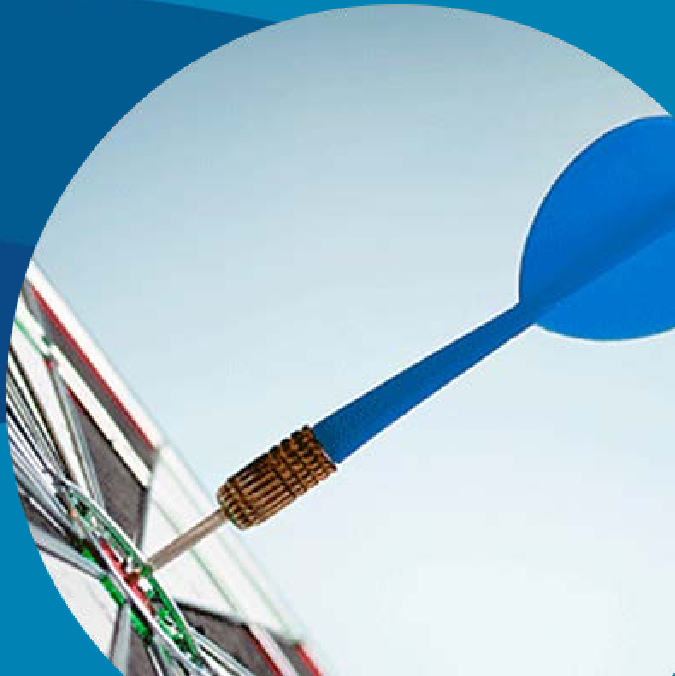
Bay County Employees' Retirement System
December 31, 2016 Actuarial Valuations

Board of Trustees Meeting

October 10, 2017

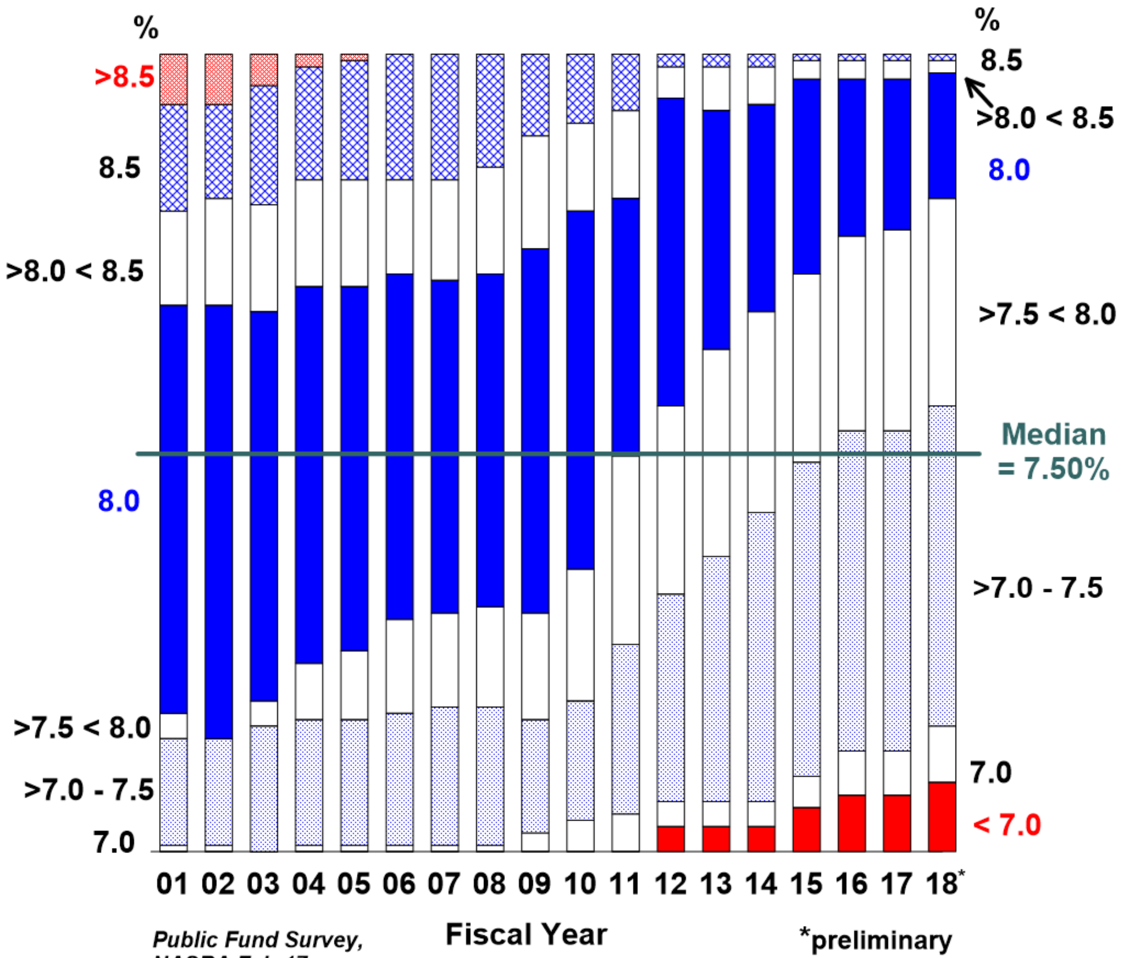


Agenda

- Current Events
- Actuarial Valuation Process
- Highlights of 2016 Bay County Actuarial Valuations
- Looking Ahead
- Appendix - Historical Contributions/Funded Ratios

Current Events

Public Pension Investment Return Assumptions: 2001-2018



Public Fund Survey, NASRA Feb-17

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Understanding Return and Risk

	Steady Return			Volatile Return		
	Beg of Yr	**Return**	**End of Yr**	**Beg of Yr**	**Return**	**End of Yr**
2016	$1,000	7.50%	$1,075	$1,000	20.00%	$1,200
2017	$1,075	7.50%	$1,156	$1,200	-5.00%	$1,140
2018	$1,156	7.50%	$1,242	$1,140	20.00%	$1,368
2019	$1,242	7.50%	$1,335	$1,368	-5.00%	$1,300
2020	$1,335	7.50%	$1,436	$1,300	20.00%	$1,560
2021	$1,436	7.50%	$1,543	$1,560	-5.00%	$1,482
2022	$1,543	7.50%	$1,659	$1,482	20.00%	$1,778
2023	$1,659	7.50%	$1,783	$1,778	-5.00%	$1,689
2024	$1,783	7.50%	$1,917	$1,689	20.00%	$2,027
2025	$1,917	7.50%	**$2,061**	$2,027	-5.00%	**$1,925**
Average Rate of Return						
Arithmetic		**7.50%**			**7.50%**	
Geometric		**7.50%**			**6.77%**	
Variance		**0.00%**			**1.56%**	
Std Dev		**0.00%**			**12.50%**	

A steady return produces a higher ending balance than a volatile return if the arithmetic average is the same. The geometric average reflects that behavior better than the arithmetic average. Basically, volatility drags down return.

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Evolution of Investment Risk

	Expected Values			
	Constant Return*		Constant Risk	
Year	**Return**	**Risk**	**Return**	**Risk**
1995	7.50%	6.0%	7.50%	6%
2005	7.50%	8.9%	6.50%	6%
2015	7.50%	17.2%	4.80%	6%

- As measured by the standard deviation of return, earning 7.5% today takes almost triple the risk it did in 1995.
- If we held risk constant at 6%, we would expect 1/3rd less return in 2015 than we would have expected in 1995.
- 17.2% volatility reduces long-term return by approximately 148 basis points.
- 6% volatility reduces long-term return by 18 basis points.

*Summarized from WSJ Article dated May 31, 2016 quoting Callan Associates.

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Alternative Liability Measures

- One or more of the following calculations is likely to be required by actuarial standards within the next several years:
  - liability based on the estimated costs of transferring all risk to an insurance company;
  - liability based on a Treasury yield curve, to approximate the cost of eliminating almost all investment risk;
  - liability based on discount rates commensurate with the level of risk of the underlying benefit promise; and
  - liability based on a high quality corporate yield curve, for comparability with private sector plans.

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Yield to Maturity on Treasuries

	Maturity								
Date	**6 mo**	**1 yr**	**2 yr**	**3 yr**	**5 yr**	**7 yr**	**10 yr**	**20 yr**	**30 yr**
1/3/1995	6.66%	7.23%	7.73%	7.84%	7.88%	7.91%	7.88%	8.07%	7.93%
1/3/2017	0.65%	0.89%	1.22%	1.50%	1.94%	2.26%	2.45%	2.78%	3.04%

Yields on treasuries have dropped remarkably since 1995. Discounting at treasury rates in 1995 would have produced a liability at that time that was similar to discounting at valuation assumed rates. Doing so today could easily produce a liability twice as high.

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Social Security

- Based on intermediate assumptions, the combined OASDI trust fund is expected to be depleted in 2034.
- After that point, 79% of benefits would be payable, declined eventually to 74%.
- Something will happen.

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Social Security – Look for

- Larger Increases in Wage Base
- Higher OASDI tax rates
- General Revenue Funding
- Age 70 Retirement
- Lower benefits

- Suggestions:
- Read "Social Security Will it be there for You" at http://www.grsconsulting.com/knowledge-base/

- Play the "Social Security Game" at
- http://socialsecuritygame.actuary.org/

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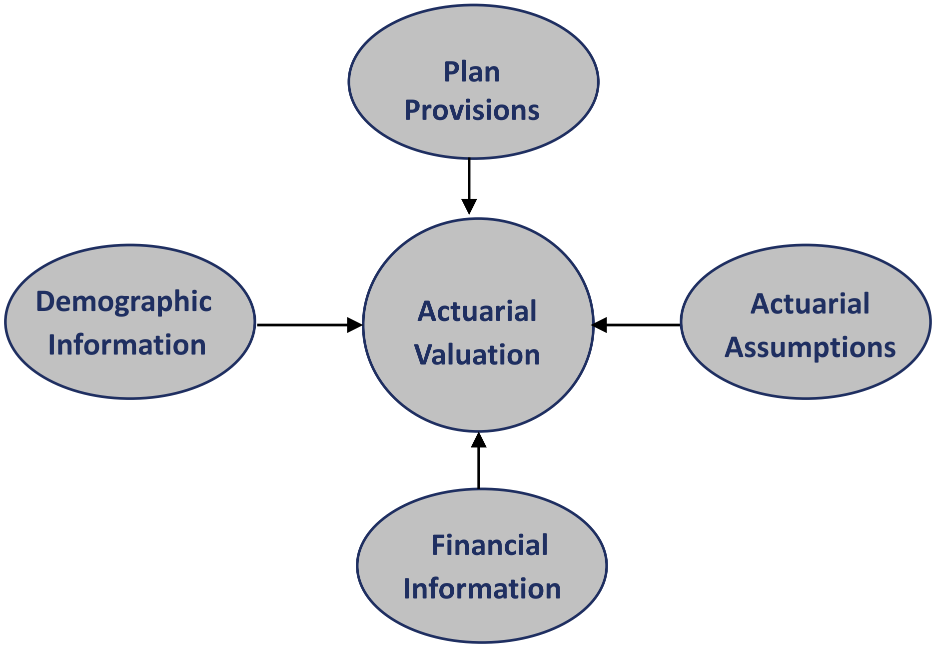
Actuarial Valuation Process



- Demographic Information, Financial Information & Plan Provisions are provided by the plan sponsor.
- Actuarial assumptions are recommended by the actuary and approved by the Board.
- The actuarial valuation is a mathematical process used to project future payments on account of specified benefit provisions. These projected payouts are converted to equivalent present value amounts and a corresponding level percent-of-payroll contribution is determined.

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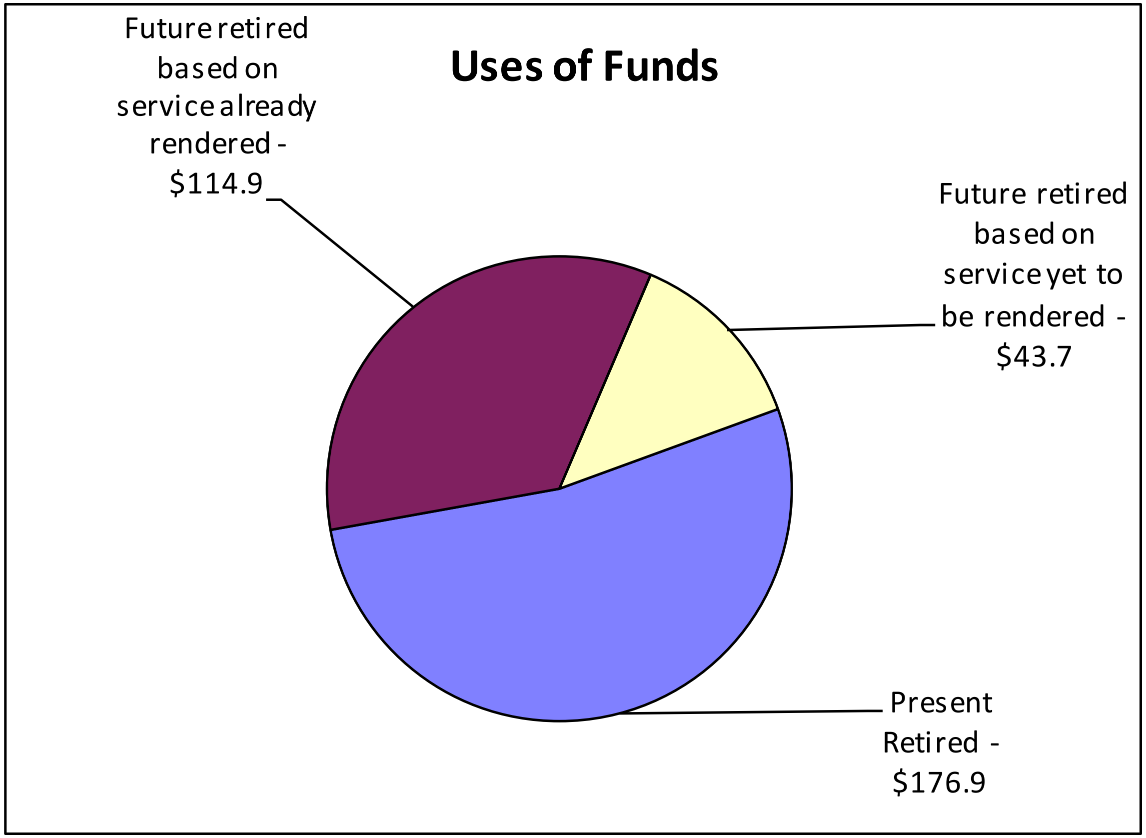
$335.5 Million* of Benefit Promises to Present Active and Retired Members



* *Present value of future benefits; all divisions combined.*

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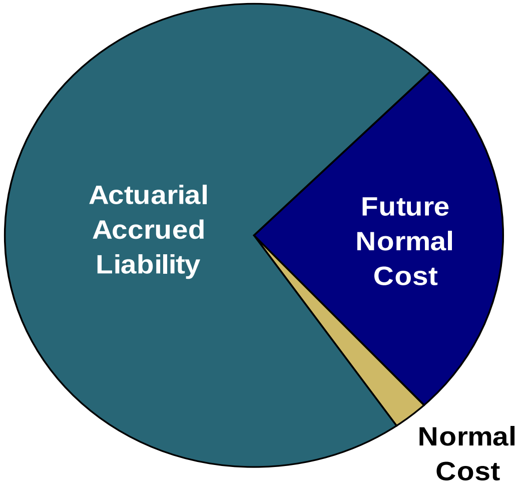
Actuarial Valuation Process

- Present Value of Future Benefits - Present Value (PV) of all Future Benefits payable to current participants (active, retired, terminated vested).
- Actuarial Liability - Portion of PV of Future Benefits allocated to prior years.
- Normal Cost - Portion of PV of Future Benefits allocated to current year.
- Future Normal Costs - Portion of PV of Future Benefits allocated to future years.



Present Value of Future Benefits

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Actuarial Valuation Process

Actuarial Accrued Liability

- Actuarial Value of Assets

Unfunded Actuarial Liability

Annual Contribution Requirement = Normal Cost + Amortization of the Unfunded Liability

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Highlights of 2016 BCERS Actuarial Valuations

- Two separate valuations as of December 31, 2016
  1. Stand alone valuation for Bay-Arenac Behavioral Health Authority (BABH)
     - Reflecting 2015 County-provided legal opinion that BCERS is an Agent-Multiple Employer plan
     - Segregated assets available for BABH benefits only
  2. Valuation for all other groups
- Valuation asset development consistent with prior valuations

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Highlights of 2016 BCERS Actuarial Valuations

	General	DWS	Library	Medical Care Facility	Sheriff's Department	Road Commission	Total	BABH
Participants								
Active	372	55	32	308	72	56	895	220
Retired	343	32	43	224	73	99	814	122
Terminated Vested	28	1	6	11	4	1	51	29
Total	743	88	81	543	149	156	1,760	371
Payroll	$ 15,633,109	$ 3,124,567	$ 1,438,212	$ 9,775,826	$ 3,759,090	$ 3,031,145	$ 36,761,949	$ 10,608,566
Actuarial Accrued Liability	98,421,282	16,015,853	11,230,128	51,057,539	29,763,278	33,545,701	240,033,781	51,801,665
Actuarial Value of Assets	114,943,406	13,276,968	11,895,322	56,335,417	37,690,185	28,344,689	262,485,987	50,204,835
Unfunded Actuarial Accrued Liability	(16,522,124)	2,738,885	(665,194)	(5,277,878)	(7,926,907)	5,201,012	(22,452,206)	1,596,830
Funded Ratio	117%	83%	106%	110%	127%	84%	109%	97%
Contribution Requirement								
Employer Normal Cost	6.50 %	9.68 %	$ 133,273	6.26 %	10.18 %	11.16 %		7.66 %
Amortization Payment for ERIP^								1.28
Amortization Payment	(7.24)	5.23	(58,493)	(3.50)	(14.65)	10.12		0.33
Total	0.00 %	14.91 %	$ 74,780	2.76 %	0.00 %	21.28 %	$ 1,546,699	9.27 %

^ *Amortization payment associated with the Early Retirement Incentive Program (ERIP).*

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Highlights of 2016 BCERS Actuarial Valuations

		Contribution Rate	
	Valuation Year	12/31/2015	12/31/2016
Division	Fiscal Year	1/1/2017	1/1/2018
General County		0.00 %	0.00 %
DWS		12.83	14.91
Library		$ 57,008	$ 74,780
Medical Care Facility		0.27 %	2.76 %
Sheriff's Department		0.00	0.00
Road Commission		19.19	21.28
BABH		8.95 %	9.27 %

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Highlights of 2016 BCERS Actuarial Valuations

- Reflects experience study changes to valuation assumptions and methods for the 2016 valuation.
- Benefit Changes
  - General County: change to the benefit eligibility for the Elected Sheriff and Appointed Undersheriff members within the Elected Officials and Department Heads group
  - Medical Care Facility: grant additional temporary months of service for employees in a temporary position
    - This change impacted a limited number of individuals (both active and retired).

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Highlights of 2016 BCERS Actuarial Valuations

- The aggregate experience during 2016 was favorable, with overall gains.
- Investment return on the market value of assets for calendar year 2016 exceeded the assumed rate of return for the valuation.

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Highlights of 2016 BCERS Actuarial Valuations: Asset Performance

	December 31,									
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Market Value of Assets*	$254.2	$170.2	$206.0	$235.4	$225.7	$246.9	$295.4	$308.1	$300.9	$311.5
Rate of Return	7.52 %	(30.62)%	25.46 %	17.63 %	(1.22)%	12.65 %	23.03 %	7.98 %	0.77 %	7.68 %
Actuarial Value of Assets*	253.5	246.6	243.3	244.7	241.2	239.3	263.4	282.2	296.1	312.7
Rate of Return	9.92 %	0.17 %	1.38 %	3.26 %	1.37 %	2.11 %	13.42 %	11.32 %	8.44 %	9.90 %

** Assets in millions of dollars.*

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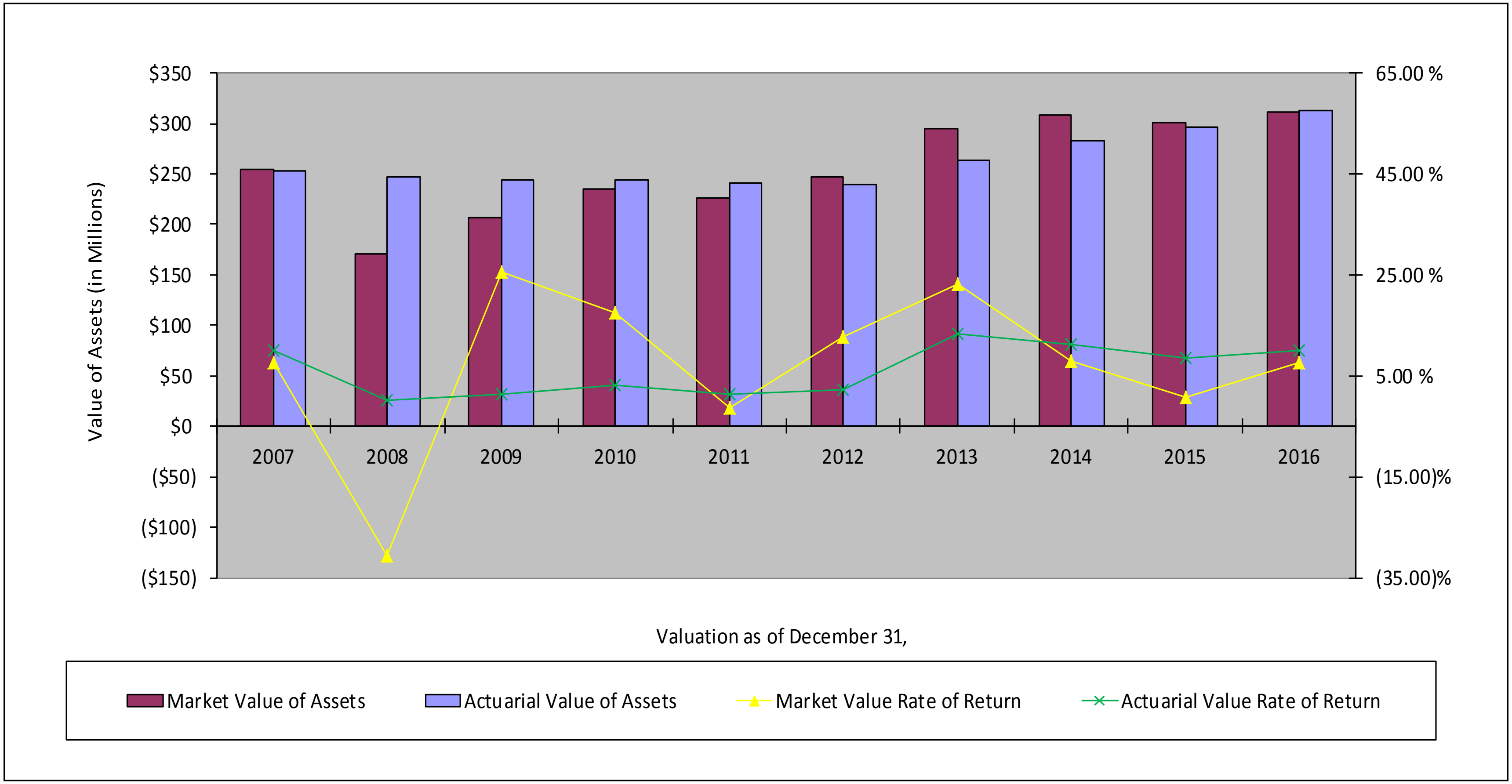
Highlights of 2016 BCERS Actuarial Valuations: Asset Performance



Highlights of 2016 BCERS Actuarial Valuations: Demographic G/(L)

- Gain due to changes in payroll (actual pay increases were less than expected).
  - for General, Library, and Sheriff
- Gain from greater member termination than expected.
  - for BABH, MCF and Sheriff

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Highlights of 2016 BCERS Actuarial Valuations: Transfers

- Members transferred between the General group/Medical Care Facility (MCF) & General group/Sheriff's Department
  - Asset transfer amounts based on member actuarial accrued liability and the funded percent of the group they transferred from
- Recommend Board approval of asset transfers
  - $44,391 from MCF to General County and $285,973 Sheriff's Department to General County

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Highlights of 2016 BCERS Actuarial Valuations: Transfers

- Recommend Board revisit and establish policy consistent with calculations on previous slide for future transfers involving members with more than 10 years of service

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Highlights of 2016 BCERS Actuarial Valuations

- We developed the value of anticipated future benefit payments to retired members and their beneficiaries. We then compared this accrued liability to the reported value of the retirement reserve account. The figures below compare the retired liabilities and the reserves for each division.

Division	Accrued Liability	Reported Retiree Reserve	Unfunded Retiree Liability
General	$ 57,111,634.00	$ 48,347,851.27	$ 8,763,782.73
DWS	10,312,515.00	8,784,845.88	1,527,669.12
Library	6,635,346.00	5,751,583.52	883,762.48
Medical Care Facility	30,659,750.00	26,255,298.81	4,404,451.19
Sheriff's Department	17,064,850.00	14,026,289.03	3,038,560.97
Road Commission	24,677,432.00	21,217,876.97	3,459,555.03
Total	**$ 146,461,527.00**	**$ 124,383,745.48**	**$ 22,077,781.52**

Division	Accrued Liability	Reported Retiree Reserve	Unfunded Retiree Liability
BABH	$ 30,422,314.00	$ 26,625,097.98	$ 3,797,216.02

- As of the valuation date, there is a shortfall in the retiree reserve for all groups.
- The valuation anticipates that the difference between the accrued liability and the reported reserve will be transferred from the Retirement System employer reserve to the retiree reserve effective January 1, 2017 to fully fund the retiree accrued liability.

Highlights of 2016 BCERS Actuarial Valuations

- Contribution rates should trend toward the long-term cost or normal cost of the benefits over time.
  - Experience gains/losses will always serve to deviate contributions from pure normal cost
- All divisions have required employer contributions, except the General County and Sheriff's department.

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Looking Ahead
Asset Smoothing - $ in Thousands

	2016	2017	2018	2019	2020
Actual Investment Return	$ 22,639				
Assumed Investment Return	21,751				
Gain/(Loss) to be phased-in	888				
Phased-in recognition					
• Current year	$ 178				
• First prior year	(3,696)	$ 178			
• Second prior year	760	(3,696)	$ 178		
• Third prior year	7,666	760	(3,696)	$ 178	
• Fourth prior year	2,059	7,666	760	(3,696)	$ 178
Total recognized gain (loss)	$ 6,967	$ 4,908	$ (2,758)	$ (3,518)	$ 178

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Looking Ahead - Contributions

- Asset smoothing helps reduce the volatility of the employer contributions.
  - The funding value of assets is 100% of market value.
  - Remaining phase-in of past market gain and losses from previous valuations.
- The Retirement System will continue to mature.
  - More retirees than active employees.
  - Normal for a prefunded retirement system.

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QUESTIONS

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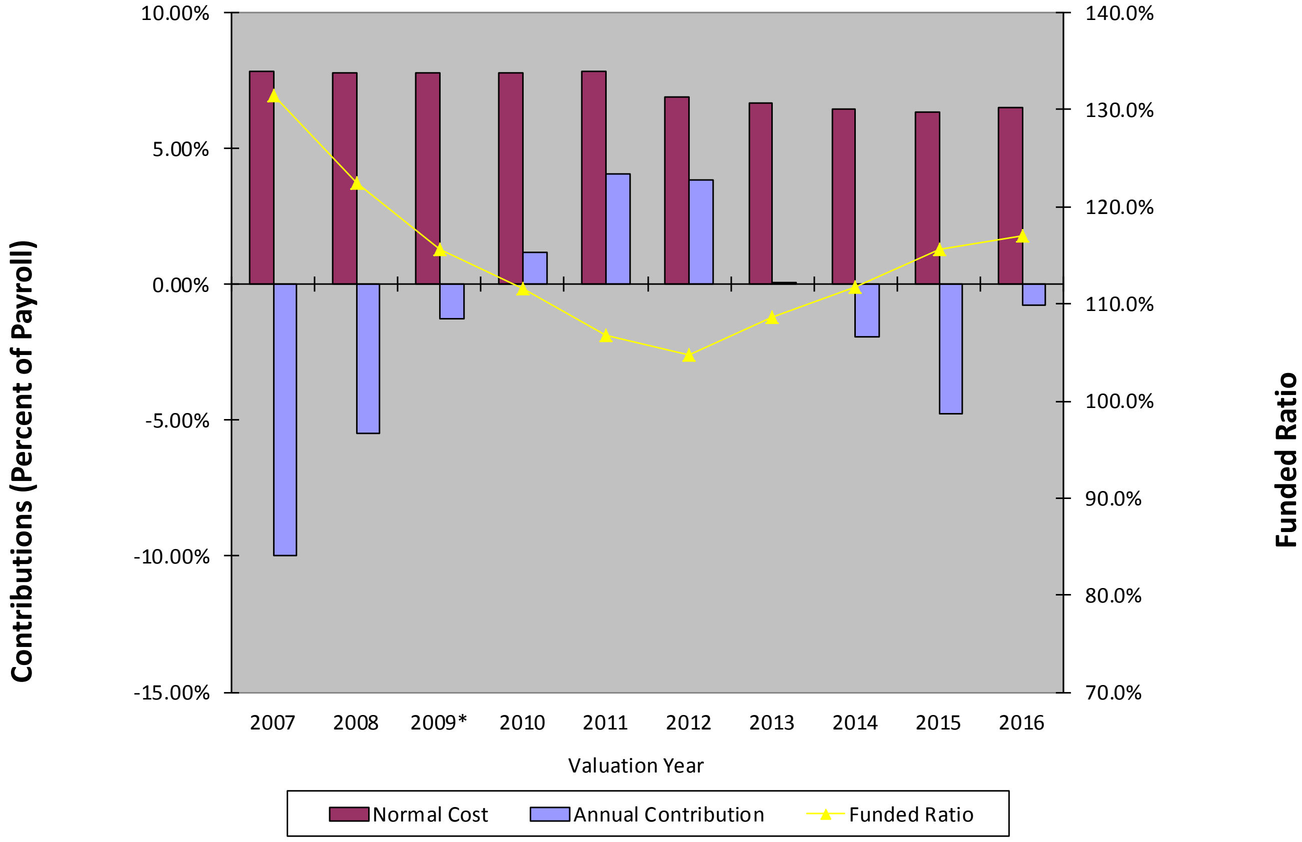
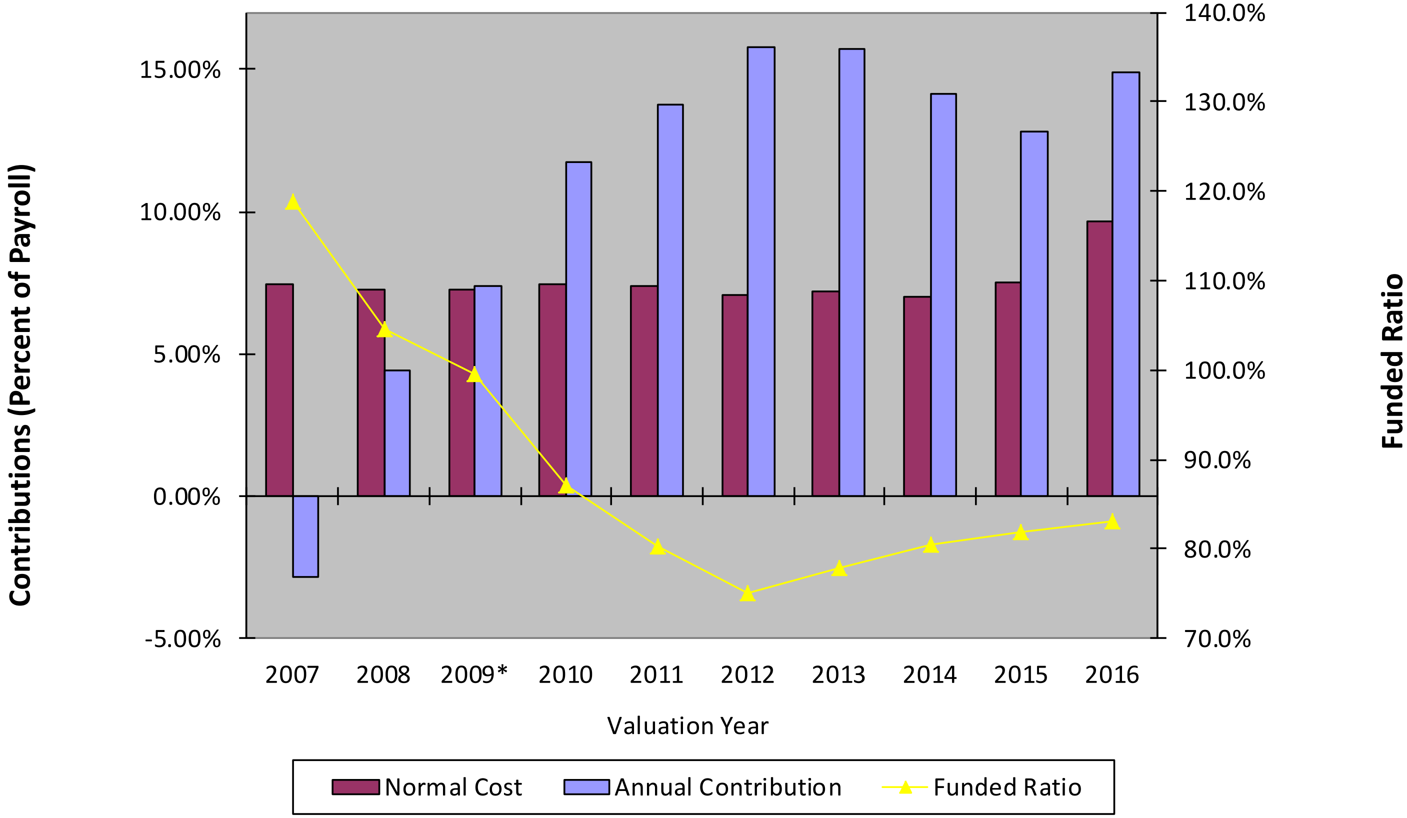
APPENDIX

Historical Information – General



** 2009 valuation implemented a 1-year lag – results used for FY 2010 and FY 2011.*

Historical Information – DWS



** 2009 valuation implemented a 1-year lag – results used for FY 2010 and FY 2011.*

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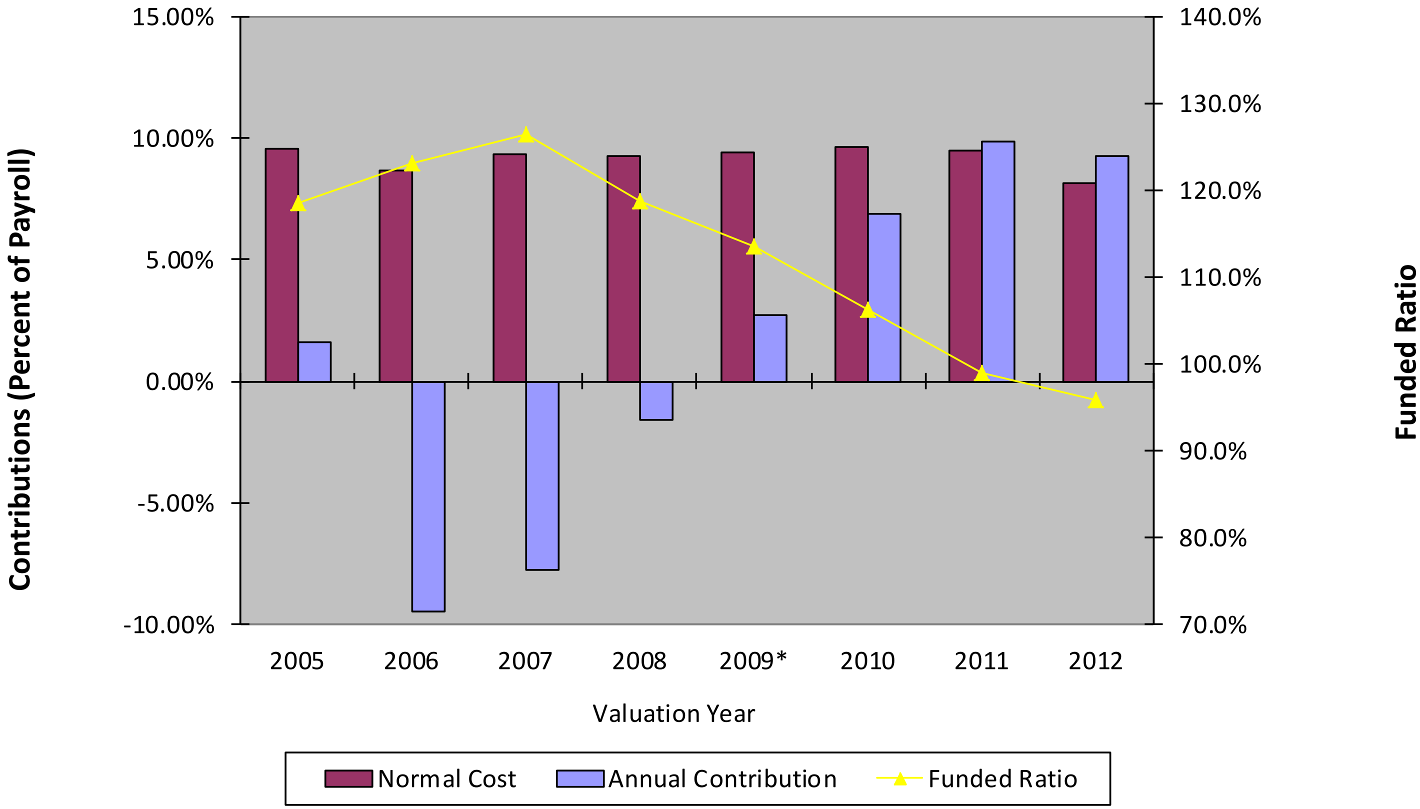
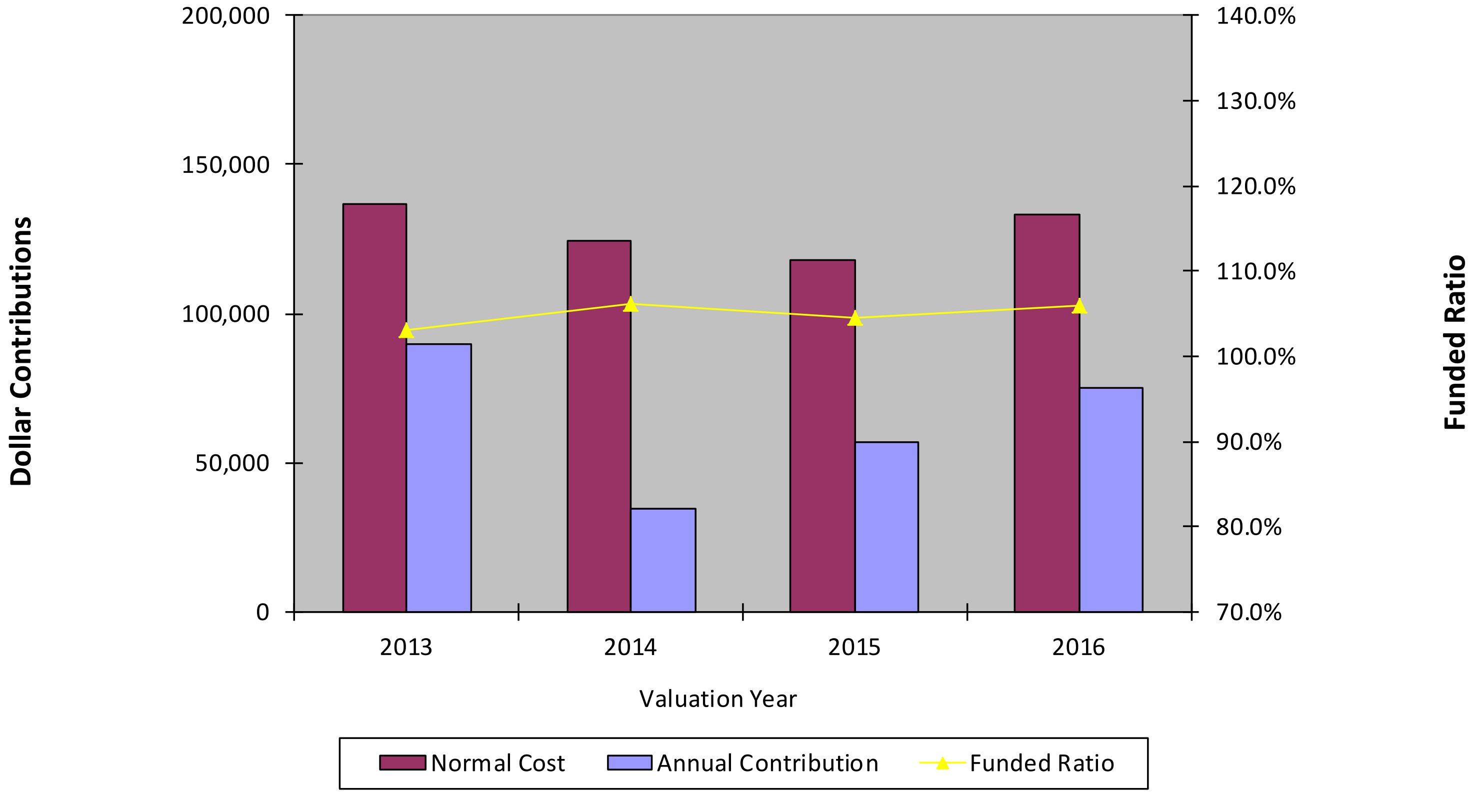
Historical Information – Library



** 2009 valuation implemented a 1-year lag – results used for FY 2010 and FY 2011.*

Historical Information – Library (Concluded)



2013 valuation reflects closure of plan to new hires – contribution expressed as level dollar amount.

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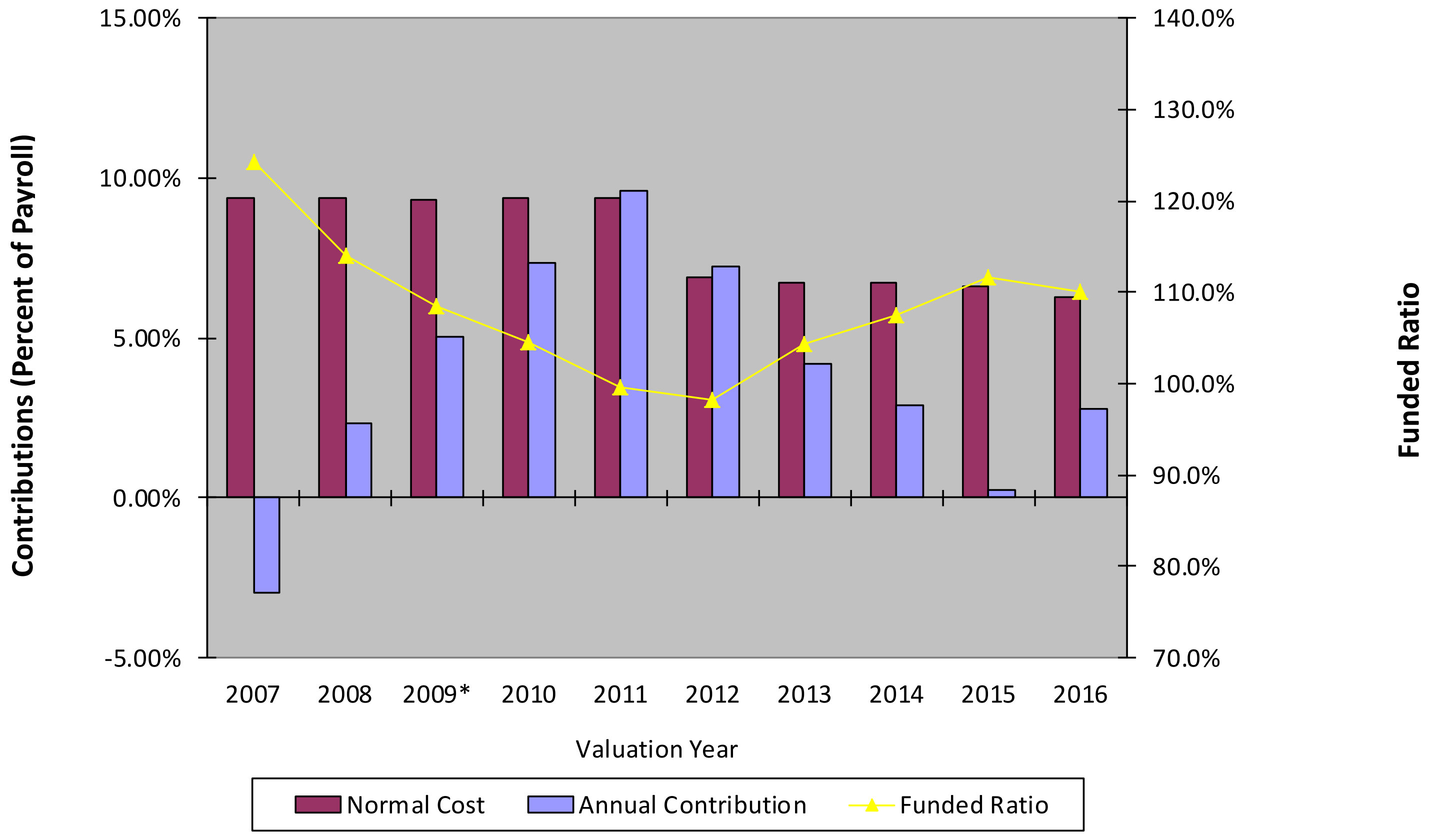
Historical Information – Medical Care Facility



** 2009 valuation implemented a 1-year lag – results used for FY 2010 and FY 2011.*

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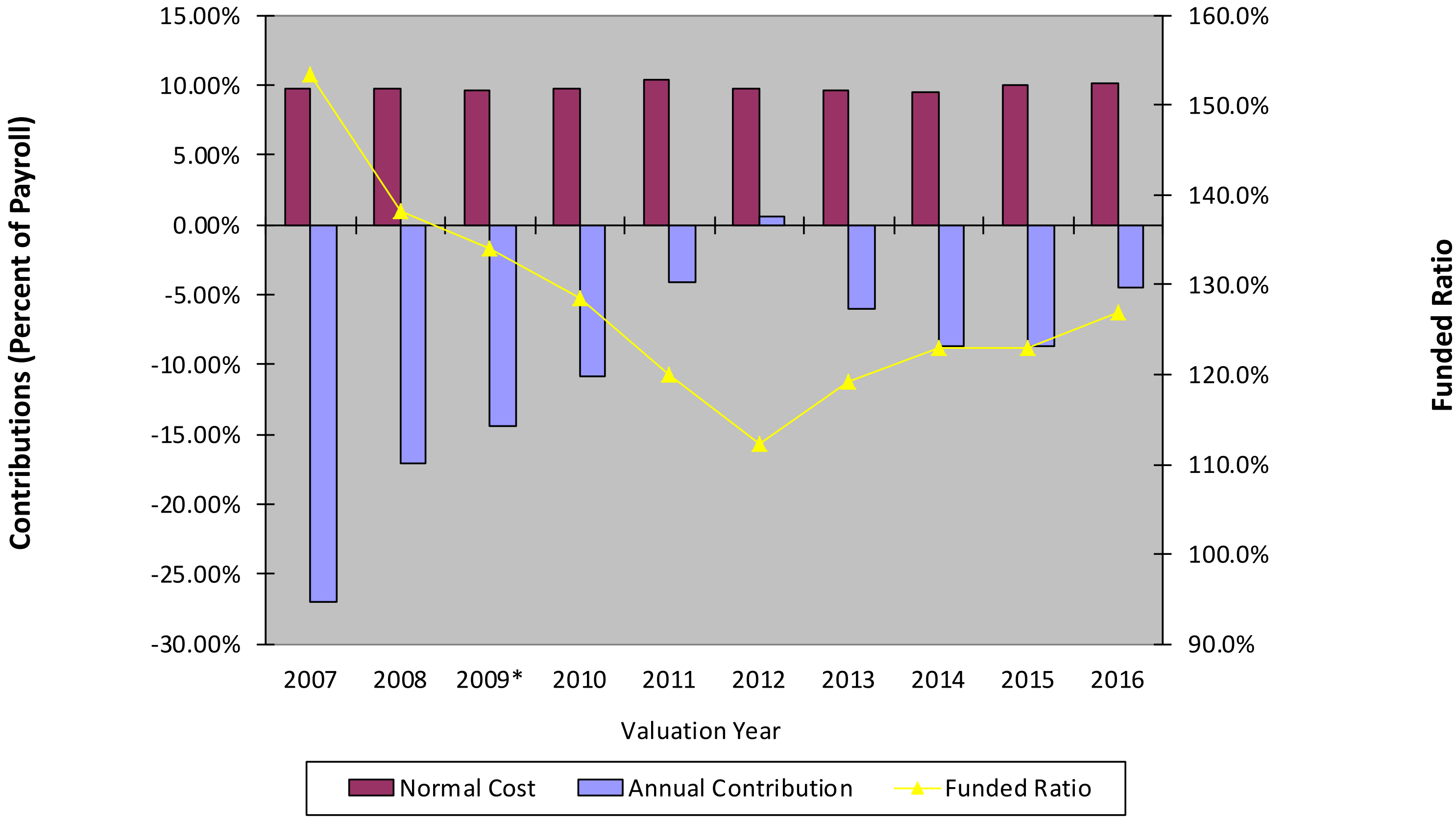
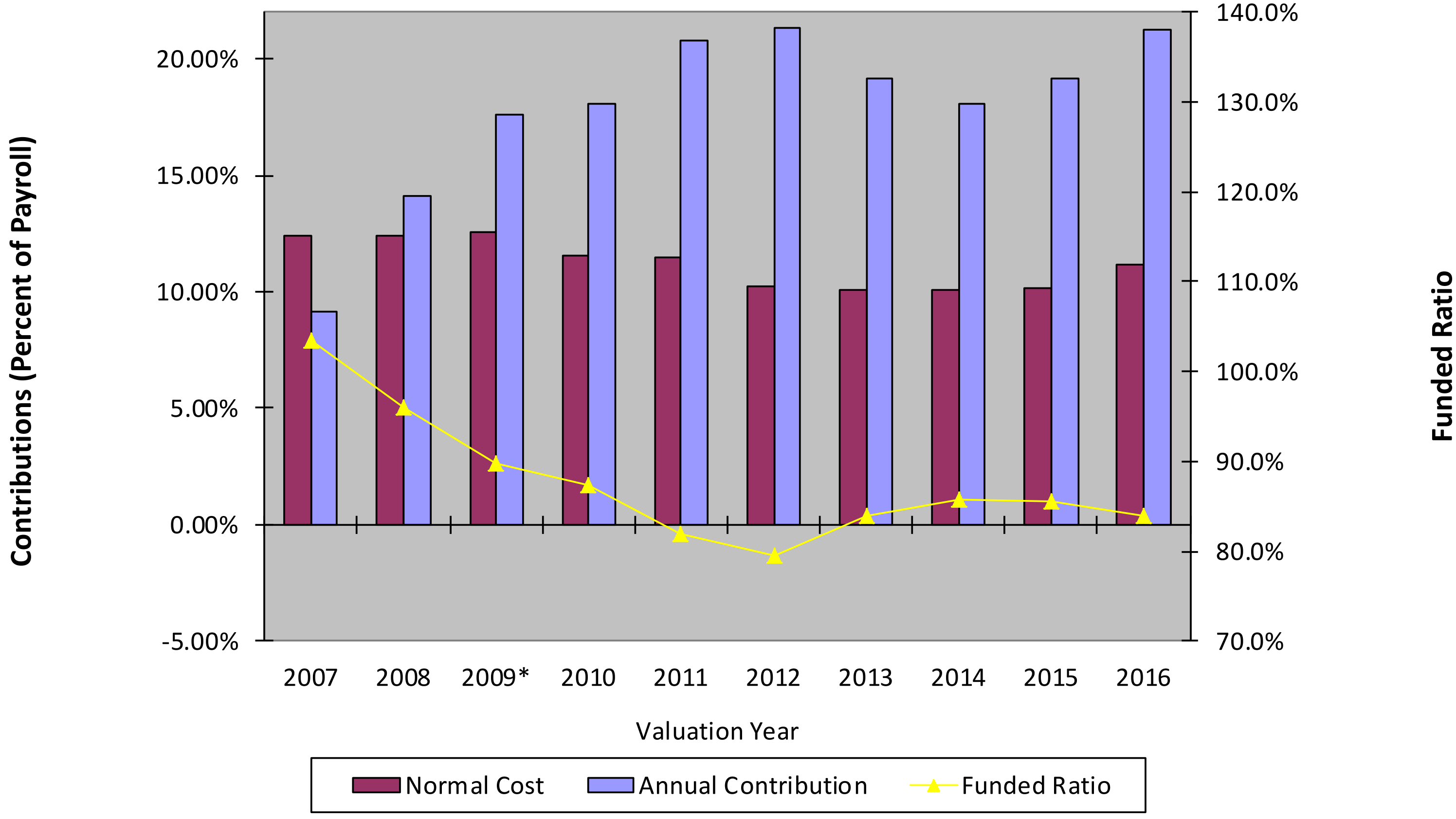
Historical Information – Sheriff's Department



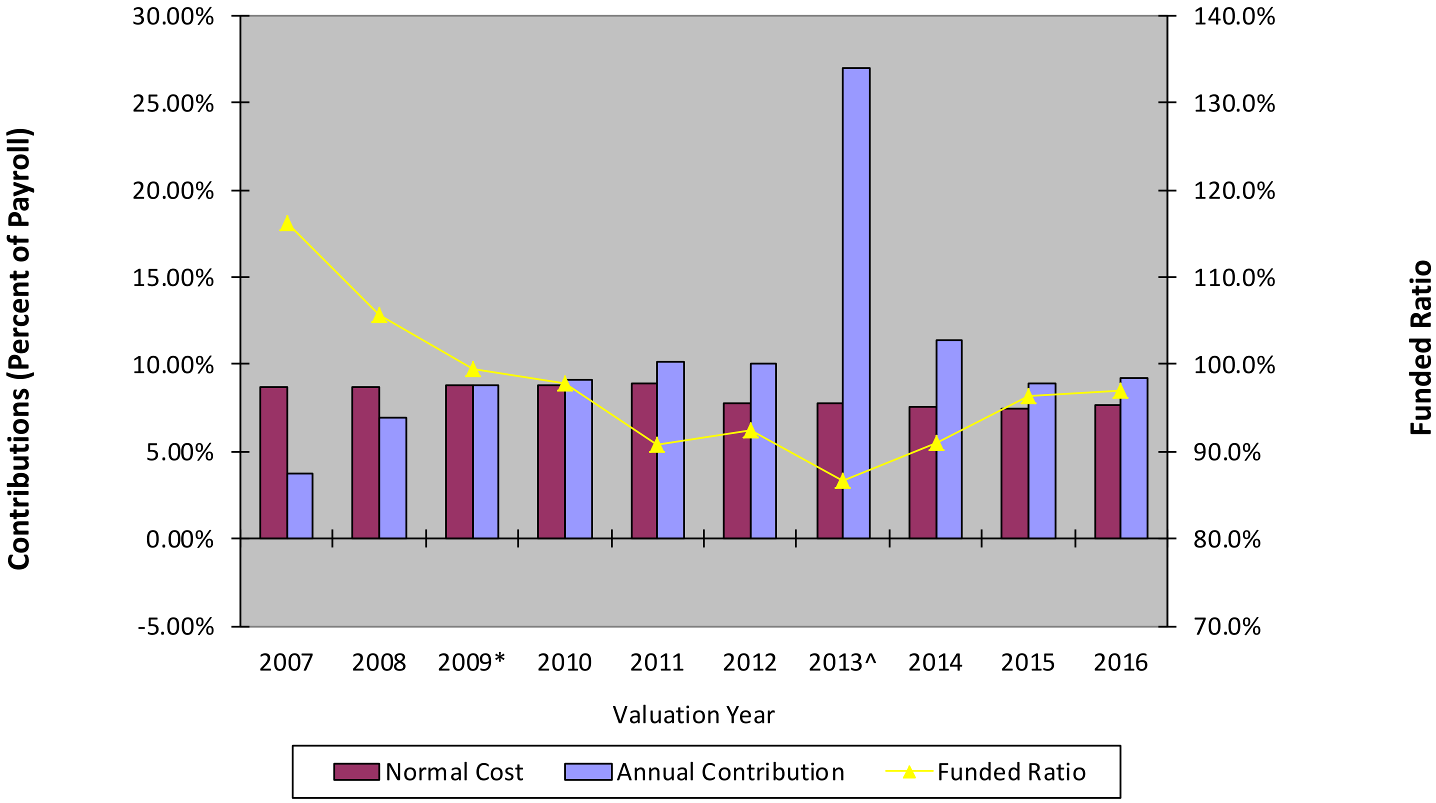
** 2009 valuation implemented a 1-year lag – results used for FY 2010 and FY 2011.*

Historical Information – Road Commission



** 2009 valuation implemented a 1-year lag – results used for FY 2010 and FY 2011.*

Historical Information – BABH



** 2009 valuation implemented a 1-year lag – results used for FY 2010 and FY 2011.*
^ 2013 valuation reflected an advanced payment of the unfunded ERIP liability.

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Disclaimers

- This presentation is one of many documents comprising the December 31, 2016 actuarial valuations of the Bay County Employees' Retirement System. This presentation should not be relied on for any purpose other than the purpose described in the valuation report.

- 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.

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Disclaimers

- This presentation shall not be construed to provide tax advice, legal advice or investment advice.
- James D. Anderson and Shana M. Neeson are independent of the plan sponsor, are Members of the American Academy of Actuaries (MAAA), and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein.

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