Fairfax County Uniformed Retirement System

Actuarial Valuation as of June 30, 2016

Produced by Cheiron

October 2016

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October 19, 2016

Board of Trustees
Fairfax County Uniformed
Retirement System
10680 Main Street, Suite 280
Fairfax, Virginia 22030-3812

Re: Fairfax County Uniformed Retirement System
Actuarial Valuation as of June 30, 2016

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, 2016. 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 2018 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.

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 Number 23.

This report was prepared exclusively for the Fairfax County Uniformed Retirement System for the purpose described herein. This report is not intended to benefit any third party, and Cheiron assumes no duty or liability to any such party.

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.

We hereby certify that, to the best of our knowledge, this report and its contents, have been prepared in accordance with generally recognized and accepted actuarial principles and practices which are consistent with the Code of Professional Conduct and applicable Actuarial Standards of Practice set out by the Actuarial Standards Board. 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, EA
Principal Consulting Actuary

Coralie A. Milligan, FSA, EA
Associate Actuary

FOREWORD

Cheiron has performed the actuarial valuation of the Fairfax County Uniformed Retirement System as of June 30, 2016. 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 2018; 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 contains details on various asset measures, together with pertinent performance measurements.

Section III shows similar information on System liabilities, measured for actuarial, accounting, and governmental reporting purposes.

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

Section V 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 Number 23.

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 which are consistent with the Code of Professional Conduct and applicable Actuarial Standards of Practice set out by the Actuarial Standards Board.

SECTION I
BOARD SUMMARY

General Comments

Fairfax County's annual contribution to this System is determined by using a corridor funding method. Under this funding approach, the County's contribution rate base rate consists of the normal cost rate plus an expense rate plus certain amortization UAL bases. The UAL base rates are summarized in Section IV. The normal cost rate and actuarial accrued liability will be measured using the entry age funding method. If the corridor funded status falls outside the corridor, a credit (if above 120%) or charge (if below 90%) will be established based on a rolling 15-year amortization equal to the amount necessary to re-enter the corridor. The County is taking steps to increase the 90% corridor floor to 100%. Once this threshold is reached, the 15-year periods will become closed 15-year layers.

The employer contribution rate for FY 2018, as calculated under this method, decreased from 31.49% for FY 2017 to 30.35% of payroll when using the 90% corridor floor. The County's FY 2017 contribution was actually based on a 97% corridor floor, and for FY 2018, we have also provided contribution rates for a 98% floor. On that basis, the contribution in FY 2017 was 39.28%, and for FY 2018 it will be in the range of 37.65% to 38.69%. 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 2017 and FY 2018 will at a minimum be 38.84% which excludes the amount for the one time change to the social security offset.

This valuation contains information reported in the June 30, 2016 Comprehensive Annual Financial Report (CAFR) of the System. Additional information regarding GASB Statement Number 67 can be found in a separate report.

Since the previous valuation, an experience study was performed to review the actuarial assumptions and methods. A description of the changes the Board has approved appears in Appendix B. The current results reflect these assumption changes which increased the liabilities by $20.5 million. As part of the experience study, we revisited the collection and use of data in preparing these valuations. Prior to this valuation, active data was collected as of December 31 and inactive data as of June 30 with participants appearing in both files being removed from the active population. The age and service of the active population was also adjusted to account for the lack of new entrants into the System between December 31 and June 30. Starting with this valuation, the process has been changed to collect all data as of the prior December 31 and to perform the initial valuation runs as of that date. 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.

Trends

The System underperformed the investment assumption during the fiscal year ending in 2016, causing an actuarial loss on the asset side of the System. The actual return on a market value basis was approximately -0.89%. On an actuarial value basis, the assets returned 4.18%

SECTION I
BOARD SUMMARY

compared with an assumed rate of return of 7.50%. The investment loss recognized for funding purposes was $64.5 million.

The measurement of liabilities produced a gain this year in the amount of $15.0 million. This gain was due to experience compared to our assumptions about salary increases, retirement behavior, COLA, death, etc. Specific components of the gain include:

- The average salary increase was 4.6% for active participants who were in both the June 30, 2015 and June 30, 2016 valuations. This was slightly less than the expected salary growth based on the actuarial assumption, which worked out to average 4.8%.

- The valuation assumed a 2.50% cost-of-living adjustment in 2015 for benefits in pay status. The actual CPI-based COLA was 1.00% last year, creating a liability gain of $16.1 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 the employer make contributions 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 $1.2 million loss.

- There was a minimal liability gain 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.

This valuation report also reflects a plan change to reduce the Social Security offset applied to certain disability benefits which increased liabilities by $0.8 million. The County will make an additional contribution in Fiscal Year 2017 to pay for this change.

The combination of liability and investment experience, plan and assumption changes, together with County plus member contributions over the last year caused a decrease in the System's funding ratio (actuarial value of assets over actuarial accrued liability) from 84.0% at June 30, 2015 to 82.5% at June 30, 2016. For purposes of measuring whether the System remains within the funding corridor, an adjusted funding ratio is used. In this ratio, there is an additional asset recognized in the amount of the unfunded actuarial liability payments being made by the County to pay for benefit increases and assumption changes. On this basis, the System's actuarial funded ratio decreased from 86.3% at June 30, 2015 to 85.4% at June 30, 2016.

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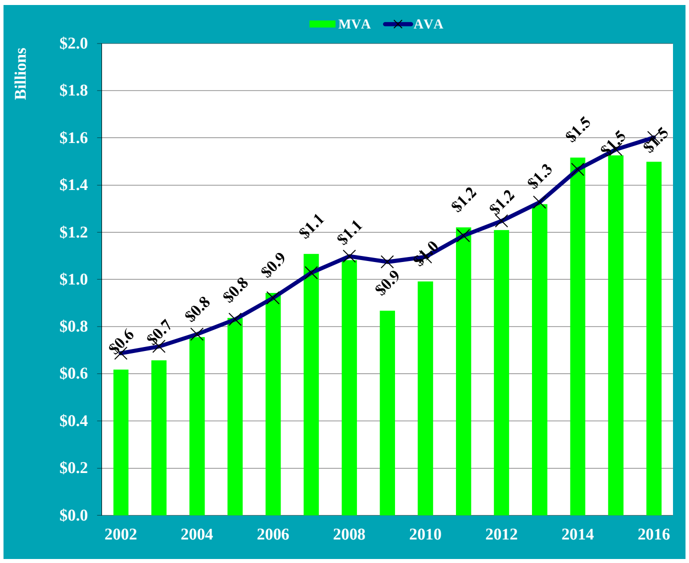
BOARD SUMMARY

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 which 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.

Growth in Assets

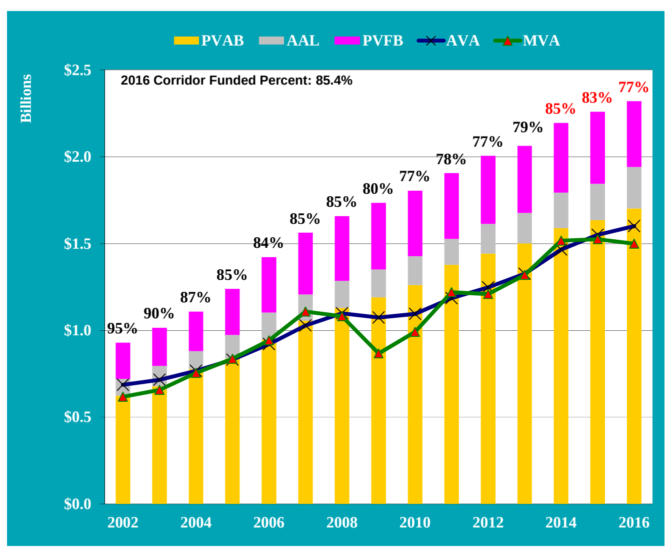


There was a slight decrease in the market value of assets (MVA) over last year due to a return of -0.9%. The actuarial value of assets (AVA) increased due to the continued recognition of recent asset gains. The System has $102.6 million in unrecognized losses that will be phased in over the next few years.

Over the period of July 1, 2002 to June 30, 2016, the System's assets returned approximately 6.71% 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.



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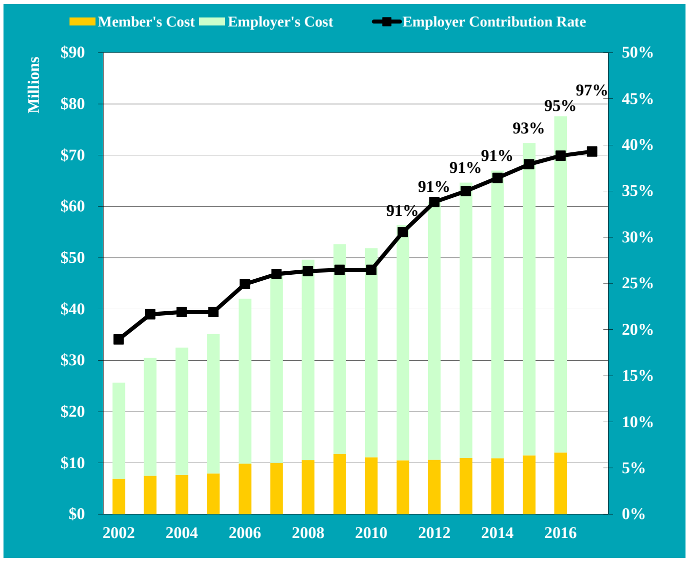
Contribution Rates

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).

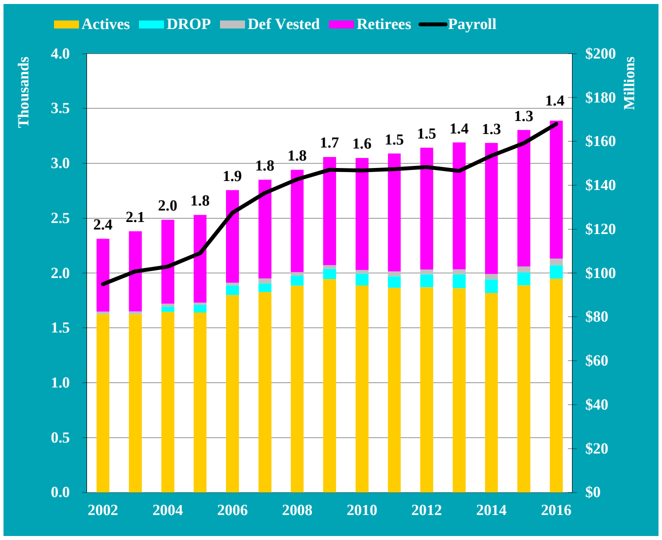


The member contribution rate is set by the County Ordinance. The County contribution rate is set by the actuarial process, as constrained by the corridor method. Note there is a lag in the rate shown. For example, the 2016 value is the rate prepared by the 2014 valuation and implemented for the period June 30, 2015 to June 30, 2016. 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 funds 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 2.4 actives to each inactive in 2002 to 1.4 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.

Starting in 2004, the chart also shows the number of DROP participants. Neither employer nor member contributions are made on their behalf, which leads to a slightly lower growth in effective covered payroll for this System.



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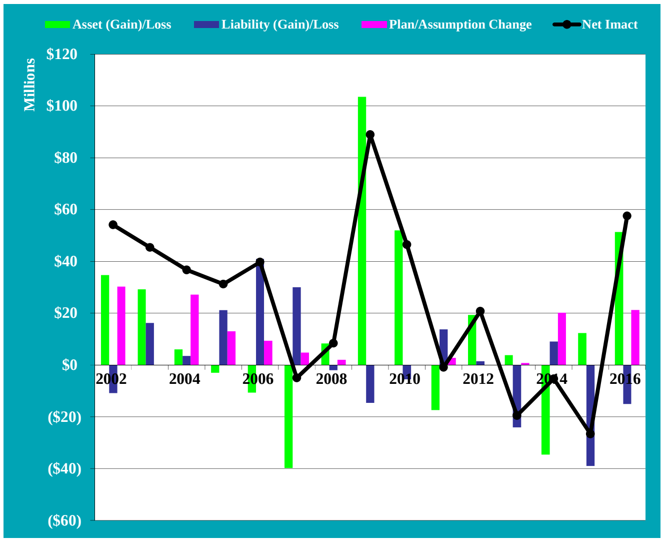
BOARD SUMMARY

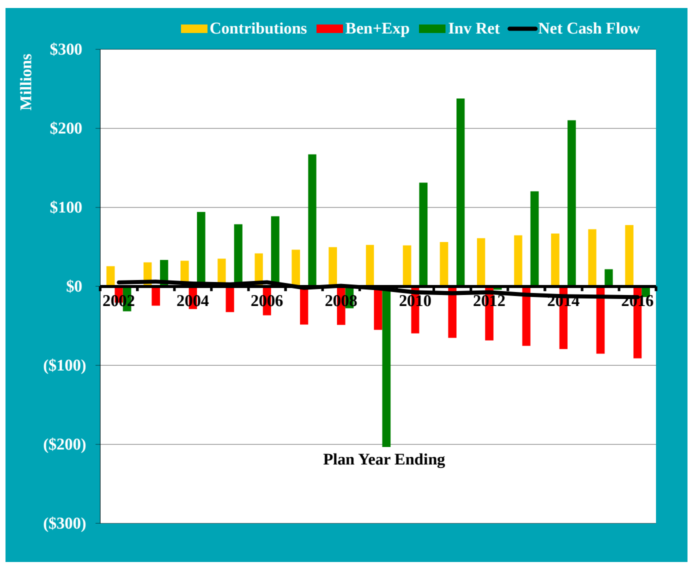
Gains and Losses



This graph shows the annual gains and losses experienced by the System, along with the change in unfunded actuarial liability (UAL) due to plan amendments and changes in assumptions. The black line shows the net impact of all such changes in a given year. Positive numbers represent increases in the UAL while negative numbers show reductions.

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 plan such as this one. The implications of a plan 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.



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BOARD SUMMARY

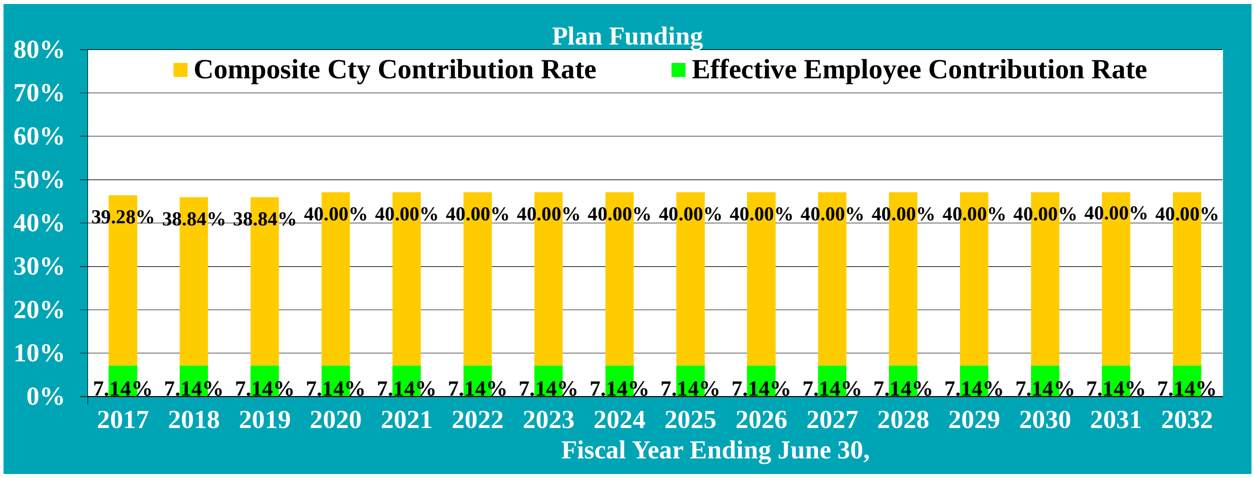
Future Outlook

Base-line Projections

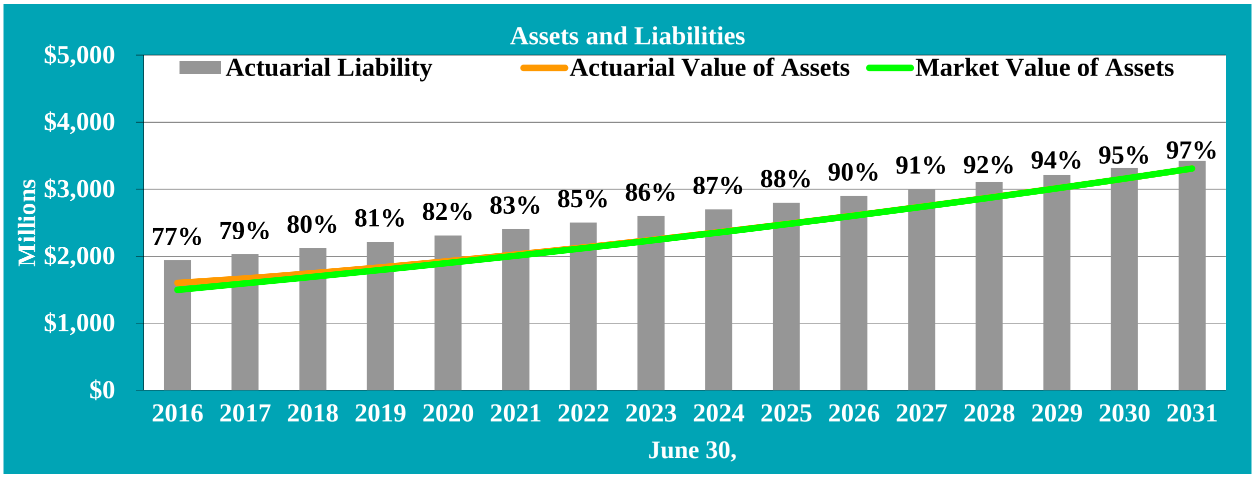
The two graphs below show the expected progress of the System over the next 15 years assuming the System's assets earn 7.25% on their *market value.*

The floor of the County's corridor contribution calculation was increased to 97% for FY 2017. In FY 2018, the amortization target could range from 97 to 98% and continue increasing until the amortization target is 100%. In addition to the increasing corridor floor, the County does not intend to reduce the contribution rate until the System is 100% funded.

The graph entitled "Plan Funding" illustrates the FY 2018 floor at 98% with 1% annual increases thereafter.



The "Assets and Liabilities" graph shows the projected funding status over the next 15 years. The funded ratio slowly increases over the entire period until reaching 97% by 2031.



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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. Since 1980, the System has averaged an 8.93% return per year. 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%
2016	7.42%	2.09%	-6.10%
2017	6.80	6.92	4.29
2018	1.42	17.47	17.90
2019	2.73	29.76	32.31
2020	4.91	19.17	-9.23
2021	-0.44	5.36	12.22
2022	1.23	10.78	17.56
2023	17.34	4.05	-14.20
2024	9.25	15.35	14.94
2025	9.00	-0.69	14.58
2026	-2.36	1.80	28.20
2027	-4.00	-8.62	24.67
2028	3.95	4.40	3.70
2029	7.02	-0.84	7.12
2029	8.92	7.58	9.97
Average	**4.75%**	**7.25%**	**9.75%**

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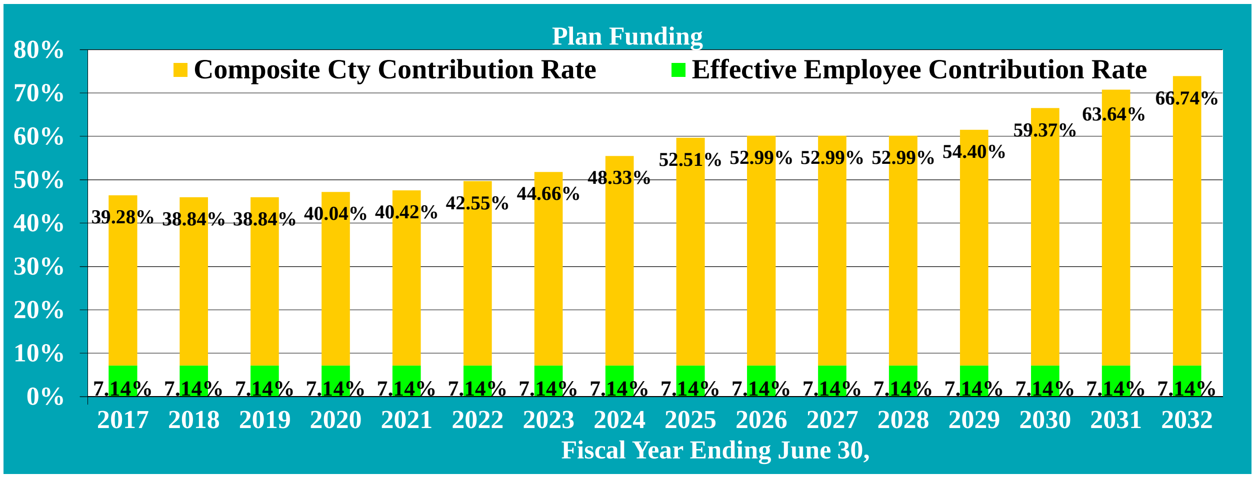
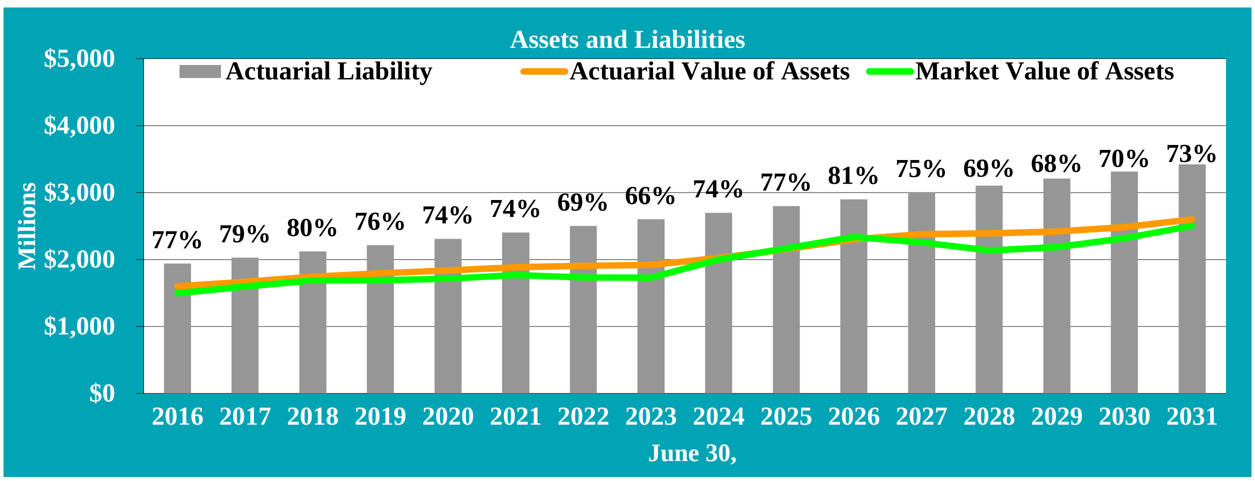
BOARD SUMMARY

<u>Alternative Projection -- with average return of 4.75% in the period</u>

Under this scenario, the corridor contribution rate increases from 39% to about 66% of payroll. The System's funding drops to as low as 66%, even with the ramping up of contributions.

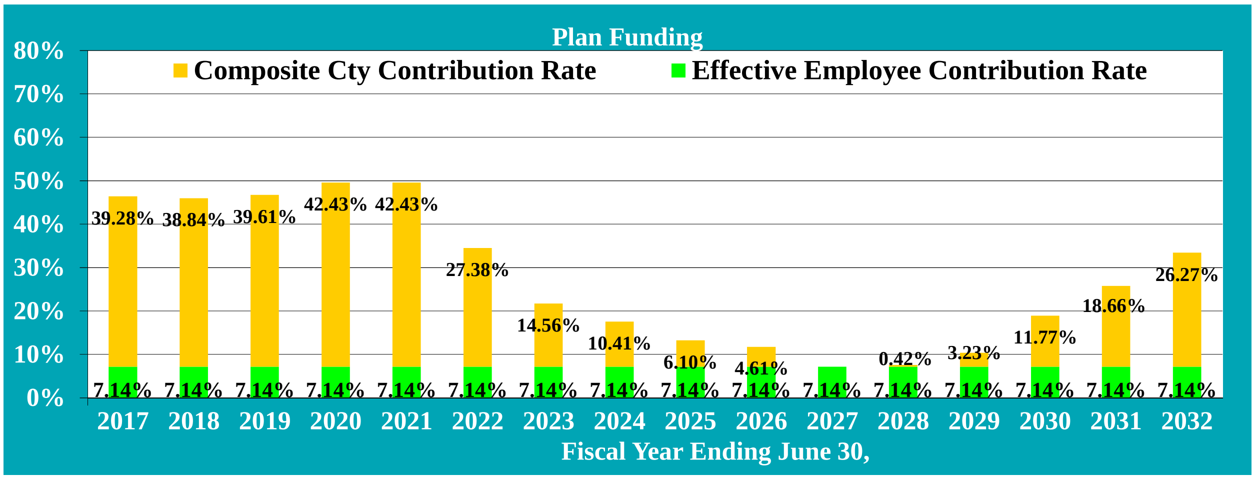


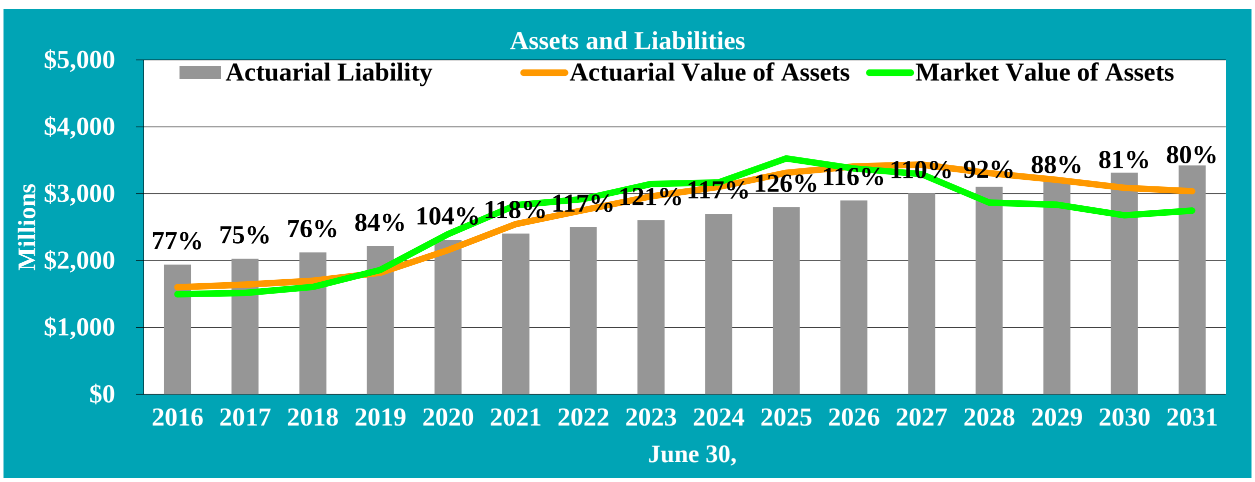


SECTION I
BOARD SUMMARY

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

Under this scenario, the corridor contribution rate increases over the next few years as the corridor floor is increased to 100%. After that time, the contribution drops dramatically as returns continue to push the funded percent over the 120% top of the corridor.





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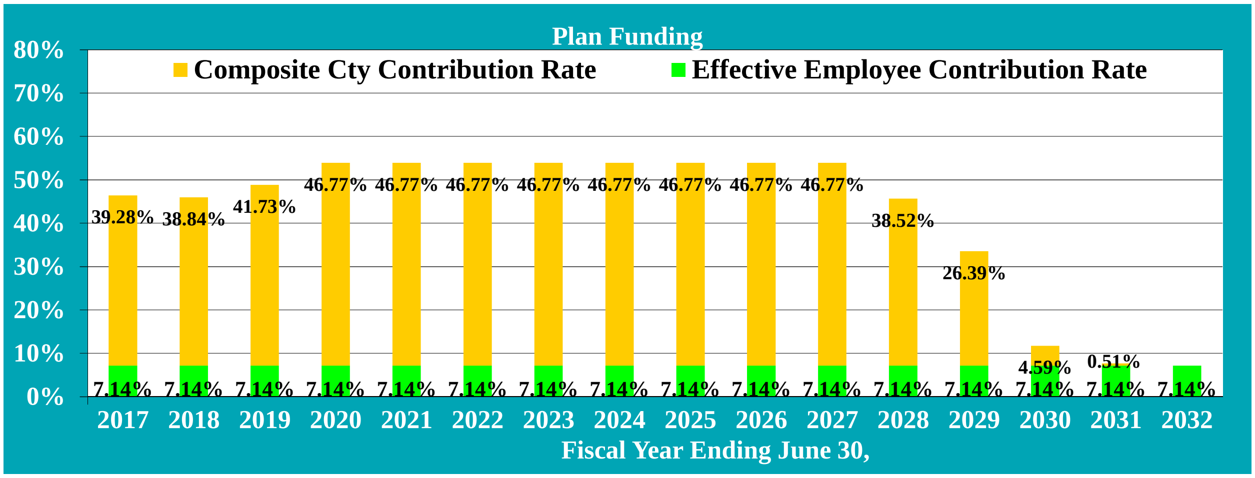
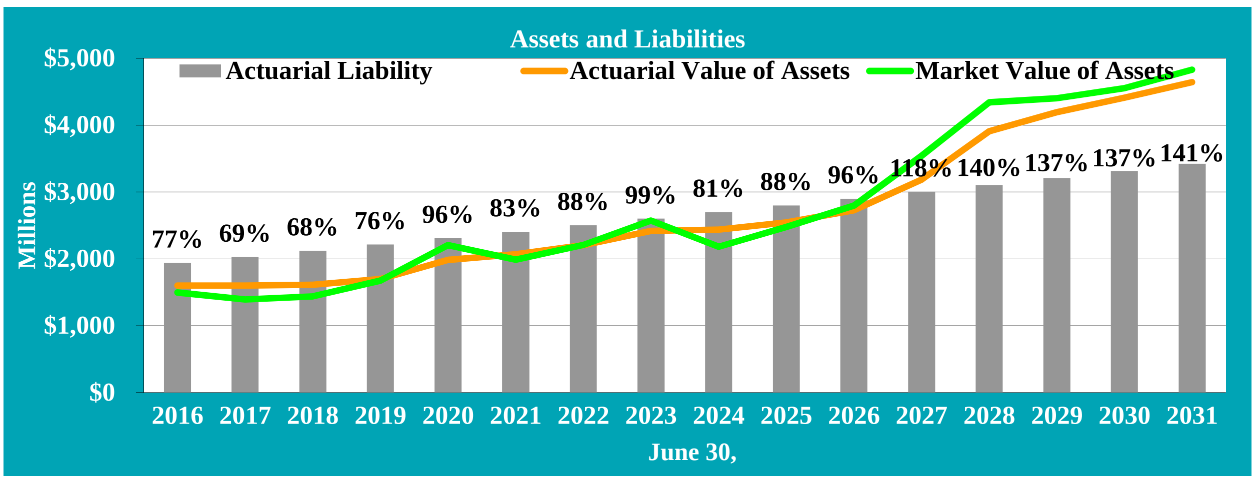
BOARD SUMMARY

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 46.77% 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:	7/1/2015	6/30/2016	% Chg.
Participant Counts			
Actives (excluding DROP)	1,889	1,948	3.1%
DROPs	116	123	6.0%
Terminated Vesteds	55	61	10.9%
In Pay Status	1,243	1,256	1.0%
Total	3,303	3,388	2.6%
Annual Salaries of Active Members	$ 159,216,906	$ 167,965,582	5.5%
Annual Retirement Allowances for Retired Members and Beneficiaries (Base amount only – not supplements)	$ 72,583,335	$ 74,503,164	2.6%
Assets and Liabilities			
Actuarial Accrued Liability (AL)	$ 1,844,719,543	$ 1,940,457,230	5.2%
Assets for Valuation Purposes (AVA)	1,550,327,414	1,601,320,543	3.3%
Unfunded Actuarial Liability	$ 294,392,129	$ 339,136,687	15.2%
Actuarial Value Funding Ratio (AVA/AL)	84.0%	82.5%	
Market Value Funding Ratio (MVA/AL)	82.7%	77.2%	
Present Value of Accrued Benefits	$ 1,634,345,665	$ 1,702,319,153	4.2%
Market Value of Assets	1,525,617,480	1,498,702,845	-1.8%
Unfunded Accrued Liability (not less than $0)	$ 108,728,185	$ 203,616,308	87.3%
Accrued Benefit Funding Ratio	93.3%	88.0%	
Contributions as a Percentage of Payroll	**Fiscal Year 2017**	**Fiscal Year 2018**	
Corridor Method:			
Normal Cost Contribution	20.19%	16.97%	
Increase Due to Amortized Changes	7.20%	8.30%	
Administrative Expense	0.25%	0.25%	
Base Rate	27.64%	25.52%	
Amortize to 97%	38.80% [1]	37.65%	
Amortize to 98%	39.84%	38.69% [2]	

[1] The actual contribution rate being paid by the County in FY 2017 is 38.84%, which is based on the maximum of the prior year contribution and the amortize to 97% amount shown above, adjusted for a reduction in the SS offset.

[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 2018 will be held at the 38.84% rate in effect for FY 2017.

SECTION II
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 upon benefit levels, County contributions, and the ultimate security of participants' benefits.

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

- **Disclosure** of system assets at June 30, 2015 and June 30, 2016,
- 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 which 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 7.50%.

SECTION II
ASSETS

Table II-1
Statement of Assets at Market Value

		6/30/2015		6/30/2016
Assets				
Equity in County's Pooled Cash,				
Contributions Receivable and Other Assets	$	6,458,577	$	6,099,260
Accrued Interest and Dividends Receivable		2,442,831		2,483,724
Receivable from Sale of Investments		66,112,015		21,335,909
Equipment		544		272
US Government Obligations		35,625,703		28,931,620
Asset-Backed Securities		101,143,099		94,558,677
Other Bonds and Notes		85,713,162		121,989,223
Common and Preferred Stock		235,397,891		169,059,146
Pooled and Mutual Funds		948,337,844		955,819,142
Short-Term Investments		127,338,284		123,384,810
Cash Collateral Received Under				
Securities Lending Agreements		37,647,651		15,980,331
Total Assets	$	1,646,217,601	$	1,539,642,114
Liabilities				
Payable for Collateral Received Under				
Securities Lending Agreements	$	37,647,651	$	15,980,331
Payable for Purchase of Investments		80,090,315		22,170,521
Accounts Payable and Accrued Expenses		2,862,155		2,788,417
Total Liabilities	$	120,600,121	$	40,939,269
Net Assets Available for Benefits	**$**	**1,525,617,480**	**$**	**1,498,702,845**

SECTION II
ASSETS

Table II-2
Changes in Market Values

Value of Assets – July 1, 2015			$	1,525,617,480
Additions				
Contributions:				
County Contributions	$	65,548,338		
Employee Contributions		12,020,447		
Total Contributions			$	77,568,785
Investment Income:				
Net Appreciation (Depreciation) in Fair Value of Investments	$	(32,235,126)		
Interest		13,085,114		
Dividends		10,213,011		
Total Investment Income	$	(8,937,001)		
Investment Activity Expenses:				
Management Fees	$	(3,970,311)		
Custodian Fees		(76,557)		
Consulting Expense		(329,621)		
Allocated Administrative Expenses		(234,476)		
Total Investment Activity Expenses	$	(4,610,965)		
From Securities Lending Activities:				
Securities Lending Income	$	160,209		
Securities Lending Expenses				
Borrowers Rebates		(59,333)		
Management Fees		0		
Net Income from Securities Lending Activities	$	100,876		
Net Investment Income			$	(13,447,090)
Total Additions			$	64,121,695
Deductions				
Annuity Benefits	$	(80,717,696)		
Disability Benefits		(7,847,743)		
Survivor Benefits		(1,164,746)		
Refunds and Other Expenses		(805,890)		
Administrative Expenses		(500,255)		
Total Deductions			$	(91,036,330)
Total				
Net Increase (Decrease)			$	(26,914,635)
Value of Assets – June 30, 2016			**$**	**1,498,702,845**

SECTION II
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, 2016 valuation.

Table II-3
Development of Actuarial Value of Assets
as of June 30, 2016

1.	Actuarial Value of Assets at July 1, 2015	**$**	**1,550,327,414**
2.	Amount in (1) with Interest to June 30, 2016		1,666,601,970
3.	Employer and Member Contributions for the Plan Year Ended June 30, 2016		77,568,785
4.	Interest on Contributions Assuming Received Uniformly Throughout the Year to June 30, 2016		2,908,829
5.	Disbursements from Trust Except Investment Expenses, July 1, 2015 Through June 30, 2016		(91,036,330)
6.	Interest on Disbursements Assuming Payments Made Uniformly Throughout the Year to June 30, 2016		(3,413,862)
7.	Expected Value of Assets at June 30, 2016 = (2) + (3) + (4) + (5) + (6)		1,652,629,392
8.	Market Value of Assets at June 30, 2016		1,498,702,845
9.	Excess of (8) Over (7)	$	(153,926,547)
10.	Actuarial Value of Assets at June 30, 2016 = (7) + 33-1/3% of (9)	**$**	**1,601,320,543**

** All interest adjustments are made using the 7 ½% per annum actuarial assumed interest rate that was in effect in the prior year.*

SECTION II
ASSETS

Investment Performance

The market value of assets (MVA) returned -0.89% during 2016, which is less than the assumed 7.50% return. A return of 4.18% 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 II-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]
1992	14.1%	9.8%	13.5%	14.2%
1993	12.2%	10.0%	13.6%	13.2%
1994	1.4%	6.3%	1.3%	-1.5%
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%

[1] Formerly the Lehman Global Aggregate Bond Index.
[2] The actuarial return in 1996 reflects the adjustment to a revised actuarial valuation method.
[3] Figures shown prior to 1997 are Shearson Lehman Government/Corporate Bond Index.

SECTION II
ASSETS

Expected benefit payments are projected for the closed group valued at June 30, 2016. 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 39.28% for FY 2017, and then using the Amortize to 98% rate for FY 2018, amortize to 99% for FY 2019 and so on increasing to 100%. 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 II-5
Projection of System's Benefit Payments and Employer Contributions

Year Beginning July 1,	Expected Benefit Payments	Expected County Contributions
2016	$ 91,242,000	$ 65,977,000
2017	97,581,000	67,015,000
2018	100,757,000	70,456,000
2019	109,975,000	74,307,000
2020	114,950,000	76,350,000
2021	121,908,000	78,450,000
2022	129,011,000	80,607,000
2023	136,176,000	82,824,000
2024	143,458,000	85,101,000
2025	150,825,000	87,442,000

SECTION III
LIABILITIES

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

- **Disclosure** of system liabilities at June 30, 2015 and June 30, 2016,
- 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 and expenses 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 pay off 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 System assets yields, for each respective type, a **net surplus** or an **unfunded liability**.

SECTION III
LIABILITIES

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

	July 1, 2015	June 30, 2016
Present Value of Future Benefits		
Active Participant Benefits (excluding DROP)	$ 1,133,935,723	$ 1,164,883,338
DROP Participant Benefits	153,687,205	167,279,062
Retiree Benefits	964,866,777	978,657,862
Terminated Vested and Inactive Members	7,588,333	8,907,427
Present Value of Benefits (PVB)	**$ 2,260,078,038**	**$ 2,319,727,689**
Market Value of Assets (MVA)	$ 1,525,617,480	$ 1,498,702,845
Future Employee Contributions	109,620,985	108,985,400
Future County Contributions	624,839,573	712,039,444
Total Resources	**$ 2,260,078,038**	**$ 2,319,727,689**
Actuarial Accrued Liability		
Present Value of Benefits (PVB)	$ 2,260,078,038	$ 2,319,727,689
Present Value of Future Normal Costs (PVFNC)		
County Portion	305,737,510	270,285,059
Employee Portion	109,620,985	108,985,400
Actuarial Accrued Liability (AAL = PVB - PVFNC)	**$ 1,844,719,543**	**$ 1,940,457,230**
Actuarial Value of Assets (AVA)	1,550,327,414	1,601,320,543
Net (Surplus)/Unfunded (AAL – AVA)	**$ 294,392,129**	**$ 339,136,687**
Present Value of Accrued Benefits		
Present Value of Benefits (PVB)	$ 2,260,078,038	$ 2,319,727,689
Present Value of Future Benefit Accruals (PVFBA)	625,732,373	617,408,536
Present Value of Accrued Benefits (PVAB = PVB – PVFBA)	**$ 1,634,345,665**	**$ 1,702,319,153**
Market Value of Assets (MVA)	$ 1,525,617,480	$ 1,498,702,845
Net Unfunded, not less than $0 (PVAB – MVA)	**$ 108,728,185**	**$ 203,616,308**

SECTION III
LIABILITIES

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 also due to changes in System assets resulting from the following:

- Employer 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 which 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 III-2

	Present Value of Benefits	Actuarial Accrued Liability	Present Value of Accrued Benefits
Liabilities 7/1/2015	$ 2,260,078,038	$ 1,844,719,543	$ 1,634,345,665
Liabilities 6/30/2016	2,319,727,689	1,940,457,230	1,702,319,153
Liability Increase (Decrease)	$ 59,649,651	$ 95,737,687	$ 67,973,488
Change Due to:			
Plan Amendment	$ 822,644	$ 806,226	$ 803,645
Actuarial (Gain)/Loss	*Not Calculated*	(15,038,096)	*Not Calculated*
Method and Assumption Change	(53,325,370)	20,479,405	(12,826,983)
Benefits Accumulated and Other Sources	112,152,377	89,490,152	79,996,826

SECTION IV
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.

Budgeted Rate (Based on Corridor Method)

The County'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 the expense rate as long as the System's actuarial funded status remains within a corridor of 90% to 120%. The normal cost rate and actuarial accrued liability will continue to be measured using the entry age funding method. If the funded status falls outside the corridor, a credit (if above 120%) or charge (if below 90%) will be established based on a 15-year amortization equal to the amount necessary to re-enter the corridor. Once the funded status is within the corridor, the contribution rate will return to the normal cost rate, plus expense rate, plus amortization of post-2001 changes.

Table IV-1

Changes Since 2001	Impact on UAL Rate
2002 Pre-Social Security Supplement	+ 2.45%
2002 ad-hoc COLA	+ 0.25%
2004 Retiree Increase	+ 1.70%
2004 DROP	+ 0.53%
2005 Assumption Changes	+ 0.91%
2006 DPSC Transfer	+ 0.62%
2007 Reduce Disability Offset to 40%	+ 0.30%
2008 Reduce Disability Offset to 30%	+ 0.12%
2010 Assumption Changes	+ 0.17%
2013 Reduce Disability Offset to 25%	+ 0.05%
2014 Reduce Disability Offset to 15%	+ 0.10%
2016 Assumption Changes	+ 1.10%
Total Increase	+ 8.30%

SECTION IV
CONTRIBUTIONS

The table below presents and compares the budgeted rate for the System for this valuation and the prior one. In both cases, the amortization follows the corridor method amortization to Total County Rate using 90%.

Table IV-2
Actuarially Determined Rate (for Corridor Contribution)

Valuation Date	July 1, 2015	June 30, 2016
Fiscal Year	2017	2018
Normal Cost Rate	20.19%	16.97%
UAL Rate	7.20%	8.30%
Amortization of Amount Outside Corridor (to 90%)	3.85%	4.83%
Expense Rate	0.25%	0.25%
Total County Rate	31.49%	30.35%
Total Rate with Alternative Amortization Targets of		
97%	38.80% [1]	37.65%
98%	39.84%	38.69% [2]

[1] The actual contribution rate being paid by the County in FY 2017 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 2018 will be held at the 38.84% rate in effect for FY 2017.

SECTION IV
CONTRIBUTIONS

Table IV-3 Development of Corridor Contribution Rate	July 1, 2015 (for FY 2017)	June 30, 2016 (for FY 2018)
1. Present Value of Future Benefits		
a. Active Employees	$ 1,133,935,723	$ 1,164,883,338
b. DROP	153,687,205	167,279,062
c. Retired Members	964,866,777	978,657,862
d. Vested Terminated and Inactive Members	7,588,333	8,907,427
e. Total Present Value	$ 2,260,078,038	$ 2,319,727,689
2. Present Value of Future Normal Costs		
a. County Portion	$ 305,737,510	$ 270,285,059
b. Employee Portion	109,620,985	108,985,400
c. Total Present Value	$ 415,358,495	$ 379,270,459
3. Actuarial Accrued Liability (1) – (2)	$ 1,844,719,543	$ 1,940,457,230
4. Actuarial Value of Assets for Corridor Purposes		
a. Actuarial Assets	$ 1,550,327,414	$ 1,601,320,543
b. Outstanding Balance of Plan and Assumption Changes	41,972,891	55,113,933
c. Adjusted Assets (a) + (b)	$ 1,592,300,305	$ 1,656,434,476
5. Funding Ratio for Corridor Test	86.3%	85.4%
6. Liability to be Amortized if outside Corridor		
a. [97% or 98%]x(3) - (4)(c)	$ 197,077,652	$ 245,213,610
b. (4)(c) - 120%x(3)	0	0
7. Active Member Payroll	$ 159,216,906	$ 167,965,582
8. Unfunded Liability Amortization Factor	11.0918	11.0842
9. Amortization as a % of Payroll (6)/(7)/(8)	11.16%	13.17%
10. County Contribution Results (Corridor)		
a. Normal Cost Rate	20.19%	16.97%
b. Administrative Expense Rate	0.25%	0.25%
c. Plan Change Amortizations	7.20%	8.30%
d. Amortization Outside Corridor (9)	11.16%	13.17%
e. Total County Contribution Rate June 30[1]	38.80%	38.69%

[1] The actual contribution rate to be paid by the County in FY 2018 will be held at 38.84%.

SECTION V
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, 2015 and June 30, 2016 are exhibited in Table V-1, which also includes a reconciliation of liabilities determined as of the prior valuation, July 1, 2015 to the liabilities as of June 30, 2016.

Table V-2 is a history of gains and losses in Accrued Liability, and Table V-3 is the Solvency Test which shows the portion of Accrued Liability covered by Assets. See our report dated October 3, 2016 for the required disclosures under GASB Statement Number 67.

SECTION V
ACCOUNTING STATEMENT INFORMATION

Table V-1
Accounting Statement Information

	July 1, 2015	June 30, 2016
A. FASB ASC Topic 960 Basis		
1. Present Value of Benefits Accrued and Vested to Date		
a. Members Currently Receiving Payments	$ 964,866,777	$ 978,657,862
b. Vested Terminated and Inactive Members	7,588,333	8,907,427
c. DROP	153,687,205	167,279,062
d. Active Members	303,318,155	307,114,555
e. Total PVVB	$ 1,429,460,470	$ 1,461,958,906
2. Present Value of Non-Vested Accrued Benefits for Active Members	204,885,195	240,360,247
3. Total Present Value of Accrued Benefits	$ 1,634,345,665	$ 1,702,319,153
4. Assets at Market Value	1,525,617,480	1,498,702,845
5. Unfunded Present Value of Accrued Benefits, But Not Less Than Zero	$ 108,728,185	$ 203,616,308
6. Ratio of Assets to Value of Benefits (4) / (3)	93.3%	88.0%
B. Statement of Changes in Present Value of Accrued Benefits		
Actuarial Present Value of Accrued Benefits as of July 1, 2015		$ 1,634,345,665
Increase (Decrease) During Years Attributable to:		
Passage of Time		$ 118,279,072
Benefit Paid – FY 2016		(90,536,075)
Assumption Changes		(12,826,983)
Benefit Change		803,645
Benefits Accrued, Other Gains/Losses		52,253,829
Net Increase (Decrease)		$ 67,973,488
Actuarial Present Value of Accrued Benefits as of June 30, 2016		$ 1,702,319,153

SECTION V
ACCOUNTING STATEMENT INFORMATION

Table V-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

	Gain (or Loss) for Year ending June 30,					
Type of Activity	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
Investment Income	$ 17,409,148	$ (19,330,917)	$ (3,805,385)	$ 34,542,175	$ (12,354,967)	$ (51,308,849)
Combined Liability Experience	(13,747,922)	(1,456,752)	24,088,845	(9,026,264)	38,954,945	15,038,096
Gain (or Loss) During Year from Financial Experience	$ 3,661,226	$ (20,787,669)	$ 20,283,460	$ 25,515,911	$ 26,599,978	$ (36,270,753)
Non-Recurring Items	(2,808,343)	0	(813,016)	(20,177,168)	0	(21,285,640)
Composite Gain (or Loss) During Year	**$ 852,883**	**$ (20,787,669)**	**$ 19,470,444**	**$ 5,338,743**	**$ 26,599,978**	**$ (57,556,393)**

Table V-3
Solvency Test

	Aggregate Accrued Liabilities For				Portion of Accrued Liabilities by Reported Assets		
Valuation Date June 30,	**(1) Active Member Contributions**	**(2) Retirees Vested Terms, Beneficiaries & DROP**	**(3) Active Members (Employer Financed Portion)**	**Reported Assets***	**(1)**	**(2)**	**(3)**
2011	$ 120,040,592	$ 896,003,321	$ 510,174,331	$ 1,185,593,678	100%	100%	33%
2012	120,373,016	981,922,550	511,358,566	1,247,526,438	100%	100%	28%
2013	130,979,546	1,042,085,650	503,200,502	1,326,424,772	100%	100%	30%
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%

* 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 Number 23 – Data Quality. The data was collected as of December 31, 2015.

Data reported in this Appendix is as of the December 31, 2015 data collection date. Covered payroll and benefits in pay status reported elsewhere in this report have been adjusted to approximate the June 30, 2016 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 June 30, 2016

Active Members *				
Plan	Count	Average Age	Average Service	Average Salary
A	0	0.00	0.00	$ 0
B	50	49.34	22.46	103,329
C	0	0.00	0.00	0
D	1,595	41.51	13.83	87,731
E	303	29.61	1.29	56,299
Total	1,948	39.86	12.10	$ 83,242

* Excludes DROP participants.

Inactive Members and DROP Participants	Count	Total Annual Benefit	Average Monthly Benefit
Service Retirement [1]			
Basic Benefit	1,038	$ 64,355,654	$ 5,167
Pre-62 Supplement	30	494,866	1,375
Pre-Social Security Supplement	592	4,439,482	625
Service-Connected Disability [2]	168	$ 7,661,616	$ 3,800
Ordinary Disability	18	$ 340,365	$ 1,576
Beneficiaries	32	$ 989,290	$ 2,576
DROP	123	$ 8,810,807	$ 5,969
Vested Former Members [3]	61	$ 921,975	$ 1,260

[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 July 1, 2015 to June 30, 2016	Active	DROP	Terminated Vested	Retired	Service-Connected Disability	Ordinary Disability	Beneficiary	Total
Participant count as of July 1, 2015	**1,889**	**116**	**55**	**1,021**	**171**	**17**	**34**	**3,303**
New Hires / Re-hires	127							**127**
Terminated Vested	(11)		11					**0**
DROP	(27)	27						**0**
Retired	(5)	(18)		23				**0**
Deceased with beneficiary								**0**
Deceased without beneficiary	(5)	(2)	(5)	(6)	(4)		(2)	**(24)**
Benefits Expired								**0**
Ordinary Disability	(1)					1		**0**
Service-Connected Disability								**0**
Terminated Not Vested	(19)							**(19)**
Corrections					1			**1**
Change	59	7	6	17	(3)	1	(2)	**85**
Participant count as of June 30, 2016	**1,948**	**123**	**61**	**1,038**	**168**	**18**	**32**	**3,388**

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	2	6	0	0	8
45 to 49	0	0	0	0	5	11	4	0	20
50 to 54	0	0	0	0	7	3	3	2	15
55 to 59	0	0	0	0	1	1	2	1	5
60 to 64	0	0	0	0	1	0	0	0	1
65 & up	0	0	0	0	1	0	0	0	1
Total	0	0	0	0	17	21	9	3	50

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	190,132	711,870	0	0	902,002
45 to 49	0	0	0	0	456,906	1,185,060	473,199	0	2,115,165
50 to 54	0	0	0	0	650,456	318,691	295,783	194,655	1,459,585
55 to 59	0	0	0	0	99,617	85,851	190,123	135,701	511,292
60 to 64	0	0	0	0	80,796	0	0	0	80,796
65 & up	0	0	0	0	97,608	0	0	0	97,608
Total	$ 0	$ 0	$ 0	$ 0	$ 1,575,515	$ 2,301,472	$ 959,105	$ 330,356	$ 5,166,448

APPENDIX A
MEMBERSHIP INFORMATION

Distribution of Active Participants - - Plan D

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	0	6	0	0	0	0	0	0	6
25 to 29	0	59	41	1	0	0	0	0	101
30 to 34	0	49	145	64	0	0	0	0	258
35 to 39	0	27	108	137	38	1	0	0	311
40 to 44	0	6	48	99	112	28	1	0	294
45 to 49	0	8	22	75	119	96	23	1	344
50 to 54	0	1	14	37	30	54	46	13	195
55 to 59	0	2	3	12	11	17	11	14	70
60 to 64	0	0	4	3	5	0	0	1	13
65 & up	0	0	0	1	0	1	0	1	3
Total	0	158	385	429	315	197	81	30	1,595

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	$ 0	$ 355,655	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 355,655
25 to 29	0	3,710,856	2,827,076	74,413	0	0	0	0	6,612,345
30 to 34	0	3,197,242	10,037,432	5,134,068	0	0	0	0	18,368,742
35 to 39	0	1,747,147	7,576,282	11,861,509	3,687,081	154,386	0	0	25,026,405
40 to 44	0	380,380	3,314,499	8,579,220	11,446,464	3,291,995	142,164	0	27,154,722
45 to 49	0	538,766	1,586,005	6,410,390	11,749,073	10,906,253	2,776,043	148,232	34,114,762
50 to 54	0	63,423	1,020,097	2,960,419	2,933,782	5,915,824	5,368,212	1,603,508	19,865,265
55 to 59	0	127,549	193,786	940,248	1,071,032	1,883,152	1,202,720	1,703,338	7,121,825
60 to 64	0	0	279,864	217,559	426,400	0	0	99,465	1,023,288
65 & up	0	0	0	67,624	0	99,118	0	120,725	287,467
Total	$ 0	$ 10,121,018	$ 26,835,041	$ 36,245,450	$ 31,313,832	$ 22,250,728	$ 9,489,139	$ 3,675,268	$ 139,930,476

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	23	27	0	0	0	0	0	0	50
25 to 29	48	80	0	0	0	0	0	0	128
30 to 34	38	42	0	0	0	0	0	0	80
35 to 39	12	10	0	0	0	0	0	0	22
40 to 44	4	8	0	0	0	0	0	0	12
45 to 49	1	1	0	0	0	0	0	0	2
50 to 54	2	4	0	0	0	0	0	0	6
55 to 59	1	2	0	0	0	0	0	0	3
60 to 64	0	0	0	0	0	0	0	0	0
65 & up	0	0	0	0	0	0	0	0	0
Total	129	174	0	0	0	0	0	0	303

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	$ 1,266,466	$ 1,561,376	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 2,827,842
25 to 29	2,484,834	4,676,382	0	0	0	0	0	0	7,161,216
30 to 34	1,948,723	2,430,993	0	0	0	0	0	0	4,379,716
35 to 39	690,086	601,240	0	0	0	0	0	0	1,291,326
40 to 44	221,506	453,913	0	0	0	0	0	0	675,419
45 to 49	65,717	74,378	0	0	0	0	0	0	140,095
50 to 54	99,265	224,351	0	0	0	0	0	0	323,616
55 to 59	11,956	247,303	0	0	0	0	0	0	259,259
60 to 64	0	0	0	0	0	0	0	0	0
65 & up	0	0	0	0	0	0	0	0	0
Total	$ 6,788,553	$ 10,269,936	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 17,058,489

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	23	33	0	0	0	0	0	0	56
25 to 29	48	139	41	1	0	0	0	0	229
30 to 34	38	91	145	64	0	0	0	0	338
35 to 39	12	37	108	137	38	1	0	0	333
40 to 44	4	14	48	99	114	34	1	0	314
45 to 49	1	9	22	75	124	107	27	1	366
50 to 54	2	5	14	37	37	57	49	15	216
55 to 59	1	4	3	12	12	18	13	15	78
60 to 64	0	0	4	3	6	0	0	1	14
65 & up	0	0	0	1	1	1	0	1	4
Total	129	332	385	429	332	218	90	33	1,948

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	$ 1,266,466	$ 1,917,031	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 3,183,497
25 to 29	2,484,834	8,387,241	2,827,076	74,413	0	0	0	0	13,773,564
30 to 34	1,948,723	5,628,235	10,037,432	5,134,068	0	0	0	0	22,748,458
35 to 39	690,086	2,348,387	7,576,282	11,861,509	3,687,081	154,386	0	0	26,317,731
40 to 44	221,506	834,293	3,314,499	8,579,220	11,636,596	4,003,866	142,164	0	28,732,144
45 to 49	65,717	613,144	1,586,005	6,410,390	12,205,980	12,091,309	3,249,241	148,232	36,370,018
50 to 54	99,265	287,774	1,020,097	2,960,419	3,584,238	6,234,516	5,663,995	1,798,163	21,648,467
55 to 59	11,956	374,852	193,786	940,248	1,170,649	1,969,003	1,392,843	1,839,039	7,892,376
60 to 64	0	0	279,864	217,559	507,196	0	0	99,465	1,104,084
65 & up	0	0	0	67,624	97,608	99,118	0	120,725	385,075
Total	$ 6,788,553	$ 20,390,957	$ 26,835,041	$ 36,245,450	$ 32,889,348	$ 24,552,198	$ 10,448,243	$ 4,005,624	$ 162,155,414

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 2016		
Age	Male	Female
20	6	2
25	6	2
30	5	2
35	6	3
40	8	5
45	13	8
50	52	29
55	67	38
60	90	59
65	139	98
70	223	156
75	364	251
80	605	414
85	1,032	726
90	1,768	1,281
95	2,720	2,072
100	3,788	3,022

110% and 100% of the RP-2014 Healthy Annuitant Mortality Table for males and females, respectively, projected using the RPEC-2015 model, with an ultimate rate of 0.75% 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.

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

APPENDIX B
ACTUARIAL ASSUMPTIONS AND METHODS

b. Disabled Mortality

Annual Deaths Per 1,000 Members Mortality Projected to 2016		
Age	Male	Female
45	19	11
50	22	14
55	23	15
60	25	19
65	31	25
70	42	34
75	58	50
80	82	74

100% and 115% of the RP-2014 Disabled Annuitant Mortality Table for males and females, respectively, projected using the RPEC-2015 model, with an ultimate rate of 0.75% 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

It is assumed that members who terminate before normal or early retirement age elect to receive a refund of contributions instead of vested benefits.

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.

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 across-the-board increase)

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.

APPENDIX B
ACTUARIAL ASSUMPTIONS AND METHODS

4. Changes Since Last Valuation

All of the assumptions were reviewed as part of the experience study performed in early 2016. The assumptions that were changed since the last valuation include healthy and disabled mortality rates, termination, disability and retirement rates, salary increases, sick leave credit, investment return, general wage increase, cost-of-living adjustments, and total payroll increase.

The data collection and valuation processes were also changed to use a data collection and measurement date of December 31, 2015 and roll-forward the resulting liabilities to the June 30, 2016 valuation date.

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.

Under the Corridor Funding Method, the County's total contribution rate is equal to the normal cost rate, plus the UAL amortization rates for changes due to assumption changes or amendments passed since July 1, 2001 plus the expense rate as long as the System's actuarial funded status remains within a corridor of 90% to 120%. If the funded status falls outside the corridor, a credit (if above 120%) or charge (if below 90%) will be established based on a 15-year amortization equal to the amount necessary to re-enter the corridor. Once the funded status is within the corridor, the contribution rate will return to the normal cost rate, plus expense rate, plus amortization of post-2001 changes.

The 90% corridor floor is being increased to 100% by 2020. As of the 2014 valuation, the floor had reached 95%. Amortization is currently performed using an open 15-year period (with the exception of prior changes identified in Section IV). Once the corridor floor reaches 100% the 15-year period will be closed. Continued use of an open amortization period would result in the System's UAL never being fully exhausted.

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

APPENDIX B
ACTUARIAL ASSUMPTIONS AND METHODS

the actual July 1 cost-of-living increase and any other changes that are known to have occurred in that six-month period.

4. Changes Since Last Valuation

As a result of an experience study, changes were made to the data collection timing, and a revised process is used to run valuation liabilities as of the December 31 prior to the valuation date and then adjust those liabilities to June 30. This change was made to better align the data sources and to allow for use of the same valuation liability for funding and GASB 67 disclosures.

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. On and following January 1, 2013, all members are enrolled in Plan E.

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: 7.08% of compensation
Plan E: 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 ($118,500 in 2016)

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 & E Benefit: 2.5% of average final compensation multiplied by credited service

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

All benefits increased by 3%

APPENDIX C
SUMMARY OF PLAN PROVISIONS

8. Early Retirement

Eligibility

20 years of service

Benefit

Plans A&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 & E: Normal retirement benefit calculated using average final compensation and service at early retirement, actuarially reduced

All benefits increased by 3%

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 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.

APPENDIX C
SUMMARY OF PLAN PROVISIONS

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 10% of Social Security disability benefit to which the member is entitled and 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

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

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

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.

APPENDIX C
SUMMARY OF PLAN PROVISIONS

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 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

The service-connected disability benefit offset was reduced from 15% to 10% of any primary Social Security benefit.

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