

*Distance Changed the Game Plan but not the Goal.*



Missouri State Employees' Retirement System  
*A Pension Trust Fund of the State of Missouri*

Schedules of GASB 68 Pension Information  
for Participating Employers  
*Fiscal Year Ended June 30, 2020*





## Independent Auditor's Report

To the Board of Trustees  
Missouri State Employees' Retirement System  
Jefferson City, Missouri

### Report on Schedule of Allocations and Net Pension Amounts by Employer

We have audited the accompanying schedules of employer allocations of the Missouri State Employees' Plan and Missouri Judicial Plan, pension trust funds administered by the Missouri State Employees' Retirement System, collectively the System as of and for the year ended June 30, 2020, and related notes. We have also audited the totals for the columns titled net pension liability, total deferred outflows of resources, total deferred inflow of resources, discount rate sensitivity and plan pension expense (specified column totals) included in the accompanying schedule of pension amounts by employer (collectively the Schedules) of the System as of and for the year ended June 30, 2020, and related notes.

### Management's Responsibility for the Schedules

Management is responsible for the preparation and fair presentation of the Schedules in accordance with accounting principles generally accepted in the United States of America; this includes design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of the Schedules that is free from material misstatement, whether due to fraud or error.

### Auditor's Responsibility

Our responsibility is to express opinions on the schedule of employer allocations and specified column totals included in the schedule of pension amounts by employer based on our audit. We conducted our audit in accordance with auditing standards generally accepted in the United States of America. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the schedule of employer allocations and specified column totals included in the schedule of pension amounts by employer are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the schedule of employer allocations and specified column totals included in the schedule of pension amounts by employer. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the schedule of employer allocations and specified column totals included in the schedule of pension amounts by employer, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the System's preparation and fair presentation of the schedule of employer allocations and specified column totals included in the schedule of pension amounts by employer in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the System's internal control. Accordingly, we express no such opinion. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluating the overall presentation of the schedule of employer allocations and specified column totals included in the schedule of pension amounts by employer.

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# Independent Auditor's Report

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We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinions.

## Opinions

In our opinion, the Schedules referred to above present fairly, in all material respects, the employer allocations and net pension liability, total deferred outflows of resources, total deferred inflow of resources, discount rate sensitivity, and plan pension expense for the total of all participating entities for the System as of and for the year ended June 30, 2020, in accordance with accounting principles generally accepted in the United States of America.

## Other Matters

We have audited, in accordance with auditing standards generally accepted in the United States of America, the financial statements of the System as of and for the year ended June 30, 2020, and our report thereon, dated October 16, 2020, expressed an unmodified opinion on those financial statements.

## Other Information

Our audit was conducted for the purpose of forming opinions on the Schedules of the System. The Schedule of Net Deferred Outflows and Inflows of Resources by Employer to be Recognized as Pension Expense – MSEP and Judicial Plan and the Schedule of Employer Covered Payroll – MSEP and Judicial Plan are presented for purposes of additional analysis and are not a required part of the financial statements.

The Schedule of Net Deferred Outflows and Inflows of Resources by Employer to be Recognized as Pension Expense – MSEP and Judicial Plan are the responsibility of management and were derived from and relate directly to the underlying accounting and other records used to prepare the Schedules. Such information has been subjected to the auditing procedures applied in the audit of the Schedules and certain additional procedures, including comparing and reconciling such information directly to the underlying accounting and other records used to prepare the Schedules, and other additional procedures in accordance with auditing standards generally accepted in the United States of America. In our opinion, the Schedule of Net Deferred Outflows and Inflows of Resources by Employer to be Recognized as Pension Expense – MSEP and Judicial Plan are fairly stated, in all material respects, in relation to the Schedules as a whole.

The Schedules of Employer Covered Payroll – MSEP and Judicial Plan have not been subjected to the auditing procedures applied in the audit of the Schedules and, accordingly, we do not express an opinion or provide any assurance on them.

## Restriction on Use

Our report is intended solely for the information and use of the System's management, the Board of Trustee, System's employers and their auditors and is not intended to be and should not be used by anyone other than these specified parties.



Boise, Idaho  
January 27, 2021

# Schedule of Employer Allocations

## Schedule of Employer Allocations - MSEP

As of and for the year ended June 30, 2020

	<b>Employer Contributions</b>	<b>Employer Allocated Proportion</b>
State of Missouri	\$ 362,327,948	83.29530 %
Environmental Improvement & Energy Resource Authority	49,538	0.01139 %
Harris Stowe State University	2,042,747	0.46961 %
Lincoln University	3,238,258	0.74444 %
Missouri Agriculture & Small Business Development Authority	42,403	0.00975 %
Missouri Consolidated Health Care Plan (MCHCP)	622,331	0.14307 %
Missouri Development Finance Board	116,712	0.02683 %
Missouri Housing Development Commission	1,215,666	0.27947 %
Missouri Public Entity Risk Management Fund	145,913	0.03354 %
Missouri Southern State University	4,305,559	0.98980 %
Missouri State University	21,455,055	4.93229 %
Missouri Technology Corporation	18,914	0.00435 %
Missouri Western State University	4,135,387	0.95068 %
Missouri Wine and Grape Board	59,784	0.01374 %
Northwest Missouri State University	6,882,459	1.58220 %
Southeast Missouri State University	9,055,206	2.08169 %
State Technical College of Missouri	2,036,096	0.46808 %
Truman State University	6,528,844	1.50091 %
University of Central Missouri	10,713,231	2.46286 %
Total	\$ 434,992,051	100.00000 %

# Schedule of Employer Allocations

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## Schedule of Employer Allocations - Judicial Plan

As of and for the year ended June 30, 2020

	<b>Employer Contributions</b>	<b>Employer Allocated Proportion</b>
State of Missouri	\$ 39,122,514	100.00000 %
Total	<u>\$ 39,122,514</u>	<u>100.00000 %</u>

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# Schedule of Pension Amounts by Employer

## Schedule of Pension Amounts by Employer - MSEP

As of and for the year ended June 30, 2020

	June 30, 2020 Net Pension Liability (NPL)	Discount Rate Sensitivity			Pension Expense		
		1% Decrease (5.95%)	Current Discount Rate (6.95%)	1% Increase (7.95%)	Proportionate Share of Pension Plan Expense	Net Recognition of Deferred Amounts	Total Employer Pension Expense
State of Missouri	\$ 5,287,234,496	\$6,620,374,312	\$5,287,234,496	\$4,165,960,014	\$787,178,276	\$16,211,300	\$803,389,576
Environmental Improvement & Energy Resource Authority	722,862	905,127	722,862	569,563	107,622	-75,993	31,629
Harris Stowe State University	29,808,609	37,324,645	29,808,609	23,487,037	4,437,989	995,606	5,433,595
Lincoln University	47,253,976	59,168,741	47,253,976	37,232,730	7,035,304	-857,929	6,177,375
Missouri Agriculture & Small Business Development Authority	618,762	774,779	618,762	487,540	92,123	-6,073	86,050
Missouri Consolidated Health Care Plan (MCHCP)	9,081,290	11,371,075	9,081,290	7,155,402	1,352,048	-169,293	1,182,755
Missouri Development Finance Board	1,703,119	2,132,548	1,703,119	1,341,935	253,565	28,061	281,626
Missouri Housing Development Commission	17,739,514	22,212,410	17,739,514	13,977,459	2,641,108	-471,517	2,169,591
Missouri Public Entity Risk Management Fund	2,129,232	2,666,103	2,129,232	1,677,681	317,006	13,450	330,456
Missouri Southern State University	62,828,458	78,670,221	62,828,458	49,504,300	9,354,077	-919,072	8,435,005
Missouri State University	313,080,782	392,021,948	313,080,782	246,685,109	46,612,343	-1,177,373	45,434,970
Missouri Technology Corporation	275,993	345,582	275,993	217,462	41,091	-89,061	-47,970
Missouri Western State University	60,345,221	75,560,854	60,345,221	47,547,689	8,984,366	-1,975,415	7,008,951
Missouri Wine and Grape Board	872,411	1,092,384	872,411	687,397	129,887	6,789	136,676
Northwest Missouri State University	100,431,575	125,754,706	100,431,575	79,132,848	14,952,534	630,901	15,583,435
Southeast Missouri State University	132,137,221	165,454,713	132,137,221	104,114,614	19,672,959	-4,967,467	14,705,492
State Technical College of Missouri	29,711,554	37,203,118	29,711,554	23,410,565	4,423,539	334,149	4,757,688
Truman State University	95,271,502	119,293,556	95,271,502	75,067,082	14,184,288	-2,513,238	11,671,050
University of Central Missouri	156,331,778	195,749,760	156,331,778	123,178,182	23,275,113	-4,997,825	18,277,288
<b>Total MSEP</b>	<b>\$ 6,347,578,355</b>	<b>\$ 7,948,076,582</b>	<b>\$ 6,347,578,355</b>	<b>\$ 5,001,434,609</b>	<b>\$ 945,045,238</b>	<b>\$ 0</b>	<b>\$ 945,045,238</b>

# Schedule of Pension Amounts by Employer

## Schedule of Pension Amounts by Employer - MSEP (Continued)

As of and for the year ended June 30, 2020

	Deferred Outflows					Deferred Inflows				
	Differences Between Expected and Actual Experience	Net Difference Between Projected and Actual Earnings on Pension Plan Investments	Changes of Assumptions	Changes in Proportion	Total Deferred Outflows of Resources	Differences Between Expected and Actual Experience	Net Difference Between Projected and Actual Earnings on Pension Plan Investments	Changes of Assumptions	Changes in Proportion	Total Deferred Inflows of Resources
State of Missouri	\$ 2,394,428	\$280,702,334	\$ 139,746,735	\$17,908,869	\$440,752,366	\$54,916,956	\$ 0	\$ 0	\$ 0	\$54,916,956
Environmental Improvement & Energy Resource Authority	327	38,377	19,106	141,800	199,610	7,508	0	0	163,600	171,108
Harris Stowe State University	13,499	1,582,556	787,870	1,237,674	3,621,599	309,613	0	0	0	309,613
Lincoln University	21,400	2,508,741	1,248,968	77,127	3,856,236	490,813	0	0	594,280	1,085,093
Missouri Agriculture & Small Business Development Authority	280	32,850	16,354	24,955	74,439	6,427	0	0	2,709	9,136
Missouri Consolidated Health Care Plan (MCHCP)	4,113	482,131	240,027	0	726,271	94,325	0	0	231,137	325,462
Missouri Development Finance Board	771	90,420	45,015	31,699	167,905	17,690	0	0	0	17,690
Missouri Housing Development Commission	8,034	941,801	468,873	0	1,418,708	184,255	0	0	578,539	762,794
Missouri Public Entity Risk Management Fund	964	113,042	56,278	82,122	252,406	22,116	0	0	18,345	40,461
Missouri Southern State University	28,453	3,335,599	1,660,617	197,524	5,222,193	652,581	0	0	728,347	1,380,928
Missouri State University	141,785	16,621,640	8,275,029	0	25,038,454	3,251,878	0	0	1,640,259	4,892,137
Missouri Technology Corporation	125	14,653	7,295	6,699	28,772	2,867	0	0	171,343	174,210
Missouri Western State University	27,329	3,203,763	1,594,983	0	4,826,075	626,788	0	0	4,059,457	4,686,245
Missouri Wine and Grape Board	395	46,317	23,059	9,373	79,144	9,061	0	0	8,635	17,696
Northwest Missouri State University	45,482	5,331,970	2,654,504	2,092,335	10,124,291	1,043,153	0	0	395,210	1,438,363
Southeast Missouri State University	59,841	7,015,241	3,492,515	0	10,567,597	1,372,471	0	0	5,703,102	7,075,573
State Technical College of Missouri	13,455	1,577,404	785,305	439,895	2,816,059	308,605	0	0	93,125	401,730
Truman State University	43,146	5,058,019	2,518,118	0	7,619,283	989,557	0	0	3,790,116	4,779,673
University of Central Missouri	70,798	8,299,744	4,132,001	1,821,859	14,324,402	1,623,772	0	0	5,893,727	7,517,499
<b>Total MSEP</b>	<b>\$ 2,874,625</b>	<b>\$336,996,602</b>	<b>\$ 167,772,652</b>	<b>\$24,071,931</b>	<b>\$531,715,810</b>	<b>\$65,930,436</b>	<b>\$ 0</b>	<b>\$ 0</b>	<b>\$24,071,931</b>	<b>\$90,002,367</b>

# Schedule of Pension Amounts by Employer

## Schedule of Pension Amounts by Employer - Judicial Plan

As of and for the year ended June 30, 2020

	June 30, 2020 Net Pension Liability (NPL)	Discount Rate Sensitivity			Pension Expense		
		1% Decrease (5.95%)	Current Discount Rate (6.95%)	1% Increase (7.95%)	Pension Plan Expense	Net Recognition of Deferred Amounts	Total Employer Pension Expense
State of Missouri	\$ 457,558,945	\$ 520,117,555	\$ 457,558,945	\$ 403,982,082	\$ 41,628,963	\$ 7,811,509	\$ 49,440,472
Total Judicial Plan	<u>\$ 457,558,945</u>	<u>\$ 520,117,555</u>	<u>\$ 457,558,945</u>	<u>\$ 403,982,082</u>	<u>\$ 41,628,963</u>	<u>\$ 7,811,509</u>	<u>\$ 49,440,472</u>



# Schedule of Pension Amounts by Employer

## Schedule of Pension Amounts by Employer - Judicial Plan (Continued)

As of and for the year ended June 30, 2020

	Deferred Outflows					Deferred Inflows				
	Differences Between Expected and Actual Experience	Net Difference Between Projected and Actual Earnings on Pension Plan Investments	Changes of Assumptions	Changes in Proportion	Total Deferred Outflows of Resources	Differences Between Expected and Actual Experience	Net Difference Between Projected and Actual Earnings on Pension Plan Investments	Changes of Assumptions	Changes in Proportion	Total Deferred Inflows of Resources
State of Missouri	\$ 484,748	\$ 6,367,050	\$ 10,163,744	\$ 0	\$17,015,542	\$11,656,300	\$ 0	\$ 0	\$ 0	\$11,656,300
Total Judicial Plan	\$ 484,748	\$ 6,367,050	\$ 10,163,744	\$ 0	\$17,015,542	\$11,656,300	\$ 0	\$ 0	\$ 0	\$11,656,300

### Note 1 - Plan Descriptions

The Missouri State Employees' Retirement System (MOSERS or the System) consists of two plans: the Missouri State Employees' Plan (MSEP) and the Judicial Plan.

The MSEP is a multiple-employer, defined benefit public employee retirement plan with two benefit structures known as the MSEP (closed plan) and MSEP 2000, which are administered by MOSERS in accordance with Sections 104.010 and 104.312 to 104.1215 of the Revised Statutes of Missouri (RSMo). As established under Section 104.320, RSMo, MOSERS is a body corporate and an instrumentality of the state. In the system are vested the powers and duties specified in Sections 104.010 and 104.312 to 104.1215, RSMo and such other powers as may be necessary or proper to enable it, its officers, employees, and agents to carryout fully and effectively all the purposes of Sections 104.010 and 104.312 to 104.1215, RSMo. Responsibility for the operation and administration of the System is vested in the 11-member MOSERS Board of Trustees as defined by state law. Due to the nature of MOSERS' reliance on funding from the state of Missouri and other state government agencies and the overall control of the plan document by the legislative and executive branches of state government, the MSEP is considered a component unit of the state of Missouri financial reporting entity and is included in the state's financial reports as a pension trust fund.

Generally, all full-time state employees hired before July 2000, who were not covered under another state sponsored retirement plan, are eligible for membership in the MSEP (closed plan). Full-time state employees hired after July 2000, and before January 2011, are eligible for membership in the MSEP 2000. Employees hired for the first time on or after January 2011 are eligible for membership in the MSEP 2011 tier of the MSEP 2000. MOSERS participates as an employer in the MSEP and MSEP 2000. The MSEP provides retirement, survivor, and disability benefits.

The Judicial Plan is a single-employer, public employee retirement plan administered in accordance with Sections 476.445 to 476.690, RSMo. Responsibility for the operation and administration of the Judicial Plan is vested in the MOSERS Board of Trustees. Due to the nature of MOSERS' reliance on funding from the state of Missouri and the overall control of the plan document by the legislative and executive branches of state government, the Judicial Plan is considered a component unit of the state of Missouri financial reporting entity and is included in the state's financial reports as a pension trust fund. Judges and commissioners of the supreme court or the court of appeals, judges of the circuit court, probate court, magistrate court, court of common pleas, court of criminal corrections, justices of the peace, or commissioners or deputy commissioners of the circuit court appointed after February 29, 1972, commissioners of the juvenile division of the circuit court appointed pursuant to Section 11.023, RSMo, commissioners of the drug court pursuant to Section 478.466, RSMo, or commissioners of the family court are eligible for membership in the Judicial Plan. The Judicial Plan provides retirement, survivor, and disability benefits. Members are immediately vested.

Further information related to required contributions, pension benefits, other plan terms, and investments and related return and financial information related to MOSERS is available as described in Note 5.

## Notes to Schedules

Participating employers in the MSEP, for which amounts are allocated in the schedules include the state of Missouri, component units of the state of Missouri, and related organizations excluded from the state of Missouri's reporting entity. The state of Missouri is the only participating employer in the Judicial Plan.

The employer contribution rate for pension plans for the year ended June 30, 2020 were as follows:

### Exhibit 1: Employer Contribution Rate for Pension Plans

	MSEP	Judicial Plan
Rate as percentage of payroll	21.77 %	63.80 %

### Note 2 – Condensed Summary of Significant Accounting Policies

MOSERS employers are required to report pension information in their financial statements in accordance with Governmental Accounting Standards. The Schedules of Employer Allocations and Schedules of Pension Amounts by Employer provide employers with the required information for financial reporting under that standard.

The underlying financial information used to prepare the pension allocation schedules is based on MOSERS' financial statements and its accounting and payroll reporting systems. The financial statements of both MSEP and the Judicial Plan were prepared using the accrual basis of accounting and in accordance with U.S. generally accepted accounting principles.

Member and employer contributions are recognized when due, pursuant to formal commitments and statutory requirements. Benefits and refunds of employee contributions are recognized when due and payable in accordance with the statutes governing MOSERS. Expenses are recognized when the liability is incurred, regardless of when payment is made. Investments are reported at fair value on a trade date basis.

Total employer contributions due for the fiscal year are generally used as the basis for determining each employer's proportionate share of the collective pension amounts reported on the schedules. However, the System is excluded from all allocations. As a result, contributions totaling \$1,632,819 related to the System's members were excluded from the Schedules of Employer Allocations.

The net pension liability is based on each plan's fiduciary net position as reported in its financial statements and the estimated total pension liability estimated by MOSERS' actuary as of each fiscal year-end. It is allocated based on each employer's proportionate share of contributions.

## Notes to Schedules

Deferred inflows and outflows, except for the change in proportion, are allocated based on each employer's proportionate share of contributions for the fiscal year. The difference between expected and actual investment earnings on pension plan investments is amortized as a component of pension expense over 5- years on a straight-line basis while the differences between expected and actual experience and changes in assumptions are amortized as a component of pension expense over the expected average remaining service lifetime (EARSL) of all participants. Deferred inflows and outflows related to the change in proportion used for allocation purposes from one fiscal year to the next are estimated by reallocating beginning balances using the ending allocation percentage and amortizing the difference over the EARSL as a component of pension expense. The remaining unamortized deferred inflows and outflows are reported in the Schedule of Pension Amounts by Employer. Each year's layer of deferred inflows and outflows retains its original calculated EARSL.

Pension expense is based on the service cost earned by participants during the fiscal year, interest on the total pension liability, certain changes in plan fiduciary net position, and the current year amortization of deferred inflows and outflows. It is allocated based on each employer's proportionate share of collective plan amounts and its specific amortization of change in proportion deferred item.

The preparation of these schedules in conformity with U.S. generally accepted accounting principles requires management to make significant estimates and assumptions that affect the reported amounts during the reporting period. Actual results could differ from those estimates.

### Note 3 – Actuarial Assumptions, Methods and Net Pension Liability

#### Net Pension Liability of Employers

The components of the net pension liability as of June 30, 2020 were as follows:

#### Exhibit 2: Net Pension Liability of Employers

	MSEP	Judicial Plan
Total pension liability	\$ 14,258,408,888	\$ 624,847,011
MOSERS' fiduciary net position	7,910,830,533	167,288,066
Employers' net pension liability	<u>\$ 6,347,578,355</u>	<u>\$ 457,558,945</u>
Plan net position as a percentage of the total pension liability	55.48 %	26.77 %
Employers' covered payroll *	\$ 1,998,090,522	\$ 61,320,560
Employers' net pension liability as a percentage of covered payroll *	317.68 %	746.18 %

\*Amounts reported as *Covered payroll*, and *Net pension liability as a percentage of covered payroll* in these *GASB 68 Employer Schedules* differ from amounts reported in MOSERS' annual actuarial valuation and *Comprehensive Annual Financial Report (CAFR)*. MOSERS internal payroll costs are included in the covered payroll figures reported in the annual actuarial valuation and *CAFR*, but are excluded from amounts reported in these GASB 68 schedules because net pension liability must be allocated among the participating employers, and not the System for the purposes of GASB Statement 68. In addition, the covered payroll figures reported in annual actuarial valuation and the *CAFR* include estimates for June payroll amounts to facilitate a timely completion of those reports, but amounts reported in these *GASB 68 Employer Schedules* are based on actual amounts.

## Notes to Schedules

An actuarial valuation of an ongoing plan involves estimates of the reported amounts and assumptions about the probability of occurrence of events far into the future. Examples include assumptions about future employment, mortality, and future salary increases. Amounts determined regarding the net pension liability are subject to continual revision as actual results are compared with past expectations and new estimates are made about the future. The Schedule of Changes in Employers' Net Pension Liability, which can be found in MOSERS CAFR, presents multi-year trend information about whether the plan fiduciary net positions are increasing or decreasing over time relative to the total pension liability. The total pension liability, as of June 30, 2020, is \$14,258,408,888 for MSEP and \$624,847,011 for the Judicial Plan based on an actuarial valuation performed as of June 30, 2020, and a measurement date of June 30, 2020, using generally accepted actuarial procedures.

### Actuarial Assumptions Used to Determine Net Pension Liability

In July 2018, the Board made several changes to actuarial methods and assumptions based upon a review of actuarial methods and economic assumptions performed by its outside actuarial consultant. Based upon this study, the Board voted to reduce the investment return assumption to 7.25% with a 2.50% inflation assumption, effective June 30, 2018; then to 7.10% with a 2.35% inflation assumption, effective June 30, 2019; and then to 6.95% with a 2.25% inflation assumption, effective June 30, 2020, and thereafter.

### Exhibit 3: Summary of Actuarial Assumptions for the MSEP & the Judicial Plan Used to Determine Net Pension Liability

	<b>Assumption</b>
Valuation date	June 30, 2020
Actuarial cost method	Entry age normal
Amortization period	30 years*
Asset valuation method	Market value
Investment rate of return	6.95 %
Projected salary increases	2.75 - 8.25% (MSEP) 2.50 - 4.70% (Judicial Plan)
Rate of payroll growth	2.25 %
COLAs	4.00%/1.80%**
Price inflation	2.25 %

Mortality rates are based on the RP-2014 Healthy Annuitant mortality table, projected from 2006 to 2026 with Scale MP-2015 and scaled by 120% for the MSEP and 98% for the Judicial Plan. The preretirement mortality table used was the RP-2014 Employee mortality table, projected from 2006 to 2026 with Scale MP-2015 and scaled by 95% for males and 90% for females for the MSEP.

An experience study covering the five-year period ended June 30, 2015, was performed in 2016.

\* Layered bases with the Legacy Base amortized over a 30-year period beginning June 30, 2018. All subsequent bases are amortized over a new 30-year period.

\*\* 4.00% compounded annually, when a minimum COLA of 4.00% is in effect. 1.80% compounded annually, when no minimum COLA is in effect (80% of price inflation).

## Discount Rate

The discount rate used to measure the total pension liability was 6.95%. The projection of cash flows used to determine the discount rate assumed that contributions from participating employers will be made using the actuarially determined rates. Based on those assumptions, MOSERS' fiduciary net position was projected to be available to make all the projected future benefit payments of the current plan members. As a result, the long-term expected rate of return on pension plan investments of 6.95% was applied to all periods of projected benefit payments to determine the total pension liability.

The table below presents the net pension liability of the plans, as of June 30, 2020, calculated using the discount rate of 6.95%, as well as what the net pension liability would be if it were calculated using a discount rate that is 1% lower (5.95%) or 1% higher (7.95%) than the current rate.

### Exhibit 4: Discount Rate Sensitivity

Employers' Net Pension Liability	1% Decrease (5.95)%	Current Discount Rate (6.95)%	1% Increase (7.95)%
MSEP	\$ 7,948,076,582	\$ 6,347,578,355	\$ 5,001,434,609
Judicial Plan	\$ 520,117,555	\$ 457,558,945	\$ 403,982,082

The current funding policy, if actuarial assumptions are met, results in the projected plan fiduciary net position being sufficient to pay benefits for all future years. Therefore, the current 6.95% discount rate is considered adequate, and the use of the municipal bond rate calculation is not necessary.

## Long-Term Expected Rate of Return

The long-term expected rate of return on pension plan investments was determined using a building-block method in which best-estimate rates of expected future rates of return (expected returns, net of pension plan investment expense and inflation) are developed for each major asset class. These ranges are combined to produce the long-term expected rate of return by weighting the expected future rates of return by the target asset allocation percentage and by adjusting for expected inflation, volatility and correlations. Best estimates of the real rates of return expected for both the old and new portfolio are summarized by asset class in the tables below.

## Notes to Schedules

### Exhibit 5: Long-Term Expected Rate of Return - Old Portfolio

Asset Class	Policy Allocation	Long-Term Expected Nominal Return*	Long-Term Expected Real Return	Weighted Average Long-Term Expected Nominal Return
Opportunistic global equities	38.0 %	8.3 %	5.8 %	3.1 %
Nominal bonds	44.0	3.3	0.8	1.5
Commodities	20.0	7.8	5.3	1.6
Inflation-protected bonds	39.0	2.4	(0.1)	0.9
Alternative beta	31.0	6.6	4.1	2.0
Cash and cash equivalents**	(72.0)	1.0	(1.5)	(0.7)
	<u>100 %</u>			
			Correlation/Volatility Adjustment	(0.7)
			Long-Term Expected Net Nominal Return	<u>7.7 %</u>
			Less : Investment Inflation Assumption	(2.5)%
			Long-Term Expected Geometric Net Real Return	<u><u>5.2 %</u></u>

\* Long-term expected arithmetic returns of the asset classes at the time of the asset allocation study for each portfolio.

\*\* Cash and cash equivalents policy allocation amounts are negative due to use of leverage.

### Exhibit 6: Long-Term Expected Rate of Return - New Portfolio

Asset Class	Policy Allocation	Long-Term Expected Nominal Return*	Long-Term Expected Real Return	Weighted Average Long-Term Expected Nominal Return
Global public equities	30.0 %	7.7 %	5.8 %	2.3 %
Global private equities	15.0	9.3	7.4	1.4
Long treasuries	25.0	3.5	1.6	0.9
Core bonds	10.0	3.1	1.2	0.3
Commodities	5.0	5.5	3.6	0.3
TIPS	25.0	2.7	0.8	0.7
Private real assets	5.0	7.1	5.2	0.3
Public real assets	5.0	7.7	5.8	0.4
Hedge funds	5.0	4.8	2.9	0.2
Alternative beta	10.0	5.3	3.4	0.5
Private credit	5.0	9.5	7.6	0.5
Cash and cash equivalents**	(40.0)	—	(1.9)	—
	<u>100.0 %</u>			
			Correlation/Volatility Adjustment	(0.6)
			Long-Term Expected Net Nominal Return	<u>7.2</u>
			Less : Investment Inflation Assumption	(1.9)
			Long-Term Expected Geometric Net Real Return	<u><u>5.3 %</u></u>

\* Long-term expected arithmetic returns of the asset classes at the time of the asset allocation study for each portfolio.

\*\* Cash and cash equivalents policy allocation amounts are negative due to use of leverage.

# Notes to Schedules

## Note 4 – Basis for Allocation

The employers' proportionate share, reported in the Schedules of Employer Allocations, is calculated using accrued retirement contributions as of June 30, 2020. Adjustments have been made for employer contributions received that do not reflect an employer's projected long-term contribution effort. As a result, the total employer contribution amounts reported in the Schedule of Employer Allocations do not agree with the total employer contribution amounts reported on the Combined Statements of Changes in Fiduciary Net Position in MOSERS' June 30, 2020 CAFR.

### Exhibit 7: Reconciliation of Employer Contributions

	<b>MSEP</b>	<b>Judicial Plan</b>
Employer Contributions reported in MOSERS' Statement of Changes of Fiduciary Net Position for the Year ended June 30, 2020	\$ 436,895,653	\$ 39,174,515
Adjustments for contributions related to past and future periods	(270,783)	(52,001)
Deduct MOSERS contributions not included in the allocation	(1,632,819)	—
Total employer contributions used as the basis for allocating employer's proportionate share of collective pension amounts.	<u>\$ 434,992,051</u>	<u>\$ 39,122,514</u>

The difference in contributions, as reported on the June 30, 2020 Schedule of Employer Allocations, and the total employer contributions as reported on the Combined Statements of Changes in Fiduciary Net Position in MOSERS' June 30, 2020 CAFR, is a difference between employer contributions and proportionate share of contributions, which is allocated proportionately to employers on the Schedules of Pension Amounts by Employer, based on the calculated allocation percentage. That amount is deferred and recognized over the average of the expected remaining service lives of active and inactive members.

## Note 5 – Changes in Benefit Terms and Assumptions

There were no changes in benefit terms during the fiscal year ended June 30, 2020.

Below is a summary of the changes in assumptions since the prior year:

- The investment return assumption was lowered from 7.10% to 6.95%.
- The inflation assumption was lowered from 2.35% to 2.25%.
- The payroll growth assumption was lowered from 2.35% to 2.25%
- The wage growth assumption was lowered from 2.60% to 2.50%.
- The cost-of-living-adjustment (COLA) assumption was lowered from 1.88% to 1.80% when no minimum COLA is in effect (80% of price inflation)



### Note 6 – Additional Financial and Actuarial Information

Additional financial and actuarial information supporting the preparation of the Schedules of Employer Allocations and Schedules of Pension Amounts by Employer is included in the Systems' CAFR for the year ended June 30, 2020. The CAFR can be obtained at [www.mosers.org](http://www.mosers.org).

## Supplementary Information

### Schedule of Net Deferred Outflows and Inflows of Resources by Employer to be Recognized in Pension Expense - MSEP

As of June 30, 2020

	2021	2022	2023	2024	2025	Total
State of Missouri	\$ 201,184,518	\$ 91,828,107	\$ 68,265,562	\$ 24,557,226	\$ —	\$ 385,835,413
Environmental Improvement & Energy Resource Authority	(38,562)	48,692	15,015	3,357	—	28,502
Harris Stowe State University	1,823,014	935,285	415,238	138,450	—	3,311,987
Lincoln University	1,218,405	730,836	602,425	219,477	—	2,771,143
Missouri Agriculture & Small Business Development Authority	35,811	18,240	8,379	2,874	—	65,304
Missouri Consolidated Health Care Plan (MCHCP)	190,186	58,647	109,797	42,179	—	400,809
Missouri Development Finance Board	79,807	39,775	22,724	7,910	—	150,216
Missouri Housing Development Commission	237,124	118,905	217,491	82,393	—	655,913
Missouri Public Entity Risk Management Fund	110,104	62,967	28,984	9,889	—	211,944
Missouri Southern State University	1,873,062	884,406	791,983	291,815	—	3,841,266
Missouri State University	10,143,085	4,565,273	3,983,815	1,454,143	—	20,146,316
Missouri Technology Corporation	(83,695)	(61,993)	(1,031)	1,282	—	(145,437)
Missouri Western State University	146,533	(906,388)	619,403	280,281	—	139,829
Missouri Wine and Grape Board	34,107	12,133	11,155	4,052	—	61,447
Northwest Missouri State University	4,306,025	2,553,186	1,360,250	466,467	—	8,685,928
Southeast Missouri State University	453,567	783,726	1,641,003	613,728	—	3,492,024
State Technical College of Missouri	1,378,591	519,273	378,466	137,999	—	2,414,329
Truman State University	1,243,875	50,645	1,102,588	442,500	—	2,839,608
University of Central Missouri	1,477,576	2,518,674	2,084,549	726,103	—	6,806,902
<b>Total</b>	<b>\$ 225,813,133</b>	<b>\$ 104,760,389</b>	<b>\$ 81,657,796</b>	<b>\$ 29,482,125</b>	<b>\$ —</b>	<b>\$ 441,713,443</b>

## Supplementary Information

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### Schedule of Net Deferred Outflows and Inflows of Resources by Employer to be Recognized in Pension Expense - Judicial Plan

As of June 30, 2020

	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>	<b>Total</b>
State of Missouri	\$ 4,600,893	\$ 941,895	\$ (458,550)	\$ 275,004	\$ -	\$ 5,359,242
Total	<u>\$ 4,600,893</u>	<u>\$ 941,895</u>	<u>\$ (458,550)</u>	<u>\$ 275,004</u>	<u>\$ -</u>	<u>\$ 5,359,242</u>

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## Schedule of Employer Covered Payroll - MSEP

As of and for the year ended June 30, 2020 (Unaudited)

	<b>Employer Covered Payroll</b>
State of Missouri	\$ 1,664,308,880
Environmental Improvement & Energy Resource Authority	227,554
Harris Stowe State University	9,383,314
Lincoln University	14,874,862
Missouri Agriculture & Small Business Development Authority	194,776
Missouri Consolidated Health Care Plan (MCHCP)	2,858,662
Missouri Development Finance Board	536,115
Missouri Housing Development Commission	5,584,137
Missouri Public Entity Risk Management Fund	670,247
Missouri Southern State University	19,777,488
Missouri State University	98,553,678
Missouri Technology Corporation	86,881
Missouri Western State University	18,995,809
Missouri Wine and Grape Board	274,616
Northwest Missouri State University	31,614,813
Southeast Missouri State University	41,594,888
State Technical College of Missouri	9,352,759
Truman State University	29,990,097
University of Central Missouri	49,210,946
Total	<u>\$ 1,998,090,522</u>

## Schedule of Employer Covered Payroll - Judicial Plan

As of and for the year ended June 30, 2020 (Unaudited)

	<b>Employer Covered Payroll</b>
State of Missouri	\$ 61,320,560
Total	<u>\$ 61,320,560</u>

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# Notes to Supplementary Information

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## Note 1. Recognition Period

The recognition period of the changes in proportion and differences between employer contributions and proportionate share of contributions, as well as the difference between expected and actual experience, and changes in assumptions are recognized over the average expected remaining service lives of active and inactive members. The difference between projected and actual investment earnings is recognized over 5 years. Plan amendments are recognized immediately.

The average expected remaining services lives of active and inactive members were as follows:

### Exhibit 8: Average Expected Remaining Service Lives

<b>Average Expected Remaining Service Lives as of Fiscal Year end June 30,</b>	<b>MSEP</b>	<b>Judicial Plan</b>
2020	3.0840	4.1680
2019	3.2630	3.9620
2018	3.5520	3.9040
2017	3.6500	3.8210
2016	3.7860	3.8190

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