THE ANNE ARUNDEL COUNTY
FIRE SERVICE
RETIREMENT PLAN

ACTUARIAL VALUATION
AS OF
JANUARY 1, 2015

Bolton Partners, Inc.
100 Light Street, 9th Floor
Baltimore, MD 21202

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BOLTON PARTNERS

April 10, 2015

PERSONAL & CONFIDENTIAL
Andrea Rhodes
Personnel Officer
Anne Arundel County Government
P.O. Box 6675
Annapolis, MD 21401

Re: Fire Service Retirement Plan Valuation

Dear Andrea:

The following report sets forth the actuarial valuation as of January 1, 2015 of the Anne Arundel County Fire Service Retirement Plan, for the plan year beginning on that date. The valuation is based on participant data submitted by the personnel department of Anne Arundel County, Aetna and Prudential and unaudited asset data submitted by the County.

INVESTMENT PERFORMANCE

The market value of plan assets as of December 31, 2014 was $489,766,897. The average investment return for the fund for the year ended December 31, 2014 was 4.8% on a market basis and 8.5% on an actuarial basis.

The plan utilizes an actuarial averaging method to smooth out swings in investment performance and thus in asset values from year to year. Under the method, investment gains or losses above or below the 7.5% actuarial assumption are phased in over a five year period. As of December 31, 2014, the actuarial value of assets was $490,533,983. Details of the development of the actuarial value of assets are set forth later in this report.

PLAN PROVISION CHANGES

This valuation report reflects the change to a 7.25% Employee Contribution percentage for all plan participants pursuant to Bill No. 30-12.

PRINCIPAL RESULTS

The principal purpose of the valuation is to set forth the County's contributions for the fiscal year ending June 30, 2016. The balance of this report sets forth details of changes in participation in the plan and the results of the valuation. A statement of funding progress is also included. The information for the plan's financial reporting requirements and the County's financial statements is included in a separate report.

The total recommended employer contribution for the fiscal year ending June 30, 2016 decreased from $15,388,777 to $14,854,838. This is in addition to employee contributions of 7.25% for all employees. Even though pay increased materially, many of the active members are in DROP and their benefits are not impacted by pay changes. The decrease as a percentage of payroll can be broken down to the following factors:

January 1, 2014 valuation	34.2%
Investment Gain	(0.7%)
Expense Load	(0.1%)
Pay Increases	0.5%
New Entrants/Change in Normal Cost	(2.3%)
COLA	(0.6%)
Demographics and Other Changes	(0.4%)
January 1, 2015 valuation	30.6%

The overall funded ratio for the plan based on the actuarial value of assets increased from 85.3% to 86.4%. Currently the market value of assets of $490 million is $1 million less than the actuarial value of the assets ($491 million). This difference of $1 million represents deferred investment losses that will be recognized in future valuations.

There have been no changes in the actuarial assumptions or methods since the last valuation. The assumptions used in this valuation are based on the December 2012 review of the plan's experience.

We have introduced on page 19 a new "Risk Metrics" sheet. This shows interesting trends and the impact of the 8.0% payroll increase in these trends.

Thomas Lowman and Kristopher Seets are Fellows of the Society of Actuaries and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein. The Actuarial Certification at the end of this report contains other important information to understand about this valuation.

Sincerely,

BOLTON PARTNERS, INC.

Thomas B. Lowman, FSA, EA

Kristopher E. Seets, FSA, EA

David W. Ballard, CEBS

Trust Fund Asset Statement

TRUST FUND ASSET STATEMENT FOR YEAR ENDED DECEMBER 31, 2014

Original Market Value 1/1/2014	$ 476,085,370
Audit Adjustment	$ 0
Market Value 1/1/2014	$ 476,085,370
Receipts:	
Employer Contributions	$ 15,983,986
Employee Contributions	2,755,952
Interest and Dividends	11,778,172
Stock Loan Income	30,305
Realized and Unrealized Gain/(Loss)	9,712,135
Other	4,238,225
Total Receipts:	$ 44,498,775
Disbursements:	
Benefit Payments	$ 28,823,048
Administrative Expenses	423,131
Investment Expenses	3,070,911
Total Disbursements	$ 32,317,090
Net Increase/(Decrease)	$ 12,181,685
Preliminary Ending Value 12/31/2014	$ 488,267,055
Contribution Receivable	$ 1,499,842
Ending Value 12/31/2014	$ 489,766,897

(Note: There may be some dollar rounding differences.)

Development of Actuarial Value of Assets

ACTUARIAL VALUE OF ASSETS

		2013	2014
1.	**MVA Beginning of Year**	**$438,607,279**	**$477,647,839**
2.	Contributions	18,585,139	18,677,311
3.	Benefit Payments	21,875,017	28,823,048
4.	Administrative Expenses	598,347	423,131
5.	Expected 8%/7.5% Return	34,933,053	35,427,255
6.	**Expected Asset Value** (1. + 2. – 3. – 4. + 5.)	**$469,652,107**	**$502,506,227**
7.	Market Value End of Year	$477,647,839	$489,766,897
8.	**Asset Gain/(Loss)** (7. – 6.)	**$7,995,732**	**($12,739,330)**
9.	80% of 2013 Gain/(Loss) of $7,995,732	$6,396,585	
10.	60% of 2012 Gain/(Loss) of $22,312,681	$13,387,608	
11.	40% of 2011 Gain/(Loss) of ($21,490,663)	($8,596,265)	
12.	20% of 2010 Gain/(Loss) of $21,120,155	$4,224,031	
13.	**Actuarial Value of Assets 1/1/2014**	**$462,235,880**	
14.	80% of 2014 Gain/(Loss) of ($12,739,330)		($10,191,464)
15.	60% of 2013 Gain/(Loss) of $7,995,732		$4,797,439
16.	40% of 2012 Gain/(Loss) of $22,312,681		$8,925,072
17.	20% of 2011 Gain/(Loss) of ($21,490,663)		($4,298,133)
18.	**Actuarial Value of Assets 1/1/2015**		**$490,533,983**

	2013	2014
Rate of Return on Actuarial Value of Assets *(net of investment expenses)*	**9.2%**	**8.5%**

Participant Summary

PARTICIPANT SUMMARY

	Active Non-Drop Participants	Active DROP	Inactive Participants: With Deferred Benefits	Inactive Participants: Receiving Benefits	Total
Participants as of January 1, 2014	639	115	0	481	1,235
Retired	(2)	(31)	0	33	0
Entered DROP	(4)	4	0	0	0
Terminated Non-Vested	(3)	0	0	0	(3)
Disabled	(6)	0	0	6	0
Deceased	(1)	0	0	(8)	(9)
New Beneficiary	0	0	0	3	3
QDRO Put in Pay	0	0	0	3	3
Rehired	0	0	0	0	0
Transfers	(1)	0	0	0	(1)
New Hires	71	0	0	0	71
Data Adjustment	0	(1)	0	(1)	(2)
Net Change	54	(28)	0	36	62
Participants as of January 1, 2015	693	87	0	517	1,297

Service - Age Distribution

AGE, SERVICE AND AVERAGE SALARY DISTRIBUTION

Age as of 1/1/2015	Under 1	01-04	05-09	10-14	15-19	20-24	25-29	30-34	35-39	40 +	Total
Under 25	33	23	3	0	0	0	0	0	0	0	59
	38,431	41,284	46,030	0	0	0	0	0	0	0	39,930
25-29	22	25	65	2	0	0	0	0	0	0	114
	38,531	43,626	47,594	58,943	0	0	0	0	0	0	45,174
30-34	11	14	78	26	0	0	0	0	0	0	129
	38,517	40,044	48,451	57,805	0	0	0	0	0	0	48,577
35-39	1	6	59	43	7	0	0	0	0	0	116
	42,097	48,954	51,695	59,737	70,487	0	0	0	0	0	55,586
40-44	1	1	35	23	33	16	0	0	0	0	109
	38,270	55,244	50,798	59,254	74,692	90,845	0	0	0	0	65,621
45-49	2	2	10	18	22	25	16	0	0	0	95
	40,183	42,472	48,790	59,379	76,003	90,960	96,774	0	0	0	75,963
50-54	1	0	6	5	10	16	17	1	0	0	56
	151,470	0	50,392	60,871	75,067	87,715	96,968	106,538	0	0	83,344
55-59	0	0	2	0	3	1	3	1	1	0	11
	0	0	57,168	0	71,900	91,903	96,749	101,464	83,285	0	81,540
60-64	0	0	0	1	0	2	0	0	0	0	3
	0	0	0	65,221	0	92,926	0	0	0	0	83,691
65-69	0	0	0	0	1	0	0	0	0	0	1
	0	0	0	0	71,897	0	0	0	0	0	71,897
70 & Up	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0
Total	71	71	258	118	76	60	36	2	1	0	693
	40,166	42,742	49,393	59,244	74,587	90,145	96,864	104,001	83,285	0	58,407

Excludes DROP participants

Average Age: 37.53

Average Service: 10.57

Average Salary: $58,407

Actuarial Costs

ACTUARIAL COSTS

	As of 01/01/2014	As of 01/01/2015
Participants		
Active excluding DROP	639	693
Active DROP	115	87
Retirees and Beneficiaries	481	517
Total	1,235	1,297
Active Payroll (Rate at January 1st including DROP)	$ 44,950,885	$ 48,549,950
1. Actuarial Liability		
Active Participants	$263,596,728	$256,402,868
Participants Receiving Benefits	278,481,205	311,351,876
Total	$542,077,933	$567,754,744
2. Actuarial Value of Assets	$462,235,880	$490,533,983
3. Unfunded Actuarial Liability (1-2)	$ 79,842,053	$ 77,220,761
4. County's Normal Cost	$ 8,775,405	$ 8,381,100
5. Amortization Payment	$ 5,010,736	$ 4,926,354
6. Estimated Expenses	$ 529,000	$ 511,000
7. Total Recommended Contributions as of January 1st (4 + 5 + 6)	$ 14,315,141	$ 13,818,454
8. Total Recommended Contribution as of December 31st (7 x 1.075)	$ 15,388,777	$ 14,854,838
9. Contribution as a % of total payroll	34.2%	30.6%

UNFUNDED LIABILITY AMORTIZATION SCHEDULE

	Amortization Period			Balances		
Charges	Date Created	Initial Years	Years Left	Initial	Outstanding	2015 Payment
Unfunded Accrued Liability	01/01/2004	30	19	$15,137,045	$16,914,715	$1,272,932
Actuarial Loss	01/01/2006	30	21	$ 1,910,765	$ 2,123,839	$ 150,021
Actuarial Loss	01/01/2008	30	23	$ 2,970,298	$ 3,256,127	$ 217,734
Actuarial Loss	01/01/2009	30	24	$27,797,740	$30,180,559	$1,968,900
Asset Method Change	01/01/2011	30	26	$23,423,233	$24,830,123	$1,548,948
Actuarial Loss	01/01/2012	30	27	$20,776,427	$21,717,618	$1,327,541
Actuarial Loss	01/01/2013	30	28	$25,562,434	$26,315,889	$1,578,214
Assumption Change	01/01/2014	20	19	$6,659,621	$6,637,739	$ 499,529
Credits						
Actuarial Gain	01/01/2005	30	20	$ 2,021,367	$ 2,255,424	$ 164,249
Actuarial Gain	01/01/2007	30	22	$ 471,511	$ 520,973	$ 35,771
Assumption Change	01/01/2008	30	23	$ 536,383	$ 587,994	$ 39,318
Actuarial Gain	01/01/2010	30	25	$ 9,592,406	$10,298,386	$ 656,492
Actuarial Gain	01/01/2011	30	26	$22,340,126	$23,681,963	$1,477,324
Assumption Change	01/01/2013	30	28	$ 2,423,902	$ 2,495,347	$ 149,651
Actuarial Gain	01/01/2014	20	19	$11,731,402	$11,692,857	$ 879,956
Actuarial Gain	01/01/2015	20	20	$ 3,222,904	$3,222,904	$ 234,704
Net Total					$77,220,761	$4,926,354

Bases are amortized as an equal percent of payroll each year. Total payroll is assumed to increase 3.0% annually. Since the January 1, 2015 amortization payment of $4,926,354 is not sufficient to cover the interest on the plan's unfunded liability, the unfunded liability is expected to grow for an initial period.

Assumptions and Methods

ASSUMPTIONS AND METHODS

Funding Method: Projected Unit Credit Actuarial Cost Method. The contribution equals the sum of the normal cost and the amount necessary to amortize the frozen unfunded actuarial liabilities over a period of years. Amortization payments increase 3.0%.

Asset Method: Asset smoothing method. Spreading the investment gains or losses in excess of the assumed return over a 5-year period. Actuarial Value of Assets recognizes adjustments resulting from an audit.

Interest: 7.5% compounded annually, net of investment fees.

COLA Increases: Benefits accrued before Bill 88-96 are assumed to increase by 3.0% of the original benefit each year from retirement.

Benefits accrued after Bill 88-96 are assumed to increase by 1.8% of the current benefit each year from retirement.

Salary Increases: The following graded schedule is used:

Attained Age	% Increase at Attained Age
20	6.5%
25	6.0%
30	5.5%
35	5.0%
40	4.5%
45	4.0%
50	4.0%

Mortality: *Healthy:* RP-2000 Blue Collar Mortality Table for males and females projected generationally using scale AA. Pre-Termination mortality uses 60% of these rates.

ASSUMPTIONS AND METHODS

(continued)

Mortality (cont.):

Disabled: RP-2000 Blue Collar Mortality Table for males and females set forward five years and then projected generationally using scale AA.

100% of pre-retirement deaths are assumed to be non-duty related.

Disability:

Sample rates are:

Age	Rate
30	0.1836%
35	0.2716%
40	0.5604%
45	0.9371%
50	1.3790%
55	0.0000%

75% of disablements are assumed to be duty-related.

Turnover:

Sample rates are:

Age	Rate
20	6.11%
25	4.73%
30	2.87%
35	2.21%
40	1.69%
45	1.21%
50	0.00%

Retirement[1]:

Sample Rates

	Service						
Age	20	22	24	27	30	32	34
40	5%	5%	20%	10%	40%	40%	100%
45	5%	5%	20%	10%	40%	40%	100%
50	10%	10%	28%	25%	40%	40%	100%
55	25%	25%	25%	25%	40%	40%	100%
59	33%	33%	33%	33%	40%	40%	100%
62	100%	100%	100%	100%	100%	100%	100%

[1] Reflected “20 and out” provision

ASSUMPTIONS AND METHODS

(continued)

DROP load: To reflect the cost of the more valuable benefits provided from the deferred retirement option program the following loads were applied:

Sample Load Rates

	Service			
Age	23	27	30	35
44	0.45%	1.71%	2.70%	14.40%
50	2.43%	4.41%	5.40%	17.46%
55	3.24%	5.49%	6.48%	18.72%
60	3.87%	6.39%	7.29%	19.62%

Disability Leave: Service credit for benefit formula purposes is increased by 1.75% to account for disability leave which is converted to service credit at retirement.

Military Service: Active liabilities (which depend on credit service) are loaded by 3.25% to account for future crediting of military service.

Other Methods and Assumptions: Administrative Expenses are $511,000 for FY2016 and $529,000 for FY2015 (average of actual expenses for the two years preceding the valuation date).

The rationale for the demographic assumptions is based on the results of the December 2012 Experience Study. The economic Assumptions are based on future expectations with an underlying 3.0% inflation assumption.

Marriage: 80% of employees and 70% of current retired and disabled members are assumed married. Males are assumed to be four years older than their spouses.

CIGNA Benefits: Our calculations reflect that some benefits have already been purchased

Plan Provisions

PLAN PROVISIONS

Normal Retirement:	20 years of service[2] or age 50 with 5 years of service.
Normal Form of Benefit:	For single participants, monthly life annuities with payments guaranteed for 5 years. For married participants, unreduced 100% Joint & Survivor Annuity with payments guaranteed for 5 years.
Cost of Living Increase (for benefits accrued as of 1/31/97):	Retiree benefits are adjusted each year. The revised benefit amount is the lesser of: a. Base benefit multiplied by ratio of current 12 month average CPI to 12 month average CPI at retirement. b. Prior year benefit increased by 4%.
Cost of Living Increase (for benefits accrued after1/31/97):	Retiree benefits are adjusted each year. The revised benefit amount is the lesser of: a. Prior year benefit multiplied by 60% of the increase in the current March CPI from March CPI for prior year, or b. Prior year benefit increased by 2.5%.
Employee Contributions:	7.25% of pay rate for all employees.
Compensation:	Regular annual rate of pay, exclusive of extra compensation of any kind such as overtime pay, bonuses, and commissions. Some members receive a special FY11 increase for pension purposes.
Final Earnings:	The average of the highest 3 years of annual basic pay.

[2] Effective 7/1/2002

PLAN PROVISIONS
(continued)

Benefit Formula:	2 ½% of final earnings for each year of service up to 20 years plus 2% of final earnings for each year of service after 20 years (maximum 70% plus 2% times unused disability credit and pre-employment military service credit)
Termination Prior to Retirement:	Return of employee contributions with 3% interest.
Disability:	Must be totally and permanently disabled (except as the result of activities specified in the County code) regardless of length of service.
Line of Duty Disability:	The greater of the accrued benefit or 66 2/3% of final earnings, payable immediately, unreduced.
Non-Line of Duty Disability:	The greater of the accrued benefit or 20% of final earnings, payable immediately, unreduced.
Pre-Retirement Spouse's Benefit:	
Line of Duty Death Benefit:	Greater of accrued benefit or 66 2/3% of final earnings.
Non-Line of Duty Death Benefit:	Accrued benefit.
Other Pre-Retirement Death Benefits:	Return of employee contributions with 3% interest.
Deferred Retirement Option Program (DROP):	Allows accumulation of pension after 20 years of County service. DROP period must be between 3 and 5 years. Members may remain in DROP for a 6^{th} year, but no interest shall be credited to the DROP account in the 6^{th} year.

Summary of Legislative Changes

SUMMARY OF MAJOR LEGISLATIVE CHANGES

County Council Bill No. 48-89:

Effective 9/13/89.

The previously combined Police and Fire plan was separated into distinct plans for each group.

The reduction for retirement prior to age 50 was changed to 0.2% per month from 0.3% per month.

County Council Bill No. 34-92:

Effective 6/1/92 through 8/31/92.

Participants over age 50 or with at least 20 years of service could elect to retire with an additional pension equal to 1/12 of 2.5% of final earnings for the first 20 years of service, plus 1/12 of 2% of final earnings for each additional year of service. The additional amount could be taken as a pension increase, a lump sum, or as a temporary supplement to age 62. Appropriate actuarial adjustments apply.

State House Bill No. 687:

Effective 7/1/90.

County employees were given the opportunity to apply for credit under the County's plan for previous service with the State of Maryland (or a political subdivision of the State).

County Council Bill 88-96:

Effective 12/4/96.

The previous method of calculating cost of living increases will only apply to benefits accrued as of 1/31/97. The cost of living increase for future benefits is a compound increase equal to 60% of the annual change in the CPI, not to exceed 2.5%. Employees hired, or rehired, on or after 12/4/96 will be Tier Two employees and will have different benefits than current employees.

SUMMARY OF MAJOR LEGISLATIVE CHANGES

(continued)

Recodification:	Effective 2/25/2002. Allows a benefit based on disability leave service and pre-plan military service to be paid over the 70% cap. Normal Retirement was changed to the earlier of 20 years of service or age 50 with 5 years of service. Elimination of Tier 2 benefits implemented a Deferred Retirement Option Program (DROP), a voluntary program that provides an alternative way to earn and receive retirement benefits.
County Council Bill 74-09:	Effective 12/11/2009. For non-represented members, FY2010 annual pay shall be determined by increasing FY2009 annual pay by an assumed 3% for determining the final average basic pay. For represented members, FY2010 annual pay shall be determined by increasing FY2009 annual pay by an assumed 5% for determining the final average basic pay.
County Council Bill 6-10:	Effective 4/18/2010. Provides for a disability benefit for those participants who are totally and permanently disabled as a result of qualified military service.
County Council Bill 41-10:	Effective 7/1/2010. Reduced the DROP interest rate from 8% to 4.25%. Increased the contribution rate for all but Battalion Chief, Division Chief, Deputy Chief and Fire Chief to 7.25%.

County Council Bill No. 98-12:	Effective 5/13/2013. Changed the definition of "final average basic pay" from highest 3 out of the last 5 years basic pays to higher 3 of all basic pays.
County Council Bill No. 30-12:	Effective 2/1/2013 All participants shall contribute 7.25% of his or her annual basic pay in each calendar year or portion of a calendar year while an active participant is in the plan.

Summary of Plan Funding

SUMMARY OF PLAN FUNDING

Schedules of Funding Progress

Actuarial Valuation Date	Actuarial Value of Assets (a)	Unfunded AAL (UAAL) (b - a)	Actuarial Accrued Liability (AAL) (b)	Funded Ratio (a/b)	Covered Payroll (c)	UAAL as a Percentage of Covered Payroll ((b - a)/c)
01/01/2005	$313,478,279	$13,381,977	$326,860,256	95.9%	$34,871,614	38.4%
01/01/2006	$340,274,675	$15,511,721	$355,786,396	95.6%	$38,592,322	40.2%
01/01/2007	$368,413,752	$15,280,517	$383,694,268	96.0%	$43,527,351	35.1%
01/01/2008[1]	$395,884,441	$18,467,029	$414,351,470	95.5%	$43,941,526	42.0%
01/01/2008[2]	$395,884,441	$17,930,646	$413,815,087	95.7%	$43,941,526	40.8%
01/01/2009	$390,551,359	$45,969,499	$436,520,858	89.5%	$48,824,352	94.2%
01/01/2010	$418,191,046	$37,084,763	$455,275,809	91.9%	$49,064,454	75.6%
01/01/2011[3]	$449,253,388	$15,236,219	$464,489,607	96.7%	$47,840,812	31.8%
01/01/2011[4]	$425,830,155	$38,659,452	$464,489,607	91.7%	$47,840,812	80.8%
01/01/2012	$426,196,539	$59,899,207	$486,095,747	87.7%	$45,673,006	131.1%
01/01/2013[1]	$426,659,036	$86,235,517	$512,894,554	83.2%	$43,361,686	198.9%
01/01/2013[2]	$426,659,036	$83,811,615	$510,470,652	83.6%	$43,361,686	193.3%
01/01/2014[1]	$462,235,880	$73,182,432	$535,418,312	86.3%	$44,950,885	162.8%
01/01/2014[2]	$462,235,880	$79,842,053	$542,077,933	85.3%	$44,950,885	177.6%
01/01/2015	$490,533,983	$77,220,761	$567,754,744	86.4%	$48,549,950	159.1%

Schedules of County's Contributions

Year Ended December 31	*Annual Required Contribution*	*Actual Contribution*	*Percentage Contributed*
2014	$15,898,958	$15,898,956[5]	100.0%

[1] *Prior to Assumption Changes*
[2] *After Assumption Changes*
[3] *Prior to Asset Method Change.*
[4] *After Asset Method Change.*
[5] *On an accrual basis. Subject to verification.*

SUMMARY OF PLAN FUNDING

(continued)

The information presented in the required supplementary schedules was determined as part of the actuarial valuations at the dates indicated. Additional information as of the latest actuarial valuation follows.

Actuarial cost method	Projected Unit Credit
Amortization method	Level percent of pay, closed
Remaining amortization period	Remaining Amortization periods range from 19 to 28 years with an average effective period of 25 years. Starting with new bases in 2014, Assumption changes and gains and losses are amortized over 20 years and plan changes are amortized over the average future service of the active population at time of the change.
Asset valuation method	5-year smoothed market
Actuarial assumptions:	
Investment rate of return	7.5%
Projected salary increases	Varies by age
Post Retirement Cost-of-living Adjustments	3.0% for pre 2/97 accruals 1.8% for post 2/97 accruals

RISK METRICS

The required contributions will vary over time based on the experience of the plan's investments and participants. As the value of the plan's assets and liabilities increase relative to the participant payroll, there is a greater risk of large changes to the required contribution expressed as a percentage of participant payroll.

The Asset Volatility Ratio (AVR) is equal to the market value of assets (MVA) divided by payroll. A higher AVR implies that the plan is exposed to greater contribution volatility. The current AVR of 10.1 indicates that a 1% asset gain/loss can be related to about 10.1% of the annual payroll. The plan currently amortizes asset gains/losses over a period of 20 years. This would result in a change in the required contribution of about 0.7% of payroll for each 1.0% change in market assets.

The Liability Volatility Ratio (LVR) is equal to the Actuarial Accrued Liability (AAL) divided by payroll. A higher LVR implies that the plan is exposed to greater contribution volatility due to changes in liability measurements. The current LVR of 11.7 indicates that a 1% liability gain/loss can be related to about 11.7% of the annual payroll. The plan currently amortizes liability gains/losses over a period of 20 years. This would result in a change in the required contribution of about 0.9% of payroll for each 1.0% change in AAL. As the plan approaches a 100% funded level, the AVR will converge to the LVR.

Historical Volatility Ratios

	2009	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
AVR	6.0	6.8	8.0	8.5	10.1	10.6	10.1
LVR	8.9	9.3	9.7	10.6	11.8	11.9	11.7

ACTUARIAL CERTIFICATION

This actuarial valuation sets forth our calculation of an estimate of the liabilities of the Anne Arundel County Fire Service Retirement Plan, together with a comparison of these liabilities with the value of the plan assets, as submitted by Anne Arundel County (the County). This calculation and comparison with assets is applicable for the valuation date only. The future is uncertain, and the plan may become better funded or more poorly funded in the future. This valuation does not provide any guarantee that the plan will be able to provide the promised benefits in the future.

This is a deterministic valuation in that it is based on a single set of assumptions. This set of assumptions is one possible basis for our calculations. Other assumptions may be equally valid. The future is uncertain and the plan's actual experience will differ from those assumptions; these differences may be significant or material because these results are very sensitive to the assumptions made and, in some cases, to the interaction between the assumptions. We may consider that some factors are not material to the valuation of the plan and may not provide a specific assumption for those factors. We may have used other assumptions in the past. We will likely consider changes in assumptions at a future date.

Different assumptions or scenarios within the range of possibilities may also be reasonable and results based on those assumptions would be different. As a result of the uncertainty inherent in a forward looking projection over a very long period of time, no one projection is uniquely "correct" and many alternative projections of the future could also be regarded as reasonable. Two different actuaries could, quite reasonably, arrive at different results based on the same data and different views of the future. A "sensitivity analysis" shows the degree to which results would be different if you substitute alternative assumptions within the range of possibilities for those utilized in this report. We have not been engaged to perform such a sensitivity analysis and thus the results of such an analysis are not included in this report. At the County's request, Bolton Partners, Inc. is available to perform such a sensitivity analysis.

The County is responsible for selecting the plan's funding policy, actuarial valuation methods, asset valuation methods, and assumptions. The policies, methods and assumptions used in this valuation are those that have been so prescribed and are described in this report. The County is solely responsible for communicating to Bolton Partners, Inc. any changes required thereto.

The County could reasonably ask how the valuation would change if we used a different assumption set or if plan experience exhibited variations from our assumptions. This report does not contain such an analysis. This type of analysis would be a separate assignment.

In addition, decisions regarding benefit improvements, benefit changes, the trust's investment policy, and similar issues should not be based on this valuation. These are complex issues and other factors should be considered when making such decisions. These other factors might include the anticipated vitality of the local economy and future growth expectations, as well as other economic and financial factors.

ACTUARIAL CERTIFICATION

(continued)

The cost of this plan is determined by the benefits promised by the plan, the plan's participant population, the investment experience of the plan and many other factors. An actuarial valuation is a budgeting tool for the County. It does not affect the cost of the plan. Different funding methods provide for different timing of contributions to the plan. As the experience of the plan evolves, it is normal for the level of contributions to the plan to change. If a contribution is not made for a particular year, either by deliberate choice or because of an error in a calculation, that contribution can be made in later years. We will not be responsible for contributions that are made at a future time rather than an earlier time. The plan sponsor is responsible for funding the cost of the plan.

We make every effort to ensure that our calculations are accurately performed. These calculations are complex. Despite our best efforts, we may make a mistake. We reserve the right to correct any potential errors by amending the results of this report or by including the corrections in a future valuation report.

Because modeling all aspects of a situation is not possible or practical, we may use summary information, estimates, or simplifications of calculations to facilitate the modeling of future events in an efficient and cost-effective manner. We may also exclude factors or data that are immaterial in our judgment. Use of such simplifying techniques does not, in our judgment, affect the reasonableness of valuation results for the plan.

This report is based on plan provisions, census data, and asset data submitted by the County. We have relied on this information for purposes of preparing this report, but have not performed an audit. The accuracy of the results presented in this report is dependent upon the accuracy and completeness of the underlying information. The plan sponsor is solely responsible for the validity and completeness of this information.

The County is solely responsible for selecting the plan's investment policies, asset allocations and individual investments. Bolton Partners, Inc.'s actuaries have not provided any investment advice to the County.

The information in this report was prepared for the internal use of the County and its auditors in connection with our actuarial valuations of the pension plan. It is neither intended nor necessarily suitable for other purposes. Bolton Partners, Inc. is not responsible for the consequences of any other use or the reliance upon this report by any other party.

ACTUARIAL CERTIFICATION

(continued)

The only purpose of this report is to:

- Provide the recommended employer contribution for fiscal year beginning July 1, 2015.

This report may not be used for any other purpose; Bolton Partners, Inc. is not responsible for the consequences of any unauthorized use.

The calculation of actuarial liabilities for valuation purposes is based on a current estimate of future benefit payments. The calculation includes a computation of the "present value" of those estimated future benefit payments using an assumed discount rate; the higher the discount rate assumption, the lower the estimated liability will be. For purposes of estimating the liabilities (future and accrued) in this report, you selected an assumption based on the expected long-term rate of return on plan investments. Using a lower discount rate assumption, such as a rate based on long-term bond yields, could substantially increase the estimated present value of future and accrued liabilities.

Because valuations are a snapshot in time and are based on estimates and assumptions that are not precise and will differ from actual experience, contribution calculations are inherently imprecise. There is no uniquely "correct" level of contributions for the coming plan year.

This report provides certain financial calculations for use by the auditor. These values have been computed in accordance with our understanding of generally accepted actuarial principles and practices and fairly reflect the actuarial position of the Plan. The various actuarial assumptions and methods which have been used are, in our opinion, appropriate for the purposes of this report.

The report is conditioned on the assumption of an ongoing plan and is not meant to present the actuarial position of the Plan in the case of Plan termination. Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions, changes in economic or demographic assumptions, increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period or additional cost or contribution requirements based on the plan's funded status), and changes in plan provisions or applicable law.

ACTUARIAL CERTIFICATION
(continued)

The County should notify Bolton Partners, Inc. promptly after receipt of this report if the County disagrees with anything contained in the report or is aware of any information that would affect the results of the report that has not been communicated to Bolton Partners, Inc. or incorporated therein. The report will be deemed final and acceptable to the County unless the County promptly provides such notice to Bolton Partners, Inc.

The undersigned credentialed actuaries meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein. They are currently compliant with the Continuing Professional Development Requirement of the Society of Actuaries. We are not aware of any direct or material indirect financial interest or relationship, including investments or other services that could create a conflict of interest that would impair the objectivity of our work.

We are available to answer any questions on the material in this report to provide explanations or further details as appropriate.

Bolton Partners, Inc.

Thomas B. Lowman, FSA, EA

Kristopher E. Seets, FSA, EA