ARIZONA PUBLIC SAFETY PERSONNEL RETIREMENT SYSTEM

PRESCOTT POLICE DEPT. (024)

ACTUARIAL VALUATION
AS OF JUNE 30, 2020

CONTRIBUTIONS APPLICABLE TO THE
PLAN/FISCAL YEAR ENDING JUNE 30, 2022

FOSTER & FOSTER
ACTUARIES AND CONSULTANTS

December 2020

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

Re: Actuarial Valuation Report as of June 30, 2020 for Prescott Police Dept. (024)

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, 2020 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.

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: ______________________
Jason L. Franken, 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 Prescott Police Dept., performed as of June 30, 2020, 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, 2021. This information is contained in the section entitled "Contribution Results."

1. Key Valuation Results

The funded status as of June 30, 2020 and the employer contribution amounts applicable to the plan/fiscal year ending June 30, 2022 are as follows:

	Tier 1 & Tier 2 Members			Tier 3 Members *		
	Pension	**Health**	**Total**	**Pension**	**Health**	**Total**
Employer Contribution Rate	41.97%	0.99%	42.96%	9.05%	0.13%	9.18%
Funded Status	67.2%	72.5%	67.3%	101.4%	203.9%	103.0%

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, 2019):

Contribution Rate

	Tier 1 & Tier 2 Members			Tier 3 Members *		
Valuation Date	**Pension**	**Health**	**Total**	**Pension**	**Health**	**Total**
June 30, 2019	56.36%	0.78%	57.14%	9.21%	0.14%	9.35%
June 30, 2020	41.97%	0.99%	42.96%	9.05%	0.13%	9.18%

Funded Status

	Tier 1 & Tier 2 Members			Tier 3 Members		
Valuation Date	**Pension**	**Health**	**Total**	**Pension**	**Health**	**Total**
June 30, 2019	54.7%	79.5%	55.2%	116.9%	205.3%	118.4%
June 30, 2020	67.2%	72.5%	67.3%	101.4%	203.9%	103.0%

** 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	56.36%	0.78%	9.21%	0.14%
Asset Experience	1.40%	0.03%	0.02%	0.00%
Payroll Base	(3.06%)	(0.02%)	0.02%	(0.02%)
Liability Experience	(0.07%)	(0.04%)	(0.15%)	0.00%
Assumption/Method Change	(0.89%)	0.04%	0.00%	0.00%
Other	(11.77%)	0.20%	(0.05%)	0.01%
Contribution Rate This Valuation	41.97%	0.99%	9.05%	0.13%

Funded Status

	Tier 1 & Tier 2		Tier 3 Members	
	Pension	**Health**	**Pension**	**Health**
Funded Status Last Valuation	54.7%	79.5%	116.9%	205.3%
Asset Experience	(1.2%)	(1.4%)	(0.6%)	(1.2%)
Liability Experience	0.0%	1.4%	4.1%	5.4%
Assumption/Method Change	0.0%	0.0%	0.0%	0.0%
Other	13.7%	(7.0%)	(19.0%)	(5.6%)
Funded Status This Valuation	67.2%	72.5%	101.4%	203.9%

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, 2020 was 1.2% for Tiers 1 and 2 and 1.7% for Tier 3. On a smoothed, actuarial value of assets basis, however, the average return was 5.4% for Tiers 1 and 2 and 6.1% for Tier 3. This fell short of the 2019 assumed earnings rate for Tiers 1 and 2 of 7.3% and for Tier 3 of 7.0%.

Liability Experience – Experience overall was unfavorable, driven by less than expected inactive mortality and turnover.

Payroll Base – Under the current amortization policy for Tiers 1 and 2, the contribution rate is developed as a level percentage of payroll. The payroll is expected to increase each year in line with the growth assumption (currently 3.50%). To the extent that actual payroll is lower/greater than expected, the contribution rate will increase/decrease as a result.

Assumption / Method Change – The amortization method for Tiers 1 and 2 was updated to use a layered approach. New bases will be amortized on a Level Dollar basis while the 2019 base will continue to be amortized on a Level Percentage of Payroll basis.

Other – This is the combination of all other factors that could impact liabilities year-over-year, with the primary sources being changes resulting from an updated understanding of some data components provided by staff and changes in member data. Note that Tier 3 experience will stabilize as the group matures.

4. Looking Ahead

The continuing effect of prior asset losses was dampened by the asset smoothing reflected in the actuarial value of assets. There remain unrecognized investment losses that will, in the absence of other gains, put upward pressure on the contribution rate next year.

If the June 30, 2020 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 62.4% (instead of 67.2%) and the pension employer contribution requirement would be 48.09% of payroll (instead of 41.97%).

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, 2020		June 30, 2019	
Applicable to Fiscal Year Ending	2022		2021	
	Rate	**Dollar**	**Rate**	**Dollar**
Pension				
Normal Cost				
Total Normal Cost	18.53%	$ 740,516	19.54%	$ 763,124
Employee Cost	(7.65%)	(305,718)	(7.65%)	(298,751)
Employer (Net) Normal Cost	10.88%	434,798	11.89%	464,373
Amortization of Unfunded Liability	31.09%	1,242,452	44.47%	1,860,354
Total Employer Cost (Pension)	41.97%	1,677,250	56.36%	2,324,727
Health				
Normal Cost	0.42%	16,784	0.44%	17,227
Amortization of Unfunded Liability	0.57%	22,779	0.34%	14,224
Total Employer Cost (Health)	0.99%	39,563	0.78%	31,451
Total Employer Cost (Pension + Health)	**42.96%**	**1,716,813**	**57.14%**	**2,356,178**
Total Minimum Contribution Requirement (if applicable)	0.00%		0.00%	
Alternate Contribution Rate (ACR) *	31.66%		44.81%	
Underlying Payroll (as of valuation date)		3,861,167		3,905,240

** The Alternate Contribution Rate is the sum of the positive amortization rates for Tiers 1 & 2 Pension and Health 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").

A.R.S. 38-843, subsection I allows for the employer to request a one-time increase in the amortization period up to a maximum of 30 years. The costs below are provided to assist with that decision, where needed. If the current approved amortization period is greater than those below, that request has already been made for this plan and the following is provided to facilitate earlier payoff, if desired.

	Rate	**Dollar**
Total Pension Employer Cost (25-year amortization)	34.81%	1,391,272
Total Pension Employer Cost (30-year amortization)	32.49%	1,298,365

Development of Employer Contributions – Tier 3 Members

Valuation Date	June 30, 2020	June 30, 2019
Applicable to Fiscal Year Ending	2022	2021

Defined Benefit (DB) Retirement Plan

	Rate	Dollar	Rate	Dollar
Pension				
Total Normal Cost	18.10%	$ 204,204	18.41%	$ 103,225
Amortization of Unfunded Liability	0.00%	0	0.00%	0
Total Pension Cost	18.10%	204,204	18.41%	103,225
Employee (EE) Pension Cost	9.05%	102,102	9.21%	51,613
Employer (ER) Pension Cost	9.05%	102,102	9.21%	51,613
Health				
Total Normal Cost	0.25%	2,821	0.28%	1,570
Amortization of Unfunded Liability	0.00%	0	0.00%	0
Total Health Cost	0.25%	2,821	0.28%	1,570
Employee (EE) Health Cost	0.13%	1,411	0.14%	785
Employer (ER) Health Cost	0.13%	1,411	0.14%	785
Total				
Total Calculated Tier 3 Required EE/ER Individual Cost	9.18%	103,513	9.35%	52,398
Board Approved Tier 3 Required EE/ER Individual Cost [1]	9.94%	112,143	9.94%	55,734
ER Legacy Cost of Tiers 1 & 2 Amort of Unfunded Liabilities [2]	31.66%	357,188	44.81%	269,146
Total Calculated Tier 3 Required ER Defined Benefit Cost	40.84%	460,701	54.16%	321,544
Total Board Approved Tier 3 Required ER Defined Benefit Cost	**41.60%**	**469,331**	**54.75%**	**324,880**
Underlying Payroll (as of valuation date)		1,090,048		560,703

[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, 2022.*

[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, 2020	June 30, 2019
Applicable to Fiscal Year Ending	2022	2021

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 Disability Program Cost	0.88%	0	1.41%	0
Total Employee Cost	**9.88%**	**0**	**10.41%**	**0**
Employer Cost	9.00%	0	9.00%	0
Employer Disability Program Cost	0.88%	0	1.41%	0
Total Employer Cost (before Legacy)	**9.88%**	**0**	**10.41%**	**0**
ER Legacy Cost of Tiers 1 & 2 Amort of Unfunded Liabilities [2]	31.66%	0	44.81%	0
Total Employer Cost	**41.54%**	**0**	**55.22%**	**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%	9.94%	9.94%	
PSPRS DC Rate				3.00%		3.00%	9.00%
PSPDCRP Disability Program Rate							0.88%
Total EE Contribution Rate	7.65%	11.65%	11.65%	14.65%	9.94%	12.94%	9.88%
Employer Contribution Rate							
PSPRS DB Normal Cost	11.30%	11.30%	11.30%	11.30%	9.94%	9.94%	
PSPRS DB Tier 1 & 2 Legacy Cost [2]	31.66%	31.66%	31.66%	31.66%	31.66%	31.66%	31.66%
PSPRS DC Rate [3]				4.00%		3.00%	9.00%
PSPDCRP Disability Program Rate							0.88%
Total ER Contribution Rate	42.96%	42.96%	42.96%	46.96%	41.60%	44.60%	41.54%

[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, 2020 actuarial valuation. Pension and health components are combined, where applicable.

Impact of Additional Contributions

	Additional Contribution (000s)										
	$0	**$1,000**	**$2,000**	**$3,000**	**$4,000**	**$5,000**	**$6,000**	**$7,000**	**$8,000**	**$9,000**	**$10,000**
Impact On											
Funded Status 06/30/2020	67.2%	68.8%	70.5%	72.1%	73.7%	75.4%	77.0%	78.7%	80.3%	82.0%	83.6%
FYE 2022 Contribution Rate	42.96%	41.00%	39.03%	37.07%	35.11%	33.14%	31.18%	29.21%	27.25%	25.29%	23.32%

Table shows the hypothetical change in the funded status and contribution rate from the June 30, 2020 actuarial valuation results for Tiers 1 & 2 if an additional contribution of the amount shown had been made to the Fund on June 30, 2020. 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	11.89%	50.88%	62.77%	0.30%	0.65%	0.95%
	2019	2021	11.89%	44.47%	56.36%	0.44%	0.34%	0.78%
	2020	2022	10.88%	31.09%	41.97%	0.42%	0.57%	0.99%
TIER 3 [1,2]	2018	2020	9.68%	0.00%	9.68%	0.26%	0.00%	0.26%
	2019	2021	9.68%	0.00%	9.68%	0.26%	0.00%	0.26%
	2020 [2]	2022	9.05%	0.00%	9.05%	0.13%	0.00%	0.13%
	2020	2022	9.68%	0.00%	9.68%	0.26%	0.00%	0.26%

[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, 2020	June 30, 2019
Pension		
Actuarial Present Value of Benefits		
Retirees and Beneficiaries	$ 43,721,631	$ 42,969,169
DROP Members	1,818,355	2,000,829
Vested Members	364,802	279,033
Active Members	19,929,292	19,057,127
Total Actuarial Present Value of Benefits	65,834,080	64,306,158
Actuarial Accrued Liability (AAL)		
All Inactive Members	45,904,788	45,249,031
Active Members	14,903,122	13,525,522
Total Actuarial Accrued Liability	60,807,910	58,774,553
Actuarial Value of Assets (AVA)	40,839,864	32,158,956
Unfunded Actuarial Accrued Liability		
Gross Unfunded Actuarial Accrued Liability	19,968,046	26,615,597
Stabilization Reserve	0	0
Net Unfunded Actuarial Accrued Liability	19,968,046	26,615,597
Funded Ratio (AVA / AAL)	67.2%	54.7%
Health		
Present Value of Benefits		
Retirees and Beneficiaries	$ 784,656	$ 695,490
DROP Members	32,028	38,864
Active Members	453,411	446,149
Total Present Value of Benefits	1,270,095	1,180,503
Actuarial Accrued Liability (AAL)		
All Inactive Members	816,684	734,354
Active Members	345,152	327,156
Total Actuarial Accrued Liability	1,161,836	1,061,510
Actuarial Value of Assets (AVA)	842,035	844,084
Unfunded Actuarial Accrued Liability	319,801	217,426
Funded Ratio (AVA / AAL)	72.5%	79.5%

Liabilities and Funded Ratios by Benefit - Tier 3

	June 30, 2020	June 30, 2019
Pension		
Actuarial Present Value of Benefits		
Retirees and Beneficiaries	$ 429,363	$ 0
Vested Members	743,741	203,244
Active Members	203,486,437	120,826,663
Total Actuarial Present Value of Benefits	204,659,541	121,029,907
Actuarial Accrued Liability (AAL)		
All Inactive Members	1,173,104	203,244
Active Members	22,066,495	7,753,481
Total Actuarial Accrued Liability	23,239,599	7,956,725
Actuarial Value of Assets (AVA)	23,570,444	9,305,220
Unfunded Actuarial Accrued Liability	(330,845)	(1,348,495)
Funded Ratio (AVA / AAL)	101.4%	116.9%
Health		
Present Value of Benefits		
Retirees and Beneficiaries	0	0
Active Members	2,785,857	1,814,082
Total Present Value of Benefits	2,785,857	1,814,082
Actuarial Accrued Liability (AAL)		
All Inactive Members	0	0
Active Members	353,563	136,597
Total Actuarial Accrued Liability	353,563	136,597
Actuarial Value of Assets (AVA)	721,079	280,404
Unfunded Actuarial Accrued Liability	(367,516)	(143,807)
Funded Ratio (AVA / AAL)	203.9%	205.3%

The liabilities shown on this page are the liabilities for all Tier 3 members grouped together in the Risk Sharing group. These liabilities are NOT the liabilities for Prescott Police 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, 2019	26,615,597	217,426	(1,348,495)	(143,807)
(2)	Normal Cost Developed in Last Valuation	464,373	17,227	4,806,265	73,059
(3)	Actual Contributions	9,736,179	38,051	6,660,557	411,565
(4)	Expected Interest On (1), (2), and (3)	1,627,726	15,765	13,589	(19,922)
(5)	Expected Unfunded Actuarial Accrued Liability as of June 30, 2020 (1)+(2)-(3)+(4)	18,971,517	212,367	(3,189,198)	(502,235)
(6)	Changes to UAAL Due to Assumptions, Methods and Benefits	0	0	0	0
(7)	Change to UAAL Due to Actuarial (Gain)/Loss	996,529	107,434	2,858,353	134,719
(8)	Unfunded Actuarial Accrued Liability as of June 30, 2020	19,968,046	319,801	(330,845)	(367,516)

Amortization of Unfunded Liabilities - Tiers 1 & 2

	Date Established	Outstanding Balance	Years Remaining	Amortization Rate
Pension	06/30/2019	26,303,827	16	42.95%
	06/30/2020	(5,834,141)	16	(11.86%)
	Total	20,469,686		31.09%
Health	06/30/2019	200,080	16	0.33%
	06/30/2020	119,721	16	0.24%
	Total	319,801		0.57%

Amortization of Unfunded Liabilities - Tier 3

	Date Established	Outstanding Balance	Years Remaining	Amortization Rate *
Pension	06/30/2018	166,947	8	0.03%
	06/30/2019	(1,419,864)	9	(0.24%)
	06/30/2020	922,072	10	0.15%
	Total	(330,845)		0.00%
Health	06/30/2018	(3,540)	8	0.00%
	06/30/2019	(129,816)	9	(0.02%)
	06/30/2020	(234,160)	10	(0.04%)
	Total	(367,516)		0.00%

* *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, 2020

Market Value Basis

	Tiers 1 & 2		Tier 3	
	Pension	Health	Pension	Health
Additions				
Contributions				
Member Contributions	$ 128,443,154	$ 0	$ 14,386,911	$ 0
Employer Contributions	938,799,348	0	14,392,453	0
Health Insurance Contributions	0	4,741,938	0	909,053
Total Contributions	1,067,242,502	4,741,938	28,779,364	909,053
Investment Income				
Net Increase in Fair Value	58,711,963	1,945,052	350,525	8,778
Interest and Dividends	66,905,282	2,216,486	399,442	10,003
Other Income	26,056,951	1,568,972	155,567	7,081
Less Investment Expenses	(49,802,841)	(1,555,022)	(297,336)	(7,018)
Net Investment Income	101,871,355	4,175,488	608,198	18,844
Transfers In	379,476	0	155,830	0
Total Additions	1,169,493,333	8,917,426	29,543,392	927,897
Deductions				
Distributions to Members				
Benefit Payments	900,036,400	0	0	0
Health Insurance Subsidy	0	17,050,706	0	0
Refund of Contributions	14,184,072	0	157,299	0
Total Distributions	914,220,472	17,050,706	157,299	0
Administrative Expenses	8,356,791	339,564	49,892	1,532
Transfers Out	367,881	0	0	0
Other	0	0	0	0
Total Deductions	922,945,144	17,390,270	207,191	1,532
Net Increase / (Decrease)	246,548,189	(8,472,844)	29,336,201	926,365
Net Position Held in Trust				
Prior Valuation	7,810,990,750	336,551,716	18,922,750	554,433
Beginning of the Year Adjustment	(163)	163	163	(163)
End of the Year	8,057,538,776	328,079,035	48,259,114	1,480,635

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

A. Investment Income	
A1. Actual Investment Income	$ 93,514,564
A2. Expected Amount for Immediate Recognition	575,689,672
A3. Amount Subject to Amortization	(482,175,108)

	Year Ended June 30						
B. Amortization Schedule	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**
2020 Experience (A3 / 7)	(68,882,158)	(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)	(22,859,275)	
2018 Experience	(6,266,349)	(6,266,349)	(6,266,349)	(6,266,349)	(6,266,351)		
2017 Experience	33,380,149	33,380,149	33,380,149	33,380,148			
2016 Experience	(64,250,729)	(64,250,729)	(64,250,726)				
2015 Experience	(36,894,248)	(36,894,251)					
2014 Experience	33,458,496						
Total Amortization	(132,314,114)	(165,772,613)	(128,878,359)	(64,627,634)	(98,007,784)	(91,741,433)	(68,882,160)

C. Actuarial Value of Assets	Total	Employer
C1. Actuarial Value of Assets, 06/30/2019	8,079,039,739	
C2. Noninvestment Net Cash Flow	153,033,625	
C3. Preliminary Actuarial Value of Assets, 06/30/2020 (A2 + B + C1 + C2)	8,675,448,922	
C4. Market Value of Assets, 06/30/2020	8,057,538,776	37,931,038
C5. Final Actuarial Value of Assets, 06/30/2020 (C3 Within 20% Corridor of C4)	8,675,448,922	40,839,864

D. Rates of Return	
D1. Market Value Rate of Return	1.2%
D2. Actuarial Value Rate of Return	5.4%

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

A. Investment Income	
A1. Actual Investment Income	$ 3,835,924
A2. Expected Amount for Immediate Recognition	24,126,918
A3. Amount Subject to Amortization	(20,290,994)

	Year Ended June 30						
B. Amortization Schedule	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**
2020 Experience (A3 / 7)	(2,898,713)	(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)	(1,075,569)	(1,075,572)	
2018 Experience	(304,653)	(304,653)	(304,653)	(304,653)	(304,656)		
2017 Experience	1,532,136	1,532,136	1,532,136	1,532,136			
2016 Experience	(3,221,043)	(3,221,043)	(3,221,044)				
2015 Experience	(1,796,589)	(1,796,586)					
2014 Experience	1,653,381						
Total Amortization	(6,111,050)	(7,764,428)	(5,967,843)	(2,746,799)	(4,278,938)	(3,974,285)	(2,898,716)

C. Actuarial Value of Assets	**Total**	**Employer**
C1. Actuarial Value of Assets, 06/30/2019	350,002,781	
C2. Noninvestment Net Cash Flow	(12,308,768)	
C3. Preliminary Actuarial Value of Assets, 06/30/2020 (A2 + B + C1 + C2)	355,709,881	
C4. Market Value of Assets, 06/30/2020	328,079,035	776,627
C5. Final Actuarial Value of Assets, 06/30/2020 (C3 Within 20% Corridor of C4)	355,709,881	842,035

D. Rates of Return	
D1. Market Value Rate of Return	1.2%
D2. Actuarial Value Rate of Return	5.2%

Development of Pension Actuarial Value of Assets - Tiers 3

A. Investment Income	
A1. Actual Investment Income	$ 558,306
A2. Expected Amount for Immediate Recognition	2,314,784
A3. Amount Subject to Amortization	(1,756,478)

	Year Ended June 30				
B. Amortization Schedule	**2020**	**2021**	**2022**	**2023**	**2024**
2020 Experience (A3 / 5)	(351,296)	(351,296)	(351,296)	(351,296)	(351,294)
2019 Experience	44,435	44,435	44,435	44,437	
2018 Experience	(370)	(370)	(371)		
2017 Experience	0	0			
2016 Experience	0				
Total Amortization	(307,231)	(307,231)	(307,232)	(306,859)	(351,294)

C. Actuarial Value of Assets	**Total**	**Employer**
C1. Actuarial Value of Assets, 06/30/2019	18,746,119	
C2. Noninvestment Net Cash Flow	28,777,895	
C3. Preliminary Actuarial Value of Assets, 06/30/2020 (A2 + B + C1 + C2)	49,531,567	
C4. Market Value of Assets, 06/30/2020	48,259,114	22,964,925
C5. Final Actuarial Value of Assets, 06/30/2020 (C3 Within 20% Corridor of C4)	49,531,567	23,570,443

D. Rates of Return	
D1. Market Value Rate of Return	1.7%
D2. Actuarial Value Rate of Return	6.1%

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Development of Health Actuarial Value of Assets - Tiers 3

A. Investment Income	
A1. Actual Investment Income	$ 17,312
A2. Expected Amount for Immediate Recognition	70,089
A3. Amount Subject to Amortization	(52,777)

	Year Ended June 30				
B. Amortization Schedule	**2020**	**2021**	**2022**	**2023**	**2024**
2020 Experience (A3 / 5)	(10,555)	(10,555)	(10,555)	(10,555)	(10,557)
2019 Experience	1,507	1,507	1,507	1,508	
2018 Experience	0	0	(2)		
2017 Experience	0	0			
2016 Experience	0				
Total Amortization	(9,048)	(9,048)	(9,050)	(9,047)	(10,557)

C. Actuarial Value of Assets	**Total**	**Employer**
C1. Actuarial Value of Assets, 06/30/2019	548,406	
C2. Noninvestment Net Cash Flow	909,053	
C3. Preliminary Actuarial Value of Assets, 06/30/2020 (A2 + B + C1 + C2)	1,518,500	
C4. Market Value of Assets, 06/30/2020	1,480,635	703,098
C5. Final Actuarial Value of Assets, 06/30/2020 (C3 Within 20% Corridor of C4)	1,518,500	721,078

D. Rates of Return	
D1. Market Value Rate of Return	1.7%
D2. Actuarial Value Rate of Return	6.1%

V. MEMBER STATISTICS

Valuation Data Summary

	June 30, 2020		June 30, 2019	
	Tiers 1 & 2	**Tier 3**	**Tiers 1 & 2**	**Tier 3**
Actives				
Number	43	19	48	10
Average Current Age	39.6	29.9	38.0	28.4
Average Age at Employment	27.4	28.8	27.1	27.6
Average Past Service	12.2	1.1	10.9	0.8
Average Annual Salary	$78,822	$54,296	$76,116	$56,070
Actives (transferred)				
Number	5	0	4	0
Average Current Age	36.8	N/A	34.4	N/A
Average Age at Employment	29.2	N/A	27.8	N/A
Average Past Service	7.6	N/A	6.6	N/A
Average Annual Salary	$64,237	N/A	$62,919	N/A
Retirees				
Number	48	0	47	0
Average Current Age	63.3	N/A	62.6	N/A
Average Annual Benefit	$50,866	N/A	$49,983	N/A
Drop Retirees				
Number	2	N/A	2	N/A
Average Current Age	54.4	N/A	53.0	N/A
Average Annual Benefit	$55,808	N/A	$56,172	N/A
Beneficiaries				
Number	11	0	11	0
Average Current Age	70.4	N/A	69.4	N/A
Average Annual Benefit	$43,186	N/A	$42,339	N/A
Disability Retirees				
Number	12	0	12	0
Average Current Age	58.5	N/A	57.6	N/A
Average Annual Benefit	$42,704	N/A	$41,867	N/A
Inactive / Vested				
Number	11	1	9	1
Average Current Age	32.7	26.7	33.2	25.8
Average Accumulated Contributions	$12,690	$387	$8,533	$387
Total Number	132	20	133	11
Former Members (transferred)	2	1	1	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	1	0	0	0	0	0	0	1	57,899	57,899
25 - 29	2	2	0	0	0	0	0	4	269,983	67,496
30 - 34	3	4	0	0	0	0	0	7	445,738	63,677
35 - 39	3	4	6	0	0	0	0	13	988,137	76,011
40 - 44	0	2	2	7	2	0	0	13	1,096,335	84,333
45 - 49	0	0	3	3	2	0	0	8	677,838	84,730
50 - 54	0	0	1	0	1	0	0	2	174,598	87,299
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	9	12	12	10	5	0	0	48	3,710,528	77,303

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	5	0	0	0	0	0	0	5	268,902	53,780
25 - 29	6	0	0	0	0	0	0	6	327,540	54,590
30 - 34	5	0	0	0	0	0	0	5	271,935	54,387
35 - 39	2	0	0	0	0	0	0	2	108,621	54,311
40 - 44	1	0	0	0	0	0	0	1	54,624	54,624
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	19	0	0	0	0	0	0	19	1,031,622	54,296

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

$110,000 for calendar 2020. 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-2019. 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-2019.

Beneficiaries:
PubS-2010 Survivor mortality, projected with future mortality improvements reflected generationally using 75% of scale MP-2019.

Disabled Lives:
PubS-2010 Disabled mortality, projected with future mortality improvements reflected generationally using 75% of scale MP-2019.

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.

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	3.50% 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 amortization method was changed for Tiers 1 and 2 to use a layered amortization approach.

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			Tier 3 [1]		
	06/30/2018	**06/30/2019**	**06/30/2020**	**06/30/2018**	**06/30/2019**	**06/30/2020**
Support Ratio						
Total Actives	57	52	48	419	944	1,408
Total Inactives	77	81	84	23	57	130
Actives / Inactives	74.0%	64.2%	57.1%	1,821.7%	1,656.1%	1,083.1%
Asset Volatility Ratio						
Market Value of Assets (MVA)		31,091,975	37,931,038		9,392,896	22,964,925
Total Annual Payroll		3,905,240	3,710,528		50,420,565	84,448,996
MVA / Total Annual Payroll		796.2%	1,022.3%		18.6%	27.2%
Accrued Liability (AL) Ratio						
Inactive Accrued Liability	41,247,571	45,249,031	45,904,788		203,244	1,173,104
Total Accrued Liability	55,594,315	58,774,553	60,807,910		7,956,725	23,239,599
Inactive AL / Total AL	74.2%	77.0%	75.5%		2.6%	5.0%
Funded Ratio						
Actuarial Value of Assets (AVA)	23,444,832	32,158,956	40,839,864	1,635,349	9,305,220	23,570,444
Total Accrued Liability	55,594,315	58,774,553	60,807,910	1,831,715	7,956,725	23,239,599
AVA / Total Accrued Liability	42.2%	54.7%	67.2%	89.3%	116.9%	101.4%
Net Cash Flow Ratio						
Net Cash Flow [2]		6,299,877	6,459,531		7,281,178	13,192,598
Market Value of Assets (MVA)		31,091,975	37,931,038		9,392,896	22,964,925
Net Cash Flow / MVA		20.3%	17.0%		77.5%	57.4%

[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) 62nd 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 on Credited Service (maximum 20 years) over 20.
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, 2015	7.50%
July 1, 2016	7.40%
July 1, 2017	7.40%
July 1, 2018	7.30%
July 1, 2019	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

None.

IX. ACTUARIAL FUNDING POLICY

The purpose of this Actuarial Funding Policy is to record the funding objectives and policy set by the Board for the Arizona Public Safety Personnel Retirement System (PSPRS). The Board establishes this Funding Policy to help ensure the systematic funding of future benefit payments for members of the Retirement System.

This funding policy was reviewed by the Board annually for several years following initial adoption until the 2017 experience study. Subsequently, it shall be reviewed every five years in conjunction with the experience study, although some adjustments may be warranted sooner to properly reflect Tier 3 benefits and changes to amortization methodology.

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.

2. Maintain stability of employer contribution rates, consistent with other funding objectives.

3. Maintain public policy goals of accountability and transparency. Each policy element is clear in intent and effect, and each should allow an assessment of whether, how and when the funding requirements of the plan will be met.

4. Promote intergenerational equity. Each generation of members and employers should incur the cost of benefits for the employees who provides services to them, rather than deferring those costs to future members and employers.

5. Provide a reasonable margin for adverse experience to help offset risks.

6. Continue progress of systematic reduction of the Unfunded Actuarial Accrued Liability (UAAL).

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 in calculating the Actuarial Value of Assets.

   b. The Actuarial Value of Assets so determined shall be subject to a 20% corridor relative to the Market Value of Assets.

3. Amortization Method

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. If the Actuarial Value of Assets exceeds the AAL, the excess is amortized over an open period of 20 years and applied as a credit to reduce the Normal Cost otherwise payable.

4. Funding Target

a. The targeted funded ratio shall be 100%.

b. The maximum amortization period shall be 30 years.

c. If the funding ratio is between 100% and 120%, a minimum contribution equal to the Normal Cost will be made.

5. Risk Management

a. Assumption Changes

i. The actuarial assumptions used shall be those last adopted by the PSPRS Board based on the most recent experience study and upon the advice and recommendation of the actuary. In accordance with best practices, the actuary shall conduct an experience study every five years. The results of the study shall be the basis for the actuarial assumption changes recommended to the PSPRS Board.

ii. The actuarial assumptions can be updated during the five-year period if significant plan design changes or other significant events occur, as advised by the actuary.

b. Amortization Method

i. The amortization method, Level Percent Closed, will ensure full payment of the UAAL over a finite, systematically decreasing period not to exceed 30 years. The amortization period will be reviewed once the period reaches 15 years.

c. Risk Measures

i. The following risk measures will be annually determined to provide quantifiable measurements of risk and their movement over time.

1. Classic measures currently determined
   - Funded ratio (assets / liability)
2. UAAL / Total Payroll
   - Measures the risk associated with contribution decreases relative impact on the ability to fund the UAAL. An increase in this measure indicates an increase in contribution risk.
3. Total Liability / Total Payroll
   - Measures the risk associated with the ability to respond to liability experience through adjustments in contributions. An increase in this measure indicates an increase in experience risk.

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.