ARKANSAS STATE HIGHWAY EMPLOYEES RETIREMENT SYSTEM (ASHERS)

ACTUARIAL VALUATION
AS OF JUNE 30, 2020

Osborn, Carreiro & Associates, Inc.
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November 16, 2020

Board of Trustees
Arkansas State Highway Employees
Retirement System (ASHERS)
P. O. Box 2261
Little Rock, AR 72203

RE: Actuarial Valuation as of June 30, 2020

Ladies and Gentlemen:

This report presents the results of our actuarial valuation of the assets and liabilities of the Arkansas State Highway Employees Retirement System (ASHERS) as of June 30, 2020. This valuation determines the contributions for the 2020-21 Plan Year (July 1, 2020 to June 30, 2021). The primary purposes of the valuation report are to determine the adequacy of the current employer contribution rate, to describe the current financial condition of ASHERS, and to analyze changes in the condition of the system.

This report together with the GASB report and the information presented in person to the board should be considered together as the complete report.

Actuarial Status of Plan

The funded status of the plan increased from 81.21% to 82.35% this year. This is the ratio of the actuarial value (smoothed) assets to the actuarial accrued liabilities of the plan. This was mostly due to the increase in contributions and a small investment gain that occurred during the fiscal year. This is detailed in the report. The funding period has been reduced to 39.5 years based on current contributions. The total contribution rate would need to be about 23.6% (compared to the current 21.9%) to meet the 30-year payoff of unfunded actuarial accrued liabilities. This gap between calculated and actual contribution is about 1.1% of payroll less than it was last year.

Accounting Information

A separate report with the reporting standard of GASB Statement 67 and 68 based on the same assumptions and methods will be sent under separate cover.

Organization of Report

Following this cover letter and a table of contents, there is an Executive Summary of the results of the valuation as well as a discussion of the highlights. The Exhibits then show the details of the calculations. The Appendices then disclose the plan provisions and assumptions used.

Assumptions

The assumptions used to compile these calculations are prescribed by the Board after consultation with the actuary. In accordance with the standards of practice for our profession, we must comment when one of the assumptions is not within a reasonable range in our opinion. The discount assumption is above the reasonable range of assumptions in our opinion. A complete discussion and additional related calculations are found in Appendix 3.

Statement of Qualifications

This report has been prepared by actuaries who have experience valuing public employee retirement systems, with the undersigned taking the primary responsibility. To the best of our knowledge, this report is complete and accurate and was completed in accordance with standards of practice promulgated by the Actuarial Standards Board and in conformance with applicable Arkansas law. The actuaries are Members of the American Academy of Actuaries (MAAA) and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained in this report.

The actuaries know of no significant conflicts of interest with the plan sponsor. We have previously disclosed that we also serve the Bureau of Legislative Research by preparing reports for the Joint Retirement Committee. We do not view this relationship as a significant conflict of interest.

We look forward to discussing this report with you in detail. Please let us know if you have any questions or comments.

Sincerely,

Jody Carreiro

Jody Carreiro, FCA, ASA, EA, MAAA
Actuary

TABLE OF CONTENTS

EXECUTIVE SUMMARY

A brief summary of the more important figures developed in this valuation, with comparable results from prior reports, follows:

	6/30/2018	6/30/2019	6/30/2020
Number in Plan			
a) Active Members	3,343	3,379	3,358
b) Members in DROP	369	366	356
c) Members Receiving Benefits	3,436	3,579	3,483
d) Inactive Members	211	269	271
Market Value of Assets	$ 1,472,472,865	$ 1,386,076,598	$ 1,407,173,769
Actuarial Value of Assets	$ 1,424,240,080	$ 1,410,043,327	$ 1,434,541,444
Actuarial Accrued Liability	$ 1,705,400,905	$ 1,736,380,825	$ 1,742,061,623
Unfunded Actuarial Accrued Liability	$ 281,160,825	$ 326,337,498	$ 307,520,179
Funded Percentage (Based on Actuarial Assets)	83.51%	81.21%	82.35%
Funded Percentage (Based on Market Value of Assets)	86.34%	79.83%	80.78%
Contribution Rates for the year beginning On the Valuation Date			
Employee	6.00%	6.50%	7.00%
Employer	12.90%	14.90%	14.90%
Total	18.90%	21.40%	21.90%
Needed to Fund UAAL in 30 years	23.31%	24.67%	23.59%
Years to Fund at Current Contribution	Infinite	53.2 years	39.5 years

Discussion

Introduction

The results of the June 30, 2020 actuarial valuation of the Arkansas State Highway Employees Retirement System (ASHERS) performed by Osborn, Carreiro & Associates, Inc. are summarized in this report. The purpose of any actuarial valuation is to provide an estimate of how well the employer is meeting its emerging pension liabilities.

We have relied on the employee data and asset information provided by the staff of ASHERS. While not auditing or verifying the data at the source, we have performed such tests for consistency and reasonableness as has been deemed necessary to be satisfied with the appropriateness of using the data supplied. There were no significant adjustments made to the data that was supplied by staff. We did remove the seasonal workers that were included in the file we received.

Executive Summary

The Executive Summary on the preceding page provides the reader with key results of this valuation report. This provides a single page with the most discussed items that are developed later in the report.

Funded Status

The Funded Status of the plan is typically first discussed in terms of the Funded Percentage. The Funded Percentage is 82.35% as of the valuation date compared with 81.21% last year. This increase from last year is due to increased contributions and a gain to actuarial value of assets as discussed later. Although the goal is always to be at least 100% funded, a funded percentage over 80% is often considered a positive sign of health for the plan.

The Funded Status of a plan is more than just a measurement of the Funded Percentage. We also need to consider whether the contribution policy will provide funding for the long term. As you know, the funding policy of ASHERS is currently part of state law. Beginning July 1, 2020, the employees contribute 7.0% and the employer contributes 14.9% of pay for a total 21.9% of pay. There are also contributions that arise from Tier II DROP (6% employee, 6.9% employer).

Exhibit 2 of the report develops a couple of contribution levels for comparison. A 30-year amortization of unfunded accrued liabilities is an old standard that is still relevant to state law. That contribution level is 23.59% of payroll compared to the 21.90% of payroll currently contributed. This means that the plan would not be fully funded over the next 30 years at the current contribution rate.

Discussion (Continued)

We also developed in Exhibit 2 the rate necessary to fund the unfunded accrued liability over 18 years. This is a timetable that we have discussed in recent years. This is a timetable where the payments to reduce the unfunded will be at least large enough so the projected unfunded does not increase in the early years. This is also referred to as negative amortization. This also makes the funding better align with the active worklife. The contribution level to fund the plan over 18 years is 27.54% of payroll.

The ultimate question about contribution policy is whether or not the current policy will ever fully fund the benefits promised. Also in Exhibit 2, we calculated the years necessary to fund the unfunded accrued liability using the current contributions available. As shown there, this amount decreased from 53.2 to 39.5 years. In other words, the plan should be sustained with the new contribution level.

Changes in Assets during the Year

The financial information provided to us is summarized in Exhibit 3 of the report. As you will note, the estimated yield for the last fiscal year was 8.24% net of investment expenses, 0.24% above the assumed rate of return. This compares with 0.32% for the previous year. This is using the standard mid-year average yield formula which is typically going to be a little different than a time weighted return often reported by investment advisors.

The actuarial value of assets, sometimes called smoothed value, takes the return in excess (or below) of the expected return of 8% and smooths it over 4 years. That is, only 25% of that gain is recognized in the year it is earned. The rate of return on the actuarial value of assets for this fiscal year was 8.35%. As you will see in Exhibit 3, there is about $27 million of net investment losses to be recognized in future years.

Actuarial Gains and Losses

The actuarial gains and losses by source are developed on page 10 of the report. Besides the gain on investment return, there is a gain on the development of the liabilities. Together, these resulted in an actuarial gain of about $29 million (1.66% of liabilities) in this fiscal year.

History of Cash Flows

We have continued showing the History of Cash Flow chart as part of Exhibit 3 (page 15). The primary result of this page is that the external cash flows out of the plan is about 7%, an expected decrease from the past few years due to the new additional contributions. This is a measurement of the cash flows in and out of the plan before adding investment income. A level of 7% means that most of the investment income expected (7% out of 8%) is immediately going out of the plan. The way to improve this measurement is to increase the amounts coming into the plan and/or decrease the amount coming out of the plan. The increased contributions in fiscal 2020 is projected to reduce that back below 7% in 2021. The legislative package that you are proposing will also help reduce this amount.

Discussion (Continued)

Proposed Legislative Changes

We presented preliminary results to the Board in August. The are no significant differences between this report and that information. Based on that information, the Board has proposed to the Commission a package of legislative changes that will help reduce the negative cash flow discussed above and reduce the funding period to about 21.5 years. The changes include contribution changes: employer contributions the same for DROP members, making employee contributions to DROP continue for those employed after 7/1/2021, and give the Board with Commission approval the ability to set the contribution rates. There were benefit changes: going from 3 year to 5 year final average salary, discontinue the health care offset while on DROP, and changes to reciprocal service calculation. You also proposed changing the marriage requirement for Option B from two years to one year. We will be prepared to include these changes in the next valuation as approved. The illustrated effect of the changes is as follows:

ASHERS Contributions Compared with Contribution based on 30-year Amortization

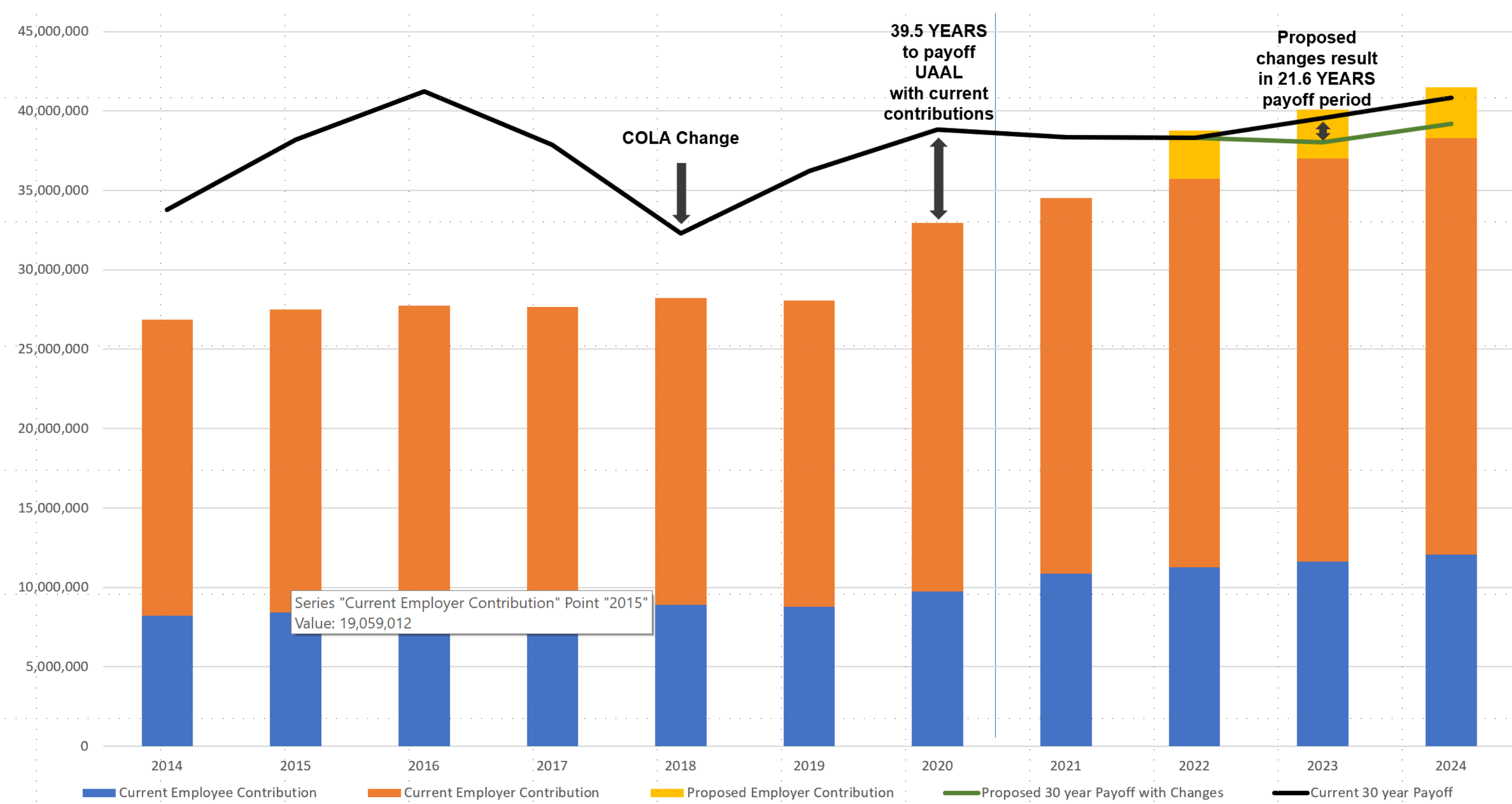

EXHIBIT 1
COSTS AND LIABILITIES

ACTUARIAL PRESENT VALUE OF FUTURE BENEFITS

			6/30/2019		6/30/2020
A.	Active Members				
	1. Retirement Benefits	$	392,976,304	$	401,719,039
	2. Disability Benefits		49,279,882		50,653,092
	3. Death Benefits		3,134,520		3,148,121
	4. Deferred Termination Benefits		14,532,925		15,083,809
	5. Refunds of Contributions		1,892,541		2,048,275
	6. Total Active Members	$	461,816,172	$	472,652,336
B.	Deferred Retirement Option Plan (DROP)				
	1. Future DROP deposits and retirement benefits	$	181,243,020	$	175,103,321
	2. Expected Payouts of current DROP Deposits		194,376,904		210,008,619
	3. Total DROP Members	$	375,619,924	$	385,111,940
C.	Inactive Members				
	1. Vested terminations	$	6,881,041	$	6,969,684
	2. Non-vested terminations		1,409,782		1,658,093
	3. Total Inactive Members	$	8,290,823	$	8,627,777
D.	Retired Members Receiving Benefits				
	1. Service retirements	$	896,492,642	$	886,289,903
	2. Disability retirements		78,516,156		78,422,389
	3. Beneficiaries		64,311,398		65,097,567
	4 Total Retired Members	$	1,039,320,196	$	1,029,809,859
E.	Total Actuarial Present Value of Future Benefits (A6 + B3 + C3 + D4)	$	1,885,047,115	$	1,896,201,912

EXHIBIT 1 (continued)

ANALYSIS OF NORMAL COST

		6/30/2019	6/30/2020
A.	Normal Cost (to fund current Active Members) (Percentage of Payroll)		
	1. Retirement Benefits	8.02%	8.08%
	2. Disability Benefits	1.85%	1.86%
	3. Death Benefits	0.12%	0.12%
	4. Deferred Termination Benefits	1.13%	1.15%
	5. Refunds of Contributions	0.61%	0.61%
	6. Total Normal Cost	11.73%	11.82%
B.	Present Value of Future Normal Costs		
	1. Annualized salaries (excludes DROPs)	$ 144,750,560	$ 158,254,471
	2. Projected payroll for upcoming fiscal year	154,451,494	159,121,521
	3. Present value of future salaries	1,169,313,818	1,209,669,365
	4. Dollar Value of Normal Cost (A6 X B2)	18,117,160	18,808,164
	5. Present Value of Future Normal Costs (A6 X B3)	137,160,511	142,982,919

EXHIBIT 1 (continued)

DEVELOPMENT OF UNFUNDED ACTUARIAL LIABILITY

			6/30/2019		6/30/2020
A.	Actuarial Accrued Liabilities – Active Members				
	1. Present Value of future benefits	$	461,816,172	$	472,652,336
	2. Less Present Value of future normal costs		137,160,511		142,982,919
	3. Accrued Liability - Actives	$	324,655,661	$	329,669,417
B.	Actuarial Accrued Liabilities – DROP Members				
	1. Present Value of future benefits	$	375,619,924	$	385,111,940
	2. Less present value of future Tier II Contributions		11,505,779		11,157,370
	3. Accrued Liability - DROP	$	364,114,145	$	373,954,570
C.	Actuarial Accrued Liabilities – Inactive Members	$	8,290,823	$	8,627,777
D.	Actuarial Accrued Liabilities – Retired Members	$	1,039,320,196	$	1,029,809,859
E.	Total Actuarial Accrued Liabilities (A3 + B3 +C + D)	$	1,736,380,825	$	1,742,061,623
F.	Actuarial Value of Assets (Developed in Exhibit 3)		1,410,043,327		1,434,541,444
G.	Unfunded Actuarial Accrued Liability (E – F)	$	326,337,498	$	307,520,179

EXHIBIT 1 (continued)

Actual Versus Expected Actuarial Assets

		6/30/2019	6/30/2020
1.	Actuarial assets, beginning of year	$ 1,424,240,080	$ 1,410,043,327
2.	Total contributions during year	28,531,322	33,474,207
3.	Benefits paid during year	(117,889,214)	(120,815,379)
4.	Refunds paid during year	(1,523,052)	(1,974,259)
5.	Assumed net investment income at 8%		
	a. Beginning of year assets	113,939,206	112,803,466
	b. Contributions	1,141,253	1,338,968
	c. Benefits	(4,715,569)	(4,832,615)
	d. Refunds	(60,922)	(78,970)
	e. Total	$ 110,303,968	$ 109,230,849
6.	Expected actuarial assets, end of year (Sum of items 1 through 5)	1,443,663,104	1,429,958,744
7.	Actuarial Value of Assets, end of year	1,410,043,327	1,434,541,444
8.	Asset gain/(loss) for year (7 – 6)	(33,619,777)	4,582,700
9.	Asset gain/(loss) as a percentage of end of year assets (8 / 7)	(2.38%)	0.32%

EXHIBIT 1 (continued)

ACTUARIAL GAIN OR LOSS FOR THE YEAR

				6/30/2019		6/30/2020
A.	Calculation of actuarial gain or loss					
	1.	Unfunded actuarial liability (UAAL), previous year	$	281,160,825	$	326,337,498
	2.	Normal cost for the year		18,358,130		18,117,160
	3.	Contributions for the year		(28,531,322)		(33,474,207)
	4.	Interest at 8.0%				
		a. On UAAL	$	22,492,866	$	26,107,000
		b. On normal cost		734,325		724,686
		c. On contributions		(1,141,253)		(1,338,968)
		d. Total	$	22,085,938	$	25,492,718
	5.	Expected UAAL (sum of items 1 – 4)		293,073,571		336,473,169
	6.	Actual UAAL		326,337,498		307,520,179
	7.	Gain (loss) for the year (item 5 – item 6)	$	(33,263,927)	$	28,952,990
B.	Source of gains and losses					
	8.	a. Asset gain (loss) for the year	$	(33,619,777)	$	4,582,700
		b. Gain (loss) from change in assumption		0		0
		c. Gain (loss) from change in method		0		0
		d. Gain (loss) from Legislative change		20,413,261		0
		e. Actuarial gain (loss) from liability experience (7 – 8a – 8b – 8c - 8d)		(20,057,411)		24,370,290
		f. Total Gain (loss) for the year (8a + 8b + 8c + 8d + 8e)	$	(33,263,927)	$	28,952,990
	9.	Total Actuarial Accrued Liabilities (end of year)	$	1,736,380,825	$	1,742,061,623
	10.	Gain (loss) components as a percentage of Actuarial Accrued Liabilities				
		a. Asset gain (loss) for the year		(1.94%)		0.26%
		b. Gain (loss) from change in assumption		0.00%		0.00%
		c. Gain (loss) from change in method		0.00%		0.00%
		d. Gain (loss) from Legislative change		1.18%		0.00%
		e. Actuarial gain (loss) from liability experience		(1.16%)		1.40%
		f. Total Gain (loss) for the year		(1.92%)		1.66%

EXHIBIT 2

DEVELOPMENT OF CONTRIBUTION RATES

			6/30/2019		6/30/2020
A.	Expected Contributions				
	1. Annualized salaries (excludes DROPs)	$	144,750,560	$	158,254,471
	2. Projected payroll for upcoming fiscal year		154,451,494		159,121,521
	3. Current Employee Contribution Rate		6.50%		7.00%
	4. Current Employer Contribution Rate		14.90%		14.90%
	5. Total Contribution Rate		21.40%		21.90%
	6. Contribution in Dollars (A2 X A5)		33,052,620		34,847,613
	7. Expected Contribution from Tier II DROP		718,598		781,122
	8. Total Expected Contributions		33,771,218		35,628,735
B.	Unfunded Actuarial Accrued Liability	$	326,337,498	$	307,520,179
C.	Calculation of 30-year Payoff Rate				
	1. 30-year Amortization of UAAL at mid-year	$	20,707,504	$	19,513,465
	2. Less Expected Tier II Contributions		718,598		781,122
	3. Contribution Needed to meet goal (C1 – C2)		19,988,906		18,732,343
	4. C3 as percentage of payroll (C3/A2)		12.94%		11.77%
	5. Normal Cost		11.73%		11.82%
	6. Total Contribution Needed to meet goal		24.67%		23.59%
D.	Calculation of 18-year Payoff Rate				
	1. 18-year Amortization of UAAL at mid-year	$	26,322,414	$	25,796,791
	2. Less Expected Tier II Contributions		718,598		781,122
	3. Contribution Needed to meet goal (D1 – D2)		25,603,816		25,015,669
	4. D3 as percentage of payroll (D3/A2)		16.59%		15.72%
	5. Normal Cost		11.73%		11.82%
	6. Total Contribution Needed to meet goal		28.31%		27.54%
E.	Calculation of Funding Period				
	1. Total Expected Contributions (A8) *	$	34,543,475	$	35,628,735
	2. Amount needed to pay Normal Cost		18,117,160		18,808,164
	3. Amount remaining to payoff UAAL (E1 – E2)		16,426,315		16,820,571
	4. Years to fund UAAL using amount in E3 Based on 3% payroll growth		53.2 years		39.5 years

EXHIBIT 3

SUMMARY OF FINANCIAL INFORMATION

(Items D-E determined by Osborn, Carreiro and Associates, Inc.)

	Plan Year Ended 6/30/2018	6/30/2019	6/30/2020
A. INCOME			
1. Contributions			
Employee	$ 9,163,176	$ 9,249,680	$ 10,265,552
State	19,294,283	19,281,642	23,208,655
Other	0	4,600	2,137
2. Investment Income			
Interest/Dividends	25,900,021	26,213,069	24,791,862
Realized Gain (+ URG for 16-17)	141,998,366	45,093,676	75,980,389
Unrealized Gain	45,856,544	(58,086,291)	18,374,253
Investment Expense	(8,257,292)	(8,661,421)	(8,604,886)
Net Investment Income	205,497,639	4,559,025	110,541,618
3. Adjustment to Previous Year	0	1,443	0
TOTAL INCOME	$ 233,955,098	$ 33,096,390	$ 144,017,962
B. EXPENSES			
1. Administrative	$ 55,703	$ 80,391	$ 131,153
2. Refunds	2,270,815	1,523,052	1,974,259
3. Benefit Payments	113,476,915	117,889,214	120,815,379
TOTAL EXPENSES	$ 115,803,433	$ 119,492,657	$ 122,920,791

EXHIBIT 3 (Continued)

		6/30/2018	6/30/2019	6/30/2020
C.	ASSETS (Market)			
1.	Short Term			
	Cash	$ 657,885	$ 1,507,373	$ 657,842
	Money Market	169,273,146	91,969,742	184,365,252
2.	Corporate Bonds	224,783,236	134,079,475	126,909,543
3.	Common Stocks	1,020,024,248	932,042,013	856,753,103
4.	U.S. Government agency obligations	58,331,725	168,570,794	235,736,224
5.	Net Securities Lending	0	94,961	5,954
6.	Receivables			
	Member contributions	245,653	226,133	300,150
	State contributions	427,411	383,543	613,176
	Interest and dividends	1,718,016	2,486,984	2,358,543
	Miscellaneous	5,636,506	62,702,630	28,687
7.	Liabilities	(8,624,961)	(7,987,050)	(554,705)
	TOTAL ASSETS	$ 1,472,472,865	$ 1,386,076,598	$ 1,407,173,769
D.	RATIO OF ASSETS TO ANNUAL EXPENSES:	12.72	11.60	11.45
E.	INVESTMENT RETURN:			
	Gross	16.36%	0.93%	8.91%
	Net of Investment Expense	15.68%	0.32%	8.24%
	Return on Actuarial Value of Assets:	5.17%	5.57%	8.35%

EXHIBIT 3 (Continued)

	7/1/2018	7/1/2019	7/1/2020
F. DEVELOPMENT OF ACTUARIAL VALUE OF ASSETS			
1. Investment income for year	$ 205,497,639	$ 4,559,025	$ 110,541,618
2. Expenses and fees for year	55,703	74,348	129,016
3. Actual net investment income	205,441,936	4,484,677	110,412,602
4. Market Value (beginning of year)	1,354,321,200	1,472,472,865	1,386,076,598
5. Contributions during year	28,457,459	28,531,322	33,474,207
6. Benefits paid during year	115,747,730	119,412,266	122,789,638
7. Expected investment income at 8%			
Market Value	108,345,696	117,797,829	110,886,128
Contributions	1,138,298	1,141,253	1,338,968
Benefits	4,629,909	4,776,491	4,911,586
Total	104,854,085	114,162,591	107,313,510
8. Investment gain for year	100,587,851	(109,677,914)	3,099,092
9. Deferral of investment gain			
Current year (75%)	75,440,888	(82,258,436)	2,324,319
Current year – 1 (50%)	15,995,561	50,293,926	(54,838,957)
Current year – 2 (25%)	(43,203,664)	7,997,781	25,146,963
Total	48,232,785	(23,966,729)	(27,367,675)
10. Market value (end of year)	1,472,872,865	1,386,076,598	1,407,173,769
11. Preliminary AVA (end of year) (10) – (9)	1,424,240,080	1,410,043,327	1,434,541,444
12. Final AVA within 20% corridor	$ 1,424,240,080	$ 1,410,043,327	$ 1,434,541,444

EXHIBIT 3 (Continued)

HISTORY OF CASH FLOW

Year Ending June 30	Contributions for the Year	Expenditures During the Year: Benefit Payments	Refund of Contributions	Expenses	Total	External Cash Flow for the Year	Market Value of Assets	External Cash Flow as Percent of Market Value
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1997	21,897,263	(23,593,197)	(902,144)	(1,274,552)	(25,770,613)	(3,873,350)	629,060,314	(0.6%)
1998	20,633,572	(26,568,398)	(1,136,696)	(1,443,527)	(29,148,321)	(8,514,749)	758,971,958	(1.1%)
1999	21,460,290	(27,868,587)	(1,218,372)	(1,776,862)	(30,863,821)	(9,403,531)	870,332,321	(1.1%)
2000	20,635,998	(32,437,078)	(860,532)	(2,231,766)	(35,529,375)	(14,893,377)	1,020,171,033	(1.5%)
2001	21,319,262	(35,505,451)	(1,134,443)	(3,179,023)	(39,818,918)	(18,499,656)	998,671,310	(1.9%)
2002	23,395,271	(40,606,836)	(658,917)	(3,545,184)	(44810,937)	(21,415,666)	875,304,832	(2.4%)
2003	23,656,596	(48,128,153)	(907,236)	(4,056,463)	(53,091,851)	(29,435,255)	891,122,027	(3.3%)
2004	23,623,171	(51,764,755)	(604,562)	(3,736,002)	(56,105,319)	(32,482,148)	981,026,764	(3.3%)
2005	23,814,179	(53,952,761)	(974,389)	(4,157,579)	(59,084,730)	(35,270,551)	1,041,898,315	(3.4%)
2006	23,956,626	(57,570,547)	(790,218)	(4,295,209)	(62,655,974)	(38,699,348)	1,098,788,670	(3.5%)
2007	23,742,542	(62,317,277)	(1,243,841)	(4,458,889)	(68,020,007)	(44,277,465)	1,186,151,377	(3.7%)
2008	24,286,799	(65,483,982)	(1,154,502)	(4,584,201)	(71,222,685)	(46,935,886)	1,242,354,294	(3.8%)
2009	24,730,528	(69,635,808)	(861,725)	(4,726,929)	(75,224,462)	(50,493,934)	994,466,871	(5.1%)
2010	26,691,696	(73,650,896)	(803,288)	(4,176,401)	(78,630,585)	(51,938,889)	1,052,235,399	(4.9%)
2011	26,574,184	(77,553,673)	(960,668)	(5,253,653)	(83,767,994)	(57,193,810)	1,298,501,306	(4.4%)
2012	26,521,075	(82,216,303)	(912,512)	(5,861,735)	(88,990,550)	(62,469,475)	1,230,012,388	(5.1%)
2013	26,712,669	(89,037,077)	(1,084,539)	(6,542,055)	(96,663,601)	(69,950,932)	1,326,032,436	(5.3%)
2014	27,499,336	(93,712,721)	(1,741,876)	(6,650,036)	(102,104,633)	(74,605,297)	1,492,232,422	(5.0%)
2015	28,197,463	(100,328,585)	(1,917,221)	(7,883,940)	(110,129,746)	(81,932,283)	1,443,476,293	(5.7%)
2016	28,611,588	(105,056,553)	(1,699,287)	(8,127,098)	(114,882,938)	(86,271,350)	1,304,869,720	(6.6%)
2017	28,318,809	(109,874,806)	(2,029,791)	(8,211,585)	(120,116,182)	(91,797,373)	1,354,321,200	(6.8%)
2018	28,457,459	(113,476,915)	(2,270,815)	(8,312,995)	(124,060,725)	(95,603,266)	1,472,472,865	(6.5%)
2019	28,531,322	(117,889,214)	(1,523,052)	(8,741,812)	(128,154,078)	(99,622,756)	1,386,076,598	(7.2%)
2020	33,474,207	(120,815,379)	(1,974,259)	(8,733,902)	(131,523,540)	(98,049,333)	1,407,173,769	(7.0%)

Column (2) includes employee and employer contributions, as well as any account reinstatement receipts during the year.
Column (5) includes both administrative and investment expenses.
Column (7) = Column (2) + Column (6)

EXHIBIT 4

EMPLOYEE PROFILE

Employee data needed for the valuation was obtained from the records furnished by the system. The following table shows a detailed breakdown of the included participants and salaries by age and years of actual ASHERS credited service. This does not include reciprocal service which determines eligibility.

All Actives – Actual Service

Age		Years of Service 0-4.9	5-9.9	10-14.9	15-19.9	20-24.9	25-29.9	Over 30	Total
Under 25	Count	266	7	-	-	-	-	-	273
	Salary	8,235,918	243,506	-	-	-	-	-	8,479,424
25-29	Count	250	111	10	-	-	-	-	371
	Salary	9,471,904	4,931,895	401,490	-	-	-	-	14,805,289
30-34	Count	170	126	39	8	-	-	-	343
	Salary	5,888,412	6,35,778	2,121,690	359,726	-	-	-	14,721,606
35-39	Count	157	85	71	68	7	-	-	388
	Salary	5,719,712	4,033,578	4,128,697	3,812,502	409,790	-	-	18,104,279
40-44	Count	134	85	70	102	49	1	-	441
	Salary	4,787,276	3,579,924	3,547,156	6,490,634	2,929,403	69,048	-	21,403,441
45-49	Count	122	84	66	65	66	40	-	443
	Salary	4,544,202	3,928,557	3,132,365	4,027,966	4,341,285	2,809,372	-	22,783,747
50-54	Count	121	88	56	72	49	56	3	445
	Salary	4,302,717	3,745,014	2,678,429	3,799,345	2,689,485	4,294,721	228,403	21,738,114
55-59	Count	119	79	67	74	72	48	1	460
	Salary	4,118,373	3,136,446	2,956,322	3,505,760	3,702,822	2,936,669	32,329	20,388,721
60-64	Count	45	56	36	23	1	-	-	161
	Salary	1,621,262	2,139,923	1,387,395	1,055,672	89,730	-	-	6,243,982
65-69	Count	17	9	1	1	-	1	-	29
	Salary	543,022	394,497	35,026	58,642	-	81,398	-	1,112,585
70 & Over	Count	1	2	-	1	-	-	-	4
	Salary	33,957	67,496	-	40,882	-	-	-	142,335
Total	Count	1,402	732	416	414	244	146	4	3,358
	Salary	49,266,755	32,552,614	20,388,570	23,101,129	14,162,515	10,191,208	260,732	149,923,523

Average Attained Age: 42.8 years
Average Actual Service: 9.0 years
Average Salary: $ 44,691

EXHIBIT 4

RETIREE PROFILE

Retiree data needed for the valuation was obtained from the records furnished by the administrator. The following table shows a detailed breakdown of the included retirees and beneficiaries by age and years since retirement. Benefits listed are annual amounts of annuities paid monthly.

All Regular Retirees Receiving Annuities

		Years since Retirement							
Age		0-.9	1-1.9	2-2.9	3-3.9	4-4.9	5-9.9	Over 10	Total
Under 45	Count	-	-	-	-	-	-	-	-
	Benefit	-	-	-	-	-	-	-	-
45-49	Count	3	2	2	-	-	-	-	7
	Benefit	102,300	66,683	52,257	-	-	-	-	221,240
50-54	Count	7	6	4	2	3	8	-	30
	Benefit	343,988	200,274	120,597	85,005	113,847	283,461	-	1,147,172
55-59	Count	26	16	17	20	10	39	2	130
	Benefit	754,877	468,192	677,886	682,903	333,359	1,414,093	46,692	4,378,002
60-64	Count	31	55	47	30	30	143	57	393
	Benefit	922,682	1,552,515	1,109,133	826,697	1,136,823	5,493,500	1,990,649	13,031,999
65-69	Count	32	52	50	59	41	249	171	654
	Benefit	656,066	1,164,355	1,173,036	1,531,464	950,299	8,040,011	6,969,019	20,484,250
70-74	Count	4	3	8	6	12	200	340	573
	Benefit	26,746	10,812	126,862	86,806	204,142	5,459,151	12,662,701	18,577,220
75-79	Count	1	-	-	-	-	15	349	365
	Benefit	11,713	-	-	-	-	220,570	12,505,442	12,737,725
80-84	Count	-	-	-	-	1	4	229	234
	Benefit	-	-	-	-	3,873	12,147	8,270,724	8,286,744
85 & Over	Count	-	-	-	-	-	1	183	184
	Benefit	-	-	-	-	-	3,061	5,865,666	5,868,727
Total	Count	104	134	128	117	97	659	1,331	2,570
	Benefit	2,818,372	3,462,831	3,259,771	3,212,875	2,742,343	20,925,994	48,310,893	84,733,079

Average Attained Age: 71.5 years
Average Years since Retirement: 11.8 years
Average Annual Benefit: $32,970

EXHIBIT 4

DISABLED PROFILE

Retiree data needed for the valuation was obtained from the records furnished by the administrator. The following table shows a detailed breakdown of the included retirees and beneficiaries by age and years since retirement. Benefits listed are annual amounts of annuities paid monthly.

All Disability Retirees Receiving Annuities

		Years since Retirement							
Age		0-.9	1-1.9	2-2.9	3-3.9	4-4.9	5-9.9	Over 10	Total
Under 45	Count	-	-	1	2	1	3	-	7
	Benefit	-	-	4,465	13,571	10,356	25,628	-	54,020
45-49	Count	1	1	1	1	-	8	2	14
	Benefit	3,763	12,722	19,97	6,056	-	118,993	12,058	173,596
50-54	Count	2	7	6	5	3	12	12	47
	Benefit	23,415	99,402	76,822	48,847	30,696	208,832	138,976	626,990
55-59	Count	4	-	6	5	6	24	22	67
	Benefit	63,473	-	77,609	25,741	140,355	333,536	382,184	1,022,898
60-64	Count	4	2	3	7	6	25	40	87
	Benefit	39,919	8,391	24,391	72,947	68,006	363,713	545,692	1,123,059
65-69	Count	-	-	-	-	4	28	49	81
	Benefit	-	-	-	-	31,043	388,917	938,429	1,358,389
70-74	Count	-	-	-	-	-	3	68	71
	Benefit	-	-	-	-	-	17,362	1,197,399	1,214,761
75-79	Count	-	-	-	-	-	-	30	30
	Benefit	-	-	-	-	-	-	719,243	719,243
80-84	Count	-	-	-	-	-	-	14	14
	Benefit	-	-	-	-	-	-	327,198	327,198
85 & Over	Count	-	-	-	-	-	-	4	4
	Benefit	-	-	-	-	-	-	73,745	73,745
Total	Count	11	10	17	20	20	103	241	422
	Benefit	130,570	120,548	203,258	167,162	280,456	1,456,981	4,334,924	6,693,899

Average Attained Age: 64.4 years
Average Years since Retirement: 13.0 years
Average Annual Benefit: $15,862

EXHIBIT 4

SURVIVOR PROFILE

Retiree data needed for the valuation was obtained from the records furnished by the administrator. The following table shows a detailed breakdown of the included retirees and beneficiaries by age and years since retirement. Benefits listed are annual amounts of annuities paid monthly.

All Survivors Receiving Annuities

		Years since Retirement							
Age		0-.9	1-1.9	2-2.9	3-3.9	4-4.9	5-9.9	Over 10	Total
Under 45	Count	-	2	1	-	1	7	-	11
	Benefit	-	15,868	14,051	-	11,646	46,823	-	88,388
45-49	Count	-	2	2	-	3	1	3	11
	Benefit	-	24,633	27,901	-	21,867	8,185	21,957	104,543
50-54	Count	-	3	-	2	-	2	3	10
	Benefit	-	82,853	-	25,863	-	30,055	23,438	162,209
55-59	Count	2	3	1	-	5	11	7	29
	Benefit	9,347	19,896	2,517	-	82,134	138,437	82,728	335,059
60-64	Count	6	8	3	4	5	30	12	68
	Benefit	85,847	188,712	60,169	74,904	59,787	425,965	152,887	1,048,271
65-69	Count	3	2	6	2	5	17	25	60
	Benefit	56,286	24,230	83,858	13,862	51,471	255,009	319,003	773,719
70-74	Count	5	6	5	10	6	17	23	72
	Benefit	62,595	106,663	95,766	165,324	87,637	216,042	339,843	1,073,870
75-79	Count	5	5	7	4	9	23	35	88
	Benefit	51,652	99,298	141,288	59,898	80,826	445,261	564,593	1,442,816
80-84	Count	2	4	5	4	3	18	28	64
	Benefit	38,394	66,206	82,165	84,644	51,754	349,406	473,802	1,146,371
85 & Over	Count	4	2	1	3	2	20	46	78
	Benefit	80,274	60,969	7,115	72,707	51,528	427,866	706,481	1,406,940
Total	Count	27	37	31	29	39	146	182	491
	Benefit	384,395	689,328	514,830	497,202	498,650	2,313,049	2,684,732	7,582,186

Average Attained Age: 73.1 years
Average Years since Retirement: 9.8 years
Average Annual Benefit: $15,442

EXHIBIT 4

DROP PROFILE

Retiree data needed for the valuation was obtained from the records furnished by the administrator. The following table shows a detailed breakdown of the included retirees and beneficiaries by age and years since retirement. Benefits listed are annual amounts of the current DROP deposits paid monthly.

All Current DROP Participants

		Years since Retirement							
Age		0-.9	1-1.9	2-2.9	3-3.9	4-4.9	5-9.9	Over 10	Total
Under 45	Count	-	-	-	-	-	-	-	-
	Benefit	-	-	-	-	-	-	-	-
45-49	Count	6	-	-	-	-	-	-	6
	Benefit	201,963	-	-	-	-	-	-	201,963
50-54	Count	9	15	15	6	4	4	-	53
	Benefit	405,404	591,326	591,862	226,196	160,077	125,604	-	2,100,469
55-59	Count	12	12	26	26	23	24	5	128
	Benefit	456,359	422,178	1,060,267	1,056,015	1,005,955	856,575	175,736	5,030,085
60-64	Count	23	32	19	16	15	15	8	128
	Benefit	403,096	743,066	567,695	477,818	531,094	607,682	274,913	3,605,364
65-69	Count	9	10	7	6	5	-	-	37
	Benefit	65,233	123,517	57,538	93,323	88,123	-	-	427,734
70-74	Count	-	1	-	-	2	-	-	3
	Benefit	-	7,980	-	-	21,525	-	-	29,505
75-79	Count	-	-	-	-	-	-	-	-
	Benefit	-	-	-	-	-	-	-	-
80-84	Count	1	-	-	-	-	-	-	1
	Benefit	2,173	-	-	-	-	-	-	2,173
85 & Over	Count	-	-	-	-	-	-	-	-
	Benefit	-	-	-	-	-	-	-	-
Total	Count	60	70	67	54	49	43	13	356
	Benefit	1,534,228	1,888,067	2,277,362	1,853,352	1,806,774	1,589,861	447,649	11,397,293

Average Attained Age:	59.5 years
Average Years since DROP:	3.2 years
Average Annual Benefit:	$32,015

APPENDIX 1

PRINCIPAL PROVISIONS OF THE PLAN

EFFECTIVE DATE:	July 1, 1949.
EMPLOYEE:	Employees of the Arkansas State Highway System.
EMPLOYER:	Arkansas State Highway System.
PLAN YEAR:	July 1 to June 30.
PARTICIPATION:	Immediate upon full-time employment.
EMPLOYER CONTRIBUTIONS:	The State contributes 14.90% (beginning 7/1/2019, previously 12.90%) of the total payroll earnings of members, excluding DROP participants. The State does not contribute for members in the Tier I portion of DROP and contributes 6.9% of payroll for members in the Tier II portion of DROP.
EMPLOYEE CONTRIBUTIONS:	1. Each Member must contribute 6.5% (for 2019-2020, 7% thereafter) of his annual Compensation while in the service of the Employer. During participation in the Tier I portion of DROP a member's contributions are suspended. 2. Within certain terms, conditions, and limitations, a Member voluntarily may make additional contributions in order to obtain creditable service for prior service.
COMPENSATION:	The total remuneration earned by an employee for services rendered during any consecutive twelve (12) months or fraction thereof.
FINAL AVERAGE COMPENSATION:	Average compensation over 36 consecutive months that produces the highest average.
CREDITED SERVICE:	Completed years and days of service since date of hire.
RECIPROCAL SERVICE:	Service completed in any reciprocal state system as defined by law. Used to determine eligibility for benefits.

Appendix 1 (Continued)

NORMAL RETIREMENT:

Eligibility: Earliest of the following:

(a) Completion of 28 years of creditable service,
(b) Age 60 and 20 years of creditable service,
(c) Age 62 and 15 years of creditable service,
(d) Age 65 and 5 years of creditable service.

Benefit Formula: Years of credited service times 2.2% of Final Average Compensation, plus post-retirement health care supplements. The minimum annual normal retirement benefit is $1,800. The health care supplements are depended on years of service at retirement, the benefits are provided as follows:

(a) For members who retired before or on June 30, 2009: $1,500 health care offset amount will be provided.

(b) For members who retire after June 30, 2009:
1. With less than 10 years of accrued service: No health care offset amount will be provided.

2. With 10 or more years of accrued service but less than 15 years of accrued service at retirement: $900 health care offset amount will be provided.

3. With 15 or more years of accrued service but less than 20 years of accrued service at retirement: $1,200 health care offset amount will be provided.

4. With 20 or more years of accrued service at retirement: $1,500 health care offset amount will be provided.

For members who retire after June 30, 2013 the health care offset is prorated for any service earned with a reciprocal retirement system.

Appendix 1 (Continued)

Normal Form:	Monthly benefit for life of Member plus, upon death, a refund of the excess (if any) of (i) the Member's accumulated contribution account at time of retirement over (ii) the total annuity payments received.
Optional Form:	Option A: 10 years certain or life, or Option B: Joint & 50% contingent survivor, with a pop up to the life only amount if the joint pensioner predeceases the member.

DEFERRED RETIREMENT OPTION PLAN (DROP):

Eligibility:	Earliest of the following: (a) Completion of 30 years of creditable service, (b) Age 60 and 20 years of creditable service, (c) Age 62 and 15 years of creditable service, (d) Age 65 and 5 years of creditable service.
Benefit:	Active members eligible for normal retirement are eligible to participate in the DROP program while continuing active employment. During DROP, the member will receive the regular retiree cost of living adjustments. A member can remain in DROP to the later of age 65 or the completion of five years of participation in DROP. DROP is divided into Tier I and Tier II. Tier I consists of the first five years of DROP participation, while Tier II is the remaining period. In Tier I, 90% of the retirement annuity will be deposited in the DROP account, whereas in Tier II, 79% of the retirement annuity will be deposited. The DROP account is credited with interest in Tier I and Tier II (as set by the Board, currently 6%). Furthermore, the member and employer contributions cease during DROP until the member enters Tier II; during Tier II participation, the member contributes 6.00% of their total payroll earnings and the employer contributes 6.90%. At actual retirement, the member will receive the DROP balance and commence receiving the regular annuity payments.

Appendix 1 (Continued)

EARLY RETIREMENT:

Eligibility:	Age 55 with 5 or more years of creditable service.
Benefit:	Normal retirement benefit earned to the date of retirement, reduced .8% for each of the first 60 months and .3% for each of the next 60 months that the early retirement date precedes the normal retirement date. The minimum annual early retirement benefit is $1,800.

DISABILITY BENEFITS:

Benefit:

1. Less than 1 Year of Creditable Service: Refund of member contributions without interest.
2. At least 1 Year of Creditable Service: Refund of member contributions with interest. Interest credits are currently 3% per annum.
3. At least 5 or more Years of Creditable Service: If he leaves his contribution account on deposit, a monthly annuity payable to the member for life based upon his years of creditable service and commencing upon disability.

TERMINATION OF SERVICE:

1. Less than 1 Year of Creditable Service: Refund of member contributions without interest.
2. At least 1 Year of Creditable Service: Refund of member contributions with interest. Interest credits are currently 3% per annum.
3. At least 5 or more Years of Creditable Service: If he leaves his contribution account on deposit, a monthly annuity payable to the member for life based upon his years of creditable service and commencing upon eligibility for retirement.

Appendix 1 (Continued)

DEATH BEFORE RETIREMENT:

1. Less than 1 Year of Creditable Service: Refund of member contributions without interest.

2. At least 1 Year of Creditable Service: Refund of member contributions with interest.

3. At least 5 Years of Creditable Service: If the beneficiary leaves the Member's contribution account on deposit, an annuity payable under either Option A or B as elected by the beneficiary and commencing at the time the Member would have become eligible for retirement.

   (a) Option A: A reduced annuity payable for 10 years in an amount equal to what the member would have received under retirement Option A.
   (b) Option B: An annuity payable for the life of the beneficiary in an amount equal to 50% of what the member would have received under retirement Option B.

4. An additional death benefit equal to $15,000.

DEATH AFTER RETIREMENT:

If no option was elected, refund of the excess (if any) of (i) the Member's accumulated account (including interest) at retirement over (ii) the total annuity payments received. If an option is elected, death benefits are payable in accordance with such option.

An additional lump sum death benefit of $7,500 is provided for retirees (not beneficiaries).

Appendix 1 (Continued)

AUTOMATIC POST RETIREMENT INCREASES:

Effective July 1 2017, the benefit increase will be the lesser of 3% or the percentage change in the Consumer Price Index for Urban Wage Earners and Clerical Workers as determined by the United States Department of Labor over the one-year period ending in the December immediately preceding the date of which the redetermined amount is being calculated. However, the redetermined amount of the benefit to be paid shall not be less than the redetermined amount of the benefit paid in the preceding year.

Previously, benefits increase by 1 1/2% of the base benefit each year after June 30, 1976 through June 30, 1978, by 3% of the base benefit each year after June 30, 1978, through June 30, 1995, and by 3% of the previous year's benefit each year after June 30, 1995 for those who are retired for at least one year on the July 1 determination date. This benefit was limited by the Consumer Price Index until June 30, 1999. Effective July 1, 1999, the benefit increase is 3% with no ties to the Consumer Price Index.

Effective July 1, 2019, the amount of the health care offset described above is not eligible for a cost of living increase. All cost of living increases granted before July 1, 2019 on the health care offset remain in place.

APPENDIX 2

LEGISLATED PLAN CHANGES ENACTED BY THE LEGISLATURE OF THE STATE OF ARKANSAS

YEAR: 1991

1.	ACT 198	Provide a one-time payment equal to 3.0% of the July 1, 1991 annualized annuity for members retired on or prior to January 1, 1990.
2.	ACT 243	Permit members to accrue more than 35 years of creditable service. (Retroactively applied).
3.	ACT 245	Effective July 1, 1991, increase annuities by the sum of $50 per month for members receiving benefits prior to, on, or subsequent to July 1, 1991. The increase is also added to the base annuity.
4.	ACT 246	Effective July 1, 1991, increase the benefit formula multiplier to 2.06% of average compensation times number of years of creditable service.
5.	ACT 380	4.0% ad hoc increase payable on July 1, 1991 for those members retired on June 1, 1991, based on benefit payable on June 1, 1991. The increase is also added to the base annuity.
6.	ACT 381	Benefits from reciprocal retirement systems are to be based on the highest final average salary at the time of retirement. (Retroactively applied).

YEAR: 1993

1.	ACT 929	2.9% ad hoc increase payable on July 1, 1993 for those members retired on June 1, 1993, based on benefits payable June 1, 1993. The increase is also added to the base annuity.
2.	ACT 930	Effective July 1, 1993, the average compensation is based on a forty-eight (48) month averaging period. (Previously sixty (60) months.)

YEAR: 1995

1.	ACT 407	Cost of living increase up to 3% of the member's previous year's benefit for those members retired for at least twelve full months after the effective date of each increase. Increases are effective July 1 and will be limited to the lesser of 3% or the Consumer Price Index but may not result in a decrease in benefits otherwise payable.

Appendix 2 (Continued)

YEAR: 1997

1. ACT 1067 Creates an active member death benefit of 10 years certain and life. Five years of service eligibility for benefit.

2. ACT 1089 Creates a $15,000 death benefit for active and vested-terminated members.

3. ACT 1073 Creates a DROP program for active members eligible for normal retirement.

4. ACT 386 Increases the multiplier from 2.06% to 2.10%. Grants 2.0% ad hoc to retirees.

5. ACT 349 Changes 48-month FAE to 36 months. Grants 2.2% ad hoc to retirees.

6. ACT 347 Changes 10-year vesting requirement to 5 years.

YEAR: 1999

1. ACT 311 Increases the $50 per month supplement to $125 per month to current and future retirees.

2. ACT 1325 Active members can retire with full benefit if they have 28 years of creditable service.

3. ACT 335 Cost of living increase will be 3% and is not limited by the Consumer Price Index.

YEAR: 2001

1. ACT 482 Provides $7,500 lump sum death benefit for retirees (not beneficiaries).

2. ACT 539 Increases the multiplier from 2.1% to 2.2%. Grant 4.8% ad hoc to retirees.

3. ACT Crediting 8% to the DROP account by taking a Board action.

YEAR: 2003

1. ACT 776 Allows members who enter DROP prior to age 60 to remain in DROP until age 65, beyond the five-year limit previously set. During this time, known as Tier II DROP, 79% of the retirement annuity will be deposited in the DROP account. Furthermore, the member contributes 6.00% of their total payroll earnings and the employer contributes 6.90%.
2. ACT 205 Changes the factors used for determining optional forms of payment to actuarially equivalent factors. Current retirees had their benefits increased to reflect the new factors effective July 1, 2003.

Appendix 2 (Continued)

YEAR: 2009

1. HB 1177 — Changes from 5 years vesting requirement to 10 years vesting requirement on health care coverage. Prorated the $125 per month health care supplements as follows:

   a. With less than 10 years of service at retirement: No health care supplements.

   b. With 10 or more years of service but less than 15 years of service at retirement: $75/month (or 60% of $125/month).

   c. With 15 or more years of service but less than 20 years of service at retirement: $100/month (or 80% of $125/month).

   d. With 20 or more years of service at retirement: $125/month (or100% of $125/month).

YEAR: 2011

1. HB 1213 — Establishes the cost for purchasing service credit as the actuarial equivalent cost. The actuarial cost is the increase in the liability associated with adding the additional service credit. This applies to all types of service credit including: military service, service with another State agency, and reinstatement of forfeited service.

YEAR: 2013

1. HB 1224 — Prorates the Health Care Offset paid by the Arkansas State Highway Employees Retirement System (ASHERS), for members who also have service in a reciprocal retirement system.

2. HB 1225 — Excludes lump sum termination payments (accrued leave, compensation, etc.) from inclusion in the Average Compensation and credited service used in the determination of retirement benefits paid by the Arkansas State Highway Employees Retirement System (ASHERS).

YEAR: 2017

1. ACT 610 — Cost of living increase will be the lesser of 3% or the percentage change in the Consumer Price Index for Urban Wage Earners and Clerical Workers as determined by the United States Department of Labor over the one-year period ending in the December immediately preceding the date of which the redetermined amount is being calculated. However, the redetermined amount of the benefit to be paid shall not be less than the redetermined amount of the benefit paid in the preceding year.

Appendix 2 (Continued)

2. ACT 461 A member of the Arkansas State Highway Employees' Retirement System may purchase creditable service in the retirement system, without interest, for a period not to exceed five years of service for active service by the member in the United States Armed Forces if the member (1) has five years of actual service in the system as of August 20, 2015; and (2) shows that he or she relied upon the ten-year service time requirement before applying to purchase military service credit under this ACT. The purchase of military service credit under this ACT shall be made in the form of a cash payment or automatic payroll deductions for period not to exceed three years.

YEAR: 2019

1. ACT 294 Effective July 1, 2019, the amount of the health care offset (also called supplement) is not eligible for a cost of living increase. All cost of living increases granted before July 1, 2019 on the health care offset remain in place.

2. ACT 295 Effective July 1, 2019, the employee contribution maximum is 7% of compensation. This can only increase by 0.5% per year, so the rate beginning July 1, 2019 will be 6.5% and the rate beginning July 1, 2020 will be 7.0% of compensation. The employer rate increased to a maximum of 14.9% and that increase was effective July 1, 2019.

APPENDIX 3

ACTUARIAL COST METHODS AND ASSUMPTIONS

INVESTMENT YIELD RATE:	8.0%* per annum, compounded annually. (Effective June 30,1997) The expected rate of return on pension plan investments for the purpose of GASB is 7.50%.
*	See the end of this Appendix for discussion.

MORTALITY:

a. Healthy Post-retirement (Effective June 30, 2015)

Male: RP-2000 Combined Healthy for males with Blue Collar adjustments, scaled at 105% with no setback. Generational mortality improvements in accordance with Scale AA from the table's base year of 2000 (both before and after the measurement date)

Female: RP-2000 Combined Healthy for females with Blue Collar adjustments, scaled at 100% with no setback. Generational mortality improvements in accordance with Scale AA from the table's base year of 2000 (both before and after the measurement date)

b. Disabled Post-retirement (Effective June 30, 2015)

Male: RP-2000 Combined Healthy for males with Blue Collar adjustments, scaled at 105% with three-year set-forward. Generational mortality improvements in accordance with Scale AA from the table's base year of 2000 (both before and after the measurement date), minimum 3% rate of mortality at all ages

Female: RP-2000 Combined Healthy for females with Blue Collar adjustments, scaled at 100% with three-year set-forward. Generational mortality improvements in accordance with Scale AA from the table's base year of 2000 (both before and after the measurement date), minimum 3% rate of mortality at all ages

c. Healthy Pre-retirement (Effective June 30, 2015)

Male: RP-2000 Combined Healthy for males with Blue Collar adjustments, scaled at 70% with no setback. Generational mortality improvements in accordance with Scale AA from the table's base year of 2000 (both before and after the measurement date)

Female: RP-2000 Combined Healthy for females with Blue Collar adjustments, scaled at 70% with no setback. Generational mortality improvements in accordance with Scale AA from the table's base year of 2000 (both before and after the measurement date)

Appendix 3 (Continued)

RETIREMENT RATES (Effective June 30, 2015):

The following probabilities of retirement were assumed for members eligible to retire:

	Early Retirement Rate	Normal Retirement Rate	
Age	Males and Females	Males	Females
48		5.0%	5.0%
49		5.0%	5.0%
50		6.5%	5.0%
51		8.0%	6.0%
52		9.5%	7.0%
53		11.0%	8.0%
54		12.5%	9.0%
55	1.0%	14.0%	10.0%
56	1.0%	15.5%	15.0%
57	2.0%	20.0%	15.0%
58	2.0%	25.0%	25.0%
59	3.0%	25.0%	25.0%
60	3.0%	15.0%	15.0%
61	8.0%	20.0%	20.0%
62	20.0%	45.0%	45.0%
63	20.0%	25.0%	25.0%
64	15.0%	25.0%	25.0%
65		40.0%	40.0%
66		40.0%	40.0%
67		40.0%	40.0%
68		40.0%	40.0%
69		40.0%	40.0%
70		100.0%	100.0%

Appendix 3 (Continued)

DISABILITY RATES (Effective June 30, 2009):

Rates based on the experience of other large public sector retirement systems through age 82; thereafter, Non-Disabled Mortality is assumed.

Age	Rates of Decrement Due to Disability
20	.00192
25	.00192
30	.00192
35	.00192
40	.00480
45	.00624
50	.01176
55	.02136
60	.03384
65	.03984

WITHDRAWAL RATES (for causes other than death, disability, or retirement)
(Effective June 30, 2015):

Select and ultimate rates are used based on age and service. Sample rates are shown.

Probability of Decrement Due to Withdrawal

Years of Service

Male Members

Age	0	1	2	3	4	5+
20	.3712	.2536	.1697	.1180	.1150	.1043
30	.2925	.1998	.1313	.0862	.0756	.0578
40	.2193	.1538	.1024	.0646	.0477	.0261
50	.1628	.1242	.0894	.0582	.0368	.0159
60	.1342	.1238	.1033	.0748	.0462	.0302

Female Members

Age	0	1	2	3	4	5+
20	.4028	.3008	.2168	.1509	.1047	.0761
30	.2819	.2118	.1542	.1093	.0765	.0571
40	.1980	.1483	.1073	.0752	.0514	.0366
50	.1715	.1250	.0863	.0550	.0336	.0171
60	.1985	.1391	.0896	.0481	.0230	.0007

Appendix 3 (Continued)

SALARY SCALES (Effective June 30, 2015):

Future compensation is assumed to increase by an inflation (growth) increase rate of 2.5% plus a productivity component of 1.00%, and plus a step-rate/promotional component based on service. Rates are illustrated below:

Years of Service	Step-rate/ Promotional Component	Total Salary Scale
0	7.00%	10.50%
1	7.00%	10.50%
2	7.00%	10.50%
3	2.00%	5.50%
4	1.25%	4.75%
5-13	0.75%	4.25%
14-17	0.50%	4.00%
18-19	0.25%	3.75%
20+	0.00%	3.50%

FUTURE INCREASE IN TOTAL PAYROLL (Effective June 30, 2015):

3.0% per annum. Used for purposes of funding the Unfunded Actuarial Accrued Liability.

COST OF LIVING INCREASE (Effective June 30, 2017):

All benefit in pay status are assumed to be increased by 2.25% annually.

PROVISION FOR EXPENSE (Effective June 30, 1997):

The assumed investment return rate represents the anticipated net rate of return after payment of all administrative and investment expenses.

ELECTION RATES (Effective June 30, 2004):

After their initial vesting, members are assumed to elect the greater value of their deferred annuity or a refund of their account balances. 100% of non-vested members are assumed to take a refund.

ELECTION OF DROP ENTRY (Effective June 30, 2015):

100% of participants who are eligible to enter DROP are assumed to elect to participate in DROP, except as noted below. Members who elect into DROP are assumed to retire at the normal retirement patterns. Members who first become eligible to DROP prior to age 60 (at 30 years of service) are assumed to enter DROP after attaining 31 years of service. Members past their first eligibility are assumed to enter DROP immediately.

Appendix 3 (Continued)

INTEREST CREDITING RATE ON DROP ACCOUNTS (Effective June 30, 2012):

6.0% interest credit on DROP accounts.

DROP ACCOUNTS PAYOUT PERIOD (Effective June 30, 2015):

It is assumed that members who participate in DROP will receive their DROP accounts in equal installments over a 10-year period.

ASSET VALUATION METHOD (Adopted June 30, 2015):

The actuarial value of assets is equal to the market value of assets less a four-year phase-in of the excess (shortfall) between expected investment return and actual income with the resulting value not being less than 80% or more than 120% of the market value of assets.

The actuarial value of assets was marked to the market for June 30, 2012 valuation. This was done to prevent an expected divergence away from the market value of assets.

ACTUARIAL COST METHOD:

The funding period required to amortize the unfunded actuarial accrued liability (UAAL) is determined using the Entry Age Actuarial Cost Method.

The Individual Entry Age Normal actuarial cost method assigns the Plan's total unfunded liabilities (the actuarial present value of future benefits less the actuarial value of assets) to various periods. The unfunded actuarial accrued liability is assigned to years prior to the valuation, and the normal cost is assigned to the year following the valuation. The remaining costs are the normal costs for future years. Then each year's contribution is composed of (i) that year's normal cost, plus (ii) a payment used to reduce the unfunded actuarial accrued liability.

The normal contribution is determined using the Entry Age Normal method. Under this method, a calculation is made to determine the rate of contribution which, if applied to the compensation of each individual member during the entire period of anticipated covered service (prior to DROP entry), would be required to meet the cost of all benefits payable on his behalf. The salary-weighted average of these rates is the normal cost rate. This calculation reflects the plan provisions that apply to each individual member. The employer normal cost rate is equal to (i) the normal cost rate, minus (ii) the member contribution rate.

The actuarial accrued liability is the difference between the total present value of future benefits and the actuarial present value of future normal costs. The unfunded actuarial accrued liability (UAAL) is the excess of the actuarial accrued liability over the actuarial value of assets.

Appendix 3 (Continued)

Since the State statutes governing the System establish the current employee and State contribution rates, the actuarial valuation determines the number of years required to amortize (or fund) the UAAL on a level percentage of payroll basis, taking into account the payroll growth assumption and the normal cost expressed as a percent of pay. Because of this amortization procedure, any change in the unfunded actuarial accrued liability due to (i) actuarial gains and losses, (ii) changes in actuarial assumptions, or (iii) amendments, affects the funding period.

FUNDING OF UNFUNDED ACTUARIAL ACCRUED LIABILITY:

The total normal cost for benefits provided by the System is 11.73% of payroll, which is 9.67% of payroll less than the total contributions scheduled for the year under current law (14.90% from Employer plus 6.5% from employees). This remaining 9.67% of payroll along with any contributions received on behalf of members in Tier II of DROP are assumed to be utilized to fund the unfunded actuarial accrued liability over a period of years in the future, assuming that total payroll is increased by 3.0% per year. The calculation is detailed in Exhibit 2 of this report.

Appendix 3 (Continued)

The Investment Yield Rate or Discount Rate that is used in this valuation is 8%. The Board has had some discussion about this issue, but has not yet directed a change in this assumption. In our opinion, a reasonable range for this assumption would be about 6.5% to 7.5%. The Board is scheduled to review all assumptions before the next valuation. We are showing some key results if the discount rate only was changed from 8.0% to 7.5%. When all assumptions are reviewed, there could be other assumption changes that could make this difference larger or smaller. Also, this does not include the effect of the proposed legislative package.

			6/30/2020 At 8.0%		6/30/2020 At 7.5%
A.	Actuarial Accrued Liabilities – Active Members				
	1. Present Value of future benefits	$	472,652,336	$	521,236,882
	2. Less Present Value of future normal costs		142,982,919		163,421,916
	3. Accrued Liability - Actives	$	329,669,417	$	357,814,966
B.	Actuarial Accrued Liabilities – DROP Members				
	1. Present Value of future benefits	$	385,111,940	$	398,664,997
	2. Less present value of future Tier II Contributions		11,157,370		13,232,769
	3. Accrued Liability - DROP	$	373,954,570	$	385,432,228
C.	Actuarial Accrued Liabilities – Inactive Members	$	8,627,777	$	9,357,811
D.	Actuarial Accrued Liabilities – Retired Members	$	1,029,809,859	$	1,072,399,159
E.	Total Actuarial Accrued Liabilities (A3 + B3 +C + D)	$	1,742,061,623	$	1,825,004,164
F.	Actuarial Value of Assets (Developed in Exhibit 3)		1,434,541,444		1,434,541,444
G.	Unfunded Actuarial Accrued Liability (E – F)	$	307,520,179	$	390,462,720
H.	Funded Percentage		82.35%		78.60%
I.	Contribution needed for 30-year Amortization		23.59%		27.39%
	Contribution needed for 18-year Amortization		27.54%		32.50%
J.	Funding Period		39.5 years		>100 years

APPENDIX 4

DEFINITION OF ACTUARIAL TERMS

ACTUARIAL ACCRUED LIABILITY:

The present value of benefits payable in the future less the present value of future normal costs for present members.

ACTUARIAL VALUE OF ASSETS:

The market value of assets of the System adjusted to recognize investment earnings above or below the investment return assumption uniformly over a five-year period.

ACTUARIAL ASSUMPTIONS:

Assumptions as to future experience under the System. Assumptions include future fund earnings rates, rates of future salary increases, and rates of death (both before and after retirement), disability, retirement, and withdrawal.

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.

ACTUARIAL GAIN OR ACTUARIAL LOSS:

A measure of the difference between actual experience and assumed experience of the System. 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 liabilities emerge which may be the same as forecasted or they may be larger or smaller than projected. Actuarial gains are due to favorable experience, i.e., the System'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 unfunded actuarial accrued liability while actuarial losses will lengthen the funding period.

ACTUARIAL LIABILITIES:

The actuarially determined present value of future benefits to be provided by the System. There are separate actuarially determined present values for retired members and non-retired members. When applied to active members, benefits which will be earned through future service and future salary increases are taken into account.

APPENDIX 4 (Continued)

DEFINED BENEFITS:
Benefits which are defined by a specific formula applied to a specific member's compensation and/or specific years of service. The amount of the benefit is not a function of contributions or actual earnings on those contributions.

FUTURE BENEFITS:
Benefits specified in the law which will become payable at some time in the future when the member satisfies the requirement to receive such benefits.

FUTURE CONTRIBUTIONS:
Contributions to be made by the member or the State in the future, as required by the law.

FUNDING PERIOD:
The number of years in the future that will be required to fund (i.e., pay off or eliminate) the unfunded actuarial accrued liability, based on the actuarial assumptions and assuming no future actuarial gains or losses.

NORMAL COST:
The average annual actuarial cost of the benefits provided by the System for the current employees.

PRESENT VALUE:
The actuarially determined lump sum value as of the valuation date of a series of payments to be made in the future, where the lump sum value is equal to the sum of the discounted value of each future payment. The discounted value of each payment is the product of (a) the amount of the payment, (b) the probability that the payment will be made (based on the current actuarial assumptions as to the future experience), and (c) the time value of money (based on the current assumed interest rate).

UNFUNDED ACTUARIAL ACCRUED LIABILITY:
That portion of the actuarial accrued liability (including the present value of benefits presently being paid to retired members and the value of any miscellaneous liabilities) that exceeds the value of current assets.

FUNDED RATIO:
The ratio of the actuarial value of assets to the actuarial accrued liability. The funding ratio is a measure of the funded status of the plan.