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PERS
of MISSISSIPPI

Report on the Annual Valuation of the Mississippi Highway Safety Patrol Retirement System

Prepared as of June 30, 2018

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Cavanaugh Macdonald
CONSULTING, LLC
The experience and dedication you deserve

October 9, 2018

Board of Trustees
Public Employees' Retirement System of Mississippi
429 Mississippi Street
Jackson, MS 39201-1005

Ladies and Gentlemen:

Presented in this report are the results of the annual actuarial valuation of the Mississippi Highway Safety Patrol Retirement System (MHSPRS). The purpose of the valuation was to measure the System's funding progress and to determine the unfunded actuarial accrued liability amortization period beginning July 1, 2018. The results may not be applicable for other purposes.

The date of the valuation was June 30, 2018.

The valuation was based upon data, furnished by the Executive Director and the PERS staff, concerning active, inactive and retired members along with pertinent financial information. While not verifying data at the source, the actuary performed tests for consistency and reasonableness. The complete cooperation of the PERS staff in furnishing materials requested is hereby acknowledged with appreciation.

Your attention is directed particularly to the presentation of results on page 1 and the comments on page 9.

Since the previous valuation, the PERS Board and the MHSPRS Administrative Board adopted an employer contribution rate of 49.08% of annual compensation effective July 1, 2018 and the amortization period is to be calculated on an open basis.

To the best of our knowledge, this report is complete and accurate. The valuation was performed by, and under the supervision of, independent actuaries who are members of the American Academy of Actuaries with experience in performing valuations for public retirement systems. The undersigned meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

The valuation was prepared in accordance with the principles of practice prescribed by the Actuarial Standards Board. We have reviewed the actuarial methods, including the asset valuation method, and continue to believe they are appropriate for the purpose of determining employer contribution levels.

Future actuarial results may differ significantly from the current results presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period or additional cost or contribution requirements based on the system's funded status); and changes in plan provisions or applicable law. Since the potential impact of such factors is outside the scope of a normal annual actuarial valuation, an analysis of the range of results is not presented herein.

Board of Trustees
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This actuarial valuation was performed to determine the adequacy of statutory contributions to fund the plan. The asset values used to determine unfunded liabilities and funded ratios are not market values but less volatile market related values. A smoothing technique is applied to market values to determine the market related values. The unfunded liability amounts and funded ratios using the market value of assets would be different. The interest rate used for determining liabilities is based on the expected return on assets. Therefore, liability amounts in this report cannot be used to assess a settlement of the obligation.

The actuarial calculations were performed by qualified actuaries according to generally accepted actuarial procedures and methods. The calculations are based on the current provisions of the system, and on actuarial assumptions that are, in the aggregate, internally consistent and reasonably based on the actual experience of the system.

Respectfully submitted,

Edward A. Macdonald, ASA, FCA, MAAA
President

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Jonathan T. Craven, ASA, EA, FCA, MAAA
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REPORT ON THE ANNUAL VALUATION OF THE
MISSISSIPPI HIGHWAY SAFETY PATROL RETIREMENT SYSTEM
PREPARED AS OF JUNE 30, 2018

SECTION I – SUMMARY OF PRINCIPAL RESULTS

1. This report, prepared as of June 30, 2018, presents the results of the annual actuarial valuation of the System. For convenience of reference, the principal results of the valuation and a comparison with the preceding year's results are summarized below. The current valuation and reported benefits amount reflect any benefit increases granted to retirees as of July 1, 2018. Based on the funding policy adopted by the PERS Board, the PERS Board and the MHSPRS Administrative Board adopted an employer contribution rate of 49.08% of annual compensation effective July 1, 2018 and the amortization period is to be calculated on an open basis.

VALUATION DATE	June 30, 2018	June 30, 2017
Active members included in valuation		
Number	511	470
Annual compensation	$ 29,555,411	$ 28,845,478
Retirees		
Number	725	726
Annual allowances	$ 30,614,457	$ 29,563,842
Assets		
Market related actuarial value	$ 352,415,000	$ 339,114,000
Market value	$ 354,169,000	$ 341,719,000
Unfunded actuarial accrued liability	$ 175,013,349	$ 158,877,521
Funded Ratio	66.8%	68.1%
Employer contribution rate		
Normal Cost*	15.18%	15.21%
Accrued liability	33.90	21.79
Total	49.08%	37.00%
Anticipated accrued liability payment period	18.3 years	37.6 years
Unfunded actuarial accrued liability based on Market value of assets	$ 173,259,349	$ 156,272,521
Funded Ratio	67.2%	68.6%
Payment period	17.9 years	35.5 years

* Includes load for administrative expenses. See Section VI for more contribution rate detail.

2. The valuation balance sheet showing the results of the valuation is given in Section III.

3. Comments on the valuation results are given in Section IV, the derivation of the experience gains and losses during the valuation year are given in Section V and the rates of contribution payable by employers are given in Section VI.

4. Due to Senate Bill No. 2659 enacted in 2004 and House Bill No. 1015 enacted April 25, 2013, additional contributions, classified as Motor Vehicle Replacement (MVR) fees are being made to the System and are expected to continue in the future. For the 2018 fiscal year, the total additional fees were $3,494,000. We have decreased our expected contributions in perpetuity from these sources to $3,500,000 from $3,800,000 based on actual monies received and the expectation from these sources in the future. The employers are also required to contribute the employer contribution rate as determined based on the funding policy. The funding period of the UAAL of 18.3 years shown on the previous page reflects the additional contributions from Senate Bill No. 2659 and House Bill No. 1015. Without these additional contributions, the funding period would have been 30.7 years on the current employer rate basis. If the funding period was kept at 30 years, without the additional contributions the employer contribution rate would have been 49.46%.

5. Schedule A of this report presents the development of the actuarial value of assets. The estimated investment return for the plan year ending June 30, 2018 on an actuarial value of assets basis was 8.54%, compared to the assumed rate of return for the period of 7.75%.

6. Schedule B details the actuarial assumptions and methods employed. There have been no changes since the previous valuation.

7. Schedule C gives a summary of the benefit and contribution provision of the System. There have been no changes since the previous valuation.

8. The table on page 4 provides a ten-year history of some pertinent figures.

9. The funding policy for the System was changed in 2012. Under the prior funding policy, the amortization payment for the UAAL was calculated based on a fixed employer contribution rate using a floating amortization period no greater than 30 years. For continuity and informational purposes, we have provided this calculation in Section VII.

10. The funded ratio shown in the Summary of Principal Results, is the ratio of actuarial value of assets to the actuarial accrued liability. The funded status would be different based on the market value of assets. The funded ratio is an indication of progress in funding the promised benefits. Since the ratio is less than 100%, there is a need for additional contributions toward the payment of the unfunded accrued liability. In addition, this funded ratio does not have any relationship to measuring the sufficiency if the plan had to settle its liabilities.

Mississippi Highway Safety Patrol Retirement System

Comparative Schedule

Valuation Date June 30	Active Members				Retired Lives				Valuation Results ($ thousands)		
	Number	Payroll ($ thousands)	Average Salary	% increase from previous year	Number	Active/ Retired Ratio	Annual Benefits ($ thousands)	Benefits as % of Payroll	Accrued Liability	Valuation Assets	UAAL
2009	570	$26,390	$46,298	(2.1)%	692	0.8	$21,994.1	83.3%	$394,630	$292,322	$102,308
2010	542	26,353	48,623	5.0	696	0.8	22,899.7	86.9	411,277	281,088	130,189
2011	515	24,872	48,295	(0.7)	704	0.7	23,975.7	96.4	414,432	278,265	136,167
2012	547	25,670	46,929	(2.8)	713	0.8	25,167.9	98.0	421,415	268,424	152,991
2013	520	25,816	49,646	5.8	713	0.7	25,835.6	100.1	431,575	271,097	160,478
2014	495	25,554	51,624	4.0	720	0.7	26,966.4	105.5	445,822	295,298	150,524
2015	518	25,505	49,237	(4.6)	724	0.7	28,076.5	110.1	477,803	316,149	161,654
2016	484	27,380	56,571	14.9	724	0.7	28,782.0	105.1	494,101	324,894	169,207
2017	470	28,845	61,373	8.5	726	0.6	29,563.8	102.5	497,992	339,114	158,878
2018	511	29,555	57,838	(5.8)	725	0.7	30,614.5	103.6	527,428	352,415	175,013

SECTION II – MEMBERSHIP DATA

Data regarding the membership of the System for use as a basis for the valuation were furnished by the System's office. The following tables summarize the membership of the System as of June 30, 2018 upon which the valuation was based. Detailed tabulations of the data are given in Schedule D.

Active Members

				Group Averages		
Employers	Number of Employers	Number	Payroll	Salary	Age	Benefit Service
State Agencies	1	511	$ 29,555,411	$57,838	42.6	13.8

Of the 511 active members, 406 are vested and 105 are non-vested.

Retired Lives

			Group Averages	
Type of Benefit Payment	No.	Annual Benefits	Benefit	Age
Retirement	534	$26,056,067	$48,794	67.5
Disability	17	436,516	25,677	67.4
Survivor	174	4,121,874	23,689	75.2
Total in HSPRS	725	$30,614,457	$42,227	69.4

Deferred Vested/Inactive Lives

Type of Member	No.	Deferred Benefits	Outstanding Balance
Deferred Vested – Benefit Included	40	$714,984	N/A
Inactive	15	N/A	$120,292
Total in HSPRS	55	$714,984	$120,292

For the liability in this valuation, deferred vested participants with benefits provided are valued assuming a retirement age of 55 and for inactive members, account balances are multiplied by two to estimate liabilities and interest in the future.

SECTION III – VALUATION BALANCE SHEET

The following valuation balance sheet shows the assets and liabilities of the retirement system as of the current valuation date of June 30, 2018 and, for comparison purposes, as of the immediately preceding valuation date of June 30, 2017. The items shown in the balance sheet are present values actuarially determined as of the relevant valuation date. The development of the actuarial value of assets is presented in Schedule A.

VALUATION BALANCE SHEET
SHOWING THE ASSETS AND LIABILITIES OF THE
MISSISSIPPI HIGHWAY SAFETY PATROL RETIREMENT SYSTEM

	JUNE 30, 2018	JUNE 30, 2017
ASSETS		
Current actuarial value of assets:		
Annuity Savings Account	$ 27,580,506	$ 26,922,434
Annuity Reserve	37,448,519	35,803,145
Employers' Accumulation Account	287,385,975	276,388,421
Total current assets	$ 352,415,000	$ 339,114,000
Future member contributions to Annuity Savings Account	$ 16,982,967	$ 15,541,379
Prospective contributions to Employer's Accumulation Account		
Normal contributions	$ 35,020,048	$ 32,111,705
Unfunded actuarial accrued liability contributions	175,013,349	158,877,521
Total prospective contributions	$ 210,033,397	$ 190,989,226
Total assets	$ 579,431,364	$ 545,644,605
LIABILITIES		
Present value of benefits payable on account of present retired members and beneficiaries	$ 358,342,339	$ 349,850,435
Present value of benefits payable on account of inactive members for service rendered before the valuation date	6,012,952	6,598,652
Present value of benefits payable on account of active members	$ 215,076,073	$ 189,195,518
Total liabilities	$ 579,431,364	$ 545,644,605

BREAKDOWN OF TOTAL AND ACCRUED LIABILITIES
AS OF JUNE 30, 2018

		Total Liability		Accrued Liability
Active Members				
Retirement	$	207,972,227	$	162,725,046
Death		1,531,323		408,845
Disability		2,169,844		38,229
Termination		3,402,679		(99,062)
Total	$	215,076,073	$	163,073,058
Retirees				
Retirement	$	318,451,793	$	318,451,793
Survivor		35,812,876		35,812,876
Disability		4,077,670		4,077,670
Total	$	358,342,339	$	358,342,339
Deferred Vested Members		5,772,369		5,772,369
Inactive Members		240,583		240,583
Total Actuarial Values	$	579,431,364	$	527,428,349
Actuarial Value of Assets				352,415,000
Unfunded Actuarial Accrued Liability			$	175,013,349

The total liability is the present value of future benefits for all current members as of the valuation date. The accrued liability is the present value of benefits that have been accrued as of the valuation date. Since all inactive members and retirees have accrued their full benefits, the total liability and accrued liability are the same. For actives, the difference between the total liability and the accrued liability is the present value of all future accruals.

SECTION IV – COMMENTS ON VALUATION

The valuation balance sheet gives the following information with respect to the funds of the System as of June 30, 2018.

Total Assets

The Annuity Savings Account is the fund to which are credited contributions made by members together with interest thereon. When a member retires, the amount of his or her accumulated contributions is transferred from the Annuity Savings Account to the Annuity Reserve. The Employer's Accumulation Account is the fund to which are credited employer contributions and investment income, and from which are paid all employer-provided benefits under the system. The assets credited to the Annuity Savings Account as of the valuation date, which represent the accumulated contributions of members to that date, amounted to $27,580,506. The assets credited to the Annuity Reserve were $37,448,519 and the assets credited to the Employer's Accumulation Account totaled $287,385,975. Current actuarial assets as of the valuation date equaled the sum of these three funds, $352,415,000. Future member contributions to the Annuity Savings Account were valued to be $16,982,967. Prospective contributions to the Employer's Accumulation Account were calculated to be $210,033,397 of which $35,020,048 is attributable to service rendered after the valuation date (normal contributions) and $175,013,349 is attributable to service rendered before the valuation date (unfunded actuarial accrued liability contributions).

Therefore, the balance sheet shows the present value of current and future assets of the System to be $579,431,364 as of June 30, 2018.

Total Liabilities

The present value of benefits payable on account of presently retired members and beneficiaries totaled $358,342,339 as of the valuation date. The present value of future benefit payments on behalf of active members amounted to $215,076,073. In addition, the present value of benefits for inactive members, due to service rendered before the valuation date, was calculated to be $6,012,952.

Therefore, the balance sheet shows the present value for all prospective benefit payments under the System to be $579,431,364 as of June 30, 2018.

Section 25-11-7 of State law requires that active members contribute the current rate of 7.25% of annual compensation to the System.

Section 25-11-123(c) requires that the State contribute a certain percentage of the annual compensation of members to cover the normal contributions and a certain percentage to cover the accrued liability contributions of the System. These individual contribution percentages are established in accordance with an actuarial valuation. Based on the funding policy adopted by the PERS Board, the PERS Board and the MHSPRS Administrative Board adopted an employer contribution rate of 49.08% of annual compensation effective July 1, 2018 and the amortization period is to be calculated on an open basis. Therefore, the amortization period for the June 30, 2018 valuation is 18.3 years, compared to 37.6 years for the last valuation.

The primary reasons for the decrease in the amortization period was due to the change in the employer contribution rate from 37.00% of pay to 49.08% of compensation. This was offset by losses on salary increases and a decrease in the Motor Vehicle Replacement (MVR) fee assumption from $3.8 million per year to $3.5 million per year. See page 12 for a reconciliation of the amortization period and see Schedule E for a complete analysis of the Financial Experience.

SECTION V – DERIVATION OF EXPERIENCE GAINS AND LOSSES

Actual experience will never (except by coincidence) coincide exactly with assumed experience. It is assumed that gains and losses will be in balance over a period of years, but sizable year to year fluctuations are common. Detail on the derivation of the experience gain/(loss) for the years ended June 30, 2018 and June 30, 2017 are shown below.

		2018 Valuation $ Thousands	2017 Valuation $ Thousands
(1)	UAAL* as of beginning of year	$ 158,877.5	$ 169,207.5
(2)	Total normal cost from last valuation	6,672.3	6,801.0
(3)	Total contributions	17,399.0	16,956.0
(4)	Interest accrual: [[(1) + (2)] x .0775] - [(3) x .03875]	12,155.9	12,983.6
(5)	Expected UAAL before changes: (1) + (2) – (3) + (4)	$ 160,306.7	$ 172,036.1
(6)	Change due to plan amendments	0.0	0.0
(7)	Change due to actuarial assumptions or methods	0.0	(3,597.8)
(8)	Expected UAAL after changes: (5) + (6) + (7)	$ 160,306.7	$ 168,438.4
(9)	Actual UAAL as of end of year	$ 175,013.3	$ 158,877.5
(10)	Gain/(loss): (8) – (9)	$ (14,706.6)	$ 9,560.9
(11)	Gain/(loss) as percent of actuarial accrued liabilities at start of year.	(2.9)%	1.9%

*Unfunded actuarial accrued liability.

Valuation Date June 30	Actuarial Gain/(Loss) as a % of Beginning Accrued Liabilities
2013	(0.9)%
2014	3.1
2015	2.3
2016	(1.2)
2017	1.9
2018	(2.9)

SECTION VI – REQUIRED CONTRIBUTION RATES

The valuation balance sheet gives the basis for determining the percentage rates for contributions to be made by employers to the Retirement System. The following table shows the rates of contribution payable by employers as determined from the present valuation for the 2019/2020 fiscal year and a comparison to the previous valuation results.

Contribution for	2019/2020 Fiscal Year	2018/2019 Fiscal Year
Normal Cost:		
Service retirement benefits	19.77%	19.87%
Disability benefits	0.85	0.87
Survivor benefits	0.45	0.44
Total	21.07%	21.18%
Member Contributions:	7.25%	7.25%
Less future refunds	(1.13)	(1.05)
Available for benefits	6.12%	6.20%
Employer Normal Cost	14.95%	14.98%
Administrative Expense Load	0.23%	0.23%
Unfunded Actuarial Accrued Liabilities (18.3 year level % of payroll amortization*)	33.90%	21.79%
Total Computed Employer Contribution Rate	49.08%	37.00%

*Amortization period a year ago was 37.6 years.

The current funding policy has set the employer contribution rate to 49.08% of payroll and set the amortization period to open-ended. Thirty-year projections are completed after the valuation to determine if an increase or decrease in the employer contribution rate is warranted according to the triggers set forth in the funding policy. Please see Schedule F for the current funding policy.

The components of the change in the computed unfunded actuarial accrued liability amortization period from 37.6 years to 18.3 years are as follows:

Previously Reported Period	37.6 years
Change due to:	
Normal amortization	(1.0)
Actuarial experience	3.1
MVR fee assumption change	3.5
Increase in Employer Contribution Rate	(24.9)
Contribution experience	(0.0)
Computed Period	18.3 years

SECTION VII – SUPPLEMENTAL DISCLOSURE INFORMATION

1. The following supplemental disclosure information is provided for informational purposes only. One such item is a distribution of the number of employees by type of membership, as follows:

NUMBER OF ACTIVE AND RETIRED PARTICIPANTS
AS OF JUNE 30, 2018

GROUP	NUMBER
Retired participants and beneficiaries currently receiving benefits	725
Terminated participants and beneficiaries entitled to benefits but not yet receiving benefits	55
Active Participants	511
Total	1,291

2. Another such item is the schedule of funding progress as shown below. As can be seen in the table below, the funded ratio has remained relatively level over the past 9 years, with increases and decreases throughout this period. Since the Highway Safety Patrol fluctuates with its active member counts and annual covered compensation from year to year, the UAAL as a percentage of payroll, shown in column 6, experiences more volatility from year to year than other PERS plans.

SCHEDULE OF FUNDING PROGRESS
($ Thousands)

Plan Year Ended	(1) Actuarial Value of Assets	(2) Actuarial Accrued Liability (AAL) Entry Age	(3) Percent Funded (1)/(2)	(4) Unfunded AAL (2) – (1)	(5) Annual Covered Payroll	(6) Unfunded AAL as a Percentage of Covered Payroll (4)/(5)
06/30/2009#	$292,322	$394,630	74.1%	$102,308	$26,390	387.7%
06/30/2010	281,088	411,277	68.3	130,189	26,353	494.0
06/30/2011#	278,265	414,432	67.1	136,167	24,872	547.5
06/30/2012	268,424	421,415	63.7	152,991	25,670	596.0
06/30/2013#	271,097	431,575	62.8	160,478	25,816	621.6
06/30/2014	295,298	445,822	66.2	150,524	25,554	589.0
06/30/2015#	316,149	477,803	66.2	161,654	25,505	633.8
06/30/2016	324,894	494,101	65.8	169,207	27,380	618.0
06/30/2017#	339,114	497,992	68.1	158,878	28,845	550.8
06/30/2018	352,415	527,428	66.8	175,013	29,555	592.2

After change in actuarial assumptions.

3. Under the prior funding policy, the amortization payment of the unfunded actuarial accrued liability rate was calculated based on a fixed employer contribution rate using a floating amortization period no greater than 30 years. The calculation of this amount for the past two valuations is shown below:

Prior Funding Policy		
Valuation Date June 30	**2018**	**2017**
Employer contribution rate		
Normal Cost*	15.18%	15.21%
Accrued liability	25.44	24.13
Total	40.62%	39.34%
Anticipated accrued liability payment period	30 years	30 years

* Includes load for administrative expenses. See Section VI for more contribution rate detail.

Solvency Tests
($ in Thousands)

Valuation Date	Actuarial Accrued Liabilities for: (1) Accumulated Employee Contributions Including Allocated Investment Earnings	(2) Retirees and Beneficiaries Currently Receiving Benefits	(3) Active and Inactive Members Employer Financed Portion	Net Assets Available for Benefits	Portions of Accrued Liabilities Covered by Assets: (1)	(2)	(3)
6/30/2009	$20,136	$273,774	$100,720	$292,322	100%	99.4%	0.0%
6/30/2010	20,658	284,106	106,513	281,088	100	91.7	0.0
6/30/2011	20,621	292,234	101,577	278,265	100	88.2	0.0
6/30/2012	20,760	300,753	99,902	268,424	100	82.3	0.0
6/30/2013	23,706	306,273	101,596	271,097	100	80.8	0.0
6/30/2014	24,411	317,825	103,586	295,298	100	85.2	0.0
6/30/2015	24,827	338,459	114,517	316,149	100	86.1	0.0
6/30/2016	25,791	343,635	124,675	324,894	100	87.0	0.0
6/30/2017	26,922	349,850	121,220	339,114	100	89.2	0.0
6/30/2018	27,581	358,342	141,505	352,415	100	90.6	0.0

As can be seen from the table above, the HSPRS plan assets currently covers 100% of the active member contribution account balances as of the valuation date but only covers about 90.6% of the retiree liability. There remains zero assets to cover any employer financed active liabilities.

Schedule of Active Member Valuation Data

		Active Members			
Valuation Date	Number of Employers	Number	Annual Payroll	Annual Average Pay	% Increase in Average Pay
2009	1	570	$26,389,909	$46,298	(2.1)%
2010	1	542	26,353,400	48,623	5.0
2011	1	515	24,872,085	48,295	(0.7)
2012	1	547	25,670,030	46,929	(2.8)
2013	1	520	25,815,787	49,646	5.8
2014	1	495	25,553,765	51,624	4.0
2015	1	518	25,504,676	49,237	(4.6)
2016	1	484	27,380,162	56,571	14.9
2017	1	470	28,845,478	61,373	8.5
2018	1	511	29,555,411	57,838	(5.8)

Schedule of Number of Retirants Added To and Removed From Rolls
Last Ten Fiscal Years

	Fiscal Year Ended June 30									
Item	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Beginning of Year	651	692	696	704	713	713	720	724	724	726
Added	62	22	32	31	23	28	22	26	22	17
Removed	(21)	(18)	(24)	(22)	(23)	(21)	(18)	(26)	(20)	(18)
End of Year	692	696	704	713	713	720	724	724	726	725

*See Schedule D for a breakdown by type of retirement.

Schedule of Benefit Payments Added To and Removed From Rolls
Last Seven Fiscal Years

Year Ending	2012	2013	2014	2015	2016	2017	2018
Beginning of Year	$23,975,708	$25,167,940	$25,835,619	$26,966,360	$28,076,536	$28,782,015	$29,563,842
Added	1,157,796	642,344	1,113,236	890,167	833,870	717,225	787,728
Removed	(574,614)	(596,871)	(661,028)	(480,408)	(830,278)	(694,187)	(494,512)
Benefit increase due to annual COLA	609,050	622,206	678,533	700,417	701,887	758,789	757,399
Benefit increase due to plan amendments	0	0	0	0	0	0	0
End of Year	$25,167,940	$25,835,619	$26,966,360	$28,076,536	$28,782,015	$29,563,842	$30,614,457

Schedule of Average Benefit Payments

	Years of Credited Service								
	0-9	10-15	16-20	21-24	25	26-29	30	31+	TOTAL
July 1, 2017 to June 30, 2018									
Average Monthly Benefit		$1,307.49	$2,490.53	$3,100.20		$3,562.34	$4,826.30	$5,100.57	$3,976.96
Average Final Salary		$31,379.76	$68,832.18	$60,334.20		$68,125.68	$77,928.36	$75,940.20	$68,584.98
Number of Active Retirants		1	2	4		1	2	7	17
July 1, 2016 to June 30, 2017									
Average Monthly Benefit	$337.90	$996.04	$556.17	$2,927.97	$1,186.14	$2,670.20	$4,606.06	$3,493.16	$2,716.76
Average Final Salary	$19,659.72	$45,533.40	$22,015.92	$67,682.80	$28,912.20	$54,518.06	$72,101.25	$47,949.84	$55,208.79
Number of Active Retirants	1	1	1	6	2	6	4	1	22
July 1, 2015 to June 30, 2016									
Average Monthly Benefit	$314.65			$2,078.23		$3,012.97	$1,729.45	$5,059.27	$2,672.66
Average Final Salary	$53,305.68			$45,947.58		$37,841.45	$50,692.08	$51,223.20	$43,534.73
Number of Active Retirants	3			6		13	1	3	26
July 1, 2014 to June 30, 2015									
Average Monthly Benefit			$1,831.19	$1,719.04	$1,978.03	$4,054.02		$4,758.40	$3,371.84
Average Final Salary			$45,652.04	$30,832.33	$36,844.69	$51,499.73		$67,377.63	$49,438.65
Number of Active Retirants			3	3	2	10		4	22
July 1, 2013 to June 30, 2014									
Average Monthly Benefit			$401.76	$2,013.42		$2,756.37	$3,898.78	$4,528.45	$3,313.21
Average Final Salary			$15,019.06	$54,344.38		$51,232.69	$69,760.18	$68,010.73	$59,196.43
Number of Active Retirants			1	5		8	5	9	28

Schedule of Average Benefit Payments

	Years of Credited Service								
	0-9	10-15	16-20	21-24	25	26-29	30	31+	TOTAL
July 1, 2012 to June 30, 2013									
Average Monthly Benefit	$661.61	$710.09		$1,172.98	$1,696.31	$2,859.71		$3,269.65	$2,327.34
Average Final Salary	$21,843.63	$36,998.42		$31,851.99	$28,672.69	$54,157.79		$54,646.02	$46,220.07
Number of Active Retirants	1	2		3	2	11		4	23
July 1, 2011 to June 30, 2012									
Average Monthly Benefit	$1,648.69		$2,340.93	$982.05	$1,568.62	$2,267.88	$4,335.37	$3,798.92	$3,112.35
Average Final Salary	$39,568.45		$58,021.27	$39,971.01	$28,716.82	$46,824.02	$71,048.35	$62,979.14	$56,306.75
Number of Active Retirants	1		1	1	1	10	5	12	31
July 1, 2010 to June 30, 2011									
Average Monthly Benefit		$716.18	$1,020.55	$2,433.84	$1,896.54	$2,408.76	$3,791.81	$3,296.52	$2,662.01
Average Final Salary		$28,057.78	$26,202.46	$60,342.83	$43,144.33	$50,019.57	$52,042.20	$51,855.68	$49,152.03
Number of Active Retirants		1	2	3	2	11	4	9	32
July 1, 2009 to June 30, 2010									
Average Monthly Benefit			$1,405.04		$3,155.49	$3,024.51	$3,461.46	$2,973.70	$2,760.91
Average Final Salary			$37,962.84		$59,219.21	$47,430.92	$30,160.22	$41,004.34	$42,581.99
Number of Active Retirants			4		2	5	2	9	22
July 1, 2008 to June 30, 2009									
Average Monthly Benefit	$466.11		$438.86	$1,580.07	$3,177.63	$3,143.57	$4,604.35	$3,055.97	$2,951.81
Average Final Salary	$33,559.84		$16,844.95	$38,404.11	$61,298.36	$59,583.98	$75,125.92	$52,752.04	$56,256.41
Number of Active Retirants	3		1	7	13	21	7	10	62

SCHEDULE A
Development of Actuarial Value of Assets
($ thousands)

	Valuation Date June 30:	2017	2018	2019	2020	2021	2022
A.	Actuarial Value Beginning of Year	$324,894	$339,114				
B.	Market Value End of Year	341,719	354,169				
C.	Market Value Beginning of Year	311,612	341,719				
D.	Cash Flow						
	D1. Contributions	13,198	13,905				
	D2. Other Revenue	3,758	3,494				
	D3. Benefit Payments	(31,001)	(32,315)				
	D4. Refunds	(144)	(103)				
	D5. Administrative Expenses	(203)	(250)				
	D6. Investment Expenses	(1,218)	(1,207)				
	D7. Net	(15,610)	(16,476)				
E.	Investment Income						
	E1. Market Total: B.-C.-D6.	45,717	28,926				
	E2. Assumed Rate	7.75%	7.75%				
	E3. Amount for Immediate Recognition	24,810	27,099				
	E4. Amount for Phased-In Recognition	20,907	1,827				
F.	Phased-In Recognition of Investment Income						
	F1. Current Year: 0.20*E4.	4,181	365				
	F2. First Prior Year	(4,566)	4,181	365			
	F3. Second Prior Year	(3,122)	(4,566)	4,181	365		
	F4. Third Prior Year	5,820	(3,122)	(4,566)	4,181	365	
	F5. Fourth Prior Year	2,707	5,820	(3,122)	(4,566)	4,181	365
	F6. Total Recognized Investment Gain	5,020	2,678	(3,142)	(20)	4,546	365
G.	Actuarial Value End of Year: A + D7. + E3. + F6. + G.	$339,114	$352,415				
H.	Difference Between Market & Actuarial Values	$2,605	$1,754	$4,896	$4,916	$370	$5

The Actuarial Valuation of Assets recognizes assumed investment income (line E3) fully each year. Differences between actual and assumed investment income (line E4) are phased in over a closed 5 year period. During periods when investment performance exceeds the assumed rate, Actuarial Value of Assets will tend to be less than market value. During periods when investment performance is less than the assumed rate, Actuarial Value of Assets will tend to be greater than market value. If assumed rates are exactly realized for 4 consecutive years, actuarial value will become equal to market value.

Asset Summary
June 30, 2018
($ in Thousands)

		Market Value	Book Value	Actuarial Value
1.	Assets at June 30, 2017	$341,719	$272,978	$339,114
2.	Contributions and Misc. Revenue	17,399	17,399	17,399
3.	Investment Increment	28,926	29,174	29,777
4.	Benefit Payments	(32,315)	(32,315)	(32,315)
5.	Refunds	(103)	(103)	(103)
6.	Expenses	(1,457)	(1,457)	(1,457)
7.	Adjustment	0	0	0
8.	Assets at June 30, 2018 (1)+(2)+(3)+(4)+(5)+(6)+(7)	$354,169	$285,676	$352,415
9.	Investment Return	8.22%	10.44%	8.54%

SCHEDULE B

STATEMENT OF ACTUARIAL ASSUMPTIONS AND METHODS

INTEREST RATE: 7.75% per annum, compounded annually (net of investment expenses only). The expected return on assets consists of 3.00% price inflation and 4.75% real rate of return.

SEPARATIONS FROM ACTIVE SERVICE: Representative values of the assumed annual rates of separation from active service are as follows:

		Death		Disability			
Age	Withdrawal and Vesting	Males	Females	Non-Duty	Duty	Service	Service Retirement*
25	5.60%	0.03%	0.01%	0.07%	0.00%	5	5%
30	4.00	0.03	0.01	0.09	0.01	10	5%
35	3.00	0.03	0.01	0.12	0.04	15	5%
40	2.00	0.04	0.02	0.15	0.05	20	5%
45	1.00	0.06	0.03	0.22	0.05	25	10%
50	1.00	0.11	0.05	0.38	0.04	30	25%
55	0.00	0.18	0.08	0.68	0.01	35	25%
60	0.00	0.29	0.11	1.16	0.00	40+	100%

* The annual rate of service retirement is 100% at age 61.

It is assumed that a member will be granted 1¾ years of service credit for unused leave at termination of employment. In addition, it is assumed that, on average, ¼ year of service credit for peace-time military service will be granted to each member.

SALARY INCREASES: Representative values of the assumed annual rates of salary increases are as follows:

		Annual Rates of	
Age	Merit & Seniority	Base (Economy)	Increase Next Year
20	5.56%	3.25%	8.81%
25	2.31	3.25	5.56
30	1.49	3.25	4.74
35	1.49	3.25	4.74
40	1.49	3.25	4.74
45	1.00	3.25	4.25
50	0.50	3.25	3.75
55	0.50	3.25	3.75
60	0.00	3.25	3.25

DEATH AFTER RETIREMENT: The mortality table, for post-retirement mortality, used in evaluating allowances to be paid was the RP-2014 Healthy Annuitant Blue Collar Mortality Table projected with Scale BB to 2022 with male rates set forward one year and adjusted by 106% for males at all ages and as follows for females: 90% for ages less the 76, 95% for age 76, 105% for age 78, and 110% for ages 79 and greater. The RP-2014 Disabled Retiree Mortality Table set forward 4 years for males and 3 years for females was used for the period after disability retirement. This assumption is used to measure the probabilities of each benefit payment being made after retirement. Mortality improvement is anticipated under this assumption as recent mortality experience shows actual deaths 11.2% greater than expected under the selected table for non-disability mortality and 10.5% greater than expected under the selected table for disability mortality.

PAYROLL GROWTH: 3.25% per annum, compounded annually.

ADMINISTRATIVE EXPENSES: 0.23% of payroll.

TIMING OF DECREMENT AND PAY INCREASES: Middle of Year.

ASSUMED INTEREST RATE ON EMPLOYEE CONTRIBUTIONS: 2.00%

MARRIAGE ASSUMPTION: 100% married with the husband three years older than his wife.

SURVIVING CHILD BENEFITS ASSUMPTION: A small load is applied for surviving children.

ASSET VALUATION METHOD: Actuarial value, as developed in Schedule A. The actuarial value of assets recognizes a portion of the difference between the market value of assets and the expected market value of assets, based on the assumed valuation rate of return. The amount recognized each year is 20% of the difference between market value and expected market value.

MAXIMUM COVERED EARNINGS ASSUMPTION GROWTH: 3.25%

MODIFIED CASH REFUND: Benefits were valued with a twelve year certain period for retirees and five year certain for active members to estimate the value of the modified cash refund feature.

VALUATION METHOD: The valuation is prepared on the projected benefit basis, which is used to determine the present value of each member's expected benefit payable at retirement, disability or death. The calculations are based on the member's age, years of service, sex, compensation, expected future salary increases, and an assumed future interest earnings rate (currently 7.75%). The calculations consider the probability of a member's death or termination of employment prior to becoming eligible for a benefit and the probability of the member terminating with a service, disability, or survivor's benefit. The present value of the expected benefits payable to active members is added to the present value of the expected future payments to current benefit recipients to obtain the present value of all expected benefits payable to the present group of members and survivors.

The employer contributions required to support the benefits of HSPRS are determined following a level funding approach, and consist of a normal contribution and an accrued liability contribution.

The normal contribution is determined using the "entry age normal" method. Under this method, a calculation is made for pension benefits to determine the uniform and constant percentage rate of employer contribution which, if applied to the compensation of the average new member during the entire period of his anticipated covered service, would be required in addition to the contributions of the member to meet the cost of all benefits payable on his behalf.

The unfunded actuarial accrued liability is determined by subtracting the current assets and the present value of prospective employer normal contributions and member contributions from the present value of expected benefits to be paid from the HSPRS. The accrued liability contribution amortizes the balance of the unfunded actuarial accrued liability over a period of years from the valuation date.

SCHEDULE C

SUMMARY OF MAIN BENEFIT AND CONTRIBUTION PROVISIONS

The following summary presents the main benefit and contribution provisions of the System in effect June 30, 2018, as interpreted in preparing the actuarial valuation.

DEFINITIONS

Average Compensation	Average annual covered earnings of an employee during the four highest consecutive years of service.
Covered Earnings	Gross salary not in excess of the maximum amount on which contributions were required.
Fiscal Year	Year commencing on July 1 and ending June 30.
Credited Service	Service while a contributing member plus additional service as described below.
Unused Sick and Vacation Leave	Service credit is provided at no charge to members for unused sick and vacation time that has accrued at the time of retirement. A payment of up to 240 hours of leave may be used in the Average Compensation definition.
Additional Service	Additional service credit may be granted for service prior to July 1, 1958, active duty military service, and retroactive service

The maximum covered earnings for employers and employees over the years are as follows:

EMPLOYER AND EMPLOYEE RATES OF CONTRIBUTION
AND MAXIMUM COVERED EARNINGS

Fiscal Date From	Fiscal Date To	Employer Rate	Employee Rate	Maximum Covered Earnings*
7/1/1958	6/30/1968	13.33%	5.00%	
7/1/1968	6/30/1971	15.33	5.00	
7/1/1971	6/30/1973	18.59	5.00	
7/1/1973	6/30/1975	20.77	5.00	
7/1/1975	6/30/1978	24.65	5.00	
7/1/1978	6/30/1980	26.16	6.00	
7/1/1980	6/30/1989	26.16	6.50	
7/1/1989	6/30/1990	27.97	6.50	
7/1/1990	6/30/2003	26.16	6.50	
7/1/2003	6/30/2006	28.16	6.50	
7/1/2006	6/30/2008	30.30	6.50	
7/1/2008	12/31/2011	30.30	7.25	
1/1/2012	6/30/2012	35.21	7.25	
7/1/2012	6/30/2018	37.00	7.25	
7/1/2018	6/30/2019	49.08	7.25	

*Maximum covered earnings equal wages paid, not to exceed wages paid to the Commissioner of the Department of Public Safety (currently $146,850).

Effective July 1, 2018, additional contributions from SB 2659 and HB 1015 are estimated to be $3,500,000 combined.

BENEFITS

Superannuation Retirement

Condition for Retirement	A retirement allowance is payable to any member who retires and has attained age 55 and completed at least five years of membership service, or has attained age 45 and completed at least 20 years of creditable service, or has completed 25 years of creditable service regardless of age. Any member who has attained age 63 shall be retired forthwith. Effective July 1, 2011, the Commissioner of Public Safety is authorized to allow a member who has attained age 63 to continue in active service. Such continued service may be authorized annually until the member attains age 65.
Amount of Allowance	The annual retirement allowance payable to a retired member is equal to: 1. A member's annuity which is the actuarial equivalent of the member's accumulated contributions at the time of his or her retirement, plus 2. An employer's annuity which, together with the member's annuity, is equal to 2-1/2% of his or her average compensation for each year of membership service, plus 3. A prior service annuity equal to 2-1/2% of average compensation for each year of prior service. The aggregate amounts of (2) and (3) above shall not exceed 100% of average compensation, regardless of service, for retirements on or after January 1, 2000; 85% for retirements prior to January 1, 2000. The minimum allowance for both service and disability retirement based on the following table for each year of creditable service, reduced if necessary as indicated below.

Service	Monthly Benefit
Less than 10 years	$250
10-15 years	$300
15 or more years	$500

The annual retirement allowance payable to a member who retires under condition (a) above prior to age 55 is computed in accordance with the above formula except that the employer's annuity and prior service annuity are reduced 3% for each year of age below age 55, or 3% for each year of service below 25 years of creditable service, whichever is less.

Deferred Vested

Condition for Vesting

Any member who withdraws from service prior to his or her attainment of age 55 but after having completed five or more years of creditable service is entitled to receive, in lieu of a refund of his or her accumulated contributions, a retirement allowance commencing at age 55.

Amount of Allowance

The annual retirement allowance payable at age 55 is equal to:

1. A member's annuity which is the actuarial equivalent of the member's accumulated contributions at the time of his or her retirement, plus

2. An employer's annuity which, together with the member's annuity, is equal to 2-1/2% of his or her average compensation for each year of membership service, plus

3. A prior service annuity equal to 2-1/2% of average compensation for each year of prior service.

The aggregate amounts of (2) and (3) above shall not exceed 100% of average compensation, regardless of service, for retirements on or after January 1, 2000; 85% for retirements prior to January 1, 2000.

The minimum allowance for both service and disability retirement based on the following table for each year of creditable service, reduced if necessary as indicated below.

Service	Monthly Benefit
Less than 10 years	$250
10-15 years	$300
15 or more years	$500

Disability Retirement

Non-Duty-Related	Non-duty related disability benefits are available to vested members under the age of 55. Vested members age 55 or older are not eligible for disability benefits but may apply for service retirement benefits. For purposed of disability benefits, average annual compensation is calculated using the last two years of salary before retirement.
Duty-Related	If you become permanently disabled due to sickness or injury caused or sustained as a direct result of duty, you may be eligible for duty-related disability retirement. You are covered for this benefit from the first day of employment if you have not reached age 55, regardless of your years of service. Duty-related disability retirement benefits are calculated at either 50 percent of average compensation of the last two years of salary before retirement (this portion is not taxable) or the non-duty-related disability retirement amount, whichever provides the higher benefit.

Death Benefits

Non-Duty-Related	If you are vested, your spouse and dependent children may be eligible to receive certain statutory benefits. Claims for non-duty-related death benefits are calculated at 2.5 percent of average compensation for each year of service credit, as calculated under Option 9, Maximum Benefit. Under this option, 50 percent of the accrued benefit is payable to your spouse until death, with 25 percent of the accrued benefit payable to one dependent child and 50 percent of the accrued benefit payable for two or more dependent children (under age 19 and never married or under age 23 if a full-time student and never married). Upon application and approval by the Medical Board, benefits to a physically or mentally disabled child may continue as long as the disability exists.
Duty-Related	Coverage for duty-related death benefits begins on the first day of employment and is available to your spouse and dependent children regardless of your vesting status. If you are vested, your spouse and dependent children may be eligible to receive benefits under either non-duty or duty-related death benefit provisions, whichever provided the higher benefit. Claims for duty-related death benefits are calculated at 50 percent of average compensation, payable to your spouse until death, with 25 percent of average compensation payable to one dependent child and 50 percent of average compensation payable for two or more dependent children (under age 19 and never married or under age 23 if a full-time student and never married). Upon application and approval by the Medical Board,

benefits to a physically or mentally disabled child may continue as long as the disability exists.

Death After Retirement

Upon the death of a highway patrolman who has retired for service or disability and who has not elected any other optional form of benefit, his widow or her widower is eligible for a benefit equal to 50% of his or her retirement allowance and each child (but not more than 2) who has not attained age 19 (23 if a full-time student) is eligible for a benefit equal to 25% of his or her retirement allowance. The benefit to the widow is payable for life and to children until they attain age 19 (23 if a full-time student) or for life if they are totally and permanently disabled.

Refund of Contributions

Upon a member's termination of employment for any reason before retirement, his or her accumulated contributions, together with regular interest thereon, are refunded. Upon the death of a member who is not eligible for any other death benefit, his or her accumulated contributions, together with regular interest thereon, are paid to his or her beneficiary.

Effective July 1, 2016, the interest rate on employee contributions shall be calculated based on the money market rate as published by the Wall Street Journal on December 31 of each preceding year with a minimum rate of one percent and a maximum rate of five percent.

Normal Form of Benefit

For single retirees, the normal form of benefit is an allowance payable during the life of the member. For married retirees, the normal form of benefit is an allowance payable as described in Option 9 below. Upon death the benefits described above are payable.

Optional Benefits

A member upon retirement may elect to receive his allowance in one of the following forms which are computed to be actuarially equivalent to the applicable retirement allowance.

Option 1. Reduced allowance with the provision that if the pensioner dies before he receives the value of the member's annuity as it was at the time of retirement, the balance shall be paid to his or her beneficiary.

Option 2. Upon his or her death, his or her reduced retirement allowance shall be continued throughout the life of, and paid to, his or her beneficiary.

Option 3. Upon his or her death, 50% of his or her reduced retirement allowance shall be continued throughout the life of, and paid to, a designated beneficiary and the other 50% of his or her reduced retirement allowance to some other designated beneficiary.

Option 4. Upon his or her death, 75% of his or her reduced retirement allowance shall be continued throughout the life of, and paid to, a designated beneficiary.

Option 4A. Upon his or her death, 50% of his or her reduced retirement allowance shall be continued throughout the life of, and paid to, a designated beneficiary.

Option 4B. A reduced retirement allowance shall be continued throughout the life of the pensioner, but with the further guarantee of payment to the pensioner or his or her beneficiary for a specified number of years certain.

Option 4C. A member may elect any option with the added provision that the member shall receive, so far as possible, the same total amount annually (considering both HSPRS and Social Security benefits) before and after the earliest age at which the member becomes eligible for a Social Security benefit. This option was only available to those who retired prior to July 1, 2004.

Option 9. Upon his or her death, spouse will receive 50% of the benefit member was receiving for life. Each dependent child (under age 19 and never married or under age 23 if a full-time student and never married) will receive 25% of the benefit member was receiving with a maximum of 50% for the support and care of two or more children. Any contribution and interest remaining after member death and after all monthly benefits due to spouse and children have been paid will be refunded to designated beneficiaries. If the member marries after retirement while receiving benefits under this option, they may apply to Pop-Down to Option 2 to provide 100% beneficiary protection to new spouse, or Pop-down to Option 4 or Option 4A for other beneficiary protections for the new spouse. PLSO is available with this option, if eligible.

A member who elects Option 2, Option 4, or Option 4A, at retirement may revert to the normal form of benefit if the designated beneficiary predeceases the retired member or if the retired member divorces the designated beneficiary. A member who elects the normal form of benefit or Option 1 at retirement may select Option 2, Option 4, or Option 4A to provide beneficiary protection to a new spouse if married after retirement.

A member who qualifies for an unreduced retirement allowance may select a partial lump-sum option at retirement. Under this option, the retiree has the option of taking a partial lump-sum distribution equal to either 12, 24, or 36 times the base maximum monthly benefit. With each lump-sum amount, the base maximum monthly benefit will be actuarially reduced. A member selecting this option may also select any of the regular options except Option 1, the prorated single-life annuity, and Option 4-C, the Social Security leveling provision. The benefit is then calculated using the new reduced maximum benefit as a starting point in applying the appropriate option factors for the reduction.

Post-Retirement Adjustments In Allowances

The allowances of retired members are adjusted annually by an amount equal to (a) 3% of the annual retirement allowance for each full fiscal year of retirement prior to the year in which the member reaches age 60*, plus (b) 3% compounded for each year thereafter beginning with the fiscal year in which the member turns age 60*.

A prorated portion of the annual adjustment will be paid to the member, beneficiary, or estate of any member or beneficiary who is receiving the annual adjustment in a lump sum, but whose benefits are terminated between July 1 and December 1.

Those members who retired on or before July 1, 1999 received an ad hoc benefit increase in the amount of $3.50 per month per each full fiscal year of retirement through June 30, 1999 plus $1.00 per month for each year of credited service. The benefits were increased on July 1, 1999.

*this age will be reduced in five phases to age 55 if the actuary certifies that reducing the age will not result in the amortization period of the unfunded actuarial accrued liability exceeding 20 years.

CONTRIBUTIONS

Members contribute 7.25% of compensation and the employer contributes 49.08% of compensation. Funds from SB 2659 and HB 1015 are also provided.

SCHEDULE D

DETAILED TABULATIONS OF THE DATA

RECONCILIATION OF DATA RECEIVED FROM PERS

Reconciliation of Data received from PERS	Active File			Pensioner File			Total
	Active	Inactive NonVested	Inactive Vested	Retirees	Disableds	Survivors	
From PERS	518	21	42	543	17	184	1,325
Refunded		(6)					(6)
Certain Period End						(1)	(1)
Deceased				(9)		(9)	(18)
Disabled			(1)				(1)
Retired	(7)		(1)				(8)
For Valuation	511	15	40	534	17	174	1,291

STATUS RECONCILIATION FROM 2017 TO 2018

Reconciliation of Data from Last Year to This Year	Actives	Retirees	Disableds	Survivors	Inactives		Total
					Vested	Non-Vested	
As of June 30, 2017	470	528	16	182	40	19	1,255
Retirement	(11)	15			(4)		
Disabled			1		(1)		
Death with Survivor		(3)		3			
Terminated Def Vested	(9)				9		
Terminated NonVest							
Return to Active Svc	2				(2)		
Refunded					(2)	(3)	(5)
Death No Survivor		(6)		(9)			(15)
Benefit Ended				(3)			(3)
Removed/Cleanup						(1)	(1)
New	59			1			60
As of June 30, 2018	511	534	17	174	40	15	1,291

SCHEDULE D

Retirants & Beneficiaries as of June 30, 2018

Tabulated by Year of Retirement

Valuation Year of Retirement Ending June 30	No.	Total Annual Benefits, excluding COLA	COLA	Total Annual Benefits	Average Monthly Total Benefit
2018	15	$772,038	$0	$772,038	$4,289
2017	18	783,491	6,681	790,172	3,658
2016	12	504,074	22,053	526,127	3,654
2015	15	700,206	52,900	753,107	4,184
2014	21	961,616	99,063	1,060,679	4,209
2013	16	644,831	86,058	730,890	3,807
2012	19	836,376	136,621	972,997	4,268
2011	20	883,693	171,002	1,054,695	4,395
2010	45	1,797,873	428,569	2,226,442	4,123
2009	30	1,279,910	326,673	1,606,584	4,463
2008	14	558,501	167,104	725,606	4,319
2007	20	687,798	216,943	904,741	3,770
2006	19	599,553	213,420	812,973	3,566
2005	19	600,369	233,994	834,363	3,659
2004	18	672,565	290,519	963,084	4,459
2003	9	232,883	105,433	338,316	3,133
2002	30	820,486	417,811	1,238,297	3,440
2001	22	662,763	314,112	976,875	3,700
2000	14	428,057	244,352	672,409	4,002
1999	14	400,097	247,752	647,850	3,856
1998	29	862,890	567,979	1,430,869	4,112
1997	30	792,119	564,718	1,356,837	3,769
1996	21	514,584	366,534	881,118	3,496
1995	16	427,158	332,241	759,399	3,955
1994	13	298,076	246,799	544,876	3,493
1993	17	342,906	288,545	631,450	3,095
1992	3	64,186	55,758	119,944	3,332
1991	5	69,809	67,436	137,245	2,287
1990	13	194,027	201,216	395,242	2,534
1989	1	20,314	21,250	41,564	3,464
1988	6	56,127	64,534	120,661	1,676
1987	101	1,699,220	1,973,882	3,673,102	3,031
1986	10	169,293	219,871	389,164	3,243
1985	8	115,286	154,159	269,444	2,807
1984	7	76,407	114,067	190,474	2,268
1983	5	56,928	84,912	141,840	2,364
1982 & Prior	50	340,682	582,302	922,984	1,538
TOTAL	725	$20,927,194	$9,687,263	$30,614,457	$3,519

SCHEDULE D

Schedule of Retired Members by Type of Retirement

Benefits Payable June 30, 2018

Amount of Monthly Benefit	Number of Rets.	Ret Type 1*	Ret Type 2*	Ret Type 3*
$1 – $500	36	2	3	31
501 – 1,000	93	8	2	83
1,001 – 1,500	70	28	5	37
1,501 – 2,000	99	84	5	10
2,001 – 2,500	103	98	1	4
2,501 – 3,000	99	95	1	3
3,001 – 3,500	94	89		5
3,501 – 4,000	49	49		
4,001 – 4,500	34	33		1
4,501 – 5,000	15	15		
Over 5,000	33	33		
Totals	725	534	17	174

*Type of Retirement
1 – Retirement for Age & Service
2 – Disability Retirement
3 – Survivor Payment

SCHEDULE D

Schedule of Retired Members by Type of Option

Benefits Payable June 30, 2018

Amount of Monthly Benefit	Number of Rets.	Life	Option 1	Option 2	Option 3	Option 4	Option 4A	Option 4B	Option 4C*	Option 5	Option 9	PLSO* 1 Year	PLSO* 2 Years	PLSO* 3 Years
$1 – $500	36	31		1							4			
501 – 1,000	93	83			1				1		9		1	
1,001 – 1,500	70	37		3				1	3		29	2		3
1,501 – 2,000	99	13		9	2		1	3	3		71	1	1	7
2,001 – 2,500	103	7		9			1	2	1		84	8	3	16
2,501 – 3,000	99	2		10	1		2	5	3		79	4	5	36
3,001 – 3,500	94	5	1	9			1	1			77	8	5	32
3,501 – 4,000	49			1	1		1	2			44	7	4	19
4,001 – 4,500	34	1	1	4				1			27	3	3	9
4,501 – 5,000	15			1							14	2	1	5
Over 5,000	33										33	3	5	5
Totals	725	179	2	47	5	0	6	15	11	0	471	38	28	132

Option Selected

Life	-	Return of Contributions
Opt. 1	-	Return of Member's Annuity
Opt. 2	-	100% Survivorship
Opt. 3	-	50%/50% Dual Survivorship
Opt. 4	-	75% Survivorship
Opt. 4A	-	50% Survivorship
Opt. 4B	-	Years Certain & Life
Opt. 4C	-	Social Security Leveling*
Opt. 5	-	Pop-Up
Opt. 9	-	Maximum Benefit with Pop-Down Provision
PLSO	-	Partial Lump Sum* (Reflects reduced monthly benefit)

*Included in other options

SCHEDULE D

Retirant and Beneficiary Information June 30, 2018

Attained Age	Service Retirement		Disability Retirement		Survivors and Beneficiaries		Total	
	No.	Annual Benefits	No.	Annual Benefits	No.	Annual Benefits	No.	Annual Benefits
Under 20					3	$20,449	3	$20,449
20 – 24					2	16,508	2	16,508
25 – 29								
30 – 34					1	17,323	1	17,323
35 – 39					1	22,122	1	22,122
40 – 44			1	$15,690			1	15,690
45 – 49	9	$379,882	1	22,752	5	103,438	15	506,072
50 – 54	20	860,758	2	67,910	3	67,113	25	995,781
55 – 59	77	3,611,352	2	56,879	1	63,078	80	3,731,309
60 – 64	127	6,466,217			8	212,280	135	6,678,497
65 – 69	104	5,132,503	4	118,814	15	352,924	123	5,604,241
70 – 74	84	4,071,745	1	32,421	32	896,050	117	5,000,216
75 – 79	67	3,138,867	2	48,932	32	809,122	101	3,996,921
80 – 84	25	1,265,238	2	44,468	32	731,097	59	2,040,803
85 – 89	15	770,162	2	28,650	27	573,045	44	1,371,857
90 – 94	6	359,343			8	174,467	14	533,810
95					2	36,579	2	36,579
96					1	9,776	1	9,776
97								
98								
99								
100 & Over					1	16,503	1	16,503
Totals	534	$26,056,067	17	$436,516	174	$4,121,874	725	$30,614,457

Average Age: 69.4 years
Average Age at Retirement: 50.2 years

SCHEDULE D

Total Active Member Data as of June 30, 2018
Tabulated by Attained Ages and Years of Service

Attained Age	Completed Years of Service								
	0 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	>= 35	Total
24 & under	16								16
Total Pay	221,127								221,127
Avg. Pay	13,820								13,820
25 to 29	32	5							37
Total Pay	940,384	255,177							1,195,561
Avg. Pay	29,387	51,035							32,312
30 to 34	29	18	14						61
Total Pay	971,045	852,510	771,935						2,595,490
Avg. Pay	33,484	47,362	55,138						42,549
35 to 39	13	13	53	3					82
Total Pay	413,127	651,112	3,069,338	204,015					4,337,592
Avg. Pay	31,779	50,086	57,912	68,005					52,897
40 to 44	7	4	46	32	5				94
Total Pay	113,261	194,179	2,662,257	2,231,686	338,461				5,539,844
Avg. Pay	16,180	48,545	57,875	69,740	67,692				58,935
45 to 49	8	2	31	31	39	4			115
Total Pay	162,554	91,280	1,704,877	2,156,891	3,045,484	348,624			7,509,710
Avg. Pay	20,319	45,640	54,996	69,577	78,089	87,156			65,302
50 to 54		2	6	11	31	8	2		60
Total Pay		120,567	320,876	758,717	2,446,891	562,314	199,862		4,409,227
Avg. Pay		60,284	53,479	68,974	78,932	70,289	99,931		73,487
55 to 59				4	13	2	11	3	33
Total Pay				277,012	971,137	191,849	950,154	238,991	2,629,143
Avg. Pay				69,253	74,703	95,925	86,378	79,664	79,671
60 to 64				2	1	1	4	5	13
Total Pay				121,751	91,994	80,295	353,480	470,197	1,117,717
Avg. Pay				60,876	91,994	80,295	88,370	94,039	85,978
65 & over									0
Total Pay									0
Avg. Pay									0
Total	105	44	150	83	89	15	17	8	511
Total Pay	2,821,498	2,164,825	8,529,283	5,750,072	6,893,967	1,183,082	1,503,496	709,188	29,555,411
Avg. Pay	26,871	49,201	56,862	69,278	77,460	78,872	88,441	88,649	57,838

While not used in the financial computations, the following group averages are computed and shown because of their general interest.

Age: 42.6 years
Service: 13.8 years
Annual Pay: $57,838

SCHEDULE E

ANALYSIS OF FINANCIAL EXPERIENCE

Gains & Losses in Accrued Liabilities
Resulting from Difference Between
Assumed Experience & Actual Experience
($ Thousands)

Type of Activity	$ Gain (or Loss) For Year Ending 6/30/2018	$ Gain (or Loss) For Year Ending 6/30/2017
Age & Service Retirements. If members retire at older ages, there is a gain. If younger ages, a loss.	$ 554.8	$ 751.2
Disability Retirements. If disability claims are less than assumed, there is a gain. If more claims, a loss.	(19.6)	157.1
Death-in Service Benefits. If survivor claims are less than assumed, there is a gain. If more claims, there is a loss.	0.6	(0.6)
Withdrawal From Employment. If more liabilities are released by withdrawals than assumed, there is a gain. If smaller releases, a loss.	(336.8)	286.3
Pay Increases. If there are smaller pay increases than assumed, there is a gain. If greater increases, a loss.	(11,488.1)	6,848.7
New Members / Rehires. Additional unfunded actuarial accrued liability will produce a loss.	(3,306.9)	(1,851.1)
Investment Income. If there is a greater investment income than assumed, there is a gain. If less income, a loss.	2,880.3	3,990.4
Death After Retirement. If retirants live longer than assumed, there is a loss. If not as long, a gain.	131.8	1,758.9
Other. Miscellaneous gains and losses resulting from data adjustments, timing of financial transactions, etc.	(3,122.7)	(2,380.0)
Gain (or Loss) During Year From Financial Experience	$ (14,706.6)	$ 9,560.9
Non-Recurring Items. Adjustments for plan amendments, software changes, assumption changes, or method changes.	0.0	3,597.7
Composite Gain (or Loss) During Year	$ (14,706.6)	$ 13,158.6

SCHEDULE F

FUNDING POLICY OF THE MHSPRS BOARD OF TRUSTEES

The purpose of the funding policy is to state the overall funding goals for the System, the benchmarks that will be used to measure progress in achieving those goals, and the methods and assumptions that will be employed to develop the benchmarks.

I. Funding Goals

The objective in requiring employer and member contributions is to accumulate sufficient assets during a member's employment to fully finance the benefits the member receives throughout retirement. In meeting this objective, the System will strive to meet the following funding goals:

- To maintain an increasing ratio of system assets to accrued liabilities and reach an 80 percent minimum funded ratio in 2042;
- To maintain adequate asset levels to finance the benefits promised to members;
- To develop a pattern of stable contribution rates when expressed as a percentage of member payroll as measured by valuations prepared in accordance with the principles of practice prescribed by the Actuarial Standards Board, with a minimum employer contribution equal to the normal cost determined under the Entry Age Normal funding method;
- To provide intergenerational equity for taxpayers with respect to system costs; and
- To fund benefit improvements through increases in contribution rates in accordance with Article 14, § 272A, of the Mississippi Constitution.

II. Benchmarks

To track progress in achieving the previously outlined funding goals, the following benchmarks will be measured annually as of the actuarial valuation date (with due recognition that a single year's results may not be indicative of long-term trends):

- **Funded ratio** – The funded ratio, defined as the actuarial value of system assets divided by the System's actuarial accrued liability, should be increasing over time, before adjustments for changes in benefits, actuarial methods, and/or actuarial assumptions, with a target of at least 80 percent in 2042. If the funded ratio is projected to be less than 60 percent in 2042 or if the funded ratio is projected to be less than 70 percent following three consecutive annual actuarial valuations, a contribution rate increase will be determined that is sufficient to generate a funded ratio of 90 percent in 2042. If a funded ratio of 100 percent or more is attained, and is projected to remain above 100 percent for the ensuing 30 years, a reduced contribution pattern will be established provided the projected funded ratio remains at or above 100 percent in every future year.
- **Contribution rate history** – Employer and member contribution rates should be level from year to year when expressed as a percent of active member payroll unless the projected funded ratio reaches a level that triggers a change in contribution rates. The initial employer contribution rate set under this policy as revised June 19, 2013, will be 37.00 percent of active member payroll effective July 1, 2013.
- **Unfunded Actuarial Accrued Liability (UAAL) amortization period** – The amortization period for the System's UAAL should be declining over time.

SCHEDULE F

III. Methods and Assumptions

The actuarial funding method used to develop the benchmarks will be entry age normal. The method used to develop the actuarial value of assets will recognize the underlying market value of the assets by spreading each year's unanticipated investment income (gains and losses) over a five-year smoothing period (20 percent per year), as adopted by the Board of Trustees of the Public Employees' Retirement System of Mississippi (PERS).

The actuarial assumptions used will be those last adopted by the PERS Board based upon the advice and recommendation of the System's actuary. The actuary shall conduct an investigation into the System's experience at least every two years on a rolling four year basis, and utilize the results of the investigation to form the basis for those recommendations.

The PERS Board will have an audit of the System's actuarial valuation results conducted by an independent actuary at least every six years. The purpose of such a review is to provide a critique of the reasonableness of the actuarial methods and assumptions in use and the resulting actuarially computed liabilities and contribution rates.

IV. Funding Policy Review

The funding policy components and triggers will be reviewed annually following the annual actuarial valuation and in conjunction with the annual projection report and will be amended as necessary following each experience investigation conducted by the Board.

SCHEDULE G

GLOSSARY

Actuarial Accrued Liability. The difference between (i) the actuarial present value of future plan benefits, and (ii) the actuarial present value of future normal cost. Sometimes referred to as “accrued liability” or “past service liability”.

Accrued Service. The service credited under the plan which was rendered before the date of the actuarial valuation.

Actuarial Assumptions. Estimates of future plan experience with respect to rates of mortality, disability, turnover, retirement, rate or rates of investment income and salary increases. Decrement assumptions (rates of mortality, disability, turnover and retirement) are generally based on past experience, often modified for projected changes in conditions. Economic assumptions (salary increases and investment income) consist of an underlying rate in an inflation-free environment plus a provision for a long-term average rate of inflation.

Actuarial Cost Method. A mathematical budgeting procedure for allocating the dollar amount of the “actuarial present value of future plan benefits” between the actuarial present value of future normal cost and the actuarial accrued liability. Sometimes referred to as the “actuarial funding method”.

Actuarial Equivalent. A series of payments is called on actuarial equivalent of another series of payments if the two series have the same actuarial present value.

Actuarial Present Value. The amount of funds presently required to provide a payment or series of payments in the future. It is determined by discounting the future payments at a predetermined rate of interest, taking into account the probability of payment.

Amortization. Paying off an interest-bearing liability by means of periodic payments of interest and principal, as opposed to paying it off with a lump sum payment.

Experience Gain (Loss). A measure of the difference between actual experience and that expected based upon a set of actuarial assumptions during the period between two actuarial valuation dates, in accordance with the actuarial cost method being used.

Normal Cost. The annual cost assigned, under the actuarial funding method, to current and subsequent plan years. Sometimes referred to as “current service cost”. Any payment toward the unfunded actuarial accrued liability is not part of the normal cost.

Reserve Account. An account used to indicate that funds have been set aside for a specific purpose and are not generally available for other uses.

Unfunded Actuarial Accrued Liability. The difference between the actuarial accrued liability and valuation assets.

Valuation Assets. The value of current plan assets recognized for valuation purposes. Generally based on book value plus a portion of unrealized appreciation or depreciation.