

Anne Arundel County Retirement and Pension System

Comprehensive Annual Financial Report
Pension Trust Funds of Anne Arundel County, Maryland
For the Year Ended December 31, 2016

Prepared by:
The Anne Arundel County Office of Finance
44 Calvert Street
Annapolis MD 21401

**Anne Arundel County Retirement and Pension System
Comprehensive Annual Financial Report
For the Year Ended December 31, 2016**

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Introductory Section



Telephone:
(410) 222-1781

**OFFICE OF FINANCE
ARUNDEL CENTER
P.O. BOX 2700
ANNAPOLIS, MARYLAND 21404-2700**

Fax:
(410) 222-1354

Dear Board of Trustees and Members of the
Anne Arundel County Retirement and Pension System:

I am pleased to present to you the Anne Arundel County Retirement and Pension System (the "System") Comprehensive Annual Financial Report, for the year ended December 31, 2016. This financial report is a historical perspective of benefits, services, and fiscal activities of the System. The purpose of this report is to provide you, the plan participants and other interested parties, with sufficient information to evaluate the performance of the System during the plan year.

Plan History

County employees participate in four single-employer defined benefit pension plans (Plans). The County Plans were established under authority created by County Charter and legislation. In December 1996, the County passed legislation creating the Anne Arundel County Retirement and Pension System, a corporation that is an agency in the executive branch of County government, effective February 1, 1997. At that date, all net assets of pension trust funds were transferred to the System. In 2004, the Board of Trustees of the System adopted a formal statement of funding objectives, policy, and strategy. The Statement of Investment Policy and Objectives was designed to clearly communicate the directives of the Trustees of the System to all interested parties. This investment policy applies to the funds of the System on an aggregate basis. The Policy Statement sets forth how each fund manager shall be governed and details specific investment guidelines relating to each of the fund managers.

Major Initiatives

In 2016, the Board did an extensive review of the System's custody agreement, fees, and securities lending arrangements. A new fee schedule was negotiated with the existing custodian and the securities lending program was transferred from the custodian to a new provider.

In 2012, an Experience and Assumption Study was conducted by the actuary to review the experience of the Plans during 2007 to 2011. A new study covering 2012 to 2016 will be conducted in 2017.

Each year, the Board reviews the investment asset allocation and prospective returns for the various classes to attempt to construct a portfolio that will produce the desired rate of return. The resulting rebalancing of the portfolio generally requires moving funds among managers and either elimination of a current manager or the hiring of new investment managers. In 2016, Private Markets exposure continued to be increased, a bank loans manager was added, and cash was raised for disbursements.

Funding Status

The overall funded ratios for the Employees' Retirement Plan, the Police Service Retirement Plan, and the Detention Officers' and Deputy Sheriffs' Retirement Plan at December 31, 2016 increased to 77.1%, 79.2%, and 74.3%, respectively from 77.0%, 78.5%, and 73.0% at December 31, 2015, respectively. There was a slight decrease in the funded ratio for the Fire Service Retirement Plan, from 87.6% to 87.4% at December 31, 2015 and 2016, respectively.

Investment Performance

The average investment returns for the Employees' Retirement Plan, the Police Service Retirement Plan, the Fire Service Retirement Plan, and the Detention Officers' and Deputy Sheriffs' Retirement Plan on a market value basis for the year ended December 31, 2016 were 7.4%, 7.3%, 7.4% and 7.3%, respectively. On an actuarial basis, the average investment returns for the Employees' Retirement Plan, the Police Service Retirement Plan, the Fire Service Retirement Plan, and the Detention Officers' and Deputy Sheriffs' Retirement Plan were 6.1%, 5.8%, 5.9%, and 5.7%, respectively. The actuarial value of assets is calculated by spreading the market-value investment gains or losses in excess of (or below) the assumed rate of return over a five-year period. The asset-smoothing method was changed with the 2011 valuation.

System Organization and Management

The Board of Trustees (the "Board") is responsible for reviewing the investment program, approving policies, objectives, and guidelines and reviewing the financial performance of the System in relation to expectations. The Board also appoints the investment committee to make specific recommendations as to asset allocation and investment strategies. The Investment Committee works with an investment consultant, currently New England Pension Consultants (NEPC), to establish strategies and conduct searches for appropriate investment managers. The Board has final approval for all manager selections and policy changes.

The Board also selects the custodian bank that administers the Plans, currently State Street Bank & Trust, the actuary for the Plans, Bolton Partners PC, and the independent auditors, CliftonLarsonAllen LLP. The Secretary of the Board of Trustees is responsible for daily administrative decisions and the Anne Arundel County Office of Personnel and the Office of Finance carry out these administrative actions, including transmittal of contributions and funding the payment of benefits and other administrative expenses. Additional details regarding investment professionals who provide services to the System are included in the Investment Section later in this report.

Financial Management

The financial statements and supplemental information and schedules included in this report are the responsibility of System management and have been prepared in accordance with accounting principles generally accepted in the United States of America for governmental accounting and reporting as pronounced and adopted by the Governmental Accounting Standards Board. I urge you to read the Management Discussion and Analysis, Basic Financial Statements, and Notes to the Basic Financial Statements to better understand the results of the System during 2016.

Independent Audit

The System is audited annually. CliftonLarsonAllen LLP, an independent firm of Certified Public Accountants, conducted the audit for the year ended December 31, 2016. Refer to Independent Auditors' Report for the audit opinion.

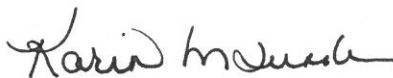
Internal Accounting Control

Management is responsible for maintaining a system of adequate internal controls designed to provide reasonable assurance that transactions are executed in accordance with management's general or specific authorization, and are recorded as needed to maintain accountability for assets and to permit preparation of the combining financial statements. We believe the internal controls in effect during the year ended December 31, 2016, adequately safeguard the assets and provide reasonable assurance regarding the proper recording of financial transactions.

Acknowledgments

Staff in Anne Arundel County's Office of Finance prepared this Comprehensive Annual Financial Report of the System. It is intended to provide complete and reliable information as a basis for making management decisions, determining compliance with legal provisions, and as a means of determining responsible stewardship for the assets contributed by the members and their employers. This report is being sent to the Board of Trustees and other interested parties.

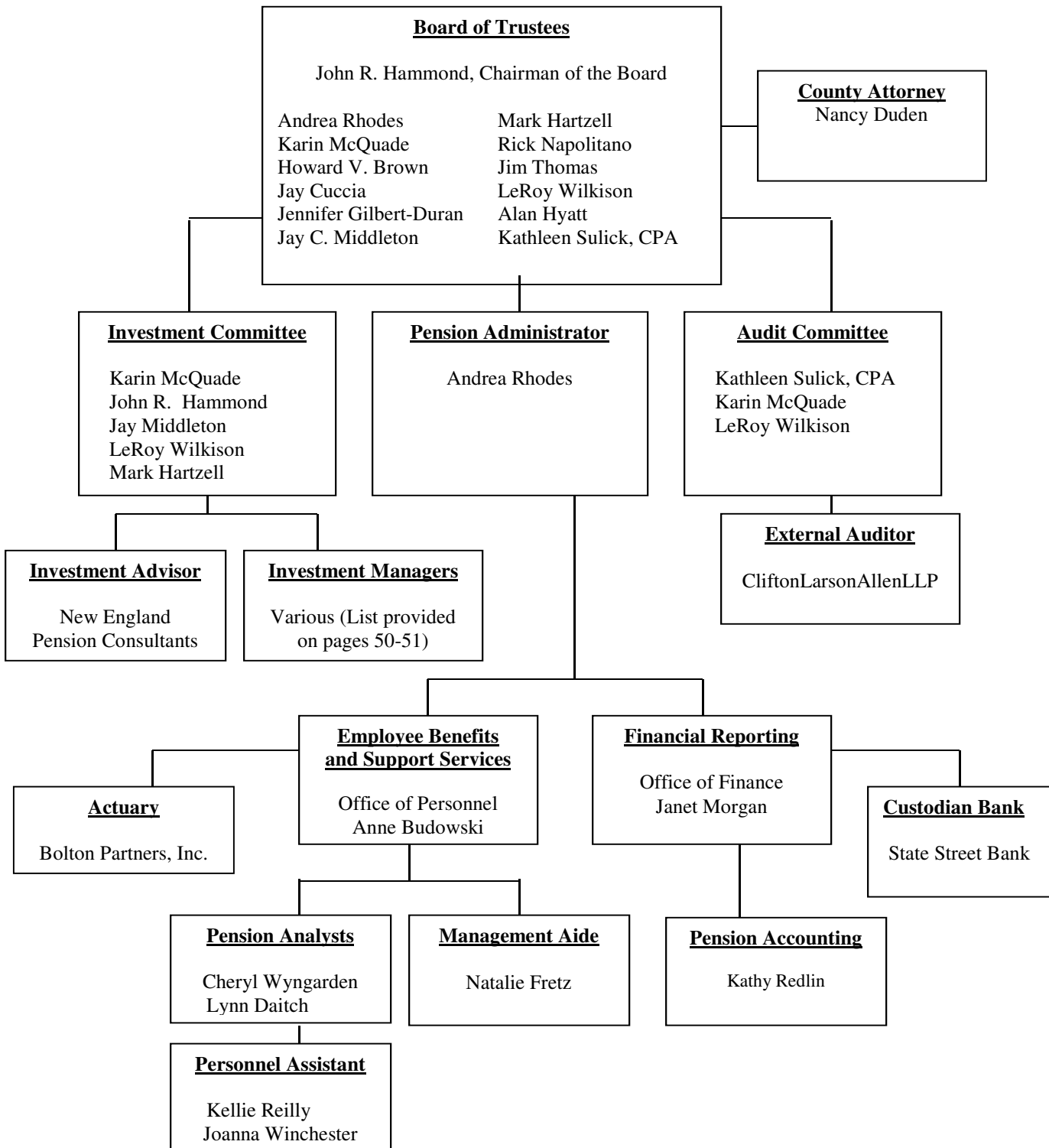
Respectfully,



Karin McQuade
Controller

Anne Arundel County Retirement and Pension System

Organizational Chart



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Financial Section



CliftonLarsonAllen LLP
CLAconnect.com

INDEPENDENT AUDITORS' REPORT

The Board of Trustees
Anne Arundel County Retirement and Pension System
Annapolis, Maryland

Report on the Financial Statements

We have audited the accompanying financial statements of Anne Arundel County Retirement and Pension System (the System), a pension trust fund of Anne Arundel County, Maryland, which comprise the combining statement of fiduciary net position as of December 31, 2016 and the related combining statement of changes in fiduciary net position for the year then ended, and the related notes to the financial statements, as listed in the table of contents. The prior year summarized comparative information has been derived from the System's 2015 financial statements and, in our report dated June 9, 2016; we expressed an unmodified opinion on those financial statements.

Management's Responsibility for the Financial Statements

Management is responsible for the preparation and fair presentation of these financial statements in accordance with accounting principles generally accepted in the United States of America; this includes the design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of financial statements that are free from material misstatement, whether due to fraud or error.

Auditors' Responsibility

Our responsibility is to express an opinion on these financial statements based on our audit. We conducted our audit in accordance with auditing standards generally accepted in the United States of America and the standards applicable to financial audits contained in *Government Auditing Standards*, issued by the Comptroller General of the United States. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditors' judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the System's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the System's internal control. Accordingly, we express no such opinion. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluating the overall presentation of the financial statements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Opinion

In our opinion, the financial statements referred to above present fairly, in all material respects, the fiduciary net position of the System as of December 31, 2016, and the respective changes in its fiduciary net position for the year then ended in accordance with accounting principles generally accepted in the United States of America.

Other Matters

Required Supplementary Information

Accounting principles generally accepted in the United States of America require that the management's discussion and analysis, the schedules of changes in net pension liability and related ratios by plan, investment returns, and employer contributions by plan, and notes to required supplementary information, as listed in the table of contents, be presented to supplement the financial statements. Such information, although not a part of the financial statements, is required by the Governmental Accounting Standards Board who considers it to be an essential part of financial reporting for placing the financial statements in an appropriate operational, economic, or historical context. We have applied certain limited procedures to the required supplementary information in accordance with auditing standards generally accepted in the United States of America, which consisted of inquiries of management about the methods of preparing the information and comparing the information for consistency with management's responses to our inquiries, the financial statements, and other knowledge we obtained during our audit of the financial statements. We do not express an opinion or provide any assurance on the information because the limited procedures do not provide us with sufficient evidence to express an opinion or provide any assurance.

Other Information

Our audit was conducted for the purpose of forming an opinion on the System's financial statements. The supplementary schedules, including the schedules of administrative expenses, investment expenses, and payments to consultants, as listed in the table of contents, are presented for purposes of additional analysis and are not a required part of the financial statements.

The supplementary schedules, as listed in the table of contents, are the responsibility of management and were derived from and relate directly to the underlying accounting and other records used to prepare the financial statements. Such information has been subjected to the auditing procedures applied in the audit of the financial statements and certain additional procedures, including comparing and reconciling such information directly to the underlying accounting and other records used to prepare the financial statements or to the financial statements themselves, and other additional procedures in accordance with auditing standards generally accepted in the United States of America. In our opinion, the supplementary schedules, including the schedules of administrative expenses, investment expenses, and payments to consultants, as listed in the table of contents, are fairly stated, in all material respects, in relation to the financial statements as a whole.

The information in the introductory, investment, actuarial and statistical sections, as listed in the table of contents, have not been subjected to the auditing procedures applied in the audit of the financial statements, and accordingly, we do not express an opinion or provide any assurance on it.

Other Reporting Required by Government Auditing Standards

In accordance with *Government Auditing Standards*, we have also issued our report dated June 15, 2017 on our consideration of the System's internal control over financial reporting and on our tests of its compliance with certain provisions of laws, regulations, contracts, and grant agreements and other matters. The purpose of that report is to describe the scope of our testing of internal control over financial reporting and compliance and the results of that testing, and not to provide an opinion on internal control over financial reporting or on compliance. That report is an integral part of an audit performed in accordance with *Government Auditing Standards* in considering the System's internal control over financial reporting and compliance.



CliftonLarsonAllen LLP

Baltimore, Maryland

June 15, 2017

**INDEPENDENT AUDITORS' REPORT ON INTERNAL CONTROL OVER FINANCIAL
REPORTING AND ON COMPLIANCE AND OTHER MATTERS BASED ON AN AUDIT
OF FINANCIAL STATEMENTS PERFORMED IN ACCORDANCE WITH
GOVERNMENT AUDITING STANDARDS**

The Board of Trustees
Anne Arundel County Retirement and Pension System
Annapolis, Maryland

We have audited, in accordance with the auditing standards generally accepted in the United States of America and the standards applicable to financial audits contained in *Government Auditing Standards* issued by the Comptroller General of the United States, the financial statements of Anne Arundel County Retirement and Pension System (the System), a pension trust fund of Anne Arundel County, Maryland, which comprise the combining statement of fiduciary net position as of December 31, 2016 and the related combining statement of changes in fiduciary net position for the year then ended, and the related notes to the financial statements, and have issued our report thereon dated June 15, 2017.

Internal Control Over Financial Reporting

In planning and performing our audit of the financial statements, we considered the System's internal control over financial reporting (internal control) to determine the audit procedures that are appropriate in the circumstances for the purpose of expressing our opinion on the financial statements, but not for the purpose of expressing an opinion on the effectiveness of the System's internal control. Accordingly, we do not express an opinion on the effectiveness of the System's internal control.

A *deficiency in internal control* exists when the design or operation of a control does not allow management or employees, in the normal course of performing their assigned functions, to prevent, or detect and correct, misstatements on a timely basis. A *material weakness* is a deficiency, or a combination of deficiencies, in internal control, such that there is a reasonable possibility that a material misstatement of the System's financial statements will not be prevented, or detected and corrected on a timely basis. A *significant deficiency* is a deficiency, or a combination of deficiencies, in internal control that is less severe than a material weakness, yet important enough to merit attention by those charged with governance.

Our consideration of internal control was for the limited purpose described in the first paragraph of this section and was not designed to identify all deficiencies in internal control that might be material weaknesses or significant deficiencies. Given these limitations, during our audit we did not identify any deficiencies in internal control that we consider to be material weaknesses. However, material weaknesses may exist that have not been identified.

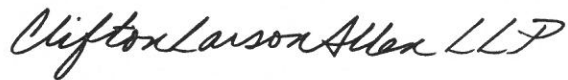
Compliance and Other Matters

As part of obtaining reasonable assurance about whether the System's financial statements are free from material misstatement, we performed tests of its compliance with certain provisions of laws, regulations, contracts, and grant agreements, noncompliance with which could have a direct and material effect on the determination of financial statement amounts. However, providing an opinion on

compliance with those provisions was not an objective of our audit, and accordingly, we do not express such an opinion. The results of our tests disclosed no instances of noncompliance or other matters that are required to be reported under *Government Auditing Standards*.

Purpose of this Report

The purpose of this report is solely to describe the scope of our testing of internal control and compliance and the result of that testing, and not to provide an opinion on the effectiveness of the System's internal control or on compliance. This report is an integral part of an audit performed in accordance with *Government Auditing Standards* in considering the System's internal control and compliance. Accordingly, this communication is not suitable for any other purpose.

A handwritten signature in black ink that reads "CliftonLarsonAllen LLP". The signature is written in a cursive, flowing style.

CliftonLarsonAllen LLP

Baltimore, Maryland
June 15, 2017

Introduction

To introduce readers of the financial report of the Anne Arundel County Retirement and Pension System (System), the Office of Finance is pleased to provide this discussion and analysis of financial activities for the year ended December 31, 2016. Please read it in conjunction with the rest of the report, which consists of the basic financial statements, including the notes thereto, required supplementary information (RSI), and supplementary schedules. Comparable combined amounts from the year ended December 31, 2015 have been provided herein to enhance comparability.

The System has the fiduciary responsibility to administer four single-employer defined benefit pension plans for certain Anne Arundel County (County) employees: the Employees' Retirement Plan, the Police Service Retirement Plan, the Fire Service Retirement Plan and the Detention Officers' and Deputy Sheriffs' Retirement Plan (the "Plans").

Financial Highlights

Total Plan net position increased \$76.5 million in calendar year 2016, bringing net position to \$1.7 billion. Contributions increased 1.8% to \$80.4 million versus \$79.0 million in 2015. Of this total, employer contributions of \$67.5 million were 1.2% higher than as of 2015 at \$66.7 million. Participant contributions increased by \$0.6 million to \$12.9 million, a 4.8% increase. The 2016 time weighted total rate of return of 7.6% compares to a loss of (1.6%) for 2015.

The System paid \$117.7 million in benefits in 2016, compared with \$110.2 million paid in 2015, an increase of 6.9%. The 2016 Cost of Living Adjustment (COLA) for beneficiaries ranged from 0.5% for retirees since 1997 and 0.4% to 0.9% for substantially all retired prior to 1997. The number of benefit recipients increased to 3,359, a 5.4% increase over the prior year.

Employees' Retirement Plan – In 2016, net position increased \$27.3 million or 4.8% to \$591.8 million driven primarily by investment gains of \$40.7 million compared with \$8.5 million in losses in 2015. Benefit payments of \$44.0 million outpaced contributions of \$31.0 million by \$13.0 million and various administrative expenses were \$459.5 thousand.

Police Service Retirement Plan – In 2016, net position increased \$22.8 million or 4.9% to \$486.4 million. The Plan's benefit payments of \$33.4 million were \$9.8 million greater than contributions of \$23.6 million. Investment gains of \$33.0 million in 2016 helped mitigate the payments to contributions variance. Administrative expenses were \$389.3 thousand.

Fire Service Retirement Plan – In 2016, net position increased by \$17.0 million or 3.6% to \$485.5 million. Investment gains in 2016 were \$33.4 million compared with the 2015 loss of \$7.8 million. Contributions of \$17.8 million were 52.7% of the benefit payments of \$33.9 million. Various administrative expenses were \$401.3 thousand.

Detention Officers' and Deputy Sheriffs' Retirement Plan. – In 2016, net position increased by \$9.5 million or 8.5% to \$120.3 million. Contributions were \$8.0 million compared with benefit payments of \$6.5 million. Investment income showed a \$10.0 million increase over the prior year due to a \$8.0 million gain in 2016 compared to a loss of (\$1.9) million in 2015. Various administrative expenses were \$92.4 thousand.

Overview of the Basic Financial Statements

In this financial report, the basic financial statements consist of the Combining Statement of Fiduciary Net Position and the Combining Statement of Changes in Fiduciary Net Position with accompanying Notes. The financial statements present information in separate columns for each of the four single-employer defined benefit pension plans as of and for the year ended December 31, 2016 with combined comparative information as of and for the year ended December 31, 2015. The Combined Statement of Fiduciary Net Position presents the financial position of the Plans. The financial position is comprised of assets, which primarily consist of investments less liabilities, including accounts payable, investment commitments payable, and the obligation for collateral related to the securities lending program. The obligation from the securities lending program is offset by collateral held. The difference between assets and liabilities is net position, which represents the amount of resources available to pay future benefits to retirees and their beneficiaries.

Investments net of cash consist of domestic and foreign debt obligations, domestic and foreign equities, real estate, insurance company contracts, absolute return funds, and private markets. The System has a securities lending program to enhance its investment return. The assets and liabilities arising from the program are closely matched, netting to no additional material Plan liability. In accordance with generally accepted accounting principles, the liability for future benefit payments is not reported in these financial statements. Refer to Note 4 for the Schedule of Net Pension Liability of the System by Plan which presents an estimate of the liabilities.

The Combining Statement of Changes in Fiduciary Net Position presents the additions to and deductions from the four Plans' net positions during the year. Each Plan receives contributions from participants and the County, as well as income or losses from investments and related activity. The primary deductions are the payment of benefits, which are the Plans' primary objectives. Deductions also include refunds to members who leave the Plans as well as administrative expenses. Administrative expenses are allocated monthly to each Plan based on its relative percentage of the total investments.

Notes to the Basic Financial Statements

The Notes to the Basic Financial Statements are an integral part of the statements. These notes provide background and more detail about the information in the financial statements. Among other matters, the notes describe the System's purpose and its membership; the significant accounting policies used to prepare the basic financial statements; the nature of the four Plans, including the membership and benefit provisions and contribution requirements; the System's investment authority and policies; how investments and related documentation are safeguarded; and selected details about various investment activity and balances.

Required Supplementary Information

The RSI section provides actuarially determined information about the Plans. The section was substantially revised for the 2014 reporting period to comply with the Statement 67, *Financial Reporting for Pension Plans* from the Government Accounting Standards (GASB) Board. The RSI section displays changes for each Plan's Net Pension Liability (NPL) and related ratios, contributions related to payrolls by Plan, and money-weighted investment returns for the System.

Summary and Analysis of Financial Information

The following Condensed Statements of Fiduciary Net Position and Changes in Fiduciary Net Position present financial information, with dollar amounts in millions, for the System comparing 2016 and 2015.

***Condensed Combined Statement of Fiduciary Net Position
As of December 31, 2016 and 2015***

(in millions)	<u>2016</u>	<u>2015</u>	Change in	
			<u>Dollars</u>	<u>Percentage</u>
Assets				
Cash and short-term investments	\$ 53.7	\$ 39.3	\$ 14.40	36.6 %
Security lending collateral	60.4	71.0	(10.6)	(14.9)
Receivables	9.0	10.7	(1.7)	(15.9)
Investments at fair value and deposits	<u>1,630.7</u>	<u>1,565.7</u>	<u>65.0</u>	4.2
Total assets	1,753.8	1,686.7	67.1	4.0
Liabilities				
Investment settlements and accounts payable	9.5	8.3	1.2	14.5
Security lending obligations	<u>60.4</u>	<u>71.0</u>	<u>(10.6)</u>	<u>(14.9)</u>
Total liabilities	69.9	79.3	(9.4)	(11.9)
Net assets restricted for pension benefits	<u><u>\$ 1,683.9</u></u>	<u><u>\$ 1,607.4</u></u>	<u><u>\$ 76.5</u></u>	<u><u>4.8 %</u></u>

***Condensed Combined Statement of Changes in Fiduciary Net Position
For Years Ended December 31, 2016 and 2015***

(in millions)	<u>2016</u>	<u>2015</u>	Change in	
			<u>Dollars</u>	<u>Percentage</u>
Additions				
Employer contributions	\$ 67.5	\$ 66.7	\$ 0.8	1.2 %
Participant contributions	12.9	12.3	0.6	4.9
Investment income (losses)	<u>115.1</u>	<u>(26.1)</u>	<u>141.2</u>	<u>(541.0)</u>
Total additions	195.5	52.9	142.6	269.6
Deductions				
Benefit payments and refunds	117.7	110.1	7.6	6.9
Administrative expenses	<u>1.3</u>	<u>1.5</u>	<u>(0.2)</u>	<u>(13.3)</u>
Total deductions	119.0	111.6	7.4	6.6
Net increase (decrease)	<u>76.5</u>	<u>(58.7)</u>	<u>135.2</u>	<u>(230.3)</u>
Net position restricted for pension benefits				
Beginning of year	1,607.4	1,666.1	(58.7)	(3.5)
End of year	<u><u>\$ 1,683.9</u></u>	<u><u>\$ 1,607.4</u></u>	<u><u>\$ 76.5</u></u>	<u><u>4.8 %</u></u>

Comparative investment returns are displayed by investment type in the following table. The table also shows each category's relative percent of the System's investment portfolio.

	<u>2016</u>		<u>2015</u>		<u>2016</u>		<u>2015</u>	
Cash and temporary investments	3.2	%	3.2	%	0.3	%	0.1	%
Domestic equity	23.2		23.2		10.8		(0.5)	
International equity pools	23.5		23.5		5.4		(0.8)	
Domestic and international fixed income	19.7		19.7		7.6		(2.7)	
Global asset allocation pools	13.4		13.4		8.9		(4.1)	
Opportunistic	0.8		0.8		11.7		(2.9)	
Private markets	6.3		6.3		5.5		4.4	
Real estate investment pools	5.4		5.4		8.1		14.7	
Stable value pooled investments	1.4		1.4		4.5		(2.0)	
Absolute Return fixed income	3.1		3.1		3.6		(0.3)	
Portable Alpha- 2013 Liquidating	0.0		0.0		n/a		n/a	
Total	<u>100.00</u>	%	<u>100.00</u>	%				
Total annual performance					7.6	%	(1.6)	%

The System's funding objective is to meet long-term benefit obligations through contributions and investment income. The funding ratio, which is the actuarial value of assets divided by the actuarial accrued liability, is an estimate of how well the System is meeting that objective. A higher funded ratio indicates that the Plan is better funded. As of December 31, 2016 and 2015 the funded ratios for the System were 80.3% and 79.9%, respectively. Additionally, System fiduciary net position as a percentage of the total pension liability as of December 31, 2016 was 74.3%.

The System paid \$117.7 million in retirement benefits and refunds to 3,359 participants and beneficiaries during 2016, compared to \$110.2 million in 2015 to 3,188 participants and beneficiaries. This reflects an average of \$35.1 thousand per person in 2016, compared to an average of \$34.6 thousand in 2015.

The System received \$12.9 million in contributions from 3,966 active participants during 2016. In 2015, \$12.3 million was received from 3,942 active participants. The employer contributions were \$67.5 million in 2016, compared to \$66.7 million in 2015. Employer contributions for the calendar year are based on the appropriate June fiscal year's actuarial recommended contribution, which is divided by 12 and provided to the respective Plans on a monthly basis. The County contributed 100.0% of the 2016 Actuarially Determined Contribution (ADC) for all Plans and has contributed the ADC recommended by the actuary for the past 10 years, with true-up adjustments from 2010 to 2011 and 2014 to 2015. Administrative costs for 2016 were approximately \$1.3 million for 7,725 participants or an average cost of \$174 per person compared to \$1.5 million for 2015 administrative costs for 7,524 participants at \$195 per person.

Overall Analysis of Financial Position

The System reduced its long-term investment assumption from 8.0% to 7.5% in 2014 which, as a more conservative approach, puts pressure on reducing the Net Pension Liability (NPL). The Board of Trustees believes the System is structured to support continued asset growth and stable funding for the future.

Requests for information

The System's Comprehensive Annual Financial Report is available at Anne Arundel County's web page www.aacounty.org/Personnel/Pension/FAQPension.cfm. If you have questions concerning this report or need additional financial information, please contact the Office of Personnel, 2660 Riva Road, Annapolis, Maryland, 21401.

Anne Arundel County Retirement and Pension System
Combining Statement of Fiduciary Net Position
December 31, 2016 (with December 31, 2015 Combined Comparative Totals)

	<i>Employees' Retirement Plan</i>	<i>Police Service Retirement Plan</i>	<i>Fire Service Retirement Plan</i>	<i>Detention Officers' and Deputy Sheriffs' Retirement Plan</i>	<i>2016 Combined Total</i>	<i>2015 Combined Total</i>
ASSETS						
Investments at market value:						
Cash and temporary investments	\$ 18,855,100	\$ 15,488,055	\$ 15,477,776	\$ 3,824,729	\$ 53,645,660	\$ 39,263,082
U. S. Government obligations	7,488,557	6,154,244	6,150,160	1,519,838	21,312,799	11,285,200
Corporate obligations	37,278,488	30,636,197	30,615,867	7,565,843	106,096,395	92,153,654
Fixed income mutual funds	49,054,818	40,314,218	40,287,466	9,955,904	139,612,406	84,718,804
International fixed income mutual funds	23,008,229	18,908,616	18,896,069	4,669,627	65,482,541	58,459,433
Global asset pools	79,527,255	65,357,068	65,313,698	16,140,427	226,338,448	262,108,213
Domestic equity	137,187,511	112,743,404	112,668,589	27,842,844	390,442,348	435,313,169
International equity pools	139,022,633	114,251,544	114,175,728	28,215,290	395,665,195	333,800,444
Private markets	41,787,112	34,341,473	34,318,685	8,480,889	118,928,159	116,195,750
Portable Alpha	32,482	26,694	26,677	6,592	92,445	286,375
Real estate investment pools	32,125,038	26,400,990	26,383,471	6,519,926	91,429,425	96,867,840
Absolute return fixed income	18,221,940	14,975,150	14,965,213	3,698,227	51,860,530	50,055,242
Aetna insurance pooled fixed income	8,206,522	6,744,282	6,739,807	1,665,552	23,356,163	24,266,278
Total investments	591,795,685	486,341,935	486,019,206	120,105,688	1,684,262,514	1,604,773,484
Collateral from securities lending transactions	21,213,216	17,433,440	17,421,871	4,305,321	60,373,848	71,027,978
Receivables						
Employer contributions	2,100,328	1,708,941	1,193,987	570,911	5,574,167	5,675,954
Participant contributions	380,751	251,545	258,280	102,423	992,999	1,051,848
Accrued interest and dividends	627,377	515,593	515,249	127,333	1,785,552	1,476,042
Investment sales proceeds	216,202	177,679	177,561	43,880	615,322	2,500,986
Total receivables	3,324,658	2,653,758	2,145,077	844,547	8,968,040	10,704,830
Deposits on hand	15,051	157,326	71,248	-	243,625	244,032
Total assets	616,348,610	506,586,459	505,657,402	125,255,556	1,753,848,027	1,686,750,324
LIABILITIES						
Accounts payable	507,229	416,851	420,074	102,945	1,447,099	1,654,690
Investment commitments payable	2,856,544	2,347,564	2,346,006	579,749	8,129,863	6,674,121
Obligation for collateral received under securities lending transactions	21,213,216	17,433,440	17,421,871	4,305,321	60,373,848	71,027,978
Total liabilities	24,576,989	20,197,855	20,187,951	4,988,015	69,950,810	79,356,789
Net position held in trust for pension benefits	\$ 591,771,621	\$ 486,388,604	\$ 485,469,451	\$ 120,267,541	\$ 1,683,897,217	\$ 1,607,393,535

Accompanying notes to the basic financial statements are an integral part of this statement.

Anne Arundel County Retirement and Pension System
Combining Statement of Changes in Fiduciary Net Position
For the Year Ended December 31, 2016 (with December 31, 2015 Combined Comparative Totals)

	<i>Employees' Retirement Plan</i>	<i>Police Service Retirement Plan</i>	<i>Fire Service Retirement Plan</i>	<i>Detention Officers' and Dep. Sheriffs' Retirement Plan</i>	<i>2016 Combined Total</i>	<i>2015 Combined Comparative Total</i>
ADDITIONS						
Contributions						
Employer	\$ 25,809,828	\$ 20,410,896	\$ 14,591,340	\$ 6,688,662	\$ 67,500,726	\$ 66,682,443
Participants	5,181,705	3,158,451	3,257,340	1,315,988	12,913,484	12,318,793
Total contributions	30,991,533	23,569,347	17,848,680	8,004,650	80,414,210	79,001,236
Investment income						
Net appreciation/(depreciation) in market value of investments	30,774,452	25,266,292	25,372,486	6,161,072	87,574,302	(50,232,908)
Interest income	6,097,955	4,623,137	4,879,946	1,097,254	16,698,292	16,442,382
Dividend income	7,618,388	6,257,348	6,278,168	1,527,758	21,681,662	18,789,871
Income/(loss) from investment activities	44,490,795	36,146,777	36,530,600	8,786,084	125,954,256	(15,000,655)
Less investment expense	3,802,275	3,186,392	3,173,927	757,928	10,920,522	11,371,195
Net income/(loss) from investing activities	40,688,520	32,960,385	33,356,673	8,028,156	115,033,734	(26,371,850)
Securities lending activities						
Securities lending income	98,952	81,252	81,716	19,664	281,584	378,253
Securities lending expenses						
Borrower rebates	27,786	22,816	22,946	5,521	79,069	23,507
Management fees	22,169	18,204	18,308	4,405	63,086	106,521
Total securities lending expenses	49,955	41,020	41,254	9,926	142,155	130,028
Net income from securities lending	48,997	40,232	40,462	9,737	139,428	248,225
Total investment income/(loss)	40,737,517	33,000,617	33,397,135	8,037,893	115,173,162	(26,123,625)
Total additions	71,729,050	56,569,964	51,245,815	16,042,544	195,587,373	52,877,611
DEDUCTIONS						
Benefit payments	44,007,025	33,356,257	33,888,976	6,488,977	117,741,235	110,160,338
Administrative expenses	459,455	389,320	401,289	92,392	1,342,456	1,470,053
Total deductions	44,466,480	33,745,577	34,290,265	6,581,369	119,083,691	111,630,391
Net increases/(decrease) in Fiduciary position	27,262,570	22,824,387	16,955,550	9,461,174	76,503,681	(58,752,780)
Net position, January 1	564,509,051	463,564,217	468,513,901	110,806,366	1,607,393,535	1,666,146,315
Net position, December 31	\$ 591,771,621	\$ 486,388,604	\$ 485,469,451	\$ 120,267,541	\$ 1,683,897,217	\$ 1,607,393,535

Accompanying notes to the basic financial statements are an integral part of this statement. 14

1 Summary of Significant Accounting Policies

The Anne Arundel County Retirement and Pension System (System) administers four defined benefit pension plans – the Employees’ Retirement Plan, the Police Service Retirement Plan, the Fire Service Retirement Plan, and the Detention Officers’ and Deputy Sheriffs’ Retirement Plan (Plans). Although the assets of the Plans are commingled for investment purposes, each Plan’s assets may be used only for the payment of benefits to the members of that Plan, in accordance with its terms. The System was established as an Agency in the Executive branch of Anne Arundel County, Maryland (County) and has the powers and privileges of a corporation to the extent permitted by law. The System is reported as Pension Trust Funds in the County’s Comprehensive Annual Financial Report (CAFR). The Board of Trustees is comprised of representatives from the Executive branch of the County, participating employee groups, and two representatives from outside County government.

A Basis of Presentation – The accounts of the System are organized on the basis of separate pension trust funds for each Plan, each of which is considered a separate accounting entity. The operations of each fund are accounted for with a separate set of self-balancing accounts that comprise its assets, liabilities, net position, additions, and deductions. Pension trust funds are accounted for and reported in this manner because capital maintenance is critical.

B Basis of Accounting – The basic financial statements were prepared using the accrual basis of accounting. Plan member contributions are recognized in the period in which the contributions are due. The County’s contribution to each Plan is recognized when due and the County has made a formal commitment to provide the contribution. Benefits and refunds are recognized when due and payable in accordance with the terms of each Plan.

The accounting and reporting policies conform to accounting principles generally accepted in the United States of America as applicable to government organizations. The preparation of financial statements in conformity with these principles requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities, and disclosure of contingent assets and liabilities at the date of the financial statements, and the reported amounts of revenue and expenses during the reporting period. Actual results could differ from those estimates.

C Investments – Investments are reported at fair value. Short-term investments are reported at cost, which approximates fair value. Securities traded on a national or international exchange are valued at the last reported sales price at current exchange rates. Mortgages are valued on the basis of future principal and interest payments, and are discounted at prevailing interest rates for similar instruments reflected at fair value. The fair value of real estate investments is based on periodic independent appraisals. Investments that do not have an established market, such as private markets, are reported at estimated fair values. The fair value of private markets are based on management’s valuation of estimates and assumptions from information and representations provided by the respective general partners, in the absence of readily ascertainable market values. There are no investments with parties or in entities related to the County. Fixed income securities are valued based on yields currently available on comparable securities of issuers with similar credit ratings.

D Administrative Expenses – The administrative expenses of the System are charged to the respective Plans on the basis of its percentage ownership in the System’s net position. Expenses are paid either by the County or from a separate cash account held by the custodian. Because of the commingled nature of funds, payments may be from either investment earnings or contributions. The total administrative expenses incurred during the year ended December 31, 2016 were \$1,342,456 of which approximately \$604,562 was initially paid through the County’s Accounts Payable department and subsequently reimbursed to the County by the System. The System is administered by employees within the County’s Office of Personnel and the Office of Finance. Some administrative costs are allocated to the Pension System and paid by the Custodian. Certain administrative costs are paid by the County’s General Fund and reimbursed by the System to the County.

E Income Taxes – The System qualifies under Section 401(a) of the Internal Revenue Code (IRC) and is exempt from income taxation as allowed by Section 501(a) of the IRC.

F Comparative Financial Information – The financial statements include prior-year combined comparative information for the System, but not at the individual Plan level, which is required by generally accepted accounting

principles. Accordingly, these financial statements should be read in conjunction with the System's audited financial report from 2015, from which the combined prior-year amounts were derived.

G New GASB Pronouncements – For the year ended December 31, 2016, the System implemented the following GASB pronouncement.

The System has adopted the provision of Governmental Accounting Standard Board (GASB) Statement No. 72, entitled *Fair Value Measurement and Application*. This statement provides guidance for determining the fair value measurement for financial reporting purposes, for applying fair value to certain investments and requirements for certain related disclosures.

2 General Description of the System

A Covered Membership – Membership in each plan consisted of the following as of December 31, 2016, based on the January 1, 2017 actuarial valuation:

	Employees Plan	Police Plan	Fire Plan	Detention Plan	Total
Retirees and beneficiaries receiving payments	1,807	711	591	250	3,359
Terminated plan members entitled to but not yet receiving payments	278	-	-	7	285
Deferred Retirement Option Program (DROP)	-	55	45	15	115
Active plan members	2,187	644	792	343	3,966
	<u>4,272</u>	<u>1,410</u>	<u>1,428</u>	<u>615</u>	<u>7,725</u>

B Plan Description, Contribution Information and Vesting – The following description of the System provides only general information. Participants should refer to the most recent Summary Plan Description booklets for a more complete description of the respective Plan's provisions.

Employees' Retirement Plan

Plan Description – The Employees' Retirement Plan is a single-employer defined benefit pension plan that covers all full-time general employees of the County who are not included in any other pension plan, as well as employees of Anne Arundel Economic Development Corporation. The Plan provides retirement, disability, and death benefits to Plan members and their beneficiaries pursuant to two separate benefit structures, Tier I and Tier II. Cost-of-living adjustments (COLAs) are also provided pursuant to County legislation.

Contributions – Contribution rates for participants are established through County legislation. Employees who elect to be in Tier I are required to contribute 4.0% of their annual covered salary. Tier II employees are not required nor permitted to make contributions. The County provided monthly contributions to the Plan based on the actuarially determined contribution for 2016 of \$25,809,828, as determined by the Plan's consulting actuary.

Cliff Vesting – Participants hired on or before June 30, 2015 will be fully vested after their fifth year of service. Termination prior to the fifth year will result in the return of all employee contributions, if applicable, plus 4.25% interest per annum with no additional benefits available. Participants hired on or after July 1, 2015 will be fully vested after their tenth year of service. Termination prior to the tenth year will result in the return of all employee contributions, if applicable, plus 4.25 % interest per annum with no additional benefits available.

Police Service Retirement Plan

Plan Description – The Police Service Retirement Plan is a single-employer defined benefit pension plan that covers the following classes of workers: Police Officer, Police Sergeant, Police Lieutenant, Police Captain, Police Major, Deputy Police Chief, and (by election) the Chief of Police. The Plan provides retirement, disability, and death benefits to Plan members and their beneficiaries. COLAs are also provided pursuant to County legislation.

Contributions – Contribution rates for participants are established through County legislation. Plan participants are required to contribute 7.25% of their annual covered salary. The County provided monthly contributions to the Plan based on the actuarially determined contribution for 2016 of \$20,410,896, as determined by the Plan's consulting actuary.

Normal Retirement – Participants hired on or after February 25, 2002 will be fully vested on the earlier of their attainment of age 50 and completion of their fifth year of service, or their completion of 20 years of service. Participants hired before February 25, 2002 will be fully vested on the earlier of their attainment of age 50 or completion of 20 years of service. Termination prior to attainment of Normal Retirement will result in the return of all employee contributions, if applicable, plus 3.0% interest per annum with no additional benefits available.

Fire Service Retirement Plan

Plan Description – The Fire Service Retirement Plan is a single-employer defined benefit pension plan that covers the following classes of workers: Fire Fighter II, Fire Fighter III, Fire Fighter Cardiac Rescue Technician, Fire Fighter/Emergency Medical Technician-Paramedic, Fire Lieutenant, Fire Captain, Fire Battalion Chief, Fire Division Chief, Fire Deputy Chief, and (by election) the Fire Administrator. The Plan provides retirement, disability, and death benefits to plan members and their beneficiaries. COLAs are also provided pursuant to County legislation.

Contributions – Contribution rates for participants are established through County legislation. Plan participants are required to contribute 7.25% of their annual covered salary. The County provided monthly contributions to the Plan based on the actuarially determined contribution for 2016 of \$14,591,340, as determined by the Plan's consulting actuary.

Normal Retirement – Participants who retire on or after July 1, 2002 will be fully vested on the earlier of their attainment of age 50 and completion of their fifth year of service, or their completion of 20 years of service. Participants who retired prior to July 1, 2002 will be fully vested on the earlier of their attainment of age 50 and completion of 5 years of service. Termination prior to attainment of Normal Retirement will result in the return of all employee contributions, if applicable, plus 3.% interest per annum with no additional benefits available.

Detention Officers' and Deputy Sheriffs' Retirement Plan

Plan Description – The Detention Officers' and Deputy Sheriffs' Retirement Plan is a single-employer defined benefit pension plan that covers the following classes of workers: Detention Officer I, Detention Officer II, Detention Officer III, Correctional Program Specialist I, Correctional Program Specialist II, Criminal Justice Program Supervisor, Security Administrator, Correctional Facility Administrator, Assistant Correctional Facility Administrator, Deputy Sheriff I, Deputy Sheriff II, Deputy Sheriff III, Deputy Sheriff IV, and (by election) the Superintendent of Detention Facilities. The plan provides retirement, disability, and death benefits to Plan members and their beneficiaries. COLAs are also provided pursuant to County legislation.

Contributions – Contribution rates for participants are established through County legislation. Plan participants are required to contribute 6.75% of their annual covered salary. The County provided monthly contributions to the Plan based on the actuarially determined contribution for 2016 of \$6,688,662, as determined by the Plan's consulting actuary.

Cliff Vesting – Participants will be fully vested on the attainment of age 50 and completion of their fifth year of service. Termination prior to attainment of Normal Retirement will result in the return of all employee contributions, if applicable, plus 4.25% interest per annum, with no additional benefits available.

C Legislative Changes for the Past Five Years

Bill No. 30-12 increased the pension contribution for non-represented employees in Fire and Police Plans to 7.25% and Detention Officers' Plan to 6.75%.

Bill No. 67-12 increased contributions for Police Lieutenants for consistency.

Bill No. 98-12 amended the definition of Final Average Basic Pay used in the determination of the retirement benefit. Final Average Basic Pay now means the average of the three highest annual basic pays consisting of the participant's annual basic pay on the participant's date of termination and *any* prior annual basic pay on the anniversary date of the date of termination. If a participant's rate of pay was reduced because of an involuntary transfer based on performance or disciplinary grounds, the Final Average Basic Pay will be the average of the three highest annual basic pays as of the date of termination and the last four anniversary dates as of the date of termination.

Bill No. 51-13 limits the ability of the Personnel Officer to recover certain overpayments. In the absence of fraud by a participant, the Personnel Officer or their agents or assigns may not recover an overpayment based on the erroneous past benefit determination caused by a failure to properly apply the Reduction in benefits upon reemployment under § 5-1-203 if the participant made a material change in position, including accepting, resigning or retiring from employment, in reasonable reliance upon an intentional or negligent misrepresentation of the amount of the participant's benefit made to the participant by the personnel officer or an employee or other agent of the personnel officer.

Bill No. 64-13 provides for a sixth year of the Deferred Retirement Option Program (DROP) for members of the Police Service Retirement Plan and certain members of the Fire Service Retirement Plan including Battalion Chiefs, Division Chiefs, Deputy Chiefs and the Fire Chief. No additional interest is earned or credited on the DROP balance during the sixth year of participation in the DROP. The initial term of a DROP participant period continues to be three years. There are no changes to DROP for participants who are employees represented by the International Association of Firefighters Local 1563. The DROP participation period may be extended by no more than two additional one year terms and the DROP participation period may be extended by no more than three additional one year terms for all other participants.

Bill No. 97-13 amends the vesting requirements and eligibility for normal retirement for participants in the Employees' Retirement Plan and some participants in the Detention Officers' and Deputy Sheriffs' Retirement Plan. In addition to changing the vesting and normal retirement requirements, this bill changes when a participant in these plans can receive credit for pre-plan military service credit, purchase service credit and/or become eligible for a non-service connected disability pension.

A participant in the Employees' Retirement Plan hired on or after July 1, 2015 vests in the benefits of the Plan upon completion of actual plan service plus transferred service under § 5-1-302 totaling 10 years. Normal retirement for a participant hired on or after July 1, 2015 is the participant's 60th birthday and completion of actual plan service plus transferred service under §5-1-302 totaling 10 years or the completion of 30 years of credited service.

Category II participants in the Detention Officers' and Deputy Sheriffs' Retirement Plan hired on or after July 1, 2015 vests in the benefits of the plan upon completion of actual plan service plus transferred service totaling 10 years. Normal retirement for participants hired on or after July 1, 2015 is the participant's 50th birthday and the completion of actual plan service plus transferred service under §5-1-302 totaling 10 years.

Bill No. 02-14 amends provisions related to the calculation of death benefits, locating persons entitled to benefits, and other general provisions to comply with IRS plan qualification rules.

There were no legislative changes in calendar years 2015 or 2016.

3 Deferred Retirement Option Program (DROP)

The Police Service, Fire Service Retirement Plans, and Detention Officers' and Deputy Sheriffs' Plan offer DROP plans. These programs permit a Plan member to be credited for benefit payments into an individual account within the Plan while continuing to provide services to the employer and to be paid a salary. All Plans allow 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 sixth year, but no interest shall be credited to the DROP account in the sixth year. The lump sum values held by the System pursuant to the DROP programs are \$8,688,426 for the Police Service Plan, \$8,922,011 for the Fire Service Plan and \$767,942 for the Detention Officers' and Deputy Sheriffs' Retirement Plan.

4 Net Pension Liability of the System by Plan

The components of the net pension liability and assumptions for each Plan at December 31, 2016 based on the actuarial valuations are displayed below:

	<u>Employees'</u> <u>Retirement Plan</u>	<u>Police Service</u> <u>Retirement Plan</u>	<u>Fire Service</u> <u>Retirement Plan</u>	<u>Detention Officers'</u> <u>and Deputy Sheriffs'</u> <u>Retirement Plan</u>
Total pension liability	\$ 830,383,057	\$ 664,977,684	\$ 598,835,855	\$ 175,568,918
Plan fiduciary net position	(592,099,006)	(486,520,135)	(485,690,368)	(120,339,036)
Plan net pension liability	<u>\$ 238,284,051</u>	<u>\$ 178,457,549</u>	<u>\$ 113,145,487</u>	<u>\$ 55,229,882</u>
Plan fiduciary net position as a percentage of the total pension liability	71.30%	73.16%	81.11%	68.54%

Actuarial assumptions. The total pension liability was determined by an actuarial valuation as of December 31, 2016 using the following summarized actuarial assumptions, applied to all periods in the measurement. Full descriptions of the actuarial assumptions are available in the January 1, 2017 valuation reports. The most recent Experience and Assumption Study was conducted in 2012 for the period 2007 to 2011.

Inflation	3.00%	3.00%	3.00%	3.00%
Salary increases	Rates vary by participant age for each Plan.			
Investment rate of return	7.5%, net of pension plan investment expense, including inflation for each Plan.			
Mortality Scale	RP-2000 Blue Collar Mortality tables with generational projection by Scale AA for each Plan.			
Set forward for post- disability mortality.	9 years	5 years	5 years	5 years

The above is a summary of key actuarial assumptions. Full descriptions of the actuarial assumptions are available in the Actuarial Statement Section included in this Comprehensive Annual Financial Report.

Discount Rate – The discount rate used to measure the total pension liability was 7.50% as of December 31, 2016. The projection of cash flows used to determine the discount rate assumed plan contributions will be made in amounts consistent with statutory provisions and recognizing the System's current funding policy and cost-sharing mechanism between employers and members. For this purpose, all contributions that are intended to fund benefits for all plan members and their beneficiaries are included, except that projected contributions that are intended to fund the service costs for future plan members and their beneficiaries are not included.

Based on those assumptions, the System's fiduciary net position was projected to be available to make all projected future benefit payments for current plan members. Therefore, the long-term expected rate of return on pension plan investments was applied to all periods of projected benefit payments to determine the total pension liability as of December 31, 2016.

Sensitivity of the net pension liability to changes in the discount rate – The following schedule presents the net pension liability, calculated using the discount rate of 7.5%, as well as what the Plan's net pension liability would be if it were calculated using a discount rate that is 1.0 percentage point lower (6.5%) or 1.0 percentage point higher (8.5%) than the current rate.

	<u>Employees'</u> <u>Retirement Plan</u>	<u>Police Service</u> <u>Retirement Plan</u>	<u>Fire Service</u> <u>Retirement Plan</u>	<u>Detention Officers'</u> <u>and Deputy Sheriffs'</u> <u>Retirement Plan</u>
1% Decrease to 6.5%	\$ 332,132,582	\$ 263,977,109	\$ 191,411,040	\$ 76,490,920
Current Discount Rate 7.5%	\$ 238,284,051	\$ 178,457,549	\$ 113,145,487	\$ 55,229,882
1% Increase to 8.5%	\$ 158,975,258	\$ 108,615,280	\$ 49,186,382	\$ 37,584,556

Long Term Expected Returns – For investment purposes, the four Plans which comprise the System are managed on a co-mingled basis and the long-term expected rates of investment return are the same for each Plan. The long-term (30 year) expected rate of return on pension System investments was determined using a building-block method in which best-estimate ranges of expected future real rates of return (expected returns, net of pension plan investment expense and inflation) are developed for each major asset class. These ranges are combined to produce the long-term expected rate of return by using an optimizer program that relies on the arithmetic return inputs, the standard deviation forecast (risk) for each asset class, and the correlations among them. The result is a 30-year nominal, geometric, net-of-fee return forecast for the pension assets. The 30-year real rate of return is calculated by netting the inflation assumption out of the nominal forecast. The nominal and real rates of return forecasts for each major asset class included in the pension System’s target asset allocation of December 31, 2016 (see the discussion of the System’s investment policy) are summarized in the following table:

30-Year Return Assumptions by Asset Class
As of December 31, 2016

Asset Class	30-Year Geometric Forecast	
	(Nominal Returns)	(Real Returns)
Cash	3.00%	0.25%
U.S. Treasuries	3.25%	0.50%
IG Corp Credit	5.00%	2.25%
Mortgage Backed Securities	3.50%	0.75%
Bank Loans	6.00%	3.25%
* Core Fixed Income	3.78%	1.03%
High-Yield Bonds	5.75%	3.00%
Absolute Return Fixed Income	4.41%	1.66%
Emerging Market Debt (External)	6.00%	3.25%
Emerging Market Debt (Local Currency)	6.50%	3.75%
Large Cap Equity	7.50%	4.75%
Small/Mid Cap Equity	7.75%	5.00%
International Equities (Unhedged)	8.00%	5.25%
Emerging Int'l Equities	9.50%	6.75%
Private Equity	9.50%	6.75%
Private Debt	8.00%	5.25%
Real Estate	6.50%	3.75%
Hedge Funds	6.50%	3.75%
Hedge Funds (Macro)	6.25%	3.50%
** Risk Parity	6.35%	3.60%

Note: NEPC's 30-year geometric inflation assumption is 2.75%.

** Core Bonds assumption based on*

market weighted blend of components of Aggregate Index (Treasuries, IG Corp Credit, and MBS).

*** Risk Parity Allocation Modeled as 3% Global Macro Hedge Funds and the balance Bridgewater All Weather (using NEPC manager specific assumptions for Bridgewater).*

5 Risks and Uncertainties

The System may invest in various types of investment securities. Investment securities are exposed to various risks, such as interest rate, market, and credit risk. Due to the level of risk associated with certain investment securities, it is possible that changes in the values of investment securities may occur in the near-term and that such changes could materially affect the amounts reported in the Statement of Fiduciary Net Position.

6 Investments

A General Investment Policy – The System operates under the “Prudent Person” rule used herein, meaning that in investing, the governing authorities of the systems, funds and plans, shall exercise the judgment and care under the circumstances then prevailing, that an institutional investor of ordinary prudence, discretion, and intelligence exercises in the management of investments entrusted to it, not in regard to speculation, but in regard to the permanent disposition of funds, considering probable safety of capital as well as probable income. Investments are made in full accordance with any and all applicable Maryland statutes, as well as any other applicable legislation or regulation, state, federal or otherwise. The roles and responsibilities of the Board of Trustees, the Investment Committee, the Investment Consultant, the Investment Managers and the Custodian are clearly defined. The Board has established a diversified portfolio to meet the System’s return requirements. The table below summarizes the target asset allocation.

Asset Class	Market Target (%)	Minimum Exposure (%)	Maximum Exposure (%)
Domestic Equity	23	13	33
International Equity	15	7	25
Emerging Market Equity	7	0	12
Domestic Fixed Income	15	5	25
Emerging Market Debt	5	0	10
Private Markets	9	0	17
Opportunistic Investments	3	0	8
Real Estate	5	0	10
Risk Parity (GAA)	16	11	21
Cash	2	0	10

B Investments Authorized – The System is authorized to invest in U.S. Government securities, insurance company general accounts, commercial paper, money market mutual funds, corporate bonds, common and international stocks, limited partnerships, absolute return funds, private equity, mortgage participation notes and real estate. State statutes do not prohibit the System from participating in securities lending transactions. (See Note 7 to the basic financial statements for additional information concerning the System’s security lending transactions.)

C Custodial Credit Risk, Deposits – Custodial credit risk for deposits is the risk that the System will not be able to recover its deposits, in the event of the failure of a depository financial institution or will not be able to recover collateral securities that are in the possession of an outside party. Investment securities are exposed to custodial credit risk if the securities are uninsured, are not registered in the name of the System, and are held by either a counterparty or the counterparty’s trust department or agent but not in the System’s name. As of December 31, 2016, there were no investments that met this criteria.

D Concentration Risk – Concentration risk is the risk of loss to the System attributed to the magnitude of the System’s investment in a single issuer. As of December 31, 2016, there was no exposure to a single issuer greater than 5.0% of the plan net position, excluding investment pools. The System’s Investment Policy Statement sets maximum concentration limits by asset type and style.

E. Rate of Return – For the year ended December 31, 2016, the annual money-weighted rate of return on pension system investments, net of System expenses, was 6.2%. The money-weighted rate of return expresses investment performance, net of investment expense, adjusted for the changing amounts actually invested.

F Interest Rate Risk – Interest rate risk is the risk that changes in interest rates will adversely affect the value of an investment. The fair value of fixed income (debt) securities is affected by increases and declines in interest rates. These investments may also have embedded call features allowing the issuer to redeem part or all of the issue prior to maturity at a pre-set price. In addition, debt issues may have interest rates that vary according to a pre-determined external index (such as the London Inter-Bank Offered Rate) or a pre-determined step-up in the interest rate at a pre-determined date(s). The Investment Policy Statement (IPS) sets limits on floating rates for mortgage backed securities and establishes limits on the average duration of some investment types.

The following table uses the *Segmented Time Distribution* method to display the System's debt holdings by maturity term and investment type. Some issues within the categories agencies/instrumentalities, corporate bonds, collateralized mortgage obligations, and other asset-backed securities have variable rate features. The total fair value of these securities was \$8,967,393 as of December 31, 2016.

Investment Type	Fair Value	Investment Maturities (in Years)			
		Less than 1 year	1 to 5	6 to 10	over 10
Money market pools	\$ 53,115,505	\$ 53,115,505	\$ -	\$ -	\$ -
U.S. Treasuries	21,312,799	9,977	10,824,784	3,709,642	6,768,396
Agency/Instrumentalities	13,720,207	1,797,840	-	-	11,922,367
Corporate Bonds	71,956,727	271,350	35,323,450	25,757,301	10,604,626
Bond Mutual Funds	205,094,947	62,269,885	142,825,062	-	-
Collateralized Mrtg Obligations	7,643,979	-	768,589	499,836	6,375,554
Other Asset-Backed Securities	2,338,930	-	-	228,306	2,110,624
Foreign and Yankee Bonds	10,436,552	232,955	4,025,730	3,584,284	2,593,583
Totals	\$ 385,619,647	\$ 117,697,512	\$ 193,767,615	\$ 33,779,369	\$ 40,375,150

The segmented time distribution table includes issues with call features and assumes that these issues will be held to maturity. The total fair market value of callable securities totals \$55,661,986 with call dates ranging from January 1, 2017, for continuously callable issues, to September 1, 2045. Stated call prices are generally at par. The callable holdings include issues with floating interest rates which have a market value of \$4,521,328.

G Credit Risk – Credit risk is the risk that an issuer or other counterparty to an investment will not fulfill its obligations to the System. Debt securities are rated by Nationally Recognized Statistical Rating Organizations to provide purchasers with an opinion of the capability and willingness of a borrower to re-pay its debt. The following table displays the System's debt holdings and quality ratings from Standard & Poor's. The Investment Policy Statement provides guidelines to all fixed income managers related to allowable quality ratings.

	Value	Standard & Poor's Credit Ratings				
		AAA - A	BBB - B	CCC - C	D	NR
Agency/Instrumentalities	\$ 13,720,207	\$ 1,848,080	\$ -	\$ -	\$ -	\$ 11,872,127
Collateralized Mort.Obligations	7,643,979	1,172,863	695,182	1,275,771	448,556	4,051,607
Other Asset-backed Obligations	2,338,930	542,137	750,679	904,712	-	141,402
Corporate Bonds	71,956,727	5,337,889	65,937,051	487,500	-	194,288
Yankee & Foreign Gov. Issued	10,436,552	1,735,497	8,690,412	-	-	10,643
Guaranteed Invest Contracts	23,356,163	-	-	-	-	23,356,163
Mutual Funds	205,094,947	-	-	-	-	205,094,947
Short Term Investment Pools	53,115,505	-	-	-	-	53,115,505
Total Credit Risk of Debt Securities	\$ 387,663,010	\$ 10,636,466	\$ 76,073,323	\$ 2,667,983	\$ 448,556	\$ 297,836,682
U.S. Gov't & Agencies *	21,312,799					
Total Debt Securities	\$ 408,975,809					

* U.S. government agency securities explicitly guaranteed by the U.S. government are categorized here.

H Foreign Currency Risk – The investment policy recognizes the value of global diversification. A maximum of 66.0% in international/global exposure is allowed. The System retains six managers for global and international equity and fixed income exposure. These managers may also purchase or sell currency on a spot basis and may enter into forward exchange contracts on currency provided that the use of such contracts is designed to dampen portfolio volatility or to facilitate the settlement of securities transactions.

There is potential risk with exposure to foreign currency relating to potential unfavorable fluctuation of exchange rates compared with the U.S. Dollar. The System's direct exposure to foreign currency was zero as of

December 31, 2016. The fair market value of international/global equities and fixed income assets that were managed in pooled funds totaled \$687,486,184 as of December 31, 2016.

I Fair Value Measurement – The Pension System categorizes its fair value measurements within the fair value hierarchy established by generally accepted accounting principles. The hierarchy is based on the valuation inputs used to measure the fair value of the asset and give the highest priority to unadjusted quoted prices in active markets for identical assets or liabilities (Level 1 measurements) and the lowest priority to unobservable inputs (Level 3 measurements). Level 1 inputs are quoted prices in active markets for identical assets, Level 2 inputs are significant other observable inputs, and Level 3 inputs are significant unobservable inputs. As of December 31, 2016 all short-term investments were in money market mutual funds which are not subject to the fair value measurement requirements.

Level 1	Unadjusted quoted prices in active markets for identical instruments.
Level 2	Quoted prices for similar instruments in active markets; quoted prices for identical or similar instruments in markets that are not active; and model-derived valuation in which all significant inputs are observable.
Level 3	Valuations derived from valuation techniques in which significant inputs are unobservable.

Investments that are measured at fair value using the net asset value per share (or its equivalent) as a practical expedient are not classified in the fair value hierarchy.

The following table shows the fair value leveling of the System's investment portfolio at December 31, 2016.

Assets at Fair Value December 31, 2016		Quoted Prices in Active Markets for Identical Assets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Investment Type	Fair Value			
Fixed Income Investments				
U.S. Government obligations	\$ 21,312,799	\$ 21,312,799	\$ -	\$ -
Agency/Instrumentalities	13,720,207	13,720,207	-	-
Collateralized Mort. obligations	7,643,979	-	7,643,979	-
Other asset-backed obligations	2,338,930	-	2,338,930	-
Corporate bonds	82,393,279	-	82,387,019	6,260
Fixed income mutual funds	77,342,522	3,157,289	74,185,233	-
International fixed income mutual funds	65,482,541	65,482,541	-	-
Aetna insurance pooled fixed income	23,356,163	-	23,356,163	-
Absolute return fixed income	51,860,530	51,860,530	-	-
Total fixed income investments	345,450,950	155,533,366	189,911,324	6,260
Equity Investments				
Domestic equity	390,442,348	314,900,031	75,542,317	-
International equity pools	299,710,330	299,710,330	-	-
Portable Alpha	92,445	-	-	92,445
Total equity investments	690,245,123	614,610,361	75,542,317	92,445
Total investments by fair value level	\$ 1,035,696,073	\$ 770,143,727	\$ 265,453,641	\$ 98,705

Investments Measured at Net Asset Value (NAV)

Investment Type	Net Asset Value	Unfunded Commitments as of 12/31/16	Redemption Frequency (If Currently Eligible)	Redemption Notice Period
Commingled Funds-Debt	\$ 62,269,884	\$ -	Twice monthly	15 days
Commingled Funds-Equities	95,954,866	-	Monthly	5 Business days
Real Estate REIT Fund	91,429,425	-	Quarterly	90 days
Global asset pools	226,338,448	-	Monthly	5 Business days
Private Markets Buyouts	33,057,915	49,866,747	Not eligible	Not eligible
Private Markets Mezzanine	15,994,675	3,597,350	Not eligible	Not eligible
Private Markets Secondaries	11,248,167	14,833,622	Not eligible	Not eligible
Private Markets Distressed	30,162,501	18,234,983	Not eligible	Not eligible
Fund of Funds	10,397,614	1,673,299	Not eligible	Not eligible
Private Markets Energy	18,067,286	13,243,587	Not eligible	Not eligible
Investments measured at cost	594,920,781	\$ 101,449,588		
Money Market Mutual Funds	53,645,660			
Total Investments	\$ 1,684,262,514			

Securities classified in Level 1 are valued using quoted prices in active markets for those securities. Securities classified in Level 2 and Level 3 are valued using methodologies such as various bid evaluations, market averages and other matrix pricing techniques as well as values derived from associated traded securities or last trade data. In instances where inputs used to measure fair value fall into different levels, the fair value is categorized based on the lowest level input that is significant to the valuation.

Investments valued at the net asset value (NAV) per share (or its equivalent) have been classified separately in the table above and include investments considered to be Alternative Investments as defined by the American Institute of Certified Public Accountants. The definition includes investments for which a readily determinable fair value does not exist (that is, investments not listed on national exchanges or over-the-counter markets, or for which quoted market prices are not available from sources such as financial publications, the

exchanges, or NASDAQ). These types of investments can be held within any of the asset classes used by the System based on underlying portfolio holdings and analysis of risk and return relations. These investments can be structured in different ways, including limited partnerships, limited liability companies, common trusts, and mutual funds. Some are closed-ended with a specific life and capital commitments while others are open-ended with opportunity for ad hoc contributions or withdrawals and termination with proper notice.

Commingled/Mutual Funds: These types of funds are open-ended funds and may be utilized in equity or fixed income asset classes. They are funds made up of underlying securities that have readily available fair values (publicly traded stocks or bonds). The System owns units of these funds rather than the individual securities. Contributions or withdrawals from the funds can be made as needed, generally with daily or monthly liquidity, with a notice period of one to thirty days. Because they are liquid funds, there are no unfunded commitments for these types of investments.

Private Markets: Private Market investments are typically private interests in corporations across different areas of the capital structure and in different stages of the corporations' development via limited partnership vehicles. Private Market investments are illiquid and long term in nature (10-12 years), typically held until maturity. These portfolios generally have a "J-Curve Effect" whereby there are low to negative returns in the initial years due to the payment of investment management fees and initial funding of investments made by the General Partner during a period when investments are typically carried at cost and returns have not been realized. To diversify the program, investments are made across business cycles, vintage years, and different strategies. The Systems' Investment Policy Statement has a dedicated asset class for Private Markets. There is no option to request redemptions from the Private Market funds.

7 Securities Lending

The Board of Trustees authorizes the System to lend securities held by the custodian, State Street Bank and Trust Company, to broker-dealers and other entities with a simultaneous agreement to return the collateral for the same securities in the future. Effective December 1, 2016, the System's Lending Agent was Deutsche Bank AG (DB). The previous Agent, State Street Bank and Trust, suspended lending activity for the System at the direction of the Board of Trustees as of May 31, 2016. Deutsche Bank AG lends securities for collateral in the form of cash or other securities of 102 percent for domestic securities and 105 percent for international. Cash collateral received by the System with respect to these transactions is invested in a separate, un-pooled account basis at the direction of the Board of Trustees in the fully collateralized Repurchase Agreements.

At year end, the System had no credit risk exposure to borrowers because the amount of collateral held by the System was greater than the value of securities on loan. The market value of invested collateral held as of December 31, 2016 was \$60,373,848. There were no securities held as collateral. The market value of securities on loan for the System as of December 31, 2016 was \$59,084,503.

The System did not impose any restrictions during the year on the amount of the loans that the agent made on its behalf. Moreover, there were no losses during the year resulting from a default of the borrowers or custodian.

All security loans can be terminated on demand by either the System or the borrower. Cash collateral received was invested in Repurchase Agreements, which as of December 31, 2016 had a weighted average final maturity of 70.3 days. The interest rate risk is zero days as assets and liabilities can be rate changed on a daily basis.

8 Financial Instruments With Off-Balance Sheet Risk

Mortgage-Backed Securities – A mortgage-backed security depends on the underlying pool of mortgage loans to provide the cash flow to make principal and interest payments on the security. A decline in interest rates can result in prepayments, which reduce the fair value of the security. If homeowners pay on mortgages longer than anticipated, the cash flows are greater and the return on investment would be higher than anticipated. A collateralized mortgage obligation (CMO) is a mortgage-backed security that is comprised of classes or tranches of bonds. Each class is structured to achieve a specific level of cash flow based on the prepayment assumptions assigned to the underlying mortgage pool.

The System invests in mortgage-backed securities to enhance fixed income returns. Mortgage-backed securities are subject to credit risk, the risk that the borrowers will be unable to meet their obligations. These securities are also subject to prepayment risk, which is the risk that a payment will be made in excess of the regularly scheduled principal payment. Prepayment risk is comprised of two risks: call risk, (the risk that prepayments will occur when interest rates have declined), and extension risk, (the risk that prepayments will not be made when interest rates have increased.) As of December 31, 2016, the fair value of government mortgage-backed securities was \$11,872,127, asset-backed securities was \$2,338,930, and CMO's was \$7,643,979. These are included in the corporate obligations total on the Statement of Fiduciary Net Position.

9 Exposure to Derivatives

Derivative instruments are securities that derive value from another asset and are in the form of a contract between two or more parties. Common derivatives are futures contracts, forwards contracts, options, and swaps. The System has no direct exposure to derivative securities. There are, however, mutual funds, commingled funds, and other investment vehicles in which the System has a percentage ownership that have exposure to futures, currency forward contracts, commodity forward contracts, and total return swap contracts. These funds enter into derivative contracts as part of their investment strategies to mitigate risk and volatility.

A derivative policy statement is included in the Investment Policy Statement (IPS). Prohibited instruments include options, commodities, uncovered options or futures, uncovered short positions, short selling, and use of financial leverage. The derivative exposure as of December 31, 2016 within the mutual funds, commingled funds, and other investment vehicles is comprised of allowable instruments based on the IPS.

10 Contingencies

Certain legal proceedings are pending against the System arising from its normal activities that, based on the facts presently available and the advice of legal counsel, management believes will not have a material adverse effect on the System's financial condition upon settlement.

11 Commitments

The System has committed to fund various private equity investments totaling \$262.2 million at December 31, 2016, of which approximately \$101.4 remains unfunded. Additional details regarding the unfunded balances are in Note 8. The expected funding dates for these commitments extend through 2021.

12 Subsequent Events

The system evaluated subsequent events through June 15, 2017, the date the financial statements were available to be issued. Events or transactions occurring after December 31, 2016, but prior to June 15, 2017 that provided additional evidence about conditions that existed at December 31, 2016, have been recognized in the financial statements for the year ended December 31, 2016. Events or transactions that provided evidence about conditions that did not exist at December 31, 2016, but arose before the financial statements were available to be issued have not been recognized in the financial statements for the year ended December 31, 2016.

Anne Arundel County Retirement and Pension System
Required Supplementary Information
Schedule of Changes in the Net Pension Liability and Related Ratios – Employees’ Retirement Plan
For Years Ended December 31

	2014	2015	2016
Total pension liability (Dollar amounts in thousands)			
Service cost	\$ 14,159	\$ 15,115	\$ 15,144
Interest	53,353	58,329	59,292
Differences between expected and actual experience	16,408	(17,971)	(12,599)
Changes of assumptions	22,567	-	-
Benefit payments, including refunds of member contributions	(39,012)	(41,253)	(44,024)
Net change in total pension liability	67,475	14,221	17,813
Total pension liability - beginning	730,874	798,349	812,570
Total pension liability - ending	798,349	812,570	830,383
Plan fiduciary net position			
Contributions - employer	24,451	25,630	25,810
Contributions - member	4,662	4,847	5,182
Net investment income	28,451	(8,374)	41,345
Benefit payments, including refunds of member contributions	(39,012)	(41,253)	(44,024)
Administrative expense	(519)	(504)	(497)
Net change in plan fiduciary net position	18,034	(19,654)	27,816
Plan fiduciary net position - beginning	565,902	583,936	564,283
Plan fiduciary net position - ending	583,936	\$ 564,283	\$ 592,099
County's net pension liability - ending	214,413	\$ 248,287	\$ 238,284
Plan fiduciary net position as a percentage of the total pension liability	73.1%	69.4%	71.3%
Covered-employee payroll	\$ 127,091	\$ 127,827	\$ 130,313
County's net pension liability as a percentage of covered-employee payroll	168.7%	194.2%	182.9%
Expected average remaining service years of all participants	5	5	5

Notes to Schedule:

- 1 Source is actuarial data based on preliminary financials. The difference between this schedule and the final combining statement of changes in fiduciary net position on page 14 is considered immaterial.
- 2 This schedule is presented to illustrate the requirement to show information for 10 years. Until 10 year trend is compiled, pension plans should present information for those years for which data is available.
- 3 There are no benefit changes reflected in the current schedule.
- 4 For FY 2014, the expected rate of investment return was reduced from 8.0% to 7.5% and other assumptions were changed to reflect results of the 2012 experience study.

Anne Arundel County Retirement and Pension System

Required Supplementary Information

Schedule of Changes in the Net Pension Liability and Related Ratios – Police Service Retirement Plan

For Years Ended December 31

	2014	2015	2016
Total pension liability (Dollar amounts in thousands)			
Service cost	\$ 10,951	\$ 12,258	\$ 12,057
Interest	41,480	45,473	47,032
Differences between expected and actual experience	12,801	(4,693)	(4,527)
Changes of assumptions	18,331	-	-
Benefit payments, including refunds of member contributions	(29,507)	(31,134)	(33,357)
Net change in total pension liability	54,055	21,903	21,205
Total pension liability - beginning	567,815	621,870	643,773
Total pension liability - ending	621,870	643,773	664,978
Plan fiduciary net position			
Contributions - employer	18,870	19,560	20,411
Contributions - member	2,950	3,104	3,158
Net investment income/(loss)	21,813	(7,869)	33,500
Benefit payments, including refunds of member contributions	(29,507)	(31,134)	(33,357)
Administrative expense	(418)	(423)	(417)
Net change in plan fiduciary net position	13,707	(16,762)	23,295
Plan fiduciary net position - beginning	466,281	479,988	463,225
Plan fiduciary net position - ending	479,988	463,225	486,520
County's net pension liability - ending	141,882	180,547	178,458
Plan fiduciary net position as a percentage of the total pension liability	77.2%	72.0%	73.2%
Covered-employee payroll	\$ 42,960	\$ 43,879	\$ 44,894
County's net pension liability as a percentage of covered-employee payroll	330.3%	411.5%	397.5%
Expected average remaining service years of all participants	4	4	4

Notes to Schedule:

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- 3 There are no benefit changes reflected in the current schedule.
- 4 For FY 2014, the expected rate of investment return was reduced from 8.0% to 7.5% and other assumptions were changed to reflect results of the 2012 experience study.

Anne Arundel County Retirement and Pension System
Required Supplementary Information
Schedule of Changes in the Net Pension Liability and Related Ratios-Fire Service Retirement Plan
For Years Ended December 31

	2014	2015	2016
Total pension liability (Dollar amounts in thousands)			
Service cost	\$ 9,184	\$ 10,339	\$ 11,102
Interest	38,949	41,924	42,294
Changes of benefit terms	-	-	-
Differences between expected and actual experience	3,679	(14,630)	(1,552)
Changes of assumptions	18,028	-	-
Benefit payments, including refunds of member contributions	(28,823)	(31,520)	(33,868)
Net change in total pension liability	41,016	6,112	17,976
Total pension liability - beginning	533,731	574,748	580,860
Total pension liability - ending	<u>\$ 574,748</u>	<u>580,860</u>	<u>598,836</u>
Plan fiduciary net position			
Contributions - employer	15,899	15,122	14,591
Contributions - member	2,778	3,050	3,257
Net investment income	22,688	(7,744)	33,899
Benefit payments, including refunds of member contributions	(28,823)	(31,520)	(33,868)
Administrative expense	(423)	(436)	(428)
Net change in plan fiduciary net position	12,119	(21,528)	17,451
Plan fiduciary net position - beginning	477,648	489,767	468,239
Plan fiduciary net position - ending	<u>489,767</u>	<u>468,239</u>	<u>485,690</u>
County's net pension liability - ending	<u>84,981</u>	<u>112,621</u>	<u>113,146</u>
Plan fiduciary net position as a percentage of the total pension liability	85.2%	80.6%	81.1%
Covered-employee payroll	\$ 40,476	\$ 43,838	\$ 46,228
County's net pension liability as a percentage of covered-employee payroll	210.0%	256.9%	244.8%
Expected average remaining service years of all participants	5	5	6

Notes to Schedule:

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- 3 There are no benefit changes reflected in the current schedule.
- 4 For FY 2014, the expected rate of investment return was reduced from 8.0% to 7.5% and other assumptions were changed to reflect results of the 2012 experience study.

Anne Arundel County Retirement and Pension System
Required Supplementary Information
Schedule of Changes in Net Pension Liability and Related Ratios-Detention Officers and Deputy Sheriffs' Plan
For Years Ended December 31

	2014	2015	2016
Total pension liability (Dollar amounts in thousands)			
Service cost	\$ 4,602	\$ 4,634	\$ 4,461
Interest	10,301	11,401	12,281
Changes of benefit terms	-	4,635	-
Differences between expected and actual experience	2,322	(2,558)	(1,678)
Changes of assumptions	3,494	-	-
Benefit payments, including refunds of member contributions	(5,819)	(6,279)	(6,485)
Net change in total pension liability	14,900	11,833	8,579
Total pension liability - beginning	140,256	155,156	166,990
Total pension liability - ending	155,156	\$ 166,990	\$ 175,569
Plan fiduciary net position			
Contributions - employer	6,111	6,371	6,689
Contributions - member	1,298	1,317	1,316
Net investment income/(loss)	4,944	(1,919)	8,159
Benefit payments, including refunds of member contributions	(5,819)	(6,279)	(6,485)
Administrative expense	(96)	(98)	(100)
Net change in plan fiduciary net position	6,438	(608)	9,579
Plan fiduciary net position - beginning	104,930	111,368	110,760
Plan fiduciary net position - ending	111,368	110,760	120,339
County's net pension liability - ending	\$ 43,788	\$ 56,230	\$ 55,230
Plan fiduciary net position as a percentage of the total pension liability	71.8%	66.3%	68.5%
Covered-employee payroll	\$ 19,776	\$ 19,386	\$ 19,801
County's net pension liability as a percentage of covered-employee payroll	221.4%	290.1%	278.9%
Expected average remaining service years of all participants	4	4	3

Notes to Schedule:

- 1 Source is actuarial data based on preliminary financials. The difference between this schedule and the final combining statement of changes in fiduciary net position on page 14 is considered immaterial.
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- 3 There are no benefit changes reflected in the current schedule.
- 4 For FY 2014, the expected rate of investment return was reduced from 8.0% to 7.5% and other assumptions were changed to reflect results of the 2012 experience study.

Schedule of Investment Returns

<u>Year Ended</u>	<u>Annual Money-weighted Rate of Return</u> <u>Net of Investment Expenses</u>
2014	4.5%
2015	(1.8%)
2016	6.2%

Note: Money-weighted results for the required 10-year timeframe will be added as available.
Source: New England Pension Consultants, LLC

Anne Arundel County Retirement and Pension System

Required Supplementary Information

Schedule of Employer's Contributions - Employees' Retirement Plan

For the Last Ten Years Ended December 31

(Dollars in thousands)

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Actuarially determined contribution	\$ 11,779	\$ 12,907	\$ 15,246	\$ 17,284	\$ 18,186	\$ 19,824	\$ 22,362	\$ 24,426	\$ 25,655	\$ 25,810
Contributions in relation to the actuarially determined contribution	11,779	12,907	15,246	17,284	18,186	19,824	22,362	24,451	25,630	25,810
Contribution deficiency (excess)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ (25)	\$ 25	\$ -
Covered-employee payroll (See Note)	\$ 117,223	\$ 124,803	\$ 126,031	\$ 123,498	\$ 120,416	\$ 116,025	\$ 115,809	\$ 127,091	\$ 127,827	\$ 130,313
Contributions as a percentage of covered-employee payroll	10.05%	10.34%	12.10%	14.00%	15.10%	17.09%	19.31%	19.24%	20.05%	19.81%

Notes to Schedule

Valuation Date:	1/1/2008	1/1/2009	1/1/2010	1/1/2011	1/1/2012	1/1/2013	1/1/2014	1/1/2015	1/1/2016	1/1/2017
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Note: "Covered-employee payroll" for 2014 has been changed to reflect the new GASB language.

Methods and assumptions used to determine contribution rates:

Actuarial cost method	Projected Unit Credit
Amortization method	Level percentage of payroll, closed, increasing 3.0% per year.
Remaining amortization period	17 to 26 years with an average effective period of 24 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 the time of the change.
Asset valuation method	5-year smoothed market
Inflation	3.00%
Salary increases	Rates vary by participant age.
Investment rate of return	7.50% net of pension plan investment expense, including inflation.
Retirement age	Rates vary by participant age and service.
Mortality	RP-2000 Blue Collar Mortality tables with generational projection by scale AA. A nine-year set forward is used for post-disability mortality.

Anne Arundel County Retirement and Pension System

Required Supplementary Information

Schedule of Employer's Contributions - Police Service Retirement Plan

For the Last Ten Years Ended December 31

(Dollars in thousands)

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Actuarially determined contribution	\$ 9,997	\$ 10,523	\$ 12,428	\$ 13,696	\$ 14,153	\$ 15,530	\$ 17,746	\$ 18,870	\$ 19,560	\$ 20,411
Contributions in relation to the actuarially determined contribution	9,997	10,523	12,428	14,056	13,793	15,530	17,746	18,870	19,560	20,411
Contribution deficiency (excess)	\$ -	\$ -	\$ -	\$ (360)	\$ 360	\$ -	\$ -	\$ -	\$ -	\$ -
Covered-employee payroll	\$ 41,011	\$ 41,509	\$ 42,499	\$ 42,449	\$ 41,335	\$ 40,522	\$ 41,714	\$ 42,960	\$ 43,879	\$ 44,894
Contributions as a percentage of covered-employee payroll	24.38%	25.35%	29.24%	33.11%	33.37%	38.33%	42.54%	43.92%	44.58%	45.46%

Notes to Schedule

Valuation Date: 1/1/2008 1/1/2009 1/1/2010 1/1/2011 1/1/2012 1/1/2013 1/1/2014 1/1/2015 1/1/2016 1/1/2017

Note: "Covered-employee payroll" for 2014 has been changed to reflect the new GASB language.

Methods and assumptions used to determine contribution rates:

Actuarial cost method	Projected Unit Credit
Amortization method	Level percentage of payroll, closed, increasing 3.0% per year.
Remaining amortization period	17 to 26 years with an average effective period of 24 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 the time of the change.
Asset valuation method	5-year smoothed market
Inflation	3.00%
Salary increases	Rates vary by participant age.
Investment rate of return	7.50% Net of pension plan investment expense, including inflation.
Retirement age	Rates vary by participant age and service.
Mortality	RP-2000 Blue Collar Mortality tables with generational projection by Scale AA. A five-year set forward is used for post-disability mortality.
Other	Employer contributions for calendar 2010 are greater than 100.0% of the Actuarially Determined Contribution due to 6/30 fiscal year revisions. Calendar 2011 was reduced for the revisions.

Anne Arundel County Retirement and Pension System

Required Supplementary Information

Schedule of Employer's Contributions - Fire Service Retirement Plan

For the Last Ten Years Ended December 31

(Dollars in thousands)

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Actuarially determined contribution	10,960	11,190	12,701	14,213	14,395	15,238	16,152	15,899	15,122	14,591
Contributions in relation to the actuarially determined contribution	10,960	11,190	12,701	14,649	13,960	15,238	16,152	15,899	15,122	14,591
Contribution deficiency (excess)	\$ -	\$ -	\$ -	\$ (435)	\$ 435	\$ -	\$ -	\$ -	\$ -	\$ -
Covered-employee payroll	\$ 43,942	\$ 48,824	\$ 49,064	\$ 47,841	\$ 45,673	\$ 43,362	\$ 44,951	\$ 40,476	\$ 43,838	\$ 46,228
Contributions as a percentage of covered-employee payroll	24.94%	22.92%	25.89%	30.62%	30.56%	35.14%	35.93%	39.28%	34.50%	31.56%

Notes to Schedule

Valuation Date:	1/1/2008	1/1/2009	1/1/2010	1/1/2011	1/1/2012	1/1/2013	1/1/2014	1/1/2015	1/1/2016	1/1/2017
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Note: "Covered-employee payroll" for 2014 has been changed to reflect the new GASB language.

Methods and assumptions used to determine contribution rates:

Actuarial cost method	Projected Unit Credit
Amortization method	Level percentage of payroll, closed, increasing 3.0% per year.
Remaining amortization period	Range from 17 to 26 years.
Asset valuation method	5-year smoothed market
Inflation	3.00%
Salary increases	Rates vary by participant age.
Investment rate of return	7.50% Net of Pension plan investment expense, including inflation.
Retirement age	Rates vary by participant age and service.
Mortality	RP-2000 Blue Collar Mortality tables with generational projection by Scale AA. A five -year set forward is used for post-disability mortality.
Other	Employer contributions for calendar 2010 are greater than 100.0% of the Actuarially Determined Contribution due to 6/30 fiscal year revisions. Calendar 2011 was reduced for the revisions.

Anne Arundel County Retirement and Pension System

Required Supplementary Information

Schedule of Employer's Contributions - Detention Officers' and Deputy Sheriffs' Retirement Plan

For the Last Ten Years Ended December 31

(Dollars in thousands)

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Actuarially determined contribution	\$ 3,601	\$ 3,788	\$ 4,349	\$ 4,789	\$ 4,994	\$ 5,141	\$ 5,600	\$ 6,111	\$ 6,371	\$ 6,689
Contributions in relation to the actuarially determined contribution	3,601	3,788	4,349	4,907	4,876	5,141	5,600	6,111	6,371	6,689
Contribution deficiency (excess)	\$ -	\$ -	\$ -	\$ (118)	\$ 118	\$ -	\$ -	\$ -	\$ -	\$ -
Covered-employee payroll	18,122,458	19,785,653	20,203,895	19,310,216	18,760,664	17,896,574	18,132,868	19,776	19,386	19,801
Contributions as a percentage of covered-employee payroll	0.02%	0.02%	0.02%	0.03%	0.03%	0.03%	0.03%	30.90%	32.86%	33.78%

Notes to Schedule

Valuation Date: 1/1/2008 1/1/2009 1/1/2010 1/1/2011 1/1/2012 1/1/2013 1/1/2014 1/1/2015 1/1/2016 1/1/2017

Note: "Covered-employee payroll" for 2014 has been changed to reflect the new GASB language.

Methods and assumptions used to determine contribution rates:

Actuarial cost method	Projected Unit Credit
Amortization method	Level percentage of payroll, closed, increasing 3.0% per year.
Remaining amortization period	From 6 to 26 years with an average effective period of 21 years. Starting with new basis in 2014, assumption changes and gains/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
Inflation	3.00%
Salary increases	Rates vary by participant age.
Investment rate of return	7.50% Net of pension plan investment expense, including inflation.
Retirement age	Rates vary by participant age and service.
Mortality	RP-2000 Blue Collar Mortality tables with generational projection by Scale AA. A five-year set forward is used for post-disability mortality.
Other	Employer contributions for calendar 2010 are greater than 100.0% of the Actuarially Determined Contribution due to 6/30 fiscal year revisions. Calendar 2011 was reduced for the revisions.

1 **Changes in Actuarial Methods and Assumptions**

There were no method or assumption changes since the prior valuation. There were no Plan amendments that affect benefits since the prior valuation for any of the four Plans.

2 **Significant Legislative Changes 2012 to 2016**

Legislative changes are listed in the General Description of the System in the Notes to the Basic Financial Statements.

Anne Arundel County Retirement and Pension System
Supplementary Schedules
For the Year Ended December 31, 2016

Schedule of Administrative Expenses

Professional Services

Actuarial	\$ 213,981
Benefit payment processing	74,037
Insurance service fees	31,710
Audit	30,000
Investment consulting fees	315,094
Legal counsel	5,214
Misc. Fees/Other Consultants	50,266
	<u>720,302</u>

Communication

Telephone	1,551
Travel & meals	3,768
	<u>5,319</u>

Miscellaneous: County paid

Supplies	13,160
Postage	20,096
Printing	3,171
Medical evaluations	10,693
Training & memberships	522
Indirect costs paid to County	550,000
Legal notices	601
	<u>598,243</u>

Miscellaneous: System paid

Prudential administration	3,960
Tax withholding expenses	14,632
	<u>18,592</u>

Total Administrative Costs **\$ 1,342,456**

Schedule of Investment Expenses

Management Fees

Aetna/ING Investment Mgmt	\$ 448,972
Apollo	103,734
Bridgewater	3,752,784
Causeway	595,238
Chartwell Investment Partners	319,024
Clarion Lion Real Estate	857,072
Crescent Mezzanine (TCW)	260,545
Dupont Capital Management	45,981
EIG Energy	401,285
Entrust Special Opportunities	272,470
HRJ Special Opportunities	16,103

Management Fees (continued)

Lexington	170,138
Loomis Sayles Sr. Loan Fnd	144,375
Newstone Partners Combined	346,003
Penn Capital	252,811
Quellos Private Capital	117,553
Private Advisors	326,152
Southeastern Asset Mgmt, Inc.	496,263
State Street Global Advisors	38,553
VOYA-ING	519,724
WEDGE Capital Management	583,769
Western Asset Management	199,623
Westwood Management Company	363,281
	<u>10,631,453</u>

Custodial Fees

State Street Bank & Trust	<u>289,069</u>
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Total Investment Expense **\$ 10,920,522**

Schedule of Payments to Consultants

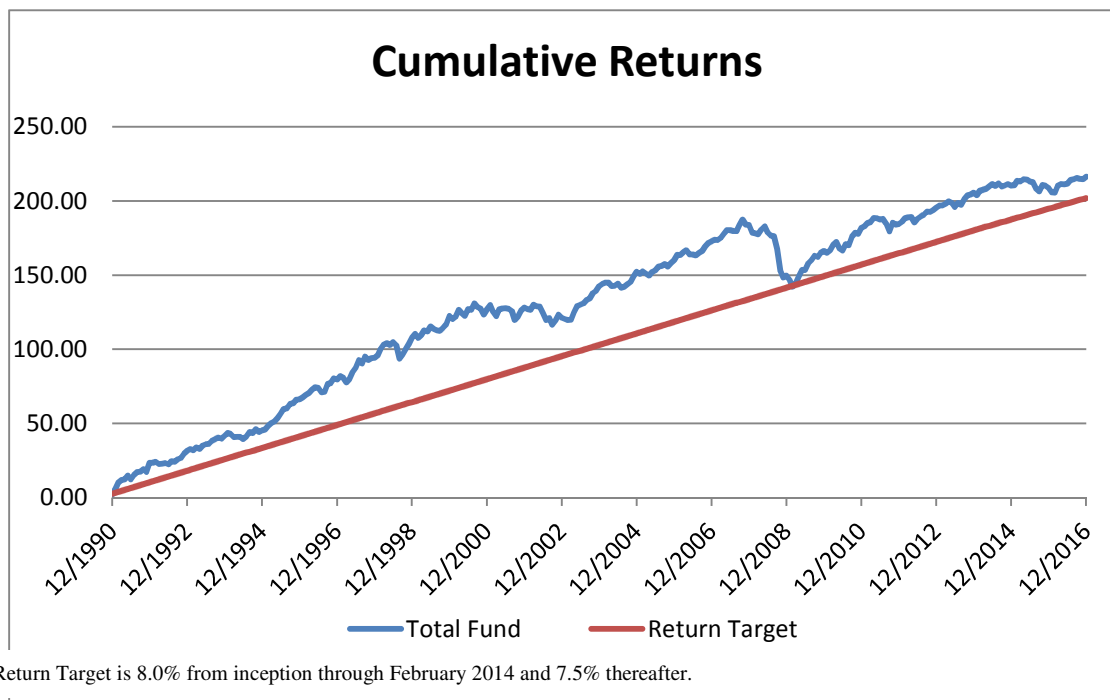
<i>Company</i>	<i>Fee</i>
Aetna	\$ 31,710
ADP	74,037
Bolton Partners, Inc.	213,981
CliftonLarsonAllen	30,000
New England Pension Consultants	315,094
Other	55,480
	<u>\$ 720,302</u>

<i>Nature of Service</i>
Insurance Services
Benefit Payment Processing
Actuarial Services
Audit Services
Investment Consulting Services
Legal Services & Miscellaneous

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Investment Section

The following is a review of investment activity of the System with discussion and comparisons to general investment market trends. NEPC, LLC (NEPC), the Investment Advisor, prepared this review using information provided by State Street Bank, the Custodian Bank. The following table illustrates the System's cumulative, net-of-fee, returns in relation to its actuarial-required rate of return.



Year ended December 31, 2016 was the eighteenth consecutive year the System's investment portfolio has been overseen by the Board of Trustees. NEPC continues to act as the System's pension and investment consultant. In 2016, the System added a senior bank loan strategy through Loomis Sayles and also committed \$20 million to Siguler Guff DOF V.

Market Commentary

The start of a new year brings time for resolution as well as reflection, a time to ponder what was and what might be. In this context, the following are two of NEPC's key 2016 takeaways:

- A consensus view is not a forecast, rather an assessment of the observable facts, and
- A lot can change in one year.

Here's the 2016 supporting case: At the start of the year, global investors were fretting over a potential slowdown in the US and Chinese economies. Meanwhile, in a different kind of market place, Donald Trump was vying to clinch the Republican nomination in the US presidential election. In response to US economic expansion and an improving Chinese outlook, by year-end risky assets had forged gains with the S&P 500 Index returning 12%, US high-yield bonds earning over 17%, and emerging market equities delivering 11%. The unexpected victory of President Trump in the elections sent domestic small-cap equities surging 9% in the fourth quarter as bond indices slumped amid expectations of higher interest rates and inflation in anticipation of his administration's policies.

Global Equity Markets

First Quarter 2016

Concerns around global growth and the precipitous decline in oil prices roiled stocks initially in the first quarter, but reassuring economic data triggered a dramatic reversal by March. The S&P 500 Index posted its best return in March since 2009, bringing it back to positive for the year. The S&P 500 ended the quarter with gains of 1.3%, while the Russell 2000 Index was down 1.5%. Returns were generally driven by the depressed areas of the market, including smaller, lower-quality and commodity-related equities; however, high-quality stocks still led for the period. Defensive, bond-proxy sectors (e.g., Telecom and Utilities) were the best performers while value outperformed growth.

Second Quarter 2016

The S&P 500 managed to end June modestly positive and returned 2.5% in the second quarter. The Russell 2000 had a strong, and broadly delivered, second quarter as 9 out of 10 of its component sectors registered positive returns. From a sector basis, the more defensive sectors of Energy, Telecommunications, Utilities, and Health Care led the market higher. Second quarter lagging sectors included Consumer Discretionary, Information Technology, and Industrials. Across the developed world, equity markets declined following the UK's *Brexit*. Ireland and Italy led developed markets lower, selling off 9.9% and 9.7%, respectively. Japanese equity markets declined nearly 7% locally, but for US dollar investors, Japanese equities returned a positive 1% as the yen approached a 2-year high against the dollar. The yen rallied considerably for the full year, benefitting from its perceived safe-haven status. Similar to the US, energy was the top sector for the quarter in the wider developed markets, returning roughly 11.5%, while consumer discretionary stocks were one of the weakest, losing 8.2%. Emerging markets investors seemed to look past *Brexit* fears while recognizing the ongoing positive developments in the economic region. Latin America was a particular focus, where favorable election results in Peru and progress in the impeachment process in Brazil led to those markets returning 16.9% and 13.3%, respectively. In contrast, Chinese equity markets continued to waver, trailing the broader benchmark with a return of -1.7%.

Third Quarter 2016

Domestic equities reversed course in the third quarter with the S&P 500 returning 3.9% and the Russell 2000 gaining 9.0%. Growth outpaced value across all capitalizations. Rotationally, Technology became the best performing sector for the period, while Utilities and Consumer Staples lagged. Volatility, as measured by the VIX Index, dropped 15% during the quarter. Outside the US, developed equity markets had their best quarter of 2016, returning 6.4%. Investors shrugged off fears surrounding *Brexit*, and monetary policies remained accommodative. Sector results came in mixed with Materials in front with gains of 16%, while Healthcare declined 2%. The UK equity market rebounded in local currency terms, but the British pound continued to sell off, experiencing 30-year lows relative to the dollar. Elsewhere, emerging markets rose around 9%, as measured by the MSCI Emerging Market Index. China—among the better performing countries for the quarter—gained 13.9% for the period. Political unrest in the Philippines resulted in declines of 5.3%.

Fourth Quarter 2016

With the prospect of US trade policy changes under a new President Trump, Domestic stocks posted gains while the overseas equity markets were largely down. US small cap stocks bested the large caps with the Russell 2000 Index returning 8.8% compared to 3.8% for the S&P 500. Value stocks outperformed growth for the quarter and for the year. Outside the US, developed market equities fell 0.7% in US dollar terms, as measured by the MSCI EAFE Index. Rising interest rates in the US and a strong dollar pulled down emerging market stocks with the MSCI Emerging Market Index losing 4.2% in the fourth quarter. In spite of the rough 4th quarter, emerging stocks still ended the year with an 11.2% gain.

2016 Summary of Results – Global Equity

For comparison, the following table illustrates equity index returns across geographies, economic regions, and styles for the year and trailing time periods:

Equity Index Returns as of 12/31/2016				
Global Equity	Quarter	1 Year	3 Yrs	5 Yrs
MSCI World	1.5%	5.3%	1.8%	8.2%
US Equity	Quarter	1 Year	3 Yrs	5 Yrs
S&P 500	3.8%	12.0%	8.9%	14.7%
Dow Jones Industrial Average	7.9%	13.4%	6.0%	10.1%
NASDAQ Composite	1.3%	7.5%	8.8%	15.6%
Russell 1000 Growth	1.0%	7.1%	8.6%	14.5%
Russell 1000 Value	6.7%	17.3%	8.6%	14.8%
Russell 2000	8.8%	21.3%	6.7%	14.5%
Russell 2000 Growth	3.6%	11.3%	5.1%	13.7%
Russell 2000 Value	14.1%	31.7%	8.3%	15.1%
International Equity	Quarter	1 Year	3 Yrs	5 Yrs
MSCI EAFE	-0.7%	1.0%	-1.6%	6.5%
MSCI Emerging Markets	-4.2%	11.2%	-2.6%	1.3%
MSCI Europe	-0.4%	-0.4%	-3.2%	6.3%
MSCI UK	-0.9%	-0.1%	-4.4%	4.0%
MSCI Japan	-0.2%	2.4%	2.5%	8.2%
MSCI Far East	-1.4%	2.3%	2.1%	8.0%

Global Fixed Income Markets

First Quarter 2016

Global investment-grade spreads tightened during the period led by the industrials sector, while global high-yield debt sharply rebounded. Domestically, high-yield bond issues gained 3.2%. Given the rebound in commodities for the period, commodity-related sectors led performance. Returns were positive across the emerging markets with local sovereign debt leading as rates fell and currencies appreciated.

Second Quarter 2016

The period delivered a ‘two-fer’ for fixed income investors: safe-haven assets rallied significantly, while risky assets also outperformed as investors continued to reach for yield. Globally, the 10-year German *bund* broke into negative territory, falling 28 bps to -0.13%. In Japan, 10-year bond yields continued to move lower, settling at -0.22%. At home, the US 10-year Treasury yield compressed 29 bps, nearing its all-time low at 1.49%, supporting a 2.2% return for the Barclays Aggregate, while US High Yield earned 5.5% for the quarter. Overall, credit was broadly buoyed by lower quality sectors. Sovereign risk assets also performed well, as emerging market local debt returned 2.7%. Looking ahead to the full year, emerging local debt remained one of the best performing fixed income risk assets, earning over 14%.

Third Quarter 2016

One-third of global developed sovereign debt yields were negative and two-thirds yielded below 1% in the third quarter. On the other hand, domestic high-yield fixed-income securities and hard currency emerging market debt

Anne Arundel County Retirement and Pension System
Investment Review
For the Year Ended December 31, 2016

were up 5.6% and 4% for the period, respectively. In measuring US investment grade fixed income, the Barclays Aggregate Index returned 0.5% for the quarter, driven primarily by the corporate credit component of the index.

Fourth Quarter 2016

With yields rising from near all-time lows, global investment grade bonds were down for the period. This was true on an aggregate scale as measured by the BC Global Aggregate Index, which was down 7.1%. It was observed in the US with the US BC Aggregate Bond Index down 3% for the quarter. Risky US credit assets continued to appreciate with investors continuing to rotate assets here in search of yield. US High Yield was up 1.8% and Bank Loans saw a 2.3% gain. The emerging markets saw corrections broadly across hard and local currency bonds with losses of 4% for the hard currency index and 6.1% for the local debt issuances.

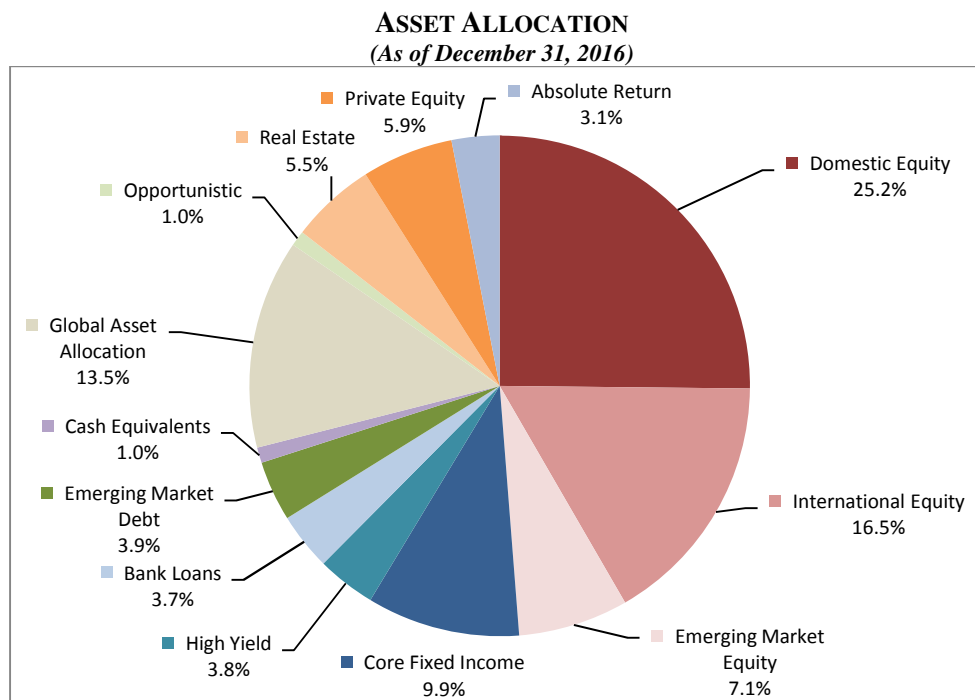
2016 Summary of Results — Global Fixed Income

For comparison, the following table illustrates fixed income index returns and yields across regions, countries, and styles for the year and trailing time periods:

Fixed Income Index Returns as of 12/31/2016				
Global Fixed Income	Quarter	1 Year	3 Yrs	5 Yrs
BC Global Agg	-7.1%	2.1%	-0.2%	0.2%
JPM EMBI Plus	-5.3%	9.6%	5.8%	5.1%
Domestic Fixed Income	Quarter	1 Year	3 Yrs	5 Yrs
BC Aggregate Bond	-3.0%	2.6%	3.0%	2.2%
BC US Agg. Treasury	-3.8%	1.0%	2.3%	1.2%
BC US Credit	-3.0%	5.6%	4.1%	3.8%
BC Mortgage Backed	-2.0%	1.7%	3.1%	2.1%
BC Interm. Gov't/Credit	-2.1%	2.1%	2.1%	1.8%
BC 1-10 Yr TIPS	-1.5%	4.0%	1.5%	0.7%
BC High Yield	1.8%	17.1%	4.7%	7.4%
S&P LSTA Lev. Loan	2.3%	10.2%	3.6%	5.1%
3 Month T-Bills	0.1%	0.3%	0.2%	0.1%
10-Year Bond Yields	Mar-16	Dec-15	Mar-15	Mar-14
US	2.4%	1.6%	2.3%	2.2%
Germany	0.2%	-0.1%	0.6%	0.5%
UK	1.2%	0.7%	2.0%	1.8%
Japan	0.0%	-0.1%	0.3%	0.3%

Growth of Assets and Asset Allocation

As of December 31, 2016, the System's net assets stood at \$1.68 billion, up slightly for the year. Over the course of the year, the System experienced \$60.35 million in net cash outflows and \$134.59 million in investment gains. At December 31, 2016, the System's assets were in compliance with Policy and were allocated as follows:



Investment Performance

For year ended December 31, 2016, the System's assets earned 7.6%, net of fees, meeting its actuarial rate of return requirement of 7.5%. This also brought the System's 26-year return (i.e., since September 1990) to 7.6%, net of fees. These returns were calculated using a time-weighted (i.e., compound interest) approach.

The following table summarizes investment holdings as of December 31, 2016, displaying fair market value and percent of the total value compared with the prior-year data:

	2016		2015	
		Percentage of Total		Percentage of Total
	<u>Fair Value</u>	<u>Fair Value</u>	<u>Fair Value</u>	<u>Fair Value</u>
Cash and temporary investments	\$ 53,645,660	3.2%	\$ 39,263,082	2.4%
Domestic and international fixed income	332,504,141	19.7%	188,157,658	11.7%
Domestic equity	390,442,348	23.2%	435,313,169	27.1%
Global fixed asset allocation pools	226,338,448	13.4%	262,108,213	16.3%
Opportunistic	13,163,809	0.8%	25,612,036	1.6%
International equity pools	395,665,195	23.5%	392,259,877	24.4%
Private Markets	105,764,350	6.3%	90,583,714	5.6%
Real estate investment pools	91,429,425	5.4%	96,867,840	6.0%
Absolute return fixed income	51,860,530	3.1%	50,055,242	3.2%
Stable Value Aetna insurance pools	23,356,163	1.4%	24,266,278	1.6%
Portable Alpha	92,445	0.0%	286,375	0.1%
	<u>\$ 1,684,262,514</u>	<u>100.0%</u>	<u>\$ 1,604,773,484</u>	<u>100.0%</u>

Anne Arundel County Retirement and Pension System
Investment Review
For the Year Ended December 31, 2016

Asset Type and Percent of Portfolio at 12/31/16		Time Weighted Rate of Return			Notes
		Last Year	Last 3 Years	Last 5 Years	
Equity	48.7%				
Russell 2000 Benchmark		21.3	6.7	14.5	
S&P 500 Benchmark		12.0	8.9	14.7	
Domestic Equity Composite		10.8	6.8	13.5	
MSCI EAFE		1.0	(1.6)	6.5	
International Equity Composite		(0.8)	(2.2)	7.3	
MSCI Emerging Markets Free		11.2	(2.6)	1.3	
International Emerging Markets Composite		19.8	(2.4)	1.3	
Total Equity		7.8	2.6	9.6	
Fixed Income/Stable Value	24.4%				
Barclays Capital Bond Aggregate Benchmark		2.6	3.0	2.2	
Core Fixed Composite		4.1	3.8	3.5	
3-Month LIBOR + 3		3.8	3.4	3.4	
Absolute Return Composite		3.6	n/a	n/a	A
BoA ML US High Yield BB-B Rated Benchmark		12.7	5.0	7.0	
High Yield Composite		10.8	3.4	5.8	
S&P/LSTA Leveraged BB Loan Index		7.3	3.7	4.4	
Bank Loan Composite		n/a	n/a	n/a	B
50% JPM EMBI Global Div/25%JPM EMBI Global/25%JPM Corporate EMBI		10.3	1.2	2.8	
Emerging Market Debt Composite		12.0	(1.1)	1.1	
Total Fixed Income		7.1	3.8	3.5	
Real Estate (R.E.)	5.5%				
Nat'l Council R.E. Invest. Fudiciaries Benchmark		8.0	11.0	10.9	
Real Estate Composite		8.1	11.6	11.3	
Global Asset Allocation	13.5%				
T-Bills + 6%		6.3	6.1	6.1	
GAA Composite		8.9	3.8	4.1	
Opportunistic	1.0%				
Barclays Capital High Yield Benchmark		17.1	4.7	7.4	
Opportunistic Composite		11.7	5.4	10.8	
Private Equity Funds	5.9%				
Private Equity 7.5%		7.5	7.5	7.5	
Private Equity Composite		5.5	6.5	6.6	
Cash Equivalents*	1.0%				
91 Day T-Bill Benchmark		0.3	0.1	0.1	
Cash Account		0.3	0.2	0.2	
Total Fund Composite Return		7.6	3.5	6.6	
Notes: A. Inception August 2014 B. Inception July 2016					
*Includes .1% of liquidating composite					

Anne Arundel County Retirement and Pension System
Investment Review
For the Year Ended December 31, 2016

The following table lists alphabetically all of the System's investment managers with their asset values, as of December 2016, describing each by service type:

Firm	Investment Service	Ending Market Value (December 31, 2016)
Aetna General	Annuity	\$23,356,163
BlackRock Fixed Income	Absolute Return Fixed Income	\$51,860,530
Bridgewater Associates All Weather	Global Asset Allocation	\$166,880,368
Bridgewater Associates Pure Alpha	Global Asset Allocation	\$59,458,082
Causeway Capital Management	International Equity	\$95,954,867
Chartwell Investment Partners	Small Cap Growth Equity	\$50,881,235
Clarion Partners	Core Real Estate	\$91,429,425
Dimensional Fund Advisors	Emerging Markets Equity	\$119,468,260
Entrust Capital	High Yield Fixed Income	\$16,565,921
Grantham, Mayo, Van Otterloo	International Equity	\$90,901,686
Lazard Asset Management	International Equity	\$89,340,383
Loomis Sayles & Company	Senior Bank Loans	\$62,269,885
PENN Capital Management	High Yield Fixed Income	\$64,464,960
PIMCO	Emerging Markets Fixed Income	\$65,482,541
Private Equity Composite	--	\$98,505,302
Southeastern Asset Management	Large Cap Value Equity	\$58,690,030
State Street Global Advisors	Large Cap Core Equity	\$75,542,659
Voya Financial (Equity)	Large Cap Growth Equity	\$109,750,183
Voya Financial (Fixed Income)	Core Fixed Income	\$74,185,232
Wedge Capital Management	Small Cap Value Equity	\$65,793,222
Western Asset Management	Core Fixed Income	\$67,415,205
Westwood Management Corp	Large Cap Value Equity	\$59,984,701

*Sum of Market Values does not equal total plan assets due to the exclusion of liquidating managers and cash.

Investment Objectives

The Trustees of the Anne Arundel County Retirement System (System) seek to maintain the annual rate of pension contributions based on accepted actuarial practices, at a stable or declining percent of payroll. The Trustees also seek to maintain the funded ratio (market value of assets/actuarial value of benefits earned to date as measured by the Accrual Benefit Obligation) at a target level of 115% and in no event less than 100% in any given year. The System must remain capable of paying all benefits earned by employees. This principle is paramount and will not be compromised. Prudence is thus a mandatory factor in all decisions relating to the System. The disposition of the System's assets shall be made solely in the interest of the participants and their beneficiaries of the pension plan for exclusive purposes of providing benefits to such participants and their beneficiaries. Investments shall be made in a cost efficient manner, and reflect current industry best practices. The System return requirements are articulated in three separate ways:

- **Nominal Returns** – The actuarially required rate of return for the Fund is 7.5% annually, net of all fees and operating expenses. In order to achieve a buffer and have a somewhat higher likelihood of achieving the Fund's objective, the Board desires a net total return in excess of this 7.5% target.
- **Real Returns** – The Board is aware the preservation of purchasing power is driven by inflation. As the Consumer Price Index (CPI) is the most commonly accepted measure of inflation, The Board has defined its real rate of return target as the nominal return less CPI. With an actuarially assumed return rate of 7.5% (long-term) and an actuarially assumed CPI rate of 2.75% (long-term), the long-term, real return target is set at 4.75%.
- **Relative Returns** – Total return shall rank in the top half of the appropriate public fund universe. Risk-adjusted returns should also rank in the top half of the same universe. Returns for investment managers shall exceed their respective benchmarks, as well as rank in the top half of the appropriate universe of managers adhering to the same investment strategy.

The Board further recognizes that the return targets described herein may not be achieved in any single year. Instead, a longer-term horizon of 5-7 years shall be used in measuring the long-term success of the Fund. While the Board expects that returns will vary over time, the Fund shall have a risk tolerance consistent with that of other funds created for similar purposes, and the assets of the Fund shall be invested accordingly.

General Investment Policy

The System operates under the "Prudent Person" rule used herein, meaning that in investing, the governing authorities of the systems, funds and plans, shall exercise the judgment and care under the circumstances then prevailing, that an institutional investor of ordinary prudence, discretion, and intelligence exercises in the management of investments entrusted to it, not in regard to speculation, but in regard to the permanent disposition of funds, considering probable safety of capital as well as probable income.

Investments are made in full accordance with any and all applicable Maryland statutes, as well as any other applicable legislation or regulation, state, federal or otherwise. The roles and responsibilities of the Board of Trustees, the Investment Committee, the Investment Consultant, the Investment Managers and the Custodian are clearly defined. The Board has established a diversified portfolio to meet the System's return requirements. The table below summarizes the target asset allocation

Asset Class	Market Target (%)	Minimum Exposure (%)	Maximum Exposure (%)
Domestic Equity	23	13	33
International Equity	17	7	27
Emerging Market Equity	7	0	12
Domestic Fixed Income	21	10	30
Emerging Market Debt	4	0	10
Private Markets	9	0	17
Real Estate	5	0	10
Global Asset Allocation (GAA)	12	7	17
Cash	2	0	10

The Chairman of the Investment Committee reviews the asset allocation at least on a quarterly basis to determine if the asset allocation is consistent with the exposure ranges described herein. The Chairman of the Investment Committee directs investment managers to transfer funds to rebalance the asset allocation as necessary with subsequent Board notification. The System shall strive to maintain a neutral bias with respect to Style Allocation (Growth versus Value) in its equity investments. As part of the normal rebalancing responsibilities, The Chairman of the Investment Committee shall use appropriate judgment and care when rebalancing portfolios. Market conditions and transaction costs are considered.

For each separate account, investment managers must comply with the quality and diversification requirements stated in the investment policy. Investment managers have detailed reporting requirements and must certify policy compliance on a quarterly basis. Permissible derivative uses are hedging, creation of permitted market exposures, and management of country and asset allocation exposure.

Proxy Voting

The Board of Trustees delegates proxy voting responsibility to its investment managers. Investment managers are required to report to the Board on an annual basis, summarizing proxy voting over the previous year. The report must detail any changes that have occurred in the manager's proxy voting policies, and note any instances where proxies were not voted in accordance with the best interest of the System's beneficiaries.

Anne Arundel County Retirement and Pension System
Summary Schedules of Fees and Commissions
For the Year Ended December 31, 2016

Investment Manager Fees

The following table presents investments managers' fees paid by asset class.

<u>Asset Class</u>	<u>Assets Managed (Includes Cash)</u>	<u>Fees Paid</u>
Domestic equity	\$ 420,642,028	\$ 2,858,662
International equity	395,665,196	595,238
Domestic fixed income	194,150,051	596,809
Global assets	226,338,526	3,752,784
Other *	133,694,141	-
Private markets **	119,066,786	2,118,443
Real estate	91,426,425	260,545
Stable value insurance account	97,541,395	448,972
Total Investment Managers' Fees		10,631,453
Other Investment Service Fees:		
Custodial fees		289,069
Total Investment Expenses		\$ 10,920,522

* Fees net to fund assets. Not available as discrete amounts.

** Fees reported for a portion, but not all of private market accounts.

Brokerage Commissions

Broker's commissions on investment transactions, excluding mutual funds, for the year ended December 31, 2016 totaled \$177,895. Brokerage firms receiving more than \$6,000 in fees are listed below.

<u>Brokerage Firms</u>	<u>Fees Paid</u>	<u>Brokerage Firms</u>	<u>Fees Paid</u>
Liquidnet, Inc.	\$ 60,301	Wells Fargo Securities	\$ 8,151
Goldman Sachs & Co.	27,282	Jefferies & Company Inc	7,394
Able Noser	15,746	Instinet	7,276
J.P. Morgan Securities	13,465	Barclays Capital LE	6,766
Morgan Stanley Co. Inc.	13,230	Sanford Bernstein Co LLC	6,504
Merrill Lynch Pierce Fenner & Smith	11,778		
			\$ 177,893

The Investment Policy Statement requires that each manager shall provide an annual commission report to the Investment Committee and Investment Consultant within forty-five (45) days of the end of each calendar year. The report shall cover all trades executed during the prior year and should include a discussion of the firm's policy for selecting brokers, reviewing brokers, and negotiating brokerage commissions. This should include identification of any situations where the investment manager has a financial interest in brokers used to execute trades in the portfolio as well as a list of all broker-dealers used by the firm. Actual commission expenses are to be compared to the prior year. If the firm has a system for monitoring total transaction costs (commissions plus market impact), a copy of this analysis should be provided. If no such system is being used, the commission report should include a complete explanation of how the firm monitors selected brokers for best execution.

Anne Arundel County Retirement and Pension System
Investment Managers Guidelines and Exemptions as of December 31, 2016

<u>Manager Name</u>	<u>Asset Class</u>	<u>Long-term Benchmark</u>	<u>Style Benchmark</u>	<u>Peer Group Universe</u>	<u>Guideline Exemptions</u>
Aetna General	Domestic Fixed Income	Ryan Labs 5 Yr GIC	Ryan Labs 5 Yr GIC	All US Fixed Income Managers	None
Apollo Investment Fund VIII, L.P.	Private Equity	7.5% Annualized Compound Return	7.5% Annualized Compound Return	Private Equity Managers	None
BlackRock	Absolute Return Fixed Income	3 Month Libor +3%	3 Month Libor + 3%	Absolute Return Fixed Income Managers	None
Bridgewater Associates, Inc.	Global Asset Allocation	91 Day T-Bills + 6%	91 Day T-Bills + 6%	Absolute Return Managers (low volatility HFOF managers)	None
Bridgewater Associates, Inc.	Hedge Fund	91 Day T-Bills + 6%	91 Day T-Bills + 6%	Absolute Return (Global Macro Managers)	None
Causeway Capital Management LLC	International Equity	MSCI EAFE	MSCI EAFE	International Developed Equity	None
Chartwell Investment Partners	U.S. Small Cap Growth Equity	Russell 2000 Index	Russell 2000 Growth	U.S. Small Cap Growth Equity	None
Clarion Partners	Real Estate	NCREIF Property Index	NCREIF Property Index	Real Estate Managers	None
Dimensional Fund Advisors, LP	Emerging Markets Equity	MSCI Emerging Markets Free Index	MSCI Emerging Markets Index (net div)	Emerging Markets Equity	None
DuPont Capital Management	Private Equity Fund of Funds	7.5% Annualized Compound Return	7.5% Annualized Compound Return	Private Equity Managers	None
EIG XV EIG XVI	Private Equity Fund of Funds	7.5% Annualized Compound Return	7.5% Annualized Compound Return	Private Equity Managers	None
Entrust	Opportunistic	HFRI ED: Distressed/Restructuring Index	HFRI ED: Distressed/Restructuring Index	Absolute Return Managers	None
Grantham, Mayo Van Otterloo	International Small Cap Equity	MSCI EAFE Small Cap Index	MSCI EAFE Small Cap Index	International Developed Equity	None
HRJ Capital (Capital Dynamics)	Private Equity Distressed Debt	7.5% Annualized Compound Return	7.5% Annualized Compound Return	Private Equity Managers	None
Lazard Asset Management LLC	International Equity	MSCI EAFE-ND	MSCI EAFE	International Developed Equity	None
Lexington Partners VI-B Lexington Partners VII Lexington Partners VIII	Private Equity Secondaries	7.5% Constant Return	7.5% Constant Return	Private Equity Managers	None
Loomis, Sayles & Company, L.P.	Bank Loans	S&P LSTA US BB Ratings Loan Index	S&P LSTA US BB Ratings Loan Index	Bank Loan Managers	None
Newstone Capital Partners I Newstone Capital Partners II	Private Equity Distressed Debt	7.5% Annualized Compound Return	7.5% Annualized Compound Return	Private Equity Managers	None

Anne Arundel County Retirement and Pension System
Investment Managers Guidelines and Exemptions as of December 31, 2016

Manager Name	Asset Class	Long-term Benchmark	Style Benchmark	Peer Group Universe	Guideline Exemptions
Penn Capital	US High Yield Fixed Income	BofA ML US High Yield BB-B Rated Index	BofA ML US High Yield BB-B Rated Index	High Yield Bond	None
PIMCO	Emerging Market Debt	50% JPM EMBI Global Div./25% JPM EMBI Global/25% JPM	50% JPM EMBI Global Div./25% JPM EMBI Global/25% JPM	Emerging Market Debt	None
Private Advisors Small Company Buyout Fund V Private Advisors Small Company Buyout Fund VI Private Advisors Coinvestment Fund LP	Private Equity Small Buyout Fund of Funds	7.5% Annualized Compound Return	7.5% Annualized Compound Return	Private Equity Managers	None
Quellos Private Capital II, LP Quellos Private Capital III, LP	Private Equity Fund of Funds	7.5% Annualized Compound Return	7.5% Annualized Compound Return	Private Equity Managers	None
Siguler Guff DOF III Siguler Guff DOF IV Siguler Guff DOF V	Private Equity Distressed Debt	7.5% Constant Return	7.5% Constant Return	Private Equity Managers	None
Southeastern Asset Management	U.S. Large Cap Value Equity	Russell 1000 Index	Russell 1000 Value Index	U.S. Large Cap Value Equity	Note A
State Street Global Advisors	Domestic Equity	S&P 500	S&P 500	US Large Cap Core Equity	None
TCW/Crescent Mezzanine Partners, LP IV TCW/Crescent Mezzanine Partners, LP V Crescent Mezzanine Partners, LP VI	Private Equity Mezzanine Debt	7.5% Annualized Compound Return	7.5% Annualized Compound Return	Private Equity Managers	None
VOYA Financial	Core Fixed Income	Barclays Capital Aggregate Bond Index	Barclays Capital Aggregate Bond Index	Core Fixed Income	Note B
VOYA Financial	U.S. Large Cap Growth Equity	Russell 1000 Index	Russell 1000 Growth Index	U.S. Large Cap Growth Equity	None
Warburg Pincus Private Equity XII, LP	Private Equity Growth Equity	7.5% Annualized Compound Return	7.5% Annualized Compound Return	Private Equity Managers	None
WEDGE Capital Management	US Small Cap Value Equity	Russell 2000 Index	Russell 2000 Value Index	US Small Cap Value	None
Western Asset Management	Core Plus Fixed Income	Barclays Capital Aggregate Bond Index	Barclays Capital Aggregate Bond Index	Core Fixed Income	Note C
Westwood Management Corp.	U.S. Large Cap Value Equity	Russell 1000 Index	Russell 1000 Value Index	U.S. Large Cap Value Equity	None

- Note A:*
1. May hold up to 10% of their portfolio in any one security.
 2. May hold up to 30% of the portfolio in American Depositary Receipts (ADRs), which are stocks or convertibles of foreign companies that are publicly traded in the US.
 3. Is exempt from being required to hold at least 25 stocks in their portfolio.
 4. For securities held in the Anne Arundel County Pension and Retirement System portfolio, Southeastern may own up to 20% of the outstanding market capitalization of a given company across all of their portfolios. If Southeastern owns more than this 20% limit for any security within the Anne Arundel County Pension and Retirement System portfolio, the Investment Committee Chairman and Investment Consultant of the Anne Arundel County Pension and Retirement System must be notified immediately for approval to continue holding the security, which may or may not be granted, depending on prevailing conditions.
 5. May hold up to 20% of the portfolio in cash and equivalents if market conditions warrant, but Board must be notified if cash goes above 20%.

- Note B:*
1. May hold up to 5% of the portfolio, at market value, in Senior Bank Loan Debt securities.

- Note C:*
1. Exempt from receiving at least two competitive offers on the same or similar securities prior to purchasing new issue mortgage back securities.
 2. Permitted to invest in the securities referenced in Section A of the Anne Arundel County Retirement and Pension System Investment Policy Statement. In addition, Western Asset may hold investments in High Yield Fixed Income, Emerging Market Debt, Emerging Market Debt Local Currency, and/or Bank Loans.

Largest Stock Holdings (By Fair Value)

Rank	Shares	Company	Fair Value
1	10,898	ALPHABET INC CL C	\$ 8,538,169
2	119,038	MICROSOFT CORP	7,397,021
3	51,958	APPLE INC	6,017,776
4	40,760	HOME DEPOT INC	5,465,101
5	27,290	FEDEX CORP	5,081,398
6	89,658	LEVEL 3 COMMUNICATIONS INC	5,053,125
7	5,826	AMAZON.COM INC	4,368,743
8	41,566	PEPSICO INC	4,349,051
9	59,849	COMCAST CORP CLASS A	4,132,573
10	439,400	CNH INDUSTRIAL NV	3,818,386

Note: This list does not include investments in stock investment pools
A complete list of portfolio holding is available upon request.

Largest Bond Holdings (By Fair Value)

Rank	Par	Description	Fair Value
1	7,600,000	US TREASURY N/B 1.250% due 10/31/2021	\$ 7,369,644
2	2,770,000	US TREASURY N/B FRN 1.000% due 07/31/2018	2,772,410
3	1,990,000	US TREASURY N/B 2.250% due 08/15/2046	1,673,232
4	1,800,000	FREDDIE MAC DISCOUNT NT 0.010% due 03/27/2017	1,797,840
5	1,570,000	US TREASURY N/B 3.000% due 11/15/2045	1,548,538
6	1,500,000	FNMA TBA 15 YR 3.500% due 01/23/2032	1,562,730
7	1,400,000	FHLMC TBA 15 YR 2.500% due 01/23/2032	1,402,520
8	1,355,000	WESTERN DIGITAL CORP 10.500% due 04/01/2024	1,602,288
9	1,320,000	US TREASURY N/B 2.000% due 02/15/2025	1,284,730
10	940,000	DIAMOND 1 FIN/DIAMOND 8.100% DUE 07/15/2036	1,118,205

Note: A complete list of portfolio holdings is available upon request.

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Actuarial Section



Anne Arundel County Retirement and Pension System
Statement from the Actuary
December 31, 2016

Dear Members of the Board of Trustees

We prepared annual actuarial valuations as of January 1, 2017 for the Anne Arundel County Retirement and Pension System. The system consists of the following plans, each of which is valued separately:

- Employees' Retirement Plan
- Police Service Retirement Plan
- Fire Service Retirement Plan
- Detention Officers' and Deputy Sheriffs' Retirement Plan

The contributions determined in these valuations are for the fiscal year ending June 30, 2018. The valuations are based on employee and financial data, which were provided by the County Office of Personnel and County Office of Finance, respectively. We have performed limited tests for consistency and reasonableness and have not found any material problems with the data.

The following GASB68 information is provided as of the December 31, 2016 measurement date for FYE2017. This will require that the actual County contributions for the second half of FY17 (i.e. contributions made after the measurement date) to be treated as a deferred outflow (when the amount is known), but this will not affect the Total Pension Expense recognized for FY17. The methods, assumptions, and participant data as of December 31, 2016 used for these calculations are summarized in the relevant sections of this report. The GASB68 information was prepared using the Entry Age Normal actuarial cost method with Normal Cost ending at DROP entry date.

Methodology, Reliance and Certification

This report is prepared for the County. The report contains the actuarial information to be included with the County's financial statements for the year end June 30, 2017 (the County's fiscal year-end date) as required by GASB68. This information has been prepared for use in the financial statements of the County. This information is not intended for, nor should it be used for, any additional purposes.

All costs, liabilities and other factors under the Plans were determined in accordance with generally accepted actuarial principles and procedures. The funding method used in the actuarial valuations is the projected unit credit cost method. The objective of this funding method is to produce level contributions as a percentage of payroll as long as the average age of the population does not change. The funding objective of the System is to meet long-term benefit promises through contributions and investment income. The funding ratio, which is the actuarial value of assets divided by the actuarial accrued liability, is an estimate of how well the System is meeting the objective. On the GASB reporting basis, the ratio for all four plans increased from the prior year.

The included calculations assume that the members and the County will continue to make all required actuarially determined contributions. Based on that assumption, the plan's fiduciary net position is expected to be available to make all future benefit payments of current plan members.

These calculations and comparisons with assets are 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.

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.

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 or in this case a measure of accounting expense. It does not affect the cost of the plan. As the experience of the plan evolves, it is normal for the level of contributions and expense 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, the plan and their auditors in connection with our actuarial valuations of the pension plan as required by GASB68. This report may not be used for any other purpose; Bolton Partners, Inc. is not responsible for the consequences of any unauthorized use or the reliance on this information by any other party.

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.

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.

The actuarial assumptions and methods used for these valuations meet the parameters set forth in the Governmental Accounting Standards Board (GASB) Statement No. 67, Financial Reporting for Defined Benefit Pension Plans.

We have included the following supporting schedules: Actuarial Basis, Schedule of Member Valuation Data, Summary of Plan Provisions, Summary of Major Legislative changes, a Solvency Test, and Analysis of Financial Experience. We meet the qualification standards of the American Academy of Actuaries to render the actuarial opinions contained in the reports and are currently compliant with the Continuing Professional Development Requirement of the Society of Actuaries.



Thomas B. Lowman, FSA, EA, MAAA
Bolton Partners, Inc.

April 27, 2017

Date



Kristopher E. Seets, FSA, EA
Bolton Partners, Inc.

April 27, 2017

Date

Order of Attachments by Plan

Attachment A.....Employee's Retirement Plan

Attachment B.....Police Service Retirement Plan

Attachment C.....Fire Service Retirement Plan

Attachment D.....Detention Officers' and Deputy Sheriffs' Retirement Plan

Attachment A

Employees' Retirement Plan

A. Method Used for Funding Purposes

This valuation was performed using the projected unit credit cost method. The contribution equals the sum of the normal cost and the amount necessary to amortize any actuarial gains/(losses) over closed periods. Effective January 1, 2014, new bases due to changes in actuarial assumptions or differences between actual and expected experience are amortized over closed periods of 20 years. New bases due to changes in plan benefits are amortized over the expected future working lifetime of affected employees. Amortization payments increase 3.0% per year.

B. Asset Valuation Method

The actuarial value of assets is determined by spreading the asset gain or loss over a 5-year period. The asset gain or loss is the amount by which the actual market value investment return differs from the expected market value asset return. The method was effective with the 1/1/2011 actuarial valuation. The Actuarial Value of Assets recognizes adjustments resulting from an audit.

There is a six-month lag between the valuation and the fiscal year. The 2017 valuation determines the County contributions due for the fiscal year ending June 30, 2018. Contributions made between the valuation date and the beginning of the next fiscal year (January 1, 2017 to June 30, 2017) have not been treated as assets in the current valuation.

C. Valuation Procedures

Tier One active participants who terminate prior to age 40 are assumed to elect to receive a refund of employee contributions with interest. Employees who terminate at or after age 40 are assumed to receive their vested benefit at normal retirement date.

D. Actuarial Assumptions

The following assumptions were used in valuing the liabilities and benefits under the Plan for purposes of determining contributions and liabilities under GASB. These assumptions are used for all members eligible to receive benefits under the Employees' Plan provisions.

Economic

Investment Return 7.5% compounded annually net of investment expenses (3.0% inflation and 4.5% real return) effective January 1, 2014.

Salary Increases A graded schedule is used. See Earnings Progression Table.

Cost of Living Adjustment 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.

Other

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.
 Disabled: RP-2000 Blue Collar Mortality Table for males and females set forward nine years and then projected generationally using scale AA. 100% of pre-retirement deaths are assumed to be non-duty-related.

Projection to the year of the valuation is assumed to be current experience. The generational projection beyond the valuation date is to account for future mortality improvements. See Table of Sample Rates.

Withdrawal See Table of Sample Rates.

Disability See Table of Sample Rates. 10% of disablement is assumed to be duty-related.
Administrative Expenses The average of actual expenses for the two years preceding the valuation date, rounded to the nearest thousand.

Retirement Rates

<u>Age</u>	<u>Service</u>		
	<u>20</u>	<u>30</u>	<u>31</u>
50	6%	40%	40%
55	9%	30%	5%
60	15%	15%	15%
65	40%	40%	40%
68	100%	100%	100%

Percentage Married Males – 70%; Females – 70%

Age Difference Males are assumed to be four years older than their spouses.

Military Service Active liabilities (which depend on credited service) are loaded by 1.0% to account for future crediting of military service.

Disability Leave Active liabilities (which depend on credited service) are loaded by 1.5% to account for future crediting of disability service.

The Tier 1 service cap of 60% is valued as 62% to account for Disability and Military service credit not being limited by the 30-year cap on service.

Age	Table of Sample Base Mortality Rates (2000)				Projection Scale (Healthy and Disabled)	
	Healthy Mortality		Disabled Mortality		Males	Females
	Males	Females	Males	Females		
20	0.03%	0.02%	0.04%	0.02%	1.90%	1.60%
25	0.04	0.02	0.10	0.05	1.00	1.40
30	0.07	0.03	0.13	0.08	0.50	1.00
35	0.11	0.05	0.17	0.13	0.50	1.10
40	0.14	0.09	0.23	0.18	0.80	1.50
45	0.18	0.14	0.36	0.26	1.30	1.60
50	0.24	0.20	0.73	0.43	1.80	1.70
55	0.42	0.28	1.38	0.91	1.90	0.80
60	0.83	0.49	2.39	1.64	1.60	0.50
65	1.55	1.04	3.91	2.82	1.40	0.50

Attained Age	Table of Sample Decrement Rates		
	Percentage		
	Disablement	Withdrawal	
		Males	Females
20	0.020%	12.47%	21.57%
25	0.020	9.97	18.12
30	0.020	6.78	13.34
35	0.030	4.37	9.05
40	0.061	3.48	7.48
45	0.100	2.40	5.95
50	0.162	0.63	1.56
55	0.266	0.43	1.07
60	0.397	0.00	0.00
64	0.541	0.00	0.00

Anne Arundel County Retirement and Pension System
Employees' Retirement Plan - Schedules of Member Valuation Data
December 31, 2016

Earnings Progression	
Attained Age	Percentage Increase at Attained Age
20	6.5%
25	6.0
30	5.5
35	5.0
40	4.5
45	4.0
50	3.5
55	3.5

Active Members

Valuation Date	Number	Annual Payroll (Jan. 1 Rate)	Average Annual Pay	% Increase in Average Pay
January 1, 2006	2,225	107,290,189	48,220	3.7%
January 1, 2007	2,338	116,709,102	49,917	3.5%
January 1, 2008	2,284	117,222,681	51,323	2.8%
January 1, 2009	2,312	124,803,488	53,981	5.2%
January 1, 2010	2,278	126,030,706	55,325	2.5%
January 1, 2011	2,239	123,498,129	55,158	(0.3%)
January 1, 2012	2,209	120,415,534	54,511	(1.2%)
January 1, 2013	2,152	116,024,717	53,915	(1.1%)
January 1, 2014	2,125	115,809,426	54,499	1.1%
January 1, 2015	2,207	127,090,869	57,585	5.7%
January 1, 2016	2,186	127,827,040	58,475	1.5%
January 1, 2017	2,187	130,312,665	59,585	1.9%

Members With Deferred Benefits

Year	Number at Beginning of Year	Additions	Decreases	Number at End of Year
1/1/05 to 12/31/05	217	37	(22)	232
1/1/06 to 12/31/06	232	20	(12)	240
1/1/07 to 12/31/07	240	42	(22)	260
1/1/08 to 12/31/08	260	37	(40)	257
1/1/09 to 12/31/09	257	25	(25)	257
1/1/10 to 12/31/10	257	24	(24)	257
1/1/11 to 12/31/11	257	22	(19)	260
1/1/12 to 12/31/12	260	41	(28)	273
1/1/13 to 12/31/13	273	34	(36)	271
1/1/14 to 12/31/14	271	27	(29)	269
1/1/15 to 12/31/15	269	30	(23)	276
1/1/16 to 12/31/16	276	18	(16)	278

Anne Arundel County Retirement and Pension System
Employees' Retirement Plan - Schedules of Member Valuation Data
December 31, 2016

Members Receiving Benefits

Year	Number at Beginning of Year	Additions	Decreases	Number at End of Year
1/1/05 to 12/31/05	911	93	(22)	982
1/1/06 to 12/31/06	982	109	(22)	1,069
1/1/07 to 12/31/07	1,069	102	(28)	1,143
1/1/08 to 12/31/08	1,143	82	(31)	1,194
1/1/09 to 12/31/09	1,194	93	(17)	1,270
1/1/10 to 12/31/10	1,270	82	(27)	1,325
1/1/11 to 12/31/11	1,325	107	(39)	1,393
1/1/12 to 12/31/12	1,393	110	(35)	1,468
1/1/13 to 12/31/13	1,468	130	(54)	1,544
1/1/14 to 12/31/14	1,544	113	(34)	1,623
1/1/15 to 12/31/15	1,623	123	(36)	1,710
1/1/16 to 12/31/16	1,710	139	(42)	1,807

Summary of Retirees and Beneficiaries Added to and Removed from Rolls

Year Ending	Added to Rolls		Removed from Rolls		Rolls End of Year		% Increase in Average Annual Allowance	Average Annual Allowance
	Number	Annual Allowance ¹	Number	Annual Allowance	Number	Annual Allowance		
12/31/2006	109	\$3,576,394	22	\$400,214	1,069	\$21,649,834	7.65%	\$20,252
12/31/2007	102	\$2,170,425	28	\$306,253	1,143	\$23,514,006	1.58%	\$20,572
12/31/2008	82	\$2,955,585	31	\$523,131	1,194	\$25,946,460	5.63%	\$21,731
12/31/2009	93	\$1,846,297	17	\$157,628	1,270	\$27,635,129	0.13%	\$21,760
12/31/2010	82	\$2,841,455	27	\$403,314	1,325	\$30,073,270	4.31%	\$22,697
12/31/2011	107	\$3,147,404	39	\$744,281	1,393	\$32,476,393	2.72%	\$23,314
12/31/2012	110	\$3,351,810	35	\$557,851	1,468	\$35,270,352	3.05%	\$24,026
12/31/2013	130	\$3,331,597	54	\$1,034,187	1,544	\$37,567,762	1.27%	\$24,331
12/31/2014	113	\$2,915,234	34	\$720,676	1,623	\$39,762,320	0.69%	\$24,499
12/31/2015	123	\$3,092,029	36	\$775,758	1,710	\$42,078,591	0.44%	\$24,607
12/31/2016	139	\$3,935,345	42	\$693,441	1,807	\$45,320,495	1.93%	\$25,081

¹ Includes COLA's

Tier One Members

<i>Compensation</i>	For purposes of the pension plan, compensation is the regular annual rate of pay, exclusive of extra compensation of any kind such as overtime pay, bonuses and commissions.																						
<i>Final Earnings</i>	The average of the highest 3 years of all basic pays.																						
<i>Eligibility Requirements</i>	Full-time general employees of the County will be eligible to participate in the pension plan upon hire.																						
<i>Employee Contributions</i>	4% of compensation.																						
<i>Retirement Date</i>																							
Normal Retirement	The first of the month coincident with or next following the participant's 60 th birthday or, if earlier, when the participant has 30 years of service.																						
Early Retirement	Reduced benefits are available the first of any month coincident with or next following the completion of 20 years of continuous service, provided the participant is at least age 50.																						
Postponed Retirement	A participant may work beyond his normal retirement date and may subsequently retire on the first of any month.																						
<i>Retirement Benefits</i>																							
Normal Retirement	2.0% of final earnings for each year of service (maximum 60% plus 2% times unused disability credit and pre-employment military service credit).																						
Early Retirement	Same as normal retirement, but reduced actuarially for early commencement.																						
	<table> <tr> <th><u>Years Early</u></th><th><u>Reduction Factor</u></th></tr> <tr><td>1</td><td>2%</td></tr> <tr><td>2</td><td>5%</td></tr> <tr><td>3</td><td>9%</td></tr> <tr><td>4</td><td>14%</td></tr> <tr><td>5</td><td>20%</td></tr> <tr><td>6</td><td>28%</td></tr> <tr><td>7</td><td>36%</td></tr> <tr><td>8</td><td>44%</td></tr> <tr><td>9</td><td>52%</td></tr> <tr><td>10</td><td>60%</td></tr> </table>	<u>Years Early</u>	<u>Reduction Factor</u>	1	2%	2	5%	3	9%	4	14%	5	20%	6	28%	7	36%	8	44%	9	52%	10	60%
<u>Years Early</u>	<u>Reduction Factor</u>																						
1	2%																						
2	5%																						
3	9%																						
4	14%																						
5	20%																						
6	28%																						
7	36%																						
8	44%																						
9	52%																						
10	60%																						
Postponed Retirement	Same as normal retirement, but based on continued accrual past normal retirement date.																						
<i>Disability</i>																							
Eligibility	Totally and permanently disabled (except as the result of actions specified in the County code). To receive duty-related disability benefits, there is no service requirement. Five years of service are required to receive non-duty benefits.																						
Duty-Related	The greater of the accrued benefit or 66-2/3% of final earnings, payable immediately, unreduced.																						
Non-Duty	The greater of the accrued benefit or 25% of final earnings, payable immediately, unreduced.																						

<i>Normal form of Payment</i>	Monthly life annuity with modified cash refund.
<i>Termination of Employment</i>	
Less than 5 years of service	Return of employee contributions with 4.25% interest.
5 years of service	At the discretion of the employee, either a return of contributions with interest or the accrued normal retirement benefit taking into account final earnings and service at date of termination, payable at normal retirement date.
<i>Death Benefits</i>	
Married and eligible for early retirement	The greatest of: • \$10 per month • 50% of the final earnings • The accrued benefit, reduced actuarially for early commencement and the joint and 100% survivor form.
Unmarried or not eligible for early retirement	Return of employee contributions with 4.25% interest plus a lump sum of 50% of final earnings.
<i>Cost of Living Increase</i> (simple, for benefits accrued as of 1/31/97)	Retiree benefits are adjusted each year. The revised benefit amount is the lesser of: • Prior-year benefit plus base benefit multiplied by increase current March CPI from March CPI for prior year. • Benefit increased by 3% of initial benefit.
<i>Cost of Living Increase</i> (compound, for benefits accrued after 1/31/97)	Retiree benefits are adjusted each year. The revised benefit amount is the lesser of: • Prior-year benefit multiplied by 60% of the increase in current March CPI from March CPI for prior year. • Benefit increased by 2.5%. Benefit payments can be reduced or increased. However, the amount can never be less than the initial benefit amount.
<u>Tier Two Members</u>	
<i>Compensation</i>	For purposes of the pension plan, compensation is the regular annual rate of pay, exclusive of extra compensation of any kind such as overtime pay, bonuses and commissions.
<i>Final Earnings</i>	The average of the highest 3 years of all basic pays.
<i>Eligibility Requirements</i>	Full-time general employees of the County will be eligible to participate in the pension plan upon hire. Members can elect to join Tier One.
<i>Employee Contributions</i>	No employee contributions required or allowed.
<i>Retirement Date</i>	
Normal Retirement	The first of the month coincident with or next following the participant's 60 th birthday or, if earlier, when the participant has 30 years of service.
Early Retirement	Reduced benefits are available the first of any month coincident with or next following the completion of 20 years of continuous service, provided the participant is at least age 50.
Postponed Retirement	A participant may work beyond his normal retirement date and may subsequently retire on the first of any month.

Retirement Benefits

Normal Retirement	1.0% of final earnings for each year of service.
Early Retirement	The normal retirement benefit is reduced for early commencement, using the same reduction factors as Tier 1.
Postponed Retirement	Same as normal retirement, but based on continued accrual past normal retirement date.

Normal form of Payment Monthly life annuity.

Disability

Eligibility	Totally and permanently disabled (except as the result of actions specified in the County code). To receive duty-related disability benefits, there is no service requirement. Five years of service are required to receive non-duty benefits.
Duty-Related	The greater of the accrued benefit or 66-2/3% of final earnings, payable immediately, unreduced.
Non-duty	The greater of the accrued benefit or 25% of final earnings, payable immediately, unreduced.

Termination of Employment

Less than 5 years of service	No benefit is payable.
5 years of service	The accrued normal retirement benefit taking into account final earnings and service at date of termination, payable at normal retirement date.

Death benefits

Married and eligible for early retirement	The greatest of: • \$10 per month • 50% of the final earnings • The accrued benefit, reduced actuarially for early commencement and the joint and 100% survivor form.
Unmarried or not eligible for early retirement	A lump sum of 50% of final earnings.

Cost of Living Increase
(compound)

Retiree benefits are adjusted each year. The revised benefit amount is the lesser of: • Prior-year benefit multiplied by 60% of the increase in current March CPI from March CPI for prior year. • Benefit increased by 2.5%. Benefit payments can be reduced or increased. However, the amount can never be less than the initial benefit amount.
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County Council Bill No. 34-92	Effective 6/1/92 through 8/31/92
	Participants age 50 or older with at least 20 years of service could elect to retire with an additional pension equal to 1/12 of 2% for each year of credited 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 No. 90-93	Effective 12/22/93
	Plan participants are required to pay the full actuarial value of service purchases. Purchases can only be made at retirement. To be eligible, an employee must have 60 months of County service. Existing plan participants must be notified of their right to purchase service under existing law.
County Council Bill No. 82-94	Effective 10/31/94
	Transfers assets from general employees plan to A&E plan for participants who have transferred between these two plans.
County Council Bill No. 88-96	Effective 12/4/96
	The previous method of calculating cost of living increase 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.
County Council Bill No. 41-99	Effective 6/15/99
	Employees paid under the deputy sheriff employees pay schedule become Tier Two members of the Detention Center Plan effective as of January 1, 1999. Service credited under the Employees' Plan will count as credited service in the Detention Center Plan and no future benefit will be paid from the Employees' Plan. Assets are transferred from the Employees' Plan to the Detention Center Plan in an amount equal to the projected unit credit accrued liability in the Employees' Plan.
Recodification	Effective 2/25/2002
	Allows a benefit based on disability leave service and pre-plan military service to be paid over the 60% cap. Normal retirement was changed to the earlier of 30 years of service or age 60.
County Council Bill No. 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.
County Council Bill No. 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 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 highest 3 of all basic pays.
County Council Bill No. 97-13	Effective 4/14/2014.
	Members of the Employees' Plan and Category II members of the Detention and Deputy Sheriffs' Plan hired on or after July 1, 2015 will be subject to 10 year vesting and 10 year normal retirement provisions. The 10 year requirement also affects the ability to purchase service or get credit for pre-plan military service. The 10 year requirement extends to County Council members hired on or after December 1, 2014.

Solvency Test

2001 to 2017

Actuarial Valuation Date	Active Member Contribution (1)	Retirees and Beneficiaries Inactive and Pay- Status Members (2)	Active Members Employer Financed Portion (3)	Actuarial Value of Assets	Portion of Actuarial Accrued Liabilities Covered by Assets		
					(1)	(2)	(3)
1/1/2001	41,406,031	111,719,124	186,186,863	302,805,427	100%	100%	80.4%
1/1/2002	44,309,682	121,204,179	192,282,764	321,443,897	100%	100%	81.1%
1/1/2003	45,678,833	150,497,365	176,296,171	335,539,414	100%	100%	79.1%
1/1/2004	47,751,449	163,182,780	156,607,123	367,756,502	100%	100%	100.1%
1/1/2005	49,689,830	197,181,410	158,300,584	395,501,876	100%	100%	93.9%
1/1/2006	50,870,066	224,477,149	163,885,111	422,234,496	100%	100%	89.6%
1/1/2007	52,535,798	257,120,315	172,315,517	456,656,849	100%	100%	85.3%
1/1/2008	52,839,596	289,584,191	183,917,695	492,788,674	100%	100%	81.8%
1/1/2009	54,817,303	315,594,769	197,782,908	488,275,803	100%	100%	59.6%
1/1/2010	58,025,700	333,890,452	206,924,979	519,556,093	100%	100%	61.7%
1/1/2011	60,121,679	360,630,667	206,517,241	522,165,145	100%	100%	49.1%
1/1/2012	62,225,800	383,559,354	207,867,904	516,070,401	100%	100%	33.8%
1/1/2013	63,403,319	423,101,739	207,075,617	508,232,321	100%	100%	10.5%
1/1/2014	63,002,887	460,323,316	212,402,830	545,812,384	100%	100%	10.6%
1/1/2015	65,660,434	486,377,944	229,067,582	582,795,438	100%	100%	13.4%
1/1/2016	66,159,912	490,715,140	228,431,557	604,433,282	100%	100%	20.8%
1/1/2017	65,446,178	523,475,213	224,074,001	627,147,522	100%	100%	17.1%

Analysis of Financial Experience

Reasons for Change in the Unfunded Accrued Liability

The unfunded accrued liability increased from \$180,873,327 to \$185,847,870. The funded status increased from 77.0% to 77.1%.

Reasons for Change in Contribution Rates

The employer contribution rate increased from 19.7% for the fiscal year ending June 30, 2017 to 20.0% for the fiscal year ending June 30, 2018. The increase of 0.3% is due to the following reasons:

Investment Performance	0.5%
Pay Increases	0.0%
New Entrants/Change in Normal Cost	0.0%
COLAs	-0.5%
Change in Expenses	0.0%
Demographics and Other Changes	0.3%
Total	0.3%

Net Pension Liability of the County

The components of the net pension liability of the County at December 31, 2016, were as follows:

Total pension liability	\$ 830,383,057
Plan fiduciary net position	<u>(592,099,006)</u>
County's net pension liability	<u>\$ 238,284,051</u>
Plan fiduciary net position as a percentage of the total pension liability	71.30%

Actuarial assumptions. The total pension liability was determined by an actuarial valuation as of December 31, 2016 using the following actuarial assumptions, applied to all periods included in the measurement:

Inflation	3.00%
Salary increases	Rates vary by participant age
Investment rate of return	7.50%, net of pension plan investment expense, including inflation
Mortality	RP-2000 Blue Collar Mortality tables with generational projection by Scale AA. A nine-year set forward is used for post-disability mortality.

The above is a summary of key actuarial assumptions. Full descriptions of the actuarial assumptions are available in the January 1, 2016 actuarial valuation report.

Sensitivity of the net pension liability to changes in the discount rate

	<i>1% Decrease</i> <u>6.50%</u>	<i>Current</i> <i>Discount Rate</i> <u>7.50%</u>	<i>1% Increase</i> <u>8.50%</u>
County's net pension liability	\$ 332,132,582	\$ 238,284,051	\$ 158,975,258

Anne Arundel County Retirement and Pension System
Employees' Retirement Plan – Actuarial Information
December 31, 2016

Changes in the Net Pension Liability

	Increase (Decrease)		
	Total Pension Liability (a)	Plan Fiduciary Net Position (b)	Net Pension Liability (a) - (b)
Balances at 12/31/15	\$ 812,569,878	\$ 564,282,662	\$ 248,287,216
Changes for the year:			
Service cost	15,144,350		15,144,350
Interest	59,291,843		59,291,843
Changes of benefit terms	-		-
Differences between expected and actual experience	(12,599,061)		(12,599,061)
Changes of assumptions	-		-
Contributions - employer		25,809,828	(25,809,828)
Contributions - member		5,181,705	(5,181,705)
Net investment income		41,345,284	(41,345,284)
Benefit payments, including refunds of member contributions	(44,023,953)	(44,023,953)	-
Administrative expense		(496,520)	496,520
Other		-	-
Net Changes	<u>17,813,179</u>	<u>27,816,344</u>	<u>(10,003,165)</u>
Balances at 12/31/16	<u>\$ 830,383,057</u>	<u>\$ 592,099,006</u>	<u>\$ 238,284,051</u>

Anne Arundel County Retirement and Pension System
Employees' Retirement Plan – Actuarial Information
December 31, 2016

Changes in the County's Net Pension Liability and Related Ratios

Last 10 Fiscal Years

(Dollar amounts in thousands)

	2016	2015	2014	2013	2012	2011	2010	2009	2008	2007
Total pension liability										
Service cost	\$ 15,144	\$ 15,115	\$ 14,159							
Interest	\$ 59,292	\$ 58,329	\$ 53,353							
Changes of benefit terms	-	-	-							
Differences between expected and actual experience	(12,599)	(17,971)	16,408							
Changes of assumptions	-	-	22,567							
Benefit payments, including refunds of member contributions	(44,024)	(41,253)	(39,012)							
Net change in total pension liability	17,813	14,221	67,475							
Total pension liability - beginning	812,570	798,349	730,874							
Total pension liability - ending (a)	<u>\$ 830,383</u>	<u>\$ 812,570</u>	<u>\$ 798,349</u>							
Plan fiduciary net position										
Contributions - employer	\$ 25,810	\$ 25,630	\$ 24,451							
Contributions - member	5,182	4,847	4,662							
Net investment income	41,345	(8,374)	28,451							
Benefit payments, including refunds of member contributions	(44,024)	(41,253)	(39,012)							
Administrative expense	(497)	(504)	(519)							
Other	-	-	-							
Net change in plan fiduciary net position	\$ 27,816	\$ (19,654)	\$ 18,034							
Plan fiduciary net position - beginning	564,283	583,936	565,902							
Plan fiduciary net position - ending (b)	<u>\$ 592,099</u>	<u>\$ 564,283</u>	<u>\$ 583,936</u>							
County's net pension liability - ending (a)-(b)	<u>\$ 238,284</u>	<u>\$ 248,287</u>	<u>\$ 214,413</u>							
Plan fiduciary net position as a percentage of the total pension liability	71.30%	69.44%	73.14%							
Covered-employee payroll	\$ 130,313	\$ 127,827	\$ 127,091							
County's net pension liability as a percentage of covered-employee payroll	182.86%	194.24%	168.71%							
Expected average remaining service years of all participants	5	5	5							

Information for FY2013 and earlier is not available

Notes to Schedule:

Benefit changes: There are no benefit changes reflected in the current schedule.

Changes of assumptions: There are no assumption changes reflected in the current schedule.

Anne Arundel County Retirement and Pension System
Employees' Retirement Plan – Actuarial Information
December 31, 2016

Schedule of County Contributions

Last 10 Fiscal Years

(Dollar amounts in thousands)

	2016	2015	2014	2013	2012	2011	2010	2009	2008	2007
Actuarially determined contribution	\$ 25,810	\$ 25,655	\$ 24,426							
Contributions in relation to the actuarially determined contribution	25,810	25,630	24,451	Information for FY2013 and earlier is not available						
Contribution deficiency (excess)	<u>\$ -</u>	<u>\$ 25</u>	<u>\$ (25)</u>							
Covered-employee payroll	\$ 130,313	\$ 127,827	\$ 127,091							
Contributions as a percentage of covered employee payroll	19.81%	20.05%	19.24%							

Notes to Schedule

Valuation date:

Actuarially determined contribution amounts are calculated as of each January 1 for the upcoming County fiscal year beginning July 1. Actuarial valuations are performed every year.

Methods and assumptions used to determine contribution rates:

Actuarial cost method	Projected Unit Credit
Amortization method	Level percent of payroll (closed), increasing 3.0% per year.
Remaining amortization period	Remaining Amortization periods range from 17 to 26 years.
Asset valuation method	5-year smoothed market
Inflation	3.00%
Salary increases	Rates vary by participant age
Investment rate of return	7.50%, net of pension plan investment expense, including inflation
Retirement age	Rates vary by participant age and service
Mortality	RP-2000 Blue Collar Mortality tables with generational projection by Scale AA. A nine-year set forward is used for post-disability mortality.

Attachment B

Police Service Retirement Plan

A. Method Used for Funding Purposes

This valuation was performed using the projected unit credit cost method. The contribution equals the sum of the normal cost and the amount necessary to amortize any actuarial gains/(losses) over closed periods. Effective January 1, 2014, new bases due to changes in actuarial assumptions or differences between actual and expected experience are amortized over closed periods of 20 years. New bases due to changes in plan benefits are amortized over the expected future working lifetime of affected employees. Amortization payments increase 3.0% per year.

B. Asset Valuation Method

The actuarial value of assets is determined by spreading the asset gain or loss over a 5-year period. The asset gain or loss is the amount by which the actual market value investment return differs from the expected market value asset return. The method was effective with the 1/1/2011 actuarial valuation. The Actuarial Value of Assets recognizes adjustments resulting from the final prior-year's audit.

There is a six-month lag between the valuation and the fiscal year. The 2017 valuation determines the County contributions due for the fiscal year ending June 30, 2018. Contributions made between the valuation date and the beginning of the next fiscal year (January 1, 2017 to June 30, 2017) have not been treated as assets in the current valuation.

C. Valuation Procedures

Generally, the plan provides a 100% survivor benefit to the spouse at the time of the retiree's death. This allows for post-retirement marriages. We have valued the forms of payment originally coded in the data or based this on marital status at time of retirement (generally a 100% survivor benefit but not always). 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.

D. Actuarial Assumptions

The following assumptions were used in valuing the liabilities and benefits under the Plan for purposes of determining contributions and liabilities under GASB. These assumptions are used for all members eligible to receive benefits under the Police Service Retirement Plan provisions.

Economic

Investment Return	7.5% compounded annually net of investment expenses (3.0% inflation and 4.5% real return) effective January 1, 2014.
Salary Increases	A graded schedule is used. See Earnings Progression Table.
Cost of Living Adjustment	Benefits accrued before Bill 88-96 are assumed to increase by 3.0% of the current benefit each year from retirement effective January 1, 2014. Benefits accrued after Bill 88-96 are assumed to increase by 1.8% of the current benefit each year from retirement effective January 1, 2014.

Other

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. 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. Projection to the year of the valuation is assumed to be current experience. The generational projection beyond the valuation date is to account for future mortality improvements. See Table of Sample Rates.
Withdrawal	See Table of Sample Rates.
Disability	See Table of Sample Rates. 75% of disablement is assumed to be duty-related.

Administrative Expenses The average of actual expenses for the two years preceding the valuation date, rounded to the nearest thousand.

Prudential Benefits Our calculations reflect that some benefits have already been purchased.

Retirement Rates¹ Sample Rates:

		<u>Service</u>				
	<u>Age</u>	<u>20</u>	<u>22</u>	<u>24</u>	<u>27</u>	<u>30</u>
For funding	40	26.40%	10.00%	18.33%	10.00%	10.00%
	45	18.34%	10.00%	18.33%	10.00%	10.00%
	50	36.66%	50.00%	58.33%	50.00%	100.00%
	55	50.00%	50.00%	50.00%	50.00%	100.00%

	<u>Age</u>	<u>20</u>	<u>22</u>	<u>23+</u>
For GASB68 accounting	40	26.40%	10.00%	100.00%
	45	18.34%	10.00%	100.00%
	50	36.66%	50.00%	100.00%
	55	50.00%	50.00%	100.00%

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

	<u>Sample Load Rates</u>				
		<u>Service</u>			
	<u>Age</u>	<u>23</u>	<u>27</u>	<u>30</u>	<u>35</u>
	44	0.4%	1.4%	2.3%	12.0%
	50	2.0%	3.7%	4.5%	14.6%
	55	2.7%	4.6%	5.4%	15.6%
	60	3.2%	5.3%	6.1%	16.4%

Percentage Married 80% of employees and 70% of current retirees and disableds are assumed married.

Age Difference Males are assumed to be four years older than their spouses.

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

Disability Leave Active liabilities (which depend on credited service) are loaded by 1.75% to account for future crediting of disability service.

<u>Table of Sample Base Mortality Rates (2000)</u>					<u>Projection Scale</u>	
<u>Age</u>	<u>Healthy Mortality</u>		<u>Disabled Mortality</u>		<u>(Healthy and Disabled)</u>	
	<u>Males</u>	<u>Females</u>	<u>Males</u>	<u>Females</u>	<u>Males</u>	<u>Females</u>
20	0.03%	0.02%	0.04%	0.02%	1.90%	1.60%
25	0.04	0.02	0.07	0.03	1.00	1.40
30	0.07	0.03	0.11	0.05	0.50	1.00
35	0.11	0.05	0.14	0.09	0.50	1.10
40	0.14	0.09	0.18	0.14	0.80	1.50
45	0.18	0.14	0.24	0.20	1.30	1.60
50	0.24	0.20	0.42	0.28	1.80	1.70
55	0.42	0.28	0.83	0.49	1.90	0.80
60	0.83	0.49	1.55	1.04	1.60	0.50
65	1.55	1.04	2.68	1.86	1.40	0.50

¹ 100% at age 58.

Attained Age	Table of Sample Decrement Rates	
	Percentage	
	Disability	Withdrawal
20	0.3060%	5.31%
25	0.3060	4.25
30	0.3060	3.19
35	0.4526	2.13
40	0.9340	1.28
45	1.5619	0.64
50	2.2983	0.00
55	0.0000	0.00
60	0.0000	0.00
64	0.0000	0.00

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

Anne Arundel County Retirement and Pension System
Police Service Retirement Plan – Schedules of Member Valuation Data
December 31, 2016

Active Members

Valuation Date	Number	Annual Payroll (Jan. 1 Rate)	Average Annual Pay	% Increase in Average Pay
January 1, 2006	642 ¹	36,694,307	57,156	7.56%
January 1, 2007	640 ²	37,805,038	59,070	3.35%
January 1, 2008	658 ³	41,011,336	62,327	5.51%
January 1, 2009	627 ⁴	41,508,547	66,202	6.22%
January 1, 2010	632 ⁵	42,499,380	67,246	1.58%
January 1, 2011	620 ⁶	42,449,204	68,466	1.81%
January 1, 2012	636 ⁷	41,334,580	64,991	(5.08%)
January 1, 2013	640 ⁸	40,521,944	63,316	(2.58%)
January 1, 2014	666 ⁹	41,714,302	62,634	(1.08%)
January 1, 2015	693 ¹⁰	48,261,635	69,642	11.19%
January 1, 2016	684 ¹¹	48,116,765	70,346	1.01%
January 1, 2017	699 ¹²	50,560,385	72,332	2.82%

¹ Includes 58 participants in DROP.

² Includes 51 participants in DROP.

³ Includes 47 participants in DROP.

⁴ Includes 34 participants in DROP.

⁵ Includes 45 participants in DROP.

⁶ Includes 57 participants in DROP.

⁷ Includes 60 participants in DROP.

⁸ Includes 60 participants in DROP.

⁹ Includes 58 participants in DROP.

¹⁰ Includes 55 participants in DROP.

¹¹ Includes 43 participants in DROP.

¹² Includes 55 participants in DROP.

Members Receiving Benefits

Year	Number at Beginning of Year	Additions	Decreases	Number at End of Year
1/1/04 to 12/31/04	411	18	(2)	427
1/1/05 to 12/31/05	427	29	(4)	452
1/1/06 to 12/31/06	452	38	(12)	478
1/1/07 to 12/31/07	478	40	(7)	511
1/1/08 to 12/31/08	511	50	(8)	553
1/1/09 to 12/31/09	553	30	(12)	571
1/1/10 to 12/31/10	571	26	(14)	583
1/1/11 to 12/31/11	583	31	(14)	600
1/1/12 to 12/31/12	600	40	(11)	629
1/1/13 to 12/31/13	629	22	(12)	639
1/1/14 to 12/31/14	639	29	(13)	655
1/1/15 to 12/31/15	655	46	(12)	689
1/1/16 to 12/31/16	689	37	(15)	711

Summary of Retirees and Beneficiaries Added to and Removed from Rolls

	Added to Rolls		Removed from Rolls		Rolls End of Year			
Year Ending	Number	Annual Allowance ¹²	Number	Annual Allowance	Number	Annual Allowance	% Increase in Average Annual Allowance	Average Annual Allowance
12/31/2008	50	\$2,367,778	8	\$359,448	553	\$20,719,636	2.32%	\$37,468
12/31/2009	30	\$1,788,475	12	\$391,958	571	\$22,116,153	3.37%	\$38,732
12/31/2010	26	\$1,037,257	14	\$550,831	583	\$22,602,579	0.10%	\$38,769
12/31/2011	31	\$1,825,986	14	\$551,286	600	\$23,877,279	2.65%	\$39,795
12/31/2012	40	\$2,627,863	11	\$542,409	629	\$25,962,733	3.72%	\$41,276
12/31/2013	22	\$1,353,267	12	\$401,425	639	\$26,914,575	2.04%	\$42,120
12/31/2014	29	\$1,788,688	13	\$669,885	655	\$28,033,378	1.61%	\$42,799
12/31/2015	46	\$1,714,607	12	\$416,626	689	\$29,331,359	(0.53%)	\$42,571
12/31/2016	37	\$1,638,640	15	\$529,572	711	\$30,440,427	0.57%	\$42,814

¹² Includes COLA's

Compensation

For purposes of the pension plan, compensation is the regular annual rate of pay, exclusive of extra compensation of any kind such as overtime pay, bonuses and commissions.

Final Earnings

The average of the highest 3 years of all basic pays.

Eligibility Requirements

Full-time employees occupying the classes of work listed below and making contributions to the plan will be eligible to participate in the pension plan upon hire:

- Police Officer
- Police Sergeant
- Police Lieutenant
- Police Captain
- Police Major
- Deputy Police Chief
- Chief of Police, by election

Employee Contributions
Retirement Date

7.25% of compensation for all participants.

Normal Retirement

The first of the month coincident with or next following the participant's 50th birthday with 5 years of service or the completion of 20 years of service. For those hired prior to February 25, 2002, the five years of service is not required.

Postponed Retirement

A participant may work beyond his normal retirement date and may subsequently retire on the first of any month.

Retirement Benefits

Normal Retirement

2.5% of final earnings for each year of service up to 20 years plus 2.0% of final earnings per year of service in excess of 20 years (maximum 70% plus 2% times unused disability credit and pre-employment military service credit).

Postponed Retirement

Same as normal retirement, but based on continued accrual past normal retirement date.

Normal Form of Payment

For single participants, monthly life annuity with payments guaranteed for 5 years.

For married participants, unreduced 100% joint and survivor annuity with payments guaranteed for 5 years.

Disability

Eligibility	Totally and permanently disabled (except as the result of activities specified in the County code) regardless of length of service.
Duty-Related	The greater of the accrued benefit or 66-2/3% of final earnings, payable immediately, unreduced.
Non-Duty	The greater of the accrued benefit or 20% of final earnings, payable immediately, unreduced.

Termination of Employment

Less than 20 years of service	Return of employee contributions with 3.00% interest.
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Death Benefits

Married	Duty-Related: Greater of accrued benefit or 66-2/3% of final earnings. Non-duty Related: Accrued Benefit.
Unmarried	Return of employee contributions with 3.00% interest plus, if one or more years of service, a lump sum of 50% of final earnings.

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:

- Base benefit multiplied by ratio of current 12 month average CPI to 12 month average CPI at retirement.
- Prior-year benefit increased by 4%.

Benefit payments can be reduced or increased. However, the amount can never be less than the initial amount.

Cost of Living Increase
(for benefits accrued after 1/31/97)

Retiree benefits are adjusted each year. The revised benefit amount is the lesser of:

- Prior-year benefit multiplied by 60% of the increase in current March CPI from March CPI for prior year.
- Prior-year benefit increased by 2.5%.

Benefit payments can be reduced or increased. However, the amount can never be less than the initial amount.

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 sixth year, but no interest shall be credited to the DROP account in the sixth year.

County Council Bill No. 34-92	Effective 6/1/92 through 8/31/92
	Participants 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.
County Council Bill No. 66-92	Effective 7/2/92
	The plan was amended to allow normal, unreduced retirement after 20 years of service.
	Employee contributions were increased to 6% from 5%.
	Participants under age 50 were not allowed to retire and receive retirement incentives (under Bill No. 34-92) in addition to unreduced retirement. They could either retire early with the incentives, or normally without the incentives.
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 No. 88-96	Effective 12/4/96
	The previous method of calculating cost of living increase 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.
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 No. 66-05	Effective 10/10/2005
	Reduced the contribution percentage for Category II participants from 6% to 5%.
County Council Bill No. 58-07	Effective 10/11/2007
	Reduced the contribution percentage for Category I participants from 6% to 5%.
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 average basic pay. Clarified the limits on those entering DROP. The effective annual interest rate for the DROP account changed from 8% to 4.25% for those entering DROP on or after July 1, 2009.
County Council Bill No. 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.
	Increased the contribution rate for Police Officers, Police Officer First Class, Police Corporals, and Police Sergeants 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 highest 3 of all basic pays.

Anne Arundel County Retirement and Pension System
Police Service Retirement Plan - Summary of Major Legislative Changes
December 31, 2016

County Council Bill No. 30-12	Effective 2/1/2013
	All participant except for those in the Police Lieutenant classification 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 in the plan.
County Council Bill No. 67-12	Effective 2/1/2013
	Participant in the Police Lieutenant classification 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 in the plan.

The Anne Arundel County Police Service Retirement Plan

Solvency Test

2001 to 2017

Actuarial Valuation Date	Active Member Contribution (1) ¹	Retirees and Beneficiaries Inactive and Pay- Status Members (2)	Active Members Employer Financed Portion (3)	Actuarial Value of Assets	Portion of Actuarial Accrued Liabilities Covered by Assets		
					(1)	(2)	(3)
1/1/2001	16,460,010	140,990,477	130,567,495	252,149,932	100%	100%	72.5%
1/1/2002	17,063,875	157,661,880	130,272,087	268,703,856	100%	100%	72.1%
1/1/2003	17,905,001	169,590,397	131,140,395	281,967,318	100%	100%	72.0%
1/1/2004	18,600,457	183,863,447	123,091,936	311,371,499	100%	100%	88.5%
1/1/2005	19,504,325	193,958,675	132,691,153	337,113,153	100%	100%	93.2%
1/1/2006	17,307,619	211,322,531	147,930,753	360,268,341	100%	100%	89.0%
1/1/2007	18,309,729	231,512,770	151,875,606	389,877,885	100%	100%	92.2%
1/1/2008	19,041,581	256,380,618	158,244,903	417,278,055	100%	100%	89.6%
1/1/2009	19,699,084	286,232,025	157,750,087	408,261,502	100%	100%	64.9%
1/1/2010	19,761,988	303,531,019	164,282,171	432,176,036	100%	100%	66.3%
1/1/2011	20,787,782	310,212,178	171,001,709	435,891,125	100%	100%	61.3%
1/1/2012	21,860,897	325,991,800	178,302,281	430,342,941	100%	100%	46.3%
1/1/2013	22,454,626	357,544,534	175,292,937	420,675,703	100%	100%	23.2%
1/1/2014	24,465,302	364,953,146	186,969,390	452,075,806	100%	100%	33.5%
1/1/2015	26,791,267	381,682,950	205,142,796	481,633,710	100%	100%	35.7%
1/1/2016	28,952,829	400,644,387	205,420,231	498,491,072	100%	100%	33.5%
1/1/2017	29,153,543	410,045,649	213,498,527	517,010,261	100%	100%	36.4%

Analysis of Financial Experience

Reasons for Change in the Unfunded Accrued Liability

The unfunded accrued liability increased from \$136,526,375 to \$135,687,458. The funded status increased from 78.5% to 79.2%.

Reasons for Change in Contribution Rates

The employer contribution rate decreased from 42.6% for the fiscal year ending June 30, 2017 to 42.2% for the fiscal year ending June 30, 2018. The decrease of 0.4% is due to the following reasons:

Investment Performance	1.2%
Pay Increases	0.1%
New Entrants/Change in Normal Cost	0.3%
COLA	-1.3%
Changes in Expenses	0.0%
Demographics and Other Changes	-0.7%
Total	-0.4%

Net Pension Liability of the County

The components of the net pension liability of the County at December 31, 2016, were as follows:

Total pension liability	\$ 664,977,684
Plan fiduciary net position	(486,520,135)
County's net pension liability	<u>\$ 178,457,549</u>
Plan fiduciary net position as a percentage of the total pension liability	73.16%

Actuarial assumptions. The total pension liability was determined by an actuarial valuation as of December 31, 2016 using the following actuarial assumptions, applied to all periods included in the measurement:

Inflation	3.00%
Salary increases	Rates vary by participant age
Investment rate of return	7.50%, net of pension plan investment expense, including inflation
Mortality	RP-2000 Blue Collar Mortality tables with generational projection by Scale AA. A five-year set forward is used for post-disability mortality.

The above is a summary of key actuarial assumptions. Full descriptions of the actuarial assumptions are available in the January 1, 2016 actuarial valuation report.

Sensitivity of the net pension liability to changes in the discount rate

	<i>1% Decrease</i> <u>6.50%</u>	<i>Current</i> <i>Discount Rate</i> <u>7.50%</u>	<i>1% Increase</i> <u>8.50%</u>
County's net pension liability	\$ 263,977,109	\$ 178,457,549	\$ 108,615,280

Anne Arundel County Retirement and Pension System
Police Service Retirement Plan – Actuarial Information
December 31, 2016

Changes in the Net Pension Liability

	Increase (Decrease)		
	Total Pension Liability	Plan Fiduciary Net Position	Net Pension Liability
	(a)	(b)	(a) - (b)
Balances at 12/31/15	\$ 643,772,887	\$ 463,225,493	\$ 180,547,394
Changes for the year:			
Service cost	12,057,151		12,057,151
Interest	47,032,076		47,032,076
Changes of benefit terms	-		-
Differences between expected and actual experience	(4,527,341)		(4,527,341)
Changes of assumptions	-		-
Contributions - employer		20,410,896	(20,410,896)
Contributions - member		3,158,451	(3,158,451)
Net investment income		33,499,769	(33,499,769)
Benefit payments, including refunds of member contributions	(33,357,089)	(33,357,089)	-
Administrative expense		(417,385)	417,385
Other		-	-
Net Changes	<u>21,204,797</u>	<u>23,294,642</u>	<u>(2,089,845)</u>
Balances at 12/31/16	<u>\$ 664,977,684</u>	<u>\$ 486,520,135</u>	<u>\$ 178,457,549</u>

Anne Arundel County Retirement and Pension System
Police Service Retirement Plan – Actuarial Information
December 31, 2016

Changes in the County's Net Pension Liability and Related Ratios

Last 10 Fiscal Years

(Dollar amounts in thousands)

	2016	2015	2014	2013	2012	2011	2010	2009	2008	2007
Total pension liability										
Service cost	\$ 12,057	\$ 12,258	\$ 10,951							
Interest	47,032	45,473	41,480							
Changes of benefit terms	-	-	-							
Differences between expected and actual experience	(4,527)	(4,693)	12,801							
Changes of assumptions	-	-	18,331							
Benefit payments, including refunds of member contributions	(33,357)	(31,134)	(29,507)							
Net change in total pension liability	21,205	21,903	54,055							
Total pension liability - beginning	643,773	621,870	567,815							
Total pension liability - ending (a)	<u>\$ 664,978</u>	<u>\$ 643,773</u>	<u>\$ 621,870</u>							
Plan fiduciary net position										
Contributions - employer	\$ 20,411	\$ 19,560	\$ 18,870							
Contributions - member	3,158	3,104	2,950							
Net investment income	33,500	(7,869)	21,813							
Benefit payments, including refunds of member contributions	(33,357)	(31,134)	(29,507)							
Administrative expense	(417)	(423)	(418)							
Other	-	-	-							
Net change in plan fiduciary net position	\$ 23,295	\$ (16,762)	\$ 13,707							
Plan fiduciary net position - beginning	463,225	479,988	466,281							
Plan fiduciary net position - ending (b)	<u>\$ 486,520</u>	<u>\$ 463,225</u>	<u>\$ 479,988</u>							
County's net pension liability - ending (a)-(b)	<u>\$ 178,458</u>	<u>\$ 180,547</u>	<u>\$ 141,882</u>							
Plan fiduciary net position as a percentage of the total pension liability	73.16%	71.95%	77.18%							
Covered-employee payroll	\$ 44,894	\$ 43,879	\$ 42,960							
County's net pension liability as a percentage of covered-employee payroll	397.51%	411.47%	330.26%							
Expected average remaining service years of all participants	4	4	4							

Information for FY2013 and earlier is not available

Notes to Schedule:

Benefit changes: There are no benefit changes reflected in the current schedule.

Changes of assumptions: There are no assumption changes reflected in the current schedule.

Anne Arundel County Retirement and Pension System
Police Service Retirement Plan – Actuarial Information
December 31, 2016

Schedule of County Contributions

Last 10 Fiscal Years

(Dollar amounts in thousands)

	2016	2015	2014	2013	2012	2011	2010	2009	2008	2007
Actuarially determined contribution	\$ 20,411	\$ 19,560	\$ 18,870							
Contributions in relation to the actuarially determined contribution	20,411	19,560	18,870	Information for FY2013 and earlier is not available						
Contribution deficiency (excess)	<u>\$ 0</u>	<u>\$ -</u>	<u>\$ -</u>							
Covered-employee payroll	\$ 44,894	\$ 43,879	\$ 42,960							
Contributions as a percentage of covered employee payroll	45.46%	44.58%	43.92%							

Notes to Schedule

Valuation date:

Actuarially determined contribution amounts are calculated as of each January 1 for the upcoming County fiscal year beginning July 1. Actuarial valuations are performed every year.

Methods and assumptions used to determine contribution rates:

Actuarial cost method	Projected Unit Credit
Amortization method	Level percent of payroll (closed), increasing 3.0% per year.
Remaining amortization period	Remaining Amortization periods range from 17 to 26 years.
Asset valuation method	5-year smoothed market
Inflation	3.00%
Salary increases	Rates vary by participant age
Investment rate of return	7.50%, net of pension plan investment expense, including inflation
Retirement age	Rates vary by participant age and service
Mortality	RP-2000 Blue Collar Mortality tables with generational projection by Scale AA. A five-year set forward is used for post-disability mortality.

Attachment C

Fire Service Retirement Plan

A. Method Used for Funding Purposes

This valuation was performed using the projected unit credit cost method. The contribution equals the sum of the normal cost and the amount necessary to amortize any actuarial gains/(losses) over closed periods. Effective January 1, 2014, new bases due to changes in actuarial assumptions or differences between actual and expected experience are amortized over closed periods of 20 years. New bases due to changes in plan benefits are amortized over the expected future working lifetime of affected employees. Amortization payments increase 3.0% per year.

B. Asset Valuation Method

The actuarial value of assets is determined by spreading the asset gain or loss over a 5-year period. The asset gain or loss is the amount by which the actual market value investment return differs from the expected market value asset return. The method was effective with the 1/1/2011 actuarial valuation. The Actuarial Value of Assets recognizes adjustments resulting from an audit.

There is a six month lag between the valuation and the fiscal year. The 2017 valuation determines the County contribution due for the fiscal year ending June 30, 2018. Contributions made between the valuation date and the beginning of the next fiscal year (January 1, 2017 to June 30, 2017) have not been treated as assets in the current valuation.

C. Valuation Procedures

Generally, the plan provides a 100% survivor benefit to the spouse at the time of the retiree's death. This allows for post retirement marriages. We have valued the forms of payment originally coded in the data or based this on marital status at time of retirement (generally a 100% survivor benefit but not always). 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.

D. Actuarial Assumptions

The following assumptions were used in valuing the liabilities and benefits under the Plan for purposes of determining contributions and liabilities under GASB. These assumptions are used for all members eligible to receive benefits under the Fire Plan provisions.

Economic

Investment Return	7.5% compounded annually net of investment expenses (3.0% inflation and 4.5% real return) effective January 1, 2014.
Salary Increases	A graded schedule is used. See Earnings Progression Table.
Cost of Living Adjustment	Benefits accrued before Bill 88-96 are assumed to increase by 3.0% of the current benefit each year from retirement. Benefits accrued after Bill 88-96 are assumed to increase by 1.8% of current benefit each year from retirement.

Other

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. 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. Projection to the year of the valuation is assumed to be current experience. The generational projection beyond the valuation date is to account for future mortality improvements. See Table of Sample Rates.
Withdrawal	See Table of Sample Rates.
Disability	See Table of Sample Rates. 75% of disablement is assumed to be duty-related.
Administrative Expenses	The average of actual expenses for the two years preceding the valuation date, rounded to the nearest thousand.

Prudential Benefits Our calculations reflect that some benefits have already been purchased.

Retirement Rates *Sample Rates:*

	Age	<u>20</u>	<u>22</u>	<u>24</u>	<u>Service</u> <u>27</u>	<u>30</u>	<u>32</u>	<u>34</u>
For funding	40	5.00%	5.00%	20.00%	10.00%	40.00%	40.00%	100.00%
	45	5.00%	5.00%	20.00%	10.00%	40.00%	40.00%	100.00%
	50	10.00%	10.00%	28.00%	25.00%	40.00%	40.00%	100.00%
	55	25.00%	25.00%	25.00%	25.00%	40.00%	40.00%	100.00%
	59	33.00%	33.00%	33.00%	33.00%	40.00%	40.00%	100.00%
	62	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

	Age	<u>20</u>	<u>22</u>	<u>24</u>	<u>25+</u>
For GASB68 accounting	40	5.00%	5.00%	20.00%	100.00%
	45	5.00%	5.00%	20.00%	100.00%
	50	10.00%	10.00%	28.00%	100.00%
	55	25.00%	25.00%	25.00%	100.00%
	59	33.00%	33.00%	33.00%	100.00%
	62	100.00%	100.00%	100.00%	100.00%

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				
	Age	<u>23</u>	<u>27</u>	<u>Service</u> <u>30</u>	<u>35</u>
	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%

Percentage Married 80% of employees and 70% of current retirees and disabled are assumed married.

Age Difference Males are assumed to be four years older than their spouses.

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

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.

Age	Table of Sample Base Mortality Rates (2000)				Projection Scale	
	Healthy Mortality		Disabled Mortality		(Healthy and Disabled)	
	Males	Females	Males	Females	Males	Females
20	0.03%	0.02%	0.04%	0.02%	1.90%	1.60%
25	0.04	0.02	0.07	0.03	1.00	1.40
30	0.07	0.03	0.11	0.05	0.50	1.00
35	0.11	0.05	0.14	0.09	0.50	1.10
40	0.14	0.09	0.18	0.14	0.80	1.50
45	0.18	0.14	0.24	0.20	1.30	1.60
50	0.24	0.20	0.42	0.28	1.80	1.70
55	0.42	0.28	0.83	0.49	1.90	0.80
60	0.83	0.49	1.55	1.04	1.60	0.50
65	1.55	1.04	2.68	1.86	1.40	0.50

Attained Age	Table of Sample Decrement Rates	
	Percentage	
	Disability	Withdrawal
20	0.1836%	6.11%
25	0.1836	4.73
30	0.1836	2.87
35	0.2716	2.21
40	0.5604	1.69
45	0.9371	1.21
50	1.3790	0.00
55	0.0000	0.00
60	0.0000	0.00
65	0.0000	0.00

Earnings Progression	
Attained Age	Percentage 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

Anne Arundel County Retirement and Pension System
Fire Service Retirement Plan – Schedules of Member Valuation Data
December 31, 2016

Active Members

Valuation Date	Number	Annual Payroll (Jan. 1 Rate)	Average Annual Pay	% Increase in Average Pay
January 1, 2006	722 ¹	38,592,322	53,452	3.0%
January 1, 2007	811 ²	43,527,351	53,671	0.4%
January 1, 2008	770 ³	43,941,526	57,067	6.3%
January 1, 2009	845 ⁴	48,824,352	57,780	1.2%
January 1, 2010	820 ⁵	49,064,454	59,835	3.6%
January 1, 2011	792 ⁶	47,840,812	60,405	1.0%
January 1, 2012	752 ⁷	45,673,006	60,735	0.5%
January 1, 2013	713 ⁸	43,361,686	60,816	0.1%
January 1, 2014	754 ⁹	44,950,885	59,617	(2.0%)
January 1, 2015	780 ¹⁰	48,549,950	62,244	4.41%
January 1, 2016	832 ¹¹	49,181,953	59,113	(5.03%)
January 1, 2017	837 ¹²	50,412,257	60,230	1.89%

¹ Includes 106 members in DROP.

² Includes 93 members in DROP.

³ Includes 61 members in DROP.

⁴ Includes 36 members in DROP.

⁵ Includes 63 members in DROP.

⁶ Includes 103 members in DROP.

⁷ Includes 121 members in DROP.

⁸ Includes 127 members in DROP.

⁹ Includes 115 members in DROP.

¹⁰ Includes 87 members in DROP.

¹¹ Includes 59 members in DROP.

¹² Includes 45 members in DROP.

Members Receiving Benefits

Year	Number at Beginning of Year	Additions	Decreases	Number at End of Year
1/1/05 to 12/31/05	270	26	(3)	293
1/1/06 to 12/31/06	293	48	(9)	332
1/1/07 to 12/31/07	332	42	(10)	364
1/1/08 to 12/31/08	364	45	(4)	405
1/1/09 to 12/31/09	405	13	(4)	414
1/1/10 to 12/31/10	414	18	(5)	427
1/1/11 to 12/31/11	427	15	(3)	439
1/1/12 to 12/31/12	439	24	(4)	459
1/1/13 to 12/31/13	459	27	(5)	481
1/1/14 to 12/31/14	481	45	(9)	517
1/1/15 to 12/31/15	517	38	(5)	550
1/1/16 to 12/31/16	550	49	(8)	591

Summary of Retirees and Beneficiaries Added to and Removed from Rolls

Year Ending	Added to Rolls		Removed from Rolls		Rolls End of Year		% Increase in Average Annual Allowance	Average Annual Allowance
	Number	Annual Allowance ¹²	Number	Annual Allowance	Number	Annual Allowance		
12/31/2007	42	\$1,968,498	10	\$178,384	364	\$13,209,380	5.51%	\$36,290
12/31/2008	45	\$2,033,100	4	\$116,736	405	\$15,125,744	2.92%	\$37,348
12/31/2009	13	\$859,830	4	\$124,348	414	\$15,861,226	2.58%	\$38,312
12/31/2010	18	\$760,013	5	\$215,742	427	\$16,405,497	0.28%	\$38,420
12/31/2011	15	\$926,323	3	\$95,933	439	\$17,235,887	2.19%	\$39,262
12/31/2012	24	\$1,419,348	4	\$53,068	459	\$18,602,167	3.22%	\$40,528
12/31/2013	27	\$1,516,284	5	\$182,136	481	\$19,936,315	2.27%	\$41,448
12/31/2014	45	\$2,426,712	9	\$307,354	517	\$22,055,673	2.93%	\$42,661
12/31/2015	38	\$2,037,484	5	\$208,634	550	\$23,884,523	1.79%	\$43,426
12/31/2016	49	\$2,058,968	8	\$179,838	591	\$25,763,653	0.39%	\$43,593

¹² Includes COLA's

Compensation

For purposes of the pension plan, compensation is the regular annual rate of pay, exclusive of extra compensation of any kind such as overtime pay, bonuses and commissions.

Final Earnings

The average of the highest 3 years of all basic pays.

Eligibility Requirements

Full-time employees occupying the classes of work listed below and making contributions to the plan will be eligible to participate in the pension plan upon hire:

- Fire Fighter II
- Fire Fighter III
- Fire Fighter/Cardiac Rescue Technician
- Fire Fighter/Emergency Medical Technician Paramedic
- Fire Lieutenant
- Fire Captain
- Fire Battalion Chief
- Fire Division Chief
- Deputy Fire Chief
- Fire Chief, by election

Employee Contributions

7.25% of compensation for all participants.

Retirement Date

Normal Retirement

The first of the month coincident with or next following the participant's 50th birthday and 5 years of service or the completion of 20 years of service.

Postponed Retirement

A participant may work beyond his normal retirement date and may subsequently retire on the first of any month.

Retirement Benefits

Normal Retirement

2.5% of final earnings for each year of service up to 20 years plus 2.0% of final earnings per year of service in excess of 20 years (maximum 70% plus 2% times unused disability credit and pre-employment military service credit.)

Postponed Retirement	Same as normal retirement, but based on continued accrual past normal retirement date.
Normal Form of Payment	For single participants, monthly life annuity with payments guaranteed for 5 years. For married participants, unreduced 100% joint and survivor annuity with payments guaranteed for 5 years.
Disability	
Eligibility	Totally and permanently disabled (except as the result of activities specified in the Country code) regardless of length of service.
Duty-Related	The greater of the accrued benefit or 66-2/3% of final earnings, payable immediately, unreduced.
Non-Duty	The greater of the accrued benefit or 20% of final earnings, payable immediately, unreduced.
Termination of Employment	Return of employee contributions with 3.00% interest.
Death Benefits	
Married	Duty-Related: Greater of accrued benefit or 66-2/3% of final earnings. Non-duty Related: Accrued Benefit.
Unmarried	Return of employee contributions with 3.00% interest plus, if one or more years of service, a lump sum of 50% of final earnings..
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: • Base benefit multiplied by ratio of current 12 month average CPI to 12 month average CPI at retirement. • Prior-year benefit increased by 4%. Benefit payments can be reduced or increased. However, the amount can never be less than the initial benefit amount.
Cost of Living Increase (for benefits accrued after 1/31/97)	Retiree benefits are adjusted each year. The revised benefit amount is the lesser of: • Prior-year benefit multiplied by 60% of the increase in current March CPI from March CPI for prior year. • Prior-year benefit increased by 2.5%. Benefit payments can be reduced or increased. However, the amount can never be less than the initial benefit amount.
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 sixth year, but no interest shall be credited to the DROP account in the sixth year.

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 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 No. 88-96	Effective 12/4/96
	The previous method of calculating cost of living increase 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.
County Council Bill No. 80-00 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 (retroactive to 1/1/2001).
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	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 highest 3 of all basic pays.
County Council Bill No. 30-12	Effective 2/1/2013
	All participant 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 in the plan.

Solvency Test

2001 to 2017

Actuarial Valuation Date	Active Member Contribution (1) ¹	Retirees and Beneficiaries Inactive and Pay- Status Members (2)	Active Members Employer Financed Portion (3)	Actuarial Value of Assets	Portion of Actuarial Accrued Liabilities Covered by Assets		
					(1)	(2)	(3)
1/1/2001	18,423,733	80,220,043	165,988,380	225,133,219	100%	100%	76.2%
1/1/2002	17,271,015	89,282,049	174,533,657	241,162,428	100%	100%	77.1%
1/1/2003	17,874,473	100,771,355	177,832,409	256,190,269	100%	100%	77.3%
1/1/2004	18,501,046	114,331,831	169,067,357	286,763,188	100%	100%	91.0%
1/1/2005	19,654,724	126,074,578	181,130,954	313,478,279	100%	100%	92.6%
1/1/2006	20,610,737	139,896,281	195,279,378	340,274,675	100%	100%	92.1%
1/1/2007	16,552,044	163,245,791	203,896,433	368,413,752	100%	100%	92.5%
1/1/2008	18,136,682	199,472,219	196,206,186	395,884,441	100%	100%	90.9%
1/1/2009	20,084,128	222,938,946	193,497,784	390,551,359	100%	100%	76.2%
1/1/2010	19,643,430	231,194,224	204,438,155	418,191,046	100%	100%	81.9%
1/1/2011	18,426,718	231,165,590	214,897,299	425,830,155	100%	100%	82.0%
1/1/2012	18,980,755	241,688,369	225,426,623	426,196,539	100%	100%	73.4%
1/1/2013	20,011,772	259,809,098	230,649,782	426,659,036	100%	100%	63.7%
1/1/2014	21,692,514	278,481,205	241,904,214	462,235,880	100%	100%	67.0%
1/1/2015	24,732,788	311,351,876	231,670,080	490,533,983	100%	100%	66.7%
1/1/2016	27,679,531	335,464,387	211,631,903	503,389,792	100%	100%	66.3%
1/1/2017	29,579,980	358,058,086	202,630,706	516,044,681	100%	100%	63.4%

Analysis of Financial Experience

Reasons for Change in the Unfunded Accrued Liability

The unfunded accrued liability increased from \$71,386,029 to \$74,224,091. The increase is partly due to recognition of investment returns below the assumption of 7.5%. The funded status decreased from 87.6% to 87.4%.

Reasons for Change in Contribution Rates

The employer contribution rate increased from 29.1% for the fiscal year ending June 30, 2017 to 29.8% for the fiscal year ending June 30, 2018. The increase of 0.7% is due to the following reasons:

Investment Performance	1.3%
Pay Increases	0.5%
New Entrants/Change in Normal Cost	0.2%
COLA	-1.1%
Change in Expenses	0.0%
Demographics and Other Changes	-0.2%
Total	0.7%

¹ Does not include contribution balances for any participants currently in DROP

Net Pension Liability of the County

The components of the net pension liability of the County at December 31, 2016, were as follows:

Total pension liability	\$ 598,835,855
Plan fiduciary net position	<u>(485,690,368)</u>
County's net pension liability	<u>\$ 113,145,487</u>
Plan fiduciary net position as a percentage of the total pension liability	81.11%

Actuarial assumptions. The total pension liability was determined by an actuarial valuation as of December 31, 2016 using the following actuarial assumptions, applied to all periods included in the measurement:

Inflation	3.00%
Salary increases	Rates vary by participant age
Investment rate of return	7.50%, net of pension plan investment expense, including inflation
Mortality	RP-2000 Blue Collar Mortality tables with generational projection by Scale AA. A five-year set forward is used for post-disability mortality.

The above is a summary of key actuarial assumptions. Full descriptions of the actuarial assumptions are available in the January 1, 2016 actuarial valuation report.

Sensitivity of the net pension liability to changes in the discount rate

	<i>1% Decrease</i> <u>6.50%</u>	<i>Current</i> <i>Discount Rate</i> <u>7.50%</u>	<i>1% Increase</i> <u>8.50%</u>
County's net pension liability	\$ 191,411,040	\$ 113,145,487	\$ 49,186,382

Anne Arundel County Retirement and Pension System
Fire Service Retirement Plan – Actuarial Information
December 31, 2016

Changes in the Net Pension Liability

	Increase (Decrease)		
	Total Pension Liability	Plan Fiduciary Net Position	Net Pension Liability
	(a)	(b)	(a) - (b)
Balances at 12/31/15	\$ 580,859,883	\$ 468,239,078	\$ 112,620,805
Changes for the year:			
Service cost	11,101,997		11,101,997
Interest	42,294,425		42,294,425
Changes of benefit terms	-		-
Differences between expected and actual experience	(1,552,016)		(1,552,016)
Changes of assumptions	-		-
Contributions - employer		14,591,340	(14,591,340)
Contributions - member		3,257,340	(3,257,340)
Net investment income		33,898,934	(33,898,934)
Benefit payments, including refunds of member contributions	(33,868,434)	(33,868,434)	-
Administrative expense		(427,890)	427,890
Other		-	-
Net Changes	<u>17,975,972</u>	<u>17,451,290</u>	<u>524,682</u>
Balances at 12/31/16	<u>\$ 598,835,855</u>	<u>\$ 485,690,368</u>	<u>\$ 113,145,487</u>

Anne Arundel County Retirement and Pension System
Fire Service Retirement Plan – Actuarial Information
December 31, 2016

Changes in the County's Net Pension Liability and Related Ratios

Last 10 Fiscal Years

(Dollar amounts in thousands)

	2016	2015	2014	2013	2012	2011	2010	2009	2008	2007
Total pension liability										
Service cost	\$ 11,102	\$ 10,339	\$ 9,184							
Interest	42,294	41,924	38,949							
Changes of benefit terms	-	-	-							
Differences between expected and actual experience	(1,552)	(14,630)	3,679							
Changes of assumptions	-	-	18,028							
Benefit payments, including refunds of member contributions	(33,868)	(31,520)	(28,823)							
Net change in total pension liability	17,976	6,112	41,016							
Total pension liability - beginning	580,860	574,748	533,731							
Total pension liability - ending (a)	<u>\$ 598,836</u>	<u>\$ 580,860</u>	<u>\$ 574,748</u>							
Plan fiduciary net position										
Contributions - employer	\$ 14,591	\$ 15,122	\$ 15,899							
Contributions - member	3,257	3,050	2,778							
Net investment income	33,899	(7,744)	22,688							
Benefit payments, including refunds of member contributions	(33,868)	(31,520)	(28,823)							
Administrative expense	(428)	(436)	(423)							
Other	-	-	-							
Net change in plan fiduciary net position	\$ 17,451	\$ (21,528)	\$ 12,119							
Plan fiduciary net position - beginning	468,239	489,767	477,648							
Plan fiduciary net position - ending (b)	<u>\$ 485,690</u>	<u>\$ 468,239</u>	<u>\$ 489,767</u>							
County's net pension liability - ending (a)-(b)	<u>\$ 113,145</u>	<u>\$ 112,621</u>	<u>\$ 84,981</u>							
Plan fiduciary net position as a percentage of the total pension liability	81.11%	80.61%	85.21%							
Covered-employee payroll	\$ 46,228	\$ 43,838	\$ 40,476							
County's net pension liability as a percentage of covered-employee payroll	244.76%	256.90%	209.95%							
Expected average remaining service years of all participants	6	5	5							

Information for FY2013 and earlier is not available

Notes to Schedule:

Benefit changes: There are no benefit changes reflected in the current schedule.

Changes of assumptions: There are no assumption changes reflected in the current schedule.

Anne Arundel County Retirement and Pension System
Fire Service Retirement Plan – Actuarial Information
December 31, 2016

Schedule of County Contributions

Last 10 Fiscal Years

(Dollar amounts in thousands)

	<u>2016</u>	<u>2015</u>	<u>2014</u>	<u>2013</u>	<u>2012</u>	<u>2011</u>	<u>2010</u>	<u>2009</u>	<u>2008</u>	<u>2007</u>
Actuarially determined contribution	\$ 14,591	\$ 15,122	\$ 15,899							
Contributions in relation to the actuarially determined contribution	<u>14,591</u>	<u>15,122</u>	<u>15,899</u>	Information for FY2013 and earlier is not available						
Contribution deficiency (excess)	<u>\$ 0</u>	<u>\$ 0</u>	<u>\$ 0</u>							
Covered-employee payroll	\$ 46,228	\$ 43,838	\$ 40,476							
Contributions as a percentage of covered employee payroll	31.56%	34.49%	39.28%							

Notes to Schedule

Valuation date:

Actuarially determined contribution amounts are calculated as of each January 1 for the upcoming County fiscal year beginning July 1. Actuarial valuations are performed every year.

Methods and assumptions used to determine contribution rates:

Actuarial cost method	Projected Unit Credit
Amortization method	Level percent of payroll (closed), increasing 3.0% per year.
Remaining amortization period	Remaining Amortization periods range from 17 to 26 years.
Asset valuation method	5-year smoothed market
Inflation	3.00%
Salary increases	Rates vary by participant age
Investment rate of return	7.50%, net of pension plan investment expense, including inflation
Retirement age	Rates vary by participant age and service
Mortality	RP-2000 Blue Collar Mortality tables with generational projection by Scale AA. A five-year set forward is used for post-disability mortality.

Attachment D

Detention Officers' and Deputy Sheriffs' Retirement Plan

A. Method Used for Funding Purposes

This valuation was performed using the projected unit credit cost method. The contribution equals the sum of the normal cost and the amount necessary to amortize any actuarial gains/(losses) over closed periods. Effective January 1, 2014, new bases due to changes in actuarial assumptions or differences between actual and expected experience are amortized over closed periods of 20 years. New bases due to changes in plan benefits are amortized over the expected future working lifetime of affected employees. Amortization payments increase 3.0% per year.

B. Asset Valuation Method

The actuarial value of assets is determined by spreading the asset gain or loss over a 5-year period. The asset gain or loss is the amount by which the actual market value investment return differs from the expected market value asset return. The method was effective with the 1/1/2011 actuarial valuation. The Actuarial Value of Assets recognizes adjustments resulting from an audit.

There is a six-month lag between the valuation and the fiscal year. The 2017 valuation determines the County contribution due for the fiscal year ending June 30, 2018. Contributions made between the valuation date and the beginning of the next fiscal year (January 1, 2017 to June 30, 2017) have not been treated as assets in the current valuation.

C. Valuation Procedures

Active participants who terminate prior to age 40 are assumed to elect to receive a refund of employee contributions with interest. Employees who terminate at or after age 40 are assumed to receive their vested benefit at normal retirement date.

D. Actuarial Assumptions

The following assumptions were used in valuing the liabilities and benefits under the Plan for purposes of determining contributions and liabilities under GASB. These assumptions are used for all members eligible to receive benefits under the Detention Officers and Deputy Sheriffs' Retirement Plan provisions.

Economic

Investment Return 7.5% compounded annually net of investment expenses (3.0% inflation and 4.5% real return) effective January 1, 2014.

Salary Increases A graded schedule is used. See Earnings Progression Table.

Cost of Living Adjustment 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.

Other

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.
 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.

Projection to the year of the valuation is assumed to be current experience. The generational projection beyond the valuation date is to account for future mortality improvements. See Table of Sample Rates.

Withdrawal See Table of Sample Rates.

Disability See Table of Sample Rates. 75% of disablement is assumed to be duty-related.

Administrative
Expenses

The average of actual expenses for the two years preceding the valuation date, rounded to the nearest thousand.

Retirement Rates

For Funding
(Category I)

Age	Annual Rate		
	Years of Service		
	<u>Less than 20</u>	<u>20 or more but less than 30</u>	<u>30 or more</u>
40-49	0%	12%	N/A
50	10%	30%	100%
51-54	5%	30%	100%
55-59	20%	30%	100%
60	100%	100%	100%

(Category II)

Age	Annual Rate			
	Years of Service			
	<u>Less than 20</u>	<u>20</u>	<u>21-29</u>	<u>30 or more</u>
<50	N/A	5%	2%	100%
50	10%	30%	30%	100%
51-59	10%	15%	15%	100%
60-64	10%	20%	20%	100%
>64	100%	100%	100%	100%

For GASB 68 accounting
(Category I)

Age	Annual Rate		
	Years of Service		
	<u>Less than 20</u>	<u>20 or more but less than 23</u>	<u>23 or more</u>
40-49	0%	12%	N/A
50	10%	30%	100%
51-54	5%	30%	100%
55-59	20%	30%	100%
60	100%	100%	100%

(Category II)

Age	Annual Rate			
	Years of Service			
	<u>Less than 20</u>	<u>20</u>	<u>21-29</u>	<u>30 or more</u>
<50	N/A	5%	2%	100%
50	10%	30%	30%	100%
51-59	10%	15%	15%	100%
60-64	10%	20%	20%	100%
>64	100%	100%	100%	100%

DROP load

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

Age	Sample Load Rates			
	Service			
	<u>23</u>	<u>27</u>	<u>30</u>	<u>35</u>
44	0.40%	1.20%	2.10%	13.70%
50	2.70%	4.40%	5.30%	17.20%
55	4.10%	6.20%	7.10%	19.20%
60	5.90%	8.50%	9.40%	21.90%

Percentage Married	Males – 80%; Females – 80%
Age Difference	Males are assumed to be four years older than their spouses.
Military Service	Active liabilities (which depend on credited service) are loaded by 3.25% to account for future crediting of military service.
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. In addition, it is assumed that participants with 30 or more years of service will have credit for 1 year of combined Disability Leave and Military Service.

Age	Table of Sample Base Mortality Rates (2000)				Projection Scale (Healthy and Disabled)	
	Healthy Mortality		Disabled Mortality		Males	Females
	Males	Females	Males	Females		
20	0.03%	0.02%	0.04%	0.02%	1.90%	1.60%
25	0.04	0.02	0.07	0.03	1.00	1.40
30	0.07	0.03	0.11	0.05	0.50	1.00
35	0.11	0.05	0.14	0.09	0.50	1.10
40	0.14	0.09	0.18	0.14	0.80	1.50
45	0.18	0.14	0.24	0.20	1.30	1.60
50	0.24	0.20	0.42	0.28	1.80	1.70
55	0.42	0.28	0.83	0.49	1.90	0.80
60	0.83	0.49	1.55	1.04	1.60	0.50
65	1.55	1.04	2.68	1.86	1.40	0.50

Attained Age	Table of Sample Disability Rates
	Percentage
20	0.245%
25	0.245%
30	0.245%
35	0.362%
40	0.747%
45	1.250%
50	1.839%
55	0.000%
60	0.000%
64	0.000%

Attained Age	Table of Sample Withdrawal Rates			
	Less Than 10 Years of Service		10 or more Years of Service	
	Male Percentage	Female Percentage	Male Percentage	Female Percentage
20	12.38%	18.75%	8.67%	13.13%
25	8.98%	14.06%	6.29%	9.84%
30	6.81%	11.25%	4.77%	7.88%
35	4.95%	8.44%	3.47%	5.91%
40	3.41%	6.19%	2.39%	4.33%
45	1.86%	3.94%	1.30%	2.76%
50	0.00%	0.00%	0.00%	0.00%

Earnings Progression	
Attained Age	Percentage Increase at Attained Age
20	6.00%
25	6.00
30	5.50
35	5.25
40	4.75
45	4.25
50	4.25

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 December 31, 2016

Active Members

Valuation Date	Number	Annual Payroll (Jan. 1 Rate)	Average Annual Pay	% Increase in Average Pay
January 1, 2002	368	13,565,333	36,862	7.6%
January 1, 2003	371	14,690,339	39,597	7.4%
January 1, 2004	365	15,396,301	42,182	6.5%
January 1, 2005	347	15,355,590	44,252	4.9%
January 1, 2006	365	16,794,068	46,011	4.0%
January 1, 2007	359	17,367,873	48,378	5.1%
January 1, 2008	357	18,122,458	50,763	4.9%
January 1, 2009	373	19,785,653	53,045	4.5%
January 1, 2010	374	20,203,895	54,021	1.8%
January 1, 2011	354	19,310,216	54,549	1.0%
January 1, 2012	347	18,760,664	54,065	(0.9%)
January 1, 2013	338	17,896,574	52,948	(2.1%)
January 1, 2014	342	18,132,868	53,020	0.1%
January 1, 2015	345	19,775,644	57,321	8.1%
January 1, 2016	350 ¹	19,974,632	57,070	(0.4%)
January 1, 2017	358 ²	21,000,562	58,661	2.79%

¹ Includes 8 members in DROP.

² Includes 15 members in DROP.

Members With Deferred Benefits

Year	Number at Beginning of Year	Additions	Decreases	Number at End of Year
1/1/00 to 12/31/00	4	5	(1)	8
1/1/01 to 12/31/01	8	3	0	11
1/1/02 to 12/31/02	11	4	(9)	6
1/1/03 to 12/31/03	6	3	(1)	8
1/1/04 to 12/31/04	8	3	0	11
1/1/05 to 12/31/05	11	3	(1)	13
1/1/06 to 12/31/06	13	3	(1)	15
1/1/07 to 12/31/07	15	1	0	16
1/1/08 to 12/31/08	16	2	(2)	16
1/1/09 to 12/31/09	16	1	(2)	15
1/1/10 to 12/31/10	15	0	(3)	12
1/1/11 to 12/31/11	12	0	(3)	9
1/1/12 to 12/31/12	9	3	0	12
1/1/13 to 12/31/13	12	0	(3)	9
1/1/14 to 12/31/14	9	0	(1)	8
1/1/15 to 12/31/15	8	0	0	8
1/1/16 to 12/31/16	8	1	(2)	7

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Members Receiving Benefits

Year	Number at Beginning of Year	Additions	Decreases	Number at End of Year
1/1/99 to 12/31/99	29	4	1	33
1/1/00 to 12/31/00	33	12	(2)	43
1/1/01 to 12/31/01	43	6	0	49
1/1/02 to 12/31/02	49	6	(1)	54
1/1/03 to 12/31/03	54	10	0	64
1/1/04 to 12/31/04	64	17	0	81
1/1/05 to 12/31/05	81	13	(2)	92
1/1/06 to 12/31/06	92	14	0	106
1/1/07 to 12/31/07	106	13	0	119
1/1/08 to 12/31/08	119	16	(2)	133
1/1/09 to 12/31/09	133	14	(1)	146
1/1/10 to 12/31/10	146	19	(1)	164
1/1/11 to 12/31/11	164	16	(1)	179
1/1/12 to 12/31/12	179	22	(4)	197
1/1/13 to 12/31/13	197	14	(3)	208
1/1/14 to 12/31/14	208	18	(3)	223
1/1/15 to 12/31/15	223	19	(3)	239
1/1/16 to 12/31/16	239	15	(4)	250

Summary of Retirees and Beneficiaries Added to and Removed from Rolls

Year Ending	Added to Rolls		Removed from Rolls		Rolls End of Year		% Increase in Average Annual Allowance	Average Annual Allowance
	Number	Annual Allowance ²	Number	Annual Allowance	Number	Annual Allowance		
12/31/2007	13	\$426,794	0	\$0	119	\$2,789,664	5.17%	\$23,443
12/31/2008	16	\$441,233	2	\$32,949	133	\$3,197,948	2.57%	\$24,045
12/31/2009	14	\$358,390	1	\$9,828	146	\$3,546,510	1.02%	\$24,291
12/31/2010	19	\$502,095	1	\$9,390	164	\$4,039,215	1.39%	\$24,629
12/31/2011	16	\$458,651	1	\$17,061	179	\$4,480,805	1.64%	\$25,032
12/31/2012	22	\$701,667	4	\$72,326	197	\$5,110,146	3.63%	\$25,940
12/31/2013	14	\$378,114	3	\$47,509	208	\$5,440,751	0.84%	\$26,157
12/31/2014	18	\$416,562	3	\$46,299	223	\$5,811,014	(0.38%)	\$26,058
12/31/2015	19	\$487,445	3	\$99,378	239	\$6,199,081	(0.46%)	\$25,938
12/31/2016	15	\$332,225	4	\$52,161	250	\$6,479,145	(0.08%)	\$25,917

² Includes COLA's

Compensation For purposes of the pension plan, compensation is the regular annual rate of pay, exclusive of extra compensation of any kind such as overtime pay, bonuses and commissions.

Final Earnings The average of the highest 3 years of all basic pays.

Eligibility Requirements Permanent employees who work at least 50% of the time specified for their position. They are either Category I or Category II

- | | |
|-------------|--|
| Category I | <ul style="list-style-type: none"> • Detention Officer • Detention Corporal • Detention Sergeant • Detention Lieutenant • Detention Captain • Deputy Sheriff I, II, III, and IV |
| Category II | <ul style="list-style-type: none"> • Correctional Program Specialist I and II • Criminal Justice Program Supervisor • Correctional Facility Administrator • Assistant Correctional Facility Administrator • Superintendent of Detention Facilities, by election |

Employee Contributions 6.75% of compensation for Detention Officer, Detention Corporal or Detention Sergeant. 5% of compensation for all others.

Retirement Date

Normal Retirement Category I: The first of the month coincident with or next following the participant's 50th birthday and five years of service or 20 years of service whichever comes first.
 Category II: The first of the month coincident with or next following the participant's 50th birthday and five years of service.

Early Retirement Reduced benefits are available the first of any month coincident with or next following the completion of 20 years of continuous service for Category II.

Postponed Retirement A participant may work beyond his normal retirement date and may subsequently retire on the first of any month.

Retirement Benefits

Normal Retirement 2.5% of final earnings for each year of service up to 20 years plus 2.0% of final earnings per year of service in excess of 20 years (maximum 70% plus 2% times unused disability credit and pre-employment military service credit)

Early Retirement Same as normal retirement but reduced for early commencement.

Postponed Retirement Same as normal retirement, but based on continued accrual past normal retirement date.

Normal Form of Payment Monthly life annuity with payments guaranteed for 5 years.

Disability

Eligibility Totally and permanently disabled (except as the result of activities specified in the County code) regardless of length of service.

Duty-Related	The greater of the accrued benefit or 66-2/3% of final earnings, payable immediately, unreduced.
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Non-Duty	The greater of the accrued benefit or 20% of final earnings, payable immediately, unreduced.
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Termination of Employment

Less than 5 years of service	Return of employee contributions with 4.25% interest.
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5 years of service or more	At the discretion of the employee, either a return of contributions with interest or the accrued normal retirement taking into account final earnings and service at date of termination, payable at normal retirement date.
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Death Benefits

Married and eligible for retirement	Duty-Related: Greater of accrued benefit or 66-2/3% of final earnings. Non-duty Related: Accrued Benefit.
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Unmarried or not eligible for retirement	Return of employee contributions with 4.25% interest plus a lump sum equal to 50% of annual pay.
--	--

Cost of Living Increase
 (simple, for benefits accrued as of 1/31/97)

Retiree benefits are adjusted each year. The revised benefit amount is the lesser of:

- Prior-year benefit plus base benefit multiplied by increase in current CPI from CPI for prior year.
- Benefit increased by 4% of original benefit.

Cost of Living Increase
 (compound, for benefits accrued after 1/31/97)

Retiree benefits are adjusted each year. The revised benefit amount is the lesser of:

- Prior-year benefit multiplied by 60% of the increase in current March CPI from March CPI for prior year.
- Prior-year Benefit increased by 2.5%.

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 sixth year, but no interest shall be credited to the DROP account in the sixth year

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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 90-93	Effective 12/22/93
	Plan participants are required to pay the full actuarial value for service purchases. Purchases can only be made at retirement. To be eligible, an employee must have 60 months of County service. Existing plan participants must be notified of their right to purchase service under existing law.
County Council Bill No. 94-93	Effective 11/19/93
	All current and future employees shall be 100% vested after 5 years of Credited service.
County Council Bill No. 88-96	Effective 12/4/96
	The previous method of calculating cost of living increase 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.
County Council Bill No. 41-99	Effective 6/15/99
	Employees paid under the deputy sheriff employees pay schedule become members of the Detention Center Plan effective as of January 1, 1999. Service credited under the Employees' Plan will count as credited service in the Detention Center plan and no future benefit will be paid from the Employees' Plan. Assets are transferred from the Employees' Plan to the Detention Center Plan in an amount equal to the projected unit credit accrued liability in the Employees' Plan.
Recodification	Effective 2/25/2002
	Allows a benefit based on disability leave service and pre-plan military service to be credited over the 70% cap. Elimination of Tier Two benefits. Changed early retirement factors. Added a death benefit.
County Council Bill No. 32-04	Effective 7/1/2004
	Allows retirement after 20 years of service for "Category I" participants. Changes vesting for new hires from 5 years to 20 years. Provides for employees contributions to be made on a pre-tax ("pick up") basis.
County Council Bill No. 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 D3 and S2 members, FY2010 annual pay shall be determined by increasing FY2009 annual pay by an assumed 4% for determining the final average basic pay.
County Council Bill No. 78-09	Effective 11/16/2009
	For D1 and D2 members, FY2010 annual pay shall be determined by increasing FY2009 annual pay by an assumed 4% for determining the final average basic pay.
County Council Bill No. 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
	Increased the contribution rate for Detention Officers, Detention Corporals and Detention Sergeants to 6.75%. Added a "pop-up" option.
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 highest 3 of all basic pays.

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County Council Bill No. 30-12	Effective 2/1/2013
	A participant in the classification of Detention Officer, Detention Corporal, or Detention Sergeant shall contribute 6.75% of his or her annual basic pay in each calendar year or portion of a calendar year while an active participant in the plan.
County Council Bill No. 50-15	Effective 7/23/2015
	Implemented a Deferred Retirement Option Program (DROP), a voluntary program that provides an alternative way to earn and receive retirement benefits
County Council Bill No. 97-13	Effective 4/14/2014
	Category II members of the Detention and Deputy Sheriffs' Plan hired on or after July 1, 2015 will be subject to 10 year vesting and 10 year normal retirement provisions. The 10 year requirement also affects the ability to purchase service or get credit for pre-plan military service.

Anne Arundel County Retirement and Pension System
 Detention Officers' and Deputy Sheriffs' Retirement Plan – Solvency Information
 December 31, 2016

Solvency Test

2001 to 2017

Actuarial Valuation Date	Active Member Contribution (1) ¹	Retirees and Beneficiaries Inactive and Pay- Status Members (2)	Active Members Employer Financed Portion (3)	Actuarial Value of Assets	Portion of Actuarial Accrued Liabilities Covered by Assets		
					(1)	(2)	(3)
1/1/2001	4,015,794	11,751,069	21,011,053	31,116,751	100%	100%	73.1%
1/1/2002	4,882,365	13,089,569	22,481,827	34,742,230	100%	100%	74.6%
1/1/2003	5,105,832	14,383,130	27,646,526	38,889,689	100%	100%	70.2%
1/1/2004	5,744,543	17,546,625	29,593,370	45,710,154	100%	100%	75.8%
1/1/2005	6,117,371	22,450,982	31,704,400	52,200,204	100%	100%	74.5%
1/1/2006	6,595,639	26,899,045	35,598,042	58,379,332	100%	100%	69.9%
1/1/2007	7,106,372	30,095,327	38,744,537	66,233,757	100%	100%	74.9%
1/1/2008	7,597,158	38,734,008	42,464,385	74,355,736	100%	100%	66.0%
1/1/2009	8,270,983	43,352,591	46,861,578	76,525,847	100%	100%	53.1%
1/1/2010	9,015,467	48,652,402	53,609,828	84,490,610	100%	100%	50.0%
1/1/2011	9,835,267	54,507,031	55,424,905	87,911,133	100%	100%	42.5%
1/1/2012	10,727,312	59,538,436	55,721,536	90,334,022	100%	100%	36.0%
1/1/2013	10,907,008	68,999,860	53,771,217	92,617,788	100%	100%	23.6%
1/1/2014	11,270,515	73,758,850	58,666,981	102,136,092	100%	100%	29.2%
1/1/2015	12,626,207	78,123,913	64,234,148	112,017,103	100%	100%	33.1%
1/1/2016	12,720,040	82,685,631	68,009,223	119,275,911	100%	100%	35.1%
1/1/2017	13,431,665	84,771,888	73,488,955	127,553,081	100%	100%	39.9%

Analysis of Financial Experience

Reasons for Change in the Unfunded Accrued Liability

The unfunded accrued liability increased from \$44,138,983 to \$44,139,427. The funded status increased from 73.0% to 74.3%.

Reasons for Change in Contribution Rates

The employer contribution rate decreased from 34.3% for the fiscal year ending June 30, 2017 to 34.0% for the fiscal year ending June 30, 2018. The decrease of 0.3% is due to the following reasons:

Investment Performance	0.8%
Pay Increases	-0.4%
New Entrants/ Change in Normal Cost	0.1%
COLA	-0.4%
Change in Expenses	0.0%
Demoraghtics and Other Changes	-0.4%
Total	-0.3%

¹ Does not include contribution balances for any participants currently in DROP

Net Pension Liability of the County

The components of the net pension liability of the County at December 31, 2016, were as follows:

Total pension liability	\$ 175,568,918
Plan fiduciary net position	(120,339,036)
County's net pension liability	<u>\$ 55,229,882</u>
Plan fiduciary net position as a percentage of the total pension liability	68.54%

Actuarial assumptions. The total pension liability was determined by an actuarial valuation as of December 31, 2016 using the following actuarial assumptions, applied to all periods included in the measurement:

Inflation	3.00%
Salary increases	Rates vary by participant age
Investment rate of return	7.50%, net of pension plan investment expense, including inflation
Mortality	RP-2000 Blue Collar Mortality tables with generational projection by Scale AA. A five-year set forward is used for post-disability mortality.

The above is a summary of key actuarial assumptions. Full descriptions of the actuarial assumptions are available in the January 1, 2016 actuarial valuation report.

Sensitivity of the net pension liability to changes in the discount rate

	<i>1% Decrease</i> <u>6.50%</u>	<i>Current</i> <i>Discount Rate</i> <u>7.50%</u>	<i>1% Increase</i> <u>8.50%</u>
County's net pension liability	\$ 76,490,920	\$ 55,229,882	\$ 37,584,556

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Changes in the Net Pension Liability

	Increase (Decrease)		
	Total Pension Liability	Plan Fiduciary Net Position	Net Pension Liability
	(a)	(b)	(a) - (b)
Balances at 12/31/15	\$ 166,990,286	\$ 110,759,983	\$ 56,230,303
Changes for the year:			
Service cost	4,461,197		4,461,197
Interest	12,281,070		12,281,070
Changes of benefit terms	-		-
Differences between expected and actual experience	(1,678,263)		(1,678,263)
Changes of assumptions	-		-
Contributions - employer		6,688,662	(6,688,662)
Contributions - member		1,315,989	(1,315,989)
Net investment income		8,159,309	(8,159,309)
Benefit payments, including refunds of member contributions	(6,485,372)	(6,485,372)	-
Administrative expense		(99,535)	99,535
Other		-	-
Net Changes	<u>8,578,632</u>	<u>9,579,053</u>	<u>(1,000,421)</u>
Balances at 12/31/16	<u>\$ 175,568,918</u>	<u>\$ 120,339,036</u>	<u>\$ 55,229,882</u>

Anne Arundel County Retirement and Pension System
 Detention Officers' and Deputy Sheriffs' Retirement Plan – Actuarial Information
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Changes in the County's Net Pension Liability and Related Ratios

Last 10 Fiscal Years

(Dollar amounts in thousands)

	2016	2015	2014	2013	2012	2011	2010	2009	2008	2007
Total pension liability										
Service cost	\$ 4,461	\$ 4,634	\$ 4,602							
Interest	12,281	11,401	10,301							
Changes of benefit terms	-	4,635	-							
Differences between expected and actual experience	(1,678)	(2,558)	2,322							
Changes of assumptions	-	-	3,494							
Benefit payments, including refunds of member contributions	(6,485)	(6,279)	(5,819)							
Net change in total pension liability	8,579	11,834	14,900							
Total pension liability - beginning	166,990	155,156	140,256							
Total pension liability - ending (a)	<u>\$ 175,569</u>	<u>\$ 166,990</u>	<u>\$ 155,156</u>							
Plan fiduciary net position										
Contributions - employer	\$ 6,689	\$ 6,371	\$ 6,111							
Contributions - member	1,316	1,317	1,298							
Net investment income	8,159	(1,919)	4,944							
Benefit payments, including refunds of member contributions	(6,485)	(6,279)	(5,819)							
Administrative expense	(100)	(98)	(96)							
Other	-	-	-							
Net change in plan fiduciary net position	\$ 9,579	\$ (608)	\$ 6,438							
Plan fiduciary net position - beginning	110,760	111,368	104,930							
Plan fiduciary net position - ending (b)	<u>\$ 120,339</u>	<u>\$ 110,760</u>	<u>\$ 111,368</u>							
County's net pension liability - ending (a)-(b)	<u>\$ 55,230</u>	<u>\$ 56,230</u>	<u>\$ 43,788</u>							
Plan fiduciary net position as a percentage of the total pension liability	68.54%	66.33%	71.78%							
Covered-employee payroll	\$ 19,801	\$ 19,386	\$ 19,776							
County's net pension liability as a percentage of covered-employee payroll	278.92%	290.05%	221.43%							
Expected average remaining service years of all participants	3	4	4							

Notes to Schedule:

Benefit changes: There are no benefit changes reflected in the current schedule.

Changes of assumptions: There are no assumption changes reflected in the current schedule.

Anne Arundel County Retirement and Pension System
 Detention Officers' and Deputy Sheriffs' Retirement Plan – Actuarial Information
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(Dollar amounts in thousands)

	<u>2016</u>	<u>2015</u>	<u>2014</u>	<u>2013</u>	<u>2012</u>	<u>2011</u>	<u>2010</u>	<u>2009</u>	<u>2008</u>	<u>2007</u>
Actuarially determined contribution	\$ 6,689	\$ 6,371	\$ 6,111							
Contributions in relation to the actuarially determined contribution	<u>6,689</u>	<u>6,371</u>	<u>6,111</u>							
Contribution deficiency (excess)	<u>\$ -</u>	<u>\$ -</u>	<u>\$ -</u>							
Covered-employee payroll	\$ 19,801	\$ 19,386	\$ 19,776							
Contributions as a percentage of covered employee payroll	33.78%	32.86%	30.90%							

Information for FY2013 and earlier is not available

Notes to Schedule

Valuation date:

Actuarially determined contribution amounts are calculated as of each January 1 for the upcoming County fiscal year beginning July 1. Actuarial valuations are performed every year.

Methods and assumptions used to determine contribution rates:

Actuarial cost method	Projected Unit Credit
Amortization method	Level percent of payroll (closed), increasing 3.0% per year.
Remaining amortization period	Remaining Amortization periods range from 6 to 26 years.
Asset valuation method	5-year smoothed market
Inflation	3.00%
Salary increases	Rates vary by participant age
Investment rate of return	7.50%, net of pension plan investment expense, including inflation
Retirement age	Rates vary by participant age and service
Mortality	RP-2000 Blue Collar Mortality tables with generational projection by Scale AA. A five-year set forward is used for post-disability mortality.

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Statistical Section

Anne Arundel County Retirement and Pension System

Statement of Changes in Plan Net Position - Employees' Retirement Plan

For the Last Ten Years Ended December 31

	<u>2007</u>	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>	<u>2013</u>	<u>2014</u>	<u>2015</u>	<u>2016</u>
ADDITIONS										
Contributions:										
Employer	\$ 11,778,948	\$ 12,906,750	\$ 15,246,252	\$ 17,284,080	\$ 18,186,402	\$ 19,823,814	\$ 22,361,658	\$ 24,451,074	\$ 25,629,927	\$ 25,809,828
Participant	<u>4,412,061</u>	<u>4,630,624</u>	<u>5,085,885</u>	<u>4,556,815</u>	<u>4,562,145</u>	<u>4,416,529</u>	<u>4,452,981</u>	<u>4,662,147</u>	<u>4,846,856</u>	<u>5,181,705</u>
Total contributions	16,191,009	17,537,374	20,332,137	21,840,895	22,748,547	24,240,343	26,814,639	29,113,221	30,476,783	30,991,533
 Total investment income (loss)	<u>52,269,375</u>	<u>(159,154,283)</u>	<u>62,603,110</u>	<u>61,439,541</u>	<u>9,825,346</u>	<u>63,100,607</u>	<u>52,230,456</u>	<u>28,221,576</u>	<u>(8,460,297)</u>	<u>40,737,517</u>
Total Additions	<u>68,460,384</u>	<u>(141,616,909)</u>	<u>82,935,247</u>	<u>83,280,436</u>	<u>32,573,893</u>	<u>87,340,950</u>	<u>79,045,095</u>	<u>57,334,797</u>	<u>22,016,486</u>	<u>71,729,050</u>
DEDUCTIONS										
Benefit payments and refunds	22,800,104	25,276,047	27,267,923	29,520,937	31,480,607	34,375,282	36,727,715	39,008,750	41,260,300	44,007,025
Administrative expenses	<u>531,801</u>	<u>426,611</u>	<u>487,143</u>	<u>504,442</u>	<u>481,210</u>	<u>546,061</u>	<u>757,210</u>	<u>502,007</u>	<u>505,852</u>	<u>459,455</u>
Total deductions	<u>23,331,905</u>	<u>25,702,658</u>	<u>27,755,066</u>	<u>30,025,379</u>	<u>31,961,817</u>	<u>34,921,343</u>	<u>37,484,925</u>	<u>39,510,757</u>	<u>41,766,152</u>	<u>44,466,480</u>
Net increases (decreases)	45,128,479	(167,319,568)	55,180,181	53,255,057	612,076	52,419,607	41,560,170	17,824,040	(19,749,666)	27,262,570
Net position, January 1	485,598,675	530,727,154	363,407,586	418,587,767	471,842,824	472,454,900	524,874,507	566,434,677	584,258,717	564,509,051
Transfers	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>
Net position, December 31	<u>\$ 530,727,154</u>	<u>\$ 363,407,586</u>	<u>\$ 418,587,767</u>	<u>\$ 471,842,824</u>	<u>\$ 472,454,900</u>	<u>\$ 524,874,507</u>	<u>\$ 566,434,677</u>	<u>\$ 584,258,717</u>	<u>\$ 564,509,051</u>	<u>\$ 591,771,621</u>

Anne Arundel County Retirement and Pension System

Statement of Changes in Plan Net Position - Police Service Retirement Plan

For the Last Ten Years Ended December 31

	<u>2007</u>	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>	<u>2013</u>	<u>2014</u>	<u>2015</u>	<u>2016</u>
ADDITIONS										
Contributions:										
Employer	\$ 9,997,308	\$ 10,522,656	\$ 12,428,136	\$ 14,055,660	\$ 13,793,256	\$ 15,530,322	\$ 17,745,906	\$ 18,869,736	\$ 19,559,952	\$ 20,410,896
Participant	2,005,960	1,910,671	2,024,825	2,297,386	2,637,833	2,553,740	2,679,723	2,949,789	3,104,338	3,158,451
Total contributions	12,003,268	12,433,327	14,452,961	16,353,046	16,431,089	18,084,062	20,425,629	21,819,525	22,664,290	23,569,347
Total investment income (loss)	42,938,230	(136,630,639)	50,713,568	49,685,037	6,731,539	50,828,258	41,763,446	22,133,732	(7,936,443)	33,000,617
Total Additions	54,941,498	(124,197,312)	65,166,529	66,038,083	23,162,628	68,912,320	62,189,075	43,953,257	14,727,847	56,569,964
DEDUCTIONS										
Benefit payments and refunds	21,008,831	23,872,491	22,214,203	21,449,672	23,479,998	28,241,364	26,936,388	29,507,128	31,131,759	33,356,257
Administrative expenses	443,634	358,812	406,518	410,184	391,458	444,328	615,138	406,090	427,109	389,320
Total deductions	21,452,465	24,231,303	22,620,721	21,859,856	23,871,456	28,685,692	27,551,526	29,913,218	31,558,868	33,745,577
Net increases (decreases)	33,489,032	(148,428,615)	42,545,808	44,178,227	(708,828)	40,226,628	34,637,549	14,040,039	(16,831,021)	22,824,387
Net position, January 1	420,415,398	453,904,430	305,475,815	348,021,623	392,199,850	391,491,022	431,717,650	466,355,199	480,395,238	463,564,217
Transfers	-	-	-	-	-	-	-	-	-	-
Net position, December 31	<u>\$ 453,904,430</u>	<u>\$ 305,475,815</u>	<u>\$ 348,021,623</u>	<u>\$ 392,199,850</u>	<u>\$ 391,491,022</u>	<u>\$ 431,717,650</u>	<u>\$ 466,355,199</u>	<u>480,395,238</u>	<u>\$ 463,564,217</u>	<u>\$ 486,388,604</u>

Anne Arundel County Retirement and Pension System

Statement of Changes in Plan Net Position - Fire Service Retirement Plan

For the Last Ten Years Ended December 31

	<u>2007</u>	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>	<u>2013</u>	<u>2014</u>	<u>2015</u>	<u>2016</u>
ADDITIONS										
Contributions:										
Employer	\$ 10,959,888	\$ 11,189,712	\$ 12,701,160	\$ 14,648,580	\$ 13,959,852	\$ 15,238,104	\$ 16,152,402	\$ 15,898,956	\$ 15,121,806	\$ 14,591,340
Participant	<u>1,889,083</u>	<u>2,033,588</u>	<u>2,346,754</u>	<u>2,494,043</u>	<u>2,659,114</u>	<u>2,453,627</u>	<u>2,432,737</u>	<u>2,778,355</u>	<u>3,050,456</u>	<u>3,257,340</u>
Total contributions	12,848,971	13,223,300	15,047,914	17,142,623	16,618,966	17,691,731	18,585,139	18,677,311	18,172,262	17,848,680
 Total investment income (loss)	<u>41,080,254</u>	<u>(127,885,708)</u>	<u>49,183,327</u>	<u>48,957,240</u>	<u>7,013,578</u>	<u>51,522,774</u>	<u>43,133,618</u>	<u>23,014,967</u>	<u>(7,794,949)</u>	<u>33,397,135</u>
Total Additions	<u>53,929,225</u>	<u>(114,662,408)</u>	<u>64,231,241</u>	<u>66,099,863</u>	<u>23,632,544</u>	<u>69,214,505</u>	<u>61,718,757</u>	<u>41,692,278</u>	<u>10,377,313</u>	<u>51,245,815</u>
DEDUCTIONS										
Benefit payments and refunds	19,299,469	21,339,616	17,785,497	17,432,953	18,091,220	19,520,674	21,870,063	28,842,723	31,492,994	33,888,976
Administrative expenses	<u>415,672</u>	<u>330,485</u>	<u>379,081</u>	<u>398,463</u>	<u>388,157</u>	<u>444,256</u>	<u>633,476</u>	<u>409,916</u>	<u>438,008</u>	<u>401,289</u>
Total deductions	<u>19,715,141</u>	<u>21,670,101</u>	<u>18,164,578</u>	<u>17,831,416</u>	<u>18,479,377</u>	<u>19,964,930</u>	<u>22,503,539</u>	<u>29,252,639</u>	<u>31,931,002</u>	<u>34,290,265</u>
Net increases (decreases)	34,214,085	(136,332,509)	46,066,663	48,268,447	5,153,167	49,249,575	39,215,218	12,439,639	(21,553,689)	16,955,550
Net position, January 1	391,793,304	426,007,390	289,674,881	335,741,544	384,009,991	389,163,158	438,412,733	477,627,951	490,067,590	468,513,901
Transfers	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>
Net position, December 31	\$ <u>426,007,389</u>	\$ <u>289,674,881</u>	\$ <u>335,741,544</u>	\$ <u>384,009,991</u>	\$ <u>389,163,158</u>	\$ <u>438,412,733</u>	\$ <u>477,627,951</u>	\$ <u>490,067,590</u>	\$ <u>468,513,901</u>	\$ <u>485,469,451</u>

Anne Arundel County Retirement and Pension System

Statement of Changes in Plan Net Position - Detention Officers' and Deputy Sheriffs' Retirement Plan

For the Last Ten Years Ended December 31

	<u>2007</u>	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>	<u>2013</u>	<u>2014</u>	<u>2015</u>	<u>2016</u>
ADDITIONS										
Contributions:										
Employer	\$ 3,600,894	\$ 3,788,256	\$ 4,348,914	\$ 4,907,130	\$ 4,876,332	\$ 5,141,280	\$ 5,600,178	\$ 6,110,988	\$ 6,370,758	\$ 6,688,662
Participant	881,978	950,675	1,029,277	1,084,820	1,175,133	1,120,848	1,195,439	1,297,641	1,317,143	1,315,988
Total contributions	4,482,872	4,738,931	5,378,191	5,991,950	6,051,465	6,262,128	6,795,617	7,408,629	7,687,901	8,004,650
Total investment income (loss)	7,292,557	(24,343,278)	9,672,565	9,901,091	1,330,029	10,887,141	9,305,671	5,017,294	(1,931,936)	8,037,893
Total Additions	11,775,429	(19,604,347)	15,050,756	15,893,041	7,381,494	17,149,269	16,101,288	12,425,923	5,755,965	16,042,543
DEDUCTIONS										
Benefit payments and refunds	2,644,842	3,101,950	3,525,414	3,837,564	4,207,935	5,018,268	5,397,604	5,812,419	6,275,285	6,488,977
Administrative expenses	75,560	64,389	75,803	80,434	79,614	93,341	137,963	91,235	99,084	92,392
Total deductions	2,720,402	3,166,339	3,601,217	3,917,998	4,287,549	5,111,609	5,535,567	5,903,654	6,374,369	6,581,369
Net increases (decreases)	9,055,027	(22,770,686)	11,449,539	11,975,043	3,093,945	12,037,660	10,565,721	6,522,269	(618,404)	9,461,174
Net position, January 1	69,496,252	78,551,279	55,780,593	67,230,132	79,205,175	82,299,120	94,336,780	104,902,501	111,424,770	110,806,366
Transfers	-	-	-	-	-	-	-	-	-	-
Net position, December 31	\$ <u>78,551,279</u>	\$ <u>55,780,593</u>	\$ <u>67,230,132</u>	\$ <u>79,205,175</u>	\$ <u>82,299,120</u>	\$ <u>94,336,780</u>	\$ <u>104,902,501</u>	<u>111,424,770</u>	\$ <u>110,806,366</u>	\$ <u>120,267,540</u>

Anne Arundel County Retirement and Pension System

Schedule of Additions by Source - Employees' Retirement Plan

For the Last Ten Years Ended December 31

	<u>2007</u>	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>	<u>2013</u>	<u>2014</u>	<u>2015</u>	<u>2016</u>
<u>Employer Data</u>										
Contributions	\$ 11,778,948	\$ 12,906,750	\$ 15,246,252	\$ 17,284,080	\$ 18,186,402	\$ 19,823,814	\$ 22,361,658	\$ 24,451,074	\$ 25,629,927	\$ 25,809,828
% of Covered Payroll	(10.0)	(10.3)	(12.1)	(14.0)	(15.1)	(17.1)	(19.3)	(19.2)	(20.1)	(19.8)
<u>Participant Data</u>										
Contributions	<u>4,412,061</u>	<u>4,630,624</u>	<u>5,085,885</u>	<u>4,556,815</u>	<u>4,562,145</u>	<u>4,416,529</u>	<u>4,452,981</u>	<u>4,662,147</u>	<u>4,846,856</u>	<u>5,181,705</u>
Total contributions	16,191,009	17,537,374	20,332,137	21,840,895	22,748,547	24,240,343	26,814,639	29,113,221	30,476,783	30,991,533
Total investment income (loss)	<u>52,269,375</u>	<u>(159,154,283)</u>	<u>62,603,110</u>	<u>61,439,541</u>	<u>9,825,346</u>	<u>63,100,607</u>	<u>52,230,456</u>	<u>28,221,576</u>	<u>(8,460,297)</u>	<u>40,737,517</u>
Total Additions	<u>\$ 68,460,384</u>	<u>\$ (141,616,909)</u>	<u>\$ 82,935,247</u>	<u>\$ 83,280,436</u>	<u>\$ 32,573,893</u>	<u>\$ 87,340,950</u>	<u>\$ 79,045,095</u>	<u>\$ 57,334,797</u>	<u>\$ 22,016,486</u>	<u>\$ 71,729,050</u>

Anne Arundel County Retirement and Pension System

Schedule of Additions by Source - Police Service Retirement Plan

For the Last Ten Years Ended December 31

	<u>2007</u>	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>	<u>2013</u>	<u>2014</u>	<u>2015</u>	<u>2016</u>
<u>Employer Data</u>										
Contributions	\$ 9,997,308	\$ 10,522,656	\$ 12,428,136	\$ 14,055,660	\$ 13,793,256	\$ 15,530,322	\$ 17,745,906	\$ 18,869,736	\$ 19,559,952	\$ 20,410,896
% of Covered Payroll	(24.4)	(25.4)	(29.2)	(33.1)	(33.4)	(38.3)	(42.5)	(39.1)	(40.7)	(40.4)
<u>Participant Data</u>										
Contributions	<u>2,005,960</u>	<u>1,910,671</u>	<u>2,024,825</u>	<u>2,297,386</u>	<u>2,637,833</u>	<u>2,553,740</u>	<u>2,679,723</u>	<u>2,949,789</u>	<u>3,104,338</u>	<u>3,158,451</u>
Total contributions	12,003,268	12,433,327	14,452,961	16,353,046	16,431,089	18,084,062	20,425,629	21,819,525	22,664,290	23,569,347
Total investment income (loss)	<u>42,938,229</u>	<u>(136,630,639)</u>	<u>50,713,568</u>	<u>49,685,037</u>	<u>6,731,539</u>	<u>50,828,258</u>	<u>41,763,446</u>	<u>22,133,732</u>	<u>(7,936,443)</u>	<u>33,000,617</u>
Total Additions	\$ <u>54,941,497</u>	\$ <u>(124,197,312)</u>	\$ <u>65,166,529</u>	\$ <u>66,038,083</u>	\$ <u>23,162,628</u>	\$ <u>68,912,320</u>	\$ <u>62,189,075</u>	\$ <u>43,953,257</u>	\$ <u>14,727,847</u>	\$ <u>56,569,964</u>

Anne Arundel County Retirement and Pension System

Schedule of Additions by Source - Fire Service Retirement Plan

For the Last Ten Years Ended December 31

	<u>2007</u>	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>	<u>2013</u>	<u>2014</u>	<u>2015</u>	<u>2016</u>
Employer Data										
Contributions	\$ 10,959,888	\$ 11,189,712	\$ 12,701,160	\$ 14,648,580	\$ 13,959,852	\$ 15,238,104	\$ 16,152,402	\$ 15,898,956	\$ 15,121,806	\$ 14,591,340
% of Covered Payroll	(24.9)	(22.9)	(25.9)	(30.6)	(30.6)	(35.1)	(35.9)	(32.7)	(30.7)	(28.9)
Participant Data										
Contributions	<u>1,889,083</u>	<u>2,033,588</u>	<u>2,346,754</u>	<u>2,494,043</u>	<u>2,659,114</u>	<u>2,453,627</u>	<u>2,432,737</u>	<u>2,778,355</u>	<u>3,050,456</u>	<u>3,257,340</u>
Total contributions	12,848,971	13,223,300	15,047,914	17,142,623	16,618,966	17,691,731	18,585,139	18,677,311	18,172,262	17,848,680
Total investment income (loss)	<u>41,080,256</u>	<u>(127,885,708)</u>	<u>49,183,327</u>	<u>48,957,240</u>	<u>7,013,478</u>	<u>51,522,774</u>	<u>43,133,618</u>	<u>23,014,967</u>	<u>(7,794,949)</u>	<u>33,397,135</u>
Total Additions	<u>\$ 53,929,227</u>	<u>\$ (114,662,408)</u>	<u>\$ 64,231,241</u>	<u>\$ 66,099,863</u>	<u>\$ 23,632,444</u>	<u>\$ 69,214,505</u>	<u>\$ 61,718,757</u>	<u>\$ 41,692,278</u>	<u>\$ 10,377,313</u>	<u>\$ 51,245,815</u>

Anne Arundel County Retirement and Pension System

Schedule of Additions by Source - Detention Officers' and Deputy Sheriffs' Retirement Plan

For the Last Ten Years Ended December 31

	<u>2007</u>	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>	<u>2013</u>	<u>2014</u>	<u>2015</u>	<u>2016</u>
<u>Employer Data</u>										
Contributions	\$ 3,600,894	\$ 3,788,256	\$ 4,348,914	\$ 4,907,130	\$ 4,876,332	\$ 5,141,280	\$ 5,600,178	\$ 6,110,988	\$ 6,370,758	\$ 6,688,662
% of Covered Payroll	(19.9)	(19.1)	(21.5)	(25.4)	(26.0)	(28.7)	(30.9)	(30.9)	(31.9)	(31.8)
<u>Participant Data</u>										
Contributions	<u>881,978</u>	<u>950,675</u>	<u>1,027,277</u>	<u>1,084,820</u>	<u>1,175,133</u>	<u>1,120,848</u>	<u>1,195,439</u>	<u>1,297,641</u>	<u>1,317,143</u>	<u>1,315,988</u>
Total contributions	4,482,872	4,738,931	5,376,191	5,991,950	6,051,465	6,262,128	6,795,617	7,408,629	7,687,901	8,004,650
Total investment income (loss)	<u>7,292,557</u>	<u>(24,343,278)</u>	<u>9,672,565</u>	<u>9,901,091</u>	<u>1,330,029</u>	<u>10,887,141</u>	<u>9,305,671</u>	<u>5,017,294</u>	<u>(1,931,936)</u>	<u>8,037,893</u>
Total Additions	<u>\$ 11,775,429</u>	<u>\$ (19,604,347)</u>	<u>\$ 15,048,756</u>	<u>\$ 15,893,041</u>	<u>\$ 7,381,494</u>	<u>\$ 17,149,269</u>	<u>\$ 16,101,288</u>	<u>\$ 12,425,923</u>	<u>\$ 5,755,965</u>	<u>\$ 16,042,543</u>

Anne Arundel County Retirement and Pension System

Schedule of Expenses by Type - Employees' Retirement Plan

For the Last Ten Years Ended December 31

	<u>2007</u>	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>	<u>2013</u>	<u>2014</u>	<u>2015</u>	<u>2016</u>
Retirement Benefits	\$ 22,419,239	\$ 24,981,888	\$ 26,707,107	\$ 29,178,742	\$ 31,102,824	\$ 34,031,017	\$ 36,318,903	\$ 38,790,383	\$ 40,941,647	\$ 43,550,814
Refunds	380,865	294,159	560,816	342,195	377,783	344,265	408,812	218,367	318,653	456,211
Administrative	<u>531,801</u>	<u>426,611</u>	<u>487,143</u>	<u>504,442</u>	<u>481,210</u>	<u>546,061</u>	<u>757,210</u>	<u>502,007</u>	<u>505,852</u>	<u>459,455</u>
Total Expenses	\$ <u>23,331,905</u>	\$ <u>25,702,658</u>	\$ <u>27,755,066</u>	\$ <u>30,025,379</u>	\$ <u>31,961,817</u>	\$ <u>34,921,343</u>	\$ <u>37,484,925</u>	\$ <u>39,510,757</u>	\$ <u>41,766,152</u>	\$ <u>44,466,480</u>

Anne Arundel County Retirement and Pension System

Schedule of Expenses by Type - Police Service Retirement Plan

For the Last Ten Years Ended December 31

	<u>2007</u>	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>	<u>2013</u>	<u>2014</u>	<u>2015</u>	<u>2016</u>
Retirement Benefits	\$ 15,661,838	\$ 17,240,916	\$ 19,638,650	\$ 20,973,246	\$ 22,560,005	\$ 24,178,421	\$ 25,801,600	\$ 26,857,368	\$ 28,042,800	\$ 29,719,138
Refunds	808,927	1,056,383	540,887	10,476	184,099	245,111	4,271	47,790	113,762	354,899
DROP payments	4,538,066	5,575,192	2,034,666	465,950	735,894	3,817,832	1,130,517	2,601,970	2,975,197	3,282,220
Administrative	<u>443,634</u>	<u>358,812</u>	<u>406,518</u>	<u>410,184</u>	<u>391,458</u>	<u>444,328</u>	<u>615,138</u>	<u>406,090</u>	<u>427,109</u>	<u>389,320</u>
Total Expenses	\$ <u>21,452,465</u>	\$ <u>24,231,303</u>	\$ <u>22,620,721</u>	\$ <u>21,859,856</u>	\$ <u>23,871,456</u>	\$ <u>28,685,692</u>	\$ <u>27,551,526</u>	\$ <u>29,913,218</u>	\$ <u>31,558,868</u>	\$ <u>33,745,577</u>

NOTE: DROP plan initiated 2002. First eligible payments made 2005.

Anne Arundel County Retirement and Pension System

Schedule of Expenses by Type - Fire Service Retirement Plan

For the Last Ten Years Ended December 31

	<u>2007</u>	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>	<u>2013</u>	<u>2014</u>	<u>2015</u>	<u>2016</u>
Retirement Benefits	\$ 12,059,353	\$ 13,057,997	\$ 14,975,604	\$ 15,560,775	\$ 15,876,486	\$ 17,701,069	\$ 19,577,152	\$ 20,143,295	\$ 23,806,037	\$ 25,293,551
Refunds	455,933	545,079	847,725	114,588	457,144	199,210	119,655	20,220	199,254	157,533
DROP payments	6,784,183	7,736,540	1,962,168	1,757,590	1,757,590	1,620,395	2,173,256	8,679,208	7,487,703	8,437,892
Administrative	<u>415,672</u>	<u>330,485</u>	<u>379,081</u>	<u>398,463</u>	<u>388,157</u>	<u>444,256</u>	<u>633,476</u>	<u>409,916</u>	<u>438,008</u>	<u>401,289</u>
Total Expenses	\$ <u>19,715,141</u>	\$ <u>21,670,101</u>	\$ <u>18,164,578</u>	\$ <u>17,831,416</u>	\$ <u>18,479,377</u>	\$ <u>19,964,930</u>	\$ <u>22,503,539</u>	\$ <u>29,252,639</u>	\$ <u>31,931,002</u>	\$ <u>34,290,265</u>

NOTE: DROP plan initiated 2001. First eligible payments made 2005.

Anne Arundel County Retirement and Pension System

Schedule of Expenses by Type - Detention Officers' and Deputy Sheriffs' Retirement Plan

For the Last Ten Years Ended December 31

	<u>2007</u>	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>	<u>2013</u>	<u>2014</u>	<u>2015</u>	<u>2016</u>
Retirement Benefits	\$ 2,573,235	\$ 3,017,953	\$ 3,435,870	\$ 3,790,618	\$ 4,190,561	\$ 4,824,001	\$ 5,364,396	\$ 5,768,304	\$ 6,129,460	\$ 6,430,861
Refunds	71,607	83,997	89,544	46,946	17,374	194,267	33,208	44,115	145,825	58,116
Administrative	<u>75,560</u>	<u>64,389</u>	<u>75,803</u>	<u>80,434</u>	<u>79,613</u>	<u>93,341</u>	<u>137,963</u>	<u>91,235</u>	<u>99,084</u>	<u>92,392</u>
Total Expenses	\$ <u>2,720,402</u>	\$ <u>3,166,339</u>	\$ <u>3,601,217</u>	\$ <u>3,917,998</u>	\$ <u>4,287,548</u>	\$ <u>5,111,609</u>	\$ <u>5,535,567</u>	\$ <u>5,903,654</u>	\$ <u>6,374,369</u>	\$ <u>6,581,369</u>

Anne Arundel County Retirement and Pension System

Average Benefit Payments - Employees' Plan

Retirement Effective Dates for the last Ten Fiscal Years Ended June 30, and the Six Months Ended December 31, 2016

		Years of Credited Service						
Retirement Effective Dates		0 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	Over 30
Period 7/1/2006 to 6/30/2007	Average monthly benefit	\$0	\$777	\$1,589	\$1,378	\$2,877	\$2,507	\$3,264
	Average final average salary	\$0	\$52,105	\$50,901	\$42,480	\$73,032	\$56,572	\$69,784
	Number of retired members	0	13	18	15	8	25	24
Period 7/1/2007 to 6/30/2008	Average monthly benefit	\$0	\$351	\$1,044	\$1,935	\$2,341	\$2,755	\$2,986
	Average final average salary	\$0	\$36,688	\$58,916	\$60,032	\$63,835	\$63,422	\$62,363
	Number of retired members	0	9	14	13	15	20	19
Period 7/1/2008 to 6/30/2009	Average monthly benefit	\$0	\$753	\$1,301	\$1,521	\$2,697	\$2,602	\$2,805
	Average final average salary	\$0	\$73,930	\$33,899	\$51,788	\$76,461	\$62,998	\$59,919
	Number of retired members	0	12	7	14	10	22	17
Period 7/1/2009 to 6/30/2010	Average monthly benefit	\$858	\$446	\$1,325	\$1,488	\$2,285	\$2,787	\$3,062
	Average final average salary	\$33,675	\$42,397	\$60,468	\$44,408	\$65,207	\$64,581	\$64,768
	Number of retired members	1	8	10	9	15	15	27
Period 7/1/2010 to 06/30/2011	Average monthly benefit	\$866	\$820	\$1,341	\$1,535	\$2,086	\$2,490	\$2,973
	Average final average salary	\$48,000	\$75,659	\$73,933	\$60,514	\$63,166	\$66,363	\$64,628
	Number of retired members	1	5	5	8	11	13	20
Period 7/1/2011 to 06/30/2012	Average monthly benefit	\$0	\$576	\$1,191	\$1,735	\$3,008	\$3,302	\$3,104
	Average final average salary	\$0	\$53,200	\$57,406	\$67,233	\$83,960	\$81,180	\$68,741
	Number of retired members	0	10	13	10	14	19	23
Period 7/1/2012 to 06/30/2013	Average monthly benefit	\$0	\$751	\$1,373	\$1,493	\$2,113	\$3,021	\$3,531
	Average final average salary	\$0	\$63,180	\$61,423	\$53,374	\$54,783	\$67,402	\$73,827
	Number of retired members	0	17	18	9	20	13	24
Period 7/1/2013 to 06/30/2014	Average monthly benefit	\$0	\$762	\$969	\$1,896	\$1,749	\$2,664	\$3,533
	Average final average salary	\$0	\$69,049	\$52,434	\$64,927	\$51,423	\$62,863	\$77,560
	Number of retired members	0	22	22	7	13	19	22
Period 7/1/2014 to 06/30/2015	Average monthly benefit	\$0	\$589	\$1,396	\$2,044	\$2,684	\$3,247	\$3,313
	Average final average salary	\$0	\$45,005	\$51,336	\$76,409	\$79,510	\$79,151	\$73,566
	Number of retired members	0	23	12	12	8	22	22
Period 7/1/2015 to 06/30/2016	Average monthly benefit	\$0	\$585	\$948	\$1,707	\$2,265	\$3,113	\$3,790
	Average final average salary	\$0	\$48,114	\$44,409	\$69,116	\$63,456	\$76,545	\$82,715
	Number of retired members	0	14	9	10	11	28	24
Period 7/1/2016 to 12/31/2016	Average monthly benefit	\$0	\$652	\$1,496	\$1,586	\$2,288	\$3,162	\$3,367
	Average final average salary	\$0	\$43,320	\$67,947	\$62,533	\$66,679	\$74,979	\$73,563
	Number of retired members	0	4	13	10	6	11	21

Anne Arundel County Retirement and Pension System
Average Benefit Payments - Police Service Retirement Plan
Retirement Effective Dates for the last Ten Fiscal Years Ended June 30, and the Six Months Ended December 31, 2016

		Years of Credited Service						
Retirement Effective Dates		0 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	Over 30
Period 7/1/2006 to 6/30/2007	Average monthly benefit	\$0	\$2,914	\$3,209	\$3,227	\$2,844	\$3,622	\$0
	Average final average salary	\$0	\$56,366	\$61,475	\$75,359	\$69,795	\$68,279	\$0
	Number of retired members	0	3	3	3	7	3	0
Period 7/1/2007 to 6/30/2008	Average monthly benefit	\$0	\$0	\$2,747	\$2,936	\$3,808	\$0	\$3,512
	Average final average salary	\$0	\$0	\$66,441	\$74,480	\$84,145	\$0	\$70,082
	Number of retired members	0	0	6	7	3	0	2
Period 7/1/2008 to 6/30/2009	Average monthly benefit	\$0	\$2,085	\$3,552	\$3,341	\$3,705	\$0	\$0
	Average final average salary	\$0	\$60,471	\$68,090	\$75,440	\$80,116	\$0	\$0
	Number of retired members	0	2	3	3	5	0	0
Period 7/1/2009 to 6/30/2010	Average monthly benefit	\$0	\$1,885	\$3,118	\$3,863	\$4,374	\$5,043	\$4,902
	Average final average salary	\$0	\$46,628	\$71,648	\$94,631	\$90,867	\$94,651	\$84,864
	Number of retired members	0	1	3	1	3	3	1
Period 7/1/2010 to 6/30/2011	Average monthly benefit	\$2,545	\$3,912	\$3,821	\$3,895	\$4,007	\$0	\$0
	Average final average salary	\$47,962	\$72,675	\$70,711	\$72,479	\$87,711	\$0	\$0
	Number of retired members	1	3	3	1	5	0	0
Period 7/1/2011 to 06/30/2012	Average monthly benefit	\$0	\$2,452	\$0	\$3,660	\$4,100	\$4,694	\$0
	Average final average salary	\$0	\$77,361	\$0	\$79,411	\$81,402	\$87,293	\$0
	Number of retired members	0	1	0	8	8	3	0
Period 7/1/2012 to 06/30/2013	Average monthly benefit	\$0	\$0	\$3,291	\$3,535	\$4,310	\$4,960	\$0
	Average final average salary	\$0	\$0	\$58,658	\$74,339	\$86,975	\$91,069	\$0
	Number of retired members	0	0	1	2	8	3	0
Period 7/1/2013 to 06/30/2014	Average monthly benefit	\$0	\$3,011	\$3,429	\$3,355	\$3,927	\$0	\$0
	Average final average salary	\$0	\$55,286	\$63,264	\$82,074	\$82,427	\$0	\$0
	Number of retired members	0	1	2	1	2	0	0
Period 7/1/2014 to 06/30/2015	Average monthly benefit	\$2,653	\$2,617	\$4,417	\$3,622	\$3,770	\$4,781	\$0
	Average final average salary	\$51,685	\$51,685	\$83,747	\$81,979	\$91,405	\$88,845	\$0
	Number of retired members	1	2	1	5	4	1	0
Period 7/1/2015 to 06/30/2016	Average monthly benefit	\$2,680	\$3,003	\$3,860	\$4,417	\$4,418	\$5,616	\$0
	Average final average salary	\$50,932	\$58,489	\$72,240	\$83,747	\$95,013	\$102,581	\$0
	Number of retired members	2	2	1	1	6	3	0
Period 7/1/2016 to 12/31/2016	Average monthly benefit	\$0	\$3,563	\$3,683	\$3,792	\$4,907	\$0	\$0
	Average final average salary	\$0	\$67,163	\$69,296	\$87,813	\$100,052	\$0	\$0
	Number of retired members	0	2	2	3	2	0	0

Anne Arundel County Retirement and Pension System
Average Benefit Payments - Fire Service Retirement Plan
Retirement Effective Dates for the last Ten Fiscal Years Ended June 30, and the Six Months Ended December 31, 2016

		Years of Credited Service						
Retirement Effective Dates		0 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	Over 30
Period 7/1/2006 to 6/30/2007	Average monthly benefit	\$0	\$2,373	\$0	\$2,689	\$2,857	\$5,063	\$4,064
	Average final average salary	\$0	\$44,472	\$0	\$61,380	\$62,573	\$92,680	\$78,725
	Number of retired members	0	1	0	2	3	1	3
Period 7/1/2007 to 6/30/2008	Average monthly benefit	\$0	\$0	\$0	\$0	\$3,560	\$3,424	\$0
	Average final average salary	\$0	\$0	\$0	\$0	\$75,334	\$65,838	\$0
	Number of retired members	0	0	0	0	3	1	0
Period 7/1/2008 to 6/30/2009	Average monthly benefit	\$2,394	\$0	\$0	\$4,415	\$3,380	\$0	\$0
	Average final average salary	\$47,082	\$0	\$0	\$83,123	\$79,240	\$0	\$0
	Number of retired members	1	0	0	1	2	0	0
Period 7/1/2009 to 6/30/2010	Average monthly benefit	\$0	\$2,810	\$0	\$4,291	\$0	\$0	\$0
	Average final average salary	\$0	\$52,555	\$0	\$77,747	\$0	\$0	\$0
	Number of retired members	0	1	0	2	0	0	0
Period 7/1/2010 to 6/30/2011	Average monthly benefit	\$0	\$2,522	\$0	\$4,087	\$4,153	\$4,061	\$0
	Average final average salary	\$0	\$46,971	\$0	\$81,781	\$83,115	\$77,005	\$0
	Number of retired members	0	1	0	3	2	1	0
Period 7/1/2011 to 06/30/2012	Average monthly benefit	\$3,856	\$1,489	\$3,240	\$0	\$3,410	\$4,338	\$0
	Average final average salary	\$70,096	\$42,806	\$58,567	\$0	\$77,007	\$77,005	\$0
	Number of retired members	1	1	2	0	1	1	0
Period 7/1/2012 to 06/30/2013	Average monthly benefit	\$0	\$2,708	\$2,203	\$3,854	\$3,651	\$0	\$4,492
	Average final average salary	\$0	\$48,963	\$67,073	\$82,747	\$79,277	\$0	\$77,005
	Number of retired members	0	2	1	3	8	0	1
Period 7/1/2013 to 06/30/2014	Average monthly benefit	\$0	\$2,747	\$0	\$3,351	\$3,278	\$4,088	\$0
	Average final average salary	\$0	\$50,146	\$0	\$71,511	\$77,656	\$84,977	\$0
	Number of retired members	0	2	0	2	1	1	0
Period 7/1/2014 to 06/30/2015	Average monthly benefit	\$0	\$2,490	\$3,257	\$3,753	\$4,764	\$7,584	\$0
	Average final average salary	\$0	\$46,132	\$61,179	\$69,802	\$96,184	\$160,740	\$0
	Number of retired members	0	2	1	1	2	2	0
Period 7/1/2015 to 06/30/2016	Average monthly benefit	\$0	\$0	\$2,607	\$3,753	\$4,166	\$3,905	\$0
	Average final average salary	\$0	\$43,912	\$57,129	\$70,887	\$90,016	\$100,211	\$0
	Number of retired members	0	1	5	2	5	2	0
Period 7/1/2016 to 12/31/2016	Average monthly benefit	\$0	\$0	\$2,094	\$0	\$3,942	\$0	\$0
	Average final average salary	\$0	\$0	\$77,400	\$0	\$88,391	\$0	\$0
	Number of retired members	0	0	1	0	3	0	0

Anne Arundel County Retirement and Pension System
Average Benefit Payments - Detention Officers' and Deputy Sheriffs' Retirement Plan
Retirement Effective Dates for the last Ten Fiscal Years Ended June 30, and the Six Months Ended December 31, 2016

		Years of Credited Service						
Retirement Effective Dates		0 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	Over 30
Period 7/1/2006 to 6/30/2007	Average monthly benefit	\$0	\$842	\$1,271	\$2,294	\$3,104	\$2,883	\$0
	Average final average salary	\$0	\$46,190	\$48,635	\$60,229	\$80,300	\$55,999	\$0
	Number of retired members	0	2	2	4	4	2	0
Period 7/1/2007 to 6/30/2008	Average monthly benefit	\$0	\$1,165	\$0	\$0	\$3,524	\$4,263	\$0
	Average final average salary	\$0	\$44,257	\$0	\$0	\$75,510	\$86,111	\$0
	Number of retired members	0	9	0	0	5	1	0
Period 7/1/2008 to 6/30/2009	Average monthly benefit	\$0	\$782	\$1,963	\$2,997	\$4,341	\$3,434	\$3,935
	Average final average salary	\$0	\$48,249	\$67,568	\$71,019	\$94,610	\$73,170	\$70,905
	Number of retired members	0	3	3	4	2	1	2
Period 7/1/2009 to 6/30/2010	Average monthly benefit	\$0	\$1,345	\$1,910	\$2,537	\$0	\$0	\$0
	Average final average salary	\$0	\$48,257	\$56,966	\$64,507	\$0	\$0	\$0
	Number of retired members	0	5	5	2	0	0	0
Period 7/1/2010 to 6/30/2011	Average monthly benefit	\$0	\$1,216	\$1,511	\$1,933	\$2,606	\$0	\$4,230
	Average final average salary	\$0	\$46,342	\$51,707	\$54,454	\$64,099	\$0	\$80,876
	Number of retired members	0	7	3	1	7	0	1
Period 7/1/2011 to 06/30/12	Average monthly benefit	\$0	\$1,294	\$1,922	\$1,800	\$3,098	\$3,917	\$4,623
	Average final average salary	\$0	\$44,652	\$50,740	\$55,734	\$68,057	\$73,954	\$75,880
	Number of retired members	0	3	5	7	2	1	2
Period 7/1/2012 to 06/30/13	Average monthly benefit	\$0	\$577	\$1,877	\$2,113	\$3,283	\$0	\$4,158
	Average final average salary	\$0	\$37,324	\$50,974	\$61,015	\$74,501	\$0	\$85,146
	Number of retired members	0	3	5	2	8	0	1
Period 7/1/2013 to 06/30/14	Average monthly benefit	\$0	\$563	\$1,353	\$2,526	\$2,683	\$0	\$0
	Average final average salary	\$0	\$47,394	\$55,388	\$69,155	\$65,806	\$0	\$0
	Number of retired members	0	2	4	4	2	0	0
Period 7/1/2014 to 06/30/15	Average monthly benefit	\$0	\$736	\$1,657	\$2,012	\$3,888	\$4,448	\$4,185
	Average final average salary	\$0	\$45,855	\$55,828	\$57,174	\$89,482	\$94,120	\$72,918
	Number of retired members	0	5	2	7	2	1	1
Period 7/1/2015 to 06/30/16	Average monthly benefit	\$0	\$643	\$1,266	\$2,574	\$3,098	\$3,124	\$0
	Average final average salary	\$0	\$43,049	\$49,626	\$68,661	\$67,546	\$69,804	\$0
	Number of retired members	0	1	1	4	3	1	0
Period 7/1/2016 to 12/31/16	Average monthly benefit	\$0	\$989	\$1,560	\$2,452	\$2,892	\$0	\$0
	Average final average salary	\$0	\$52,659	\$56,889	\$65,706	\$65,116	\$0	\$0
	Number of retired members	0	2	2	2	1	0	0

Anne Arundel County Retirement and Pension System

Schedule of Members by Years of Service - Employees' Retirement Plan

For the Last Ten Years Ended December 31

<i>Years of Credited Service</i>	<i>2007</i>	<i>2008</i>	<i>2009</i>	<i>2010</i>	<i>2011</i>	<i>2012</i>	<i>2013</i>	<i>2014</i>	<i>2015</i>	<i>2016</i>
0 to 4	747	807	755	673	534	443	468	614	647	721
5 to 9	465	421	451	452	501	533	578	512	437	373
10 to 14	283	286	291	349	415	432	333	347	354	364
15 to 19	307	273	233	191	211	220	229	236	269	287
20 to 24	225	281	287	308	278	233	196	163	141	148
25 to 29	167	136	146	153	149	170	205	203	200	170
30 and over	90	108	115	113	121	121	116	132	138	124
Total members	2,284	2,312	2,278	2,239	2,209	2,152	2,125	2,207	2,186	2,187
Average years of service	11.59	11.58	11.97	12.30	12.83	13.08	12.81	12.37	12.40	12.00
Average age	46.39	46.88	47.44	47.81	48.24	48.63	48.95	48.60	48.90	48.80
Average salary	\$ 51,323	\$ 53,981	\$ 55,325	\$ 55,158	\$ 54,511	\$ 53,915	\$ 54,499	\$57,585	\$58,475	\$59,585

Anne Arundel County Retirement and Pension System

Schedule of Members by Years of Service - Police Service Retirement Plan

For the Last Ten Years Ended December 31

<i>Years of Credited Service</i>	<u>2007</u>	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>	<u>2013</u>	<u>2014</u>	<u>2015</u>	<u>2016</u>
0 to 4	158	168	166	133	149	135	157	183	194	199
5 to 9	135	101	110	129	120	138	158	151	123	132
10 to 14	145	156	151	133	140	126	92	98	119	112
15 to 19	127	112	101	99	114	126	142	138	119	125
20 to 24	32	43	50	61	44	49	49	53	58	58
25 to 29	11	11	6	7	7	4	7	13	27	18
30 and over	<u>3</u>	<u>2</u>	<u>3</u>	<u>1</u>	<u>2</u>	<u>2</u>	<u>3</u>	<u>2</u>	<u>1</u>	<u>-</u>
Total members	611	593	587	563	576	580	608	638	641	644
Average years of service	10.69	10.72	10.61	11.13	10.92	10.67	10.65	10.57	10.90	10.60
Average age	36.88	37.12	37.04	37.69	37.44	37.36	37.42	37.18	37.40	37.00
Average salary	\$ 60,948	\$ 64,867	\$ 65,534	\$ 66,276	\$ 64,170	\$ 62,102	\$ 62,122	\$67,336	\$68,454	\$69,711

Anne Arundel County Retirement and Pension System

Schedule of Members by Years of Service - Fire Service Retirement Plan

For the Last Ten Years Ended December 31

<i>Years of Credited Service</i>	<u>2007</u>	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>	<u>2013</u>	<u>2014</u>	<u>2015</u>	<u>2016</u>
0 to 4	297	400	323	244	133	98	71	142	239	288
5 to 9	92	69	133	183	239	240	320	258	194	104
10 to 14	85	89	82	95	76	85	63	118	157	206
15 to 19	106	116	100	75	105	77	84	76	85	70
20 to 24	96	98	93	74	58	60	71	60	52	75
25 to 29	20	19	20	16	18	24	29	36	38	39
30 and over	<u>13</u>	<u>18</u>	<u>6</u>	<u>2</u>	<u>2</u>	<u>2</u>	<u>1</u>	<u>3</u>	<u>8</u>	<u>10</u>
Total members	709	809	757	689	631	586	639	693	773	792
Average years of service	10.22	9.54	9.81	9.83	10.42	11.18	10.83	10.57	10.20	10.20
Average age	36.75	36.13	36.58	36.73	37.31	38.15	37.86	37.53	37.30	37.20
Average salary	\$ 55,461	\$ 56,834	\$ 57,714	\$ 56,521	\$ 55,924	\$ 55,581	\$ 54,752	\$58,407	\$56,711	\$58,368

Anne Arundel County Retirement and Pension System

Schedule of Members by Years of Service - Detention Officers' and Deputy Sheriffs' Retirement Plan

For the Last Ten Years Ended December 31

<i>Years of Credited Service</i>	<i>2007</i>	<i>2008</i>	<i>2009</i>	<i>2010</i>	<i>2011</i>	<i>2012</i>	<i>2013</i>	<i>2014</i>	<i>2015</i>	<i>2016</i>
0 to 4	94	114	122	89	88	79	76	85	103	112
5 to 9	101	84	73	87	68	72	82	85	57	53
10 to 14	107	110	112	106	114	71	59	50	64	55
15 to 19	40	49	49	49	47	87	88	82	78	85
20 to 24	4	8	9	14	23	22	28	33	28	26
25 to 29	8	6	6	6	5	4	5	5	9	10
30 and over	<u>3</u>	<u>2</u>	<u>3</u>	<u>3</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>3</u>	<u>2</u>
Total members	357	373	374	354	347	338	342	345	342	343
Average years of service	9.16	9.16	6.92	10.40	10.80	10.96	11.27	11.43	11.10	11.00
Average age	43.19	43.19	43.85	44.46	44.50	44.27	44.99	44.72	44.10	43.80
Average salary	\$ 50,763	\$ 53,045	\$ 54,021	\$ 54,549	\$ 54,065	\$ 52,949	\$ 53,020	\$57,321	\$56,685	\$57,730

Anne Arundel County Retirement and Pension System

Summary of Current Active Members and DROP Members by Years of Service and Plan

For the Year Ended December 31, 2016

	<i>Employees' Retirement Plan</i>	<i>Police Service Retirement Plan</i>	<i>Fire Service Retirement Plan</i>	<i>Officers' and Deputy Sheriffs' Retirement Plan</i>	<i>Total</i>
Years of Credited Service					
0-4	707	198	326	104	1,335
5-9	349	109	93	55	606
10-14	372	114	203	49	738
15-19	291	110	80	60	541
20-24	168	69	57	53	347
25-29	168	29	47	26	270
30+	<u>161</u>	<u>6</u>	<u>14</u>	<u>11</u>	<u>192</u>
Total Current Active Members	<u><u>2,216</u></u>	<u><u>635</u></u>	<u><u>820</u></u>	<u><u>358</u></u>	<u><u>4,029</u></u>
0-4	N/A	-	-	-	-
5-9	N/A	-	-	-	-
10-14	N/A	-	-	-	-
15-19	N/A	-	-	-	-
20-24	N/A	11	8	4	23
25-29	N/A	24	16	7	47
30+	N/A	<u>17</u>	<u>11</u>	<u>4</u>	<u>32</u>
Total Current Active DROP Members		<u><u>52</u></u>	<u><u>35</u></u>	<u><u>15</u></u>	<u><u>102</u></u>

Anne Arundel County Retirement and Pension System

Schedule of Current Active DROP Members by Year of Entry

For the Last Five Years Years Ended December 31

	<i><u>Police Service Retirement Plan</u></i>	<i><u>Fire Service Retirement Plan</u></i>	<i><u>Detention & Sherrif Officers Retirement Plan</u></i>	<i><u>Total</u></i>
2012	11	12	-	23
2013	4	2	-	6
2014	6	4	-	10
2015	7	3	8	18
2016	<u>20</u>	<u>9</u>	<u>7</u>	<u>36</u>
	<u>48</u>	<u>30</u>	<u>15</u>	<u>93</u>

- Notes:
- 1) The Employee's Retirement Plan does not provide a DROP.
 - 2) The Police Service Retirement Plan DROP was initiated in 2002.
 - 3) The Fire Service Retirement Plan DROP was initiated in 2001.
 - 4) The Detention Officers' and Deputy Sheriffs' Retirement Plan was initiated in 2015.
 - 5) Actuarial data is based on preliminary employee information which therefore, does not agree with the final census data reflected above.

Anne Arundel County Retirement and Pension System

Schedule of Retirees and Beneficiaries by Attained Age and Type of Retirement

For the Year Ended December 31, 2016

<i>Age Group</i>	<i>Normal Retirement</i>	<i>Early Retirement</i>	<i>Service Connected Disability</i>	<i>Non-Service Connected Disability</i>	<i>Total</i>
19 & Under	1				1
20 - 24	1				1
25 - 29	1		3		4
30 - 34	-		6	3	9
35 - 39	1		10	3	14
40 - 44	4		23	4	31
45 - 49	56		49	5	110
50 - 54	160	15	58	9	242
55 - 59	297	33	50	9	389
60 - 64	554	59	60	15	688
65 - 69	621	33	33	8	695
70 - 74	427	10	27	6	470
75 - 79	297	-	5	5	307
80 - 84	181	-	5	1	187
85 & Up	123	-	-	-	123
Total Members	<u>2,724</u>	<u>150</u>	<u>329</u>	<u>68</u>	<u>3,271</u>

Anne Arundel County Retirement and Pension System

History of Operating Revenues and Expenses

For the Last Ten Years Ended December 31

	<u>2007</u>	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>	<u>2013</u>	<u>2014</u>	<u>2015</u>	<u>2016</u>
REVENUES										
Employer Contributions	\$ 36,337,038	\$ 38,407,374	\$ 44,724,462	\$ 50,895,450	\$ 50,815,842	\$ 55,733,520	\$ 61,860,144	\$ 65,330,754	\$ 66,682,443	\$ 67,500,726
Participant Contributions	9,189,082	9,525,558	10,486,741	10,433,064	11,034,225	10,544,744	10,760,880	11,687,932	12,318,793	12,913,484
Investment Income	143,580,417	(448,013,909)	172,172,570	169,916,939	24,900,493	176,338,780	145,893,607	78,387,569	(26,123,625)	115,173,162
Total Revenues	\$ <u>189,106,537</u>	\$ <u>(400,080,977)</u>	\$ <u>227,383,773</u>	\$ <u>231,245,453</u>	\$ <u>86,750,560</u>	\$ <u>242,617,044</u>	\$ <u>218,514,631</u>	\$ <u>155,406,255</u>	\$ <u>52,877,611</u>	\$ <u>195,587,372</u>
EXPENSES										
Benefits and Refunds	\$ 65,753,246	\$ 73,590,104	\$ 70,793,037	72,241,126	\$ 77,259,760	\$ 87,155,588	\$ 90,931,770	\$ 103,171,020	\$ 110,160,338	\$ 117,741,235
Administrative Expenses	1,466,667	1,180,297	1,348,545	1,393,523	1,340,439	1,527,986	1,604,203	1,409,248	1,470,053	1,342,456
Total Expenses	\$ <u>67,219,913</u>	\$ <u>74,770,401</u>	\$ <u>72,141,582</u>	\$ <u>73,634,649</u>	\$ <u>78,600,199</u>	\$ <u>88,683,574</u>	\$ <u>92,535,973</u>	\$ <u>104,580,268</u>	\$ <u>111,630,391</u>	\$ <u>119,083,691</u>
COVERED PAYROLL										
Annual Covered Payroll	220,298,031	234,922,040	237,798,435	233,098,361	226,183,784	217,804,921	220,607,481	243,678,098	243,678,098	252,285,869
Total Covered Payroll	\$ <u>220,298,031</u>	\$ <u>234,922,040</u>	\$ <u>237,798,435</u>	\$ <u>233,098,361</u>	\$ <u>226,183,784</u>	\$ <u>217,804,921</u>	\$ <u>220,607,481</u>	\$ <u>243,678,098</u>	\$ <u>245,100,390</u>	\$ <u>252,285,869</u>
Employer Contributions as a Percent of Covered Payroll	<u>16.49%</u>	<u>16.35%</u>	<u>18.81%</u>	<u>21.83%</u>	<u>22.47%</u>	<u>25.59%</u>	<u>28.04%</u>	<u>26.81%</u>	<u>27.36%</u>	<u>26.76%</u>

Anne Arundel County Retirement and Pension System

History of Plan Investments and Liabilities

For the Ten Years Ended December 31

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Total Net Assets Fair Market Value	<u>\$1,489,190,253</u>	<u>\$1,014,338,875</u>	<u>\$1,169,581,066</u>	<u>\$1,337,927,398</u>	<u>\$1,342,485,137</u>	<u>\$1,498,074,369</u>	<u>\$1,623,305,968</u>	<u>\$ 1,668,780,810</u>	<u>\$ 1,604,773,484</u>	<u>\$ 1,684,262,514</u>
Actuarial Accrued Liability (AAL)	\$1,462,619,222	\$1,566,882,186	\$1,652,709,089	\$1,713,528,066	\$1,791,891,067	\$1,893,021,509	\$1,997,891,150	\$ 2,117,461,985	\$ 2,158,514,771	\$ 2,227,654,391
Actuarial Value of Assets (AVA)	<u>\$1,380,306,906</u>	<u>\$1,363,614,511</u>	<u>\$1,454,413,785</u>	<u>\$1,471,797,558</u>	<u>\$1,462,944,903</u>	<u>\$1,448,184,848</u>	<u>\$1,562,260,162</u>	<u>\$ 1,666,980,234</u>	<u>\$ 1,725,590,057</u>	<u>\$ 1,787,755,545</u>
Unfunded Actuarial Liability (UAL)	<u>\$74,934,851</u>	<u>\$203,267,675</u>	<u>\$198,295,304</u>	<u>\$241,730,508</u>	<u>\$328,946,164</u>	<u>\$444,836,661</u>	<u>\$435,630,988</u>	<u>\$ 450,481,751</u>	<u>\$ 432,924,714</u>	<u>\$ 439,898,846</u>
Funded Ratio (AVA/AAL)	<u>94.37%</u>	<u>87.03%</u>	<u>88.00%</u>	<u>85.89%</u>	<u>81.64%</u>	<u>76.50%</u>	<u>78.20%</u>	<u>78.73%</u>	<u>79.94%</u>	<u>80.25%</u>