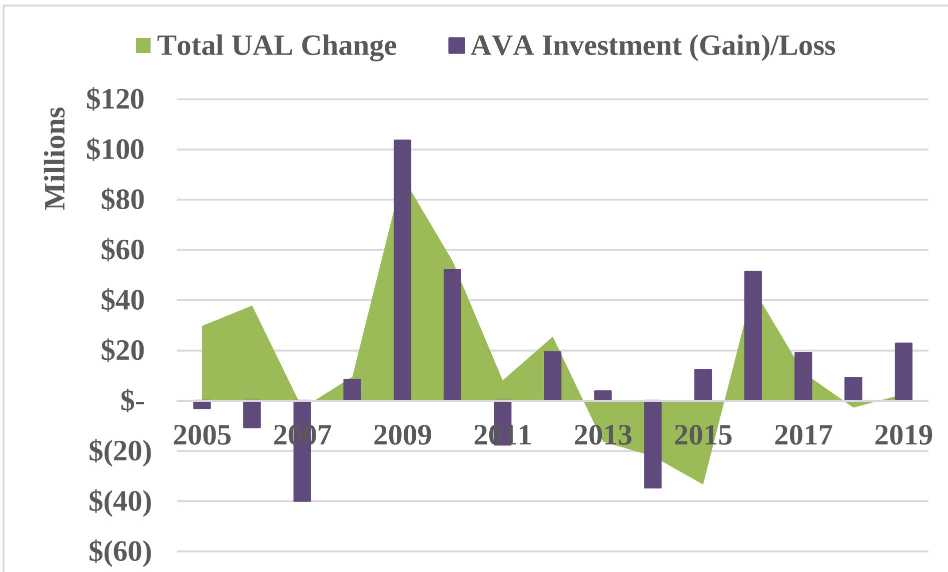
The fundamental risk to a pension plan is that the contributions needed to pay the benefits become unaffordable. While we believe it is unlikely that the Plan by itself would become unaffordable, the contributions needed to support the Plan may differ significantly from expectations. While there are a number of factors that could lead to contribution amounts deviating from expectations, we believe the primary sources are:

- Investment risk,
- Interest rate risk,
- Longevity and other demographic risks,
- Contribution risk, and
- Assumption change risk.

Other risks that we have not identified may also turn out to be important.

SECTION II - IDENTIFICATION AND ASSESSMENT OF RISK

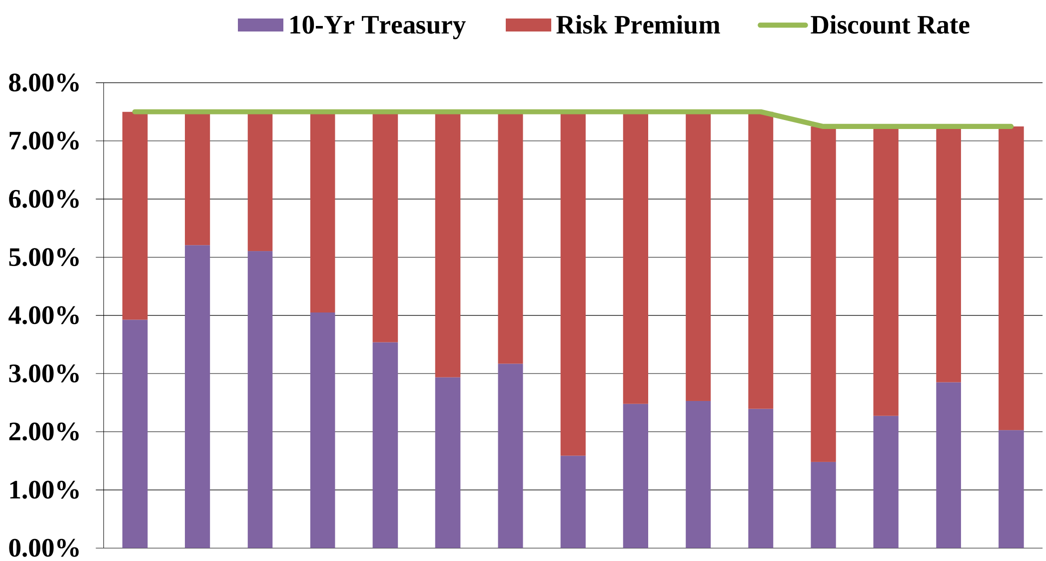
Investment Risk is the potential for investment returns to be different than expected. Lower investment returns than anticipated will increase the Unfunded Actuarial Liability necessitating higher contributions in the future unless there are other gains that offset these investment losses. The potential volatility of future investment returns is determined by the Plan's asset allocation, and the affordability of the investment risk is determined by the amount of assets invested relative to the size of the plan sponsor or other contribution base.



The graph above shows the impact of investment gains and losses on the smoothed Actuarial Value of Assets over the last 15 years compared to the Plan's total change in UAL.

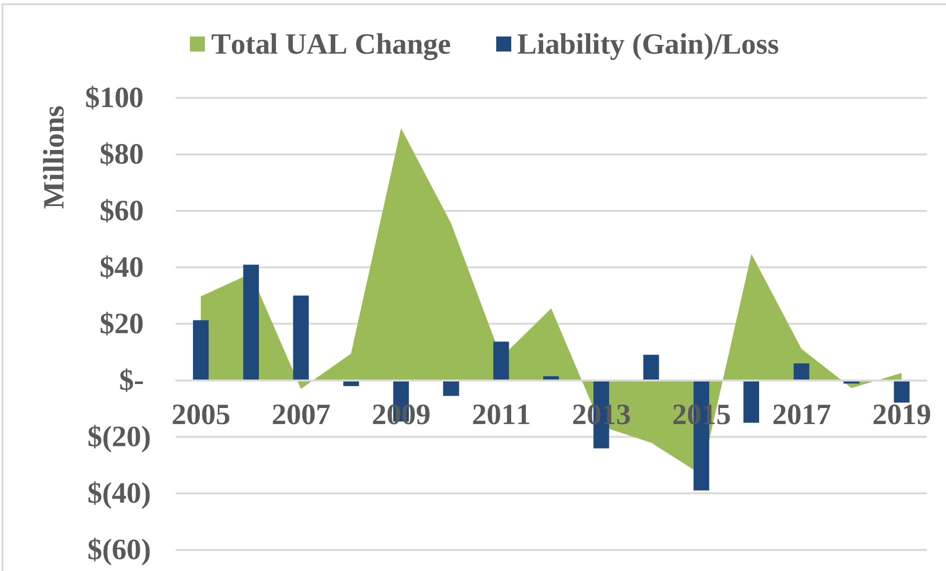
SECTION II - IDENTIFICATION AND ASSESSMENT OF RISK

Interest rate risk is the potential for interest rates to be different than expected. For public plans, short-term fluctuations in interest rates have little or no effect as the plan's liability is usually measured based on the expected return on assets. Longer-term trends in interest rates, however, can have a powerful effect. The chart below shows the yield on a 10-year Treasury security compared to the Plan's assumed rate of return. The difference is a simple measure of the amount of investment risk taken. As interest rates have declined, plans faced a choice: maintain the same level of risk and reduce the expected rate of return, maintain the same expected rate of return and take on more investment risk, or some combination of the two strategies.



SECTION II - IDENTIFICATION AND ASSESSMENT OF RISK

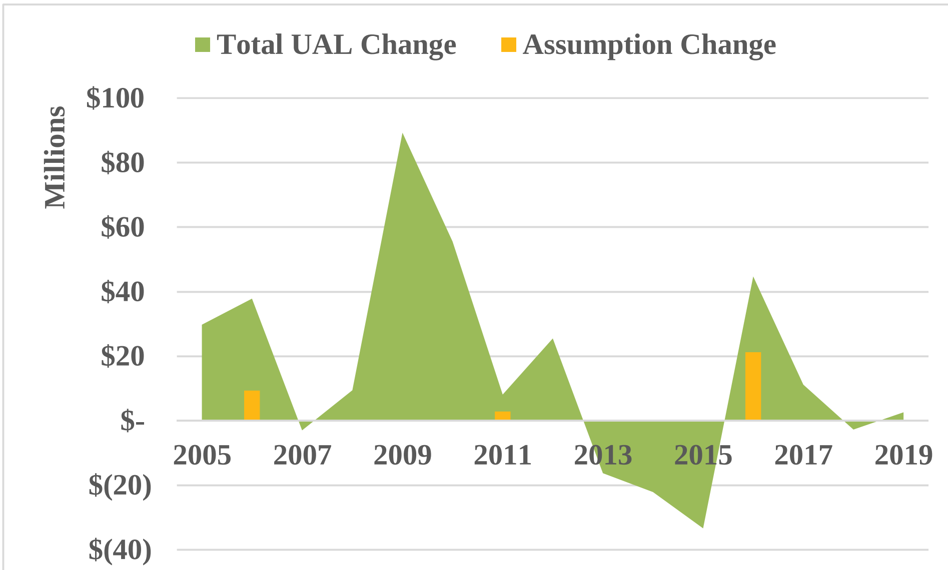
Longevity and other demographic risks are the potential for mortality or other demographic experience to be different than expected. Generally, longevity and other demographic risks emerge slowly over time and are often dwarfed by other changes, particularly those due to investment returns. The following graph shows the demographic gains and losses over the last fifteen years compared to the total change in the UAL for each year.



Contribution risk is the potential for actual future contributions to deviate from expected future contributions. There are different sources of contribution risk ranging from the sponsor choosing to not make contributions in accordance with the funding policy to material changes in the contribution base (e.g., covered employees, covered payroll, sponsor revenue) that affect the amount of contributions the plan can collect. Historically, the Plan has made contributions in accordance with their funding policy.

SECTION II - IDENTIFICATION AND ASSESSMENT OF RISK

Assumption change risk is the potential for the environment to change such that future valuation assumptions are different than the current assumptions. Increases in UAL from assumption changes were related to experience studies in which demographic and economic assumptions were adjusted. Assumption change risk is an extension of the other risks identified, but rather than capturing the risk as it is experienced, it captures the cost of recognizing a change in environment when the current assumption is no longer reasonable.



Plan Maturity Measures

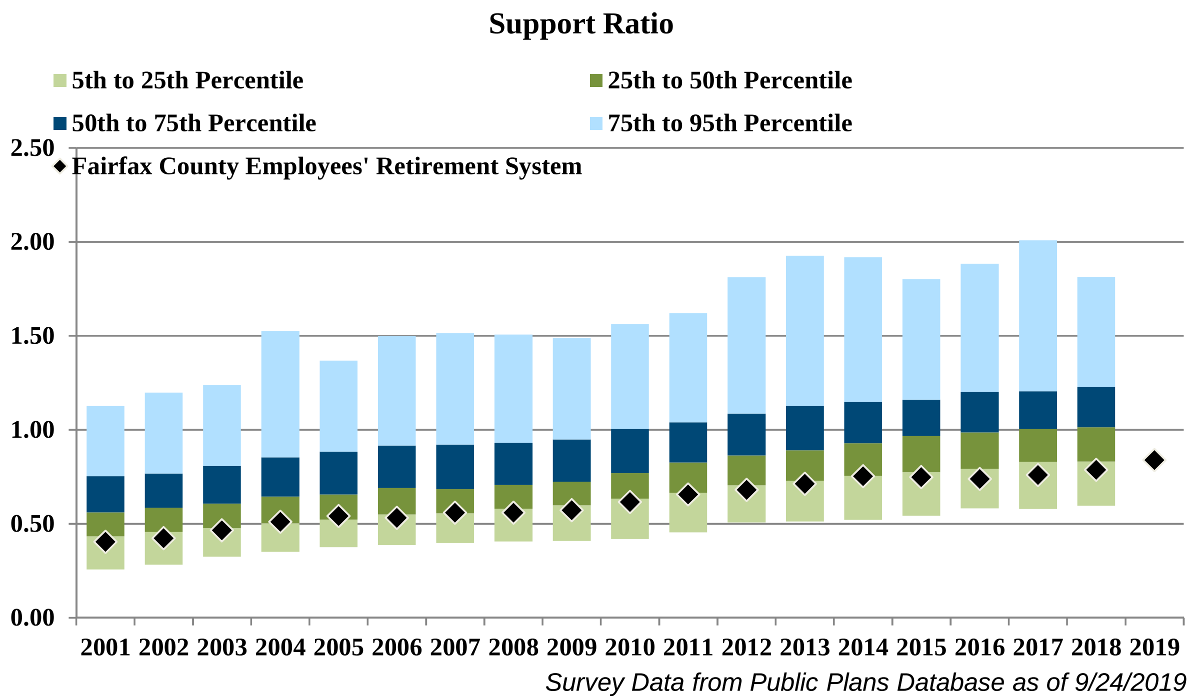
The future financial condition of a mature pension plan is more sensitive to each of the risks identified above than a less mature plan. Before assessing each of these risks, it is important to understand the maturity of this system compared to other plans and how the maturity has changed over time.

Plan maturity can be measured in a variety of ways, but they all get at one basic dynamic – the larger the plan is compared to the contribution or revenue base that supports it, the more sensitive the plan will be to risk. The measures below have been selected as the most important in understanding the primary risks identified for this system.

SECTION II - IDENTIFICATION AND ASSESSMENT OF RISK

Inactives per Active (Support Ratio)

One simple measure of plan maturity is the ratio of the number of inactive members (those receiving benefits or entitled to a deferred benefit) to the number of active members. The revenue base supporting the plan is usually proportional to the number of active members, so a relatively high number of inactives compared to actives indicates a larger plan relative to its revenue base as well.



The graph above shows the distribution from the 5th to 95th percentile of support ratios for the plans in the Public Plans Database. The black diamond shows how the Retirement System compares to the other plans.

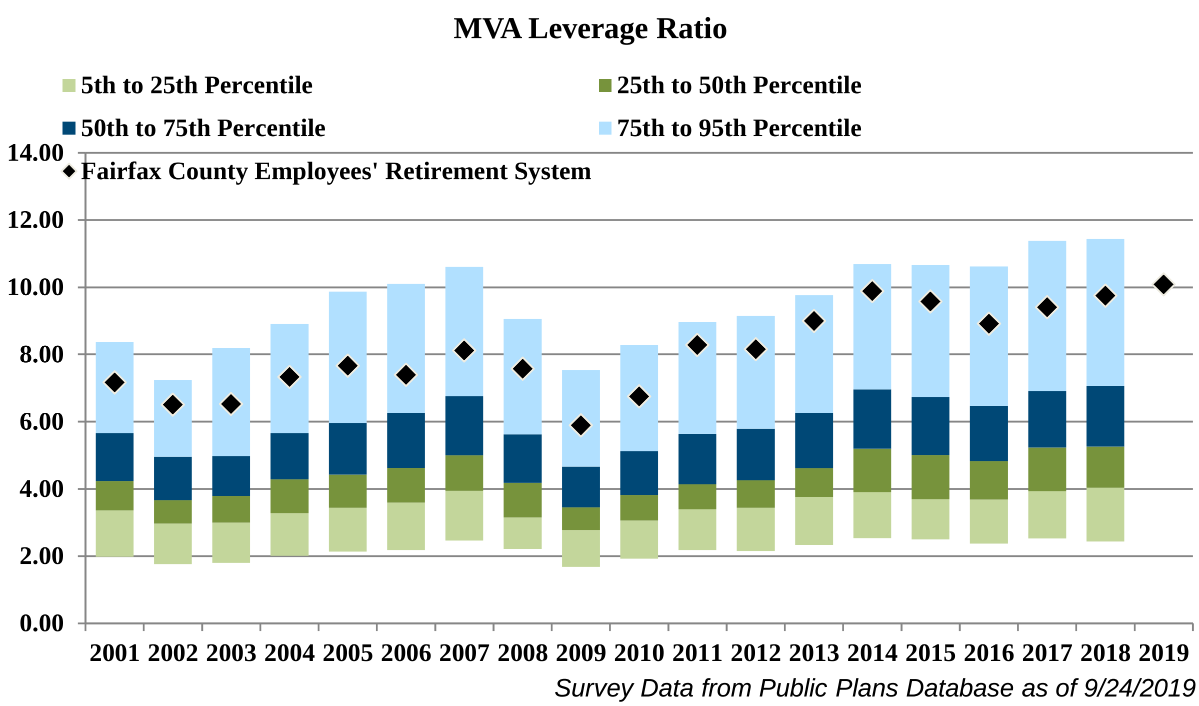
Whereas the support ratios for the plans as a whole have increased over the period as they mature, URS's support ratio has increased over the period and is among the 25th to 50th percentile of the Public Plans Database.

SECTION II - IDENTIFICATION AND ASSESSMENT OF RISK

Leverage Ratios

Leverage or volatility ratios measure the size of the plan compared to its revenue base more directly. An asset leverage ratio of 5.0, for example, means that if the System experiences a 10% loss on assets compared to the expected return, the loss would be equivalent to 50% of payroll.

The same investment loss for a system with an asset leverage ratio of 10.0 would be equivalent to 100% of payroll. As the Plan becomes better funded, the asset leverage ratio will increase, and if it was 100% funded, the leverage ratio would equal the Actuarial Liability (AL) leverage ratio.

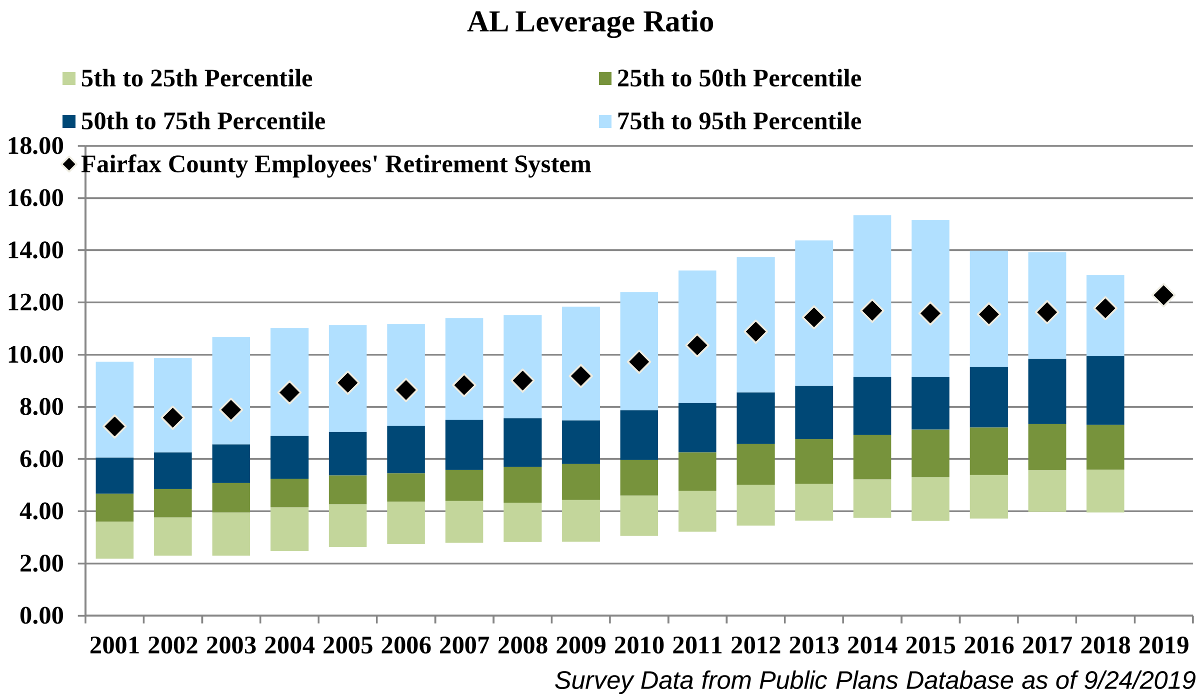


The chart above shows the distribution from the 5th to 95th percentile of asset leverage ratios for the plans in the Public Plans Database. The black diamond shows how the Plan compares.

The Plan's asset leverage ratio has historically been in the 75th to 95th percentile compared to other plans. This asset leverage ratio will continue to increase as the Plan approaches 100% funded.

SECTION II - IDENTIFICATION AND ASSESSMENT OF RISK

The actuarial liability leverage ratio of 5.0 means that if the System experiences a 10% loss on assets compared to the expected return, the liability loss would be equivalent to 50% of payroll.



The chart above shows the distribution from the 5th to 95th percentile of Actuarial Liability leverage ratios for the plans in the Public Plans Database. The black diamond shows how the Plan compares.

The Plan's Actuarial Liability leverage ratio has historically been in the 75th to 95th percentile compared to other plans. But as the Plan matures and more of the liability is due to inactive members, this ratio continues to increase. The ratio has been under 12.5 over the period with the ratio currently around 12.3 in 2019.

SECTION III - ASSETS

Pension system assets play a key role in the financial operation of the System and in the decisions the Trustees may make with respect to future deployment of those assets. The level of assets, the allocation of assets among asset classes, and the methodology used to measure assets will likely impact benefit levels, County contributions, and the ultimate security of participants' benefits.

In this section, we present detailed information on the System's assets including:

- **Disclosure** of the System's assets at June 30, 2018 and June 30, 2019,
- Statement of the **changes** in market values during the year,
- Development of the **actuarial value of assets**,
- An assessment of **investment performance**, and
- A projection of the System's expected **cash flows** for the next 10 years.

Disclosure

The market value of assets represents "snap-shot or cash-out" values, which provide the principal basis for measuring financial performance from one year to the next. Market values, however, can fluctuate widely with corresponding swings in the marketplace. As a result, market values are usually not suitable for long-range planning.

The actuarial values are market values that have been smoothed; they are used for evaluating the System's ongoing liability to meet its obligations.

Current methods employed by this system set the actuarial value equal to the expected value plus 33⅓% of the difference between the expected value of assets and the actual market value, where the expected value is equal to the prior year's actuarial value, rolled forward with actual contributions, benefit payments, and administrative expenses plus interest imputed at the prior year investment return assumption of 7.25%.

SECTION III - ASSETS

Table III-1 Statement of Assets at Market Value	June 30, 2018	June 30, 2019
Assets		
Equity in County's Pooled Cash,		
Contributions Receivable and Other Assets	$ 6,510,270	$ 7,336,697
Accrued Interest and Dividends Receivable	2,623,631	3,476,861
Receivable from Sale of Investments	43,996,598	29,579,765
Capital Assets	11,439	10,513
US Government Obligations	44,831,697	43,215,007
Asset-Backed Securities	69,338,689	75,975,545
Other Bonds and Notes	83,721,152	113,408,686
Common and Preferred Stock	284,512,370	288,513,712
Pooled and Mutual Funds	1,121,102,778	1,150,347,965
Short-Term Investments	152,562,613	138,257,366
Cash Collateral Received Under		
Securities Lending Agreements	18,008,041	13,851,978
Total Assets	$ 1,827,219,278	$ 1,863,974,095
Liabilities		
Payable for Collateral Received Under		
Securities Lending Agreements	$ 18,008,041	$ 13,851,978
Payable for Purchase of Investments	45,789,010	33,096,554
Accounts Payable and Accrued Expenses	3,519,493	3,292,787
Total Liabilities	$ 67,316,544	$ 50,241,319
Net Assets Available for Benefits	**$ 1,759,902,734**	**$ 1,813,732,776**

SECTION III - ASSETS

Table III-2
Changes in Market Values

Value of Assets – July 1, 2018			$	1,759,902,734
Additions				
Contributions:				
County Contributions	$	69,246,070		
Employee Contributions		12,605,683		
Total Contributions			$	81,851,753
Investment Income:				
Net Appreciation (Depreciation) in Fair Value of Investments	$	66,076,422		
Interest		13,845,692		
Dividends		13,760,379		
Total Investment Income	$	93,682,493		
Investment Activity Expenses:				
Management Fees	$	(14,718,694)		
Custodian Fees		(72,364)		
Consulting Expense		(331,380)		
Allocated Administrative Expenses		(556,736)		
Total Investment Activity Expenses	$	(15,679,174)		
From Securities Lending Activities:				
Securities Lending Income	$	613,397		
Securities Lending Expenses				
Borrowers Rebates		(474,911)		
Management Fees		0		
Net Income from Securities Lending Activities	$	138,486		
Net Investment Income			$	78,141,805
Total Additions			$	159,993,558
Deductions				
Annuity Benefits	$	(95,256,500)		
Disability Benefits		(8,065,107)		
Survivor Benefits		(1,310,646)		
Refunds and Other Expenses		(911,127)		
Administrative Expenses		(620,136)		
Total Deductions			$	(106,163,516)
Total				
Net Increase (Decrease)			$	53,830,042
Value of Assets – June 30, 2019			**$**	**1,813,732,776**

SECTION III - ASSETS

Actuarial Value of Assets

The actuarial value of assets represents a "smoothed" value developed by the actuary to reduce or eliminate erratic results which could develop from short-term fluctuations in the market value of assets. For this system, the actuarial value has been calculated by adding 33⅓% of the difference between market value and expected value to the expected value. The following table illustrates the calculation of the actuarial value of assets for the June 30, 2019 valuation.

Table III-3
Development of Actuarial Value of Assets
as of June 30, 2019

1.	Actuarial Value of Assets at June 30, 2018	**$**	**1,778,267,298**
2.	Amount in (1) with Interest to June 30, 2019		1,907,191,677
3.	Employer and Member Contributions for the Plan Year Ended June 30, 2019		81,851,753
4.	Interest on Contributions Assuming Received Uniformly Throughout the Year to June 30, 2019		2,915,212
5.	Disbursements from Trust Except Investment Expenses, July 1, 2018 Through June 30, 2019		(106,163,516)
6.	Interest on Disbursements Assuming Payments Made Uniformly Throughout the Year to June 30, 2019		(3,781,094)
7.	Expected Value of Assets at June 30, 2019 = (2) + (3) + (4) + (5) + (6)		1,882,014,032
8.	Market Value of Assets at June 30, 2019		1,813,732,776
9.	Excess of (8) Over (7)	$	(68,281,256)
10.	Actuarial Value of Assets at June 30, 2019 = (7) + 33-1/3% of (9)	**$**	**1,859,253,613**

Investment Performance

The market value of assets (MVA) returned 4.47% during 2019, which is less than the assumed 7.25% return. A return of 5.96% on the actuarial value of assets (AVA) is primarily the result of the asset smoothing method being utilized for the calculation of the actuarial value of assets. Since only 33⅓% of the gain or loss from the performance of the System is recognized in a given year, in periods of very good performance, the AVA can lag significantly behind the MVA. In a period of negative returns, the AVA does not decline as rapidly as the MVA.

Table III-4
Annual Rates of Return

Year Ending June 30,	Market Value	Actuarial Value	Total Return Standard & Poor's 500 Index	Barclays Global Aggregate Index[1]
1995	14.6%	9.3%	26.1%	12.8%
1996	15.0%	14.2% [2]	26.0%	4.7% [3]
1997	17.2%	12.9%	34.6%	8.2%
1998	16.2%	10.8%	30.2%	10.5%
1999	9.6%	13.4%	22.7%	3.1%
2000	5.2%	10.4%	7.3%	4.6%
2001	(2.8)%	5.7%	(14.8)%	11.2%
2002	(4.9)%	2.3%	(18.0)%	8.6%
2003	5.4%	3.3%	0.3%	10.4%
2004	14.3%	6.7%	19.1%	0.3%
2005	10.4%	7.9%	6.3%	6.8%
2006	10.5%	8.8%	8.6%	(0.8)%
2007	17.8%	11.8%	20.6%	6.1%
2008	(2.5)%	6.7%	(13.1)%	7.1%
2009	(19.6)%	(1.9)%	(26.2)%	5.5%
2010	15.2%	2.6%	14.4%	9.5%
2011	24.1%	9.1%	30.8%	3.9%
2012	(0.3)%	5.9%	5.4%	7.5%
2013	10.0%	7.2%	20.6%	(0.1)%
2014	16.0%	10.0%	24.6%	4.4%
2015	1.4%	6.7%	7.4%	1.8%
2016	(0.9)%	4.2%	4.0%	6.0%
2017	10.8%	6.1%	17.9%	(0.3)%
2018	8.1%	6.7%	12.2%	0.8%
2019	4.5%	6.0%	10.4%	7.9%

[1] Figures shown prior to 1987 are Salomon Brothers Long Term Bond Index.

[2] Figures shown prior to 1997 are Shearson Lehman Government/Corporate Bond Index.

[3] The actuarial return in 1996 reflects the adjustment to a revised actuarial valuation method.

SECTION III - ASSETS

Expected benefit payments are projected for the closed group valued at June 30, 2019. Projecting any further than 10 years using a closed group would not yield reliable predictions due to the omission of new hires.

Expected employer contributions are projected based on the current County contribution rate of 38.83% for FY 2020 and FY 2021, and then continuing to calculate a rate with 15 year amortization layers thereafter. This projection assumes no further gains or losses, a 2.75% annual increase in the total covered payroll, and models the anticipated impact of new hires coming in with altered plan provisions.

Table III-5
Projection of System's Benefit Payments and Employer Contributions

Year Beginning July 1,	Expected Benefit Payments	Expected County Contributions
2019	$ 108,460,000	$ 69,842,000
2020	115,577,000	71,762,000
2021	122,522,000	73,736,000
2022	127,322,000	75,764,000
2023	135,014,000	77,847,000
2024	142,281,000	79,988,000
2025	150,002,000	82,188,000
2026	157,248,000	84,448,000
2027	164,652,000	86,770,000
2028	172,784,000	89,156,000

SECTION IV - LIABILITIES

In this section, we present detailed information on System liabilities including:

- **Disclosure** of System liabilities at June 30, 2018 and June 30, 2019,
- Statement of **changes** in these liabilities during the year, and
- A **projection** of future liabilities.

Disclosure

Several types of liabilities are calculated and presented in this report. Each type is distinguished by the people ultimately using the figures and the purpose for which they are using them.

- **Present Value of Benefits:** Used for analyzing the financial outlook of the System, this represents the amount of money needed today to fund all future benefits of the System, assuming participants continue to accrue benefits and all assumptions are met.

- **Actuarial Accrued Liability:** Used for funding calculations and GASB disclosures, this liability is calculated taking the present value of benefits above and subtracting the present value of future member contributions and future employer normal costs under an acceptable actuarial funding method. This method is referred to as the **Entry Age Normal** funding method.

- **Present Value of Accrued Liabilities:** Used for communicating the current level of liabilities, this liability represents the total amount of money needed today to fully fund the current accrued obligations of the System, assuming no future accruals of benefits and that all assumptions are met, including the 7.25% investment return. These liabilities are also used to assess whether the System can meet its current benefit commitments.

None of the liability figures disclosed in this report is meant to be a measure of the System's settlement liability.

The following table discloses each of these liabilities for the current and prior valuations. With respect to each disclosure, a subtraction of the appropriate value of the System's assets yields, for each respective type, a **net surplus** or an **unfunded liability**.

SECTION IV - LIABILITIES

Table IV-1
Liabilities/Net (Surplus)/Unfunded

	June 30, 2018	June 30, 2019
Present Value of Future Benefits		
Active Participant Benefits (excluding DROP)	$ 1,260,441,614	$ 1,254,129,420
DROP Participant Benefits	162,435,126	191,847,699
Retiree Benefits	1,097,926,481	1,156,254,071
Terminated Vested and Inactive Members	11,759,691	13,469,978
Present Value of Benefits (PVB)	**$ 2,532,562,912**	**$ 2,615,701,168**
Market Value of Assets (MVA)	$ 1,759,902,734	$ 1,813,732,776
Future Employee Contributions	115,642,017	115,300,792
Future County Contributions	657,018,161	686,667,600
Total Resources	**$ 2,532,562,912**	**$ 2,615,701,168**
Actuarial Accrued Liability		
Present Value of Benefits (PVB)	$ 2,532,562,912	$ 2,615,701,168
Present Value of Future Normal Costs (PVFNC)		
County Portion	291,070,965	290,970,580
Employee Portion	115,642,017	115,300,792
Actuarial Accrued Liability (AAL = PVB - PVFNC)	**$ 2,125,849,930**	**$ 2,209,429,796**
Actuarial Value of Assets (AVA)	1,778,267,298	1,859,253,613
Net (Surplus)/Unfunded (AAL – AVA)	**$ 347,582,632**	**$ 350,176,183**
Present Value of Accrued Benefits		
Present Value of Benefits (PVB)	$ 2,532,562,912	$ 2,615,701,168
Present Value of Future Benefit Accruals (PVFBA)	659,017,807	660,939,129
Present Value of Accrued Benefits (PVAB = PVB – PVFBA)	**$ 1,873,545,105**	**$ 1,954,762,039**
Market Value of Assets (MVA)	$ 1,759,902,734	$ 1,813,732,776
Net Unfunded, not less than $0 (PVAB – MVA)	**$ 113,642,371**	**$ 141,029,263**

Changes in Liabilities

Each of the liabilities disclosed in the prior table is expected to change at each valuation. The components of that change, depending upon which liability is analyzed, can include:

- New hires since the last valuation
- Benefits accrued since the last valuation
- Plan amendments increasing benefits
- Passage of time which adds interest to the prior liability
- Benefits paid to retirees since the last valuation
- Participants retiring, terminating, or dying at rates different than expected
- A change in actuarial or investment assumptions
- A change in the actuarial funding method

Unfunded liabilities will change because of all of the above and due to changes in System assets resulting from the following:

- County contributions less than the full actuarial contribution
- Investment earnings different than expected
- A change in the method used to measure System assets

In each valuation, we report on those elements of change that are of particular significance, potentially affecting the long-term financial outlook of the System. Below we present key changes in liabilities since the last valuation.

Table IV-2

	Present Value of Benefits	Actuarial Accrued Liability	Present Value of Accrued Benefits
Liabilities 6/30/2018	$ 2,532,562,912	$ 2,125,849,930	$ 1,873,545,105
Liabilities 6/30/2019	2,615,701,168	2,209,429,796	1,954,762,039
Liability Increase (Decrease)	$ 83,138,256	$ 83,579,866	$ 81,216,934
Change Due to:			
Plan Amendment	$ 0	$ 0	$ 0
Actuarial (Gain)/Loss	*Not Calculated*	(7,935,310)	*Not Calculated*
Method and Assumption Change	0	0	0
Benefits Accumulated and Other Sources	83,138,256	91,515,176	81,216,934

SECTION V - CONTRIBUTIONS

In the process of evaluating the financial condition of any pension system, the actuary analyzes the assets and liabilities to determine what level (if any) of contributions is needed to properly maintain the funding status of the system. Typically, the actuarial process will use a funding technique that will result in a pattern of contributions that is both stable and predictable.

For this system, the funding method employed is the **Entry Age Actuarial Cost Method**. Under this method, there are three components to the total contribution: the **normal cost rate**, the **unfunded actuarial liability rate** (UAL rate), and the **administrative expense rate**. The normal cost rate is determined in the following steps. First, an individual normal cost rate is determined by taking the value, as of entry age into the System, of each member's projected future benefits. This value is then divided by the value, also at entry age, of the member's expected future salary. Second, the normal cost rate is multiplied by current salary and added together to obtain the total System normal cost. This is divided by total salary to convert it to the total system normal cost rate. Finally, the total normal cost rate is reduced by the average member contribution rate to produce the County's normal cost rate.

Development of County Contribution Rate

The employer's total contribution rate is equal to the normal cost rate plus rate changes due to amendments passed or assumption changes adopted since July 1, 2001 plus a 15-year amortization of the UAL that existed on June 30, 2018. In the future, additional amortization bases will be created each year. Finally, the rate includes an expense rate. Please see Table V-3 for details.

The contribution method was changed between the 2018 and 2019 valuations. Please refer to the 2018 report for a description of the corridor method that was previously in place. This section contains a comparison of the County contribution rates for FY 2020 and 2021 in Table V-1. Table V-2 shows the development of the FY 2020 rate under the previously used corridor method. Tables V-3 and V-4 show the calculations of the FY 2021 rate using a closed 15-year layered amortization approach.

SECTION V - CONTRIBUTIONS

The table below presents and compares the budgeted rate for the System for this valuation and the prior one.

The UAL rate is the level percent of member payroll which, when applied to each year's payroll, will be sufficient to amortize the various layers of unfunded actuarial liability over their respective 15-year periods.

Table V-1
Actuarially Determined Rate (for County Contribution)

Valuation Date	June 30, 2018	June 30, 2019
Fiscal Year	**2020**	**2021**
Normal Cost Rate	17.12%	17.16%
UAL Rate	21.07%	19.73%
Expense Rate	0.25%	0.25%
Total County Rate	38.44% [1]	37.14% [2]

[1] The actual contribution rate being paid by the County in FY 2020 is 38.84%.
[2] The County has a policy of not paying any less than the existing rate until such a time as the UAL has been exhausted. FY 2021 will be held at the 38.84% rate in effect for FY 2020, first paid for FY 2017.

SECTION V - CONTRIBUTIONS

Table V-2
Development of Corridor Contribution Rate

		June 30, 2018 (for FY 2020)
1.	**Present Value of Future Benefits**	
	a. Active Employees	$ 1,260,441,614
	b. DROP	162,435,126
	c. Retired Members	1,097,926,481
	d. Vested Terminated and Inactive Members	11,759,691
	e. Total Present Value	$ 2,532,562,912
2.	**Present Value of Future Normal Costs**	
	a. County Portion	$ 291,070,965
	b. Employee Portion	115,642,017
	c. Total Present Value	$ 406,712,982
3.	**Actuarial Accrued Liability (1) – (2)**	$ 2,125,849,930
4.	**Actuarial Value of Assets for Corridor Purposes**	
	a. Actuarial Assets	$ 1,778,267,298
	b. Outstanding Balance of Plan and Assumption Changes	38,177,196
	c. Adjusted Assets (a) + (b)	$ 1,816,444,494
5.	**Funding Ratio for Corridor Test**	85.4%
6.	**Liability to be Amortized if outside Corridor**	
	a. [100%] x (3) - (4)(c)	$ 309,405,436
	b. (4)(c) - 120%x(3)	0
7.	**Active Member Payroll**	$ 180,446,949
8.	**Unfunded Liability Amortization Factor**	11.0842
9.	**Amortization as a % of Payroll (6)/(7)/(8)**	15.47%
10.	**County Contribution Results**	
	a. Normal Cost Rate	17.12%
	b. Administrative Expense Rate	0.25%
	c. Plan Change Amortizations	3.42%
	d. Amortization Outside Corridor (9)	17.65%
	e. Total County Contribution Rate June 30[1]	38.44%

[1]The actual contribution rate to be paid by the County in FY 2020 will be held at 38.84%.

SECTION V - CONTRIBUTIONS

Table V-3
Development of UAL Amortization Layer

		June 30, 2019 (for FY 2021)
1.	**Present Value of Future Benefits**	
	a. Active Employees	$ 1,254,129,420
	b. DROP	191,847,699
	c. Retired Members	1,156,254,071
	d. Vested Terminated and Inactive Members	13,469,978
	e. Total Present Value	$ 2,615,701,168
2.	**Present Value of Future Normal Costs**	
	a. County Portion	$ 290,970,580
	b. Employee Portion	115,300,792
	c. Total Present Value	$ 406,271,372
3.	**Actuarial Accrued Liability (1) – (2)**	$ 2,209,429,796
4.	**Actuarial Value of Assets**	$ 1,859,253,613
5.	**Unfunded Accrued Liability (UAL)**	$ 350,176,183
6.	**Oustanding Prior Bases (see Table V-4)**	331,771,529
7.	**New Base at July 1, 2019**	18,404,654
8.	**Expected Employer Contribution FY 2020 (38.83% * $179,819,293)**	69,841,813
9.	**Employer Normal Cost Payments**	(30,865,858)
10.	**Expense Payments (using 0.25% assumption)**	(449,548)
11.	**Net Contriution to apply to UAL**	38,526,407
12.	**FY 2020 Amortization of prior bases (from Table V-4)**	35,472,973
13.	**Excess UAL Payment (11 - 12)**	$ 3,053,434
14.	**Remaining 2019 base as of July 1, 2020 (7 plus interest - 13)**	$ 16,576,807
15.	**14-year Amortization Factor**	10.3847
16.	**New UAL Amortization Layer (14 / 15)**	$ 1,596,277
17.	**FY 2021 Payment on Prior Bases (from Table V-4)**	34,687,903
18.	**Total UAL Payments (16 + 17)**	$ 36,284,180
19.	**Estimated FY 2021 Payroll**	$ 184,764,324
20.	**UAL as a % of Payroll (18/19)**	19.64%

SECTION V - CONTRIBUTIONS

Table V-4
Schedule of Amortization Bases

Type of Base		Date Established	June 30, 2019 Outstanding Amount	FY 2020 Amortization Payment	June 30, 2020 Outstanding Amount[1]	Amortization Years	July 1, 2020 Amortization Payment
1.	Assumption Changes	7/1/2005	$ 1,654,530	$ 1,713,457	$ -	1	$ -
2.	DPSC Conversion	7/1/2006	2,207,259	1,167,427	1,158,279	2	1,199,531
3.	Reduce Disability Offset to 40%	7/1/2007	1,568,628	564,868	1,097,367	3	580,402
4.	Reduce Disability Offset to 30%	7/1/2008	819,319	225,952	644,720	4	232,166
5.	Assumption Changes	7/1/2010	1,670,526	320,093	1,460,146	6	328,896
6.	Reduce Disability Offset to 25%	7/1/2013	693,491	94,146	646,270	9	96,735
7.	Reduce Disability Offset to 15%	7/1/2014	1,510,591	188,290	1,425,113	10	193,468
8.	Assumption Changes	7/1/2016	19,167,455	2,071,205	18,412,123	12	2,128,163
9.	Unfunded Base	7/1/2018	302,479,730	29,127,535	294,244,576	14	29,928,542
	Total		**$ 331,771,529**	**$ 35,472,973**	**$ 319,088,594**		**$ 34,687,903**

[1] Outstanding amount includes a full year of interest on prior year balance and half year on the amortization payment

SECTION VI - ACCOUNTING STATEMENT INFORMATION

ASC Topic 960 of the Financial Accounting Standards Board (FASB) describes certain disclosures regarding a plan's funded status.

The FASB ASC Topic 960 disclosures provide a quasi "snap shot" view of how the System's assets compare to its liabilities if contributions stopped and accrued benefit claims had to be satisfied. However, due to potential legal requirements and the possibility that alternative interest rates would have to be used to determine the liabilities, these values may not be a good indication of the amount of money it would take to buy the benefits for all members if the System were to terminate.

FASB ASC Topic 960 specifies that a comparison of the present value of accrued (accumulated) benefits with the market value of the assets as of the valuation date must be provided. The relevant amounts as of June 30, 2018 and June 30, 2019 are exhibited in Table VI-1, which also includes a reconciliation of liabilities determined as of the prior valuation, June 30, 2018 to the liabilities as of June 30, 2019.

Table VI-2 is a history of gains and losses in Accrued Liability, and Table VI-3 is the Schedule of Funded Liabilities by Type, which shows the portion of Accrued Liability covered by Assets. See our report dated October 29, 2019 for the required disclosures under GASB Statement No. 67.

SECTION VI - ACCOUNTING STATEMENT INFORMATION

Table VI-1
Accounting Statement Information

		June 30, 2018	June 30, 2019
A.	**FASB ASC Topic 960 Basis**		
1.	Present Value of Benefits Accrued and Vested to Date		
	a. Members Currently Receiving Payments	$ 1,097,926,481	$ 1,156,254,071
	b. Vested Terminated and Inactive Members	11,759,691	13,469,978
	c. DROP	162,435,126	191,847,699
	d. Active Members	465,061,945	452,528,146
	e. Total PVVB	$ 1,737,183,243	$ 1,814,099,894
2.	Present Value of Non-Vested Accrued Benefits for Active Members	136,361,862	140,662,145
3.	Total Present Value of Accrued Benefits	$ 1,873,545,105	$ 1,954,762,039
4.	Assets at Market Value	1,759,902,734	1,813,732,776
5.	Unfunded Present Value of Accrued Benefits, But Not Less Than Zero	$ 113,642,371	$ 141,029,263
6.	Ratio of Assets to Value of Benefits (4) / (3)	93.9%	92.8%
B.	**Statement of Changes in Present Value of Accrued Benefits**		
	Actuarial Present Value of Accrued Benefits as of July 1, 2018		$ 1,873,545,105
	Increase (Decrease) During Years Attributable to:		
	Passage of Time		$ 132,006,073
	Benefit Paid – FY 2019		(105,543,380)
	Assumption Changes		0
	Benefit Change		0
	Benefits Accrued, Other Gains/Losses		54,754,241
	Net Increase (Decrease)		$ 81,216,934
	Actuarial Present Value of Accrued Benefits as of June 30, 2019		$ 1,954,762,039

SECTION VI - ACCOUNTING STATEMENT INFORMATION

Table VI-2
Analysis of Financial Experience
Gains and Losses in Accrued Liability During Years Ended June 30
Resulting from Differences Between Assumed Experience and Actual Experience

Type of Activity	2014	2015	2016	2017	2018	2019
	Gain (or Loss) for Year ending June 30,					
Investment Income	$ 34,542,175	$ (12,354,967)	$ (51,308,849)	$ (19,058,604)	$ (9,182,282)	$ (22,760,419)
Combined Liability Experience	(9,026,264)	38,954,945	15,038,096	(6,047,672)	1,127,589	7,935,310
Gain (or Loss) During Year from Financial Experience	$ 25,515,911	$ 26,599,978	$ (36,270,753)	$ (25,106,276)	$ (8,054,693)	$ (14,825,109)
Non-Recurring Items	(20,177,168)	0	(21,285,640)	(839,465)	(956,369)	-
Composite Gain (or Loss) During Year	**$ 5,338,743**	**$ 26,599,978**	**$ (57,556,393)**	**$ (25,945,741)**	**$ (9,011,062)**	**$ (14,825,109)**

Table VI-3
Schedule of Funded Liabilities by Type
Aggregate Accrued Liabilities For

Valuation Date June 30,	(1) Active Member Contributions	(2) Retirees Vested Terms, Beneficiaries & DROP	(3) Active Members (Employer Financed Portion)	Reported Assets*	Portion of Accrued Liabilities by Reported Assets (1)	(2)	(3)
2014	$ 137,482,080	$ 1,094,584,634	$ 561,785,579	$ 1,466,110,756	100%	100%	42%
2015	145,293,199	1,126,142,315	573,284,029	1,550,327,414	100%	100%	49%
2016	155,579,540	978,657,862	806,219,828	1,601,320,543	100%	100%	58%
2017	154,777,842	1,046,091,139	832,820,471	1,683,381,052	100%	100%	58%
2018	168,602,734	1,097,926,481	859,320,715	1,778,267,298	100%	100%	60%
2019	169,786,637	1,156,254,071	883,389,088	1,859,253,613	100%	100%	60%

* Reported Assets are the actuarial value of assets in this demonstration.

APPENDIX A - MEMBERSHIP INFORMATION

The data for this valuation was provided electronically by the Fairfax County Retirement System staff. Cheiron did not perform a formal audit on the data. However, we did perform checks of the data for reasonableness and consistency in accordance with Actuarial Standards of Practice No. 23 – Data Quality. The data was collected as of December 31, 2018.

Data reported in this Appendix is as of the December 31, 2018 data collection date. Covered payroll and benefits in pay status reported elsewhere in this report have been adjusted to approximate the June 30, 2019 values.

For inactive participants given with a Joint and Survivor form of benefit and no continuation percentage provided, a survivor percentage of 100% is assumed.

APPENDIX A - MEMBERSHIP INFORMATION

Summary of Membership Data as of December 31, 2018

Active Members *				
Plan	Count	Average Age	Average Service	Average Salary
A	0	0.00	0.00	$ 0
B	33	51.30	24.60	116,979
C	0	0.00	0.00	0
D	1,353	43.27	15.81	96,482
E	553	31.32	2.94	64,283
Total	1,939	40.00	12.29	$ 87,647

* Excludes DROP participants.

Inactive Members and DROP Participants	Count	Total Annual Benefit	Average Monthly Benefit
Service Retirement [1]			
Basic Benefit	1,194	$ 78,260,146	$ 5,462
Pre-62 Supplement	33	771,108	1,947
Pre-Social Security Supplement	694	5,390,473	647
Service-Connected Disability [2]	157	$ 7,786,966	$ 4,133
Ordinary Disability	18	$ 350,227	$ 1,621
Beneficiaries	33	$ 1,162,314	$ 2,935
DROP	137	$ 10,223,075	$ 6,218
Vested Former Members [3]	89	$ 1,440,703	$ 1,349

[1] Supplements shown include only amounts currently payable. For members who are in Plan B, and have not yet attained age 55, this means their pre-62 supplement will double in future years.
[2] Benefits are net of offsets for Workers' Compensation and Social Security.
[3] Benefits are payable at age 55.

APPENDIX A - MEMBERSHIP INFORMATION

Data Reconciliation from June 30, 2018 to June 30, 2019

	Active	DROP	Terminated Vested	Retired	Service-Connected Disability	Ordinary Disability	Beneficiary	Total
Participant count as of July 1, 2018	**1,974**	**117**	**83**	**1,142**	**162**	**17**	**33**	**3,528**
New Hires / Re-hires	89		(1)					**88**
Terminated Vested	(15)		15					**0**
DROP	(63)	63						**0**
Retired	(20)	(43)	(1)	64				**0**
Deceased with beneficiary				(1)			1	**0**
Deceased without beneficiary				(12)	(5)		(1)	**(18)**
Benefits Expired								**0**
Ordinary Disability			(1)			1		**0**
Service-Connected Disability								**0**
Return of Contributions	(26)		(6)					**(32)**
Corrections				1				**1**
Change	(35)	20	6	52	(5)	1	0	**39**
Participant count as of June 30, 2019	**1,939**	**137**	**89**	**1,194**	**157**	**18**	**33**	**3,567**

APPENDIX A - MEMBERSHIP INFORMATION

Distribution of Active Participants - - Plan B

COUNTS BY AGE/SERVICE

	Service								
Age	Under 1	1 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 & Up	Total
Under 25	0	0	0	0	0	0	0	0	0
25 to 29	0	0	0	0	0	0	0	0	0
30 to 34	0	0	0	0	0	0	0	0	0
35 to 39	0	0	0	0	0	0	0	0	0
40 to 44	0	0	0	0	0	0	0	0	0
45 to 49	0	0	0	0	0	14	2	0	16
50 to 54	0	0	0	0	0	6	4	1	11
55 to 59	0	0	0	0	0	3	1	0	4
60 to 64	0	0	0	0	0	0	0	1	1
65 & up	0	0	0	0	0	1	0	0	1
Total	0	0	0	0	0	24	7	2	33

TOTAL SALARY BY AGE/SERVICE

	Service								
Age	Under 1	1 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 & Up	Total
Under 25	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0
25 to 29	0	0	0	0	0	0	0	0	0
30 to 34	0	0	0	0	0	0	0	0	0
35 to 39	0	0	0	0	0	0	0	0	0
40 to 44	0	0	0	0	0	0	0	0	0
45 to 49	0	0	0	0	0	1,628,196	277,314	0	1,905,509
50 to 54	0	0	0	0	0	625,007	525,197	170,247	1,320,450
55 to 59	0	0	0	0	0	297,329	88,863	0	386,192
60 to 64	0	0	0	0	0	0	0	146,607	146,607
65 & up	0	0	0	0	0	101,544	0	0	101,544
Total	$ 0	$ 0	$ 0	$ 0	$ 0	$ 2,652,075	$ 891,373	$ 316,854	$ 3,860,302

APPENDIX A - MEMBERSHIP INFORMATION

Distribution of Active Participants - - Plan D

COUNTS BY AGE/SERVICE

	Service								
Age	Under 1	1 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 & Up	Total
Under 25	0	0	0	0	0	0	0	0	0
25 to 29	0	0	35	1	0	0	0	0	36
30 to 34	0	1	86	83	0	0	0	0	170
35 to 39	0	0	57	168	55	0	0	0	280
40 to 44	0	0	21	96	127	44	1	0	289
45 to 49	0	0	9	58	102	113	26	1	309
50 to 54	0	0	8	31	42	69	28	17	195
55 to 59	0	0	3	13	11	17	8	11	63
60 to 64	0	0	0	2	0	4	1	1	8
65 & up	0	0	0	1	2	0	0	0	3
Total	0	1	219	453	339	247	64	30	1,353

TOTAL SALARY BY AGE/SERVICE

	Service								
Age	Under 1	1 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 & Up	Total
Under 25	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0
25 to 29	0	0	2,632,257	72,519	0	0	0	0	2,704,776
30 to 34	0	63,910	6,905,291	6,970,922	0	0	0	0	13,940,123
35 to 39	0	0	4,475,732	14,785,990	5,438,303	0	0	0	24,700,025
40 to 44	0	0	1,573,792	8,273,138	12,920,547	5,109,898	93,381	0	27,970,756
45 to 49	0	0	738,951	5,138,577	10,317,268	12,998,075	3,471,336	145,538	32,809,744
50 to 54	0	0	636,941	2,676,039	3,978,461	7,666,883	3,620,201	2,224,183	20,802,708
55 to 59	0	0	244,494	1,076,350	969,788	1,895,462	1,073,359	1,289,499	6,548,952
60 to 64	0	0	0	157,595	0	427,544	90,148	135,509	810,795
65 & up	0	0	0	96,055	155,757	0	0	0	251,812
Total	$ 0	$ 63,910	$ 17,207,457	$ 39,247,186	$ 33,780,124	$ 28,097,862	$ 8,348,425	$ 3,794,728	$ 130,539,691

APPENDIX A - MEMBERSHIP INFORMATION

Distribution of Active Participants - - Plan E

COUNTS BY AGE/SERVICE

Age	Service: Under 1	1 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 & Up	Total
Under 25	29	49	0	0	0	0	0	0	78
25 to 29	28	155	9	0	0	0	0	0	192
30 to 34	13	140	10	0	0	0	0	0	163
35 to 39	4	58	9	0	0	0	0	0	71
40 to 44	1	17	1	1	0	0	0	0	20
45 to 49	0	11	0	0	0	0	0	0	11
50 to 54	3	7	1	0	0	0	0	0	11
55 to 59	2	4	0	0	0	0	0	0	6
60 to 64	0	1	0	0	0	0	0	0	1
65 & up	0	0	0	0	0	0	0	0	0
Total	80	442	30	1	0	0	0	0	553

TOTAL SALARY BY AGE/SERVICE

Age	Service: Under 1	1 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 & Up	Total
Under 25	$ 1,504,247	$ 3,044,251	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 4,548,498
25 to 29	1,458,639	10,153,007	636,582	0	0	0	0	0	12,248,228
30 to 34	681,328	9,512,764	720,357	0	0	0	0	0	10,914,449
35 to 39	202,564	3,789,272	664,556	0	0	0	0	0	4,656,392
40 to 44	10,869	1,089,161	75,140	39,325	0	0	0	0	1,214,495
45 to 49	0	730,376	0	0	0	0	0	0	730,376
50 to 54	304,535	421,199	61,820	0	0	0	0	0	787,554
55 to 59	93,377	284,008	0	0	0	0	0	0	377,385
60 to 64	0	71,116	0	0	0	0	0	0	71,116
65 & up	0	0	0	0	0	0	0	0	0
Total	$ 4,255,559	$ 29,095,155	$ 2,158,454	$ 39,325	$ 0	$ 0	$ 0	$ 0	$ 35,548,494

APPENDIX A - MEMBERSHIP INFORMATION

Distribution of Active Participants - - Total

COUNTS BY AGE/SERVICE

	Service								
Age	Under 1	1 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 & Up	Total
Under 25	29	49	0	0	0	0	0	0	78
25 to 29	28	155	44	1	0	0	0	0	228
30 to 34	13	141	96	83	0	0	0	0	333
35 to 39	4	58	66	168	55	0	0	0	351
40 to 44	1	17	22	97	127	44	1	0	309
45 to 49	0	11	9	58	102	127	28	1	336
50 to 54	3	7	9	31	42	75	32	18	217
55 to 59	2	4	3	13	11	20	9	11	73
60 to 64	0	1	0	2	0	4	1	2	10
65 & up	0	0	0	1	2	1	0	0	4
Total	80	443	249	454	339	271	71	32	1,939

TOTAL SALARY BY AGE/SERVICE

	Service								
Age	Under 1	1 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 & Up	Total
Under 25	$ 1,504,247	$ 3,044,251	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 4,548,498
25 to 29	1,458,639	10,153,007	3,268,839	72,519	0	0	0	0	14,953,004
30 to 34	681,328	9,576,674	7,625,648	6,970,922	0	0	0	0	24,854,572
35 to 39	202,564	3,789,272	5,140,288	14,785,992	5,438,303	0	0	0	29,356,419
40 to 44	10,869	1,089,161	1,648,931	8,312,464	12,920,547	5,109,898	93,381	0	29,185,251
45 to 49	0	730,376	738,950	5,138,577	10,317,268	14,626,270	3,748,650	145,538	35,445,629
50 to 54	304,535	421,199	698,761	2,676,039	3,978,461	8,291,890	4,145,398	2,394,430	22,910,713
55 to 59	93,377	284,008	244,494	1,076,350	969,788	2,192,791	1,162,222	1,289,499	7,312,529
60 to 64	0	71,116	0	157,595	0	427,544	90,148	282,116	1,028,519
65 & up	0	0	0	96,055	155,756	101,544	0	0	353,355
Total	$ 4,255,559	$ 29,159,064	$ 19,365,911	$ 39,286,513	$ 33,780,123	$ 30,749,937	$ 9,239,799	$ 4,111,583	$ 169,948,489

APPENDIX B - ACTUARIAL ASSUMPTIONS AND METHODS

A. Long-Term Assumptions Used to Determine System Costs and Liabilities

1. Demographic Assumptions

a. Healthy Mortality

Annual Deaths Per 10,000 Members Mortality Projected to 2019		
Age	Male	Female
20	4	2
25	5	2
30	5	2
35	6	3
40	7	4
45	11	7
50	45	27
55	63	36
60	85	54
65	123	83
70	189	132
75	305	216
80	514	365
85	896	646
90	1,591	1,167
95	2,521	1,935
100	3,578	2,870

110% and 100% of the RP-2014 Healthy Annuitant Mortality Table for males and females, respectively, backed down to 2006 then projected using the RPEC-2015 model, with an ultimate rate of 0.65% for ages 20-85 grading down to an ultimate rate of 0% for ages 115-120 and convergence to the ultimate rate in the year 2015. The valuation uses fully generational projection of mortality improvements. Sample rates shown are those projected through the valuation date.

5% of pre-retirement deaths are assumed to be service-connected.

APPENDIX B - ACTUARIAL ASSUMPTIONS AND METHODS

b. Disabled Mortality

Annual Deaths Per 10,000 Members Mortality Projected to 2019		
Age	Male	Female
45	172	104
50	206	134
55	233	168
60	265	203
65	321	247
70	412	333
75	561	487
80	801	735

100% and 115% of the RP-2014 Disabled Annuitant Mortality Table for males and females, respectively, backed down to 2006 then projected using the RPEC-2015 model, with an ultimate rate of 0.65% for ages 20-85 grading down to an ultimate rate of 0% for ages 115-120 and convergence to the ultimate rate in the year 2015. The valuation uses fully generational projection of mortality improvements. Sample rates shown are projected through the valuation date.

c. Termination of Employment (Prior to Normal Retirement Eligibility)

Annual Terminations Per 1,000 Members	
Service	Male and Female
0	122
5	25
10	8
15	5
20	5
25	0

APPENDIX B - ACTUARIAL ASSUMPTIONS AND METHODS

d. Disability

Annual Disabilities Per 1,000 Members*	
Age	**Male and Female**
20	1
25	1
30	1
35	1
40	2
45	3
50	5
55	8
60	8

* Disabilities are assumed to be all service-connected. Of these, 30% are assumed to receive Social Security benefits and 38% are assumed to receive Workers' Compensation benefits. 5% of all service-connected disabilities are at the 90% severe level.

e. Retirement/DROP

Years of Service	Retirement/DROP*
5-24	20%
25	30
26	30
27	27
28	25
29	28
30	25
31	30
32	35
33	35
34	35
35+	100

* 75% of those who leave under this decrement are assumed to DROP, with the other 25% taking immediate retirement.

APPENDIX B - ACTUARIAL ASSUMPTIONS AND METHODS

f. Merit/Seniority Salary Increase (in addition to General Wage Increases)

Year of Service	Merit/Seniority Increase
0	6.50%
5	3.00%
10	1.55%
15	3.00%
20	3.00%
25+	1.00%

g. Family Composition

For purposes of valuing the pre-retirement death benefit, an assumption is made concerning how many employees are married. The assumption used in this valuation is that 80% of employees are married at death while active and that the female spouse is three years younger than the male spouse.

h. Sick Leave Credit

Unused sick leave balances as reported for each active member are used as of the valuation date. Future sick leave accruals are assumed to accrue at 100% of each participant's annual average but are capped at 124 hours per year.

2. Economic Assumptions

a.	Rate of Investment Return:	7.25%
b.	Rate of General Wage Increase:	2.75%*
c.	Rate of Increase in Cost of Living:	2.50%**
d.	Rate of Increase in Total Payroll (for Amortization):	2.75%
e.	Administrative Expenses as a Percentage of Payroll:	0.25%

* General Wage Increase assumption applies for projecting contributions and developing Social Security benefits.

** Benefit increases are limited to 4% per year.

3. Rationale for Assumptions

The actuarial assumptions were adopted by the Board of Trustees upon the recommendation of the actuary, based on an experience study performed in 2016. The results of this study were presented in a report dated June 2016 and are incorporated into this report by reference.

4. Changes Since Last Valuation

None

APPENDIX B - ACTUARIAL ASSUMPTIONS AND METHODS

B. Actuarial Methods

1. Funding Method

The Entry Age Normal Cost method is used to determine costs. Under this method, the employer contribution has three components: the normal cost, the payment toward the unfunded actuarial liability, and the expense rate.

The normal cost is a level percent of pay cost, which, along with the member contributions, will pay for projected benefits at retirement for each plan participant.

The actuarial liability is that portion of the present value of projected benefits that will not be paid by future employer normal costs or member contributions. The difference between this liability and funds accumulated as of the same date is referred to as the unfunded actuarial liability.

The expense rate is added to cover the System’s administrative expenses.

The employer’s total contribution rate is equal to the normal cost rate plus rate changes due to amendments passed or assumption changes adopted since July 1, 2001 plus a 15-year level percent of pay amortization of the UAL that existed on June 30, 2018. In the future, additional amortization bases will be created each year. Finally the rate includes an expense rate.

2. Actuarial Value of Assets

For purposes of determining the County contribution to the System, we use an actuarial value of assets. The asset adjustment method dampens the volatility in asset values that could occur because of fluctuations in market conditions. Use of an asset smoothing method is consistent with the long-term nature of the actuarial valuation process.

In determining the actuarial value of assets, we calculate an expected actuarial value based on cash flow for the year and imputed returns at the actuarial assumption. This expected value is compared to the market value, and one-third of the difference is added to the preliminary actuarial value to arrive at the final actuarial value.

3. Valuation Timing

All participant data is collected as of the December 31 prior to the valuation date. Initial valuation runs are performed as of December 31, and the resulting liabilities are then adjusted for six months to the June 30 valuation date. The adjustment takes into account the actual July 1 cost-of-living increase and any other changes that are known to have occurred in that six-month period.

APPENDIX B - ACTUARIAL ASSUMPTIONS AND METHODS

4. Changes Since Last Valuation

Annual 15-year closed amortization bases are now being established to calculate the contribution rate.

APPENDIX C - SUMMARY OF PLAN PROVISIONS

1. Membership

The plan covers uniformed employees including non-clerical employees of the Fire and Rescue Department, Park Police Department, Sheriff's Department, Helicopter Pilots, Department of Public Safety Communications, and Game Wardens, who are not covered by the Fairfax County Police Officers Retirement System, the Employees' Retirement System, or the VRS. In order to join, an eligible employee must take a physical examination, agree to make required contributions, and may not be within five years of his normal retirement date.

Plan A members as of July 1, 1981 were given the opportunity to join Plan B at that time. Between July 1, 1981 and March 31, 1998, all members were enrolled in Plan B. As of April 1, 1998, Plan A members were given the opportunity to join Plan C, and Plan B members were given the opportunity to join Plan D. On and following April 1, 1998, all members were enrolled in Plan D. Members hired on or after January 1, 2013 and prior to July 1, 2019, all members are enrolled in Plan E. Members hired on or after July 1, 2019 will join Plan F.

2. Member Contributions

Plan A: 4% of compensation up to Social Security wage base and 5-3/4% of compensation in excess of wage base
Plan B: 7.08% of compensation up to Social Security wage base and 8.83% of compensation in excess of wage base
Plan C: 4% of compensation
Plan D, E, and F: 7.08% of compensation

Interest is credited at the rate of 5% per year.

Member contributions are made through an "employer pick-up" arrangement, which results in deferral of the taxes on these contributions.

3. Credited Service

All service as a member plus certain purchased prior service is credited. Also, credit is allowed at the rate of one month for 172 hours of accrued unused sick leave. For those hired on or after January 1, 2013, the amount of unused sick leave that may be used is capped at 2,080 hours.

4. Average Final Compensation

Compensation includes salary paid due to regularly scheduled hours worked, holiday hours worked, administrative emergency leave worked, and shift differential paid. It does not include premium pay such as all overtime. Pay at the rate of final salary is credited for any unused sick leave period. Average final compensation is the average over the high 36 consecutive months (or shorter period of total service).

APPENDIX C - SUMMARY OF PLAN PROVISIONS

Participants whose average final compensation was affected by the 1992-1993 step freeze shall have their average final compensation adjusted.

5. **Social Security Wage Base**

The amount of wages subject to Social Security (FICA) taxes ($132,900 in 2019)

6. **Social Security Breakpoint**

The Social Security breakpoint is the average of past and future Social Security wage bases over an employee's career.

7. **Normal Retirement**

Eligibility

(i) age 55 with six years of service, or
(ii) completion of 25 years of service

Benefit

Plan A Benefit: 2.0% of average final compensation multiplied by credited service, plus, starting at age 55, 100% of the Pre-62 Supplement defined below.

Plan B Benefit: 2.0% of average final compensation multiplied by credited service, plus 50% of the Pre-62 Supplement defined below until age 55 and 100% of the supplement after age 55.

Pre-62 Supplement: Estimated Primary Social Security Benefit multiplied by a ratio, not to exceed one, of the years of credited service as of the date of the calculation, to 25. If the member was hired prior to July 1, 1976, this ratio is equal to one. The supplement is reduced by the Social Security benefits the member is eligible to receive.

Pre-Social Security Supplement (Plans A&B): 0.2% of average final compensation multiplied by credited service.

Plans C, D, and E Benefit: 2.5% of average final compensation multiplied by credited service.

Pre-Social Security Supplement (Plans C, D, and E): 0.3% of average final compensation multiplied by credited service.

All benefits above increased by 3%.

Plan F Benefit: 2.5% of average final compensation multiplied by credited service.

APPENDIX C - SUMMARY OF PLAN PROVISIONS

Plan F: Early Age Option of 0.3% of average final compensation up to the Social Security breakpoint times credited service. This benefit is payable from retirement age until the participant reaches his/her SSRA (age 65, 66, or 67). After SSRA, the base benefit would be reduced to account for the accelerated pre-SSRA benefit.

8. Early Retirement

Eligibility

20 years of service

Benefit

Plans A and B: Normal retirement benefit, excluding the Pre-Social Security supplement, calculated using average final compensation and service at early retirement, actuarially reduced.

Plan A: The Pre-62 Supplement is not provided until age 55; the full supplement is provided at this time.

Plan B: Prior to age 55, one-half of the Pre-62 Supplement is provided. At age 55, the full supplement is paid.

Plans C, D, and E: Normal retirement benefit calculated using average final compensation and service at early retirement, actuarially reduced.

All benefits above increased by 3%.

Plan F: Normal retirement benefit calculated using average final compensation and service at early retirement, actuarially reduced.

9. DROP (Deferred Retirement Option Program)

Eligibility

All members are eligible for DROP participation upon attaining eligibility for normal service retirement. Members can only participate in DROP once, and their election is irrevocable.

Benefit

The benefit scheduled to begin at normal retirement will be credited to a separate DROP account within the Retirement System, accumulating with interest while the member continues to work for a period of 36 months. Upon completion of the three-year period, DROP participation ends, and participants must terminate employment. At that time, the participant will receive payment of the accumulated DROP benefits and begin receiving his

APPENDIX C - SUMMARY OF PLAN PROVISIONS

or her monthly retirement benefit (in the same amount as determined at commencement of DROP participation, plus annual cost-of-living increases).

For those hired on or after January 1, 2013, the amount credited to the DROP account will exclude the Pre-Social Security Supplement described in item 7.

The DROP account will be credited with interest at an annual rate of 5%, compounded monthly.

Death or Disability during DROP

Non Service-Connected: The effective date of the death or disability will be treated as the end of the DROP participation.

Service-Connected Disability: The member may elect either (1) to receive the service-connected disability benefits to which he or she would otherwise be entitled (forfeiture of DROP balance) or (2) the normal retirement benefit plus the DROP account balance.

Service-Connected Death: The beneficiary will receive payment of the accumulated DROP benefits and the regular service-connected benefit.

10. Service-Connected Disability

Eligibility

No age or service requirement

Benefit

40% of final compensation less 100% of Virginia Workers' Compensation benefit

If severely disabled, the benefit is 90% of final compensation with the same offsets for Social Security and Workers' Compensation.

11. Ordinary Disability

Eligibility

Five years of credited service

Benefit

Plans A, B, C, D, and E: 2% of average final compensation times years of credited service; maximum is 60% of average final compensation, increased by 3%

APPENDIX C - SUMMARY OF PLAN PROVISIONS

Plan F: 2% of average final compensation times years of credited service; maximum is 60% of average final compensation

12. Service - Connected Death

Eligibility

No age or service requirement

Benefit

Lump sum payment of $10,000 plus ordinary death benefit

13.Ordinary Death

Eligibility

Less than five years of service

Benefit

Return of employee contributions with interest, payable in a lump sum

Eligibility

Five or more years of service

Benefit

Spouse Allowance: In lieu of the refund of contributions, the spouse of the deceased member may elect an allowance of 50% of the normal retirement benefit, excluding the Pre-Social Security Retirement Age supplement, based on average final compensation and service as of the date of the member’s death. The allowance is payable for the life of the spouse but ceases upon the spouse’s remarriage, if such remarriage occurs prior to the spouse’s age 60.

14. Vesting

Eligibility

Five years of service

APPENDIX C - SUMMARY OF PLAN PROVISIONS

Benefit

Normal retirement benefit based on average final compensation and service at date of termination. Benefit is payable in full at age 55 or actuarially reduced and payable at early retirement age. No supplements are payable.

A member may withdraw his contributions with interest at termination, in which case no vested benefit is payable.

15. Withdrawal

Eligibility

Not eligible for other benefits

Benefit

Contributions with interest

16. Form of Payment

The normal form of payment is a life annuity with a guarantee that at least the amount of member contributions with interest will be paid to the retiree or beneficiaries.

A member may elect an actuarially equivalent "pop-up" Joint and Survivor benefit.

17. Cost-of-Living Adjustment

Each July 1, benefits are increased by the lesser of 4% or the increase in the cost-of-living index for the Washington metropolitan area. The increase is prorated for those who have not been retired for a full year.

Cost-of-living adjustments do not apply to the Pre-62 or Pre-Social Security Supplements or to deferred vested benefits prior to benefit commencement. For Plan A and C benefits, cost-of-living adjustments do not apply to service retirement benefits until the member has attained age 55.

In addition to automatic adjustments, benefits may be further increased on an ad hoc basis, if actuarial experience has been favorable.

18. Changes Since Last Valuation

None