ARKANSAS STATE HIGHWAY EMPLOYEES RETIREMENT SYSTEM (ASHERS)

ACTUARIAL VALUATION
AS OF JUNE 30, 2023

Osborn, Carreiro & Associates, Inc.
ACTUARIES ● CONSULTANTS ● ANALYSTS
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November 9, 2023

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, 2023

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, 2023. This valuation determines the contributions for the 2023-24 Plan Year (July 1, 2023 to June 30, 2024). 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 decreased from 86.20% to 84.23% this year (about 80% on a market value basis). This is the ratio of the actuarial value (smoothed) assets to the actuarial accrued liabilities of the plan. This was mostly due to the large investment loss that occurred during the previous fiscal year. This is detailed in the report. The equivalent funding period has increased from 18 to 19 years based on current contributions. The total contribution rate for fiscal 2024 is projected to be near the 18-year period to fully fund the unfunded actuarial accrued liabilities.

Funding Policy

The Board adopted a funding policy which would define the Actuarially Determined Contribution. This was done at their November 7, 2023 meeting at which the results shown in this report were presented. It formalizes the definition of four metrics the Board will review each year. This change altered the format of the Executive Summary and Discussion as well as the Determination of Contribution Rate (page 11).

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.

Osborn, Carreiro & Associates, Inc.
ACTUARIES ● CONSULTANTS ● ANALYSTS

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 that follow show the details of the calculations. The Appendices disclose the plan provisions and assumptions used.

Assumptions

There were no changes in plan provisions or assumptions reflected in this valuation. The last change in assumptions was reflected in the June 30, 2021 actuarial valuation.

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

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EXECUTIVE SUMMARY

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

	6/30/2021	6/30/2022	6/30/2023
Number in Plan			
a) Active Members	3,367	3,277	3,418
b) Members in DROP	306	285	293
c) Members Receiving Benefits	3,535	3,586	3,599
d) Inactive Members	294	335	355
Market Value of Assets	$ 1,715,093,810	$ 1,468,838,071	$ 1,504,601,737
Actuarial Value of Assets	$ 1,585,450,507	$ 1,577,072,265	$ 1,580,781,920
Actuarial Accrued Liability	$ 1,783,900,358	$ 1,829,588,526	$ 1,876,793,868
Unfunded Actuarial Accrued Liability	$ 198,449,851	$ 252,516,261	$ 296,011,947
Funded Percentage (Based on Actuarial Assets)	88.88%	86.20%	84.23%
Funded Percentage (Based on Market Value of Assets)	96.14%	80.28%	80.17%
Contribution Rates for the year beginning On the Valuation Date			
Employee	7.00%	7.00%	7.00%
Employer	14.90%	14.90%	14.90%
Total	21.90%	21.90%	21.90%
Actuarially Determined Contribution Rate		21.02%	21.94%
Needed to Fund UAAL in 18 years	19.44%	21.90%	22.37%
Equivalent Funding Period	12.5 years	18.0 years	19.1 years

Discussion

Introduction

The results of the June 30, 2023 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.

Key Metrics

The key metrics that the Board has agreed to review are outlined in the funding policy adopted in 2023. The Board adopted a traffic signal approach to be used in judging these metrics, as follows:

Funded Percentage	**Under 75%**	**75% to 82%**	**Over 82%**
Equivalent Funding Period	**Over 20 Years**	**17 to 20 Years**	**Under 17 Years**
Cash Flow Percentage	**Over 7.0%**	**6.5% to 7.0%**	**Under 6.5%**
Actual to ADC	**Under 95%**	**95% to 100%**	**Over 100%**

Funded Status

The Funded Status of the plan is typically discussed in terms of the Funded Percentage. The Funded Percentage is 84.23% as of the valuation date compared with 86.20% last year. This decrease from last year is mainly due to recognizing the investment losses from 2022 fiscal year.

The breakdown for this metric is over 82% (green) and under 75% (red) and between those two yellow. The Funded Percentages for the past few years are as follows:

	Based on Actuarial Value	Based on Market Value
6/30/2020 Valuation	82.35%	80.78%
6/30/2021	88.88%	96.14%
6/30/2022	86.20%	80.28%
6/30/2023	84.23%	80.17%

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. Beginning July 1, 2021, the employer contributions are 14.9% for all members on DROP.

Discussion (Continued)

We develop in this report an Actuarially Determined Contribution (ADC) as a help in knowing if the current contribution structure will continue to move the plan consistently toward being fully funded. The next two metrics point to that goal.

Equivalent Funding Period

The Equivalent Funding Period is a measurement of the number of years under current assumptions that the current contribution structure will need to fully fund the Unfunded Actuarial Accrued Liability (UAAL). The goals of the Board is under 17 years (green). If the metric is over 20 years (red) it deserves attention and between these amounts (yellow) it deserves monitoring. The measure of this metric for the past few years is as follows:

	Equivalent Funding Period
6/30/2020 Valuation	39.5 years
6/30/2021	12.5
6/30/2022	18.0
6/30/2023	19.1

Actual to Actuarially Determined Contributions

The other metric that is developed in Exhibit 2 is the Actuarially Determined Contribution. This amount is based on the funding policy and is a contribution that relies on level funding principles to fully fund the UAAL in a reasonable period of time. In general, the layers of amortization are funded over 18 years. The concept is to fund at least the ADC, so that over 100% is considered green. If this ratio falls below 95% (red), then it deserves immediate discussion.

Since this is a new calculation, we only show this metric starting with the 6/30/2021 valuation. The calculation for this ratio for the past few years is as follows:

	Ratio of Actual Contributions To ADC
6/30/2021 Valuation	113%
6/30/2022	101.2%
6/30/2023	97.4%

Discussion (Continued)

Cash Flow Percentage

The other metric that is to be reviewed in each valuation is the Cash Flow Percentage. This amount is developed in Exhibit 3 and shows a longer history. If the non-investment cash flows are over 7.0% of the market value of assets (red), then the plan would need to payout almost all of their assumed investment earnings. The plan is fairly mature, so we expect to be paying out more, but if this goes too high the Board should be concerned. The goal is to keep this ratio below 6.5% (green) and to monitor when between 6.5% and 7.0% (yellow). The ratio for the past several years is as follows:

	Cash Flow Percentage
6/30/2020 Valuation	7.0%
6/30/2021	5.8%
6/30/2022	6.6%
6/30/2023	6.6%

Legislative Changes

There were no legislative changes that were included to change the plan provisions for this valuation report.

EXHIBIT 1
COSTS AND LIABILITIES

ACTUARIAL PRESENT VALUE OF FUTURE BENEFITS

		6/30/2022	6/30/2023
A.	Active Members		
	1. Retirement Benefits	$ 398,866,359	$ 433,494,313
	2. Disability Benefits	52,138,997	57,445,830
	3. Death Benefits	2,607,431	2,803,388
	4. Deferred Termination Benefits	16,441,485	18,191,041
	5. Refunds of Contributions	3,652,562	4,147,846
	6. Total Active Members	$ 473,706,834	$ 516,082,418
B.	Deferred Retirement Option Plan (DROP)		
	1. Future DROP deposits and retirement benefits	$ 146,546,393	$ 149,593,923
	2. Expected Payouts of current DROP Deposits	236,949,191	243,164,002
	3. Total DROP Members	$ 383,495,584	$ 392,757,925
C.	Inactive Members		
	1. Vested terminations	$ 9,355,731	$ 9,698,453
	2. Non-vested terminations	2,770,247	2,874,370
	3. Total Inactive Members	$ 12,125,978	$ 12,572,823
D.	Retired Members Receiving Benefits		
	1. Service retirements	$ 976,298,577	$ 984,866,687
	2. Disability retirements	76,831,990	76,409,137
	3. Beneficiaries	76,254,578	80,039,790
	4 Total Retired Members	$ 1,129,385,145	$ 1,141,315,614
E.	Total Actuarial Present Value of Future Benefits (A6 + B3 + C3 + D4)	$ 1,998,713,541	$ 2,062,728,780

EXHIBIT 1 (continued)

ANALYSIS OF NORMAL COST

		6/30/2022	6/30/2023
A.	Normal Cost (to fund current Active Members) (Percentage of Payroll)		
	1. Retirement Benefits	7.88%	7.86%
	2. Disability Benefits	1.81%	1.78%
	3. Death Benefits	0.09%	0.09%
	4. Deferred Termination Benefits	1.40%	1.31%
	5. Refunds of Contributions	0.57%	0.57%
	6. Total Normal Cost	11.75%	11.61%
B.	Present Value of Future Normal Costs		
	1. Annualized salaries (excludes DROPs)	$ 158,782,858	$ 179,064,864
	2. Projected payroll for upcoming fiscal year	167,483,300	189,102,728
	3. Present value of future salaries	1,259,288,054	1,426,154,845
	4. Dollar Value of Normal Cost (A6 X B2)	19,679,288	21,954,827
	5. Present Value of Future Normal Costs (A6 X B3)	147,966,346	165,576,578

EXHIBIT 1 (continued)

DEVELOPMENT OF UNFUNDED ACTUARIAL LIABILITY

		6/30/2022	6/30/2023
A.	Actuarial Accrued Liabilities – Active Members		
	1. Present Value of future benefits	$ 473,706,834	$ 516,082,418
	2. Less Present Value of future normal costs	147,966,346	165,576,578
	3. Accrued Liability – Actives	$ 325,740,488	$ 350,505,840
B.	Actuarial Accrued Liabilities – DROP Members		
	1. Present Value of future benefits	$ 383,495,584	$ 392,757,925
	2. Less present value future DROP Contributions	21,158,669	20,358,335
	3. Accrued Liability – DROP	$ 362,336,915	$ 372,399,590
C.	Actuarial Accrued Liabilities – Inactive Members	$ 12,125,978	$ 12,572,823
D.	Actuarial Accrued Liabilities – Retired Members	$ 1,129,385,145	$ 1,141,315,614
E.	Total Actuarial Accrued Liabilities (A3 + B3 +C + D)	$ 1,829,588,526	$ 1,876,793,867
F.	Actuarial Value of Assets (Developed in Exhibit 3)	1,577,072,265	1,580,781,920
G.	Unfunded Actuarial Accrued Liability (E – F)	$ 252,516,261	$ 296,011,947

EXHIBIT 1 (continued)

Actual Versus Expected Actuarial Assets

		6/30/2022	6/30/2023
1.	Actuarial assets, beginning of year	$ 1,585,165,788	$ 1,577,072,265
2.	Total contributions during year	39,927,660	42,400,373
3.	Benefits paid during year	(125,578,090)	(129,349,597)
4.	Refunds paid during year	(2,357,761)	(2,459,421)
5.	Assumed net investment income at 7.5%		
	a. Beginning of year assets	118,908,788	118,280,420
	b. Contributions	1,497,287	1,590,014
	c. Benefits	(4,709,178)	(4,850,610)
	d. Refunds	(88,416)	(92,228)
	e. Total	$ 115,608,481	$ 114,927,596
6.	Expected actuarial assets, end of year (Sum of items 1 through 5)	1,613,050,797	1,602,591,216
7.	Actuarial Value of Assets, end of year	1,577,072,265	1,580,781,920
8.	Asset gain/(loss) for year (7 – 6)	(35,978,531)	(21,809,296)
9.	Asset gain/(loss) as a percentage of end of year assets (8 / 7)	(2.28)%	(1.38)%

EXHIBIT 1 (continued)

ACTUARIAL GAIN OR LOSS FOR THE YEAR

		6/30/2022	6/30/2023
A.	Calculation of actuarial gain or loss		
1.	Unfunded actuarial liability (UAAL), previous year	$ 198,449,851	$ 252,516,261
2.	Normal cost for the year	19,371,421	19,679,288
3.	Contributions for the year	(39,927,660)	(42,400,373)
4.	Interest at 7.5%		
	a. On UAAL	$ 14,883,739	$ 18,938,720
	b. On normal cost	726,428	737,973
	c. On contributions	(1,497,287)	(1,590,014)
	d. Total	$ 14,112,880	$ 18,086,679
5.	Expected UAAL (sum of items 1 – 4)	192,006,492	247,881,855
6.	Actual UAAL	252,516,261	296,011,947
7.	Gain (loss) for the year (item 5 – item 6)	$ (60,509,769)	$ (48,130,092)
B.	Source of gains and losses		
8.	a. Asset gain (loss) for the year	$ (35,978,531)	$ (21,809,296)
	b. Gain (loss) from change in assumption	0	0
	c. Gain (loss) from change in method/discount	0	0
	d. Gain (loss) from Legislative change	0	0
	e. Gain (loss) from COLA different than exp.	(8,970,122)	(9,081,765)
	f. Gain (loss) from active salary above exp.	Not calculated	(15,401,802)
	e. Other gain (loss) from liability experience (balancing item)	(15,561,116)	(1,837,229)
	f. Total Gain (loss) for the year (Total all item 8 amounts)	$ (60,509,769)	$ (48,130,092)
9.	Total Actuarial Accrued Liabilities (end of year)	$ 1,829,588,526	$ 1,876,793,868

EXHIBIT 2

DEVELOPMENT OF CONTRIBUTION RATES

			6/30/2022	6/30/2023
A.	Expected Contributions			
	1.	Annualized salaries (excludes DROPs)	$ 158,782,858	$ 179,046,864
	2.	Projected payroll for upcoming fiscal year	167,483,300	189,102,728
	3.	Current Employee Contribution Rate	7.00%	7.00%
	4.	Current Employer Contribution Rate	14.90%	14.90%
	5.	Total Contribution Rate	21.90%	21.90%
	6.	Contribution in Dollars (A2 X A5)	36,678,843	41,413,497
	7.	Expected Contribution from DROP Salary	3,429,345	3,600,151
	8.	Total Expected Contributions	40,108,188	45,013,648
B.	Unfunded Actuarial Accrued Liability		$ 252,516,261	$ 296,011,947
C.	Calculation of Actuarially Determined Contribution			
	1.	Scheduled Amortization of UAAL at mid-year	$ 19,946,079	$ 24,261,809
	2.	Normal Cost Rate	11.75%	11.61%
	3.	Normal Cost Amount (C2 X A2)	19,679,288	21,954,827
	4.	Total Actuarially Determined Contribution	39,625,367	46,216,636
	5.	Expected Total Contribution A8	40,108,188	45,013,648
	6.	Actual to ADC Ratio	101.2%	97.4%
	7.	Actuarially Determined Contribution Rate	21.02%	21.94%
D.	Calculation of 18-year Payoff Rate			
	1.	18-year Amortization of UAAL at mid-year	$ 20,427,965	$ 23,946,663
	2.	Less Expected DROP Contributions	3,429,345	3,600,151
	3.	Contribution Needed to meet goal (D1 – D2)	16,998,620	20,346,512
	4.	D3 as percentage of payroll (D3/A2)	10.15%	10.76%
	5.	Normal Cost	11.75%	11.61%
	6.	Total Contribution Needed to meet goal	21.90%	22.37%
E.	Calculation of Funding Period			
	1.	Total Expected Contributions (A8)	$ 40,108,188	$ 45,013,648
	2.	Amount needed to pay Normal Cost	19,679,288	21,954,827
	3.	Amount remaining to payoff UAAL (E1 – E2)	20,428,900	23,058,822
	4.	Years to fund UAAL using amount in E3 Based on 3% payroll growth	17.98 years	19.05 years

EXHIBIT 2 (continued)

AMORTIZATION SCHEDULE

Based on the Funding Policy adopted by the Board beginning with the June 30, 2023 valuation, the below table shows the layers of UAAL that are being amortized for the current valuation period.

Description	Date Added	Initial Balance	Initial Period	Remain Period	Remaining Balance	Amortization Payment
Initial Layer	6/30/2021	198,449,851	20	18	196,630,784	15,896,569
2022 Gain/Loss	6/30/2022	55,817,062	18	17	55,324,664	4,647,893
2023 Gain/Loss	6/30/2023	44,056,499	18	18	44,056,499	3,717,347
					296,011,947	24,261,809
Unfunded Actuarial Accrued Liability					296,011,947	
Average Funding Period					17.63	

EXHIBIT 3

SUMMARY OF FINANCIAL INFORMATION

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

	Plan Year Ended		
	6/30/2021	6/30/2022	6/30/2023
A. INCOME			
1. Contributions			
Employee	$ 11,428,100	$ 11,935,011	$ 12,688,641
State	24,091,743	27,992,649	29,711,732
Other	0	0	20,854
2. Investment Income			
Interest/Dividends	18,641,176	21,051,049	30,372,451
Realized Gain	202,131,149	129,989,849	(14,580,033)
Unrealized Gain	186,131,046	(300,064,292)	118,819,522
Investment Expense	(8,660,539)	(9,102,394)	(9,293,449)
Net Investment Income	398,242,832	(158,125,788)	125,318,491
3. Adjustment to Previous Year	0	0	0
TOTAL INCOME	$ 433,762,675	$ (118,198,128)	$ 167,739,718
B. EXPENSES			
1. Administrative	$ 105,929	$ 121,760	$ 167,034
2. Refunds	2,054,337	2,357,761	2,459,421
3. Benefit Payments	123,682,368	125,578,090	129,349,597
TOTAL EXPENSES	$ 125,842,634	$ 128,057,611	$ 131,976,052

EXHIBIT 3 (Continued)

	6/30/2021	6/30/2022	6/30/2023
C. ASSETS (Market)			
1. Short Term			
Cash	$ 318,111	$ 418,006	$ 258,309
Money Market	244,075,629	297,021,004	127,029,813
2. Corporate Bonds	105,956,774	105,605,469	93,968,130
3. Common Stocks	1,118,762,865	743,917,220	911,841,371
4. U.S. Government agency obligations	244,312,244	319,262,191	368,370,565
5. Net Securities Lending	89,370	(35,745)	(538,820)
6. Receivables			
Member contributions	376,919	456,704	516,696
State contributions	857,450	1,019,675	1,186,047
Interest and dividends	1,295,933	2,128,001	2,998,787
Miscellaneous	156,138	102,071	57,282
7. Liabilities	(1,107,623)	(1,056,525)	(1,086,443)
TOTAL ASSETS	$ 1,715,093,810	$ 1,468,838,071	$ 1,504,601,737
D. RATIO OF ASSETS TO ANNUAL EXPENSES:	13.63	11.47	11.40
E. INVESTMENT RETURN:			
Gross	29.97%	(8.94)%	9.48%
Net of Investment Expense	29.24%	(9.47)%	8.80%
Return on Actuarial Value of Assets:	12.94%	5.17%	6.09%

EXHIBIT 3 (Continued)

	7/1/2021	7/1/2022	7/1/2023
F. DEVELOPMENT OF ACTUARIAL VALUE OF ASSETS			
1. Investment income for year	$ 398,230,408	$ (158,125,788)	$ 125,318,491
1b. Adjustment for change in discount	(81,820,693)	0	0
2. Expenses and fees for year	93,505	121,760	146,180
3. Actual net investment income	316,316,210	(158,247,548)	125,172,311
4. Market Value (beginning of year)	1,407,173,769	1,715,093,810	1,468,838,071
5. Contributions during year	35,519,843	39,927,660	42,400,373
6. Benefits paid during year	125,736,705	127,935,851	131,809,018
7. Expected investment income at 7.5% (8% before 2022)			
Market Value	112,573,902	128,632,036	110,162,855
Contributions	1,420,794	1,497,287	1,590,014
Benefits	- 5,029,468	- 4,797,594	- 4,942,838
Total	108,965,228	125,331,729	106,810,031
8. Investment gain for year	207,350,982	(283,579,277)	18,362,280
9. Deferral of investment gain			
Current year (75%)	155,513,236	(212,684,458)	13,771,710
Current year – 1 (50%)	1,549,546	103,675,491	(141,789,639)
Current year – 2 (25%)	(27,419,479)	774,773	51,837,746
Total	129,643,304	(108,234,194)	(76,180,183)
10. Market value (end of year)	1,715,093,810	1,468,838,071	1,504,601,737
11. Preliminary AVA (end of year) (10) – (9)	1,585,450,507	1,577,072,265	1,580,781,920
12. Final AVA within 20% corridor	$ 1,585,450,507	$ 1,577,072,265	$ 1,580,781,920

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%)
2021	35,519,843	(123,682,368)	(2,054,337)	(8,766,468)	(134,503,173)	(98,983,330)	1,715,093,810	(5.8%)
2022	39,927,660	(125,578,090)	(2,357,761)	(9,224,154)	(137,160,005)	(97,232,345)	1,468,838,071	(6.6%)
2023	42,400,373	(129,349,597)	(2,459,421)	(9,439,629)	(141,248,647)	(98,848,274)	1,504,601,737	(6.6%)

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

		Years of Service							
Age		0-4.9	5-9.9	10-14.9	15-19.9	20-24.9	25-29.9	Over 30	Total
Under 25	Count	339	5						344
	Salary	13,658,807	205,747						13,864,554
25-29	Count	274	112	8					394
	Salary	12,803,232	5,773,299	380,177					18,956,708
30-34	Count	191	114	45					350
	Salary	8,450,391	6,346,675	2,893,062					17,690,128
35-39	Count	161	105	84	43	6			399
	Salary	6,997,330	5,679,801	6,136,628	2,802,569	346,669			21,962,997
40-44	Count	136	83	57	83	71	4		434
	Salary	5,784,095	4,389,230	3,573,429	5,603,408	4,836,322	265,111		24,451,595
45-49	Count	134	86	55	59	79	36		449
	Salary	5,993,569	4,453,332	3,294,042	3,926,370	6,037,820	2,798,462		26,503,595
50-54	Count	105	88	61	63	58	44	2	421
	Salary	4,535,368	4,609,640	3,501,027	3,817,437	4,327,838	3,358,922	219,502	24,369,734
55-59	Count	105	73	61	59	54	44		396
	Salary	4,306,427	3,689,717	3,306,342	3,261,824	3,413,643	2,636,369		20,614,322
60-64	Count	72	54	41	21	5	1		194
	Salary	3,018,343	2,460,043	2,120,922	1,049,127	290,465	103,394		9,042,294
65-69	Count	17	8	2			1		28
	Salary	705,615	367,364	98,505			92,734		1,264,218
70 & Over	Count	6	2	1					9
	Salary	207,136	98,791	38,792					344,719
Total	Count	1,540	730	415	328	273	130	2	3,418
	Salary	66,460,313	38,073,639	25,342,925	20,460,736	19,252,757	9,254,992	219,502	179,064,864

Average Attained Age: 42.1 years
Average Actual Service: 8.4 years
Average Salary: $ 52,389

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		2		1				3
	Benefit		80,496		39,234				119,730
50-54	Count	2	11	7	5	3	3		31
	Benefit	66,791	517,547	269,449	206,353	100,741	103,778		1,264,659
55-59	Count	15	20	23	19	11	30	7	125
	Benefit	483,090	732,540	1,036,631	704,277	363,578	1,116,499	235,872	4,672,487
60-64	Count	58	59	63	21	17	115	33	366
	Benefit	1,522,229	1,514,631	2,083,625	776,574	507,117	4,250,256	1,335,486	11,989,918
65-69	Count	29	46	52	52	74	212	186	651
	Benefit	422,641	917,284	1,149,433	1,239,909	2,294,649	6,860,286	7,497,963	20,382,165
70-74	Count	4	7	10	6	18	200	384	629
	Benefit	14,830	62,872	94,603	78,586	263,505	5,323,700	14,934,091	20,772,187
75-79	Count				1	2	26	390	419
	Benefit				4,564	4,743	398,710	14,705,475	15,113,492
80-84	Count				1		2	248	251
	Benefit				12,453		5,896	9,153,677	9,172,026
85 & Over	Count						1	180	181
	Benefit						3,274	7,000,390	7,003,664
Total	Count	108	145	155	106	125	589	1,428	2,656
	Benefit	2,509,581	3,825,370	4,633,741	3,061,950	3,534,333	18,062,399	54,862,954	90,490,328

Average Attained Age:	71.7 years
Average Years since Retirement:	11.9 years
Average Annual Benefit:	$34,070

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	Count	2	2				1	1	6
45	Benefit	36,226	31,514				4,481	5,225	77,446
45-49	Count		2	2			7	2	13
	Benefit		40,917	39,826			79,768	20,002	180,513
50-54	Count	4	3	2	1	4	9	9	32
	Benefit	68,851	75,058	33,692	3,932	47,855	136,277	113,318	478,983
55-59	Count	1	4	3	4	4	29	20	65
	Benefit	18,015	71,261	35,940	53,286	72,049	412,354	349,342	1,012,247
60-64	Count	3	2	4	4	1	26	34	74
	Benefit	22,696	11,442	41,763	69,968	5,247	337,898	543,778	1,032,792
65-69	Count			2	2		22	48	74
	Benefit			14,306	10,711		263,869	772,682	1,061,568
70-74	Count						6	68	74
	Benefit						62,315	1,195,691	1,258,006
75-79	Count							43	43
	Benefit							902,246	902,246
80-84	Count							18	18
	Benefit							424,953	424,953
85 &	Count							8	8
Over	Benefit							207,879	207,879
Total	Count	10	13	13	11	9	100	251	407
	Benefit	145,788	230,192	165,527	137,897	125,151	1,296,962	4,535,116	6,636,633

Average Attained Age: 65.8 years
Average Years since Retirement: 14.1 years
Average Annual Benefit: $16,306

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	4	6	6			4		20
	Benefit	34,936	86,680	86,546			39,351		247,513
45-49	Count	1	1	3		2	2	1	10
	Benefit	1,959	22,749	31,067		26,335	8,720	1,744	92,574
50-54	Count	2	2	5	1		3	3	16
	Benefit	18,037	25,377	34,370	56,994		51,854	24,609	211,241
55-59	Count	3	1	2		2	7	8	23
	Benefit	46,508	22,394	15,950		37,028	121,345	96,152	339,377
60-64	Count	3	6	6	5	5	15	14	54
	Benefit	35,384	65,132	54,737	47,285	68,518	244,853	209,941	725,850
65-69	Count	3	6	9	7	5	27	34	91
	Benefit	69,741	91,377	132,587	118,506	115,493	357,203	502,745	1,387,652
70-74	Count	10	13	8	1	2	22	28	84
	Benefit	229,770	191,197	110,692	3,249	30,388	280,452	388,889	1,234,637
75-79	Count	10	8	3	5	7	20	32	85
	Benefit	177,926	152,114	29,337	66,972	157,636	328,569	571,600	1,484,154
80-84	Count	4	3	2	5	3	21	34	72
	Benefit	98,014	33,375	16,619	83,452	37,606	410,277	622,724	1,302,067
85 & Over	Count	3	1	7	5	2	11	52	81
	Benefit	38,615	8,514	188,680	100,951	9,113	259,300	938,367	1,543,540
Total	Count	43	47	51	29	28	132	206	536
	Benefit	750,890	698,909	700,585	477,409	482,117	2,101,924	3,356,771	8,568,605

Average Attained Age:	72.5 years
Average Years since Retirement:	9.4 years
Average Annual Benefit:	$15,986

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		2						2
	Benefit		87,925						87,925
50-54	Count	8	9	9	5	4	2		37
	Benefit	443,256	383,419	375,134	194,504	140,127	79,146		1,615,586
55-59	Count	13	12	13	9	10	37	1	95
	Benefit	532,671	469,419	464,937	396,076	423,229	1,477,944	41,441	3,805,717
60-64	Count	34	35	11	9	6	19	10	124
	Benefit	682,003	858,587	251,803	235,189	204,045	806,038	357,386	3,395,051
65-69	Count	8	6	8	3	7			32
	Benefit	53,527	39,461	103,332	50,047	151,948			398,315
70-74	Count					1			1
	Benefit					8,475			8,475
75-79	Count			1					1
	Benefit			13,302					13,302
80-84	Count								-
	Benefit								-
85 & Over	Count				1				1
	Benefit				2,883				2,883
Total	Count	63	64	42	27	28	58	11	293
	Benefit	1,711,457	1,838,811	1,208,508	878,699	927,824	2,363,128	398,827	9,327,254

Average Attained Age:	60.2 years
Average Years since DROP:	3.3 years
Average Annual Benefit:	$31,834

EXHIBIT 4

VESTED TERMINATED MEMBERS

Vested Terminated Member data needed for the valuation was obtained from the records furnished by the administrator. These are the members who have left employment, did not withdraw their employee contributions, and are eligible for a benefit that begins later, typically age 65. The following table shows a detailed breakdown of the included members and beneficiaries by time until benefit commencement. Benefits listed are annual amounts of the benefits payable.

Benefits Commence Within number of years	Number of Members	Annual Benefit
1 year	15	47,185
2 years	10	43,996
3 years	2	9,262
4 years	9	46,263
5 years	7	22,585
5 to 10 years	50	373,488
Over 10 years	262	1,827,507
Total	355	2,370,286

Average Attained Age:	47.3 years
Average Years until Benefit Commencement:	17.8 years
Average Annual Benefit:	$ 6,677

EXHIBIT 5

REVIEW OF FUTURE UNCERTAINTIES

Introduction

The calculations in this report are based on the data and assumptions as outlined. This report is based on the participant and financial data supplied by the plan sponsor. We did not audit this data, although we did review it for reasonableness and consistency. We have relied on the data provided to us. If any of this data is incorrect or incomplete, the results of our calculations could be materially different.

The funding policy gives the Board a path of contributions that lead to full funding. Actual future measurements of the Actuarially Determined Contributions and funded status may differ significantly from expected future measurements. There are several areas of risk that may cause the calculations to differ, including: plan experience differing from the anticipated economic assumptions (investment return, inflation, and salary increases), plan experience differing from the expected demographic assumptions (rates of termination, disability, retirement and death). The user should understand the ongoing risks involved in using these results.

This section of the report provides additional information to help the user of the report understand the uncertainties involved with this type of actuarial valuation.

Plan Maturity

A significant issue that the plan has to deal with is the maturity of the plan. This means that the plan is at a point where there are significant benefits being paid by the plan. This has happened while the total active population has remained fairly level. One illustration of this is in the graph below:

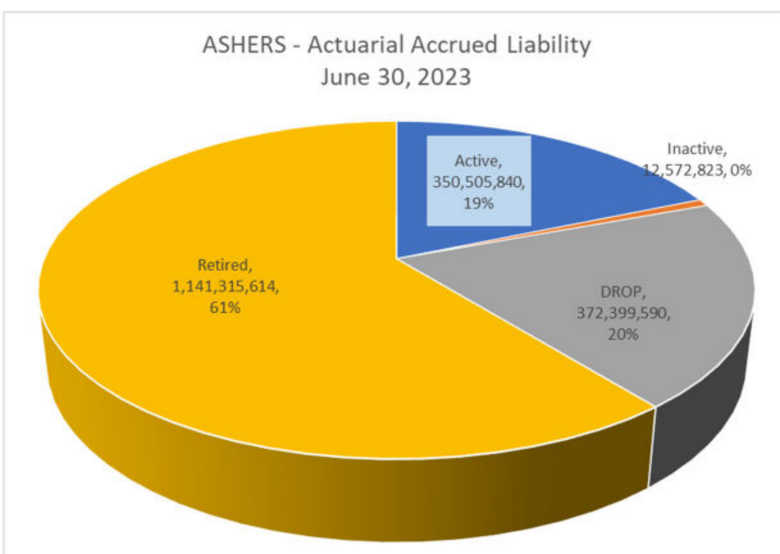

Exhibit 5 (Continued)

As seen in the nearby graph, over 60% of the liabilities of the plan are associated with participants who are currently receiving benefits. The DROP participants and former participants who still have balances make up 20% of the liabilities. This means that 80% of the liabilities of the plan are "locked in", that is, they have been fully determined and are awaiting payout. This means that changes in assumptions and most changes in plan provisions do not alter these liabilities. This makes it difficult to make small changes to affect the plan.

This is the reason the Board puts so much emphasis on the Cash Flow Percentage, one of the funding policy's key metrics. The history of this ratio has already been reported here on page 16. As discussed, if this ratio becomes too high it is hard to manage investment policy and curtail UAAL growth.

Asset Smoothing

We have discussed in meetings and will note here again that we still have a significant amount of investment losses to absorb into the Actuarial Value of Assets over the next two years. This amount is about $90 million as of this valuation report.

Future Investment Returns

The biggest risk in managing ongoing contribution rates is the uncertainty of future investment returns. The Board and Actuary are comfortable with the long term assumption at this time, but variations in the actual results are inevitable. We can see one illustration of this in the GASB Disclosure Report. In that report, we calculate the amount of the liabilities and Unfunded Actuarial Accrued Liaiblity assuming the assumed return is one percent higher and lower. If the plan earned 6.5% over the long term instead of 7.5%, then the liabilities of the plan would be about $200 million higher. That is, $2,079 million compared to the reported amount of $1,877 million.

The Actuarial Standards of Practice #4 also requires that we convey the liability if the liability were calculated using a low default risk obligation measurement. In other words, a measurement where we use a discount rate that is generally similar to the rate that governments can borrow. This report uses the same index as the GASB report which for June 30, 2023 is 4.13%. If liabilities were calculated using that discount rate, they would be about $2,716 million. This does not change our strong funding policy which will fully fund all benefits as time passes and can adjust for future uncertainties.

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. Beginning 7/1/2021, a contribution is made for salaries of those members on DROP. Previously, the State did not contribute for members in the Tier I portion of DROP and contributed 6.9% of payroll for members in the Tier II portion of DROP.
EMPLOYEE CONTRIBUTIONS:	1. Each Member must contribute 7.0% (for 7/1/2020 and after) 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 60 consecutive months that produces the highest average. This changed beginning 7/1/2021 and the 36 month average is maintained until the 60 month average is greater.
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.

Those who elect DROP after July 1, 2021 will not be paid a health care offset during the DROP period. It will begin upon ultimate retirement.

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%).

The member contributions, for those hired before July 1, 2021, cease during DROP until the member enters Tier II. For those hired July 1, 2021 and after, the employee contribution will continue during the entire DROP period. While on DROP, the employer contributes the employer rate, currently 14.90% (beginning July 1, 2021). 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 lump sum 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.

Recent COLA amounts are as follows:

1999-2016	3.00%
2017	2.07%
2018	2.18%
2019	1.77%
2020	2.31%
2021	1.45%
2022	3.00%

APPENDIX 2

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

Session 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).
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.)
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)

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.
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.
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.
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)

2009	1.	ACT 439	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).
	2.		Trustees used provision of Act 1073 of 1997 to reduce the interest credited on DROP accounts to 6%, effective 7/1/2009.
2011	1.	ACT 564	Establishes the cost for purchasing service credit as the actuarial equivalent cost. This applies to all types of service credit including military service, service with another State agency, and reinstatement of forfeited service.
2013	1.	ACT 309	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.	ACT 310	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).
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.
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.
2021	1.	ACT 137	The employer contribution rate will be based on the recommendation of the actuary and then presented for approval to the Commission.
	2.	ACT 138	The employer contribution beginning July 1, 2021 will apply to salaries for Tier 1 and Tier 2 DROP participants. Those hired 7/1/2021 and after will pay employee contributions on DROP salaries.
	3.	ACT 139	The length of time to be married before being eligible for survivor benefits was reduced from 2 years to 1 year.
	4.	ACT 149	The definition of final average compensation went from 3 years to 5 years. There is a provision so that those employed at 7/1/2021 do not see a decrease in final average compensation.
	5.	ACT 150	Those who elect DROP after July 1, 2021 will not be paid a health care offset during the DROP period. It will begin upon ultimate retirement.
	6.	ACT 711	There were various changes in reciprocal service beginning 7/1/2021. ASHERS benefits for those who begin reciprocal service after 7/1/2021 will be based on the ASHERS definition of final average compensation.

APPENDIX 3

ACTUARIAL COST METHODS AND ASSUMPTIONS

INVESTMENT YIELD RATE: 7.5% per annum, compounded annually. (Effective June 30,2021) The expected rate of return on pension plan investments for the purpose of GASB is also 7.50%.

MORTALITY:

a. Healthy Post-retirement (Effective June 30, 2021)

Male: Pub-2010 Public Retirement Plans for males, amount weighted Mortality Table for General employees with below median income, scaled at 105% with no setback. Generational mortality improvements are in accordance with MP-2020 from the table's base year of 2010 (both before and after the measurement date)

Female: Pub-2010 Public Retirement Plans for females, amount weighted Mortality Table for General employees with below median income, scaled at 105% with no setback. Generational mortality improvements are in accordance with MP-2020 from the table's base year of 2010 (both before and after the measurement date)

b. Disabled Post-retirement (Effective June 30, 2021)

Male: Pub-2010 Public Retirement Plans for disabled males, amount weighted Mortality Table for General employees with below median income, with no scale and no setback. Generational mortality improvements are MP-2020 from the table's base year of 2010 (both before and after the measurement date)

Female: Pub-2010 Public Retirement Plans for disabled females, amount weighted Mortality Table for General employees with below median income, with no scale and no setback. Generational mortality improvements are MP-2020 from the table's base year of 2010 (both before and after the measurement date)

c. Healthy Pre-retirement (Effective June 30, 2021)

Male: Pub-2010 Public Retirement Plans for male employees, amount weighted Mortality Table for General employees with below median income, no scale, no setback. Generational mortality improvements are in accordance with MP-2020 from the table's base year of 2010 (both before and after the measurement date)

Female: Pub-2010 Public Retirement Plans for female employees, amount weighted Mortality Table for General employees with below median income, no scale, no setback. Generational mortality improvements are in accordance with MP-2020 from the table's base year of 2010 (both before and after the measurement date)

Appendix 3 (Continued)

RETIREMENT RATES (Continued Effective June 30, 2021):

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 (Continued Effective June 30, 2021):

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, 2021):

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	.4306	.2764	.1850	.1357	.1323	.1095
30	.2984	.2268	.1431	.0991	.0869	.0607
40	.2368	.1815	.0983	.0743	.0549	.0274
50	.1677	.1279	.0983	.0599	.0379	.0164
60	.0138	.1275	.0971	.0770	.0476	.0311

Female Members

Age	0	1	2	3	4	5+
20	.4672	.3279	.2363	.1539	.1099	.0776
30	.2875	.2404	.1681	.1115	.0803	.0582
40	.2138	.1750	.1030	.0767	.0504	.0373
50	.1766	.1288	.0949	.0561	.0353	.0174
60	.2045	.1433	.0842	.0491	.0242	.0007

Appendix 3 (Continued)

SALARY SCALES (Effective June 30, 2021):

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	9.00%	12.00%
1	7.00%	10.00%
2	4.50%	7.50%
3	2.00%	5.00%
4-6	1.50%	4.50%
7-10	1.00%	4.00%
11-13	0.75%	3.75%
14-16	0.50%	3.50%
17-19	0.50%	3.25%
20+	0.00%	3.00%

FUTURE INCREASE IN TOTAL PAYROLL (Effective June 30, 2021):

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

COST OF LIVING INCREASE (Effective June 30, 2021):

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)

INTERESTING 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, 2021):

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.

The return for 2021 was reduced by the amount of the liability change due to change in discount rate. This made a one time additional recognition of market return.

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.

Appendix 3 (Continued)

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.

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 11.75% of payroll, which is 10.15% of payroll less than the total contributions scheduled for the year under current law (14.90% from Employer plus 7.0% from employees). This remaining 10.15% of payroll along with any contributions received on behalf of members on 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 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.