ARIZONA STATE RETIREMENT SYSTEM

ANNUAL ACTUARIAL VALUATION – FUNDING

AS OF JUNE 30, 2017

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January 24, 2018

Board of Trustees
Arizona State Retirement System
3300 North Central Avenue, 14th Floor
Phoenix, Arizona 85012

Re: Actuarial Valuation for Funding Purposes as of June 30, 2017

Members of the Board:

We certify that the information contained in this report is accurate and fairly presents the actuarial position of the Arizona State Retirement System as of June 30, 2017. This report was prepared at the request of the Board and is intended for use by ASRS staff and those designated or approved by the Board. This report may be provided to parties other than ASRS only in its entirety and only with the permission of the Board.

Actuarial Valuation

The primary purposes of the actuarial valuation report are to determine the employer and member contribution rates, describe the current financial condition of ASRS, analyze changes in the condition of ASRS, and provide various summaries of the data.

Plan Provisions

Our actuarial valuation as of June 30, 2017 reflects the benefit and contribution provisions set forth in Title 38 Chapter 5 Article 2 of the Arizona Revised Statutes. The current plan provisions are outlined in Appendix I of this report.

Actuarial Assumptions and Methods

The assumptions and methods applied in this actuarial valuation were adopted by the Board of Trustees on October 27, 2017 based on the Report on the Actuarial Experience Study covering a five-year period from July 1, 2011 to June 30, 2016, dated October 18, 2017. We believe the assumptions are internally consistent and are reasonable, based on the actual experience of ASRS.

The results of the actuarial valuation are dependent upon the actuarial assumptions used. Actual results can and almost certainly will differ, as actual experience deviates from the assumptions. Even seemingly minor changes in the assumptions can materially change the liabilities, calculated contribution rates and funding periods. A review of the impact of a different set of assumptions on the funded status of the plan is outside the scope of this actuarial valuation.

The current actuarial assumptions and methods are outlined in Appendix III of this report.

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Data

The valuation was based upon information as of June 30, 2017, furnished by ASRS staff, concerning system benefits, financial transactions, plan provisions and active members, terminated members, retirees and beneficiaries. We checked for internal and year-to-year consistency, but did not audit the data. We are not responsible for the accuracy or completeness of the information provided by ASRS staff.

Certification

All of our work conforms with generally accepted actuarial principles and practices, and to the Actuarial Standards of Practice issued by the Actuarial Standards Board. In our opinion, our calculations also comply with the requirements of, where applicable, the Internal Revenue Code and ERISA.

The signing actuaries are independent of the plan sponsor. Ryan Falls and Joe Newton are Enrolled Actuaries, Fellows of the Society of Actuaries, and Members of the American Academy of Actuaries and Paul Wood is an Associate of the Society of Actuaries and a Member of the American Academy of Actuaries. All three meet the Qualification Standards of the American Academy of Actuaries. Finally, each of the undersigned are experienced in performing valuations for large public retirement systems.

Respectfully submitted,
Gabriel, Roeder, Smith & Company

R. Ryan Falls, FSA, EA, MAAA
Senior Consultant and Actuary

Joseph P. Newton, FSA, EA, MAAA
Pension Market Leader and Actuary

Paul T. Wood, ASA, FCA, MAAA
Consultant and Actuary

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SECTION A

EXECUTIVE SUMMARY

Executive Summary

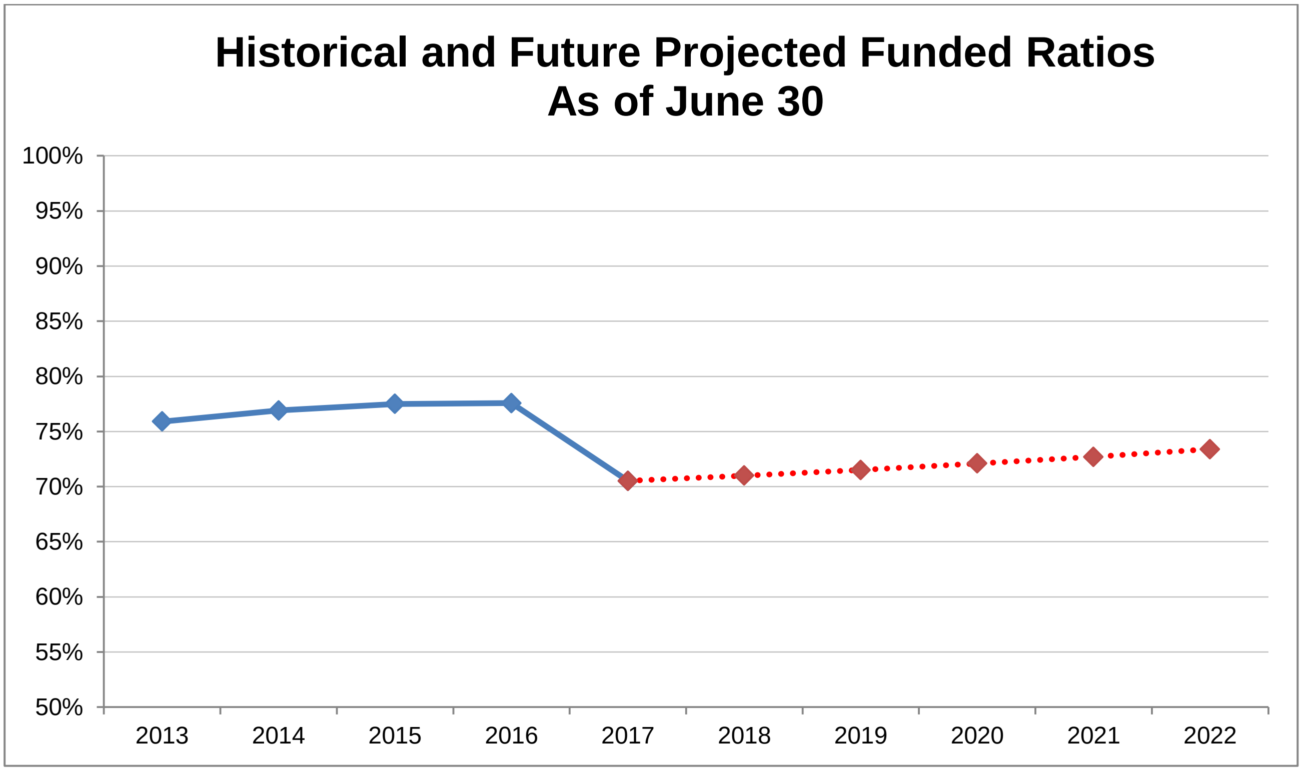
Item	2017	2016
Membership		
• Number of		
- Active members	206,055	204,162
- Retirees, beneficiaries, and disableds*	142,117	136,026
- Inactive non-retired members	228,490	222,260
- Long term disabled (LTD)	3,534	3,797
- Total	580,196	566,245
• Valuation Payroll for subsequent fiscal year	$ 9,598,270,045	$ 9,263,859,477
Contribution rates - Before Phase In Policy	FYE 2019	FYE 2018
• Members	12.97%	11.34%
• Employers	12.97%	11.34%
Contribution rates - After Phase In Policy	FYE 2019	FYE 2018
• Members	11.64%	N/A
• Employers	11.64%	N/A
Assets		
• Market value (MVA)**	$ 37,783,302,345	$ 34,292,592,169
• Actuarial value (AVA)**	$ 36,806,856,334	$ 35,761,373,386
• Return on market value	13.6%	0.6%
• Return on actuarial value	6.1%	6.6%
Actuarial Information on AVA (smoothed)		
• Actuarial accrued liability**	$ 52,189,000,274	$ 46,104,924,533
• Unfunded actuarial accrued liability (UAAL)**	$ 15,382,143,940	$ 10,343,551,147
• Funded ratio	70.5%	77.6%
Actuarial Information on MVA		
• Unfunded actuarial accrued liability (UAAL)**	$ 14,405,697,929	$ 11,812,332,364
• Funded ratio	72.4%	74.4%

** Excludes System members and members currently receiving benefits from the LTD Program*

*** Includes liabilities and assets for System members who retired or will retire on or after July 1, 1981.*

The Board made the policy decision to phase in the impact to the contribution of the assumption changes over a five year period. This phase in resulted in a total contribution rate of 23.28% of total payroll effective July 1, 2018. This policy provides for a smooth transition to the higher contribution rates over a reasonable period of time.

The following chart illustrates the recent history and outlook of the funded status of ASRS over the next five years:



June 30,	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Funded Ratio	75.9%	76.9%	77.5%	77.6%	70.5%	71.0%	71.5%	72.1%	72.7%	73.4%
UAAL (in billions)	$10.0	$9.9	$10.0	$10.3	$15.4	$15.6	$15.7	$15.8	$15.9	$15.9
EE/ER Contribution	11.48%	11.35%	11.34%	11.34%	11.64%	11.94%	12.24%	12.54%	12.83%	12.79%

The projections beyond 2017 are based on the same assumptions, methods and provisions used for the June 30, 2017 valuation. The contribution rates above reflect the Board's phase in policy.

The significant decline in 2017 was due to the changes in assumptions, most notably the decrease in the investment return assumption to 7.5%. Prospectively, the funded status is expected to improve annually. Assuming the market value of assets earns 7.50% per year; ASRS is projected to reach full funding in 2046.

SECTION B

DISCUSSION

Discussion

Introduction

The results of the June 30, 2017 actuarial valuation of the Arizona State Retirement System are presented in this report.

The primary purposes of this actuarial valuation report are to determine the employer and member contribution rates, describe the current financial condition of ASRS, analyze the changes in the condition of ASRS, and provide various summaries of the data.

The total contribution rate for fiscal year ending June 30, 2019, is 23.28% of payroll. This contribution rate is shared equally between the employer and the employee.

All of the tables referenced in the following discussion appear in Section C of this report.

Plan Provisions

There were no changes to the plan provisions during the past year. The current plan provisions and a history of changes made to the plan provisions are outlined in Appendix I of this report.

Actuarial Assumptions and Methods

The assumptions and methods applied in this actuarial valuation were adopted by the Board of Trustees on October 27, 2017 based on the Report on the Actuarial Experience Study covering a five-year period from July 1, 2011 to June 30, 2016, dated October 18, 2017. The notable assumption and method changes reflected in this actuarial valuation include:

- Changing the actuarial cost method to the Entry Age Normal actuarial cost method,
- Lowering nominal investment return assumption to 7.50%,
- Establishing an explicit administrative expense assumption of 0.25% of payroll,
- Reflecting the potential for future PBI’s in the funding calculations, and
- Updating the healthy retiree mortality to the 2017 State Retirees of Arizona mortality table with generational mortality improvements using the Ultimate MP scales.

We believe the assumptions are internally consistent and are reasonable, based on the actual experience of ASRS.

The results of the actuarial valuation are dependent upon the actuarial assumptions used. Actual results can and almost certainly will differ, as actual experience deviates from the assumptions. Even seemingly minor changes in the assumptions can materially change the liabilities, calculated contribution rates and funding periods. A review of the impact of a different set of assumptions on the funded status of ASRS is outside the scope of this actuarial valuation.

The current actuarial assumptions and methods are outlined in Appendix III of this report.

Funding Adequacy

The financial objectives of the Plan are to: (1) maintain reasonably stable contribution rates, and (2) achieve an ultimate funded status of 100%. In order to achieve these objectives, the Board has adopted a closed 30-year amortization period with level percent of pay payments for the 401(a) portion of the Plan and a 15-year period for the 401(h) portion. Furthermore, the Board made the policy decision to phase in the impact to the contribution of the assumption changes over a five year period. This policy provides for a smooth transition to the ultimate contribution rates over a reasonable period of time.

The actuarial valuation includes a calculation of the contribution rates payable by members and participating employers. These rates, when applied to payroll, yield contribution amounts sufficient to fund the normal cost plus the amortization of the unfunded actuarial accrued liability. Contribution rates are set annually, based on the valuation of the preceding year. The rate calculated in this report (23.28% of payroll) will apply in the fiscal year beginning July 1, 2018. The rate calculated as part of the prior valuation (22.68% of payroll) applied in the fiscal year that began July 1, 2017. Employers and employees share equally in the contribution rate determined as part of the valuation.

The unfunded actuarial accrued liability (UAAL) of ASRS increased from $10.3 billion as of June 30, 2016 to $15.4 billion as of June 30, 2017. Additionally, the funded ratio of ASRS—actuarial value of assets divided by the actuarial accrued liability—decreased from 77.6% to 70.5% as of June 30, 2017. Both of these changes were almost entirely due to the change in actuarial assumptions. The funded status is one of many metrics used to show trends and develop future expectations about the health of a retirement system. The funded status measure itself is not appropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations or assessing the need for or the amount of future contributions since it does not reflect normal cost contributions, the timing of amortization payments, or future experience other than expected.

System Assets

This report contains several tables that summarize key information with respect to the ASRS assets.

The total market value of assets increased from $34.3 billion to $37.8 billion (including the System assets) as of June 30, 2017. Table 5 reconciles the changes in the fund during the year.

Table 6A shows the development of the actuarial value of assets for the 401(a) and 401(h) portions of ASRS. Similarly, Table 6B shows the development of the actuarial valuation of assets for the System. Rather than use the ASRS' market value of assets, the valuation reflects a smoothed asset value. The actuarial value of assets is equal to the market value of assets less a ten-year phase-in of the difference between the expected investment return and actual income on the market value of assets. The actuarial value is currently 2.6% less than the market value.

The approximate investment return for the fiscal year ending June 30, 2017 was 13.6% when measured on market value and 6.1% when measured on actuarial value. Table 7 shows a history of return rates. The ASRS ten-year average market return, net of administrative and investment expenses is 5.6%.

Table 8 provides a history of the contributions paid into ASRS and the administrative expenses and benefit payments that have been paid out of ASRS. This table shows that ASRS paid administrative expenses and benefit payments, in excess of contributions received, of $1,065 million (or 2.8% of assets) in fiscal year 2017.

Data

The valuation was based upon information as of June 30, 2017, furnished by ASRS staff, concerning system benefits, financial transactions, plan provisions and active members, terminated members, retirees and beneficiaries. We checked for internal and year-to-year consistency, but did not audit the data. We are not responsible for the accuracy or completeness of the information provided by ASRS staff.

The tables in Appendix III show key census statistics for the various groups included in the valuation.

Permanent Benefit Increase

The determination of the "Excess Investment Earnings" held in reserve for future Permanent Benefit Increases (PBIs) is shown in Table 12. There are no assets available for future PBIs. Since the investment return (on the actuarial value of assets) of 6.1% is below 8% for fiscal year 2017, there are no additional "Excess Investment Earnings" to be allocated for PBIs.

SECTION C

TABLES

Table 1

Development of Employer Cost

	June 30, 2017 Final Assumptions 401(a)	401(h)	Total	June 30, 2017 Prior Assumptions Total
I. Actuarial accrued liabilities (AAL)				
A. Liabilities due to members' benefits				
1. Active members				
a. Retirement benefits	$ 18,931,141,673	$ 0	$ 18,931,141,673	$ 13,935,655,579
b. Health insurance premium supplement	0	615,509,645	615,509,645	676,710,918
c. Disability deferred retirement benefits	372,229,397	0	372,229,397	378,420,907
d. Pre-retirement death benefits	428,723,216	0	428,723,216	264,324,070
e. Withdrawal benefits	(1,149,819,283)	0	(1,149,819,283)	1,373,341,374
f. Total active members	**$ 18,582,275,003**	**$ 615,509,645**	**$ 19,197,784,648**	**$ 16,628,452,848**
2. Inactive members	2,516,151,397	90,879,471	2,607,030,868	2,425,528,082
3. Retired members and beneficiaries	28,123,247,976	817,799,444	28,941,047,420	27,292,048,979
4. Formerly disabled members now receiving benefits	1,063,035,116	41,989,100	1,105,024,216	1,059,756,995
5. Benefit increases for other-than-plan members	490,682	4,061,702	4,552,384	4,687,300
6. Post-1981 System members	333,560,738	0	333,560,738	357,386,108
7. Total actuarial accrued liabilities	**$ 50,618,760,912**	**$ 1,570,239,362**	**$ 52,189,000,274**	**$ 47,767,860,312**
II. Actuarial value of assets	**$ 35,268,099,197**	**$ 1,538,757,137**	**$ 36,806,856,334**	**$ 36,806,856,334**
III. Unfunded actuarial accrued liability (Item I. – Item II.)	**$ 15,350,661,715**	**$ 31,482,225**	**$ 15,382,143,940**	**$ 10,961,003,978**
IV. Amortization of unfunded actuarial accrued liability (per Section 38-737)				
A. Unfunded AAL amortization at beginning of fiscal year 2018	$ 1,013,976,167	$ 5,079,103	$ 1,019,055,270	$ 945,452,420
B. Interest to middle of year on A	38,024,106	190,466	38,214,572	37,818,097
C. Expected alternate contributions	(27,237,720)	(294,144)	(27,531,864)	(27,531,864)
D. Total unfunded actuarial accrued liability amortization (A+B+C)	**$ 1,024,762,553**	**$ 4,975,425**	**$ 1,029,737,978**	**$ 955,738,653**
V. Normal cost for the year				
A. Normal cost at beginning of fiscal year 2018	$ 1,394,312,898	$ 48,513,849	$ 1,442,826,747	$ 1,280,306,817
B. Interest to middle of year on A	52,286,734	1,819,269	54,106,003	51,212,273
C. Assumed Administrative Expenses	23,768,562	827,005	24,595,567	N/A
D. Total normal cost for the year (A+B)	**$ 1,470,368,194**	**$ 51,160,123**	**$ 1,521,528,317**	**$ 1,331,519,090**
VI. Total contribution for the year (Item IV. + Item V.)	**$ 2,495,130,747**	**$ 56,135,548**	**$ 2,551,266,295**	**$ 2,287,257,743**
VII. Total covered payroll (projected to 2017/2018 plan year)	**$ 9,838,226,796**	**$ 9,838,226,796**	**$ 9,838,226,796**	**$ 9,890,512,022**
VIII. Total contribution for fiscal year 2018 as a percentage of covered payroll (Before Phase in Policy)				
A. Member portion	12.97%	0.00%	12.97%	11.57%
B. Employer portion	12.39%	0.58%	12.97%	11.57%
C. Total	**25.36%**	**0.58%**	**25.94%**	**23.14%**
IX. Total contribution for fiscal year 2018 as a percentage of covered payroll (After Phase In Policy)				
A. Member portion	11.64%	0.00%	11.64%	N/A
B. Employer portion	11.18%	0.46%	11.64%	N/A
C. Total	**22.82%**	**0.46%**	**23.28%**	**N/A**
X. Funded Status				
A. Funded Status on Actuarial Value of Assets	69.7%	98.0%	70.5%	77.1%
B. Market Value of Assets	$ 36,202,703,337	$ 1,580,599,008	$ 37,783,302,345	$ 37,783,302,345
C. Funded Status on Market Value of Assets	71.5%	100.7%	72.4%	79.1%

The Board made the policy decision to phase in the impact to the contribution of the assumption changes over a five year period. This resulted in a total contribution rate of 23.28% of total payroll effective July 1, 2018. This policy provides for a smooth transition to the higher contribution rates over a reasonable period of time.

Table 2

Actuarial Present Value of Future Benefits

			401(a)		401(h)
1.	Active Members				
	a. Retirement benefits	$	23,411,539,511	$	836,018,909
	b. Disability deferred retirement benefits		614,244,726		37,617,260
	c. Pre-retirement death benefits		640,695,438		0
	d. Withdrawal benefits		2,619,348,570		8,908
	e. Total	**$**	**27,285,828,245**	**$**	**873,645,077**
2.	Inactive members	$	2,516,151,397	$	90,879,471
3.	Retired members and beneficiaries		28,123,247,976		817,799,444
4.	Formerly disabled members now receiving benefits		1,063,035,116		41,989,100
5.	Benefit increases for other-than-plan members		490,682		4,061,702
6.	Post-1981 System members		333,560,738		0
4.	Total Actuarial Present Value of Future Benefits	**$**	**59,322,314,154**	**$**	**1,828,374,794**

Table 3

Analysis of Normal Cost

		401(a)	401(h)
1.	Gross Normal Cost Dollar		
	a. Retirement benefits	$ 785,206,291	$ 47,133,656
	b. Disability deferred retirement benefits	41,194,272	3,197,645
	c. Pre-retirement death benefits	37,724,734	0
	e. Termination	582,474,335	1,817
	f. Administrative Expenses	23,768,562	827,005
	g. Total	**$ 1,470,368,194**	**$ 51,160,123**
2.	Gross Normal Cost Rate		
	a. Retirement benefits	7.99%	0.48%
	b. Disability deferred retirement benefits	0.42%	0.03%
	c. Pre-retirement death benefits	0.38%	0.00%
	e. Termination	5.92%	0.00%
	f. Administrative Expenses	0.24%	0.01%
	g. Total	**14.95%**	**0.52%**

Table 4

Historical Summary of Active Member Data

Valuation as of June 30	Active Members: Number	Active Members: Percent Increase	Covered Payroll: Amount in $ Millions	Covered Payroll: Percent Increase	Average Salary: $ Amount	Average Salary: Percent Increase	Average Age	Average Service
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
2009	222,515	N/A	9,835	N/A	44,198	N/A	45.2	8.8
2010	213,530	-4.0%	9,420	-4.2%	44,115	-0.2%	45.5	9.2
2011	208,939	-2.2%	9,061	-3.8%	43,365	-1.7%	45.7	9.4
2012	203,994	-2.4%	8,869	-2.1%	43,475	0.3%	45.8	9.6
2013	202,693	-0.6%	8,753	-1.3%	43,182	-0.7%	45.7	9.6
2014	203,201	0.3%	8,909	1.8%	43,841	1.5%	45.7	9.6
2015	203,252	0.0%	9,072	1.8%	44,636	1.8%	45.7	9.6
2016	204,162	0.4%	9,264	2.1%	45,375	1.7%	45.6	9.6
2017	206,055	0.9%	9,598	3.6%	46,581	2.7%	45.4	9.4

Table 5

Reconciliation of Plan Net Assets

		401(a)	401(h)
1.	Market value of assets at beginning of year	$ 32,586,838,750	$ 1,432,937,544
2.	Revenue for the year		
	a. Contributions for the year		
	i. Employer	$ 1,053,180,791	$ 53,913,995
	ii. Member	1,079,239,845	0
	iii. Member reimbursement of member contributions	14,109,165	0
	iv. Total	$ 2,146,529,801	$ 53,913,995
	b. Investment income for the year (net of investment expenses)	$ 4,372,088,321	$ 190,761,436
	c. Total revenue	$ 6,518,618,122	$ 244,675,431
3.	Disbursements for the year		
	a. Retirement and disability benefits	$ 2,849,047,130	$ 95,720,036
	b. Death benefits	40,753,765	0
	c. Refunds	249,546,933	0
	d. Transfers from other plans	(540,026)	0
	e. Transfers to PSPRS	1,030,867	0
	f. Other	747,603	0
	g. Administrative expenses	27,672,552	1,293,931
	h. Total disbursements	$ 3,168,258,824	$ 97,013,967
4.	Increase in net assets (Item 2c - Item 3h)	$ 3,350,359,298	$ 147,661,464
5.	Market value of assets at end of year (Item 1 + Item 4)	$ 35,937,198,048	$ 1,580,599,008
6.	Actual net investment income (Item 2b - Item 3g)	$ 4,344,415,769	$ 189,467,505
7.	Expected net income at 8%		
	a. Market value of assets at beginning of year	$ 2,606,947,100	$ 114,635,004
	b. Contributions for the year	85,861,192	2,156,560
	c. Disbursements (excluding administrative expenses)	(136,092,072)	(4,147,868)
	d. Total	$ 2,556,716,220	$ 112,643,696
8.	Excess investment income (Item 6 - Item 5d)	$ 1,787,699,549	$ 76,823,809
9.	Estimated dollar weighted market yield	13.59%	13.46%

Table 6A

Development of Actuarial Value of Assets – Plan

			401(a)	401(h)
1.	Excess (shortfall) on assets for last nine years:			
	a. Current year		$ 1,787,699,549	$ 76,823,809
	b. Current year - 1		(2,418,716,644)	(104,347,895)
	c. Current year - 2		(1,806,094,137)	(76,888,776)
	d. Current year - 3		3,179,372,871	139,750,375
	e. Current year - 4		1,268,151,988	53,775,488
	f. Current year - 5		(1,792,377,102)	(81,616,387)
	g. Current year - 6		3,588,521,827	162,067,515
	h. Current year - 7		1,259,547,369	56,654,835
	i. Current year - 8		(6,298,770,518)	(280,417,337)
2.	Deferral of excess (shortfall) on assets:			
	a. Current year	(90% deferral)	1,608,929,594	69,141,428
	b. Current year - 1	(80% deferral)	(1,934,973,315)	(83,478,316)
	c. Current year - 2	(70% deferral)	(1,264,265,896)	(53,822,143)
	d. Current year - 3	(60% deferral)	1,907,623,723	83,850,225
	e. Current year - 4	(50% deferral)	634,075,994	26,887,744
	f. Current year - 5	(40% deferral)	(716,950,841)	(32,646,555)
	g. Current year - 6	(30% deferral)	1,076,556,548	48,620,255
	h. Current year - 7	(20% deferral)	251,909,474	11,330,967
	i. Current year - 8	(10% deferral)	(629,877,052)	(28,041,734)
	j. Total deferred		$ 933,028,229	$ 41,841,871
3.	Market value of assets			
	a. Excluding System assets		$ 35,937,198,048	$ 1,580,599,008
	b. Including System assets		$ 36,202,703,337	$ 1,580,599,008
4.	Actuarial value of assets			
	a. Excluding System assets (Item 3a - Item 2j)		$ 35,004,169,819	$ 1,538,757,137
	b. Including System assets		$ 35,268,099,197	$ 1,538,757,137

Table 6B

Development of Actuarial Value of Assets – System

			System Only
1.	Excess (shortfall) on assets for last nine years:		
	a. Current year		$ 14,617,338
	b. Current year - 1		(23,355,338)
	c. Current year - 2		(22,543,836)
	d. Current year - 3		27,750,764
	e. Current year - 4		14,578,335
	f. Current year - 5		(26,115,426)
	g. Current year - 6		54,309,075
	h. Current year - 7		24,922,896
	i. Current year - 8		(118,851,796)
2.	Deferral of excess (shortfall) on assets:		
	a. Current year	(90% deferral)	13,155,604
	b. Current year - 1	(80% deferral)	(18,684,270)
	c. Current year - 2	(70% deferral)	(15,780,685)
	d. Current year - 3	(60% deferral)	16,650,458
	e. Current year - 4	(50% deferral)	7,289,168
	f. Current year - 5	(40% deferral)	(10,446,170)
	g. Current year - 6	(30% deferral)	16,292,723
	h. Current year - 7	(20% deferral)	4,984,579
	i. Current year - 8	(10% deferral)	(11,885,180)
	j. Total deferred		$ 1,576,227
3.	Market value of assets		$ 265,558,401
4.	Actuarial value of assets		$ 263,982,174
5.	Allocation of System assets		
	a. Percent of total System liability for members retiring after July 1, 1981		99.98%
	b. Market value of assets allocated to Plan		$ 265,505,289
	c. Actuarial value of assets allocated to Plan		$ 263,929,378

Table 7

History of Investment Return Rates

Year Ending June 30,	401(a) (Excluding System Assets)	401(h)
Returns on market value of assets:		
2008	-7.46%	-7.62%
2009	-18.28%	-17.83%
2010	14.57%	14.44%
2011	24.80%	24.68%
2012	1.11%	1.03%
2013	12.95%	12.70%
2014	19.28%	19.22%
2015	2.49%	2.62%
2016	0.61%	0.77%
2017	13.59%	13.46%
Returns on actuarial value of assets:		
2008	6.44%	5.02%
2009	3.04%	1.96%
2010	2.03%	1.07%
2011	4.04%	3.01%
2012	6.16%	6.01%
2013	6.66%	6.49%
2014	7.64%	7.55%
2015	7.88%	7.75%
2016	6.61%	6.60%
2017	6.08%	6.07%

Table 8

History of Cash Flow – 401(a) and 401(h) Combined

Year Ending June 30,	Contributions	Distributions and Expenditures: Benefit Payments and Refunds	Distributions and Expenditures: Administrative Expenses	Distributions and Expenditures: Total	External Cash Flow for the Year	Market Value of Assets	External Cash Flow as Percent of Market Value
(1)	(2)	(3)	(5)	(6)	(7)	(8)	(9)
2008	$ 1,805.7	$ (1,931.1)	$ (29.9)	$ (1,961.0)	$ (155.3)	$ 25,296	-0.6%
2009	1,757.9	(2,073.1)	(28.0)	(2,101.1)	(343.2)	20,403	-1.7%
2010	1,702.2	(2,241.3)	(29.0)	(2,270.3)	(568.1)	22,775	-2.5%
2011	1,735.2	(2,412.9)	(28.1)	(2,441.0)	(705.8)	27,835	-2.5%
2012	1,863.9	(2,580.5)	(32.0)	(2,612.5)	(748.6)	27,215	-2.8%
2013	1,987.2	(2,712.7)	(33.9)	(2,746.6)	(759.4)	29,951	-2.5%
2014	2,047.0	(2,868.7)	(27.0)	(2,895.7)	(848.7)	34,802	-2.4%
2015	2,109.9	(2,988.9)	(27.3)	(3,016.2)	(906.3)	34,800	-2.6%
2016	2,122.4	(3,113.2)	(23.8)	(3,137.0)	(1,014.6)	34,020	-3.0%
2017	2,200.4	(3,236.3)	(29.0)	(3,265.3)	(1,064.9)	37,518	-2.8%

Dollar amounts in millions, Excludes System assets

Column (7) = Column (2) + Column (6).

Table 9

Total Experience Gain or Loss

Item	401(a)		401(h)	
(1)	(2)		(3)	
A. Calculation of total actuarial gain or loss				
1. Unfunded actuarial accrued liability (UAAL), previous year	$ 10,265,187,792		$ 78,363,355	
2. Normal cost for the year	1,191,163,877		30,866,144	
3. Expected contributions for the year	(2,094,150,510)		(51,049,363)	
4. Interest at 8%				
a. On UAAL	$ 821,215,023		$ 6,269,068	
b. On normal cost	95,293,110		2,469,292	
c. On contributions	(83,766,020)		(2,041,975)	
d. Total	$ 832,742,113		$ 6,696,385	
5. Assumption change (Gains)/Losses	4,441,863,599		(20,723,637)	
6. Legislative changes	0		0	
7. Expected UAAL (Sum of Items 1 through 7)	14,636,806,871		44,152,884	
8. Actual UAAL	15,350,661,715		31,482,225	
9. Total (gain)/loss for the year (Item 9 - Item 8)	$ 713,854,844		$ (12,670,659)	
B. Source of gains and losses		% of AAL		% of AAL
10. Asset (Gain)/Loss for the year	$ 655,279,769	1.29%	$ 28,323,953	1.80%
11. Pay Increases (Less)/Greater than Expected	133,722,713	0.26%	0	0.00%
12. Non-Retired Demographic (Gains)/Losses	9,291,956	0.02%	(1,833,246)	0.12%
13. Post-Retirement Mortality (Gains)/Losses	(18,177,809)	0.04%	(15,517,232)	0.99%
14. Rehires	475,689	0.00%	745,074	0.05%
15. Other (Gains)/Losses	(66,737,474)	0.13%	(24,389,208)	1.55%
16. Total (Sum of Items 11 through 15)	$ 713,854,844	1.41%	$ (12,670,659)	0.81%

Table 10
Solvency Test

Year End June 30,	Aggregate Accrued Liabilities for: Member Contributions (1)	Retirees and Beneficiaries (2)	Active Members (Employer Financed Portion) (3)	Net Assets Available for Benefits	Portion of Accrued Liabilities Covered by Net Assets Available for Benefits (1)	(2)	(3)
401(a) Portion of the Plan							
2008	$ 6,256,502,949	$ 16,357,773,654	$ 9,810,200,566	$ 26,612,440,139	100%	100%	41%
2009	7,054,925,502	17,455,947,713	9,779,242,657	27,093,788,614	100%	100%	26%
2010	7,704,328,621	19,246,476,421	9,121,714,675	27,571,999,406	100%	100%	7%
2011	8,374,149,814	20,541,081,742	8,135,947,783	27,983,517,225	100%	95%	0%
2012	9,110,894,718	21,699,459,353	7,639,934,669	28,948,010,913	100%	91%	0%
2013	9,917,301,188	23,684,426,598	6,310,027,446	30,110,632,566	100%	85%	0%
2014	10,780,693,824	24,689,077,682	5,879,545,497	31,547,987,085	100%	84%	0%
2015	11,714,896,096	25,757,665,962	5,495,566,397	33,112,994,638	100%	83%	0%
2016	12,699,053,783	26,593,566,522	5,242,386,763	34,269,819,276	100%	81%	0%
2017	13,581,097,101	29,520,334,512	7,517,329,299	35,268,099,197	100%	73%	0%
401(h) Portion of the Plan							
2008	$ 0	$ 619,808,594	$ 826,578,982	$ 1,239,385,591	100%	100%	75%
2009	0	627,536,754	824,885,946	1,266,370,836	100%	100%	77%
2010	0	652,876,059	832,466,290	1,251,145,282	100%	100%	72%
2011	0	669,593,178	834,596,496	1,247,433,042	100%	100%	69%
2012	0	674,713,116	827,369,335	1,281,566,359	100%	100%	73%
2013	0	738,731,217	746,089,038	1,324,596,696	100%	100%	79%
2014	0	734,450,033	742,246,895	1,374,129,582	100%	100%	86%
2015	0	833,901,538	771,529,022	1,446,698,253	100%	100%	79%
2016	0	802,948,944	766,968,521	1,491,554,110	100%	100%	90%
2017	0	863,850,246	706,389,116	1,538,757,137	100%	100%	96%

Table 11

Schedule of Funding Progress – 401(a) and 401(h) Combined

Year End June 30,	Actuarial Accrued Liabilities	Actuarial Value of Net Assets	Assets as a % of Accrued Liabilities	Unfunded Actuarial Accrued Liabilities (UAL)	Covereed Employee Payroll	UAL as a % of Covered Employee Payroll
2008	$ 33,870,864,745	$ 27,851,825,730	82.2%	$ 6,019,039,015	$ 9,708,352,896	62.0%
2009	35,742,538,572	28,360,159,450	79.3%	7,382,379,122	9,834,810,345	75.1%
2010	37,557,862,066	28,823,144,688	76.7%	8,734,717,378	9,419,951,810	92.7%
2011	38,555,369,013	29,230,960,267	75.8%	9,324,408,746	9,060,630,604	102.9%
2012	39,952,371,191	30,229,577,272	75.7%	9,722,793,919	8,868,678,184	109.6%
2013	41,396,575,487	31,435,228,262	75.9%	9,961,347,225	8,752,783,004	113.8%
2014	42,826,013,931	32,922,116,667	76.9%	9,903,897,264	8,908,620,792	111.2%
2015	44,573,559,015	34,559,692,891	77.5%	10,013,866,124	9,072,376,682	110.4%
2016	46,104,924,533	35,761,373,386	77.6%	10,343,551,147	9,263,859,477	111.7%
2017	52,189,000,274	36,806,856,334	70.5%	15,382,143,940	9,598,270,045	160.3%

Table 12

Schedule of Plan Retirees and Beneficiaries Added to and Removed from Rolls

	Added To Rolls			Removed From Rolls			Rolls - End of Year		
Year End June 30,	Number	Annual Allowance	Average Annual Allowance	Number	Annual Allowance	Average Annual Allowance	Number	Annual Allowance	Average Annual Allowance
401(a) Portion of the Plan									
2008	7,784	$ 148,885,733	$ 19,127	2,422	$ 33,418,979	$ 13,798	88,956	$1,704,185,097	$ 19,158
2009	7,958	153,218,995	19,253	2,490	30,033,184	12,062	94,424	1,827,370,908	19,353
2010	9,360	176,419,906	18,848	2,477	35,666,261	14,399	101,307	1,968,124,553	19,427
2011	9,288	179,066,507	19,279	2,599	38,511,310	14,818	107,926	2,108,679,750	19,538
2012	9,227	171,972,274	18,638	2,792	41,695,405	14,934	114,431	2,238,956,619	19,566
2013	9,489	175,974,484	18,545	3,045	47,326,711	15,542	120,875	2,367,604,392	19,587
2014	8,385	160,478,869	19,139	3,005	45,575,405	15,167	126,255	2,482,507,856	19,663
2015	8,695	169,138,375	19,452	3,414	52,490,287	15,375	131,536	2,599,155,944	19,760
2016	7,887	155,932,683	19,771	3,397	54,560,473	16,061	136,026	2,700,528,154	19,853
2017	9,616	200,106,997	20,810	3,525	56,592,938	16,055	142,117	2,844,042,213	20,012
401(h) Portion of the Plan									
2010	5,689	$ 10,358,376	$ 1,821	2,647	$ 6,487,680	$ 2,451	57,795	$ 86,092,944	$ 1,490
2011	6,047	10,459,392	1,730	3,199	7,707,744	2,409	60,643	88,844,592	1,465
2012	5,867	9,754,788	1,663	3,285	8,936,184	2,720	63,225	89,663,196	1,418
2013	5,861	9,434,508	1,610	4,159	9,127,908	2,195	64,927	89,969,796	1,386
2014	5,609	8,620,656	1,537	3,350	8,597,436	2,566	67,186	89,993,016	1,339
2015	7,429	15,954,804	2,148	3,119	7,965,132	2,554	71,496	97,982,688	1,370
2016	8,132	12,166,768	1,529	2,430	10,554,272	4,343	77,198	99,595,184	1,290
2017	9,895	17,824,796	1,801	5,831	11,688,084	2,004	81,262	105,731,896	1,301

Table 13

Permanent Benefit Increase Calculation

Determination of PBI, EPBI effective July 1, 2018		
1.	Actuarial Present Value (APV) for all Retirees and Beneficiaries as of June 30, 2016 (401(a) Only)	$ 25,249,815,473
2.	Rate of Return on Actuarial Value of Assets for Fiscal Year Ending June 30, 2016	6.61%
3.	Excess Earnings Available for PBI	
	a. Carry-over From Prior Year	$ 0
	b. Current Year (Item 1 x [Item 2 – 8%])	0
	c. Total Excess Earnings Available for PBI (Item 3.a + Item 3.b)	$ 0
4.	Preliminary PBI % (Item 3.c / Item 1)	0.00%
5.	Actual PBI % (Item 4, but not greater than 4% and equal to 0% if less than 1%)	0.00%
6.	Target Cost of 2017 PBI (Item 1 x Item 5)	$ 0
7.	APV of $1 Per Year of Service for Eligible Group	0
8.	Per Year of Service Factor for 2017 PBI (Item 6 / Item 7)	0
9.	Excess Investment Earnings to be Carried Forward to Next Year	0
10.	Determination of EPBI (8% of Item 3.c)	$ 0
Determination of Reserves for Future PBIs:		
11.	Actuarial Present Value (APV) for all Retirees and Beneficiaries as of June 30, 2017 (401(a) only)	27,466,275,288
12.	Rate of Return on Actuarial Value of Assets for Fiscal Year Ending June 30, 2017	6.08%
13.	Excess Earnings Reserves for Future PBIs	
	a. Carry Over From Prior Year (Item 10)	$ 0
	b. Current Year (Item 11 x [Item 12 – 8%, minimum 0])	0
	c. Total Excess Earnings Reserves for Future PBIs	$ 0

Appendix I

Summary of Plan Provisions

Summary of Plan Provisions for the Arizona State Retirement System

The Arizona State Retirement Plan makes provision for the retirement, disability, and death and survivor benefits to all members of the State, instrumentalities of the State and certain political subdivisions. The major provisions of the Plan may be summarized as follows:

Member and Employer Contributions

The contribution rate for the fiscal year beginning on July 1st is based on the results of the most recent actuarial valuation as of the last day of the preceding plan year. The member's contribution rate is equal to the required employer contribution rate. The contribution rate for fiscal year 2018 is 11.34% for each member and each employer, based on the 2016 actuarial valuation. The contribution rate for fiscal year 2019 will be 11.64% based on this valuation. Interest was credited at 8.00% until it was lowered to 4% beginning July 1, 2005 and subsequently lowered again to 2% beginning July 1, 2013 for return of contributions upon withdrawal.

Average Monthly Compensation

The average of the highest consecutive 36 months in the last 120 months for a member whose membership commences before July 1, 2011, and the average of the highest consecutive 60 months in the last 120 months for a member whose membership commences on or after July 1, 2011. Members who commenced membership prior to 1984 can use a 60-month average and include additional types of compensation, if doing so produces a larger result.

Benefit Multiplier

Applicable multiplier applies to all years of past service.

Years of Credited Service	Multiplier
Less than 20	2.10%
20.00 to 24.99	2.15%
25.00 to 29.99	2.20%
30.00 or more	2.30%

Normal Retirement

Eligibility: The earliest of the following:

a. Age 65, or

b. Age 62 and 10 years of credited service, or

c. *For members hired before July 1, 2011:* The first day immediately following the day that the sum of the member's age and years of total credited service equals eighty; and
For members hired on or after July 1, 2011: Age 60 with 25 years of credited service or age 55 with 30 years of credited service.

Benefits: The product of Benefit Multiplier, the member's Average Monthly Compensation, and years of total credited service. Normal Retirement benefit also includes any prior service benefits to which the member was entitled under the System.

Early Retirement

Eligibility: Age 50 with 5 years of credited service

Benefits: Normal Retirement Benefit reduced according to the table on the following page.

	Age At Date Of Retirement															
Years of Service	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65
Members Hired Before July 1, 2011																
5-9.99	35%	40%	45%	50%	55%	60%	65%	70%	75%	80%	85%	88%	91%	94%	97%	100%
10-19.99	44%	49%	54%	59%	64%	69%	74%	79%	84%	89%	94%	97%	100%	100%	100%	100%
20	50%	55%	60%	65%	70%	75%	80%	91%	94%	97%	100%	100%	100%	100%	100%	100%
21	50%	55%	60%	65%	70%	75%	91%	94%	97%	100%	100%	100%	100%	100%	100%	100%
22	50%	55%	60%	65%	70%	91%	94%	97%	100%	100%	100%	100%	100%	100%	100%	100%
23	50%	55%	60%	65%	91%	94%	97%	100%	100%	100%	100%	100%	100%	100%	100%	100%
24	50%	55%	60%	91%	94%	97%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
25	50%	55%	91%	94%	97%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
26	50%	91%	94%	97%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
27	91%	94%	97%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
28	94%	97%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
29	97%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
30+	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Members Hired On Or After July 1, 2011																
5-9.99	35%	40%	45%	50%	55%	60%	65%	70%	75%	80%	85%	88%	91%	94%	97%	100%
10-24.99	44%	49%	54%	59%	64%	69%	74%	79%	84%	89%	94%	97%	100%	100%	100%	100%
25-29.99	44%	49%	54%	59%	64%	69%	74%	79%	84%	89%	100%	100%	100%	100%	100%	100%
30+	44%	49%	54%	59%	64%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Vesting of Benefits

Eligibility: A member is fully vested in their accrued benefit.

Benefits: A fully vested member is entitled to either:

a. the enhanced refund option for members hired before July 1, 2011 or for members terminated due to an Employer Reduction in Force or position elimination for members hired on or after July 1, 2011, or

b. the refund option for members hired on or after July 1, 2011 who are not terminated due to an Employer Reduction in Force or position eliminated, or,

c. the retirement benefit payable at Normal Retirement earned to the date of member's termination.

The enhanced refund option allows members who terminate prior to eligibility for retirement to receive a refund of their member contributions with interest. In addition, if a member has at least five years of service, he or she is also entitled to a share of the employer contributions with interest. The share is 25% for members with five years of service and increases 15% for each additional year of service up to a maximum of 100% for ten or more years of service. The Board reduced the interest rate to be credited on withdrawal of contributions from 8% to 4% effective June 30, 2005, and from 4% to 2% effective June 30, 2013.

The refund option is the same as the enhanced refund option except it does not include any share of the employer contributions with interest.

Disability Benefits (for disability after June 30, 1988)

Long Term Disability Benefit:

Monthly benefit equal to two-thirds of monthly compensation reduced by percentages of other income received payable commencing six months after date of disability until the earlier of:

a. date of cessation of total disability,

b. or Normal Retirement date.

This benefit is paid by a separate LTD plan.

Disability Benefit if Member Remains Disabled Through Normal Retirement Date:

Monthly benefit member would have received if service had continued to normal retirement date assuming the member's salary remained at the level it was at his or her date of disability, also provided that the amount of total credited service is limited to 30 years unless the member had more than 30 years at date of disability.

The minimum monthly benefit payable to a disabled member is $50.

Disability Benefits (for disability before July 1, 1988)

Eligibility: Age 50 with 5 years of credited service.

Benefits: A life annuity that can be provided by the member's accumulated contribution account. Disability payments after Normal or Early Retirement eligibility are reduced by the actuarial value of the disability payments made up to the date of Normal or Early Retirement eligibility.

Pre-Retirement Death Refund Alternative

Eligibility: Death prior to retirement.

Benefits: Any one of the following, at the option of the beneficiary:

a. a lump sum equal to the sum of (i) and (ii):

   (i) the sum of the member's combined (member and employer) accumulated contribution balance, and

   (ii) the amount of the member's combined (member and employer) accumulated account, along with any supplemental credits transferred from the System to the Plan with interest.

b. The beneficiary may elect to receive a monthly income, in the single life form, which is actuarially equivalent to the amount in (a) at 8%.

Retiree Health Insurance Premium Supplement

Eligibility: Retirement or disability after five years of credited service and covered by an employer-sponsored group insurance program for which the retired or disabled member must pay part of the cost. Members who elect the enhanced refund option are not eligible for this benefit.

Benefits: The benefit is payable only with respect to allowable health insurance premiums for which the member is responsible. The maximum benefits for members with ten or more years of credited service are:

a. with respect to premiums paid for retirees with member only coverage:
   – $150 per month if the retiree is under age 65
   – $100 per month if the retiree is 65 or over

b. with respect to premiums paid for retirees with family coverage:
   – $260 per month if the member and dependent are under age 65
   – $170 per month if the member and dependent are 65 or over
   – $215 per month if the member is over age 65 and the dependent is under age 65
   – $215 per month if the member is under age 65 and the dependent is over age 65

For members with five to nine years of service, the benefits are the same dollar amounts as above multiplied by a vesting fraction equal to 10% for each completed year of service (i.e., 50% to 90%).

Automatic Benefit Adjustments Based On Excess Investment Earnings

Permanent Benefit Increase (PBI)

Retirees who have been retired one year are eligible for a PBI up to a maximum of a 4% increase. The PBI is paid from a reserve of "Excess Investment Earnings." If there are no "Excess Investment Earnings" in the reserve, then no PBI is paid.

Permanent Benefit Increase Enhancement (EPBI)

Provides retired members with at least ten years of service who have been retired five or more years an additional benefit. For each complete five-year period the member has been retired, an incremental benefit is paid if monies to pay the benefit are available. This benefit is funded by an interest credit of 8.0% of the reserve for future PBIs.

PBI and enhanced PBI benefits are reflected in the valuation as soon as they are awarded. Future PBIs and enhanced PBIs are not included in the valuation.

Due to legislation enacted in the 2013 legislative session, PBIs and EPBIs will not be awarded to members hired on or after September 13, 2013.

Forms of Payment

The normal form of payment is a benefit payable for the life of the member with any remaining member account balance paid at time of death. Joint and contingent, period certain and partial lump-sum options are available on an actuarially equivalent basis.

Minimum Benefit

The minimum monthly benefit payable to a retired member who is at least age 75 and who has 20 or more years of credited service is $600.

Appendix II

Historical Changes to the Plan Provisions

Historical Changes to the Plan Provisions

A. Legislated Plan Changes Enacted by the 1989 Legislature of the State of Arizona

1. Projected Unit Credit (PUC) Funding Method

Beginning with the June 30, 1989 actuarial valuation, the total member and employer contributions payable beginning July 1, 1990 shall be determined using the Projected UnitCredit (PUC) funding method.

2. $12,000 Minimum Average Compensation for Current Retirees

Recalculation of the retirement benefit for all plan members retired before June 30, 1989 who had ten years of credited service using a minimum average compensation of one thousand dollars per month.

3. 2.0% Ad Hoc COLAs

- Effective July 1, 1989, all members retired on or before June 30, 1988 shall receive a 2.0% permanent benefit increase to their December 31, 1988 base benefit.
- Effective July 1, 1990, all members retired on or before June 30, 1989 shall receive a 2.0% permanent benefit increase to their June 30, 1990 base benefit.

4. Early Retirement Window

During the period of May 15, 1989, through November 14, 1989, a member who is eligible for either Normal Retirement or Early Retirement with age plus credited service at least equal to 80 may retire and receive a benefit calculated using a 2.2% multiplier instead of the 2.0% multiplier in effect at that time.

5. 3.0% Tax Equity Allowance

Retroactive to the later of January 1, 1989 or the date payments commence, each member retiring on or before September 14, 1989 shall receive a tax equity benefit allowance consisting of a permanent increase of 3.0% in his or her January 1, 1989 base benefit.

B. Legislated Plan Changes Enacted by the 1990 Legislature of the State off Arizona

1. Rule of 82

Effective May 1, 1990, the number of points (sum of member's age and years of service) required to be eligible for normal retirement shall be reduced from 85 to 82. Also, the early retirement reduction factor for members with 77 or more points but less than 82 points shall be 3% for each point or fraction thereof less than 82.

2. 3.0% Tax Equity Allowance

Each member who retires between September 15, 1989 and September 14, 1990 shall receive a tax equity benefit allowance consisting of a permanent increase of 3.0% in his or her base benefit retroactive to the date of retirement.

3. Graded Vesting for Health Insurance Premium Supplement

The Health Insurance Premium Supplement is extended to those qualifying members with between five and nine years of service. The member will be eligible to receive 10% of the benefit for each completed year of service (i.e., 50% to 90%).

C. Legislated Plan Changes Enacted by the 1991 Legislature of the State of Arizona

1. 3.0% Tax Equity Allowance

Each member who retires between September 15, 1990 and September 14, 1991 shall receive a tax equity benefit allowance consisting of a permanent increase of 3.0% in his or her base benefit retroactive to the date of retirement.

2. Recalculation of Retiree Benefits Using 2.0% Benefit Multiplier

Each retired member with at least ten years of service who retired prior to June 30, 1985 shall have his or her benefit recomputed. The recomputed benefit shall be equal to 2% times final average earnings times credited service plus an additional $2 for each year of service. The retired member will receive the larger of the recalculated benefit or his/her current benefit. This increase is effective October 1, 1991.

3. 2.3% Ad Hoc Increase

Effective July 1, 1991, all members retired on or before June 30, 1990 shall receive a 2.3% permanent benefit increase in their June 30, 1991 base benefit.

4. Rule of 80

Effective July 1, 1992, the number of points (sum of member's age and years of service) required to be eligible for normal retirement shall be reduced from 82 to 80. (For continuation purposes, this legislation is not reflected until the 1993/94 fiscal year).

5. Pop-up Option

A pop-up option is added for retiring members who first participate in the Plan on or after December 31, 1991.

D. Legislated Plan Changes Enacted by the 1992 Legislature of the State of Arizona

1. 3.0% Tax Equity Allowance

Each member who retires between September 15, 1991 and September 14, 1992 shall receive a tax equity benefit allowance consisting of a permanent increase of 3.0% in his or her base benefit, retroactive to the date of retirement.

2. Minimum Retiree Benefit

Each retiree of the Arizona State Retirement Plan who is at least age 75 on December 31, 1992 and who had at least ten years of service upon retirement from the plan shall be eligible for a minimum benefit. If the eligible retiree had at least ten years of service but less than fifteen years, his minimum benefit is $350 a month. If the eligible retiree had at least fifteen years of service but less than twenty, his minimum benefit is $500. If the eligible retiree had at least twenty years of service, his minimum benefit is $600. The minimum benefit shall be compared to the retiree's current benefit (including all ad hoc increases).

3. 5% Ad Hoc Increase

Effective November 1, 1992, all members retired on or before October 31, 1992 shall receive a 5% permanent benefit increase in their October 31, 1992 benefit.

4. Forfeited Service Repurchase

Any present active member who has previously forfeited service has until December 31, 1994 to repurchase the forfeited service by paying the Plan the member and employer contributions (accumulated with interest) that would have been contributed during the member's period of forfeited service.

5. Repurchase of Service Due to Reduction in Force

Any present active member who was terminated prior to December 31, 1992 as a result of a required reduction in force may purchase the credited service for the following period of unemployment if the member had five or more years of service at the time of termination and resumed employment with a participating employer within two years of termination. The cost of the repurchase is the total of the member and employer contribution (accumulated with interest) that would have been contributed during the member's period of unemployment.

6. Change in Section 38-781.05 Funding Method

Section 38-781.05 of the Plan was amended so that the funding period for the Plan would continue to be the period between valuation and June 30, 2003, as long as the Plan has a negative Unfunded Actuarial Accrued Liability. If the Plan were to have a positive UAAL, then the old funding mechanism would apply.

E. Legislated Plan Changes Enacted by the 1993 Legislature of the State of Arizona

No benefit changes were passed by the 1993 Legislature. However, the Legislature passed legislation to reduce the required contribution rate of 4.09% down to 3.14%.

F. Legislated Plan Changes Enacted by the 1994 Legislature of the State of Arizona

1. Minimum LTD Benefit

Each member on long-term disability will receive a minimum monthly benefit of $50.

2. Minimum Retiree Benefit

Each retiree of the Arizona State Retirement Plan who is at least age 75 and who had 20 or more years of service at retirement will receive a minimum monthly benefit of $600.

3. Pop-up Benefit

Members who retired prior to January 1, 1992 and who elected a Joint and Survivor option shall receive a "Pop-up" in their retirement income if their beneficiary pre-deceases them.

4. Excess Investment Earnings COLA

Retirees at least age 55 who have been retired at least one year and members on long-term disability are eligible to receive a cost-of-living adjustment equal to one-half the increase in CPI for the prior calendar year. The COLA will be paid from a reserve of Excess Investment Earnings. If there are no Excess Investment Earnings in the reserve, no COLA will be granted.

5. Change in Section 38-737 Funding Period

Section 38-737 was amended to change the funding period of the Plan to a rolling 30-year period. The change is to be phased-in over the next nineteen years. If the Plan ceases to have a surplus, the funding period would immediately go to 30 years.

G. Legislated Plan Changes Enacted by the 1995 Legislature of the State of Arizona

1. Change in Maximum Increase Provided by Excess Investment Earnings COLA

The maximum COLA payable from Excess Investment Earnings was increased from 50% to 100% of the increase in the CPI.

2. Removal of LTD Benefit from the Plan

The Legislature established a new LTD program and removed the LTD benefit from the Plan. Liabilities for current LTD recipients will be transferred to the new LTD program effective October 1, 1995.

3. Creation of Separate Account for the Health Premium Supplement

The Health Premium Supplement benefit is to be separated into a 401(h) account. The assets and liabilities associated with the Health Premium Supplement will be accounted for separately.

H. Legislated Plan Changes Enacted by the 1996 Legislature of the State of Arizona

No material changes.

I. Legislated Plan Changes Enacted by the 1997 Legislature of the State of Arizona

1. Creation of family Health Supplement. Allows unused portion of the Health Supplement of a member or dependent to be used to pay the other recipient's health insurance premium.

2. The calculation methodology for the Excess Investment Earnings COLA was modified.

3. The contribution rate will be determined on a biennial cycle beginning with the 2000 fiscal year.

J. Legislated Plan Changes Enacted by the 1998 Legislature of the State of Arizona

No material changes.

K. Legislated Plan Changes Enacted by the 1999 Legislature of the State of Arizona

1. Enhanced Refund Option

Members who terminate prior to eligibility for retirement may elect to receive a refund of their member contributions with interest. If the member has at least five years of service, the member is also entitled to a share of the employer contributions with interest. The share is 50% with five years of service and increases 10% for each additional year of service to a maximum of 100% for ten or more years of service.

2. Benefit Multiplier Increased to 2.1%

The benefit multiplier increased from 2.0% to 2.1% effective July 1, 2000.

3. 5% Ad Hoc Increase

A 5% retiree ad hoc increase for retirees and beneficiaries effective July 1, 2000.

4. Increase in Maximum Service While on LTD

Increase in the maximum amount of service that may be accrued while on LTD from 25 to 30 years.

5. Changes in Permanent Benefit Increase COLA

a. The maximum aggregate COLA was increased from 3% to 4%.

b. The threshold for determining "Excess Earnings" was lowered from 9% to 8%.

c. The limitation of the COLA to the increase in the CPI was removed.

L. Legislated Plan Changes Enacted by the 2000 Legislature of the State of Arizona

The age restriction on the Permanent Benefit Increase was eliminated.

M. Legislated Plan Changes Enacted by the 2001 Legislature of the State of Arizona

1. Health Insurance Premium Benefit Increase

Increases the health insurance premium benefit for eligible members as follows:

- Benefit for Medicare eligible member with member only coverage increased from $65 to $100
- Benefit for non-Medicare eligible member with member only coverage increased from $95 to $150
- Benefit for family coverage where member and dependent are non-Medicare eligible increased from $175 to $260
- Benefit for family coverage where member and dependent are Medicare eligible increased from $115 to $170
- Benefit for family coverage where member is Medicare eligible and dependent is non-Medicare eligible increased from $145 to $215
- Benefit for family coverage where member is non-Medicare eligible and dependent is Medicare eligible increased from $145 to $215

2. Graded Multiplier

Provides a graded multiplier in the retirement benefit formula increasing with years of service according to the following:

- 0.00 to 19.99 Years of Service: 2.10%
- 20.00 to 24.99 Years of Service: 2.15%
- 25.00 to 29.99 Years of Service: 2.20%
- 30.00 or More Years of Service: 2.30%

3. Employer Option Service Purchase Incentive

Permits an employer to offer a member who is eligible to retire under the Rule of 80 a contract to work and additional three years of employment. No contributions are made to ASRS during the contract. If the member completes the contract, then they receive an additional three years of service with the option to purchase three more years of service.

4. Permanent Benefit Increase Enhancement

Provides that interest at a rate of 8% be credited on the funds held in reserve for the permanent benefit increase (PBI). This interest will then be used to fund an additional increase for retirees who have at least ten years of service and who have been retired at least five years. The increase is incremental for each five years of retirement.

5. Temporary Rural Health Insurance Premium Benefit

In addition to the premium benefit paid to ASRS retired and disabled members, the Legislature granted a temporary benefit for retired and disabled members who live in areas of the state not served by a managed care program (HMO) and who have ten years of credited service in the following amounts:

- Benefit for Medicare eligible member with member only coverage of $170 per month
- Benefit for non-Medicare eligible member with member only coverage of $300 per month

- Benefit for Medicare eligible members with Medicare eligible dependent with family coverage of $350 per month
- Benefit for non-Medicare eligible members with non-Medicare eligible dependent with family coverage of $600 per month
- Benefit for Medicare eligible members with non-Medicare eligible dependent with family coverage of $470 per month
- Benefit for non-Medicare eligible members with Medicare eligible dependent with family coverage of $470 per month

6. Partial Lump Sum Option

Allows a retiring member to receive a portion of his benefit in a lump sum payment. The lump sum is limited to a maximum of 36 monthly payments. The member's monthly annuity is actuarially reduced to reflect the lump sum payment.

7. Maximum Benefit

Members who are hired after the date the graded multiplier became law have a maximum benefit equal to 80% of the member's 36-month final average earnings.

N. Legislated Plan Changes Enacted by the 2002 Legislature of the State of Arizona

No material changes.

O. Legislated Plan Changes Enacted by the 2003 Legislature of the State of Arizona

Temporary Rural Health Insurance Premium Benefit

The Legislature extended the temporary Rural Health Insurance Subsidy for the next two years from July 1, 2003, to June 30, 2005. The benefit is provided to retired and disabled members who live in areas of the state not served by a Health Maintenance Organization (HMO) and who have ten years of credited service. The Rural Health Insurance Subsidy now requires "minimum out-of-pocket" payments ranging from $100 to $425 per month depending on the plan and coverage selected.

P. Legislated Plan Changes Enacted by the 2004 Legislature of the State of Arizona

1. Service Purchase Program

The Arizona Legislature revised the method of calculating the cost of service purchases so that future purchases would be made at true actuarial present value.

2. Early Retirement Incentive Programs

The Arizona Legislature provided that employers that participate in ASRS and offer early retirement incentives to their members must notify ASRS of the incentives. ASRS will determine the cost of the incentives and the employers will pay the cost.

Q. Legislated Plan Changes Enacted by the 2005 Legislature of the State of Arizona

1. Temporary Rural Health Insurance Premium Benefit

The Legislature extended the temporary Rural Health Insurance Subsidy for the next two years from July 1, 2005, to June 30, 2007. The benefit is provided to Medicare-eligible retirees and disabled members who live in Arizona counties with no Health Maintenance Organization (HMO) service area and who have ten years of credited service.

2. Contribution Rates

The contribution rates for fiscal 2006 and 2007 are 6.90% and 8.60%, respectively.

R. Legislated Plan Changes Enacted by the 2006 Legislature of the State of Arizona

1. Elections After Retirement

Legislature limited the ability of ASRS retirees to rescind their elections after retirement. Specifically, members who have chosen a form with a death benefit can "pop up" once to the single life form but are then not allowed to "pop down" to a death benefit form.

2. Conformance with Certain Federal Regulations

State statutes were modified to conform to federal regulations regarding military service purchases, optional forms of retirement benefits, and minimum required distributions.

3. Repeal of Deferred Retirement Option Plan

The legislature repealed the modified Deferred Retirement Option Plan (DROP).

4. Early Termination Incentive Programs

The change made in the 2004 legislature to early retirement incentive programs was extended to early termination programs.

S. Legislated Plan Changes Enacted by the 2007 Legislature of the State of Arizona

1. Social Security Offsets and Pre-Existing Condition Period

Offset percentages for Social Security disability benefits were increased from 64% to 85% and for Social Security retirement benefits from 83% to 85% for members who become disabled on or after July 1, 2008. The pre-existing condition period is increased from three months to six months for members hired on or after July 1, 2008. ASRS is required to recover overpayments by reducing future benefits to a member, beneficiary, or alternate payee.

2. Temporary Rural Health Insurance Premium Benefit

The Legislature extended the temporary Rural Health Insurance Subsidy for two years from July 1, 2007, to June 30, 2009. The benefit is provided to Medicare-eligible retirees and disabled members who live in Apache, Gila, Mohave, or Navajo counties if they have ten years of credited service.

3. Exemption of Post-Doctoral Scholars

Effective September 19, 2007, post-doctoral scholars are exempted from ASRS membership.

4. Expanded Eligibility for Active Military Service Credit

Effective July 1, 2007, the term “presidential” call-up is changed to “military” call-up. Applies death and disability benefits to those that occur during active military service rather than just to those that are a result of active service. Allows member who becomes disabled during or as a result of active service to receive service credit (paid by the employer) from the date active service began through one year after the member’s date of disability if the member cannot return to work. The disability provision expires June 30, 2009.

T. Legislated Plan Changes Enacted by the 2008 Legislature of the State of Arizona

1. Unclaimed Property Exemption and Procedures

Legislation exempted ASRS from unclaimed property statutes. ASRS members will forfeit their benefits if they do not claim them by the time they reach age 73½. If such a member later claims his benefit, his benefit will be restored with interest if applicable. ASRS will send notices to members beginning at age 65½, and will make efforts to find lost members.

2. Divestment from Companies Investing in Iran or Doing Business in Sudan

ASRS must engage with and potentially divest from companies that have invested, since August 5, 1996, $20 million or more in any year in Iran's petroleum energy sector or that meet specific Sudan-related business operations criteria. Additionally, ASRS must divest from companies that violate paragraph 6(j) of the Export Administration Act.

3. Transfer Procedures

For voluntary transfers, the legislation allowed retired or disabled members to elect whether to remain with ASRS or to transfer to another system and specified how a transfer will affect payroll deduction agreements. For a transfer that is mandated by either statute or an employer, the legislation required retired or disabled members to remain with ASRS and specified how a transfer will affect payroll deduction agreements.

4. Transfer Out Bills

These bills expanded the ASRS credited service that a dispatcher may transfer to CORP and extended the timeframe for ASRS to transfer assets from 60 to 90 days. They expanded the definition of designated position to include State detention officers and provided that all prior ASRS service will transfer to CORP unless the employee irrevocably elects to remain with ASRS. They allowed the local board of the judiciary to designate certain positions within the Administrative Office of the Courts for membership in CORP.

5. Plan Administration

This bill modified one of the salary calculations used for service purchases to be the average of the three pay periods (out of the last five) that remain after the pay periods with the highest and lowest pay are removed. It clarified that the salary calculations used for other public service purchases are also used for leave of absence purchases. It granted the ASRS Board rulemaking authority over the Plan, LTD program, and transfers. It clarified that a member who purchases forfeited service credit is subject to the benefit structure in place when the person again becomes a member. Finally, it required ASRS to recover overpayments by reducing benefits owed to a member, beneficiary, or alternate payee.

6. Federal Conforming Changes

The legislature made changes to comply with federal laws and IRS regulations, most notably the Economic Growth and Tax Relief Reconciliation Act of 2001.

U. Legislated Plan Changes Enacted by the 2009 Legislature of the State of Arizona

1. Service Purchase

Effective July 1, 2010, members will be required to have five years of service credit in ASRS before initiating a service purchase.

2. 80% Cap on Benefits

Effective September 30, 2009, the maximum limit on ASRS pensions of 80% of 36-month final average earnings is eliminated.

3. Return to Work

Retired members who return to work with a suspension of benefits and work for at least 60 consecutive months will be permitted to choose a new optional form of benefit when they again retire.

Retired members are allowed to return to work without suspension if the member returns to a different position that does not require participation and the member participates in another program.

4. Administration

ASRS is exempt from State Personnel Management and Personnel Board provisions and the State classification and compensation statute.

5. Early Termination Incentives

The scope of the early termination incentive statute is broadened and exceptions are limited.

6. Dual Employment

Contributions from a second employer will count, beginning January 1, 2010, only if member meets 20/20 membership criteria with respect to the second employer, with certain exceptions.

V. Legislated Plan Changes Enacted by the 2010 Legislature of the State of Arizona

1. Average Monthly Compensation

The Average Monthly Compensation used in the retiring member's retirement benefit calculation is changed from the average of the highest consecutive 36 months in the last 120 months to the average of the highest consecutive 60 months in the last 120 months for a member whose membership commences on or after July 1, 2011.

2. Normal Retirement Date

The Normal Retirement Date definition is changed from 80 to 85 points (age + years of service) for a member whose membership commences on or after July 1, 2011.

3. Early Retirement Reductions

The Early Retirement reductions were also modified to conform to the 85 point normal retirement for a member whose membership commences on or after July 1, 2011 by adjusting the period over which the reduction is calculated.

4. Employer Contribution Refunds

Employer contribution refunds are eliminated for a member hired on or after July 1, 2011 except for a member who was terminated due to an Employer Reduction in Force or position elimination, in which case the member will receive the current refund vesting schedule.

5. Long-Term Disability Plan Appeals

A person appealing an ASRS decision under the LTD Program (usually a decision of an Administrative Law Judge) may request that the ASRS Board hear the appeal in Executive Session, rather than in a Public Hearing. The request for Executive Session must be made at least 48 hours in advance and the Board shall then conduct the hearing in Executive Session. The Board is required to follow existing Executive Session procedures established in the Open Meeting Law statutes. Minutes of and discussions held at an Executive Session are confidential except from the appellant for use in the appellant's further appeal to the Superior Court.

6. Health Insurance

A retiree may no longer elect to purchase individual health care coverage and receive the Health Benefit Supplement (HBS). [NOTE: this provision will not eliminate the HBS or ASRS insurance enrollees or retirees enrolled in their former Employer's insurance.] ASRS may continue to pay the HBS to a retiree who is receiving the payment under the current statutory provisions (one retiree).

7. Compensation

I.R.C. 415 Compensation Regulations and military differential wage payments from the Heroes Earnings Assistance and Relief Tax Act of 2008 (HEART Act) have been updated as required by the Internal Revenue Service.

W. Legislated Plan Changes Enacted by the 2011 Legislature of the State of Arizona

1. Eligibility for New State Employees

State employees hired after July 20, 2011, will not be eligible for the ASRS Plan or LTD program before their 27th week of employment, unless they are already members of ASRS.

2. Normal Retirement Age

For members whose membership commenced on or after July 1, 2011, the 85-point requirement is removed and replaced by two rules: age 60 and 25 years of credited service or age 55 and 30 years of credited service. Early retirement reductions are adjusted to reflect these new rules.

3. Service Purchase Rules

Purchases of Other Public Service, Leave of Absence Service, and Military Service (except USERRA or Heart Act purchases) are limited to 60 months for each type of purchase, and a member is required to have ten years of credited service before initiating a request to purchase such service.

4. Return-to-Work Rules

Employers are required to pay an Alternate Contribution Rate (ACR) for retired members who return to work on or after July 1, 2012, in any capacity and in a position ordinarily filled by an employee of the employer. The ACR is the greater of 2% or the contribution rate to fund the deficits of the Plan and LTD program, but not greater than the employer's portion of the total contribution rate for the Plan and LTD program.

5. Split of Contributions

Retroactive to July 1, 2011, responsibility for making contributions to the ASRS Plan and LTD programs is changed from 50% employees and 50% employers to 53% employees and 47% employers. Pre-retirement survivor benefits are based on the sum of employee and employer balances, rather than twice the employee balance.

X. Legislated Plan Changes Enacted by the 2012 Legislature of the State of Arizona

1. Forms of Pension

Partial lump-sum payments are to be based on single-life annuity form of payment. Level Income Alternative option is eliminated for new retirements after July 1, 2013.

2. Service Purchase Rules

This provision reduces the credited service requirement to purchase Other Public Service, Leave of Absence time, or Military Service to five years.

3. Health Benefit Supplements

For new retirees and disabilities after August 1, 2012, this provision eliminates health supplements for retirees and disabled members who are covered under an active employee plan, either as an insured or as a dependent, except that if the member is a dependent and the ASRS employer is not subsidizing the premium that the retiree or disabled member must pay, the member is entitled to a single coverage subsidy.

4. Long-Term Disability Plan

This provision caps total income at 100% of member's pre-disability pay for new disabilities after August 1, 2012. It also requires objective medical evidence to support claims.

5. Split of Contributions

This provision revises the split of contributions between members and employers to be a 50%/50% split, and provides for the return to members of the contribution amounts in excess of 50% that members had previously contributed.

6. Employers that Cease Participation in ASRS

This provision requires ASRS to charge employers for their share of the unfunded actuarial liabilities in the Plan and LTD programs if the employers cease to participate because of privatization, bankruptcy, or a change from public to private status. It is effective for cessations that occur on or after January 2, 2013.

7. Opt-out of ASRS for Members First Hired before July 1, 2015

Members who first become employees of an ASRS employer on or after Age 65 and before July 1, 2015, can irrevocably elect not to participate in ASRS. ASRS must report on this provision by December 31, 2014.

8. Spousal Consent

Married members must select their spouses as their beneficiaries and must select an option with at least 50% continuation to their spouses, unless spouses waive these requirements in writing. This provision applies to retirements, beneficiary designations, or beneficiary changes that occur on or after July 1, 2013.

Y. Legislated Plan Changes Enacted by the 2013 Legislature of the State of Arizona

1. Amortization

The legislation allows the ASRS Board to determine the periods over which to amortize deficits or surpluses.

2. Benefits

The legislation removed the requirement that a survivor's benefit must exceed $5,000 to qualify for an annuity election. It limits the annuity option for the survivor to the single-life option, provided the annuity amount is greater than an amount selected by the ASRS Board (presently $100 per month).

The legislation eliminated the present value calculation that was available upon the death of a member who had reached early retirement eligibility or had 15 years of service.

3. Permanent Benefit Increases

The legislation eliminates Permanent Benefit Increases for members hired after September 13, 2013.

4. Health Insurance Program

The legislation permits the ASRS Board to establish a self-insured health insurance program and an account to administer such a program, provided the self-insured program offers all the benefits required by Title 20.

Z. Legislated Plan Changes Enacted by the 2014 Legislature of the State of Arizona

1. Charter Schools

The legislation allows charter schools that obtain their charters through a university to become members of the ASRS retroactive to July 1, 2011.

2. Section 218 Agreements

The legislation eliminates the requirement that employees of ASRS employers must be covered by the state's Section 218 agreement with the Social Security Administration. It also repeals the ASRS defined contribution plan established by Laws 013, Chapter 216.

3. Elected Officials

Retroactive to January 1, 2014, a state elected official who was elected or appointed before December 31, 2013, and who is a member of ASRS because he previously elected not to participate in the Elected Officials' Retirement Plan (EORP) is no longer required to elect to continue or resume participation in ASRS in writing and is a member of ASRS without election.

4. Applicable Interest Rate

The legislation confirms the ASRS practice of using a "stability period" to set and maintain the "applicable interest rate" for a year. The look-back month that is used to determine the applicable interest rate is the third full calendar month preceding the first day of the stability period.

5. Compensation for LTD Benefit Determinations

The legislation changes the definition of "monthly compensation" to be the median of the last six pay periods of compensation, excluding the highest two and lowest two such pay periods. If the member was employed for fewer than six pay periods, "monthly compensation" is the median monthly compensation based on the pay periods that the member worked.

6. Background Checks

The legislation allows ASRS to perform background and credit checks on current and prospective employees.

AA. Legislated Plan Changes Enacted by the 2015 Legislature of the State of Arizona.

1. Actuarial Valuation Methods

The legislation gives the Arizona State Retirement System Board of Trustees authority to change the actuarial valuation method of the Plan beginning June 30, 2016. Prior to the passage of this legislation the ASRS was required by statute to use the Projected Unit Credit method.

2. Service Purchase

The legislation modifies service purchase laws so that they are consistent with Arizona case law whereby the right to purchase service was defined as a benefit by the Arizona Court of Appeals. As a result, legislation delineated service purchase rights that individuals hired on or after July 20, 2011 could purchase no more than 60 months of credited service and individuals hired on or after July 1, 2010 must have at least 5 years of service to initiate a service purchase request.

3. Participation Opt-out

Legislation passed in 2012 allowed individuals 65 years of age or older and with no prior ASRS membership to opt-out of participation in the Plan. The ability to opt-out was to expire on July 1, 2015. The legislation removed the July 1, 2015 sunset on the election, thereby permitting the opt-out provision in perpetuity.

AB. Legislated Plan Changes Enacted by the 2016 Legislature of the State of Arizona.

1. Retention of Service Credit

HB 2104 is an emergency measure that provides for the retention of credited service for certain members of the Arizona State Retirement System (ASRS) who were potentially mis-enrolled in the ASRS and who became eligible participants in the ASRS on July 24, 2014 following the passage of Laws Chapter 2014, Chapter 44.

Provisions of HB 2104

i. Stipulates that an employee in a position that was exempt from ASRS membership retains credited service for the period of employment that the employer remitted ASRS contributions on the employees' behalf.
ii. Allows, retroactive to July 1, 2015, a retired ASRS member to return to work as a state elected official who is subject to term limits and still be eligible to receive retirement benefits.
iii. Contains an emergency clause.
iv. Makes technical and conforming changes.

2. Rulemaking exemptions

HB 2159 provides the Arizona State Retirement System (ASRS) and the ASRS Board (Board) an exemption from rulemaking in the areas of actuarial, investments, and accounting.

Provisions of HB 2159

i. Exempts ASRS and the Board from rulemaking for actuarial assumptions and calculations, investment strategy and decisions and accounting methodology, except that these decisions are subject to the Uniform Administrative Hearing Procedures.
ii. Contains a retroactive effective date of January 1, 1987.
iii. Includes a purpose statement.
iv. Makes technical and conforming changes.

AC. Legislated Plan Changes Enacted by the 2017 Legislature of the State of Arizona.

HB2167 (2017) establishes Internal Revenue Code conforming language to A.R.S. § 38-738 for the purposes of employer credits and contributions not withheld. Additionally, stipulates that a member who previously received a return of contribution may only receive an adjustment of employer contributions or service credits for qualifying employment and compensation occurring after the member's most recent return of contributions. *Effective Date: August 9, 2017*

SB1052 (2017) requires the ASRS to withhold any overpayments and federally required taxes from a member's Partial Lump Sum distribution or return of contributions before distributing funds to the member. *Effective Date: August 9, 2017*

APPENDIX III

SUMMARY OF ACTUARIAL ASSUMPTIONS AND METHODS

Summary of Actuarial Assumptions and Methods

The assumptions and methods were adopted by the Board of Trustees on October 27, 2017, based on the Report on the Actuarial Experience Study covering a five-year period from July 1, 2011 to June 30, 2016, dated October 18, 2017.

I. *Valuation Date*

The valuation date is June 30 of each plan year. This is the date as of which the actuarial present value of future benefits and the actuarial value of assets are determined.

II. *Actuarial Cost Method*

The actuarial valuation uses the Entry Age Normal actuarial cost method. Under this method, the total contribution rate is the sum of (i) the normal cost rate, and (ii) a rate that will amortize the unfunded actuarial liability.

1. The valuation is prepared on the projected benefit basis. The present value of each participant's expected benefit payable at retirement or termination is determined, based on age, service, sex, compensation, and the interest rate assumed to be earned in the future (7.50%). The calculations take into account the probability of a participant's death or termination of employment prior to becoming eligible for a benefit, as well as the possibility of his terminating with a service benefit. Future salary increases are also anticipated. The present value of the expected benefits payable on account of the active participants is added to the present value of the expected future payments to retired participants and beneficiaries to obtain the present value of all expected benefits payable from the Plan on account of the present group of participants and beneficiaries.

2. The contributions required to support the benefits of the Plan are determined following a level funding approach, and consist of a normal cost contribution and an unfunded accrued liability contribution, plus a component to cover administrative expenses.

3. The normal contribution is determined using the Entry Age Normal method. Under this method, a calculation is made to determine the average uniform and constant percentage rate of employer contribution which, if applied to the compensation of each new participant during the entire period of his anticipated covered service, would be required in addition to the contributions of the participant to meet the cost of all benefits payable on their behalf.

4. The unfunded accrued liability contributions are determined by subtracting the actuarial value of assets from the actuarial accrued liability. Amortization bases are established each year and amortized based on the funding policy. The current year amortization base is determined by taking the current unfunded liability less the outstanding amounts of prior year bases.

III. Actuarial Value of Assets

The actuarial value of assets is based on the market value of assets with a ten-year phase-in of actual investment return in excess of (less than) expected investment income. Offsetting unrecognized gains and losses are immediately recognized, with the shortest remaining bases recognized first and the net remaining bases continue to be recognized on their original timeframe. Expected investment income is determined using the assumed investment return rate and the market value of assets (adjusted for receipts and disbursements during the year). The returns are computed net of investment-related expenses.

IV. Actuarial Assumptions

Investment Return: 7.50% per year, net of investment-related expenses (composed of an assumed 2.30% inflation rate and a 5.20% real rate of return)

Administrative Expenses: The actual administrative expenses for the ASRS Plan are assumed to be 0.25% of payroll.

Salary Increases: A select-and-ultimate salary scale made up of a merit component and general salary increase component as follows:

Years of Service	Merit Component	Total Salary Increase*
(1)	(2)	(3)
1	4.50%	7.20%
2	3.50%	6.20%
3	2.75%	5.45%
4	2.25%	4.95%
5	2.00%	4.70%
6	1.75%	4.45%
7	1.50%	4.20%
8	1.10%	3.80%
9	1.00%	3.70%
10	0.90%	3.60%
11	0.80%	3.50%
12	0.70%	3.40%
13	0.60%	3.30%
14	0.50%	3.20%
15	0.40%	3.10%
16	0.30%	3.00%
17	0.20%	2.90%
18	0.20%	2.90%
19	0.10%	2.80%
20 or more	0.00%	2.70%

*Total salary increase - wage inflation (or growth) rate (2.70%) + merit component

Payroll Growth: 2.50% per year, compounded annually (for projecting valuation payroll).

Decrement Timing: All decrements – mortality, service retirement, disability retirement, and termination of employment for reasons other than death or retirement – are assumed to occur at the middle of the valuation year.

Mortality Decrements:

Service Retirees, Beneficiaries, and Inactive Members

Rates are based on the 2017 State Retirees of Arizona (SRA) mortality table. Generational mortality improvements in accordance with the Ultimate MP scales and projected from the year 2017.

Disability Retirees

Rates are based on the RP-2014 Disabled Retiree Mortality. Generational mortality improvements in accordance with the Ultimate MP scales are projected from the year 2014.

Active Members

Rates are based on the RP-2014 Active Member Mortality table. Generational mortality improvements in accordance with the Ultimate MP scales are projected from the year 2014.

	2017 Rates of Mortality					
	Males			Females		
Age	Non-disabled	Disabled	Employee	Non-disabled	Disabled	Employee
20	0.000394	0.006899	0.000394	0.000157	0.002165	0.000157
25	0.000470	0.008224	0.000470	0.000168	0.002312	0.000168
30	0.000439	0.007680	0.000439	0.000212	0.002914	0.000212
35	0.000507	0.008887	0.000507	0.000278	0.003822	0.000278
40	0.000609	0.010670	0.000609	0.000384	0.005292	0.000384
45	0.000944	0.016533	0.000944	0.000637	0.008780	0.000637
50	0.001636	0.019789	0.001636	0.001069	0.011553	0.001069
55	0.002705	0.022675	0.002705	0.001623	0.014049	0.001623
60	0.004489	0.025814	0.004549	0.002369	0.016494	0.002369
65	0.007957	0.030744	0.008031	0.004912	0.020240	0.003586
70	0.014104	0.039148	0.013443	0.009209	0.027365	0.006122
75	0.024999	0.052675	0.022499	0.017263	0.039826	0.010448
80	0.044311	0.074340	0.037658	0.032361	0.059223	0.017834

Service Retirement Decrements: Rates at representative ages and years of service are shown below:

Sample Retirement Rates For Members Hired Before July 1, 2011						
	Years of Service					
Age	5	10	15	20	25	30
50	6.0%	6.0%	6.0%	6.0%	6.0%	25.0%
55	7.0%	7.0%	7.0%	7.0%	20.0%	25.0%
60	10.0%	10.0%	10.0%	20.0%	15.0%	25.0%
62	15.0%	25.0%	25.0%	25.0%	25.0%	25.0%
65	30.0%	30.0%	30.0%	30.0%	30.0%	25.0%
70	25.0%	27.5%	25.0%	25.0%	25.0%	25.0%
75	27.5%	27.5%	27.5%	27.5%	27.5%	25.0%
80	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Sample Retirement Rates For Members Hired On or After July 1, 2011							
	Years of Service						
Age	5	10	15	20	25	30	35
50	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%
55	7.0%	7.0%	7.0%	7.0%	7.0%	50.0%	90.0%
60	10.0%	10.0%	10.0%	10.0%	40.0%	65.0%	25.0%
62	15.0%	25.0%	25.0%	25.0%	40.0%	25.0%	25.0%
65	30.0%	30.0%	30.0%	30.0%	30.0%	25.0%	25.0%
70	25.0%	27.5%	25.0%	25.0%	25.0%	25.0%	25.0%
75	27.5%	27.5%	27.5%	27.5%	27.5%	25.0%	25.0%
80	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Deferred vested members are assumed to retire at their normal retirement age.

Disability Retirement Decrements:

Sample rates for eligible members:

Annual Rates per 100 Members	
Age	Unisex
20	0.0454
25	0.0502
30	0.0606
35	0.0925
40	0.1468
45	0.2271
50	0.3384
55	0.3970
60	0.4317

Termination Decrements for Reasons Other Than Death or Retirement:

Termination rates for members not eligible for service retirement, based on years of completed service (rates are zero for members eligible for service retirement):

Annual Rates of Termination Based on Years of Completed Service				
	Entry Age Less Thanor Equal to 35		Entry Age Greater Than 35	
Service	Males	Females	Males	Females
0	23.00%	24.30%	17.50%	21.10%
1	18.80%	20.00%	14.80%	17.40%
2	15.70%	16.90%	12.60%	14.60%
3	13.60%	14.70%	11.00%	12.60%
4	11.90%	13.00%	9.80%	11.10%
5	10.50%	11.70%	8.80%	9.90%
6	9.40%	10.50%	8.00%	8.80%
7	8.40%	9.50%	7.20%	7.90%
8	7.50%	8.60%	6.60%	7.10%
9	6.70%	7.80%	6.00%	6.40%
10	6.00%	7.00%	5.50%	5.70%
11	5.30%	6.40%	5.10%	5.10%
12	4.70%	5.80%	4.60%	4.60%
13	4.20%	5.20%	4.20%	4.10%
14	3.70%	4.70%	3.80%	3.60%
15	3.20%	4.20%	N/A	N/A
16	2.70%	3.70%	N/A	N/A
17	2.30%	3.30%	N/A	N/A
18	1.90%	2.90%	N/A	N/A
19	1.50%	2.50%	N/A	N/A
20+	1.10%	2.10%	N/A	N/A

Withdrawal of Employee Contributions: Members that terminate with a vested benefit are assumed to choose the most valuable option available to them at the time of termination: withdrawal of contributions or deferred annuity. If the member is assumed to elect a refund option, then it is also assumed that the member forfeits the health insurance premium supplement. We assume that members who elect a single life annuity will receive accumulated benefit payments equal to their contributions after three years of being in receipt.

Future Retirees Eligible for the Health Insurance Premium Supplement: It is assumed that 60% of future retirees will be eligible to receive the post-retirement health insurance premium supplement and that 40% of those retirees will be eligible for the dependent premium supplement. These assumptions also apply to members who have been retired less than one year.

Beneficiary Characteristics: 100% of members are assumed to be married. The husband is assumed to be three years older than the wife.

Census Data and Assets

- The valuation was based on members of ASRS as of June 30, 2017 and does not take into account future members.
- All census data was supplied by ASRS and was subject to reasonable consistency checks.
- There were data elements that were modified for some members as part of the valuation in order to make the data complete. However, the number of missing data items was immaterial.
- Asset data was supplied by ASRS.

Other Actuarial Valuation Procedures

- No provision was made in this actuarial valuation for the limitations of Internal Revenue Code Sections 415 or 401(a)17.
- Valuation payroll (earnings applied to the current valuation year) is the expected payroll for the fiscal year following the valuation date.
- Optional Form Load – A load of 0.174% has been added to the non-retired 401(a) liabilities to account for the election of optional forms other than a single life annuity.
- Alternate Contribution Rate – The past service contribution rate is adjusted to consider alternate contribution rate payments. We reduce the amortization amount by the anticipated amount of alternate contributions, and adjust for interest.
- Adjustment for Contribution Timing – Contribution rates are increased by ½ of a year's interest to reflect the fact that contributions are made throughout the fiscal year and are further adjusted to reflect the one year lag.
- Future Permanent Benefit Increases (PBIs) – Future PBIs are assumed to be 0.30% per year.

APPENDIX IV

DETAILED SUMMARIES OF MEMBERSHIP DATA

Detailed Summaries of Membership Data

Table A

Schedule of Missing Dates of Birth and Gender

ASRS Members Missing Date of Birth						
		2013	**2014**	**2015**	**2016**	**2017**
Active						
	New	1,720	1,187	3,295	4,390	4,359
	Continuing	1,262	811	1,113	1,948	2,655
	Total	**2,982**	**1,998**	**4,408**	**6,338**	**7,014**
Inactive						
	New	387	422	1,455	1,003	1,113
	Continuing	28,057	26,834	25,969	26,263	27,620
	Total	**28,444**	**27,256**	**27,424**	**27,266**	**28,733**
Retired						
	New	-	-	-	1	3
	Continuing	-	-	-	1	-
	Total	**-**	**-**	**-**	**2**	**3**
Total						
	New	2,107	1,609	4,750	5,394	5,475
	Continuing	29,319	27,645	27,082	28,212	30,275
	Total	**31,426**	**29,254**	**31,832**	**33,606**	**35,750**

ASRS Members Missing Gender						
		2013	**2014**	**2015**	**2016**	**2017**
Active						
	New	1,730	1,871	3,251	4,414	4,379
	Continuing	1,248	733	1,086	1,866	2,599
	Total	**2,978**	**2,604**	**4,337**	**6,280**	**6,978**
Inactive						
	New	419	422	1,427	1,010	1,116
	Continuing	35,066	3,098	3,318	5,249	7,215
	Total	**35,485**	**3,520**	**4,745**	**6,259**	**8,331**
Retired						
	New	-	-	-	6	12
	Continuing	-	-	-	-	-
	Total	**-**	**-**	**-**	**6**	**12**
Total						
	New	2,149	2,293	4,678	5,430	5,507
	Continuing	36,314	3,831	4,404	7,115	9,814
	Total	**38,463**	**6,124**	**9,082**	**12,545**	**15,321**

Missing dates of birth are populated based on the member's current service in the data and the average entry age of the active group. Missing genders are populated based on the average gender by employer.

Table B

Summary of Active Membership

	Count		Average Age		Average Service		Average Salary	
	2016	**2017**	**2016**	**2017**	**2016**	**2017**	**2016**	**2017**
Male	65,216	65,819	46.6	46.5	9.7	9.5	$ 52,637	$ 54,058
Female	138,946	140,236	45.1	45.0	9.5	9.4	41,966	43,072
Total	**204,162**	**206,055**	**45.6**	**45.4**	**9.6**	**9.4**	**$ 45,375**	**$ 46,581**

Table C

Summary of Retired Membership

	2016	**2017**
Number	136,026	142,117
Total Monthly Allowance	$ 224,857,505	$ 237,003,518
Average Monthly Allowance	$ 1,653	$ 1,668
Average Age	70.7	70.9
Average Service	19.4	19.4

Table D

Summary of Inactive Membership

	2016	**2017**
Number	222,260	228,490
Average Age	46.9	47.2

Table E

Active Members Age and Service Schedule

	Years of Service										
Current Age	**Under 1**	**0 to 4**	**5 to 9**	**10 to 14**	**15 to 19**	**20 to 24**	**25 to 29**	**30 to 34**	**35 to 39**	**40 & up**	**Total**
Under 25	2,209	5,649	124	0	0	0	0	0	0	0	**7,982**
	$22,288	$28,401	$25,813	$0	$0	$0	$0	$0	$0	$0	**$26,669**
25 to 29	2,135	11,283	3,152	125	0	0	0	0	0	0	**16,695**
	$30,853	$38,722	$41,713	$37,732	$0	$0	$0	$0	$0	$0	**$38,273**
30 to 34	1,763	8,583	6,209	3,068	87	0	0	0	0	0	**19,710**
	$32,465	$41,136	$47,597	$48,876	$47,069	$0	$0	$0	$0	$0	**$43,627**
35 to 39	4,274	11,654	5,279	6,275	2,077	55	0	0	0	0	**29,614**
	$25,136	$36,873	$49,446	$54,380	$55,930	$58,338	$0	$0	$0	$0	**$42,506**
40 to 44	1,375	7,150	5,053	5,399	4,741	1,150	28	0	0	0	**24,896**
	$33,944	$40,457	$47,065	$54,531	$61,186	$62,933	$66,396	$0	$0	$0	**$49,505**
45 to 49	1,308	6,597	5,271	5,464	4,705	3,654	943	36	0	0	**27,978**
	$36,045	$40,920	$46,157	$51,528	$58,633	$66,824	$68,607	$66,661	$0	$0	**$51,079**
50 to 54	1,144	5,544	4,509	5,405	4,552	3,432	2,499	462	15	0	**27,562**
	$36,329	$41,345	$44,817	$48,319	$54,279	$61,873	$70,296	$70,138	$69,316	$0	**$50,887**
55 to 59	864	4,949	4,132	5,026	4,840	3,364	2,047	896	220	8	**26,346**
	$35,659	$41,170	$44,731	$47,222	$51,320	$59,112	$68,175	$71,168	$67,714	$59,940	**$50,204**
60 to 64	483	3,144	2,828	3,483	3,252	2,134	1,409	673	285	79	**17,770**
	$32,589	$40,149	$45,064	$48,328	$52,594	$56,231	$63,717	$70,382	$68,471	$68,752	**$50,133**
65 to 69	190	1,104	1,049	1,087	734	503	376	209	106	78	**5,436**
	$24,539	$33,740	$43,441	$49,767	$54,358	$59,793	$63,761	$78,322	$71,089	$85,607	**$48,953**
70 & up	80	520	446	392	263	128	111	54	29	43	**2,066**
	$16,834	$26,052	$34,856	$41,317	$51,227	$49,933	$57,707	$65,889	$68,697	$90,862	**$39,866**
Total	**15,825**	**66,177**	**38,052**	**35,724**	**25,251**	**14,420**	**7,413**	**2,330**	**655**	**208**	**206,055**
	$29,555	**$38,523**	**$45,932**	**$50,638**	**$55,684**	**$61,541**	**$67,710**	**$71,186**	**$68,670**	**$79,305**	**$46,581**

Table F

Distribution of Retired Members and Beneficiaries by Age and Years of Service

	Years of Service										
Current Age	**0-4**	**5-9**	**10-14**	**15-19**	**20-24**	**25-29**	**30-34**	**35-39**	**40-44**	**Over 45**	**Total**
Below 55	27	172	270	277	230	801	752	25	9	2	**2,565**
	$171	$295	$509	$659	$989	$2,708	$3,400	$2,272	$1,761	$1,505	**$2,107**
55-59	18	633	981	741	1,556	2,763	2,565	125	6	0	**9,388**
	$158	$288	$613	$859	$1,781	$2,690	$3,710	$3,811	$3,535	$0	**$2,305**
60-64	25	2,256	3,214	2,930	4,573	4,331	4,600	484	46	1	**22,460**
	$203	$360	$743	$1,113	$1,776	$2,633	$3,610	$4,329	$4,695	$4,376	**$2,000**
65-69	1,481	5,394	6,288	4,960	6,301	5,731	5,905	1,022	155	6	**37,243**
	$202	$388	$779	$1,187	$1,766	$2,500	$3,501	$4,379	$5,457	$4,788	**$1,736**
70-74	2,190	4,910	5,404	4,246	4,935	4,323	3,524	1,000	193	25	**30,750**
	$141	$366	$740	$1,130	$1,695	$2,450	$3,347	$4,128	$4,731	$5,764	**$1,523**
75-79	1,360	3,034	3,531	2,856	3,214	2,308	1,539	525	142	21	**18,530**
	$110	$337	$697	$1,108	$1,673	$2,354	$3,158	$3,877	$4,687	$5,753	**$1,365**
80-84	690	1,914	2,288	1,875	1,858	1,410	959	224	48	10	**11,276**
	$113	$349	$734	$1,161	$1,736	$2,419	$3,037	$3,718	$4,805	$5,442	**$1,354**
85-89	335	1,131	1,359	1,127	1,007	842	511	127	18	9	**6,466**
	$133	$358	$785	$1,183	$1,742	$2,359	$2,981	$3,395	$4,639	$5,398	**$1,342**
90-94	100	488	626	474	465	324	162	50	6	4	**2,699**
	$152	$378	$815	$1,239	$1,646	$2,207	$2,714	$3,011	$6,600	$6,897	**$1,273**
Over 95	24	125	156	162	132	81	39	16	5	0	**740**
	$131	$386	$804	$1,152	$1,587	$1,896	$2,454	$2,567	$4,298	$0	**$1,196**
Total	**6,250**	**20,057**	**24,117**	**19,648**	**24,271**	**22,914**	**20,556**	**3,598**	**628**	**78**	**142,117**
	$146	**$362**	**$741**	**$1,131**	**$1,728**	**$2,515**	**$3,453**	**$4,092**	**$4,861**	**$5,533**	**$1,668**

Table G

Distribution of New Retired Members and Beneficiaries by Age and Years of Service

	Years of Service										
Current Age	**0-4**	**5-9**	**10-14**	**15-19**	**20-24**	**25-29**	**30-34**	**35-39**	**40-44**	**Over 45**	**Total**
Below 55	4	42	78	80	59	347	274	13	1	1	**899**
	$130	$294	$624	$735	$1,262	$3,044	$3,746	$2,351	$1,331	$1,121	**$2,570**
55-59	2	135	193	179	534	390	402	42	4	0	**1,881**
	$306	$346	$807	$1,085	$1,992	$2,630	$3,910	$3,909	$3,050	$0	**$2,252**
60-64	6	411	651	677	631	384	284	64	18	0	**3,126**
	$260	$426	$863	$1,283	$1,844	$2,605	$3,619	$4,706	$4,698	$0	**$1,659**
65-69	339	529	572	450	330	238	189	64	21	1	**2,733**
	$223	$469	$859	$1,339	$1,799	$2,765	$3,508	$4,691	$5,734	$1,732	**$1,374**
70-74	54	110	176	85	65	47	31	14	6	6	**594**
	$204	$412	$773	$1,283	$1,841	$2,109	$3,593	$2,939	$4,318	$6,992	**$1,247**
75-79	10	24	55	41	25	12	18	5	0	1	**191**
	$146	$298	$540	$960	$1,361	$1,793	$2,521	$3,652	$0	$8,054	**$1,073**
80-84	3	14	27	11	18	16	12	3	1	0	**105**
	$76	$274	$632	$1,055	$1,454	$1,834	$2,284	$2,903	$6,063	$0	**$1,242**
85-89	2	8	13	10	9	8	12	1	0	1	**64**
	$120	$347	$701	$1,085	$1,399	$1,464	$2,154	$4,471	$0	$7,689	**$1,332**
90-94	2	3	3	4	3	3	2	1	0	0	**21**
	$116	$490	$668	$961	$1,182	$2,008	$3,268	$3,882	$0	$0	**$1,311**
Over 95	1	0	1	0	0	0	0	0	0	0	**2**
	$93	$0	$1,311	$0	$0	$0	$0	$0	$0	$0	**$702**
Total	**423**	**1,276**	**1,769**	**1,537**	**1,674**	**1,445**	**1,224**	**207**	**51**	**10**	**9,616**
	$216	**$425**	**$821**	**$1,236**	**$1,847**	**$2,705**	**$3,681**	**$4,216**	**$4,911**	**$6,055**	**$1,734**

Table H

Members in Active Service as of June 30, 2017, by Annual Salary

Annual Salary	Number of Members	Percent of Total
Less than $10,000	6,312	3.1%
$10,000 - $14,999	11,433	5.5%
$15,000 - $19,999	12,955	6.3%
$20,000 - $24,999	11,292	5.5%
$25,000 - $29,999	12,433	6.0%
$30,000 - $34,999	14,017	6.8%
$35,000 - $39,999	16,127	7.8%
$40,000 - $44,999	19,683	9.6%
$45,000 - $49,999	23,131	11.2%
$50,000 - $54,999	18,301	8.9%
$55,000 - $59,999	13,589	6.6%
$60,000 - $64,999	10,152	4.9%
$65,000 - $69,999	7,769	3.8%
$70,000 - $74,999	5,949	2.9%
$75,000 - $79,999	4,433	2.2%
$80,000 - $84,999	3,745	1.8%
$85,000 - $89,999	2,973	1.4%
$90,000 and Over	11,761	5.7%
Total	**206,055**	**100.0%**

Table I

Number of Retirees by Benefit Option and Monthly Amount

	Optional Form of Benefit							
Monthly Amount	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**Total**
Under $300	12,998	137	177	411	2,823	232	782	**17,560**
$300 - $499	9,346	177	221	417	2,289	273	749	**13,472**
$500 - $999	18,813	397	613	875	4,438	716	1,712	**27,564**
$1,000 - $1,499	12,809	284	478	595	3,479	807	1,611	**20,063**
$1,500 - $1,999	9,120	207	327	460	2,856	835	1,430	**15,235**
$2,000 - $2,499	7,258	156	270	385	2,569	742	1,376	**12,756**
$2,500 - $2,999	5,691	126	242	359	2,141	608	1,079	**10,246**
$3,000 - $3,499	4,566	90	190	281	1,829	570	920	**8,446**
$3,500 - $3,999	3,038	51	108	203	1,306	424	617	**5,747**
$4,000 and Over	5,269	131	444	953	2,223	844	1,164	**11,028**
Total	**88,908**	**1,756**	**3,070**	**4,939**	**25,953**	**6,051**	**11,440**	**142,117**

Optional Form Code	Description
1	Life annuity
2	Life annuity – 5 years certain and life
3	Life annuity – 10 years certain and life
4	Life annuity – 15 years certain and life
5	Joint annuity – 100% to contingent survivor
6	Joint annuity – 66 2/3% to contingent survivor
7	Joint annuity – 50% to contingent survivor

Table J

Health Insurance Benefit Counts

Current HIB Benefit	Count	Monthly Premium Supplement	Average Monthly Premium Supplement
Single, Non-Medicare	12,322	$1,732,223	$141
Single, Medicare	35,586	2,608,108	73
Family, Both Non-Medicare	6,843	1,188,341	174
Family, One Medicare, One Non-Medicare	6,478	981,109	151
Family, Both Medicare	20,033	2,301,211	115
	81,262	$8,810,991	$108

Table K

Data Reconciliation

	Active Members	Inactive	Retirees, Beneficiaries and QDRO	Long Term Disability	Total
Total at June 30, 2016	**204,162**	**222,260**	**136,026**	**3,797**	**566,245**
Terminations	(14,632)	14,632	0	0	0
Refund	(5,849)	(5,886)	0	(38)	(11,773)
Transfer Out	(49)	(30)	0	0	(79)
Disabled	(365)	(93)	0	458	0
Retirements	(6,864)	(1,445)	8,309	0	0
Returned from LTD	28	146	445	(619)	0
New QDRO	0	0	113	0	113
New Beneficiary	0	0	749	0	749
Deaths	(171)	(436)	(3,337)	(67)	(4,011)
Benefit Expiration	0	0	(111)	0	(111)
Data Adjustments	0	1,302	(2)	3	1,303
New Entrants Terminated with Account Balance	0	3,074	0	0	3,074
Rehires	5,109	(5,034)	(75)	0	0
New Entrants	24,686	0	0	0	24,686
Net Change	**1,893**	**6,230**	**6,091**	**(263)**	**13,951**
Total at June 30, 2017	**206,055**	**228,490**	**142,117**	**3,534**	**580,196**

APPENDIX V

GLOSSARY

Glossary

Actuarial Accrued Liability (AAL): That portion, as determined by a particular Actuarial Cost Method, of the Actuarial Present Value of Future Plan Benefits which is not provided for by future Normal Costs. It is equal to the Actuarial Present Value of Future Plan Benefits minus the actuarial present value of future Normal Costs.

Actuarial Assumptions: Assumptions as to future experience under the Fund. These include assumptions about the occurrence of future events affecting costs or liabilities, such as:

- mortality, withdrawal, disablement, and retirement;
- future increases in salary;
- future rates of investment earnings and future investment and administrative expenses;
- characteristics of members not specified in the data, such as marital status;
- characteristics of future members;
- future elections made by members; and
- other relevant items.

Actuarial Cost Method or ***Funding Method:*** A procedure for allocating the Actuarial Present Value of Future Benefits to various time periods; a method used to determine the Normal Cost and the Actuarial Accrued Liability. These items are used to determine the ARC.

Actuarial Gain or ***Actuarial Loss:*** A measure of the difference between actual experience and that expected based upon a set of Actuarial Assumptions, during the period between two Actuarial Valuation dates. Through the actuarial assumptions, rates of decrements, rates of salary increases, and rates of fund earnings have been forecasted. To the extent that actual experience differs from that assumed, Actuarial Accrued Liabilities emerge which may be the same as forecasted, or may be larger or smaller than projected. Actuarial gains are due to favorable experience, e.g., the Fund's assets earn more than projected, salaries do not increase as fast as assumed, members retire later than assumed, etc. Favorable experience means actual results produce actuarial liabilities not as large as projected by the actuarial assumptions. On the other hand, actuarial losses are the result of unfavorable experience, i.e., actual results that produce actuarial liabilities which are larger than projected. Actuarial gains will shorten the time required for funding of the actuarial balance sheet deficiency while actuarial losses will lengthen the funding period.

Actuarially Equivalent: Of equal actuarial present value, determined as of a given date and based on a given set of Actuarial Assumptions.

Actuarial Present Value (APV): The value of an amount or series of amounts payable or receivable at various times, determined as of a given date by the application of a particular set of Actuarial Assumptions. For purposes of this standard, each such amount or series of amounts is:

a. adjusted for the probable financial effect of certain intervening events (such as changes in compensation levels, marital status, etc.),
b. multiplied by the probability of the occurrence of an event (such as survival, death, disability, termination of employment, etc.) on which the payment is conditioned, and
c. discounted according to an assumed rate (or rates) of return to reflect the time value of money.

Actuarial Present Value of Future Plan Benefits: The Actuarial Present Value of those benefit amounts which are expected to be paid at various future times under a particular set of Actuarial Assumptions, taking into account such items as the effect of advancement in age and past and anticipated future compensation and service credits. The Actuarial Present Value of Future Plan Benefits includes the liabilities for active members, retired members, beneficiaries receiving benefits, and inactive, nonretired members either entitled to a refund or a future retirement benefit. Expressed another way, it is the value that would have to be invested on the valuation date so that the amount invested plus investment earnings would be provide sufficient assets to pay all projected benefits and expenses when due.

Actuarial Valuation: The determination, as of a valuation date, of the Normal Cost, Actuarial Accrued Liability, Actuarial Value of Assets, and related Actuarial Present Values for a plan. An Actuarial valuation for a governmental retirement system typically also includes calculations of items needed for compliance with GASB.

Actuarial Value of Assets or ***Valuation Assets:*** The value of the Fund's assets as of a given date, used by the actuary for valuation purposes. This may be the market or fair value of plan assets, but commonly actuaries use a smoothed value in order to reduce the year-to-year volatility of calculated results, such as the funded ratio and the ARC.

Actuarially Determined: Values which have been determined utilizing the principles of actuarial science. An actuarially determined value is derived by application of the appropriate actuarial assumptions to specified values determined by provisions of the law.

Amortization Method: A method for determining the Amortization Payment. The most common methods used are level dollar and level percentage of payroll. Under the Level Dollar method, the Amortization Payment is one of a stream of payments, all equal, whose Actuarial Present Value is equal to the UAAL. Under the Level Percentage of Pay method, the Amortization payment is one of a stream of increasing payments, whose Actuarial Present Value is equal to the UAAL. Under the Level Percentage of Pay method, the stream of payments increases at the assumed rate at which total covered payroll of all active members will increase.

Amortization Payment: That portion of the pension plan contribution or ARC which is designed to pay interest on and to amortize the Unfunded Actuarial Accrued Liability.

Actuarially Determined Contribution (ADC) or ***Annual Required Contribution (ARC):*** A calculated contribution for a defined benefit pension plan for the reporting period, most often determined based on the funding policy of the plan. Typically the calculated contribution has a normal cost payment and an amortization payment.

Closed Amortization Period: A specific number of years that is counted down by one each year and therefore declines to zero with the passage of time. For example if the amortization period is initially set at 30 years, it is 29 years at the end of one year, 28 years at the end of two years, etc. See Funding Period and Open Amortization Period.

Decrements: Those causes/events due to which a member's status (active-inactive-retiree-beneficiary) changes, that is: death, retirement, disability, or termination.

Defined Benefit Plan: An employer-sponsored retirement benefit that provides workers, upon attainment of designated age and service thresholds, with a monthly benefit based on the employee's salary and length of service. The value of a benefit from a defined benefit plan is generally not affected by the return on the assets that are invested to fund the benefit.

Defined Contribution Plan: A retirement plan, such as a 401(k) plan, a 403(b) plan, or a 457 plan, in which the contributions to the plan are assigned to an account for each member, and the plan's earnings are allocated to each account, and each member's benefits are a direct function of the account balance.

Employer Normal Cost: The portion of the Normal Cost to be paid by the employers. This is equal to the Normal Cost less expected member contributions.

Experience Study: A periodic review and analysis of the actual experience of the Fund which may lead to a revision of one or more actuarial assumptions. Actual rates of decrement and salary increases are compared to the actuarially assumed values and modified as deemed appropriate by the Actuary.

Funded Ratio: The ratio of the actuarial value of assets (AVA) to the actuarial accrued liability (AAL). Plans sometimes calculate a market funded ratio, using the market value of assets (MVA), rather than the AVA.

Funding Period or ***Amortization Period:*** The term "Funding Period" is used it two ways. In the first sense, it is the period used in calculating the Amortization Payment as a component of the ARC. This funding period is chosen by the Board of Trustees. In the second sense, it is a calculated item: the number of years in the future that will theoretically be required to amortize (i.e., pay off or eliminate) the Unfunded Actuarial Accrued Liability, based on the statutory employer contribution rate, and assuming no future actuarial gains or losses.

GASB: The Governmental Accounting Standards Board is an organization that exists in order to promulgate accounting standards for governmental entities.

Normal Cost: That portion of the Actuarial Present Value of pension plan benefits and expenses which is allocated to a valuation year by the Actuarial Cost Method. Any payment in respect of an Unfunded Actuarial Accrued Liability is not part of Normal Cost (see Amortization Payment). For pension plan benefits which are provided in part by employee contributions, Normal Cost refers to the total of employee contributions and employer Normal Cost unless otherwise specifically stated. Under the entry age normal cost method, the Normal Cost is intended to be the level cost (when expressed as a percentage of pay) needed to fund the benefits of a member from hire until ultimate termination, death, disability or retirement.

Open Amortization Period: An open amortization period is one which is used to determine the Amortization Payment but which does not change over time. In other words, if the initial period is set as 30 years, the same 30-year period is used in determining the Amortization Period each year. In theory, if an Open Amortization Period is used to amortize the Unfunded Actuarial Accrued Liability, the UAAL will never completely disappear, but will become smaller each year, either as a dollar amount or in relation to covered payroll.

Unfunded Actuarial Accrued Liability: The excess of the Actuarial Accrued Liability over the Actuarial Value of Assets. This value may be negative in which case it may be expressed as a negative Unfunded Actuarial Accrued Liability, also called the Funding Surplus.

Valuation Date or ***Actuarial Valuation Date:*** The date as of which the value of assets is determined and as of which the Actuarial Present Value of Future Plan Benefits is determined. The expected benefits to be paid in the future are discounted to this date.