ARKANSAS STATE HIGHWAY EMPLOYEES RETIREMENT SYSTEM (ASHERS)

ACTUARIAL VALUATION
AS OF JUNE 30, 2024

Osborn, Carreiro & Associates, Inc.

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November 4, 2024

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, 2024

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, 2024. This valuation determines the contributions for the 2024-25 Plan Year (July 1, 2024 to June 30, 2025). 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 84.23% to 83.60% this year (about 84% 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 recognition of the large investment loss that occurred during the 2022 fiscal year. This is detailed in the report. The equivalent funding period has decreased from 19.1 to 18.5 years based on current contributions. The total contribution rate for fiscal 2025 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 on November 7, 2023 for use beginning with the 2023 valuation. It formalizes the definition of four metrics the Board will review each year. These metrics are included in the format of the Executive Summary and Discussion and the Determination of Contribution Rate.

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 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:

	6/30/2022	6/30/2023	6/30/2024
Number in Plan			
a) Active Members	3,277	3,418	3,597
b) Members in DROP	285	293	275
c) Members Receiving Benefits	3,586	3,599	3,625
d) Inactive Members	335	355	383
Market Value of Assets	$ 1,468,838,071	$ 1,504,601,737	$ 1,612,068,530
Actuarial Value of Assets	$ 1,577,072,265	$ 1,580,781,920	$ 1,606,778,467
Actuarial Accrued Liability	$ 1,829,588,526	$ 1,876,793,868	$ 1,922,066,478
Unfunded Actuarial Accrued Liability	$ 252,516,261	$ 296,011,947	$ 315,288,011
Funded Percentage (Based on Actuarial Assets)	86.20%	84.23%	83.60%
Funded Percentage (Based on Market Value of Assets)	80.28%	80.17%	83.87%
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%	22.14%
Needed to Fund UAAL in 18 years	21.90%	22.37%	22.12%
Equivalent Funding Period	18.0 years	19.1 years	18.5 years

Discussion

Introduction

The results of the June 30, 2024 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 83.60% as of the valuation date compared with 84.23% 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:

Valuation Date	Based on Actuarial Value	Based on Market Value
6/30/2020	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%
6/30/2024	83.60%	83.87%

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. 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:

Valuation Date	Equivalent Funding Period
6/30/2020	39.5 years
6/30/2021	12.5
6/30/2022	18.0
6/30/2023	19.1
6/30/2024	18.5

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:

Valuation Date	Ratio of Actual Contributions To ADC
6/30/2021	113%
6/30/2022	101.2%
6/30/2023	97.4%
6/30/2024	98.8%

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:

Valuation Date	Cash Flow Percentage
6/30/2020	7.0%
6/30/2021	5.8%
6/30/2022	6.6%
6/30/2023	6.6%
6/30/2024	6.2%

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

			6/30/2023		6/30/2024
A.	Active Members				
	1. Retirement Benefits	$	433,494,313	$	477,999,433
	2. Disability Benefits		57,445,830		62,810,425
	3. Death Benefits		2,803,388		2,998,852
	4. Deferred Termination Benefits		18,191,041		19,809,946
	5. Refunds of Contributions		4,147,846		4,625,685
	6. Total Active Members	$	516,082,418	$	568,244,341
B.	Deferred Retirement Option Plan (DROP)				
	1. Future DROP Deposits and Retirement Benefits	$	149,593,923	$	137,817,738
	2. Expected Payouts of Current DROP Deposits		243,164,002		241,376,618
	3. Total DROP Members	$	392,757,925	$	379,194,356
C.	Inactive Members				
	1. Vested Terminations	$	9,698,453	$	10,705,505
	2. Non-vested Terminations		2,874,370		3,135,476
	3. Total Inactive Members	$	12,572,823	$	13,840,981
D.	Retired Members Receiving Benefits				
	1. Service Retirements	$	984,866,687	$	1,006,595,807
	2. Disability Retirements		76,409,137		74,931,699
	3. Beneficiaries		80,039,790		83,726,495
	4 Total Retired Members	$	1,141,315,614	$	1,165,254,001
E.	Total Actuarial Present Value of Future Benefits (A6 + B3 + C3 + D4)	$	2,062,728,780	$	2,126,533,679

EXHIBIT 1 (continued)

ANALYSIS OF NORMAL COST

		6/30/2023	6/30/2024
A.	Normal Cost (to fund current Active Members) (Percentage of Payroll)		
	1. Retirement Benefits	7.86%	8.05%
	2. Disability Benefits	1.78%	1.80%
	3. Death Benefits	0.09%	0.08%
	4. Deferred Termination Benefits	1.31%	1.24%
	5. Refunds of Contributions	0.57%	0.58%
	6. Total Normal Cost	11.61%	11.75%
B.	Present Value of Future Normal Costs		
	1. Annualized Salaries (excludes DROPs)	$ 179,064,864	$ 198,759,297
	2. Projected Payroll for upcoming Fiscal Year	189,102,728	211,198,503
	3. Present Value of Future Salaries	1,426,154,845	1,581,661,237
	4. Dollar Value of Normal Cost (A6 X B2)	21,954,827	24,817,997
	5. Present Value of Future Normal Costs (A6 X B3)	165,576,578	185,845,195

EXHIBIT 1 (continued)

DEVELOPMENT OF UNFUNDED ACTUARIAL LIABILITY

			6/30/2023		6/30/2024
A.	Actuarial Accrued Liabilities – Active Members				
	1. Present Value of Future Benefits	$	516,082,418	$	568,244,341
	2. Less Present Value of Future Normal Costs		165,576,578		185,845,195
	3. Accrued Liability – Actives	$	350,505,840	$	382,399,146
B.	Actuarial Accrued Liabilities – DROP Members				
	1. Present Value of Future Benefits	$	392,757,925	$	379,194,355
	2. Less Present Value Future DROP Contributions		20,358,335		18,622,005
	3. Accrued Liability – DROP	$	372,399,590	$	360,572,350
C.	Actuarial Accrued Liabilities – Inactive Members	$	12,572,823	$	13,840,981
D.	Actuarial Accrued Liabilities – Retired Members	$	1,141,315,614	$	1,165,254,001
E.	Total Actuarial Accrued Liabilities (A3 + B3 +C + D)	$	1,876,793,867	$	1,922,066,478
F.	Actuarial Value of Assets (Developed in Exhibit 3)		1,580,781,920		1,606,778,467
G.	Unfunded Actuarial Accrued Liability (E – F)	$	296,011,947	$	315,288,011

EXHIBIT 1 (continued)

Actual Versus Expected Actuarial Assets

		6/30/2023	6/30/2024
1.	Actuarial assets, beginning of year	$ 1,577,072,265	$ 1,580,781,920
2.	Total contributions during year	42,400,373	44,678,750
3.	Benefits paid during year	(129,349,597)	(133,755,140)
4.	Refunds paid during year	(2,459,421)	(2,216,775)
5.	Assumed net investment income at 7.5%		
	a. Beginning of year assets	118,280,420	118,558,644
	b. Contributions	1,590,014	1,675,453
	c. Benefits	(4,850,610)	(5,015,818)
	d. Refunds	(92,228)	(83,129)
	e. Total	$ 114,927,596	$ 115,135,150
6.	Expected actuarial assets, end of year (Sum of items 1 through 5)	1,602,591,216	1,604,623,905
7.	Actuarial Value of Assets, end of year	1,580,781,920	1,,606,778,467
8.	Asset gain/(loss) for year (7 – 6)	(21,809,296)	2,154,562
9.	Asset gain/(loss) as a percentage of end of year assets (8 / 7)	(1.38)%	0.13%

EXHIBIT 1 (continued)

ACTUARIAL GAIN OR LOSS FOR THE YEAR

			6/30/2023		6/30/2024
A.	Calculation of actuarial gain or loss				
1.	Unfunded actuarial liability (UAAL), previous year	$	252,516,261	$	296,011,947
2.	Normal cost for the year		19,679,288		21,954,827
3.	Contributions for the year		(42,400,373)		(44,678,750)
4.	Interest at 7.5%				
	a. On UAAL	$	18,938,720	$	22,200,896
	b. On normal cost		737,973		823,306
	c. On contributions		(1,590,014)		(1,675,453)
	d. Total	$	18,086,679	$	21,348,749
5.	Expected UAAL (sum of items 1 – 4)		247,881,855		294,636,773
6.	Actual UAAL		296,011,947		315,288,011
7.	Gain (loss) for the year (item 5 – item 6)	$	(48,130,092)	$	(20,651,238)
B.	Source of gains and losses				
8.	a. Asset gain (loss) for the year	$	(21,809,296)	$	2,154,562
	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.		(9,081,765)		(9,166,733)
	f. Gain (loss) from active salary above exp.		(15,401,802)		(15,748,588)
	e. Other gain (loss) from liability experience (balancing item)		(1,837,229)		2,109,521
	f. Total Gain (loss) for the year (Total all item 8 amounts)	$	(48,130,092)	$	(20,651,238)
9.	Total Actuarial Accrued Liabilities (end of year)	$	1,876,793,868	$	1,922,066,478

EXHIBIT 2

DEVELOPMENT OF CONTRIBUTION RATES

			6/30/2023		6/30/2024
A.	Expected Contributions				
	1. Annualized salaries (excludes DROPs)	$	179,046,864	$	198,759,297
	2. Projected payroll for upcoming fiscal year		189,102,728		211,198,503
	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)		41,413,497		46,252,472
	7. Expected Contribution from DROP Salary		3,600,151		3,609,581
	8. Total Expected Contributions		45,013,648		49,862,053
B.	Unfunded Actuarial Accrued Liability	$	296,011,947	$	315,288,011
C.	Calculation of Actuarially Determined Contribution				
	1. Scheduled Amortization of UAAL at mid-year	$	24,261,809	$	26,865,389
	2. Normal Cost Rate		11.61%		11.75%
	3. Normal Cost Amount (C2 X A2)		21,954,827		24,815,824
	4. Total Actuarially Determined Contribution		46,216,636		51,681,213
	5. Expected Total Contribution A8		45,013,648		49,862,053
	6. Actual to ADC Ratio		97.4%		96.5%
	7. Actuarially Determined Contribution Rate		21.94%		22.14%
D.	Calculation of 18-year Payoff Rate				
	1. 18-year Amortization of UAAL at mid-year	$	23,946,663	$	25,506,051
	2. Less Expected DROP Contributions		3,600,151		3,609,581
	3. Contribution Needed to meet goal (D1 – D2)		20,346,512		21,896,470
	4. D3 as percentage of payroll (D3/A2)		10.76%		10.37%
	5. Normal Cost		11.61%		11.75%
	6. Total Contribution Needed to meet goal		22.37%		22.12%
E.	Calculation of Funding Period				
	1. Total Expected Contributions (A8)	$	45,013,648	$	49,862,053
	2. Amount needed to pay Normal Cost		21,954,827		24,815,824
	3. Amount remaining to payoff UAAL (E1 – E2)		23,058,822		25,046,229
	4. Years to fund UAAL using amount in E3 Based on 3% payroll growth		19.05 years		18.48 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	17	194,896,179	16,373,466
2022 Gain/Loss	6/30/2022	55,817,062	18	16	54,654,977	4,767,329
2023 Gain/Loss	6/30/2023	44,056,499	18	17	43,506,509	3,828,868
2024 Gain/Loss	6/30/2024	23,230,347	18	18	23,230,347	1,875,726
					315,288,012	26,865,389
Unfunded Actuarial Accrued Liability					315,288,012	
Average Funding Period					16.65	

EXHIBIT 3

SUMMARY OF FINANCIAL INFORMATION

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

	Plan Year Ended		
	6/30/2022	6/30/2023	6/30/2024
A. INCOME			
1. Contributions			
Employee	$ 11,935,011	$ 12,688,641	$ 13,409,742
State	27,992,649	29,711,732	31,269,008
Other	0	20,854	3,745
2. Investment Income			
Interest/Dividends	21,051,049	30,372,451	35,387,945
Realized Gain	129,989,849	(14,580,033)	132,166,176
Unrealized Gain	(300,064,292)	118,819,522	40,601,010
Investment Expense	(9,102,394)	(9,293,449)	(9,293,267)
Net Investment Income	(158,125,788)	125,318,491	198,861,864
3. Adjustment to Previous Year	0	0	0
TOTAL INCOME	$ (118,198,128)	$ 167,739,718	$ 243,544,359
B. EXPENSES			
1. Administrative	$ 121,760	$ 167,034	$ 105,651
2. Benefit Payments			
Contribution Refunds	2,357,761	2,459,421	2,216,775
Death Benefits	990,000	900,000	1,035,000
DROP Payouts	16,889,094	17,966,924	20,313,055
Monthly Benefits	107,698,996	110,482,673	112,407,085
TOTAL EXPENSES	$ 128,057,611	$ 131,976,052	$ 136,077,566

EXHIBIT 3 (Continued)

	6/30/2022	6/30/2023	6/30/2024
C. ASSETS (Market)			
1. Short Term			
Cash	$ 418,006	$ 258,309	$ 392,437
Money Market	297,021,004	127,029,813	173,069,692
2. Corporate Bonds	105,605,469	93,968,130	186,393,185
3. Common Stocks	743,917,220	911,841,371	948,392,797
4. U.S. Government Agency Obligations	319,262,191	368,370,565	301,556,311
5. Net Securities Lending	(35,745)	(538,820)	(24,394)
6. Receivables			
Member contributions	456,704	516,696	535,550
State contributions	1,019,675	1,186,047	1,248,906
Interest and dividends	2,128,001	2,998,787	2,675,278
Miscellaneous	102,071	57,282	91,062
7. Liabilities	(1,056,525)	(1,086,443)	(2,262,294)
TOTAL ASSETS	$ 1,468,838,071	$ 1,504,601,737	$ 1,612,068,530
D. RATIO OF ASSETS TO ANNUAL EXPENSES:	11.47	11.40	11.85
E. INVESTMENT RETURN:			
Gross	(8.94)%	9.48%	14.31%
Net of Investment Expense	(9.47)%	8.80%	13.63%
Return on Actuarial Value of Assets:	5.17%	6.09%	7.65%

EXHIBIT 3 (Continued)

	7/1/2022	7/1/2023	7/1/2024
F. DEVELOPMENT OF ACTUARIAL VALUE OF ASSETS			
1. Investment income for year	$ (158,125,788)	$ 125,318,491	$ 198,861,863
1b. Adjustment for change in discount	0	0	0
2. Expenses and fees for year	121,760	146,180	101,905
3. Actual net investment income	(158,247,548)	125,172,311	198,759,958
4. Market Value (beginning of year)	1,715,093,810	1,468,838,071	1,504,601,737
5. Contributions during year	39,927,660	42,400,373	44,678,750
6. Benefits paid during year	127,935,851	131,809,018	135,971,915
7. Expected investment income at 7.5% (8% before 2022)			
Market Value	128,632,036	110,162,855	112,845,130
Contributions	1,497,287	1,590,014	1,675,453
Benefits	- 4,797,594	- 4,942,838	- 5,098,947
Total	125,331,729	106,810,031	109,421,636
8. Investment gain for year	(283,579,277)	18,362,280	89,338,322
9. Deferral of investment gain			
Current year (75%)	(212,684,458)	13,771,710	67,003,742
Current year – 1 (50%)	103,675,491	(141,789,639)	9,181,140
Current year – 2 (25%)	774,773	51,837,746	(70,894,819)
Total	(108,234,194)	(76,180,183)	5,290,063
10. Market value (end of year)	1,468,838,071	1,504,601,737	1,612,068,530
11. Preliminary AVA (end of year) (10) – (9)	1,577,072,265	1,580,781,920	1,606,778,467
12. Final AVA within 20% corridor	$ 1,577,072,265	$ 1,580,781,920	$ 1,606,778,467

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%)
2024	44,678,750	(133,755,140)	(2,216,775)	(9,398,917)	(145,370,832)	(100,692,082)	1,612,068,530	(6.2%)

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	400	6						406
	Salary	17,008,270	275,547						17,283,817
25-29	Count	273	114	10					397
	Salary	12,925,186	6,355,694	529,491					19,810,371
30-34	Count	198	127	63	1				389
	Salary	9,188,448	7,762,741	4,065,663	57,951				21,074,803
35-39	Count	167	102	80	41	8			398
	Salary	7,609,118	5,834,534	6,189,843	2,985,977	468,250			23,087,722
40-44	Count	163	95	55	70	65	5		453
	Salary	7,498,489	5,247,071	3,615,918	5,346,107	4,683,719	324,168		26,715,472
45-49	Count	157	86	58	60	85	37		483
	Salary	7,189,628	4,792,767	3,710,466	4,162,275	6,893,881	2,976,275		29,725,292
50-54	Count	105	90	50	55	68	47	4	419
	Salary	4,869,542	5,028,565	3,130,965	3,517,257	5,522,997	4,137,862	331,003	26,538,191
55-59	Count	112	84	55	56	55	36	1	399
	Salary	4,767,438	4,402,940	3,263,512	3,427,842	3,723,072	2,312,562	118,331	22,015,697
60-64	Count	81	62	44	20	4	2		213
	Salary	3,621,186	3,021,668	2,455,231	1,085,311	287,019	114,037		10,584,452
65-69	Count	19	5	3	1				28
	Salary	846,486	319,618	155,825	47,463				1,369,392
70 & Over	Count	8	2	1			1		12
	Salary	328,861	85,388	41,677			98,162		554,088
Total	Count	1,683	773	419	304	285	128	5	3,597
	Salary	75,852,652	43,126,533	27,158,591	20,630,183	21,578,938	9,963,066	449,334	198,759,297

Average Attained Age: 41.8 years
Average Actual Service: 8.1 years
Average Salary: $ 55,257

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	1		2					3
	Benefit	24,064		82,911					106,975
50-54	Count	11	1	9	5	5	4		35
	Benefit	331,951	33,985	400,980	203,838	210,568	130,970		1,312,292
55-59	Count	18	13	21	18	15	30	7	122
	Benefit	848,441	469,058	821,393	892,611	579,734	1,148,694	204,226	4,964,157
60-64	Count	57	55	48	45	23	95	39	362
	Benefit	1,449,648	1,542,927	1,314,349	1,820,628	857,376	3,480,218	1,641,470	12,106,616
65-69	Count	36	34	54	71	48	211	181	635
	Benefit	682,022	493,851	1,173,021	1,676,705	1,279,059	7,027,723	7,393,378	19,725,759
70-74	Count	8	4	10	14	10	212	388	646
	Benefit	85,127	15,217	125,639	174,989	178,477	5,627,208	15,232,455	21,439,112
75-79	Count	1			1	1	33	416	452
	Benefit	13,988			3,451	4,701	549,620	16,096,539	16,668,299
80-84	Count					1	1	246	248
	Benefit					12,622	9,870	9,621,472	9,643,964
85 & Over	Count						2	173	175
	Benefit						4,832	6,778,814	6,783,646
Total	Count	132	107	144	154	103	588	1,450	2,678
	Benefit	3,435,241	2555,038	3,918,293	4,772,222	3,122,537	17,979,135	56,968,354	92,750,820

Average Attained Age:	71.8 years
Average Years since Retirement:	12.0 years
Average Annual Benefit:	$34,634

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			2			1	1	4
	Benefit			32,460			4,616	5,382	42,458
45-49	Count		1	1	1		4	3	10
	Benefit		19,081	33,363	9,818		33,316	29,967	125,545
50-54	Count	2	4	4	2	1	10	9	32
	Benefit	61,416	68,851	87,501	49,327	4,050	146,777	127,539	545,461
55-59	Count	3	2	3	4	3	23	24	62
	Benefit	35,637	31,573	56,071	53,596	33,274	332,011	420,816	962,978
60-64	Count	2	3	1	4	4	20	36	70
	Benefit	14,236	22,276	5,174	43,016	68,314	222,537	619,149	994,702
65-69	Count				2	2	18	52	74
	Benefit				14,736	11,032	201,887	805,605	1,033,260
70-74	Count						5	65	70
	Benefit						50,230	1,195,351	1,245,581
75-79	Count							45	45
	Benefit							939,784	939,784
80-84	Count							18	18
	Benefit							416,338	416,338
85 & Over	Count							10	10
	Benefit							259,631	259,631
Total	Count	7	10	11	13	10	81	263	395
	Benefit	111,289	141,781	214,569	170,493	116,670	991,374	4,819,562	6,565,738

Average Attained Age: 66.3 years
Average Years since Retirement: 14.8 years
Average Annual Benefit: $16,622

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	4	6	4		3		19
	Benefit	22,785	35,742	89,253	44,679		31,490		223,949
45-49	Count	1	1	1	2		3	1	9
	Benefit	17,631	1,959	23,431	30,918		36,268	1,796	112,003
50-54	Count	1	1	2	4		4	2	14
	Benefit	14,846	16,548	26,138	37,100		40,289	22,381	157,302
55-59	Count	1	4	1	4	1	8	5	24
	Benefit	5,336	49,436	23,066	25,724	58,704	155,964	44,051	362,281
60-64	Count	2	2	4	5	4	12	18	47
	Benefit	30,974	24,599	46,872	49,775	19,979	118,780	255,234	546,213
65-69	Count	9	3	7	10	7	23	38	97
	Benefit	97,916	57,923	78,681	143,169	132,808	387,597	604,470	1,502,564
70-74	Count	15	8	10	7	1	22	28	91
	Benefit	227,140	172,452	197,411	108,189	17,978	317,643	403,293	1,444,106
75-79	Count	9	12	7	4	6	22	33	93
	Benefit	221,853	259,102	96,747	36,042	73,208	338,936	613,588	1,639,476
80-84	Count	6	3	5	1	4	23	33	75
	Benefit	123,531	62,967	92,702	823	58,656	450,581	612,647	1,401,907
85 & Over	Count	6	3	1	8	5	13	47	83
	Benefit	143,252	39,774	8,769	210,635	108,309	280,774	878,787	1,670,300
Total	Count	52	41	44	49	28	133	205	552
	Benefit	905,264	720,502	683,070	687,054	469,642	2,158,322	3,436,247	9,060,101

Average Attained Age: 72.8 years
Average Years since Retirement: 9.2 years
Average Annual Benefit: $16,413

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	1							1
	Benefit	34,436							34,436
50-54	Count	9	6	7	8	4	4		38
	Benefit	320,732	344,303	281,195	320,826	129,133	156,399		1,552,588
55-59	Count	5	13	12	10	5	24		69
	Benefit	141,772	579,241	508,137	375,048	264,383	922,580		2,791,161
60-64	Count	30	31	28	7	8	25	7	136
	Benefit	669,749	662,056	784,631	213,476	236,841	1,060,385	306,520	3,933,658
65-69	Count	7	6	4	6	4			27
	Benefit	45,863	45,576	39,167	77,849	75,495			283,950
70-74	Count	1		1		1			3
	Benefit	6,744		11,435		10,212			28,391
75-79	Count								-
	Benefit								-
80-84	Count								-
	Benefit								-
85 & Over	Count					1			1
	Benefit					2,970			2,970
Total	Count	53	56	52	31	23	53	7	275
	Benefit	1,219,296	1,631,176	1,624,565	987,199	719,034	2,139,364	306,520	8,627,154

Average Attained Age:	60.4 years
Average Years since DROP:	3.3 years
Average Annual Benefit:	$31,371

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	20	67,456
2 years	2	13,232
3 years	8	39,862
4 years	8	35,334
5 years	10	65,024
5 to 10 years	55	405,387
Over 10 years	280	2,091,092
Total	383	2,717,387

Average Attained Age:	47.0 years
Average Years until Benefit Commencement:	18.1 years
Average Annual Benefit:	$ 7,095

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:

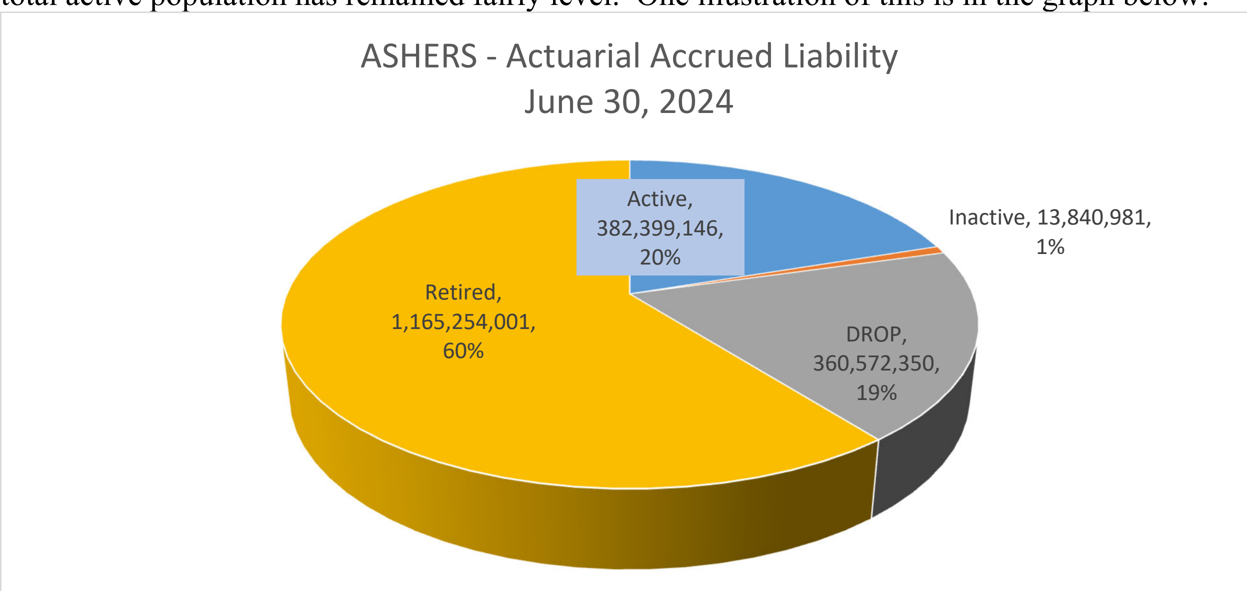

Exhibit 5 (Continued)

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 that 2022 produced a significant investment loss that will be ultimately absorbed into the Actuarial Value of Assets over next year. Together with the gains in 2023 and 2024, the Actuarial Value and Market Value of Assets are only about $6 million apart 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 $222 million higher. That is, $2,143 million compared to the reported amount of $1,922 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, 2024 is 4.21%. If liabilities were calculated using that discount rate, they would be about $2,713 million. This does not change our strong funding policy which will fully fund all benefits as time passes and can adjust for future uncertainties. Another way to view this information is that the roughly $800 million difference is the added value of a diversified portfolio over a fully immunized portfolio.

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%
2023	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)

INTERCE 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 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.

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., 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 or losses will be amortized according to the plan's funding policy.

ACTUARIAL LIABILITIES:

The actuarially determined present value of future benefits to be provided by the System. Separate actuarially determined present values are calculated 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 as defined by the actuarial cost method.

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 four-year period.

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.

ACTUARIALLY DETERMINED CONTRIBUTION (ADC):

The contribution amount expressed as a percentage of payroll that will fund the normal cost of the plan as well as the amortization of the UAAL according to the funding policy of the plan.

APPENDIX 4 (Continued)

DEFINED BENEFITS:

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

EQUIVALENT FUNDING PERIOD:

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

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.

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 and approved by the State Highway Commission.

NORMAL COST:

The average annual actuarial cost of the benefits provided by the System for the current employees as defined by the Cost Method.

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 actuarial value of assets.