ARIZONA PUBLIC SAFETY PERSONNEL RETIREMENT SYSTEM

MESA FIRE DEPT. (017)

ACTUARIAL VALUATION
AS OF JUNE 30, 2021

CONTRIBUTIONS APPLICABLE TO THE
PLAN/FISCAL YEAR ENDING JUNE 30, 2023

FOSTER & FOSTER
ACTUARIES AND CONSULTANTS

December 2021

Board of Trustees
Arizona Public Safety Personnel Retirement System
Phoenix, AZ

Re: Actuarial Valuation Report as of June 30, 2021 for Mesa Fire Dept. (017)

Dear Members of the Board:

We are pleased to present to the Board this report of the annual actuarial valuation of the Arizona Public Safety Personnel Retirement System (PSPRS). The valuation was performed to determine whether the assets and contributions are sufficient to provide the prescribed benefits and to develop the appropriate funding requirements for the applicable plan year.

This report was prepared at the request of the Board and is intended for use by PSPRS and those designated or approved by the Board. It documents the valuation of the consolidated plan and provides summary information for PSPRS participating employers. This report may be provided to parties other than PSPRS only in its entirety and only with the permission of the Board. Foster & Foster is not responsible for the unauthorized use of this report.

The valuation has been conducted in accordance with generally accepted actuarial principles and practices, including the applicable Actuarial Standards of Practice as issued by the Actuarial Standards Board, and reflects laws and regulations issued to date pursuant to the provisions of Title 38, Chapter 5, Article 4 of the Arizona Revised Statutes, as well as applicable federal laws and regulations. In our opinion, the assumptions used in this valuation, as adopted by the Board of Trustees, represent reasonable expectations of anticipated plan experience. Future actuarial measurements may differ significantly from the current measurements presented in this report for a variety of reasons including changes in applicable laws, changes in plan provisions, changes in assumptions, or plan experience differing from expectations. Due to the limited scope of the valuation, we did not perform an analysis of the potential range of such future measurements.

The computed contribution rates shown in the "Contribution Results" section should be considered minimum contribution rates that comply with the Board's funding policy and Arizona Statutes. Users of this report should be aware that contributions made at that rate do not guarantee benefit security. Given the importance of benefit security to any retirement system, we suggest that contributions to the System in excess of those presented in this report be considered.

The funding percentages and unfunded accrued liability as measured based on the actuarial value of assets will differ from similar measures based on the market value of assets. These measures, as provided, are appropriate for determining the adequacy of future contributions, but may not be appropriate for the purpose of settling a portion or all of the Plan's liabilities.

In conducting the valuation, we have relied on personnel, plan design, and asset information supplied by PSPRS through June 30, 2021 and the actuarial assumptions and methods described in the Actuarial Assumptions section of this report. While we cannot verify the accuracy of all this information, the supplied information was reviewed for consistency and reasonableness. As a result of this review, we have no reason to doubt the substantial accuracy of the information and believe that it has produced appropriate results. This information, along with any adjustments or modifications, is summarized in various sections of this report.

This valuation assumes the continuing ability of the participating employers to make the contributions necessary to fund this plan. A determination regarding whether or not the participating employers are actually able to do so is outside our scope of expertise. Consequently, we did not perform such an analysis.

In performing the analysis, we used third-party software to model (calculate) the underlying liabilities and costs. These results are reviewed in the aggregate and for individual sample lives. The output from the software is either used directly or input into internally developed models to generate the costs. All internally developed models are reviewed as part of the process. As a result of this review, we believe that the models have produced reasonable results. We do not believe there are any material inconsistencies among assumptions or unreasonable output produced due to the aggregation of assumptions.

The undersigned are familiar with the immediate and long-term aspects of pension valuations and meet the Qualification Standards of the American Academy of Actuaries necessary to render the actuarial opinions contained herein. All sections of this report are considered an integral part of the actuarial opinions.

To our knowledge, no associate of Foster & Foster, Inc. working on valuations of the program has any direct financial interest or indirect material interest in the Arizona Public Safety Personnel Retirement System, nor does anyone at Foster & Foster, Inc. act as a member of the Board of Trustees of the Arizona Public Safety Personnel Retirement System. Thus, there is no relationship existing that might affect our capacity to prepare and certify this actuarial report.

If there are any questions, concerns, or comments about any of the items contained in this report, please contact us at 239-433-5500.

Respectfully Submitted,

Foster & Foster, Inc.

By: ______________________________
Bradley R. Heinrichs, FSA, EA, MAAA

By: ______________________________
Paul M. Baugher, FSA, EA, MAAA

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I. SUMMARY OF REPORT

The regular annual actuarial valuation of the Arizona Public Safety Personnel Retirement System for the Mesa Fire Dept., performed as of June 30, 2021, has been completed and the results are presented in this Report. The purpose of this valuation is to:

- Compute the liabilities associated with benefits likely to be paid on behalf of current retired and active members. This information is contained in the section entitled "Liability Support."
- Compare accumulated assets with the liabilities to assess the funded condition. This information is contained in the section entitled "Liability Support."
- Compute the employers' recommended contribution rates for the Fiscal Year beginning July 1, 2022. This information is contained in the section entitled "Contribution Results."

1. Key Valuation Results

The funded status as of June 30, 2021 and the employer contribution amounts applicable to the plan/fiscal year ending June 30, 2023 are as follows:

	Tier 1 & Tier 2 Members			Tier 3 Members *		
	Pension	**Health**	**Total**	**Pension**	**Health**	**Total**
Employer Contribution Rate	57.48%	0.57%	58.05%	9.91%	0.13%	10.04%
Funded Status	50.2%	88.3%	50.9%	106.6%	225.0%	108.3%

2. Comparison of Key Results to Prior Year

The chart below compares the results from this valuation with the results of the prior year's valuation (as of June 30, 2020):

Contribution Rate

	Tier 1 & Tier 2 Members			Tier 3 Members *		
Valuation Date	**Pension**	**Health**	**Total**	**Pension**	**Health**	**Total**
June 30, 2020	55.62%	0.55%	56.17%	10.21%	0.15%	10.36%
June 30, 2021	57.48%	0.57%	58.05%	9.91%	0.13%	10.04%

Funded Status

	Tier 1 & Tier 2 Members			Tier 3 Members		
Valuation Date	**Pension**	**Health**	**Total**	**Pension**	**Health**	**Total**
June 30, 2020	48.5%	90.9%	49.3%	101.1%	202.1%	102.6%
June 30, 2021	50.2%	88.3%	50.9%	106.6%	225.0%	108.3%

** The Tier 3 rates shown are the calculated rates as of the valuation date and do not reflect any Legacy costs that the employer must also contribute.*

3. **Reasons for Change**

Changes in the results from the prior year's valuation can be illustrated in the following tables along with high-level explanations for the entire System below:

Contribution Rate

	Tier 1 & Tier 2		Tier 3 Members	
	Pension	**Health**	**Pension**	**Health**
Contribution Rate Last Valuation	55.62%	0.55%	10.21%	0.15%
Asset Experience	(0.14%)	0.00%	(0.11%)	0.00%
Payroll Base	(0.81%)	0.00%	0.00%	0.00%
Liability Experience	1.36%	0.02%	0.19%	0.00%
Additional Contribution	(0.34%)	0.00%	0.00%	0.00%
Assumption/Method Change	1.93%	0.00%	0.00%	0.00%
Other	(0.14%)	0.00%	(0.38%)	(0.02%)
Contribution Rate This Valuation	57.48%	0.57%	9.91%	0.13%

Funded Status

	Tier 1 & Tier 2		Tier 3 Members	
	Pension	**Health**	**Pension**	**Health**
Funded Status Last Valuation	48.5%	90.9%	101.1%	202.1%
Asset Experience	0.1%	(0.1%)	3.4%	8.3%
Liability Experience	(0.7%)	(0.8%)	(6.2%)	(10.5%)
Additional Contribution	0.4%	0.0%	0.0%	0.0%
Assumption/Method Change	0.0%	0.0%	0.0%	0.0%
Other	1.9%	(1.7%)	8.3%	25.1%
Funded Status This Valuation	50.2%	88.3%	106.6%	225.0%

Assets Experience – Asset gains and losses (relative to the assumed earnings rate) are smoothed over seven years for Tiers 1 and 2 and over five years for Tier 3. The return on the market value of assets for the year ending June 30, 2021 was 26.7% for Tiers 1 and 2 and 32.7% for Tier 3. On a smoothed, actuarial value of assets basis, however, the average return was 7.6% for Tiers 1 and 2 and 11.5% for Tier 3. These returns exceeded the 2020 assumed earnings rate for Tiers 1 and 2 of 7.3% and for Tier 3 of 7.0%.

Payroll Base – Under the current amortization policy for Tiers 1 and 2, the contribution rate is developed as a level percentage of payroll. Payroll for this purpose includes members of this plan and defined contribution plan's members that would have been in this plan. To the extent that actual payroll is lower/greater than last year's projected payroll, the contribution rate will increase/decrease as a result. The payroll decreased compared to expected, resulting in an increase in the contribution rate.

Liability Experience – Experience overall was unfavorable, driven by salary increases that were higher than expected.

Additional Contribution – Monies contributed in excess of the required contribution rate in order to pay down the unfunded liability.

Assumption / Method Change – The payroll growth assumption was decreased from 3.50% to 3.00%.

Other – This is the combination of all other factors that could impact liabilities year-over-year, with the primary sources being changes in benefits for continuing inactives. Note that Tier 3 experience will stabilize as the group matures.

4. Looking Ahead

The volatility in annual returns, which have produced both gains and losses in recent years, was dampened by the asset smoothing reflected in the actuarial value of assets. The significant gain realized this year will, in the absence of other losses, put downward pressure on the contribution rate next year.

If the June 30, 2021 pension valuation results were based on the market value of assets instead of the actuarial value of assets, the pension funded percentage for Tiers 1 and 2 would be 54.9% (instead of 50.2%) and the pension employer contribution requirement would be 52.33% of payroll (instead of 57.48%).

5. Conclusion

The funded status for Tiers 1 and 2 will continue to improve if assumptions are met and contributions at least equal to the rates determined for each employer are made to the fund. The recent adoption of a layered amortization approach along with a plan to systematically lower the payroll growth assumption was an excellent step to improve funding and ensure the Plan is on a viable path.

The funded status for Tier 3 will stabilize as the population continues to grow, as contributions appear sufficient to keep the liabilities fully funded.

II. Contribution Results

Contribution Requirements

Development of Employer Contributions - Tiers 1 & 2 Members				
Valuation Date	June 30, 2021		June 30, 2020	
Applicable to Fiscal Year Ending	2023		2022	
	Rate	**Dollar**	**Rate**	**Dollar**
Pension				
Normal Cost				
Total Normal Cost	22.38%	$ 7,077,276	22.85%	$ 7,337,207
Employee Cost	(7.65%)	(2,419,176)	(7.65%)	(2,456,439)
Employer (Net) Normal Cost	14.73%	4,658,100	15.20%	4,880,768
Amortization of Unfunded Liability	42.75%	13,518,926	40.42%	12,978,990
Total Employer Cost (Pension)	57.48%	18,177,026	55.62%	17,859,758
Health				
Normal Cost	0.36%	113,844	0.39%	125,230
Amortization of Unfunded Liability	0.21%	66,409	0.16%	51,377
Total Employer Cost (Health)	0.57%	180,253	0.55%	176,607
Total Employer Cost (Pension + Health)	**58.05%**	**18,357,279**	**56.17%**	**18,036,365**
Total Minimum Contribution Requirement (if applicable)	0.00%		0.00%	
Alternate Contribution Rate (ACR) *	42.96%		40.58%	
Underlying Payroll (as of valuation date)		30,702,153		31,024,460

** The Alternate Contribution Rate is the sum of the positive amortization rates for Tiers 1 & 2 Pension and Health (subject to an 8% minimum) and is charged when retirees return to active status.*

The results above are shown both prior to and after the application of the statutory minimum contribution requirement of 8% of payroll (5% of payroll if the actual employer contribution is less than 5% for the 2006/2007 Fiscal Year) and are based on the current amortization schedule approved by the Board of Trustees for your individual plan (see "Actuarial Assumptions and Methods").

Development of Employer Contributions – Tier 3 Members		
Valuation Date	June 30, 2021	June 30, 2020
Applicable to Fiscal Year Ending	2023	2022

Defined Benefit (DB) Retirement Plan

	Rate	Dollar	Rate	Dollar
Pension				
Total Normal Cost	19.82%	$ 1,002,328	20.42%	$ 573,837
Amortization of Unfunded Liability	0.00%	0	0.00%	0
Total Pension Cost	19.82%	1,002,328	20.42%	573,837
Employee (EE) Pension Cost	9.91%	501,164	10.21%	286,919
Employer (ER) Pension Cost	9.91%	501,164	10.21%	286,919
Health				
Total Normal Cost	0.26%	13,149	0.30%	8,431
Amortization of Unfunded Liability	0.00%	0	0.00%	0
Total Health Cost	0.26%	13,149	0.30%	8,431
Employee (EE) Health Cost	0.13%	6,575	0.15%	4,216
Employer (ER) Health Cost	0.13%	6,575	0.15%	4,216
Total				
Total Calculated Tier 3 Required EE/ER Individual Cost	10.04%	507,739	10.36%	291,135
Board Approved Tier 3 Required EE/ER Individual Cost [1]	10.84%	548,195	10.84%	304,623
ER Legacy Cost of Tiers 1 & 2 Amort of Unfunded Liabilities [2]	42.96%	2,172,553	40.58%	1,140,368
Total Calculated Tier 3 Required ER Defined Benefit Cost	53.00%	2,680,292	50.94%	1,431,503
Total Board Approved Tier 3 Required ER Defined Benefit Cost	**53.80%**	**2,720,749**	**51.42%**	**1,444,991**
Underlying Payroll (as of valuation date)		4,909,858		2,715,143

[1] *The Board decided to keep Tier 3 rates level (as calculated with the June 30, 2019 valuation) for the fiscal year ending June 30, 2023.*

[2] *Pursuant to ARS § 38-843(B), the amortization of positive unfunded liabilities for Tiers 1 & 2 shall be applied to all Tier 3 payroll on a level percent basis. However, while it is statutorily required to present the rates in this manner, these are the minimums where alternate methods for paying down that unfunded liability is at the discretion of each employer. Further, to understand the effects of reform in relation to Tier 3, compare the total rate of Tier 3 before application of those legacy costs.*

Development of Employer Contributions – Tier 3 Members

Valuation Date	June 30, 2021	June 30, 2020
Applicable to Fiscal Year Ending	2023	2022

Defined Contribution (DC) Retirement Plan

	Rate	Dollar	Rate	Dollar
Tier 2 & 3 DB / Non-Social Security				
Employee Cost	3.00%		3.00%	
Employer Cost [1]	3.00%		3.00%	
Tier 3 DC Only				
Employee Cost	9.00%	$ 0	9.00%	$ 0
Employee Health Subsidy Program Cost	0.19%	0		
Employee Disability Program Cost	1.66%	0	0.88%	0
Total Employee Cost	**10.85%**	**0**	**9.88%**	**0**
Employer Cost	9.00%	0	9.00%	0
Employer Health Subsidy Program Cost	0.19%	0		
Employer Disability Program Cost	1.66%	0	0.88%	0
Total Employer Cost (before Legacy)	**10.85%**	**0**	**9.88%**	**0**
ER Legacy Cost of Tiers 1 & 2 Amort of Unfunded Liabilities [2]	42.96%	0	40.58%	0
Total Employer Cost	**53.81%**	**0**	**50.46%**	**0**
Underlying Payroll (as of valuation date)		0		0

[1] *Employer rate is 4% for Tier 2 members for a period of time depending on the individual's membership date.*

[2] *Pursuant to ARS § 38-843(B), the amortization of positive unfunded liabilities for Tiers 1 & 2 shall be applied to all Tier 3 payroll on a level percent basis. However, while it is statutorily required to present the rates in this manner, these are the minimums where alternate methods for paying down that unfunded liability is at the discretion of each employer. Further, to understand the effects of reform in relation to Tier 3, compare the total rate of Tier 3 before application of those legacy costs.*

Contribution Rate Summary

	Tier 1		Tier 2		Tier 3		
Membership Date On or After	7/1/1968	7/20/2011	1/1/2012		7/1/2017		
Participates in Social Security	N/A	N/A	Yes	No	Yes	No	N/A
Available Retirement Plan [1]	DB Only	DB Only	DB Only	Hybrid	DB Only	Hybrid	DC Only
Employee Contribution Rate							
PSPRS DB Rate	7.65%	11.65%	11.65%	11.65%	10.84%	10.84%	
PSPRS DC Rate				3.00%		3.00%	9.00%
Employer Health Subsidy Program Cost							0.19%
PSPDCRP Disability Program Rate							1.66%
Total EE Contribution Rate	7.65%	11.65%	11.65%	14.65%	10.84%	13.84%	10.85%
Employer Contribution Rate							
PSPRS DB Normal Cost	15.09%	15.09%	15.09%	15.09%	10.84%	10.84%	
PSPRS DB Tier 1 & 2 Legacy Cost [2]	42.96%	42.96%	42.96%	42.96%	42.96%	42.96%	42.96%
PSPRS DC Rate [3]				4.00%		3.00%	9.00%
Employer Health Subsidy Program Cost							0.19%
PSPDCRP Disability Program Rate							1.66%
Total ER Contribution Rate	58.05%	58.05%	58.05%	62.05%	53.80%	56.80%	53.81%

[1] Employers that pay into Social Security on behalf of their members do not participate in the Hybrid Plan.

[2] Per statute (ARS § 38-843(B)), any positive unfunded liability for Tiers 1 and 2 is to be applied to all Tier 3 (DB and DC) payrolls.

[3] The 4.00% employer match for Tier 2 Hybrid members is for a short period of time depending on the membership date of the employee at which point the rate will change to 3.00% (ARS § 38-868(C)).

Exhibit summarizes employee and employer contributions based on Statute and the results of June 30, 2021 actuarial valuation. Pension and health components are combined, where applicable.

Impact of Additional Contributions

	Additional Contribution (000s)										
	$0	**$10,000**	**$20,000**	**$30,000**	**$40,000**	**$50,000**	**$60,000**	**$70,000**	**$80,000**	**$90,000**	**$100,000**
Impact On											
Funded Status 06/30/2021	50.2%	52.3%	54.4%	56.5%	58.6%	60.7%	62.9%	65.0%	67.1%	69.2%	71.3%
FYE 2023 Contribution Rate	58.05%	55.81%	53.57%	51.33%	49.09%	46.85%	44.61%	42.37%	40.13%	37.89%	35.66%

Table shows the hypothetical change in the funded status and contribution rate from the June 30, 2021 actuarial valuation results for Tiers 1 & 2 if an additional contribution of the amount shown had been made to the Fund on June 30, 2021. This illustration can help estimate the impact of contributing additional monies to the fund in the future.

Historical Summary of Employer Rates

			Pension			Health		
	Valuation Date June 30	**Fiscal Year Ending June 30**	**Normal Cost**	**Unfunded Amortization**	**Total**	**Normal Cost**	**Unfunded Amortization**	**Total**
TIERS 1 & 2	2018	2020	15.51%	35.61%	51.12%	0.27%	0.14%	0.41%
	2019	2021	15.58%	37.22%	52.80%	0.40%	0.07%	0.47%
	2020	2022	15.20%	40.42%	55.62%	0.39%	0.16%	0.55%
	2021	2023	14.73%	42.75%	57.48%	0.36%	0.21%	0.57%
TIER 3 [1]	2018	2020	10.59%	0.00%	10.59%	0.25%	0.00%	0.25%
	2019	2021	10.59%	0.00%	10.59%	0.25%	0.00%	0.25%
	2020	2022	10.59%	0.00%	10.59%	0.25%	0.00%	0.25%
	2021 [2]	2023	9.91%	0.00%	9.91%	0.13%	0.00%	0.13%
	2021	2023	10.59%	0.00%	10.59%	0.25%	0.00%	0.25%

[1] *Rates shown are Board approved EE/ER rates, unless otherwise noted. Does not reflect Legacy costs that the employer must also contribute.*

[2] *Rates shown are calculated EE/ER rates*

III. Liability Support

Liabilities and Funded Ratios by Benefit - Tiers 1 & 2

	June 30, 2021	June 30, 2020
Pension		
Actuarial Present Value of Benefits		
Retirees and Beneficiaries	$ 246,158,000	$ 227,990,694
DROP Members	90,623,460	80,657,937
Vested Members	1,004,755	995,916
Active Members	198,566,642	203,353,013
Total Actuarial Present Value of Benefits	536,352,857	512,997,560
Actuarial Accrued Liability (AAL)		
All Inactive Members	337,786,215	309,644,547
Active Members	135,623,181	139,505,256
Total Actuarial Accrued Liability	473,409,396	449,149,803
Actuarial Value of Assets (AVA)	237,555,737	217,829,205
Unfunded Actuarial Accrued Liability		
Gross Unfunded Actuarial Accrued Liability	235,853,659	231,320,598
Stabilization Reserve	0	0
Net Unfunded Actuarial Accrued Liability	235,853,659	231,320,598
Funded Ratio (AVA / AAL)	50.2%	48.5%
Health		
Present Value of Benefits		
Retirees and Beneficiaries	$ 5,697,196	$ 5,301,894
DROP Members	1,263,653	1,122,753
Active Members	2,960,237	3,207,801
Total Present Value of Benefits	9,921,086	9,632,448
Actuarial Accrued Liability (AAL)		
All Inactive Members	6,960,849	6,424,647
Active Members	2,025,145	2,196,924
Total Actuarial Accrued Liability	8,985,994	8,621,571
Actuarial Value of Assets (AVA)	7,936,099	7,835,790
Unfunded Actuarial Accrued Liability	1,049,895	785,781
Funded Ratio (AVA / AAL)	88.3%	90.9%

Liabilities and Funded Ratios by Benefit - Tier 3

	June 30, 2021	June 30, 2020
Pension		
Actuarial Present Value of Benefits		
Retirees and Beneficiaries	$ 0	$ 0
Vested Members	838	838
Active Members	17,042,801	9,291,668
Total Actuarial Present Value of Benefits	17,043,639	9,292,506
Actuarial Accrued Liability (AAL)		
All Inactive Members	838	838
Active Members	1,197,661	381,195
Total Actuarial Accrued Liability	1,198,499	382,033
Actuarial Value of Assets (AVA)	1,277,164	386,197
Unfunded Actuarial Accrued Liability	(78,665)	(4,164)
Funded Ratio (AVA / AAL)	106.6%	101.1%
Health		
Present Value of Benefits		
Retirees and Beneficiaries	0	0
Active Members	219,703	131,946
Total Present Value of Benefits	219,703	131,946
Actuarial Accrued Liability (AAL)		
All Inactive Members	0	0
Active Members	17,717	5,817
Total Actuarial Accrued Liability	17,717	5,817
Actuarial Value of Assets (AVA)	39,856	11,754
Unfunded Actuarial Accrued Liability	(22,139)	(5,937)
Funded Ratio (AVA / AAL)	225.0%	202.1%

The liabilities shown on this page are the liabilities for Mesa Fire Dept. Tier 3 members.

Derivation of Experience (Gain)/Loss

		Tiers 1 & 2		Tier 3	
		Pension	Health	Pension	Health
(1)	Unfunded Actuarial Accrued Liability as of June 30, 2020	231,320,598	785,781	(4,164)	(5,937)
(2)	Normal Cost Developed in Last Valuation	4,880,768	125,230	286,919	4,215
(3)	Actual Contributions	21,210,411	146,964	390,330	24,486
(4)	Expected Interest On (1), (2), and (3)	16,482,155	61,234	6,645	(1,004)
(5)	Expected Unfunded Actuarial Accrued Liability as of June 30, 2021 (1)+(2)-(3)+(4)	231,473,110	825,281	(100,930)	(27,212)
(6)	Changes to UAAL Due to Assumptions, Methods and Benefits	0	0	0	0
(7)	Change to UAAL Due to Actuarial (Gain)/Loss	4,380,549	224,614	22,265	5,073
(8)	Unfunded Actuarial Accrued Liability as of June 30, 2021	235,853,659	1,049,895	(78,665)	(22,139)

Amortization of Unfunded Liabilities - Tiers 1 & 2

	Date Established	Outstanding Balance [1]	Years Remaining	Amortization Rate
Pension	06/30/2019	233,264,781	25	41.20%
	06/30/2021 [2]	6,699,882	25	1.55%
	Total	239,964,663		42.75%
Health	06/30/2019	468,361	25	0.08%
	06/30/2021 [2]	581,534	25	0.13%
	Total	1,049,895		0.21%

Amortization of Unfunded Liabilities - Tier 3

	Date Established	Outstanding Balance	Years Remaining	Amortization Rate [3]
Pension	06/30/2018	0	7	0.00%
	06/30/2019	(48,831)	8	(0.16%)
	06/30/2020	45,560	9	0.13%
	06/30/2021	(75,394)	10	(0.22%)
	Total	(78,665)		0.00%
Health	06/30/2018	0	7	0.00%
	06/30/2019	(1,369)	8	0.00%
	06/30/2020	(4,121)	9	(0.01%)
	06/30/2021	(16,649)	10	(0.05%)
	Total	(22,139)		0.00%

[1] *By Statute, any unfunded liability is adjusted by remove any "maintenance of effort" balance included in the assets.*

[2] *Since the "Years Remaining" for the 2020 and 2021 bases are the same, they have been combined into a single base.*

[3] *By Statute, negative amortization rates are not subtracted in Tier 3 rate calculations.*

IV. Asset Support

Statement of Changes in Fiduciary Net Position for Year Ended June 30, 2021

Market Value Basis

	Tiers 1 & 2		Tier 3	
	Pension	**Health**	**Pension**	**Health**
Additions				
Contributions				
Member Contributions	$ 125,332,035	$ 0	$ 21,045,607	$ 0
Employer Contributions	1,907,760,231	0	21,046,874	0
Health Insurance Contributions	0	4,005,856	0	1,358,038
Total Contributions	2,033,092,266	4,005,856	42,092,481	1,358,038
Investment Income				
Net Increase in Fair Value	2,205,440,985	84,098,414	21,638,252	757,438
Interest and Dividends	71,848,357	2,739,739	704,927	24,676
Other Income	83,636,944	3,601,503	820,588	32,436
Less Investment Expenses	(50,004,841)	(1,785,590)	(490,613)	(16,082)
Net Investment Income	2,310,921,445	88,654,066	22,673,154	798,468
Transfers In	145,214	0	55,573	0
Total Additions	4,344,158,925	92,659,922	64,821,208	2,156,506
Deductions				
Distributions to Members				
Benefit Payments	933,886,583	0	57,370	0
Health Insurance Subsidy	0	16,906,670	0	0
Refund of Contributions	12,184,527	0	576,884	0
Total Distributions	946,071,110	16,906,670	634,254	0
Administrative Expenses	10,897,164	364,534	106,925	3,283
Transfers Out	276,873	0	0	0
Other	0	0	0	0
Total Deductions	957,245,147	17,271,204	741,179	3,283
Net Increase / (Decrease)	3,386,913,778	75,388,718	64,080,029	2,153,223
Net Position Held in Trust				
Prior Valuation	8,057,538,776	328,079,035	48,259,114	1,480,635
Beginning of the Year Adjustment	0	0	0	0
End of the Year	11,444,452,554	403,467,753	112,339,143	3,633,858

Development of Pension Actuarial Value of Assets - Tiers 1 & 2

A. Investment Income	
A1. Actual Investment Income	$ 2,300,024,281
A2. Expected Amount for Immediate Recognition	627,173,072
A3. Amount Subject to Amortization	1,672,851,209

	Year Ended June 30						
B. Amortization Schedule	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**
2021 Experience (A3 / 7)	238,978,744	238,978,744	238,978,744	238,978,744	238,978,744	238,978,744	238,978,745
2020 Experience	(68,882,158)	(68,882,158)	(68,882,158)	(68,882,158)	(68,882,158)	(68,882,160)	
2019 Experience	(22,859,275)	(22,859,275)	(22,859,275)	(22,859,275)	(22,859,275)		
2018 Experience	(6,266,349)	(6,266,349)	(6,266,349)	(6,266,351)			
2017 Experience	33,380,149	33,380,149	33,380,148				
2016 Experience	(64,250,729)	(64,250,726)					
2015 Experience	(36,894,251)						
Total Amortization	73,206,131	110,100,385	174,351,110	140,970,960	147,237,311	170,096,584	238,978,745

C. Actuarial Value of Assets	**Total**	**Employer**
C1. Actuarial Value of Assets, 06/30/2020	8,675,448,922	
C2. Non-investment Net Cash Flow	1,086,889,497	
C3. Preliminary Actuarial Value of Assets, 06/30/2021 (A2 + B + C1 + C2)	10,462,717,622	
C4. Market Value of Assets, 06/30/2021	11,444,452,554	259,846,004
C5. Final Actuarial Value of Assets, 06/30/2021 (C3 Within 20% Corridor of C4)	10,462,717,622	237,555,737

D. Rates of Return	
D1. Market Value Rate of Return	26.7%
D2. Actuarial Value Rate of Return	7.6%

Development of Health Actuarial Value of Assets - Tiers 1 & 2

A. Investment Income	
A1. Actual Investment Income	$ 88,289,532
A2. Expected Amount for Immediate Recognition	23,487,183
A3. Amount Subject to Amortization	64,802,349

	Year Ended June 30						
B. Amortization Schedule	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**
2021 Experience (A3 / 7)	9,257,478	9,257,478	9,257,478	9,257,478	9,257,478	9,257,478	9,257,481
2020 Experience	(2,898,713)	(2,898,713)	(2,898,713)	(2,898,713)	(2,898,713)	(2,898,716)	
2019 Experience	(1,075,569)	(1,075,569)	(1,075,569)	(1,075,569)	(1,075,572)		
2018 Experience	(304,653)	(304,653)	(304,653)	(304,656)			
2017 Experience	1,532,136	1,532,136	1,532,136				
2016 Experience	(3,221,043)	(3,221,044)					
2015 Experience	(1,796,586)						
Total Amortization	1,493,050	3,289,635	6,510,679	4,978,540	5,283,193	6,358,762	9,257,481

C. Actuarial Value of Assets	**Total**	**Employer**
C1. Actuarial Value of Assets, 06/30/2020	355,709,881	
C2. Non-investment Net Cash Flow	(12,900,814)	
C3. Preliminary Actuarial Value of Assets, 06/30/2021 (A2 + B + C1 + C2)	367,789,300	
C4. Market Value of Assets, 06/30/2021	403,467,753	8,705,963
C5. Final Actuarial Value of Assets, 06/30/2021 (C3 Within 20% Corridor of C4)	367,789,300	7,936,099

D. Rates of Return	
D1. Market Value Rate of Return	27.5%
D2. Actuarial Value Rate of Return	7.2%

Development of Pension Actuarial Value of Assets - Tiers 3

A. Investment Income	
A1. Actual Investment Income	$ 22,566,229
A2. Expected Amount for Immediate Recognition	4,806,547
A3. Amount Subject to Amortization	17,759,682

	Year Ended June 30				
B. Amortization Schedule	**2021**	**2022**	**2023**	**2024**	**2025**
2021 Experience (A3 / 5)	3,551,936	3,551,936	3,551,936	3,551,936	3,551,938
2020 Experience	(351,296)	(351,296)	(351,296)	(351,294)	
2019 Experience	44,435	44,435	44,437		
2018 Experience	(370)	(371)			
2017 Experience	0				
Total Amortization	3,244,705	3,244,704	3,245,077	3,200,642	3,551,938

C. Actuarial Value of Assets	**Total**	**Employer**
C1. Actuarial Value of Assets, 06/30/2020	49,531,567	
C2. Non-investment Net Cash Flow	41,513,800	
C3. Preliminary Actuarial Value of Assets, 06/30/2021 (A2 + B + C1 + C2)	99,096,619	
C4. Market Value of Assets, 06/30/2021	112,339,143	1,447,834
C5. Final Actuarial Value of Assets, 06/30/2021 (C3 Within 20% Corridor of C4)	99,096,619	1,277,164

D. Rates of Return	
D1. Market Value Rate of Return	32.7%
D2. Actuarial Value Rate of Return	11.5%

Development of Health Actuarial Value of Assets - Tiers 3

A. Investment Income	
A1. Actual Investment Income	$ 795,185
A2. Expected Amount for Immediate Recognition	150,372
A3. Amount Subject to Amortization	644,813

	Year Ended June 30				
B. Amortization Schedule	**2021**	**2022**	**2023**	**2024**	**2025**
2021 Experience (A3 / 5)	128,963	128,963	128,963	128,963	128,961
2020 Experience	(10,555)	(10,555)	(10,555)	(10,557)	
2019 Experience	1,507	1,507	1,508		
2018 Experience	0	(2)			
2017 Experience	0				
Total Amortization	119,915	119,913	119,916	118,406	128,961

C. Actuarial Value of Assets	**Total**	**Employer**
C1. Actuarial Value of Assets, 06/30/2020	1,518,500	
C2. Non-investment Net Cash Flow	1,358,038	
C3. Preliminary Actuarial Value of Assets, 06/30/2021 (A2 + B + C1 + C2)	3,146,825	
C4. Market Value of Assets, 06/30/2021	3,633,858	46,024
C5. Final Actuarial Value of Assets, 06/30/2021 (C3 Within 20% Corridor of C4)	3,146,825	39,856

D. Rates of Return	
D1. Market Value Rate of Return	36.8%
D2. Actuarial Value Rate of Return	12.3%

V. Member Statistics

Valuation Data Summary

	June 30, 2021		June 30, 2020	
	Tiers 1 & 2	**Tier 3**	**Tiers 1 & 2**	**Tier 3**
Actives				
Number	281	78	307	49
Average Current Age	42.3	29.9	42.0	30.1
Average Age at Employment	28.0	28.7	27.9	29.5
Average Past Service	14.3	1.2	14.1	0.6
Average Annual Salary	$102,653	$56,923	$95,690	$50,860
Actives (transferred)				
Number	13	3	12	1
Average Current Age	32.5	28.8	32.0	33.5
Average Age at Employment	23.8	26.0	24.0	30.8
Average Past Service	8.7	2.8	8.0	2.7
Average Annual Salary	$67,608	$53,719	$54,197	$52,124
Retirees				
Number	224	0	208	0
Average Current Age	65.4	N/A	65.4	N/A
Average Annual Benefit	$69,903	N/A	$68,631	N/A
Drop Retirees				
Number	74	N/A	67	N/A
Average Current Age	54.5	N/A	54.8	N/A
Average Annual Benefit	$70,369	N/A	$69,563	N/A
Beneficiaries				
Number	30	0	27	0
Average Current Age	72.6	N/A	72.9	N/A
Average Annual Benefit	$55,011	N/A	$54,549	N/A
Disability Retirees				
Number	35	0	35	0
Average Current Age	62.5	N/A	62.2	N/A
Average Annual Benefit	$56,064	N/A	$55,961	N/A
Inactive / Vested				
Number	18	1	19	1
Average Current Age	40.5	29.3	40.8	28.3
Average Accumulated Contributions	$31,471	$838	$29,594	$838
Total Number	675	82	675	51
Former Members (transferred)	3	0	3	0

Counts and Pay Summary by Service - Tiers 1 & 2

	Past Service									
Age	**0-4**	**5-9**	**10-14**	**15-19**	**20-24**	**25-29**	**30+**	**Total Count**	**Total Pay**	**Average Pay**
<20	0	0	0	0	0	0	0	0	0	0
20 - 24	0	0	0	0	0	0	0	0	0	0
25 - 29	4	10	0	0	0	0	0	14	1,164,678	83,191
30 - 34	0	33	4	1	0	0	0	38	3,334,372	87,747
35 - 39	0	29	35	8	0	0	0	72	6,641,437	92,242
40 - 44	0	22	21	23	8	0	0	74	7,825,014	105,743
45 - 49	0	4	6	14	21	2	0	47	5,011,190	106,621
50 - 54	0	3	5	7	15	8	1	39	4,550,092	116,669
55 - 59	0	0	0	2	4	0	1	7	762,041	108,863
60 - 64	0	0	0	1	0	0	2	3	435,530	145,177
65+	0	0	0	0	0	0	0	0	0	0
Total	4	101	71	56	48	10	4	294	29,724,354	101,103

Counts and Pay Summary by Service - Tier 3

	Past Service									
Age	**0-4**	**5-9**	**10-14**	**15-19**	**20-24**	**25-29**	**30+**	**Total Count**	**Total Pay**	**Average Pay**
15 - 19	0	0	0	0	0	0	0	0	0	0
20 - 24	10	0	0	0	0	0	0	10	556,318	55,632
25 - 29	33	0	0	0	0	0	0	33	1,846,130	55,943
30 - 34	25	0	0	0	0	0	0	25	1,433,024	57,321
35 - 39	11	0	0	0	0	0	0	11	639,672	58,152
40 - 44	2	0	0	0	0	0	0	2	126,013	63,007
45 - 49	0	0	0	0	0	0	0	0	0	0
50 - 54	0	0	0	0	0	0	0	0	0	0
55 - 59	0	0	0	0	0	0	0	0	0	0
60 - 64	0	0	0	0	0	0	0	0	0	0
65+	0	0	0	0	0	0	0	0	0	0
Total	81	0	0	0	0	0	0	81	4,601,157	56,804

VI. ACTUARIAL ASSUMPTIONS AND METHODS

Interest Rate

This is the assumed earnings rate on System assets, compounded annually, net of investment and administrative expenses.

Tiers 1 & 2:
7.30% per year.

Tier 3:
7.00% per year.

Salary Increases

See table below. This is an annual increase for individual member's salary. These rates, which are based on a 2017 experience study using actual plan experience, consist of 3.5% for wage inflation with the remaining portion for merit / seniority increases.

Age	Maricopa County Police	Pima County Police	Other Police	Maricopa County Fire	Pima County Fire	Other Fire
20	7.50%	7.50%	7.50%	7.50%	7.50%	7.20%
25	7.14%	6.24%	6.60%	7.35%	6.36%	6.60%
30	6.00%	5.16%	5.25%	6.74%	5.48%	5.60%
35	4.77%	4.55%	4.15%	5.56%	4.83%	4.96%
40	3.90%	3.89%	3.60%	4.46%	4.03%	4.44%
45	3.54%	3.56%	3.50%	3.74%	3.60%	3.78%
50+	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%

Inflation

2.50%.

Tier 3 Compensation Limit

$115,868 for calendar 2021. Assumed increases of 2.00% per year thereafter.

Cost-of-Living Adjustment

1.75%.

Mortality Rates

These rates are used to project future decrements from the population due to death.

Active Lives:
PubS-2010 Employee mortality, loaded 110% for males and females, projected with future mortality improvements reflected generationally using 75% of scale MP-2020. 100% of active deaths are assumed to be in the line of duty.

Inactive Lives
PubS-2010 Healthy Retiree mortality, loaded 110% for males and females, projected with future mortality improvements reflected

generationally using 75% of scale MP-2020.

Beneficiaries:
PubS-2010 Survivor mortality, projected with future mortality improvements reflected generationally using 75% of scale MP-2020.

Disabled Lives:
PubS-2010 Disabled mortality, projected with future mortality improvements reflected generationally using 75% of scale MP-2020.

The mortality assumptions sufficiently accommodate anticipated future mortality improvements.

Retirement / DROP Rates

These rates are used to project future decrements from the active population due to retirement. The rates below are based on a 2017 experience study using actual plan experience.

Tier 1 – reaching age 62 before attaining 20 years of service:
Age-related rates based on age at retirement: 60% assumed at age 62, 50% assumed at ages 63 – 69, and 100% assumed at age 70. Rates are the same for all employers.

Tier 1 – reaching age 62 after attaining 20 years of service:
Service-related rates based on service at retirement:

Service	Maricopa County Police	Pima County Police	Other Police	Maricopa County Fire	Pima County Fire	Other Fire
20	27%	24%	35%	14%	18%	23%
21	18%	19%	30%	14%	18%	18%
22	14%	14%	23%	7%	11%	11%
23	10%	10%	10%	7%	7%	8%
24	8%	7%	10%	7%	7%	5%
25	38%	32%	36%	22%	22%	30%
26	36%	32%	30%	26%	26%	30%
27	29%	22%	30%	19%	19%	30%
28	29%	22%	30%	32%	25%	25%
29	29%	22%	30%	30%	25%	16%
30	34%	35%	30%	30%	30%	32%
31	34%	35%	30%	30%	30%	35%
32	65%	65%	70%	55%	55%	60%
33	65%	65%	70%	55%	55%	60%
34+	100%	100%	100%	100%	100%	100%

60% are assumed to enter the DROP program while the remaining 40% are assumed to retire and commence benefits immediately. DROP periods are assumed to be 4 years in length.

Tiers 2 & 3:
Age-related rates based on age at retirement:

Age	Maricopa County Police	Pima County Police	Other Police	Maricopa County Fire	Pima County Fire	Other Fire
53	38%	32%	36%	22%	22%	30%
54	36%	32%	30%	26%	26%	30%
55	29%	22%	30%	19%	19%	30%
56	29%	22%	30%	32%	25%	25%
57	29%	22%	30%	30%	25%	16%
58	34%	35%	30%	30%	30%	32%
59	34%	35%	30%	30%	30%	35%
60-63	65%	65%	70%	55%	55%	60%
64+	100%	100%	100%	100%	100%	100%

Termination Rate

These rates are used to project future decrements from the active population due to termination. Service-related rates based on service at termination are shown below. The rates below apply to members prior to retirement eligibility and are based on a 2017 experience study using actual plan experience.

Service	Maricopa County Police	Pima County Police	Other Police	Maricopa County Fire	Pima County Fire	Other Fire
1	14.00%	16.00%	16.00%	7.00%	10.00%	9.50%
2	8.50%	9.00%	12.50%	4.50%	5.00%	9.00%
3	6.50%	7.50%	11.50%	3.70%	5.00%	7.50%
4	4.50%	6.00%	9.00%	3.00%	4.00%	7.50%
5	3.60%	6.00%	8.00%	2.50%	4.00%	6.50%
6	3.30%	4.50%	8.00%	1.70%	3.50%	4.50%
7	3.30%	4.50%	7.00%	1.70%	3.00%	4.00%
8	3.30%	3.20%	7.00%	1.70%	2.40%	3.50%
9	2.70%	3.20%	6.50%	1.70%	2.40%	3.50%
10	2.70%	3.20%	6.00%	1.50%	2.40%	3.00%
11	2.70%	3.20%	5.00%	1.10%	2.40%	2.70%
12	1.80%	1.40%	4.00%	0.70%	1.00%	2.00%
13	1.30%	1.40%	3.50%	0.70%	1.00%	2.00%
14	1.30%	1.40%	3.00%	0.70%	1.00%	1.70%
15	1.30%	1.00%	3.00%	0.60%	1.00%	1.20%
16	0.70%	1.00%	2.00%	0.50%	1.00%	1.20%
17	0.70%	1.00%	1.75%	0.50%	0.50%	1.20%
18	0.70%	1.00%	1.75%	0.40%	0.50%	1.20%
19	0.50%	1.00%	1.75%	0.40%	0.50%	1.20%
20+	0.50%	1.00%	1.75%	0.40%	0.50%	0.50%

Disability Rate

These rates are used to project future decrements from the active population due to disability. Sample age-related rates based on age at disability are provided below. These rates are based on a 2017 experience study using actual plan experience. 100% of disablements are assumed to be duty-related.

Age	Maricopa County Police	Pima County Police	Other Police	Maricopa County Fire	Pima County Fire	Other Fire
20	0.08%	0.08%	0.10%	0.03%	0.03%	0.03%
25	0.08%	0.08%	0.10%	0.03%	0.03%	0.03%
30	0.17%	0.16%	0.20%	0.04%	0.03%	0.03%
35	0.22%	0.21%	0.26%	0.09%	0.07%	0.08%
40	0.36%	0.35%	0.44%	0.17%	0.16%	0.17%
45	0.51%	0.49%	0.62%	0.17%	0.43%	0.48%
50	0.78%	0.75%	0.95%	0.43%	0.59%	0.65%
55	1.02%	0.98%	1.23%	1.00%	1.01%	1.13%

Marital Status

For active members, 85% of males and 60% of females are assumed to be married. Actual marital status is used, where applicable, for inactive members.

Spouse's Age

Males are assumed to be three years older than females.

Health Care Utilization

For active members, 70% of retirees are expected to utilize retiree health care. Actual utilization is used for inactive members.

Funding Method

Entry Age Normal Cost Method.

Actuarial Asset Method

Method described below. Note that during periods when investment performance exceeds (falls short) of the assumed rate, the actuarial value of assets will tend to be less (greater) than the market value of assets.

Tiers 1 & 2:
Each year the assumed investment income is recognized in full while the difference between actual and assumed investment income are smoothed over a 7-year period subject to a 20% corridor around the market value.

Tier 3:
Each year the assumed investment income is recognized in full while the difference between actual and assumed investment income are smoothed over a 5-year period subject to a 20% corridor around the market value.

Funding Policy Amortization Method	***Tiers 1 & 2:*** Any positive UAAL (assets less than liabilities) is amortized using a layered approach beginning with the June 30, 2020 valuation, with new amounts determined according to a Level Dollar method over a closed period of 15 years (phased into from current period of at most 30 years). Initial layer from June 30, 2019 valuation continues to be amortized according to a Level Percentage of Payroll method. Any negative UAAL (assets greater than liabilities) is amortized according to a Level Dollar method over an open period of 20 years. ***Tier 3:*** Any positive UAAL (assets less than liabilities) is amortized according to a Level Dollar method over a closed period of 10 years. No amortization is made of any negative UAAL (assets greater than liabilities).
Payroll Growth	3.00% per year. This is annual increase for total employer payroll.
Stabilization Reserve	Beginning with the June 30, 2007 valuation and with each subsequent valuation, if the actuarial value of assets exceeds the actuarial accrued liability, one half of this excess in each year is allocated to a Stabilization Reserve. This Reserve is excluded from the calculation of the employer contribution rates. The Reserve accumulates as long as the plan is overfunded. Once the plan becomes underfunded, the Stabilization Reserve will be used to dampen increases in the employer contribution rates.

Changes to Actuarial Assumptions and Methods Since the Prior Valuation

The payroll growth assumption was lowered from 3.50% to 3.00%.

VII. DISCUSSION OF RISK

ASOP No. 51, Assessment and Disclosure of Risk Associated with Measuring Pension Obligations and Determining Pension Plan Contributions, states that the actuary should identify risks that, in the actuary's professional judgment, may reasonably be anticipated to significantly affect the plan's future financial condition.

Throughout this report, actuarial results are determined under various assumption scenarios. These results are based on the premise that all future plan experience will align with the plan's actuarial assumptions; however, there is no guarantee that actual plan experience will align with the plan's assumptions. Whenever possible, the recommended assumptions in this report reflect conservatism to allow for some margin of unfavorable future plan experience. However, it is still possible that actual plan experience will differ from anticipated experience in an unfavorable manner that will negatively impact the plan's funded position.

Below are examples of ways in which plan experience can deviate from assumptions and the potential impact of that deviation. Typically, this results in an actuarial gain or loss representing the current-year financial impact on the plan's unfunded liability of the experience differing from assumptions; this gain or loss is amortized over a period of time determined by the plan's amortization method. When assumptions are selected that adequately reflect plan experience, gains and losses typically offset one another in the long term, resulting in a relatively low impact on the plan's contribution requirements associated with plan experience. When assumptions are too optimistic, losses can accumulate over time and the plan's amortization payment could potentially grow to an unmanageable level.

- <u>Investment Return</u>: When the rate of return on the Actuarial Value of Assets falls short of the assumption, this produces a loss representing assumed investment earnings that were not realized. Further, it is unlikely that the plan will experience a scenario that matches the assumed return in each year as capital markets can be volatile from year to year. Therefore, contribution amounts can vary in the future.
- <u>Salary Increases</u>: When a plan participant experiences a salary increase that was greater than assumed, this produces a loss representing the cost of an increase in anticipated plan benefits for the participant as compared to the previous year. The total gain or loss associated with salary increases for the plan is the sum of salary gains and losses for all active participants.
- <u>Payroll Growth</u>: The plan's payroll growth assumption, if one is used, causes a predictable annual increase in the plan's amortization payment in order to produce an amortization payment that remains constant as a percentage of payroll if all assumptions are realized. If payroll does not increase according to the plan's payroll growth assumption, the plan's amortization payment can increase significantly as a percentage of payroll even if all assumptions other than the payroll growth assumption are realized.
- <u>Demographic Assumptions:</u> Actuarial results take into account various potential events that could happen to a plan participant, such as retirement, termination, disability, and death. Each of these potential events is assigned a liability based on the likelihood of the event and the financial consequence of the event for the plan. Accordingly, actuarial liabilities reflect a blend of financial consequences associated with various possible outcomes (such as retirement at one of various possible ages). Once the outcome is known (e.g. the participant retires) the liability is adjusted to reflect the known outcome. This adjustment

produces a gain or loss depending on whether the outcome was more or less favorable than other outcomes that could have occurred.

- Contribution risk: This risk results from the potential that actual employer contributions may deviate from actuarially determined contributions, which are determined in accordance with the Board's funding policy. The funding policy is intended to result in contribution requirements that if paid when due, will result in a reasonable expectation that assets will accumulate to be sufficient to pay plan benefits when due. Contribution deficits, particularly large deficits and those that occur repeatedly, increase future contribution requirements and put the plan at risk for not being able to pay plan benefits when due.

Impact of Plan Maturity on Risk

For newer pension plans, most of the participants and associated liabilities are related to active members who have not yet reached retirement age. As pension plans continue in operation and active members reach retirement ages, liabilities begin to shift from being primarily related to active members to being shared amongst active and retired members. Plan maturity is a measure of the extent to which this shift has occurred. It is important to understand that plan maturity can have an impact on risk tolerance and the overall risk characteristics of the plan. For example, plans with a large amount of retired liability do not have as long of a time horizon to recover from losses (such as losses on investments due to lower than expected investment returns) as plans where the majority of the liability is attributable to active members. For this reason, less tolerance for investment risk may be warranted for highly mature plans with a substantial inactive liability. Similarly, mature plans paying substantial retirement benefits resulting in a small positive or net negative cash flow can be more sensitive to near term investment volatility, particularly if the size of the fund is shrinking, which can result in less assets being available for investment in the market.

To assist with determining the maturity of the plan, we have provided some relevant metrics in the table following titled "Plan Maturity Measures and Other Risk Metrics." For a better understanding of the overall Plan and the impact of these risks, please refer to the consolidated PSPRS valuation report.

Plan Maturity Measures and Other Risk Metrics - Tiers 1 & 2

	06/30/2018	06/30/2019	06/30/2020	06/30/2021
Support Ratio				
Total Actives	355	340	319	294
Total Inactives	319	333	356	381
Actives / Inactives	111.3%	102.1%	89.6%	77.2%
Asset Volatility Ratio				
Market Value of Assets (MVA)		202,718,569	202,314,287	259,846,004
Total Annual Payroll		33,023,875	30,027,206	29,724,354
MVA / Total Annual Payroll		613.9%	673.8%	874.2%
Accrued Liability (AL) Ratio				
Inactive Accrued Liability	263,776,084	290,192,029	309,644,547	337,786,215
Total Accrued Liability	395,623,521	433,956,415	449,149,803	473,409,396
Inactive AL / Total AL	66.7%	66.9%	68.9%	71.4%
Funded Ratio				
Actuarial Value of Assets (AVA)	196,253,304	209,675,241	217,829,205	237,555,737
Total Accrued Liability	395,623,521	433,956,415	449,149,803	473,409,396
AVA / Total Accrued Liability	49.6%	48.3%	48.5%	50.2%
Net Cash Flow Ratio				
Net Cash Flow [1]		647,673	(2,833,492)	1,273,274
Market Value of Assets (MVA)		202,718,569	202,314,287	259,846,004
Net Cash Flow / MVA		0.3%	(1.4%)	0.5%

[1] *Determined as total contributions minus benefit payments. Administrative expenses are typically included but are considered part of the net interest rate assumption for this plan.*

Plan Maturity Measures and Other Risk Metrics - Tier 3 [1]

	06/30/2018	06/30/2019	06/30/2020	06/30/2021
Support Ratio				
Total Actives	0	19	50	81
Total Inactives	0	1	1	1
Actives / Inactives	N/A	1,900.0%	5,000.0%	8,100.0%
Asset Volatility Ratio				
Market Value of Assets (MVA)		58,823	376,276	1,447,834
Total Annual Payroll		944,032	2,715,143	4,909,858
MVA / Total Annual Payroll		6.2%	13.9%	29.5%
Accrued Liability (AL) Ratio				
Inactive Accrued Liability		838	838	838
Total Accrued Liability		838	382,033	1,198,499
Inactive AL / Total AL		100.0%	0.2%	0.1%
Funded Ratio				
Actuarial Value of Assets (AVA)	0	58,274	386,197	1,277,164
Total Accrued Liability	0	838	382,033	1,198,499
AVA / Total Accrued Liability	N/A	6,953.9%	101.1%	106.6%
Net Cash Flow Ratio				
Net Cash Flow [2]		55,877	313,095	780,661
Market Value of Assets (MVA)		58,823	376,276	1,447,834
Net Cash Flow / MVA		95.0%	83.2%	53.9%

[1] *Tier 3 results are shown for the Risk Sharing group, where applicable.*
[2] *Determined as total contributions minus benefit payments. Administrative expenses are typically included but are considered part of the net interest rate assumption for this plan.*

VIII. SUMMARY OF CURRENT PLAN

The following is a summary of the benefit provisions provided in Title 38, Chapter 5, Article 4 of the Arizona Revised Statutes.

Membership

Full-time employees of an eligible group, prior to attaining age 65, who are engaged to work for more than six months in a calendar year.

Benefit Tiers

Benefits differ for members based on their hire date:

Tier	Hire Date
1	Hired before January 1, 2012
2	Hired on or after January 1, 2012 but before July 1, 2017
3	Hired on or after July 1, 2017

Compensation

Compensation is the amount including base salary, overtime pay, shift and military differential pay, compensatory time used in lieu of overtime pay, and holiday pay, paid to an employee on a regular payroll basis and longevity pay paid at least every six months for which contributions are made to the System. For Tier 3 members, compensation is limited by statutory cap ($110,000 with adjustments by the Board).

Average Monthly Benefit Compensation

Tier 1:
The highest compensation paid to member during three consecutive years out of the last 20 years of Credited Service, divided by months.

Tier 2:
The highest compensation paid to member during five consecutive years out of the last 20 years of Credited Service, divided by months.

Tier 3:
The highest compensation paid to member during five consecutive years out of the last 15 years of Credited Service, divided by months.

Credited Service

Total periods of service, both before and after the member's date of participation, for which the member made contributions to the fund.

Normal Retirement Date

Tier 1:
First day of month following attainment of 1) 20 years of service or 2) 62^{nd} birthday and completion of 15 years of service.

Tier 2:
First day of month following the attainment of age 52.5 and completion of 15 years of service.

Tier 3:
First day of month following the attainment of age 55 and completion of 15 years of service.

Benefit

Tier 1:
50% of Average Monthly Benefit Compensation, adjusted based on Credited Service as follows (maximum benefit of 80% of Average Monthly Benefit Compensation):

Credited Service	Benefit Adjustment
15 years, but less than 20	Reduced 4% per year less than 20
20 years, but less than 25	Plus 2% per year between 20 and 25
25+ years	Plus 2.5% per year above 20

Tier 2:
Benefit multiplier (below) times Average Monthly Benefit Compensation times Credited Service (maximum benefit of 80% of Average Monthly Benefit Compensation):

Credited Service	Benefit Multiplier
15 years, but less than 17	1.50%
17 years, but less than 19	1.75%
19 years, but less than 22	2.00%
22 years, but less than 25	2.25%
25+ years	2.50%

Tier 3:
Benefit multiplier (below) times Average Monthly Benefit Compensation times Credited Service (maximum benefit of 80% of Average Monthly Benefit Compensation):

Credited Service	Benefit Multiplier
15 years, but less than 17	1.50%
17 years, but less than 19	1.75%
19 years, but less than 22	2.00%
22 years, but less than 25	2.25%
25+ years	2.50%

Form of Benefit

For married retirees, an annuity payable for the life of the member with 80% continuing to the eligible spouse upon death. For unmarried retirees, the normal form is a single life annuity.

Early Retirement	***Only applicable to Tier 3 members:***
Date	Attainment of age 52.5 and 15 years of Credited Service.
Benefit	Actuarial equivalent of Normal Retirement benefit.
Disability Benefit – Accidental (duty-related)	
Eligibility	Total and permanent disability incurred in performance of duty.
Benefit Amount	A maximum of: a.) 50% of Average Monthly Benefit Compensation, and; b.) The monthly Normal Retirement pension that the member is entitled to receive if he or she retired immediately.
Disability Benefit – Ordinary (not duty-related)	
Eligibility	Total and permanent disability not incurred in performance of duty.
Benefit Amount	Normal Retirement pension that the member is entitled to receive, prorated based on Credited Service earned over the required Credited Service for Normal Retirement (maximum ratio of 1).
Disability Benefit – Other	
Temporary	Benefit equals 1/12 of 50% of compensation during year preceding date of disability. Payments terminate after 12 months.
Catastrophic	Benefit equals 90% of Average Monthly Benefit Compensation. After 60 months member receives greater of 62.5% Average Monthly Benefit Compensation and accrued normal pension.
Pre-Retirement Death Benefit	
Service Incurred	100% of Average Monthly Benefit Compensation, reduced by child's pension.
Non-Service Incurred	80% of benefit based on calculation for accidental disability retirement.
Child's Pension	10% of pension for each child (maximum 20% paid) based on calculation for accidental disability retirement. Payable to dependent child under age 18 (23, if full-time student).
Guardian's Pension	Same as spouse's pension. Payable (along with child's pension) when no spouse is being paid and there is at least one child under 18 (23, if full-time student).
Vesting (Termination)	
Vesting Service Requirement	***Tier 1*:** 10 years of Credited Service.

Tiers 2 & 3:
15 years of Credited Service.

Non-Vested Benefit

Tier 1:
Lump sum payment of accumulated contributions, plus additional amount based on years of Credited Service.

Service	Additional % of Contributions
Less than 5 years	0%
5 years	25%
6 years	40%
7 years	55%
8 years	70%
9 years	85%
10+ years	100%

Tiers 2 & 3:
Lump sum payment of accumulated contributions, with interest at rate determined by the Board.

Vested Benefit

Tier 1:
Deferred retirement annuity based on two times member's accumulated contributions, deferred to age 62. Member is not entitled to survivor benefits, benefit increases, or group health insurance subsidy.

Tiers 2 & 3:
Calculated same as normal retirement pension. Payable if contributions left in fund until reach age requirement. Member is entitled to survivor benefits, benefit increases, and group health insurance subsidy.

Cost-of-Living Adjustment

Payable to retired member or survivor of retired member

Tiers 1 & 2:
Compound cost-of-living adjustment on base benefit. First payment is made on July 1, 2018, with annual adjustments effective every July 1 thereafter.

Cost-of-living adjustment will be based on the average annual percentage change in the Metropolitan Phoenix-Mesa Consumer Price Index published by the United States Department of Labor, Bureau of Statistics. Maximum increase of 2%.

Tier 3:
Compound cost-of-living adjustment on base benefit beginning earlier of first calendar year after the 7th anniversary of retirement or when the retired member reaches 60 years of age.

A cost-of-living adjustment shall be paid on July 1 each year that the funded ratio for members hired on or after July 1, 2017 is 70% or more.

The cost-of-living adjustment will be based on the average annual percentage change in the Metropolitan Phoenix-Mesa Consumer Price Index published by the United States Department of Labor, Bureau of Statistics. The cost-of-living adjustment will not exceed:

- 2%, if funded ratio for members who are hired on or after July 1, 2017 is 90% or more;
- 1.5%, if funded ratio for members who are hired on or after July 1, 2017 is 80-90%;
- 1%, if funded ratio for members who are hired on or after July 1, 2017 is 70-80%.

Deferred Retirement Option Plan (DROP):

Eligibility: Tier 1 and 20 years of Credited Service.

DROP Period: Maximum 60 months.

Member Contributions: Cease upon DROP entry.

Benefit Amount: Calculated based on Credited Service and average monthly compensation as of the beginning of the DROP period, credited to DROP participation account for DROP period.

Interest on DROP Participation Account:

Beginning Year	Interest Rate
July 1, 2016	7.40%
July 1, 2017	7.40%
July 1, 2018	7.30%
July 1, 2019	7.30%
July 1, 2020	7.30%

Payment of DROP Participation Account: Payable as lump sum distribution to Public Safety Personnel Defined Contribution Retirement Plan at end of DROP period or at termination.

Payment Monthly Benefit: System commences payment of benefit amount at the earlier of 1) the end of the DROP period and 2) at termination.

Post-Retirement Health Insurance Subsidy

Eligibility: Retired member or survivor who elect health coverage provided by the state or participating employer.

Maximum Subsidy Amounts (monthly)

	Member Only	With Dependents
Medicare Eligible	$100	$170
One w/ Medicare	N/A	$215
Not Medicare Eligible	$150	$260

Employee Contributions

Members hired before July 20, 2011:
7.65%

Members hired on/after July 20, 2011, but before July 1, 2017:
11.65%. Amounts in excess of 7.65% are not used to reduce the employer contribution ("maintenance of effort").

Tier 3:
50% of total contribution, which is Normal Cost plus a level-dollar amortization of unfunded actuarial accrued liability over a closed period not to exceed 10 years.

Employer Contributions

Tiers 1 & 2:
Normal Cost plus amortization of unfunded actuarial accrued liability over a closed period not to exceed 20 years (subject to one-time election to extend to closed period not to exceed 30 years). Contribution will never be less than 8% of payroll.

Tier 3:
50% of total contribution, which is Normal Cost plus a level-dollar amortization of unfunded actuarial accrued liability over a closed period not to exceed 10 years.

Changes to Benefit Provisions Since the Prior Valuation

The proration period for the Ordinary Disability Benefit was revised to reflect the different required Credited Service periods for different benefit tiers.

IX. Actuarial Funding Policy

A pension plan funding policy describes how pension funding will improve for underfunded plans or maintain funded benefits for funded plans over time for those benefits defined in ARS. Those benefits defined in ARS are to be equitably managed and administered by PSPRS.

This Actuarial Funding Policy identifies the funding objectives and elements of the actuarial funding policy set by the Board for the Arizona Public Safety Personnel Retirement System (PSPRS). The Board adopted this Funding Policy to help ensure the systematic funding of future benefit payments for members of the Retirement System as established by the legislature.

To achieve the systematic funding of future benefits, metrics are identified to measure the progress, or the lack of progress, over time to identify trends. These trends inform the continuation of the current policies or identify areas of needed research for consideration.

This funding policy is reviewed annually and adopted by the Board in accordance with ARS 38-863.02. This policy was reviewed and adopted by the Board in October 2021.

PSPRS Statement of Purpose

The Purpose of the Public Safety Personnel Retirement System is to provide uniform, consistent, and equitable statewide retirement programs for those who have been entrusted to our care.

Funding Objectives

1. Maintain adequate assets so that current plan assets, plus future contributions and investment earnings, are sufficient to fund all benefits expected to be paid to members and their beneficiaries.
    a. Corollary 1a: Current and future contributions should be calculated based upon assumptions that reflect the Board's best estimate of future experience and methods that appropriately allocate costs to address generational equity.
    b. Corollary 1b: While the shorter-term objective is to fully fund the actuarial liability (AAL) that estimates benefits earned as of the valuation date, contributions should target the long-term present value of benefits (PVB) to fund all benefits and help offset risks.

2. Maintain public policy goals of accountability and transparency through stakeholder communication and education. Each policy element is clear in intent and effect, and each should be considered in a balanced approach to determine how and when the funding requirements of the plan will be met.
    a. Corollary 2a: Board shall provide stakeholders with separate reports and tools to help explain current results as well as to help model future funding requirements.

3. Promote intergenerational equity. Defined benefit pensions are designed with a long-term perspective and designed to minimize contribution volatility that cannot avoid some level of generational cost shift. However, the goal is that each generation of members and employers (taxpayers) should, to the extent possible, incur the cost of benefits for the employees who provide services to them, rather than shifting those costs to other generations of members and employers (taxpayers).

a. Corollary 3a: A systematic reduction of the Unfunded Actuarial Accrued Liability (UAAL) over a reasonable time period is paramount to achieving this objective.

Consideration can be given to reduce volatility, to the extent possible, of employer and employee contribution rates as long as the integrity of the objectives listed above is not compromised.

Elements of Actuarial Funding Policy

1. Actuarial Cost Method
   a. The Entry Age Normal level percent of pay actuarial cost method of valuation shall be used in determining the Actuarial Accrued Liability (AAL) and Normal Cost. Differences in the past between assumed experience and actual experience ("actuarial gains and losses") shall become part of the AAL. The Normal Cost shall be determined on an individual basis for each active member.

2. Asset Smoothing Method
   a. The investment gains or losses of each valuation period, resulting from the difference between the actual investment return and assumed investment return, shall be recognized annually in level amounts over seven years (Tiers 1 and 2) or five years (Tier 3) in calculating the Actuarial Value of Assets.
   b. The Actuarial Value of Assets so determine shall be subject to a 20% corridor relative to the Market Value of Assets.

3. Amortization Method (Unfunded Amounts)
   a. The Actuarial Value of Assets are subtracted from the computed AAL. Any unfunded amount is amortized as a level percent of payroll over a closed period.
   b. The unfunded liabilities, for EORP and Tiers 1 & 2 for both PSPRS and CORP, determined in the June 30, 2019 actuarial valuation will become the initial layer for each employer beginning with the June 30, 2020 actuarial valuation and amortized using the current closed year period for that employer and continue to decrease each year.
      i. The payroll growth rate assumption used to amortize the Public Safety Plan (PSPRS) June 30, 2019 Unfunded Liability will be decreased by 0.5% beginning with the 6/30/2021 actuarial valuation and again each year with the intention of ultimately achieving 0.0%. Once the payroll growth assumption reaches 2.0%, however, the Board will reevaluate the payroll growth assumption and decide whether to continue to let it track down to 0.0%.
      ii. The payroll growth rate used to amortize the Correction Officers Retirement Plan (CORP) June 30, 2019 Unfunded Liability will be 3.0% beginning with the 6/30/2020 actuarial valuation, and future years will be reduced by 0.5% until 0.0% is reached.
      iii. The payroll growth rate used to amortize the Elected Officials Retirement Plan (EORP) June 30, 2019 Unfunded Liability will be 2.5% beginning with the 6/30/2020 actuarial valuation, and future years will be reduced by 0.5% until 0.0% is reached.
   c. Gains and losses, for EORP and Tiers 1 & 2 for both PSPRS and CORP, for each employer beginning with the June 30, 2020 actuarial valuation will be amortized as a new layer over the same amortization period as the regular unfunded liability to a minimum of 15 years. Once the amortization period for each employer decreases to 15 years, each subsequent year's gains and losses will be amortized as a new 15-year closed layer.
      i. The payroll growth rate used to amortize unfunded liability for all Plans under this paragraph will be 0.0% (i.e. level-dollar amortization).

   d. Tier 3 amortization methods are established in ARS 38-843.G and ARS 38-891.K.

4. Amortization Method (Overfunded Amounts)
   a. If the Actuarial Value of Assets exceeds the AAL for EORP and Tiers 1 & 2 for both PSPRS and CORP, the excess is amortized over an open period of 20 years and applied as a credit to reduce the Normal Cost otherwise payable.
   b. Tier 3 amortization methods are established in ARS 38-843.G and ARS 38-891.K.

Metrics to Monitor Funding Objectives

1. Appropriateness of Assumptions – Gain/Loss Experience (Corollary 1a)
   a. Metric: Do the cumulative gain/loss layers over the prior five years exceed 8% of plan assets?
   b. Measurement: History of annual gain/loss (split by asset and liability experience) and five-year cumulative results will be tracked.
   c. Action Plan: This metric assumes that a full experience study is performed at least every five years so objective of measurement is to monitor interim experience. If the metric answer is yes, a review of the sources or causes of gains and losses should be analyzed and presented to the Advisory Committee to provide a recommendation to the Board of Trustees. The analysis and presentation are intended to provide a basis for consideration if assumption changes are warranted between full experience studies.

2. Funding Targets (Corollary 1b)
   a. Metric: Has the funded status, on both an AAL and PVB basis when compared to the market value of assets, increased over a five-year period?
   b. Measurement: History of funded status measures will be tracked.
   c. Action Plan: If the answer is no and not readily explainable (e.g., significant assumption change), a review of the reason(s) for the decrease should be researched and presented to the Advisory Committee to provide a recommendation to the Board of Trustees. The analysis and presentation are intended to provide a basis for consideration if changes to assumptions and/or methods are warranted between full experience studies.

3. Communication with Stakeholders (Corollary 2a)
   a. Metric: Have reports and budgeting tools been provided to stakeholders in a timely fashion?
   b. Measurement: Yes/No answer based on input from PSPRS administrator. (An annual standard survey of stakeholders – 3 to 5 questions.)
   c. Action Plan: If the answer is no, and periodically regardless (e.g., every three years), PSPRS staff will revisit this metric to report to the Advisory Committee to provide a recommendation to the Board of Trustees if current reports / tools are sufficient and if the delivery timing is appropriate.

4. Timely Recognition of Costs (Corollary 3a)
   a. Metric: Has the percentage of unfunded liability subject to negative amortization decreased over a five-year lookback period?
   b. Measurement: History of unfunded liability subject to negative amortization as a percentage of total unfunded liability will be tracked.
   c. Action Plan: If the answer is no, and not readily explainable (e.g., adopted assumption changes being phased in are anticipated to address negative amortization), a review of the reason(s) for negative amortization should be researched and presented to the Advisory Committee to provide a

recommendation to the Board of Trustees. The analysis and presentation are intended to provide a basis for consideration if changes to assumptions and/or methods are warranted between full experience studies.

X. GLOSSARY

Actuarial Accrued Liability – Computed differently under different funding methods, the actuarial accrued liability generally represents the portion of the actuarial present value of benefits attributable to service credit earned (or accrued) as of the valuation date.

Actuarial Present Value of Benefits – Amount which, together with future interest, is expected to be sufficient to pay all benefits to be paid in the future, regardless of when earned, as determined by the application of a particular set of actuarial assumptions; equivalent to the actuarial accrued liability plus the present value of future normal costs attributable to the members.

Actuarial Assumptions – Assumptions as to the occurrence of future events affecting pension costs. These assumptions include rates of investment earnings, changes in salary, rates of mortality, withdrawal, disablement, and retirement as well as statistics related to marriage and family composition.

Actuarial Cost Method – A method of determining the portion of the cost of a pension plan to be allocated to each year; sometimes referred to as the "actuarial funding method." Each cost method allocates a certain portion of the actuarial present value of benefits between the actuarial accrued liability and future normal costs.

Actuarial Equivalence – Series of payments with equal actuarial present values on a given date when valued using the same set of actuarial assumptions.

Actuarial Present Value - The amount of funds required as of a specified date to provide a payment or series of payments in the future. It is determined by discounting future payments at predetermined rates of interest, and by probabilities of payments between the specified date and the expected date of payment.

Actuarial Value of Assets – The value of cash, investments, and other property belonging to the pension plan as used by the actuary for the purpose of the actuarial valuation. This may correspond to market value of assets, or some modification using an asset valuation method to reduce the volatility of asset values.

Asset Gain (Loss) – That portion of the actuarial gain attributable to investment performance above (below) the expected rate of return in the actuarial assumptions.

Amortization – Paying off an interest-discounted amount with periodic payments of interest and (generally) principal, as opposed to paying off with a lump sum payment.

Amortization Payment – That portion of the pension plan contribution designated to pay interest and reduce the outstanding principal balance of unfunded actuarial accrued liability. If the amortization payment is less than the accrued interest on the unfunded actuarial accrued liability the outstanding principal balance will increase.

Assumed Earnings Rate – The interest rate used in developing present values to reflect the time value of money.

Decrements – Events which result in the termination of membership in the system such as retirement, disability, withdrawal, or death.

Entry Age Normal (EAN) Funding Method – A standard actuarial funding method whereby each member's normal costs (service costs) are generally level as a percentage of pay from entry age until retirement. The annual cost of benefits is comprised of the normal cost plus an amortization payment to reduce the UAL.

Experience Gain (Loss) – The difference between actual unfunded actuarial accrued liabilities and anticipated unfunded actuarial accrued liabilities during the period between two valuation dates. It is a measurement of the difference between actual and expected experience, and may be related to investment earnings above (or below) those expected or changes in the liability due to fewer (or greater) than expected numbers of retirements, deaths, disabilities, or withdrawals, or variances in pay increases relative to assumed pay increases. The effect of such gains (or losses) is to decrease (or increase) future costs.

Funded Ratio – A measure of the ratio of the actuarial value of assets to liabilities of the system. Typically, the assets used in the measure are the actuarial value of assets as determined by the asset valuation method. The funded ratio depends not only on the financial strength of the plan but also on the asset valuation method used to determine the assets and on the funding method used to determine the liabilities.

Market Value of Assets (MVA) – The value of assets as they would trade on an open market.

Normal Cost – Computed differently under different funding methods, generally that portion of the actuarial present value of benefits allocated to the current plan year.

Unfunded Actuarial Accrued Liability (UAAL) – The excess of the actuarial accrued liability over the valuation assets; sometimes referred to as "unfunded past service liability". UAL increases each time an actuarial loss occurs and when new benefits are added without being fully funded initially and decreases when actuarial gains occur.