

City of Phoenix Employees' Retirement System

Actuarial Valuation Report as of June 30, 2016

Produced by Cheiron

October 2016

Table of Contents

<i>Section</i>		<i>Page</i>
Section I	Board Summary	1
Section II	Certification	14
Section III	Assets	15
Section IV	Funding Liability Measures	18
Section V	Contributions.....	25
Section VI	Accounting and Financial Reporting under GASB 67 and 68.....	28
Section VII	Actuarial Section of the CAFR.....	38
 <i>Appendices</i>		
Appendix A	Membership Information	41
Appendix B	Actuarial Assumptions and Methods	52
Appendix C	Summary of Plan Provisions.....	58
Appendix D	Glossary of Terms.....	63

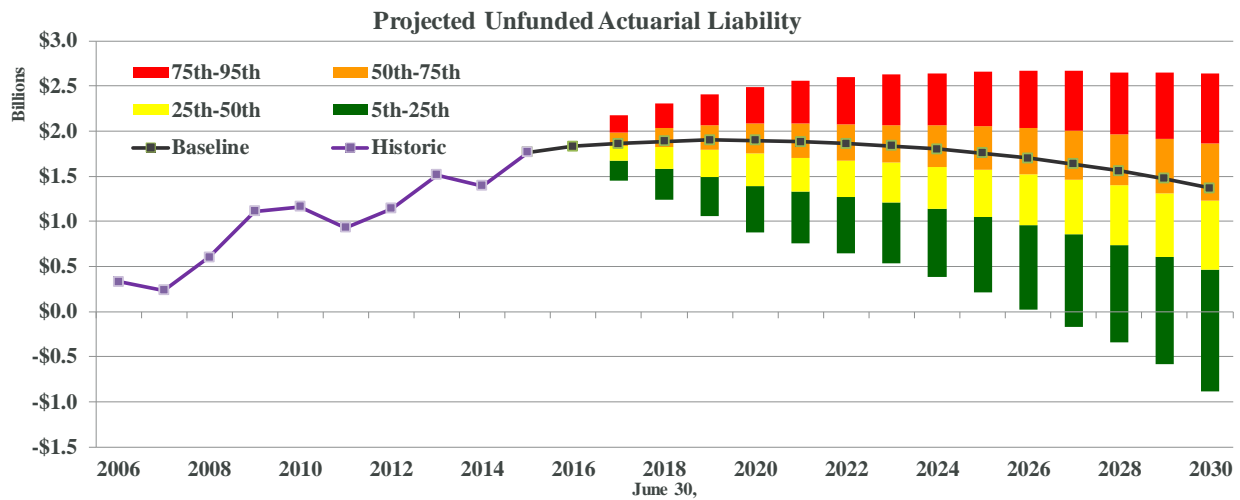
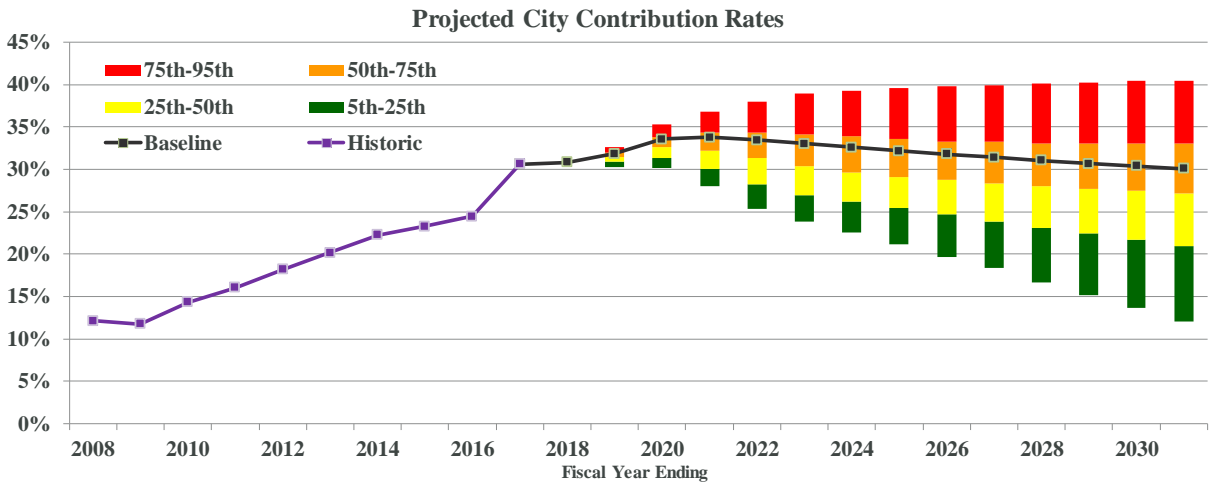
**CITY OF PHOENIX EMPLOYEES' RETIREMENT SYSTEM
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2016**

SECTION I – BOARD SUMMARY

Highlights of this report are summarized in the tables and graphs below.

<u>Contributions</u>			Actuarial Liability	<u>Funding Status</u>		
	Fiscal Year Ending			Valuation Date		
	2018	2017		6/30/2016	6/30/2015	
Tier 1 Member Rate	5.00%	5.00%		Actuarial Liability (AL)	\$ 3,984	\$ 3,976
Tier 2/3 Member Rate	11.00%	11.00%		Market Value of Assets (MVA)	2,151	2,210
City Rate	30.82%	30.60%		Unfunded AL (UAL) - MVA	\$ 1,833	\$ 1,766
				Funded Ratio - MVA	54.0%	55.6%
Normal Cost Rate	15.45%	16.47%		Actuarial Value of Assets (AVA)	2,283	2,203
Interest on MVA UAL	26.23%	26.34%		UAL - AVA	\$ 1,701	\$ 1,773
Additional UAL Rate	-4.52%	-6.22%		Funded Ratio - AVA	57.3%	55.4%
Total UAL Rate	21.71%	20.12%				
Total Rate	37.16%	36.59%				

Amounts in Millions



**CITY OF PHOENIX EMPLOYEES' RETIREMENT SYSTEM
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2016**

SECTION I – BOARD SUMMARY

Assets and Liabilities

This report measures assets and liabilities both for funding purposes and for financial reporting purposes. For many pension plans, the basis for these measures differs, but for the City of Phoenix Employees' Retirement System (COPERS), the measures are the same except for the use of a smoothed value of assets to develop contribution rates for funding purposes. Table I-1 below compares the assets, liabilities, Unfunded Actuarial liability (UAL), and funded ratios between June 30, 2016 and June 30, 2015.

Table I - 1			
Assets And Liabilities			
Item	June 30, 2016	June 30, 2015	% Change
Actuarial Liability (AL)			
Actives	\$ 1,396.6	\$ 1,442.8	-3.2%
Terminated Vesteds	64.6	67.2	-3.9%
In Pay Members	<u>2,523.0</u>	<u>2,465.9</u>	2.3%
Total AL	\$ 3,984.1	\$ 3,975.9	0.2%
Market Value of Assets (MVA)	<u>2,151.4</u>	<u>2,209.5</u>	-2.6%
Unfunded AL (UAL) - MVA Basis	\$ 1,832.7	\$ 1,766.4	3.8%
Funded Ratio - MVA Basis	54.0%	55.6%	-2.8%
Actuarial Value of Assets (AVA)	<u>2,283.2</u>	<u>2,202.9</u>	3.6%
UAL - AVA Basis	\$ 1,700.9	\$ 1,773.0	-4.1%
Funded Ratio - AVA Basis	57.3%	55.4%	3.4%
Expected Payroll (Pay)	\$ 496.3	\$ 484.9	2.4%
Asset Leverage Ratio (MVA/Pay)	4.3	4.6	-4.9%
AL Leverage Ratio (AL/Pay)	8.0	8.2	-2.1%
Interest on UAL - MVA Basis	\$ 132.6	\$ 127.8	3.8%
Interest Cost	26.7%	26.4%	1.4%

Dollar amounts in millions

For funding purposes, the Actuarial Liability (AL) represents the targeted amount of assets as of the valuation date based on the actuarial cost method. Shortfalls or surpluses in assets compared to the Actuarial Liability are made up over a period of time through increases or reductions in contributions. Since COPERS uses the same actuarial cost method for funding as is required by the Governmental Accounting Standards Board (GASB) for financial reporting and the discount rate used for both purposes is also the same, the Total Pension Liability (TPL) under GASB Statement Nos. 67 and 68 is identical to the Actuarial Liability developed for funding.

SECTION I – BOARD SUMMARY

As of June 30, 2016, approximately 63% of the Actuarial Liability is for members who are currently receiving benefits, increased from 62% in the prior valuation. The Actuarial Liability for active members decreased 3.2% while it increased for retirees by 2.3%. Payroll for active members increased by 2.4%.

For financial reporting purposes under GASB Statement Nos. 67 and 68, the Plan's Fiduciary Net Position (FNP) is equal to the Market Value of Assets (MVA) and the Net Pension Liability (NPL) is equal to the Unfunded Actuarial Liability (UAL) based on that FNP. On this basis, the COPERS funded ratio decreased from 55.6% as of June 30, 2015 to 54.0% as of June 30, 2016. The NPL increased from \$1.77 billion to \$1.83 billion over this same period.

For funding purposes, COPERS calculates an Actuarial Value of Assets (AVA) that recognizes gains and losses compared to the expected investment returns over a four-year period. For this year, the investment return on the AVA was 6.8% compared to a 0.4% return on the MVA. The ratio of the AVA to the MVA increased from 99.7% to 106.1%. Also over this year, the UAL based on the AVA decreased from \$1.77 billion to \$1.70 billion; and, the funded ratio based on AVA increased from 55.4% to 57.3%.

The asset leverage ratio is calculated as the MVA divided by payroll and measures the sensitivity of COPERS funding to investment gains and losses. The ratio of 4.3 as of June 30, 2016 means that a 10% investment loss (relative to the assumed rate of return) is equivalent to a loss of 43% of payroll. The Actuarial Liability leverage ratio shows what the asset leverage ratio would be if COPERS was 100% funded. The decrease from 8.2 to 8.0 in the last year is due to a combination of assumption changes that reduced the Actuarial Liability and increases in active payroll.

The interest cost on the UAL ($7.5\% \times \text{UAL} \div \text{payroll}$) has increased from 26.4% of payroll to 26.7% of payroll over the last year. Since the UAL payments for FYE 2017 and 2018 are less than the interest on the UAL, the UAL is expected to grow during these periods. Once the amortization payments on the assumption changes are fully phased-in and the amortization periods shorten, the UAL payment will exceed the interest cost and the current UAL is expected to be paid off in 22 years.

Despite the tendency to focus on the most recent valuation results, it is important to remember that each valuation is merely a snapshot of the long-term progress of the System. The results of the current year's valuation should thus be evaluated in the context of historical trends, as well as trends expected in the future for a better understanding of the status of the System. All historical information shown in this report from valuations prior to 2012 was determined by the prior actuary.

Chart I-1 on the next page shows the historical trends and expected projections for assets (both MVA and AVA) and Actuarial Liability (AL) as well as funded ratios, developed on the basis of the smoothed AVA values. The historical trends are shown since 2006 and the projected values are shown for the next fifteen years assuming that all actuarial assumptions are exactly met. From 2007 to 2015, the funded ratio has declined with most of the decrease attributable to the stagnation in the assets since 2008 combined with the significant increase in liabilities due to assumption changes in 2013 and 2015. The smoothed AVA spread the investment losses from

SECTION I – BOARD SUMMARY

2008-2009 over four years, but now those losses have been fully recognized and the MVA, the blue line, is lower than the Actuarial Value of Assets, the green line. During the projection period, the two asset values do not show deviation due to the assumption within this projection that all actuarial assumptions are exactly met, including the investment rate of return. The projections show growth in the funded ratio as contributions pays off the existing UAL, with the AVA funded ratio expected to increase from the current 57% to 80% over the 15-year projection period shown.

Chart I-1: Historical and Deterministic Projected Assets and Liabilities

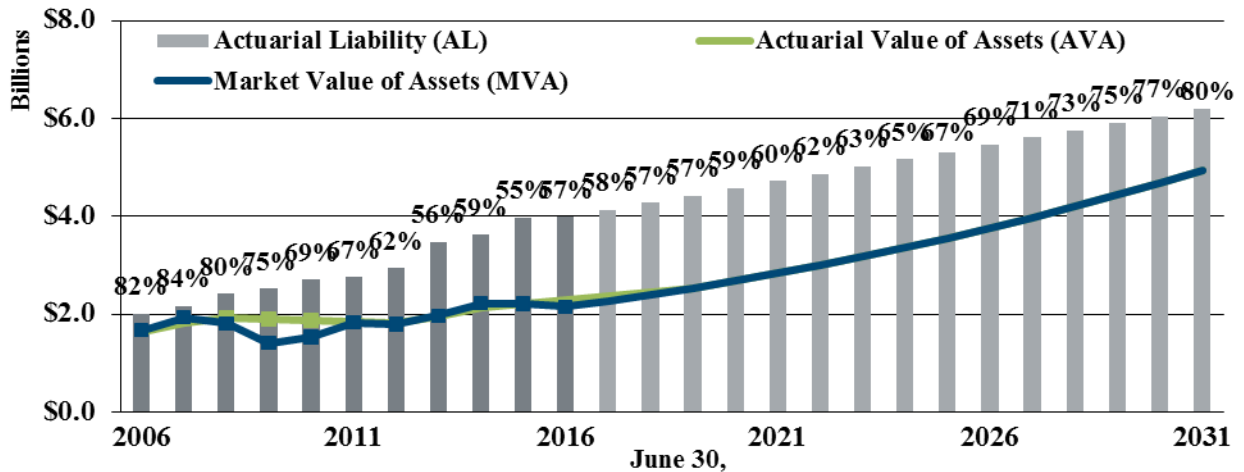
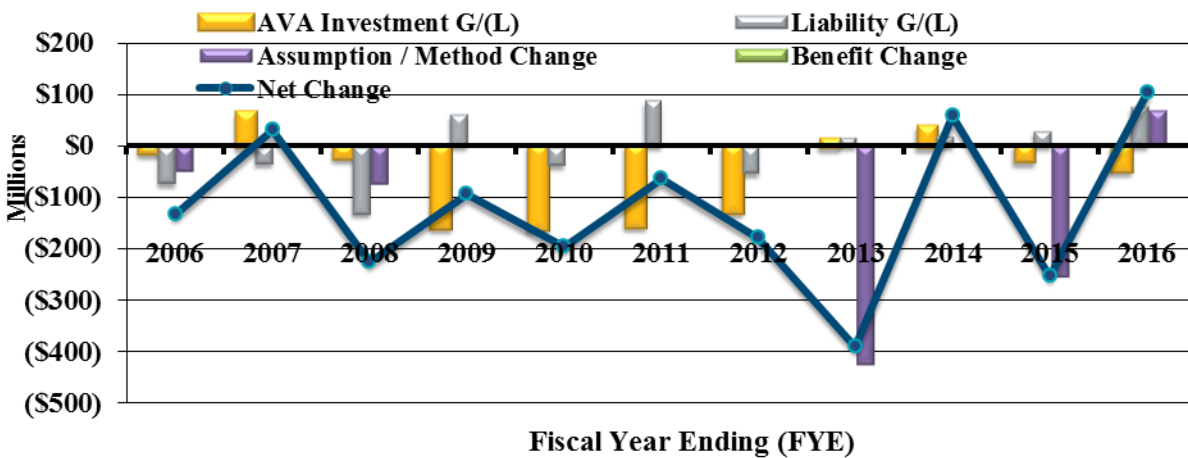


Chart I-2 below shows historical changes in UAL for COPERS, broken into investment gains and losses on the Actuarial Value of Assets, liability gains and losses, and assumption changes.

Chart I-2: Sources of Historical Gains, Losses and Assumption Changes



The investment losses (gold bars) from 2009 through 2012 contributed significantly to the increase in the UAL. On the liability side, experience since 2009 has been relatively balanced between gains and losses while experience prior to 2009 appears to have been dominated by

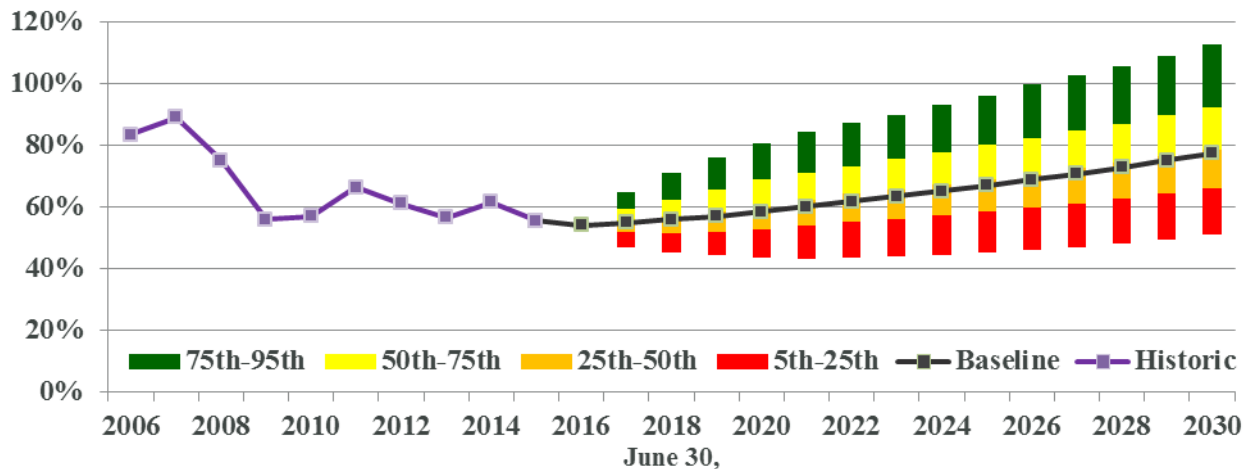
SECTION I – BOARD SUMMARY

losses. The assumption changes in 2013, including the recognition of a liability for future Pension Equalization Reserve payments and a reduction in the discount rate, significantly increased the measure of the UAL. The assumption changes adopted in 2015 also had a net effect of increasing the UAL, driven by projected improvements in mortality and other changes to the demographic assumptions. In the last year, there were liability gains primarily attributable to lower salary increases than expected and no payment from the Pension Equalization Reserve (PER). These gains were partially offset by investment losses measured on the Actuarial Value of Assets. In addition, there was an assumption change to more accurately estimate future Pension Equalization Reserve payments by excluding payments for the first three years after a member retires. Previously, our valuation system was unable to accommodate this refinement.

If experience has taught us anything, it is that there is a significant level of uncertainty in projections of the future. The largest source of uncertainty is the projection of investment returns. In order to better understand the potential impact of investment returns on COPERS, we have included stochastic projections throughout this report based on the assumed rate of return of 7.50% with Meketa’s estimated standard deviation of 10.74%. Each projection contains 10,000 trials that are 15 years in length.

Chart I-3 below shows historical and a stochastic projection of MVA funded ratios. The black line shows the projected funded ratio for each year if all assumptions are met. The colored ranges represent different percentiles of the 10,000 results. For example, the red range represents the 5th through 25th percentile of funded ratios for each year seen among the 10,000 trials. Based on the assumed distribution investment returns, there is a 5% chance the result will be worse than the red range and a 5% chance that the result will be better than the green range.

Chart I-3: Historical and Stochastic Projected MVA Funded Ratios



Membership

As shown in Table I-2 on the following page, total membership grew 3.3% from 2015 to 2016, with significant changes within membership categories. Active membership increased 4.3%, terminated vested membership decreased 1.8%, and members currently in payment increased

**CITY OF PHOENIX EMPLOYEES' RETIREMENT SYSTEM
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2016**

SECTION I – BOARD SUMMARY

2.9%. Total payroll projected for FYE 2017 increased 2.4%, while the average pay per active member decreased by 1.8%. These changes explain, in part, the changes in the liability measurement and the changes in calculated contribution rates. For example, the reduction in active Actuarial Liability is due partly to a combination of active members retiring and the pay for remaining active members not increasing as expected.

Table I - 2			
Total Membership			
Item	June 30, 2016	June 30, 2015	% Change
Active Members			
Tier 1	6,416	6,741	-4.8%
Tier 2	953	722	32.0%
Tier 3	<u>414</u>	<u>0</u>	N/A
Total	7,783	7,463	4.3%
Terminated Vesteds	885	901	-1.8%
In Pay Members			
Service Retirees	5,576	5,419	2.9%
Disabled Retirees	249	251	-0.8%
Beneficiaries	<u>1,060</u>	<u>1,018</u>	4.1%
Total	6,885	6,688	2.9%
Total Members	15,553	15,052	3.3%
Active Member Payroll			
Actual for Prior Year	\$ 474.0	\$ 484.3	-2.1%
Projected for Upcoming Year	\$ 496.3	\$ 484.9	2.4%
Average Pay per Active Member			
Projected for Upcoming Year	\$ 63,771	\$ 64,968	-1.8%
Annuities Currently In Pay	\$ 215.1	\$ 207.9	3.5%

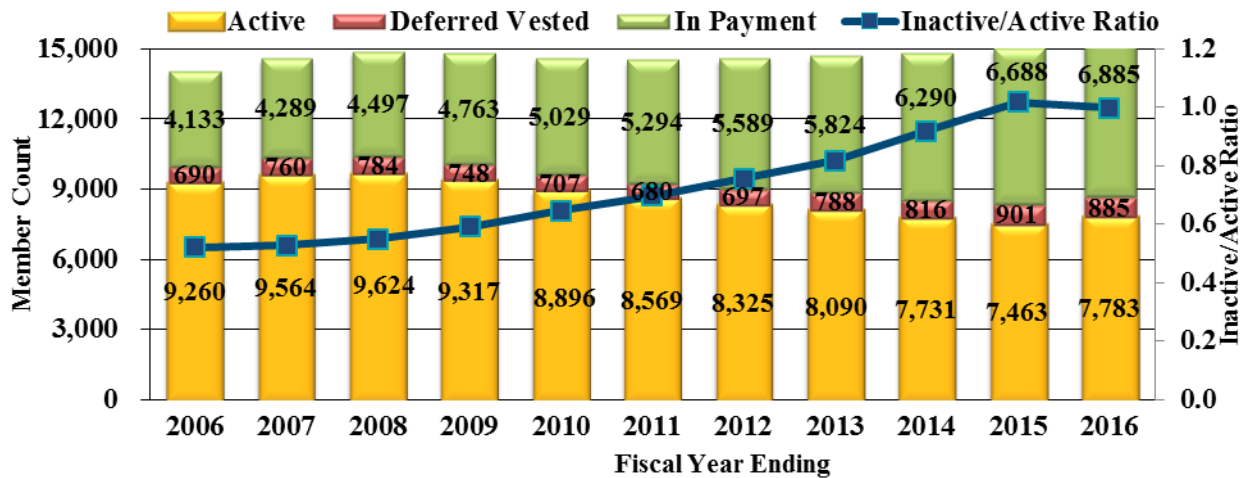
Payroll and annuity amounts in millions

Chart I-4 on the next page puts the membership trends in some historical perspective. The number of active members has declined over 20 percent since 2008, while the number of members receiving benefits has increased almost 50 percent during the same period. There are now approximately equal numbers of active and inactive (those currently receiving benefits plus terminated vested members) members, making the System more sensitive to changes as any gain or loss on inactive members is now spread over the payroll of fewer active members than it would have been in the past. The blue line illustrates the relative size of these two groups, showing the trend of the ratio of inactive members to active members, increasing from 0.5 in 2006 to 1.0 in 2016.

CITY OF PHOENIX EMPLOYEES' RETIREMENT SYSTEM
 ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2016

SECTION I – BOARD SUMMARY

Chart I-4: Historical Changes in Member Counts



Contribution Rates

The total annual contribution rate, referred to in the City Charter as the Projected Percentage, equals the sum of the normal cost rate, the administrative expense rate, and the amortization payment on the UAL expressed as a percentage of total annual payroll. Normal cost rates are calculated separately for Tier 1, Tier 2, and Tier 3 members. The normal cost rates by Tier are then combined as a weighted average based on the projected annual payroll for each Tier for the fiscal year to which the rates apply to develop the normal cost rate for COPERS as a whole.

The administrative expense rate is assumed to be 0.07% of total annual compensation as of June 30, 2016.

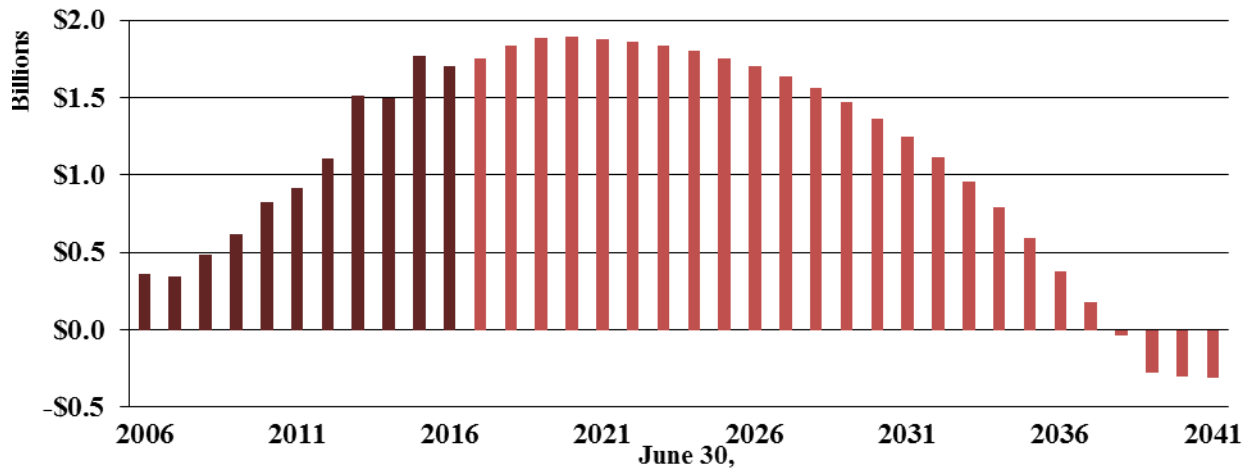
The UAL rate for the fiscal year ending (FYE) 2018, determined by this June 30, 2016 actuarial valuation, consists of eight separate components for the UAL. There are 22 years remaining on the amortization period for all current components, except the 2015 assumption changes, which has 19 years remaining on its amortization. All current components are amortized as a level percentage of payroll assuming 3.5% increases in total annual payroll each year. The amortization of the 2015 assumption changes, however, is in the second year of a four-year phase-in to the full amortization rate, so the payment on the amortization of these assumption changes is currently one-half of what it would be without the phase-in.

Chart I-5 on the following page shows the historical UAL and its projected decline as payments are made based on these amortization schedules.

**CITY OF PHOENIX EMPLOYEES' RETIREMENT SYSTEM
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2016**

SECTION I – BOARD SUMMARY

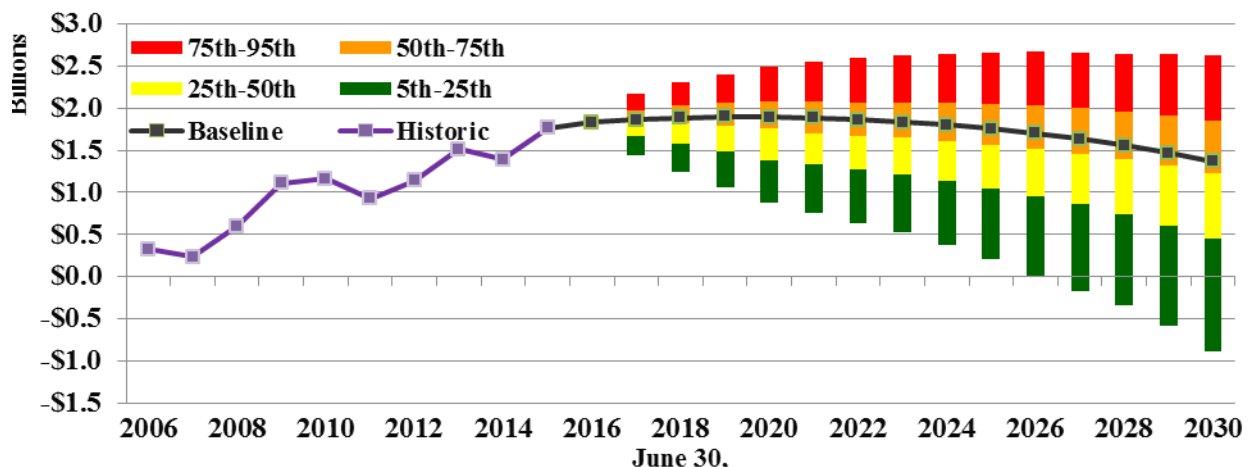
Chart I-5: Historical and Deterministic Projected Unfunded Actuarial Liability



This amortization structure results in a total UAL rate of 21.7% of payroll for FYE 2018, which is less than the amount needed to pay the interest cost on the UAL (26.7% of payroll). As a result, the dollar amount of the UAL is expected to increase in the short term as shown in the chart above. As the phase-in of the base for the 2015 assumption changes are completed and the remaining amortization periods on all the UAL components shorten, the UAL rate will exceed the interest cost on the UAL and is expected to pay off the principal and interest in 22 years. Due to the lag between the valuation date and when contribution rates become effective, a slight surplus is projected after the end of the amortization periods.

Chart I-6 below shows the historical and stochastically projected UAL based on AVA. While the amortization methods are designed to pay off the entirety of the current UAL in 22 years, the stochastic projection shows that there is a 5% chance that it will be paid off in as early as 10 years. It also shows, however, that there is more than a 5% chance that the UAL will be more than \$2.5 billion in 10 years.

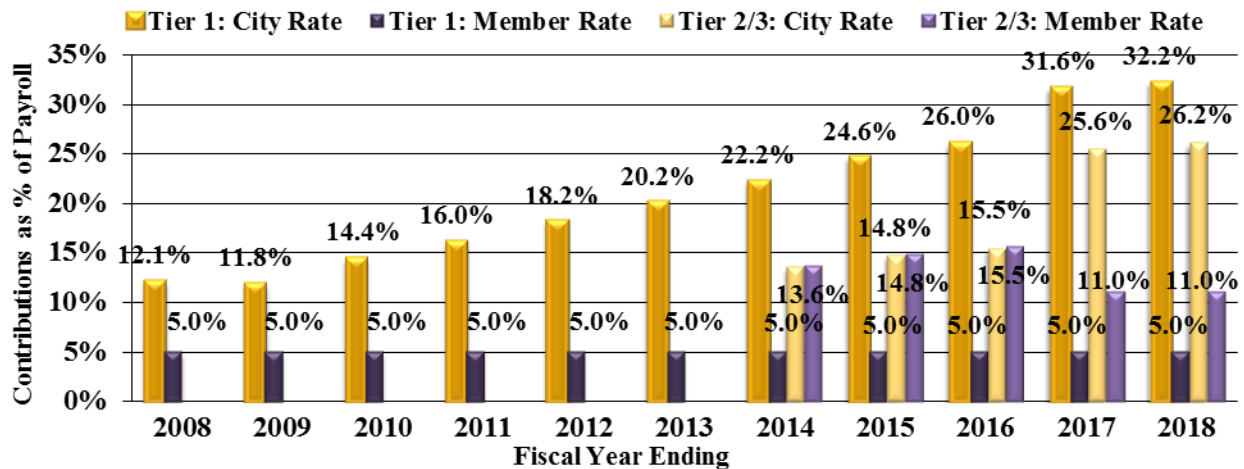
Chart I-6: Historical and Stochastic Projected Unfunded Actuarial Liability



SECTION I – BOARD SUMMARY

Chart I-7 shows historical contribution rates by tier from FYE 2008 through 2018. Note that there is a lag between the actuarial valuations and the contribution rates they develop such that these rates were developed by the June 30, 2006 through the June 30, 2016 actuarial valuations. There has been a steady increase in the City's contribution rate as the UAL has grown throughout this period. With the implementation of Tier 2, it was thought that new members would help shoulder a significant portion of the increased contribution rates. However, the recent ballot measure capped the contribution rates for Tier 2 and Tier 3 members at 11%. In the short term, this cap shifts some of the burden back to the City, but the lower normal cost rates for Tier 3 members compared to Tier 2 are eventually expected to help reduce City contributions compared to those expected prior to the 2015 ballot measure.

Chart I-7: Historical Contribution Rates by Tier



For Tier 1, members contribute 5.0% of payroll, and the City contributes the remainder of the Projected Percentage (32.2% for FYE 2018). Effective January 1, 2016, Tier 2 and Tier 3 member contributions are half of the Projected Percentage, capped at 11.0%, with the City contributing the remainder (26.2% for FYE 2018). Based on expected Tier 1 payroll of approximately \$399 million, expected Tier 2 payroll of approximately \$42 million, and expected Tier 3 payroll of approximately \$73 million for FYE 2018, we expect the City's aggregate contribution rate to be approximately 30.8% of payroll for FYE 2018.

Chart I-8 on the following page shows historical and projected aggregate member contribution rates (purple bars) and City contribution rates (gold bars) compared to the projection of member plus City contributions from the prior valuation, indicated by the red line. If all actuarial assumptions are exactly met, the City contribution rates are expected to increase from approximately 31% in FYE 2018 to approximately 34% in FYE 2020 as the impact of the assumption changes is phased in and recent investment losses are recognized. Then, City contribution rates are expected to decline gradually to 30% by FYE 2030 as Tier 3 grows. Aggregate member contribution rates are projected to increase gradually over the projection period as Tier 1 members who contribute 5% leave the workforce and are replaced by Tier 3 members who contribution 50% of the Projected Percentage up to 11% of pay. The projected

**CITY OF PHOENIX EMPLOYEES' RETIREMENT SYSTEM
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2016**

SECTION I – BOARD SUMMARY

total contribution rates, the Projected Percentage values, are lower than the projections from the prior valuation in the short-term. In the long-term, the projections are very similar.

Chart I-8 also shows the City normal cost rate for the all COPERS actives with the black line. The projections show that this amount is expected to decline as more Tier 3 members enter the plan, replacing primarily Tier 1 members who currently have a higher City normal cost than those in Tier 3.

Chart I-8: Historical and Deterministic Projected Contribution Rates

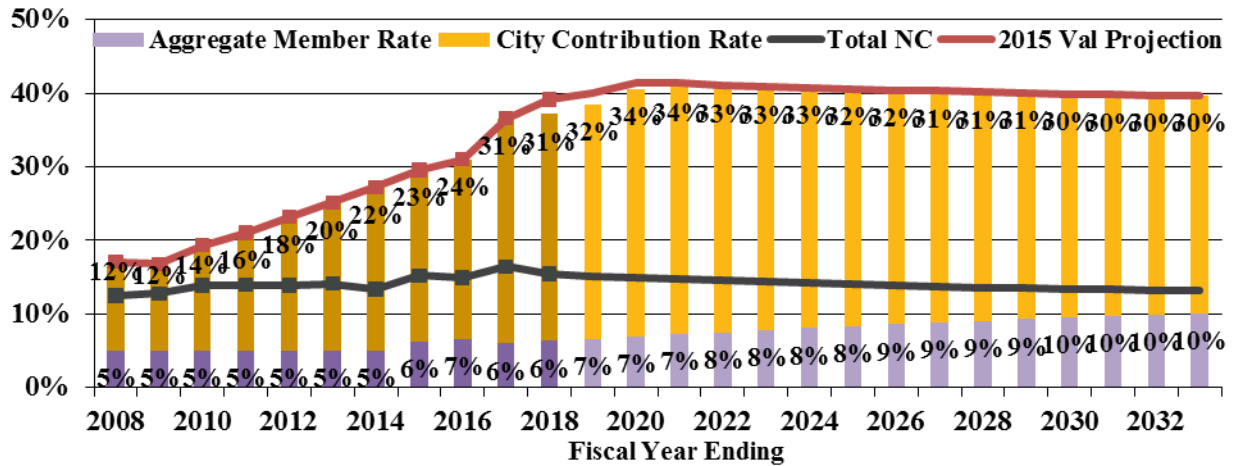


Table I-3 on the next page shows the primary sources for the change in the Projected Percentage from the rate that was calculated in the prior report. While the rate was expected to increase, primarily due to the phase-in of the amortization of the 2013 and 2015 assumption changes, additional increases were caused by the reduction in payroll and the investment experience. Demographic experience, plan changes, and assumption changes reduced the contribution rate so that the actual rate for FYE 2018 is less than the expected rate from the prior valuation.

SECTION I – BOARD SUMMARY

Table I - 3 Reconciliation of Changes In Contribution Rates			
	Total Normal Cost ¹	UAL Rate	Projected Percentage
FYE 2017 Projected Percentage	16.47%	20.12%	36.59%
Expected FYE 2018 Projected Percentage	16.20%	22.88%	39.08%
Changes Due to:			
Reduction in total payroll	0.00%	0.25%	0.25%
Asset experience	0.00%	0.63%	0.63%
Demographic experience	-0.18%	-1.06%	-1.24%
Plan changes	-0.07%	-0.04%	-0.11%
Assumption changes	-0.50%	-0.95%	-1.45%
FYE 2018 Projected Percentage	15.45%	21.71%	37.16%

¹ Includes administrative expenses and employee contributions

Dollar amounts in millions

Chart I-9 below shows historical and stochastically projected aggregate City contribution rates. The black line shows the projected contribution rate for each year based on all assumptions being met. The colored ranges represent different percentiles of 10,000 stochastic trials. While the City's contribution rate is expected to decline over time, there is significant uncertainty depending on actual investment returns. As noted above, the downward trend relies on a growing Tier 3 population with lower normal cost rates.

Chart I-9: Historical and Stochastic Projection of City Contribution Rates

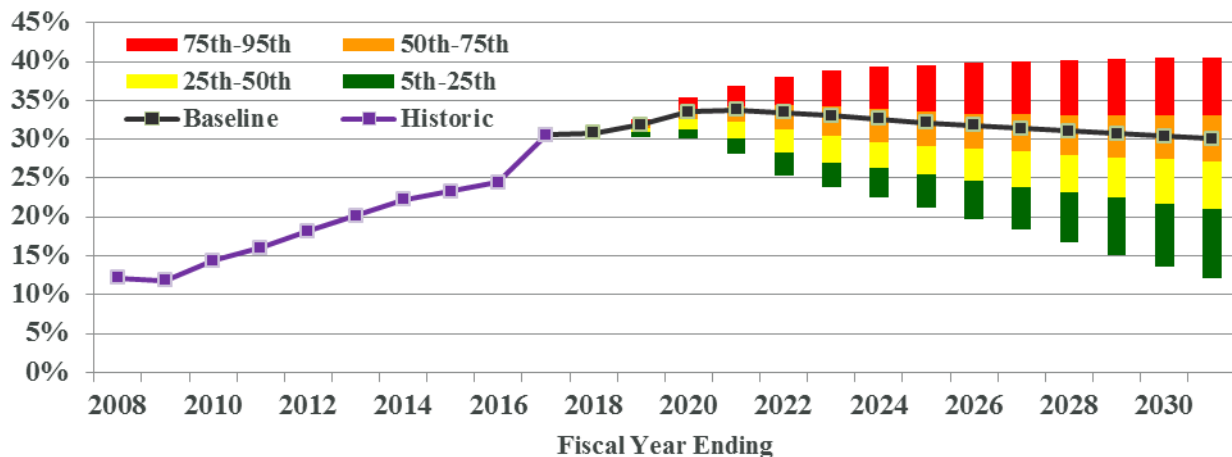


Chart I-10 on the following page shows historical and stochastically projected Tier 2/Tier 3 member contribution rates. As noted above, these contribution rates are half of the Projected Percentage, but effective January 1, 2016, capped at 11%. The black line in the chart shows the projected contribution rate for each year if all assumptions are met. The lack of colored ranges

SECTION I – BOARD SUMMARY

representing different percentiles of the 10,000 results indicates that the projected rate is expected to equal the cap of 11% for all trials between the 5th and 95th percentile for all years in the projection. However, after the current UAL is paid off, it is expected that these rates will drop below this level, eventually to the level of one-half of the Tier 3 total normal cost rate, 6.5%.

Chart I-10: Historical and Stochastic Projection of Tier 2/3 Member Contribution Rates

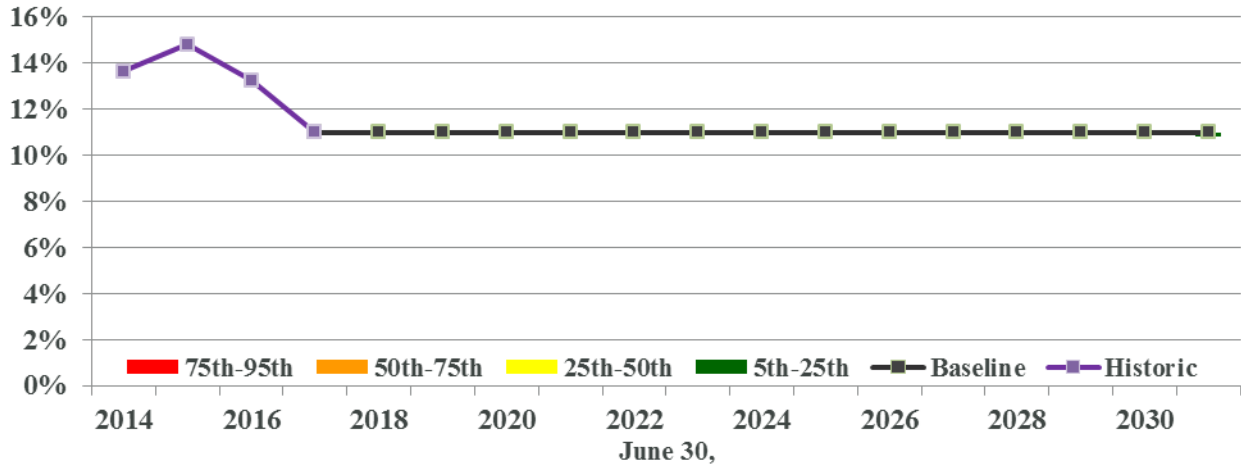
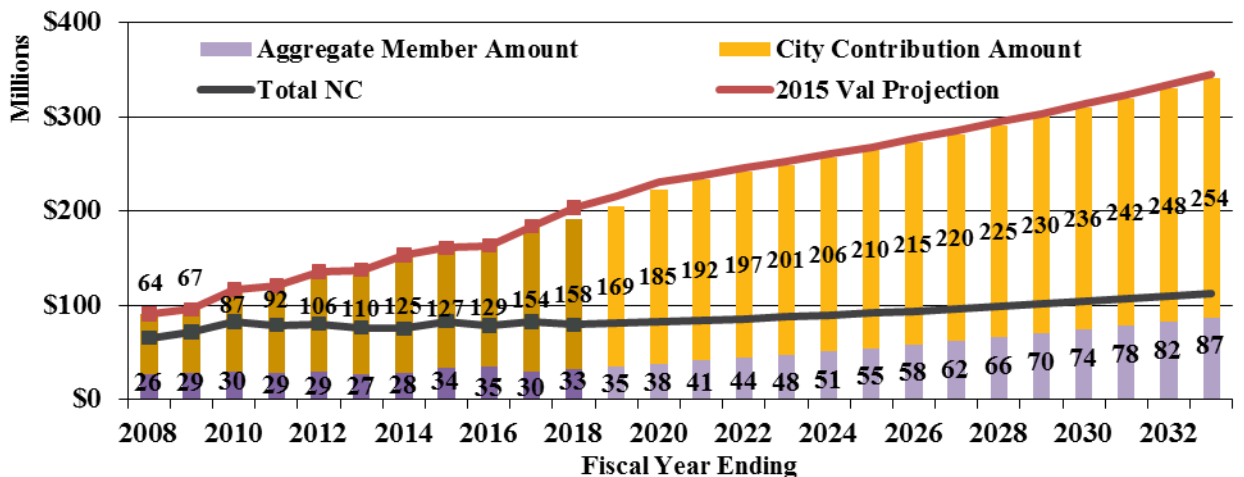


Chart I-11 below shows historical and projected member (purple bars) and City (gold bars) contribution amounts compared to the projected amounts shown in the prior valuation. If all actuarial assumptions are exactly met, City contributions are expected to increase from \$158 million in FYE 2018 to approximately \$185 million in FYE 2020, reflecting the phase-in of the impact of the assumption changes and the expected growth in payroll. The contribution amount is expected to increase after that at a rate lower than payroll growth as member contributions are expected to increase more rapidly than payroll as Tier 1 members are replaced by Tier 3 members.

Chart I-11: Historical and Deterministic Projection of Contribution Amounts

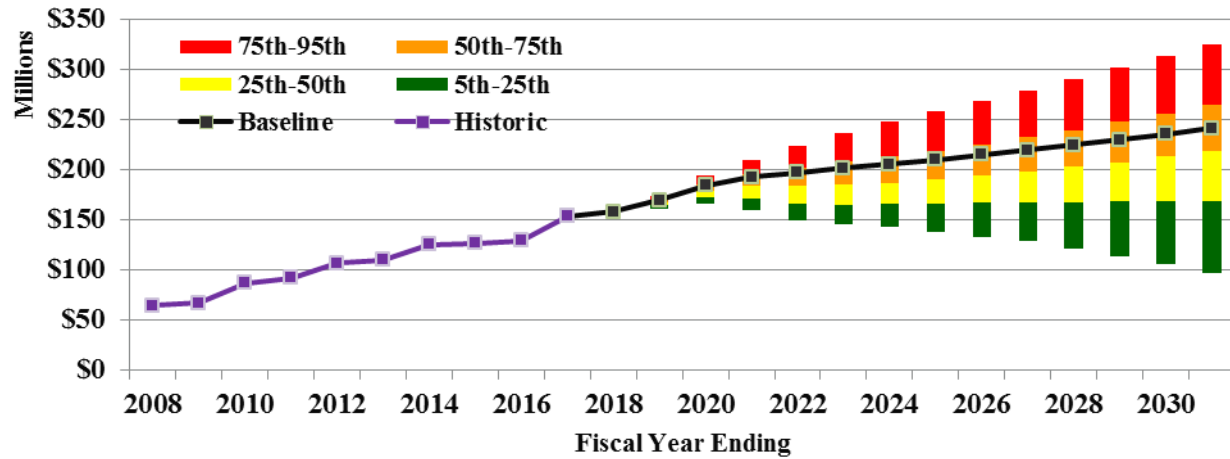


**CITY OF PHOENIX EMPLOYEES' RETIREMENT SYSTEM
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2016**

SECTION I – BOARD SUMMARY

Chart I-12 below shows the historical and stochastic projection of City contribution amounts. The black line shows the projected contribution amount for each year if all assumptions are met. The colored ranges represent different percentiles of the 10,000 results. There is significant uncertainty in the level of City contributions depending on investment returns.

Chart I-12: Historical and Stochastic Projection of City Contribution Amounts



SECTION II – CERTIFICATION

The purpose of this report is to present the results of the June 30, 2016 actuarial valuation for the City of Phoenix Employees' Retirement System (COPERS). This report is for the use of COPERS and the City of Phoenix and their respective auditors in preparing financial reports in accordance with applicable law and accounting requirements.

In preparing our report, we relied on information, some oral and some written, supplied by the System. This information includes, but is not limited to, the plan provisions, membership data, and financial information. We performed an informal examination of the obvious characteristics of the data for reasonableness and consistency in accordance with Actuarial Standard of Practice No. 23.

The assumptions used in this valuation were adopted by the Board in August 2015 based on our recommendations and the experience study covering the period from July 1, 2009 through June 30, 2014 with the exception of the mortality assumptions, which were adopted by the Board in October 2015.

The funded ratios in this report are for the purpose of establishing contribution rates and for meeting financial reporting requirements under GASB 67 and 68. These measures are not appropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations.

Future actuarial measurements may differ significantly from the current measurements due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; and, changes in plan provisions or applicable law.

To the best of our knowledge, this report and its contents have been prepared in accordance with generally recognized and accepted actuarial principles and practices that are consistent with the Code of Professional Conduct and applicable Actuarial Standards of Practice set out by the Actuarial Standards Board. The schedules provided for financial reporting purposes have been prepared in accordance with our understanding of generally accepted accounting principles as promulgated by the GASB. Furthermore, as credentialed actuaries, we meet the Qualification Standards of the American Academy of Actuaries to render the opinion contained in this report. This report does not address any contractual or legal issues. We are not attorneys and our firm does not provide any legal services or advice.

This report was prepared for the System for the purposes described herein and for the use by the plan auditor in completing an audit related to the matters herein. Other users of this report are not intended users as defined in the Actuarial Standards of Practice, and Cheiron assumes no duty or liability to any other user.



William R. Hallmark, ASA, EA, FCA, MAAA
Consulting Actuary



Elizabeth Wiley, FSA, EA, FCA, MAAA
Consulting Actuary

**CITY OF PHOENIX EMPLOYEES' RETIREMENT SYSTEM
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2016**

SECTION III – ASSETS

COPERS uses and discloses two different asset measurements that are presented in this section of the report: market value and actuarial value. The market value represents, as of the valuation date, the value of the assets if they were liquidated on that date. The Actuarial Value of Assets for COPERS is a value that smoothes annual investment returns over four years to reduce the impact of short-term investment volatility on contribution rates. The Market Value of Assets is used primarily for reporting and disclosure, and the Actuarial Value of Assets is used primarily to determine contribution rates.

This section shows the changes in the Market Value of Assets and develops the Actuarial Value of Assets.

Statement of Changes in the Market Value of Assets

Table III-1 shows the changes in the Market Value of Assets for the current and prior fiscal years.

Table III - 1		
Changes In Market Value Of Assets		
	FYE 2016	FYE 2015
Market Value, Beginning of Year	\$ 2,209,525,632	\$ 2,222,241,522
Contributions		
Member	\$ 29,305,943	\$ 27,860,787
City	119,844,242	117,092,059
Inter-System Transfers	216,669	199,341
Total	<u>\$ 149,366,854</u>	<u>\$ 145,152,187</u>
Net Investment Earnings	\$ 9,171,452	\$ 47,148,320
Disbursements		
Benefit Payments	\$ (216,094,202)	\$ (204,181,254)
Inter-System Transfers	(315,120)	(420,926)
Administrative Expenses	(234,097)	(414,217)
Total	<u>\$ (216,643,419)</u>	<u>\$ (205,016,397)</u>
Market Value, End of Year	\$ 2,151,420,519	\$ 2,209,525,632
Net Cash Flow as % of Assets	-3.0%	-2.7%
Estimated Rate of Return	0.4%	2.2%

The above shows that the net cash flow (contributions and net inter-system transfers minus benefit payments and administrative expenses) are currently -3.0% of assets. Negative net cash

SECTION III – ASSETS

flow is typical for a mature pension system and makes the system somewhat more sensitive to short-term investment returns. The net investment earnings for the year ended June 30, 2016 represent approximately a 0.4% return on the market value of assets compared to an assumed return of 7.5%. For the year ended June 30, 2015, the net investment return on the Market Value of Assets was approximately 2.2%.

Actuarial Value of Assets

To determine ongoing contribution amounts, COPERS uses an Actuarial Value of Assets that smoothes year-to-year market value returns in order to reduce the volatility of resulting contribution rates.

The Actuarial Value of Assets for COPERS is calculated by recognizing the difference between actual investment returns and the expected return (7.50%) on the prior year's Actuarial Value of Assets over a four-year period. Any difference between the expected return and the actual net investment earnings is considered a gain or loss. Table III-2 on the next page shows the calculation of the Actuarial Value of Assets, including increases for actual contributions and expected earnings, reductions for actual benefit payments and administrative expenses, and recognition of 25 percent of the gains and losses for the last four years. The gain and loss amounts not recognized in the current year will be recognized in future years.

**CITY OF PHOENIX EMPLOYEES' RETIREMENT SYSTEM
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2016**

SECTION III – ASSETS

Table III - 2		
Development Of Actuarial Value Of Assets		
	FYE 2016	FYE 2015
1. Actuarial Value of Assets, Beginning of Year	\$ 2,202,923,270	\$ 2,120,700,320
2. Net Cash Flow	(67,276,565)	(59,864,210)
3. Expected Return	162,741,983	156,848,200
4. Actual Return	9,171,452	47,148,320
5. Current Year Gain / (Loss) [4. - 3.]	(153,570,531)	(109,699,880)
6. Gains / (Losses)		
a. Current Year	\$ (153,570,531)	\$ (109,699,880)
b. Prior Year	(109,699,880)	152,930,726
c. 2nd Prior Year	152,930,726	49,647,635
d. 3rd Prior Year	<u>49,647,635</u>	<u>(151,922,641)</u>
e. Total	\$ (60,692,050)	\$ (59,044,160)
7. Phase-In Amount [25% of 6.e.]	\$ (15,173,012)	\$ (14,761,040)
8. Actuarial Value of Assets, End of Year [1. + 2. + 3. + 7.]	\$ 2,283,215,676	\$ 2,202,923,270
9. Estimated Rate of Return	6.8%	6.8%
10. Ratio of Actuarial to Market Value of Assets	106.1%	99.7%

On the basis of the smoothed Actuarial Value of Assets, the return for the year ending June 30, 2016 was approximately 6.8%, less than the assumed return of 7.5%, but more than the return on the Market Value of Assets. The ratio of the Actuarial Value of Assets to the Market Value of Assets has grown from 99.7% as of June 30, 2015 to 106.1% as of June 30, 2016. The current ratio is greater than 100%, meaning that there are stored losses remaining in the Actuarial Value of Assets that will be recognized over the next three years.

**CITY OF PHOENIX EMPLOYEES' RETIREMENT SYSTEM
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2016**

SECTION IV – FUNDING LIABILITY MEASURES

This section presents detailed information on liability measures for COPERS for funding purposes, including:

- Present value of future benefits,
- Actuarial Liability,
- Normal cost, and
- Analysis of changes in the Unfunded Actuarial Liability during the year.

Present Value of Future Benefits

The present value of future benefits represents the expected amount of money needed today to pay all benefits both earned as of the valuation date and those to be earned in the future by current plan members under the current plan provisions **if all assumptions are met**. Table IV-1 below shows the present value of future benefits as of June 30, 2016 and June 30, 2015. The amounts as of June 30, 2016 are split by tier as well as showing the total.

Table IV - 1					
Present Value Of Future Benefits					
	June 30, 2016				June 30, 2015
	Tier 1	Tier 2	Tier 3	Total	Total
Actives					
Retirement	\$ 1,736,392	\$ 73,112	\$ 19,168	\$ 1,828,672	\$ 1,887,700
Termination	85,713	15,204	4,975	105,892	112,520
Death	22,070	1,816	554	24,439	25,642
Disability	27,337	2,300	684	30,320	31,505
Total Actives	\$ 1,871,511	\$ 92,432	\$ 25,381	\$ 1,989,323	\$ 2,057,367
In Pay Status					
Service Retirees	\$ 2,289,942	\$ 0	\$ 0	\$ 2,289,942	\$ 2,241,352
Disabled Retirees	46,213	0	0	46,213	46,227
Beneficiaries	186,835	0	0	186,835	178,283
Total	\$ 2,522,989	\$ 0	\$ 0	\$ 2,522,989	\$ 2,465,862
Deferred Vested	\$ 64,281	\$ 280	\$ 9	\$ 64,570	\$ 67,206
Total	\$ 4,458,781	\$ 92,712	\$ 25,389	\$ 4,576,882	\$ 4,590,436
In Pay Status Excluding Minors					
Total	\$ 2,522,733	\$ 0	\$ 0	\$ 2,522,733	\$ 2,465,588
Monthly Payments	\$ 17,923	\$ 0	\$ 0	\$ 17,923	\$ 17,318

Amounts in Thousands

SECTION IV – FUNDING LIABILITY MEASURES

Normal Cost

Under the entry age (EA) actuarial cost method, the present value of future benefits for each individual is spread over the individual's expected working career under the System as a level percentage of the individual's expected pay. The normal cost rate is determined by dividing the value, as of entry age into the System, of each member's projected future benefits by the value, also at entry age, of the member's expected future salary. The normal cost rate is multiplied by the member's current salary to determine each member's normal cost at the valuation date. The normal cost of the System is the sum of the normal costs for each individual in the System. The normal cost represents the expected amount of money needed to fund the benefits attributed to the next year of service under the EA method.

Table IV-2 below shows the total EA normal cost as of June 30, 2016 and June 30, 2015 for Tier 1 members.

Table IV - 2				
Tier 1 Entry Age Normal Cost				
	June 30, 2016		June 30, 2015	
Tier 1 Normal Cost				
Retirement	\$	52,525,613	\$	57,215,620
Termination		7,599,691		8,257,326
Death		1,292,452		1,419,988
Disability		1,550,215		1,683,415
Total Tier 1 Normal Cost	\$	62,967,971	\$	68,576,349
Expected Tier 1 active payroll	\$	397,769,362	\$	416,246,437
Tier 1 Normal Cost Rate		15.83%		16.47%

The normal cost rate for Tier 1 members declined primarily due to the programming change that does not increase benefits for assumed PEP increases until three years after benefits commence.

Table IV-3 on the following page shows the total EA normal cost as of June 30, 2016 and June 30, 2015 for Tier 2 members.

**CITY OF PHOENIX EMPLOYEES' RETIREMENT SYSTEM
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2016**

SECTION IV – FUNDING LIABILITY MEASURES

Table IV - 3		
Tier 2 Entry Age Normal Cost		
	June 30, 2016	June 30, 2015
Tier 2 Normal Cost		
Retirement	\$ 5,638,833	\$ 4,576,378
Termination	1,153,178	1,217,837
Death	148,244	127,691
Disability	169,842	141,182
Total Tier 2 Normal Cost	\$ 7,110,097	\$ 6,063,088
Expected Tier 2 active payroll	\$ 42,164,928	\$ 32,539,956
Tier 2 Normal Cost Rate	16.86%	18.63%

Tier 2 is a small and closed group of employees. The decrease in the normal cost rate for this group is attributable to changes in the group of employees in Tier 2, the reduction in interest credits on member contributions, and the programming change that does not increase benefits for assumed PER increases until three years after benefits commence.

Table IV-4 below shows the total EA normal cost as of June 30, 2016 and June 30, 2015 for Tier 2 members.

Table IV - 4		
Tier 3 Entry Age Normal Cost		
	June 30, 2016	June 30, 2015
Tier 3 Normal Cost		
Retirement	\$ 1,764,186	N/A
Termination	408,959	N/A
Death	52,178	N/A
Disability	58,160	N/A
Total Tier 3 Normal Cost	\$ 2,283,483	N/A
Expected Tier 3 active payroll	\$ 18,096,677	N/A
Tier 3 Normal Cost Rate	12.62%	13.06%

Employees hired on or after January 1, 2016 are Tier 3 members. As of June 30, 2015, there were no Tier 3 members, so a normal cost rate was developed by applying the Tier 3 plan provisions to a hypothetical group of members. The reduction in normal cost rate is attributable to the differences between the hypothetical group and the actual group as of June 30, 2016. The lower normal cost rate for Tier 3 members compared to Tiers 1 and 2 is primarily due to the lower multipliers and no future PER payments.

**CITY OF PHOENIX EMPLOYEES' RETIREMENT SYSTEM
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2016**

SECTION IV – FUNDING LIABILITY MEASURES

The normal cost rates for the individual tiers are combined based on the expected payroll for each tier for the fiscal year to which contribution rates apply to determine an aggregate normal cost rate for COPERS. Table IV-5 below shows the projected payroll, projected normal cost, and total normal cost rate for the fiscal year ending June 30, 2018.

Table IV - 5				
Aggregate Normal Cost Rate for FYE 2018				
	Projected Payroll	Projected Normal Cost	Projected Normal Cost Rate	
Tier 1	\$ 398,575,856	\$ 62,679,216	15.73%	
Tier 2	42,030,036	7,087,805	16.86%	
Tier 3	73,098,558	9,223,755	12.62%	
Total	\$ 513,704,449	\$ 78,990,776	15.38%	

In addition to these normal cost rates, there is also an administrative expense rate of 0.07% of annual compensation for each of the tiers.

Actuarial Liability

The Actuarial Liability represents the expected amount of money needed today to pay for benefits attributed to service prior to the valuation date under the entry age (EA) actuarial cost method if all assumptions are met. It is essentially a funding target. The difference between the Actuarial Liability and the Actuarial Value of Assets is the Unfunded Actuarial Liability. Table IV-6 on the next page shows the Actuarial Liability as of June 30, 2016 and June 30, 2015.

**CITY OF PHOENIX EMPLOYEES' RETIREMENT SYSTEM
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2016**

SECTION IV – FUNDING LIABILITY MEASURES

Table IV - 6					
Actuarial Liability					
	June 30, 2016				June 30, 2015
	Tier 1	Tier 2	Tier 3	Total	Total
Actives					
Retirement	\$ 1,332,072	\$ 10,549	\$ 492	\$ 1,343,113	\$ 1,384,404
Termination	24,429	817	111	25,357	28,829
Death	12,608	182	12	12,802	13,524
Disability	15,060	231	15	15,306	16,082
Total Actives	\$ 1,384,170	\$ 11,778	\$ 630	\$ 1,396,578	\$ 1,442,839
In Pay Status					
Service Retirees	\$ 2,289,942	\$ 0	\$ 0	\$ 2,289,942	\$ 2,241,352
Disabled Retirees	46,213	0	0	46,213	46,227
Beneficiaries	186,835	0	0	186,835	178,283
Total	\$ 2,522,989	\$ 0	\$ 0	\$ 2,522,989	\$ 2,465,862
Deferred Vested	\$ 64,281	\$ 280	\$ 9	\$ 64,570	\$ 67,206
Total Actuarial Liability	\$ 3,971,440	\$ 12,058	\$ 638	\$ 3,984,137	\$ 3,975,908

Amounts in Thousands

Unfunded Actuarial Liability (UAL) and Funded Ratios

The UAL is the difference between the Actuarial Liability and an assets measure. This difference represents how far ahead or behind the funding target the assets are as of the valuation date. If all assumptions are met in the future, contributions in addition to the normal cost will be needed to pay off the UAL. For determining contribution amounts, the UAL is measured using the Actuarial Value of Assets (AVA), which dampens the impact of short-term volatility in investment returns on contribution rates. However, it is important to also understand the UAL measured using the Market Value of Assets (MVA) as this is the amount that must ultimately be made up either through future contributions or future experience.

The funded ratio is simply the ratio of assets to Actuarial Liability, the funding target for COPERS. It is measured using both the AVA and the MVA. As the funded ratio compares assets to the funding target, it is appropriate for assessing the need for and amount of future contributions in excess of the normal cost. It is not appropriate for other purposes such as assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations.

**CITY OF PHOENIX EMPLOYEES' RETIREMENT SYSTEM
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2016**

SECTION IV – FUNDING LIABILITY MEASURES

Table IV-7 shows the calculation of the UAL and funded ratio based both on the Actuarial and Market Value of Assets as of June 30, 2016 and June 30, 2015.

Table IV - 7				
Unfunded Actuarial Liability (UAL)				
	June 30, 2016		June 30, 2015	
Actuarial Liability (AL)	\$	3,984,137	\$	3,975,908
Actuarial Value of Assets (AVA)		<u>2,283,216</u>		<u>2,202,923</u>
AVA Unfunded AL (UAL)	\$	1,700,921	\$	1,772,985
AVA Funded Ratio (AVA/AL)		57.3%		55.4%
Market Value of Assets (MVA)		<u>2,151,421</u>		<u>2,209,526</u>
MVA UAL	\$	1,832,716	\$	1,766,383
MVA Funded Ratio (MVA/AL)		54.0%		55.6%

Amounts in Thousands

Analysis of Change in Unfunded Actuarial Liability (UAL)

The UAL is expected to change at each valuation for a variety of reasons. Table IV-8 on the next page develops the expected UAL measured on the Actuarial Value of Assets and identifies the primary sources for changes in this UAL since the last valuation.

**CITY OF PHOENIX EMPLOYEES' RETIREMENT SYSTEM
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2016**

SECTION IV – FUNDING LIABILITY MEASURES

Table IV - 8	
Development Of Experience (Gain) / Loss	
Item	Amount
1. AVA Unfunded Actuarial Liability at June 30, 2015	\$ 1,772,984,915
2. Normal Cost for Year	80,756,505
3. Expected City and Member Contributions	178,627,382
4. Interest and administrative expenses	129,721,955
5. Assumption and Benefit Changes	(72,649,246)
6. Expected AVA Unfunded Actuarial Liability at June 30, 2016 [1. + 2. - 3. + 4. + 5.]	\$ 1,732,186,747
7. Actual AVA Unfunded Actuarial Liability at June 30, 2016	\$ 1,700,921,180
8. (Gain) or Loss [7. - 6.]	\$ (31,265,567)
Difference portion due to:	
Asset Experience	45,626,444
Salary Increases	(56,084,663)
Retirement	1,944,503
Mortality	1,053,807
Termination	8,297,115
COLA	(32,457,674)
Other Experience	354,902
Total	\$ (31,265,567)

SECTION V – CONTRIBUTIONS

Under the funding method employed by COPERS, there are three components to the Projected Percentage, which is the total contribution rate defined by the City Charter:

- The normal cost rate,
- The administrative expense rate, and
- The amortization payment on the Unfunded Actuarial Liability (UAL) expressed as a percentage of total annual compensation.

The normal cost rates for each tier were developed in Section IV. The administrative expense rate is currently 0.07% for all tiers. This section develops the UAL amortization payment rate and the Projected Percentage. Then, the Projected Percentage is split between members and the City as required by the City Charter, and finally, the total City contribution is estimated.

The UAL is composed of experience gains and losses, assumption changes, and plan provision changes. In September 2013, the Board adopted amortization methods that:

1. Amortize the UAL measured before the assumption changes as of July 1, 2013 over a closed 25-year period as a level percentage of payroll,
2. Amortize the change in UAL due to the assumption changes as of July 1, 2013 over a closed 25-year period as a level percentage of payroll with a four-year phase-in to the ultimate rate, and
3. Amortize future gains and losses over closed 20-year periods from the date in which they are first recognized as a level percent of payroll (except future gains cannot be amortized over a period shorter than the period remaining on the 25-year amortizations described above).

In August 2015, the Board adopted a 20-year amortization of the assumption changes as of July 1, 2015 with a four-year phase-in to the full amortization payment rate.

Table V-1 shows the amortization payment for each of the current components of the total UAL rate. There are 22 years remaining on the amortization period for all current components, except the 2015 assumption changes, which has 19 years remaining on its amortization. All current components are amortized as a level percentage of payroll assuming 3.5% increases in total annual payroll each year. However, the amortization of the June 30, 2015 assumption changes is in the second year of a four-year phase-in to the full amortization rate, so the payment on the amortization of these assumption changes is one-half of what it would be without the phase-in.

**CITY OF PHOENIX EMPLOYEES' RETIREMENT SYSTEM
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2016**

SECTION V – CONTRIBUTIONS

Table V - 1				
Development Of UAL Contribution Rate				
Amortization Base	Outstanding Balance	Remaining Period	Amortization Payment	Amortization % of Pay
2013 UAL	\$1,120,135,171	22	\$ 76,378,689	15.39%
2013 Assumption Changes	477,630,845	22	32,568,228	6.56%
2014 Experience Gain	(59,100,368)	22	(4,029,878)	-0.81%
2015 Experience Gain	(3,020,497)	22	(205,959)	-0.04%
2015 Assumption Changes ¹	269,190,842	19	10,112,706	2.04%
2016 Experience Gain	(31,265,567)	22	(2,131,906)	-0.43%
2016 Plan Changes	(3,229,125)	22	(220,184)	-0.04%
2016 Assumption Changes	<u>(69,420,121)</u>	22	<u>(4,733,552)</u>	<u>-0.95%</u>
Total	\$1,700,921,180		\$107,738,144	21.71%

¹ The amortization of the 2015 assumption changes is phased-in over four years. The first year payment was one-fourth of the regularly calculated amortization payment, increasing each year until the regularly calculated amortization payment is made after four years.

The Projected Percentage consists of the normal cost rate, the administrative expense rate, and the UAL rate. For Tier 1, members contribute 5 percent of pay and the City contributes the balance of the Projected Percentage. For Tier 2 and Tier 3, members contribute one-half of the Projected Percentage, up to a maximum of 11 percent of pay, and the City contributes the balance of the Projected Percentage. These contribution rates are applied to the actual payroll for each Tier for the applicable fiscal year in developing the City's total contribution. Table V-2 on the following page summarizes the contribution rates and estimates contribution amounts for the fiscal years ending June 30, 2018 and June 30, 2017.

**CITY OF PHOENIX EMPLOYEES' RETIREMENT SYSTEM
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2016**

SECTION V – CONTRIBUTIONS

Table V - 2		
Summary Of Contribution Rates And Estimated Amounts		
Fiscal Year Ending	June 30, 2018	June 30, 2017
Total Normal Cost Rate	15.38%	16.40%
Administrative Expense Rate	0.07%	0.07%
Total UAL Contribution Rate	<u>21.71%</u>	<u>20.12%</u>
Projected Percentage	37.16%	36.59%
Member Contribution Rates		
Tier 1	5.00%	5.00%
Tier 2	11.00%	11.00%
Tier 3	11.00%	11.00%
City Contribution Rates		
Tier 1	32.16%	31.59%
Tier 2	26.16%	25.59%
Tier 3	26.16%	25.59%
Projected Payroll		
Tier 1	\$ 398,575,856	\$ 419,248,797
Tier 2	42,030,036	50,131,375
Tier 3	<u>73,098,558</u>	<u>32,442,795</u>
Total	\$ 513,704,449	\$ 501,822,967
Estimated Contribution Amounts		
Members	\$ 32,592,938	\$ 30,045,599
City	<u>158,299,635</u>	<u>153,571,425</u>
Total	\$ 190,892,573	\$ 183,617,024

SECTION VI – ACCOUNTING AND FINANCIAL REPORTING UNDER GASB 67 AND 68

This section provides accounting and financial disclosure information under Governmental Accounting Standards Board (GASB) Statement No. 67 for COPERS as well as GASB No. 68 information for the City of Phoenix (City). This information includes:

- Determination of the single rate of return used as the discount rate for measuring the Total Pension Liability (TPL)
- Changes in the TPL, Fiduciary Net Position (FNP), and Net Pension Liability (NPL)
- Calculation of the NPL at the discount rate as well as discount rates one percent higher and one percent lower
- Schedule of changes in NPL and related ratios
- Schedule of employer contributions
- Schedule of deferred inflows and outflows of resources
- Calculation of pension expense

The measurement date for this report is June 30, 2016. This measurement date is used for the System's GASB 67 reporting and the City's GASB 68 reporting as of the June 30, 2016 reporting. Measurements are based on the fair value of assets as of June 30, 2016 and the Total Pension Liability as of the valuation date, also June 30, 2016.

The beginning-of-year measurements for FYE 2016 are based on the actuarial valuation as of June 30, 2015. The end-of-year measurements for FYE 2016 are based on the actuarial valuation as of June 30, 2016. The assumption changes adopted for the June 30, 2016 actuarial valuation are reflected in the end of year measurements.

Determination of Discount Rate

The discount rate used to measure the Total Pension Liability as of both June 30, 2015 and June 30, 2016 was 7.50%, equal to the assumed long-term expected rate of return on the System's investments.

We have assumed that employee and City contributions to COPERS will continue to follow the established contribution policy. The total contribution rate is the sum of the normal cost rate, the administrative expense rate, and the Unfunded Actuarial Liability (UAL) rate. The normal cost rate is determined under the entry age actuarial cost method. The administrative expense rate is assumed to be 0.07% of annual compensation. The UAL rate is the sum of the amortization rates for each amortization base. As of June 30, 2016, there are 22 years remaining on the amortization period for all current components except the 2015 assumption changes, which has 19 years remaining on its amortization. All current components are being amortized as a level percentage of annual payroll assuming 3.5% increases in total annual payroll each year. The amortization of the 2015 assumption changes is being phased-in over four years to the full amortization rate, with the current payment on the amortization of the 2015 assumption changes being half of what it would be without the phase-in.

We have not performed a formal cash flow projection as described under Paragraph 41 of GASB Statement 67. However, Paragraph 43 allows for alternative methods to confirm the sufficiency of the FNP if the evaluations "can be made with sufficient reliability without a separate projection of cash flows into and out of the pension plan..." In our professional judgment,

**CITY OF PHOENIX EMPLOYEES' RETIREMENT SYSTEM
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2016**

SECTION VI – ACCOUNTING AND FINANCIAL REPORTING UNDER GASB 67 AND 68

adherence to the contribution policy described above will result in the System's projected FNP being greater than or equal to the benefit payments projected for each future period.

Therefore, the long-term expected rate of return on System investments was applied as the single rate to all periods of projected benefit payments to determine the TPL. Additionally, the actuarial methods and assumptions used in developing the TPL, including the use of the entry age actuarial cost method as described in paragraph 46 of GASB 67, are the same as those used in developing the actuarial liability for funding purposes. As a result, the TPL is identical to the Actuarial Liability calculated for funding purposes and shown in Section IV of this report.

Note Disclosures

The table below shows the changes in the Total Pension Liability, the Plan Fiduciary Net Position (i.e., fair value of System assets), and the Net Pension Liability during the measurement year.

Change in Net Pension Liability			
	Increase (Decrease)		
	Total Pension Liability	Plan Fiduciary Net Position	Net Pension Liability
	(a)	(b)	(a) - (b)
Balances at 6/30/2015	\$ 3,975,908	\$ 2,209,526	\$ 1,766,383
Changes for the year:			
Service cost	80,757		80,757
Interest	293,206		293,206
Changes of benefits	(3,229)		(3,229)
Differences between expected and actual experience	(76,892)		(76,892)
Changes of assumptions	(69,420)		(69,420)
Contributions - employer		119,844	(119,844)
Contributions - member		29,306	(29,306)
Net investment income		9,171	(9,171)
Benefit payments	(216,193)	(216,193)	0
Administrative expense		(234)	234
Net changes	<u>8,229</u>	<u>(58,105)</u>	<u>66,334</u>
Balances at 6/30/2016	<u>\$ 3,984,137</u>	<u>\$ 2,151,421</u>	<u>\$ 1,832,716</u>

Amounts in Thousands

The interest credited on member contributions was reduced to 3.75%, which reduced the TPL by \$3 million. Changes in assumptions decreased the TPL by \$69 million during the year. The

SECTION VI – ACCOUNTING AND FINANCIAL REPORTING UNDER GASB 67 AND 68

difference between expected and actual experience was a gain of approximately \$77 million. The sources of this gain are shown in Table IV-8 (excluding asset experience).

Total contributions and investment income were less than the service cost, interest cost, and administrative expenses, resulting in an increase in the Net Pension Liability (NPL) of approximately \$216 million. When combined with the benefit change, the assumption change and plan experience, the NPL increased by approximately \$66 million. The NPL remaining as of June 30, 2016 is approximately \$1.8 billion.

Changes in the discount rate affect the measurement of the TPL. Lower discount rates produce a higher TPL and higher discount rates produce a lower TPL. Because the discount rate does not affect the measurement of assets, the percentage change in the NPL can be very significant for a relatively small change in the discount rate. The table below shows the sensitivity of the NPL to the discount rate.

Sensitivity of Net Pension Liability to Changes in Discount Rate			
	1% Decrease 6.50%	Discount Rate 7.50%	1% Increase 8.50%
Total Pension Liability	\$ 4,475,602	\$ 3,984,137	\$ 3,574,561
Plan Fiduciary Net Position	<u>2,151,421</u>	<u>2,151,421</u>	<u>2,151,421</u>
Net Pension Liability	<u>\$ 2,324,181</u>	<u>\$ 1,832,716</u>	<u>\$ 1,423,140</u>
Plan Fiduciary Net Position as a Percentage of the Total Pension Liability	48.1%	54.0%	60.2%

Amounts in Thousands

A one percent decrease in the discount rate increases the TPL by approximately 12% and increases the NPL by approximately 27%. A one percent increase in the discount rate decreases the TPL by approximately 10% and decreases the NPL by approximately 22%.

Required Supplementary Information

The schedules of Required Supplementary Information generally start with one year of information as of the implementation of GASB 67, but eventually will need to build up to 10 years of information. The schedule on the next page shows the changes in NPL and related ratios required by GASB. The covered-employee payroll in these exhibits has been changed since the prior report to reflect the clarification of the definition of covered-employee payroll by GASB.

CITY OF PHOENIX EMPLOYEES' RETIREMENT SYSTEM
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2016

SECTION VI – ACCOUNTING AND FINANCIAL REPORTING UNDER GASB 67 AND 68

Schedule of Changes in Net Pension Liability and Related Ratios

	FYE 2016	FYE 2015	FYE 2014
<u>Total Pension Liability</u>			
Service cost (MOY)	\$ 80,757	\$ 75,310	\$ 78,331
Interest (includes interest on service cost)	293,206	266,355	257,219
Changes of benefit terms	(3,229)	0	0
Differences between expected and actual experience	(76,892)	(31,009)	(20,336)
Changes of assumptions	(69,420)	254,870	0
Benefit payments, including refunds of member contributions	(216,193)	(204,403)	(179,877)
Net change in total pension liability	\$ 8,229	\$ 361,124	\$ 135,337
Total pension liability - beginning	<u>3,975,908</u>	<u>3,614,784</u>	<u>3,479,447</u>
Total pension liability - ending	<u>\$ 3,984,137</u>	<u>\$ 3,975,908</u>	<u>\$ 3,614,784</u>
<u>Plan fiduciary net position</u>			
Contributions - employer	\$ 119,844	\$ 117,092	\$ 110,629
Contributions - member	29,306	27,861	27,760
Net investment income	9,171	47,148	298,736
Benefit payments, including refunds of member contributions	(216,193)	(204,403)	(179,877)
Administrative expense	(234)	(414)	(628)
Net change in plan fiduciary net position	\$ (58,105)	\$ (12,716)	\$ 256,620
Plan fiduciary net position - beginning	<u>2,209,526</u>	<u>2,222,242</u>	<u>1,965,622</u>
Plan fiduciary net position - ending	<u>\$ 2,151,421</u>	<u>\$ 2,209,526</u>	<u>\$ 2,222,242</u>
Net pension liability - ending	<u>\$ 1,832,716</u>	<u>\$ 1,766,383</u>	<u>\$ 1,392,543</u>
Plan fiduciary net position as a percentage of the total pension liability	54.00%	55.57%	61.48%
Covered employee payroll	\$ 473,974	\$ 484,309	\$ 518,746
Net pension liability as a percentage of covered employee payroll	386.67%	364.72%	268.44%

Amounts in Thousands

**CITY OF PHOENIX EMPLOYEES' RETIREMENT SYSTEM
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2016**

SECTION VI – ACCOUNTING AND FINANCIAL REPORTING UNDER GASB 67 AND 68

Since an Actuarially Determined Contribution (ADC) is calculated, a 10-year schedule is required showing the following:

1. The Actuarially Determined Contribution (formerly referred to as the ARC),
2. Actual contributions related to the ADC,
3. The difference between the ADC and actual contributions related to the ADC,
4. The covered employee payroll, and
5. The actual contributions as a percentage of covered employee payroll.

Because prior contribution amounts were determined in accordance with Actuarial Standards of Practice, we believe the full 10-year schedule should be shown.

Schedule of Employer Contributions										
	FYE 2016	FYE 2015	FYE 2014	FYE 2013	FYE 2012	FYE 2011	FYE 2010	FYE 2009	FYE 2008	FYE 2007
Actuarially Determined Contribution	\$ 119,844	\$ 117,092	\$ 110,629	\$ 115,244	\$ 114,709	\$ 105,682	\$ 90,965	\$ 86,241	\$ 66,383	\$ 64,198
Contributions in Relation to the Actuarially Determined Contribution	<u>119,844</u>	<u>117,092</u>	<u>110,629</u>	<u>115,244</u>	<u>114,709</u>	<u>105,682</u>	<u>90,965</u>	<u>86,241</u>	<u>66,383</u>	<u>64,198</u>
Contribution Deficiency/(Excess)	<u>\$ 0</u>	<u>\$ 0</u>	<u>\$ 0</u>	<u>\$ 0</u>	<u>\$ 0</u>	<u>\$ 0</u>	<u>\$ 0</u>	<u>\$ 0</u>	<u>\$ 0</u>	<u>\$ 0</u>
Covered-Employee Payroll	\$ 473,974	\$ 484,309	\$ 518,746	\$ 524,648	\$ 540,792	\$ 541,388	\$ 578,327	\$ 587,171	\$ 580,207	\$ 538,211
Contributions as a Percentage of Covered-Employee Payroll	25.29%	24.18%	21.33%	21.97%	21.21%	19.52%	15.73%	14.69%	11.44%	11.93%

Amounts in Thousands

**CITY OF PHOENIX EMPLOYEES' RETIREMENT SYSTEM
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2016**

SECTION VI – ACCOUNTING AND FINANCIAL REPORTING UNDER GASB 67 AND 68

The following information on key methods and assumptions used to calculate the ADC for FYE 2016 should be presented as notes to the schedule:

Notes to Schedule	
Valuation date:	June 30, 2014
Timing	Actuarially determined contribution rates are calculated based on the actuarial valuation one year prior to the beginning of the plan year
Actuarial cost method	Entry age
Asset valuation method	4-year smoothed market
Amortization method	The UAL as of June 30, 2013 is amortized as a level percentage of payroll over a closed 25-year period. The impact of the September 2013 assumption changes is amortized over a closed 25-year period with a four-year phase-in. Future gains and losses are amortized over closed 20-year periods. However, future gains will not be amortized over a shorter period than the remaining period on the amortization of the 2013 UAL.
Discount rate	7.50%
Salary increases	3.50% plus merit component based on age ranging from 3.80% at age 20 to 0.00% for members age 65 and older
Amortization payment growth rate	3.50%
COLA	1.50%
Mortality	Male and female RP-2000 combined employee and annuitant tables
A complete description of the methods and assumptions used to determine contribution rates for the fiscal year ending June 30, 2016 can be found in the June 30, 2014 actuarial valuation report.	

SECTION VI – ACCOUNTING AND FINANCIAL REPORTING UNDER GASB 67 AND 68

Employer Reporting Amounts

It is our understanding that the City of Phoenix has elected to use measurement dates the same as each reporting date in implementing GASB 68. As a result, the schedules in this section will be used by the City of Phoenix for its 2016 reporting.

The impact of experience gains or losses and assumption changes on the TPL are recognized in expense over the average expected remaining service life of all active and inactive members of the System. As of the measurement date, this recognition period was 5.0 years.

During the measurement year, there was an experience gain of approximately \$77 million. Approximately \$15.4 million of that gain is recognized in the current year as a decrease in pension expense and an identical amount will be recognized in each of the next four years. Unrecognized decreases in the TPL from prior experience gains were approximately \$25 million, of which approximately \$6.2 million was recognized as a reduction in pension expense in the current year. The combination of unrecognized current and prior experience gains results in a deferred inflow of resources as of June 30, 2016 of approximately \$80 million.

Assumption changes since the last measurement date decreased the TPL by approximately \$69.4 million. Approximately \$13.9 million of this change was recognized in the current year as a decrease in pension expense and an identical amount will be recognized in each of the next four years, resulting in a deferred inflow of resources as of June 30, 2016 of approximately \$55.5 million. Unrecognized increases in the TPL from prior assumption changes were approximately \$204 million, of which approximately \$51 million was recognized as a reduction in pension expense in the current year, resulting in a deferred outflow of resources as of June 30, 2016 of approximately \$153 million.

The impact of investment gains or losses is recognized over a period of five years for all plans. During the measurement year, there was an investment loss of approximately \$154 million. Approximately \$30.8 million of that loss is recognized in the current year as an increase in pension expense and an identical amount will be recognized in each of the next four years. Unrecognized investment losses from prior periods were approximately \$94 million, of which approximately \$23.5 million was recognized as an increase in pension expense in the current year. The combination of unrecognized current and prior investment gains and losses results in a deferred outflow of resources as of June 30, 2016 of approximately \$194 million.

The table on the following page summarizes the current balances of deferred outflows and deferred inflows of resources along with the net recognition over the next five years.

CITY OF PHOENIX EMPLOYEES' RETIREMENT SYSTEM
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2016

SECTION VI – ACCOUNTING AND FINANCIAL REPORTING UNDER GASB 67 AND 68

Schedule of Deferred Inflows and Outflows of Resources

	Deferred Outflows of Resources	Deferred Inflows of Resources
Differences between expected and actual experience	\$ 0	\$ 80,119
Changes in assumptions	152,922	55,536
Net difference between projected and actual earnings on pension plan investments	193,642	0
Total	<u>\$ 346,564</u>	<u>\$ 135,655</u>
Amounts reported as deferred outflows and deferred inflows of resources will be recognized in pension expense as follows:		
Measurement year ended June 30:		
2017	69,786	
2018	69,786	
2019	69,786	
2020	1,551	
2021	0	
Thereafter \$	0	

Amounts in Thousands

The annual pension expense recognized by the City can be calculated two different ways. First, it is the change in the amounts reported on the City’s Statement of Net Position that relate to the System and are not attributable to employer contributions. That is, it is the change in NPL plus the changes in deferred outflows and inflows plus employer contributions.

Alternatively, annual pension expense can be calculated by its individual components. While GASB does not require or suggest the organization of the individual components shown in the table on the next page, we believe it helps to understand the level and volatility of pension expense.

CITY OF PHOENIX EMPLOYEES' RETIREMENT SYSTEM
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2016

SECTION VI – ACCOUNTING AND FINANCIAL REPORTING UNDER GASB 67 AND 68

Calculation of Pension Expense		
	Measurement Year Ending	
	2016	2015
Change in Net Pension Liability	\$ 66,334	\$ 373,840
Change in Deferred Outflows	(48,815)	(297,749)
Change in Deferred Inflows	110,848	24,807
Employer Contributions	119,844	117,092
Pension Expense	\$ 248,211	\$ 217,991
Pension Expense as % of Payroll	52.37%	45.01%
Operating Expenses		
Service cost	\$ 80,757	\$ 75,310
Employee contributions	(29,306)	(27,861)
Administrative expenses	234	414
Total	\$ 51,685	\$ 47,864
Financing Expenses		
Interest cost	\$ 293,206	\$ 266,355
Expected return on assets	(163,237)	(164,464)
Total	\$ 129,969	\$ 101,892
Changes		
Benefit changes	\$ (3,229)	\$ 0
Recognition of assumption changes	37,090	50,974
Recognition of liability gains and losses	(21,580)	(6,202)
Recognition of investment gains and losses	54,276	23,463
Total	\$ 66,557	\$ 68,235
Pension Expense	\$ 248,211	\$ 217,991

Amounts in Thousands

First, there are components referred to as operating expenses. These are items directly attributable to the operation of the plan during the measurement year. Service cost less employee contributions represents the increase in employer-provided benefits attributable to the year, and administrative expenses are the cost of operating the System for the year.

Second, there are the financing expenses: the interest on the Total Pension Liability less the expected return on assets. Since the discount rate is equal to the long-term expected return on assets, the financing expense can be thought of as approximately the interest on the Net Pension Liability.

**CITY OF PHOENIX EMPLOYEES' RETIREMENT SYSTEM
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2016**

SECTION VI – ACCOUNTING AND FINANCIAL REPORTING UNDER GASB 67 AND 68

The final category is changes. This category will drive most of the volatility in pension expense from year to year. It includes any changes in benefits made during the year and recognized amounts due to assumption changes, gains or losses on the TPL, and investment gains or losses. For the current year, the recognition of investment losses increases the pension expense by a similar amount to the decreases due to liability gains and assumption changes.

**CITY OF PHOENIX EMPLOYEES' RETIREMENT SYSTEM
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2016**

SECTION VII – ACTUARIAL SECTION OF THE CAFR

The Government Finance Officers Association (GFOA) maintains a checklist of items to be included in the System's Comprehensive Annual Financial Report (CAFR) in order to receive recognition for excellence in financial reporting. The schedules in this section are listed by the GFOA for inclusion in the Actuarial Section of the System's CAFR.

Since the financial reporting for 2013 was based on results prior to the assumption changes adopted by the Board in September, the effect of those assumption changes is shown in FYE 2014.

Table VII - 1						
Schedule Of Funding Progress						
Valuation Date June 30,	(1) Actuarial Value of Assets	(2) Actuarial Liability (AL)	(3) Percent Funded (1) / (2)	(4) Unfunded AL (UAL) (2) - (1)	(5) Annual Covered Payroll	(6) UAL as a % of Covered Payroll (4) / (5)
2016	\$ 2,283,216	\$ 3,984,137	57.3%	\$ 1,700,921	\$ 496,333	342.7%
2015	2,202,923	3,975,908	55.4%	1,772,985	484,853	365.7%
2014	2,120,700	3,614,784	58.7%	1,494,084	509,267	293.4%
2013	1,961,939	3,055,606	64.2%	1,093,668	508,032	215.3%
2012	1,827,528	2,939,374	62.2%	1,111,845	506,017	219.7%
2011	1,834,620	2,752,909	66.7%	918,289	513,322	178.9%
2010	1,868,093	2,697,288	69.3%	829,195	550,175	150.7%
2009	1,895,148	2,518,094	75.3%	622,946	539,468	115.5%
2008	1,908,414	2,413,365	79.1%	504,951	566,512	89.1%
2007	1,816,508	2,166,119	83.9%	349,611	535,079	65.3%

Amounts in Thousands

**CITY OF PHOENIX EMPLOYEES' RETIREMENT SYSTEM
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2016**

SECTION VII – ACTUARIAL SECTION OF THE CAFR

The Government Finance Officers Association has named the exhibit below, the Solvency Test. It should be noted, however, that it doesn't test the solvency of the plan in the sense understood by financial economists that a 100 percent ratio would mean that there were sufficient assets to settle the obligation on the valuation date. Instead, a 100 percent ratio only means that assets are expected to be sufficient if all assumptions are met in the future, including the expected rate of return on investments.

Table VII - 2							
City of Phoenix Employees' Retirement System							
Solvency Test							
Valuation Date	Actuarial Accrued Liability for			Valuation Assets	Portion of Actuarial Liability Covered by Assets		
	(1)	(2)	(3)		(1)	(2)	(3)
	Active Member Contributions	Retirees and Beneficiaries	Remaining for Active Members				
6/30/2016	\$393,626	\$2,522,989	\$1,067,522	\$2,283,216	100%	75%	0%
6/30/2015	383,029	2,465,862	1,127,017	2,202,923	100	74	0
6/30/2014	393,754	2,099,274	1,121,756	2,120,700	100	82	0
6/30/2013	396,583	1,881,123	1,201,741	1,962,533	100	83	0
6/30/2012	443,964	1,525,152	970,258	1,827,528	100	91	0
6/30/2011	446,456	1,431,877	874,576	1,834,620	100	97	0
6/30/2010	445,141	1,311,929	940,217	1,868,093	100	100	12
6/30/2009	446,039	1,193,391	878,664	1,895,148	100	100	29
6/30/2008	433,742	1,066,886	912,737	1,908,414	100	100	45
6/30/2007	403,819	964,006	798,294	1,816,509	100	100	56

Amounts in Thousands

**CITY OF PHOENIX EMPLOYEES' RETIREMENT SYSTEM
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2016**

SECTION VII – ACTUARIAL SECTION OF THE CAFR

Table VII - 3 City of Phoenix Employees' Retirement System Analysis Of Financial Experience										
	<u>2016</u>	<u>2015</u>	<u>2014</u>	<u>2013</u>	<u>2012</u>	<u>2011</u>	<u>2010</u>	<u>2009</u>	<u>2008</u>	<u>2007</u>
1. UAAL at Start of Year	\$ 1,772,985	\$ 1,494,084	\$ 1,516,915	\$ 1,111,845	\$ 918,289	\$ 829,195	\$ 622,946	\$ 504,950	\$ 349,611	\$ 373,605
2. Normal Cost for year	80,757	75,310	78,331	71,828	77,366	80,099	78,731	83,089	72,806	66,246
3. Contributions	(178,288)	(157,314)	(153,885)	(143,502)	(133,822)	(119,613)	(116,482)	(98,157)	(95,435)	(88,358)
4. Assumed Investment Income Accrual on (1), (2) and (3)	129,383	109,037	110,987	86,136	71,248	64,652	48,228	39,755	27,005	29,004
5. Expected UAAL Before Changes	\$ 1,804,836	\$ 1,521,117	\$ 1,552,347	\$ 1,126,307	\$ 933,081	\$ 854,333	\$ 633,424	\$ 529,637	\$ 353,987	\$ 380,496
6. Effect of Assumption/Method Changes	(69,420)	254,870	0	423,247	0	0	0	0	74,539	0
7. Effect of Benefit Changes	(3,229)	0	0	0	0	0	0	0	0	0
8. Expected UAAL After Changes	\$ 1,732,187	\$ 1,775,987	\$ 1,552,347	\$ 1,549,554	\$ 933,081	\$ 854,333	\$ 633,424	\$ 529,637	\$ 428,526	\$ 380,496
9. Actual UAAL	1,700,921	1,772,985	1,494,084	1,516,915	1,111,845	918,289	829,195	622,946	504,950	349,611
10. Gain / (Loss) [9. - 10.]	\$ 31,266	\$ 3,002	\$ 58,263	\$ 32,639	\$ (178,764)	\$ (63,956)	\$ (195,771)	\$ (93,309)	\$ (76,424)	\$ 30,885
11. As % of AAL at Start of Year	0.8%	0.1%	1.7%	1.1%	(6.5)%	(2.4)%	(7.8)%	(3.9)%	(3.5)%	1.5%

Dollar amounts in thousands

**CITY OF PHOENIX EMPLOYEES' RETIREMENT SYSTEM
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2016**

APPENDIX A – MEMBERSHIP INFORMATION

Table A - 1						
Active Member Data						
	Count			Average Expected Future Service		
	June 30, 2016	June 30, 2015	% Change	June 30, 2016	June 30, 2015	% Change
Category						
Tier 1	6,416	6,741	-4.8%	9.3	9.6	-3.4%
Tier 2	953	722	32.0%	13.5	13.0	3.5%
Tier 3	414	0	N/A	12.7	N/A	N/A
Active Total	7,783	7,463	4.3%	10.0	9.9	0.4%
	Average Age			Average Vesting Service		
	June 30, 2016	June 30, 2015	% Change	June 30, 2016	June 30, 2015	% Change
Category						
Tier 1	48.1	47.6	1.2%	14.5	13.8	5.1%
Tier 2	39.0	38.6	1.0%	1.6	1.0	68.0%
Tier 3	38.1	N/A	N/A	0.4	N/A	N/A
Active Total	46.5	46.7	-0.4%	12.2	12.6	-3.1%
	Total Annualized Pensionable Earnings			Average Annualized Pensionable Earnings		
	June 30, 2016	June 30, 2015	% Change	June 30, 2016	June 30, 2015	% Change
Category						
Tier 1	\$ 429,780,751	\$ 448,686,312	-4.2%	\$ 66,986	\$ 66,561	0.6%
Tier 2	46,208,667	36,166,796	27.8%	48,488	50,093	-3.2%
Tier 3	20,343,383	N/A	N/A	49,139	N/A	N/A
Active Total	\$ 496,332,801	\$ 484,853,108	2.4%	\$ 63,772	\$ 64,968	-1.8%

Table A - 2						
Non-Active Member Data						
	Count			Average Age		
	June 30, 2016	June 30, 2015	% Change	June 30, 2016	June 30, 2015	% Change
Category						
Retirees	5,576	5,419	2.9%	68.6	68.3	0.4%
Disableds	249	251	-0.8%	63.5	63.3	0.3%
Beneficiaries & QDROs	1,060	1,018	4.1%	71.6	71.6	0.1%
Payee Total	6,885	6,688	2.9%	68.8	68.6	0.4%
Deferred Vesteds	885	901	-1.8%	48.7	48.3	0.8%
	Total Annual Benefit			Average Annual Benefit		
	June 30, 2016	June 30, 2015	% Change	June 30, 2016	June 30, 2015	% Change
Category						
Retirees	\$ 191,137,835	\$ 185,103,085	3.3%	\$ 34,279	\$ 34,158	0.4%
Disableds	3,895,823	3,873,354	0.6%	15,646	15,432	1.4%
Beneficiaries & QDROs	20,103,429	18,896,049	6.4%	18,965	18,562	2.2%
Payee Total	\$ 215,137,087	\$ 207,872,488	3.5%	\$ 31,247	\$ 31,081	0.5%
Deferred Vesteds	\$ 11,080,138	\$ 11,207,455	-1.1%	\$ 12,520	\$ 12,439	0.7%

**CITY OF PHOENIX EMPLOYEES' RETIREMENT SYSTEM
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2016**

APPENDIX A – MEMBERSHIP INFORMATION

Table A - 3												
Distribution of Active Tier 1 Members												
Counts by Age and Service as of June 30, 2016												
Age	Years of Vesting Service										Total	
	Under 1	1 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 & up		
Under 25	0	9	1	0	0	0	0	0	0	0	0	10
25 to 29	2	49	76	15	0	0	0	0	0	0	0	142
30 to 34	7	70	220	147	8	0	0	0	0	0	0	452
35 to 39	8	95	183	310	145	6	0	0	0	0	0	747
41 to 44	4	70	177	318	322	92	5	0	0	0	0	988
45 to 49	5	59	179	307	300	230	117	13	0	0	0	1,210
50 to 54	9	54	149	273	265	257	212	49	3	0	0	1,271
55 to 59	7	41	124	213	237	182	97	50	14	0	0	965
60 to 64	0	12	64	118	123	77	63	26	10	0	0	493
65 to 69	0	7	18	31	26	10	13	9	3	0	0	117
70 & up	0	1	3	7	5	3	1	1	0	0	0	21
Total	42	458	1,193	1,739	1,431	857	508	148	30	0	0	6,406
Average Expected Salary by Age And Service as of June 30, 2016												
Age	Years of Vesting Service										Total	
	Under 1	1 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 & up		
Under 25	\$ 0	\$ 47,729	\$ 45,876	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 47,544
25 to 29	40,885	48,214	51,663	53,327	0	0	0	0	0	0	0	50,497
30 to 34	46,709	56,254	57,001	59,056	56,966	0	0	0	0	0	0	57,394
35 to 39	41,843	59,042	60,146	65,342	66,226	68,400	0	0	0	0	0	63,212
41 to 44	37,996	54,964	59,088	68,325	70,548	79,313	84,154	0	0	0	0	67,429
45 to 49	47,028	62,653	60,091	67,573	70,197	79,117	79,010	82,857	0	0	0	70,256
50 to 54	57,752	59,128	58,925	66,009	66,690	77,085	79,895	65,567	82,916	0	0	69,548
55 to 59	36,769	61,404	59,958	61,743	67,466	73,735	74,173	77,974	79,821	0	0	67,338
60 to 64	0	68,551	68,829	62,612	66,799	75,888	80,117	76,445	74,993	0	0	69,899
65 to 69	0	67,924	64,882	71,452	65,211	75,448	77,898	75,197	77,664	0	0	70,348
70 & up	0	40,054	48,324	61,166	58,550	58,253	60,641	73,528	0	0	0	57,851
Total	\$ 45,423	\$ 58,802	\$ 59,234	\$ 65,217	\$ 68,275	\$ 76,905	\$ 78,579	\$ 73,828	\$ 78,305	\$ 0	\$ 0	\$ 67,081

The average expected salary amounts reported above are limited by the 401(a)(17) maximum compensation limit.

**CITY OF PHOENIX EMPLOYEES' RETIREMENT SYSTEM
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2016**

APPENDIX A – MEMBERSHIP INFORMATION

Table A - 4												
Distribution Of Active Tier 2 Members												
Counts by Age and Service as of June 30, 2016												
Age	Years of Vesting Service										Total	
	Under 1	1 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 & up		
Under 25	47	39	0	0	0	0	0	0	0	0	0	86
25 to 29	67	111	0	0	0	0	0	0	0	0	0	178
30 to 34	58	86	0	0	0	0	0	0	0	0	0	144
35 to 39	37	95	0	0	0	0	0	0	0	0	0	132
41 to 44	40	81	0	0	0	0	0	0	0	0	0	121
45 to 49	34	59	0	0	0	0	0	0	0	0	0	93
50 to 54	28	67	0	0	0	0	0	0	0	0	0	95
55 to 59	20	48	1	0	0	0	0	0	0	0	0	69
60 to 64	10	21	0	0	0	0	0	0	0	0	0	31
65 to 69	1	2	0	0	0	0	0	0	0	0	0	3
70 & up	1	0	0	0	0	0	0	0	0	0	0	1
Total	343	609	1	0	0	0	0	0	0	0	0	953
Average Expected Salary by Age And Service as of June 30, 2016												
Age	Years of Vesting Service										Total	
	Under 1	1 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 & up		
Under 25	\$ 37,503	\$ 41,562	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 39,344
25 to 29	42,360	45,577	0	0	0	0	0	0	0	0	0	44,366
30 to 34	42,441	50,427	0	0	0	0	0	0	0	0	0	47,210
35 to 39	46,099	49,399	0	0	0	0	0	0	0	0	0	48,474
41 to 44	46,300	50,406	0	0	0	0	0	0	0	0	0	49,049
45 to 49	48,016	52,129	0	0	0	0	0	0	0	0	0	50,625
50 to 54	45,417	55,299	0	0	0	0	0	0	0	0	0	52,386
55 to 59	47,350	58,537	50,182	0	0	0	0	0	0	0	0	55,173
60 to 64	61,305	72,758	0	0	0	0	0	0	0	0	0	69,063
65 to 69	32,560	45,617	0	0	0	0	0	0	0	0	0	41,265
70 & up	32,818	0	0	0	0	0	0	0	0	0	0	32,818
Total	\$ 44,168	\$ 50,906	\$ 50,182	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 48,480

The average expected salary amounts reported above are limited by the 401(a)(17) maximum compensation limit.

**CITY OF PHOENIX EMPLOYEES' RETIREMENT SYSTEM
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2016**

APPENDIX A – MEMBERSHIP INFORMATION

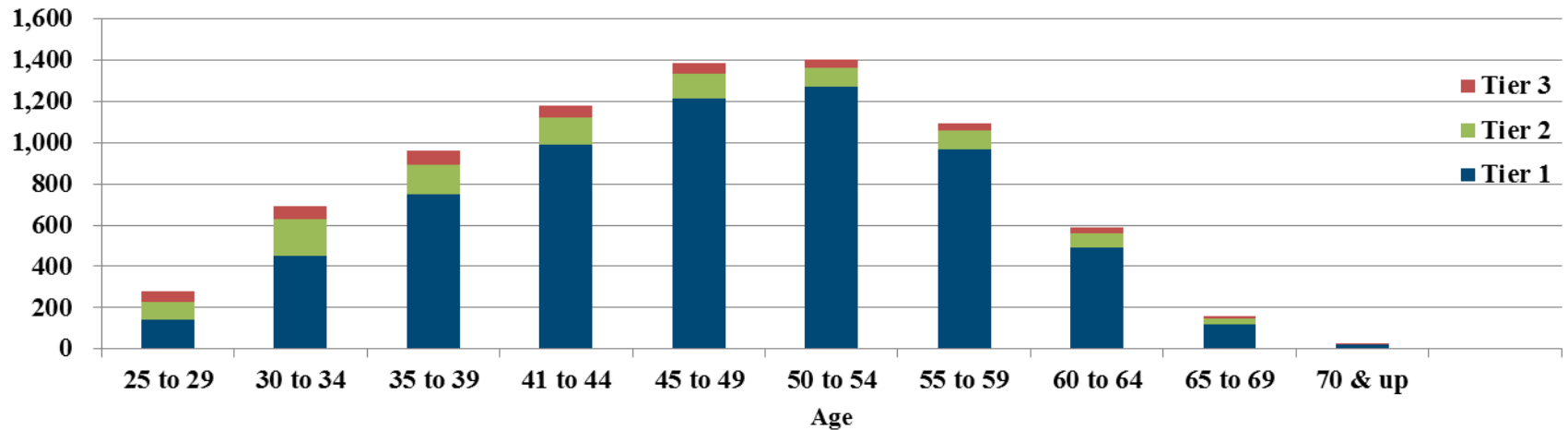
Table A - 5												
Distribution Of Active Tier 3 Members												
Counts by Age and Service as of June 30, 2016												
Age	Years of Vesting Service											Total
	Under 1	1 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 & up		
Under 25	54	0	0	0	0	0	0	0	0	0	0	54
25 to 29	64	0	0	0	0	0	0	0	0	0	0	64
30 to 34	70	0	0	0	0	0	0	0	0	0	0	70
35 to 39	59	0	0	0	0	0	0	0	0	0	0	59
41 to 44	55	0	0	0	0	0	0	0	0	0	0	55
45 to 49	39	0	0	0	0	0	0	0	0	0	0	39
50 to 54	35	0	0	0	0	0	0	0	0	0	0	35
55 to 59	24	0	0	0	0	0	0	0	0	0	0	24
60 to 64	11	0	0	0	0	0	0	0	0	0	0	11
65 to 69	1	0	0	0	0	0	0	0	0	0	0	1
70 & up	2	0	0	0	0	0	0	0	0	0	0	2
Total	414	0	0	0	0	0	0	0	0	0	0	414
Average Expected Salary by Age And Service as of June 30, 2016												
Age	Years of Vesting Service											Total
	Under 1	1 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 & up		
Under 25	\$ 37,411	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 37,411
25 to 29	43,929	0	0	0	0	0	0	0	0	0	0	43,929
30 to 34	49,676	0	0	0	0	0	0	0	0	0	0	49,676
35 to 39	54,056	0	0	0	0	0	0	0	0	0	0	54,056
41 to 44	50,403	0	0	0	0	0	0	0	0	0	0	50,403
45 to 49	51,151	0	0	0	0	0	0	0	0	0	0	51,151
50 to 54	54,393	0	0	0	0	0	0	0	0	0	0	54,393
55 to 59	69,100	0	0	0	0	0	0	0	0	0	0	69,100
60 to 64	70,326	0	0	0	0	0	0	0	0	0	0	70,326
65 to 69	94,974	0	0	0	0	0	0	0	0	0	0	94,974
70 & up	31,820	0	0	0	0	0	0	0	0	0	0	31,820
Total	\$ 50,144	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 50,144

The average expected salary amounts reported above are limited by the 401(a)(17) maximum compensation limit.

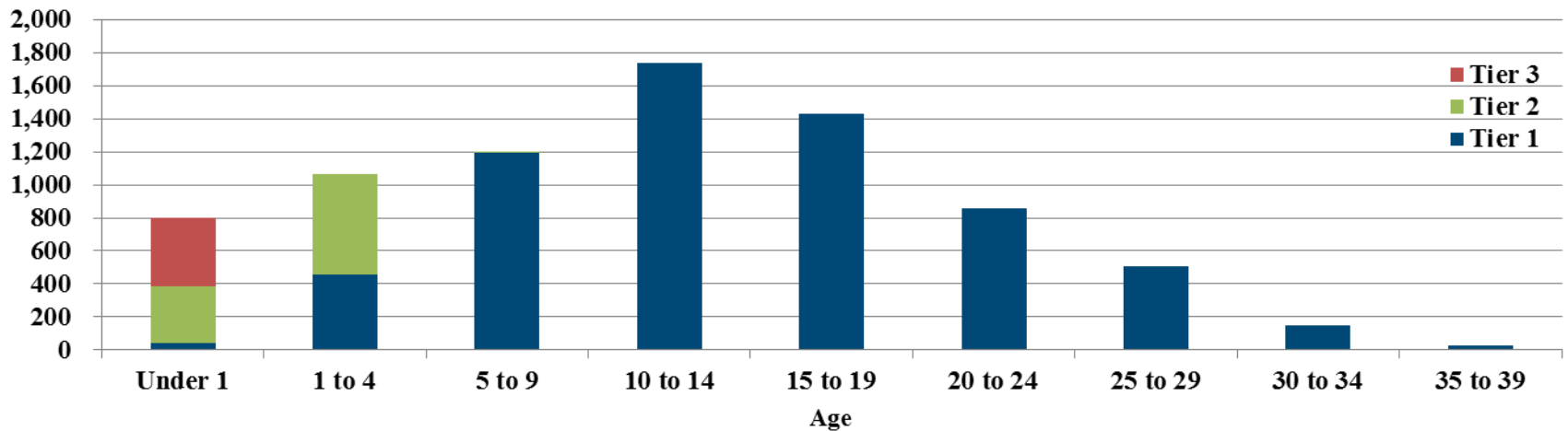
CITY OF PHOENIX EMPLOYEES' RETIREMENT SYSTEM
 ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2016

APPENDIX A – MEMBERSHIP INFORMATION

Age Distribution of Active Members by Tier



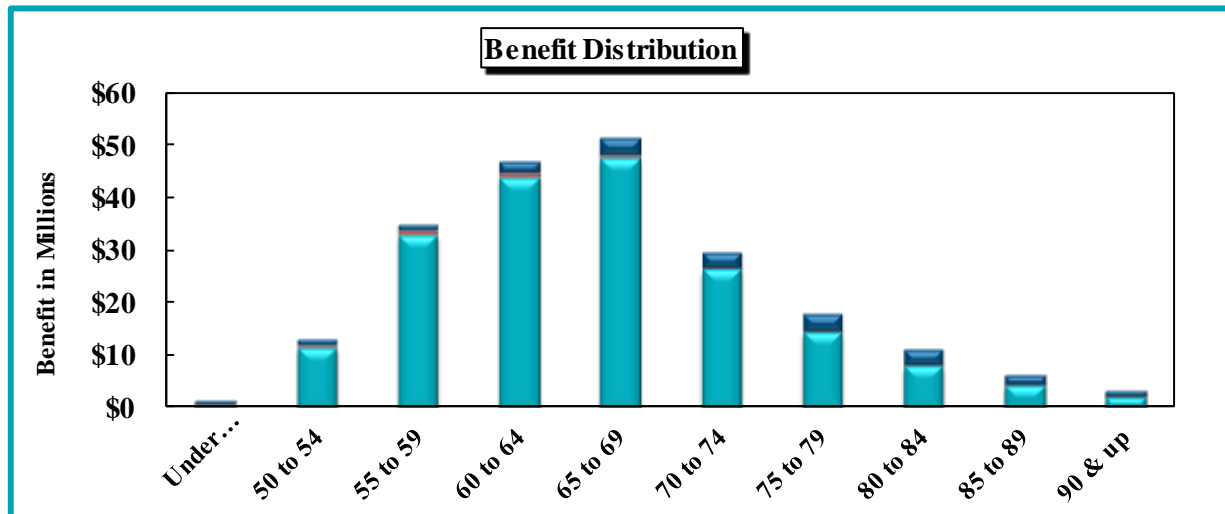
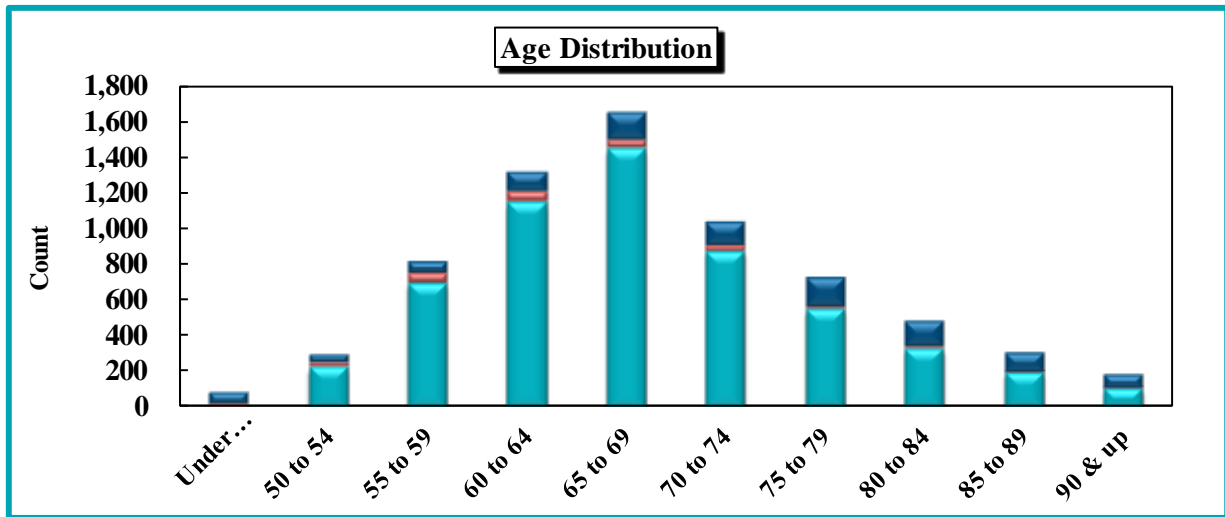
Service Distribution of Active Members by Tier



**CITY OF PHOENIX EMPLOYEES' RETIREMENT SYSTEM
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2016**

APPENDIX A – MEMBERSHIP INFORMATION

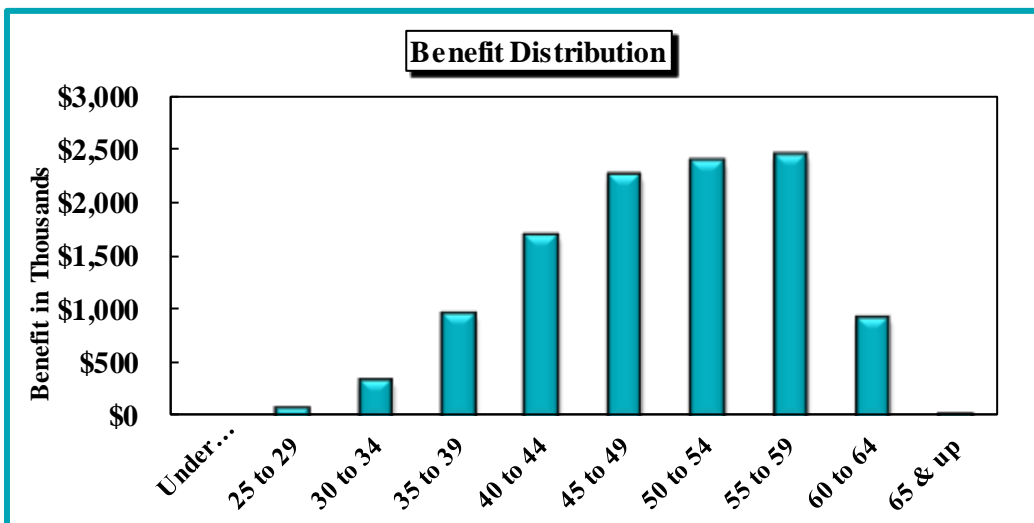
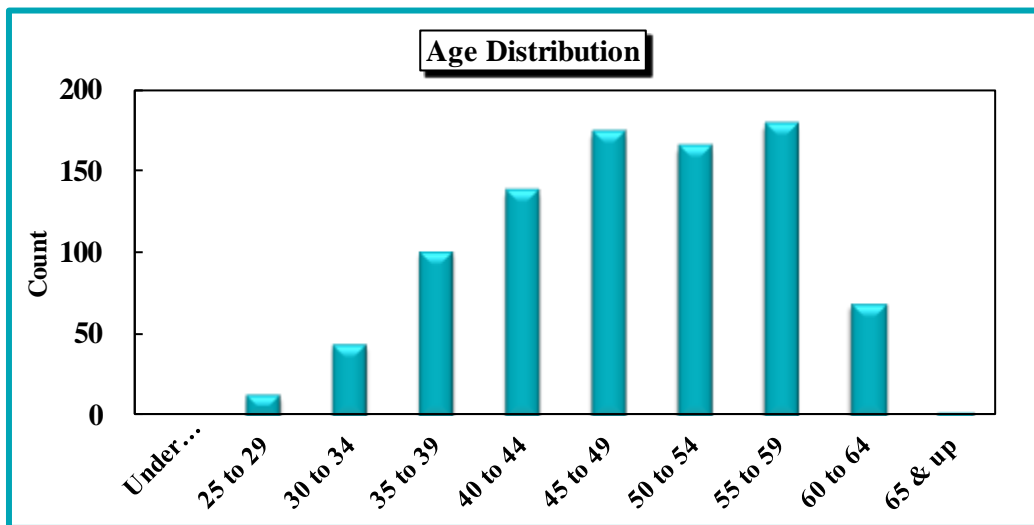
Table A - 6 Distribution of Members in Pay Status as of June 30, 2016						
Age	Service Retirees		Disabled Retirees		Beneficiaries / QDROs	
	Count	Annual Benefit	Count	Annual Benefit	Count	Annual Benefit
Under 50	5	\$ 277,452	18	\$ 312,004	64	\$ 675,961
50 to 54	224	11,488,728	27	479,740	40	951,201
55 to 59	697	32,850,189	50	852,579	65	1,132,479
60 to 64	1,142	43,881,993	56	847,134	115	2,280,517
65 to 69	1,447	47,400,864	41	646,979	157	3,393,023
70 to 74	875	26,351,334	24	302,808	140	3,022,683
75 to 79	551	14,480,038	14	183,603	160	3,060,454
80 to 84	330	7,910,617	14	202,380	141	2,799,677
85 to 89	196	4,427,445	3	24,320	105	1,646,270
90 & up	109	2,069,177	2	44,275	73	1,141,163
Total	5,576	\$ 191,137,835	249	\$ 3,895,823	1,060	\$ 20,103,429



CITY OF PHOENIX EMPLOYEES' RETIREMENT SYSTEM
 ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2016

APPENDIX A – MEMBERSHIP INFORMATION

Table A - 7 Distribution Of Terminated Vesteds as of June 30, 2016		
Age	Count	Annual Benefit
Under 25	0	\$ 0
25 to 29	13	76,619
30 to 34	44	332,062
35 to 39	101	955,264
40 to 44	138	1,694,940
45 to 49	174	2,248,494
50 to 54	165	2,381,548
55 to 59	179	2,450,446
60 to 64	69	926,259
65 & up	2	14,506
Total	885	\$ 11,080,138



CITY OF PHOENIX EMPLOYEES' RETIREMENT SYSTEM
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2016

APPENDIX A – MEMBERSHIP INFORMATION

Table A - 8							
Data Reconciliation							
from June 30, 2015 to June 30, 2016							
	Terminated						Total
	Actives	Vested	Retired	QDROs	Disabled	Spouses	
1. June 30, 2015 Valuation	7,463	901	5,419	147	251	871	15,052
2. Additions							
a. New Entrants	793						793
b. New Beneficiary/QDRO				7		76	83
c. Total	793			7		76	876
3. Reductions							
a. Terminated - Non-Vested	(151)						(151)
b. Cashed Out		(25)					(25)
c. Benefits Expired				(1)		(2)	(3)
d. Deaths	(14)	(2)	(132)	(2)	(11)	(36)	(197)
e. Total	(165)	(27)	(132)	(3)	(11)	(38)	(376)
4. Changes in Status							
a. Vested Terminated	(73)	74			(1)		
b. Returned to Work	25	(25)					
c. Retired	(259)	(29)	288				
d. Disabled	(1)	(9)			10		
e. Data Corrections			1				1
f. Total	(308)	11	289		9		1
5. June 30, 2016 Valuation	7,783	885	5,576	151	249	909	15,553

**CITY OF PHOENIX EMPLOYEES' RETIREMENT SYSTEM
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2016**

APPENDIX A – MEMBERSHIP INFORMATION

Table A - 9									
City of Phoenix Employees' Retirement System									
Schedule of Retirees Added to and Removed from Rolls									
Year Ended	Added to Rolls			Removed		Total		Average Annual Pensions	% Increase in Pensions
	Count	Annual Pensions		Count	Annual Pensions	Count	Annual Pensions		
		New	PER (a)						
6/30/2016	375	\$ 11,253	\$ 320	182	\$ 4,329	6,734	\$ 213,061	\$ 31,640	3.5%
6/30/2015	578	20,077	2,406	192	4,225	6,541	205,816	31,466	9.7
6/30/2014	597	20,138	1,810	145	3,232	6,155	187,559	30,473	11.1
6/30/2013	426	12,574	0	201	3,996	5,703	168,843	29,606	5.4
6/30/2012	448	14,488	0	161	4,174	5,478	160,264	29,256	6.9
6/30/2011	444	15,251	0	184	3,574	5,191	149,950	28,887	8.4
6/30/2010	432	15,139	120	170	3,206	4,931	138,273	28,042	9.5
6/30/2009	426	14,195	1,594	174	3,002	4,669	126,220	27,034	11.3
6/30/2008	348	10,935	2,874	148	2,732	4,417	113,433	25,681	10.8
6/30/2007	290	8,205	1,519	142	2,165	4,217	102,356	24,272	8.0

(a) Pension Equalization Increases

Note: The dollar amounts of the pensions added to and removed from the rolls for years prior to June 30, 2011 were determined by the prior actuary. The amounts added to the rolls includes additions and deletions due to PER increases, in addition to the annual pensions for new retirees.

**CITY OF PHOENIX EMPLOYEES' RETIREMENT SYSTEM
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2016**

APPENDIX A – MEMBERSHIP INFORMATION

Table A - 10									
City of Phoenix Employees' Retirement System									
Schedule of Retired Members by Type of Benefit									
Monthly Benefit	Number of Retirees	Type of Retirement							
		Deferred	Normal or Voluntary	Duty Disability	Non-Duty Disability	Survivor Payment	Death Benefit	Alternate Payee	
Deferred	885	885	-	-	-	-	-	-	-
\$ 1 - \$ 300	98	-	45	1	-	13	26	13	
301 - 400	144	-	94	6	2	31	3	8	
401 - 500	139	-	89	9	2	29	1	9	
501 - 600	137	-	90	4	7	24	4	8	
601 - 700	173	-	96	3	11	48	6	9	
701 - 800	178	-	98	2	10	42	11	15	
801 - 900	193	-	122	5	22	31	8	5	
901 - 1,000	175	-	91	2	15	49	6	12	
1,001 - 1,100	199	-	118	5	10	46	11	9	
1,101 - 1,200	195	-	130	1	16	29	8	11	
1,201 - 1,300	161	-	114	1	12	23	3	8	
1,301 - 1,400	176	-	112	-	13	34	8	9	
1,401 - 1,500	179	-	129	2	7	29	10	2	
1,501 - 2,000	799	-	618	15	35	81	32	18	
2,001 - 2,500	854	-	737	1	12	85	11	8	
2,501 - 3,000	747	-	679	-	9	45	11	3	
3,001 - 4,000	1,089	-	1,019	-	7	50	12	1	
4,001 - 5,000	613	-	587	-	2	18	5	1	
Over 5,001	636	-	608	-	-	23	3	2	
Totals	7,770	885	5,576	57	192	730	179	151	

**CITY OF PHOENIX EMPLOYEES' RETIREMENT SYSTEM
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2016**

APPENDIX A – MEMBERSHIP INFORMATION

Table A - 11										
City of Phoenix Employees' Retirement System										
Schedule of Retired Members by Benefit Option										
Monthly Benefit	Total	Option Selected								
		Life	Option A		Option B		Option C	Child Benefit		
Standard	Pop-Up		Standard	Pop-Up						
\$ 1 - \$ 300	98	41	20	7	0	0	4	26		
301 - 400	144	91	34	7	1	4	7	0		
401 - 500	139	85	40	7	0	1	6	0		
501 - 600	137	81	23	17	3	3	10	0		
601 - 700	173	102	37	20	3	3	8	0		
701 - 800	178	117	31	13	3	3	11	0		
801 - 900	193	93	49	23	5	10	13	0		
901 - 1,000	175	111	27	16	6	7	8	0		
1,001 - 1,100	199	124	41	20	3	5	6	0		
1,101 - 1,200	195	99	61	16	3	10	6	0		
1,201 - 1,300	161	81	43	25	3	7	2	0		
1,301 - 1,400	176	95	43	14	6	10	8	0		
1,401 - 1,500	179	96	43	15	5	14	6	0		
1,501 - 2,000	799	360	227	95	23	54	40	0		
2,001 - 2,500	854	367	263	102	30	62	30	0		
2,501 - 3,000	747	316	196	105	33	64	33	0		
3,001 - 4,000	1,089	427	350	127	42	94	49	0		
4,001 - 5,000	613	221	204	76	30	59	23	0		
Over 5,001	636	258	213	62	25	48	30	0		
Totals	6,885	3,165	1,945	767	224	458	300	26		
Deferred Vesteds	885									
Total	<u>7,770</u>									

* Beneficiaries of members who selected Option C are listed under the Option C column. All other beneficiaries are listed under the Life column.

APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

Actuarial Assumptions

The assumptions were adopted by the Board in August 2015 based on an experience study covering the period from July 1, 2009 through June 30, 2014 and our recommendations with the exception of the mortality assumptions which were adopted by the Board in October 2015.

1. Discount Rate

The discount rate of 7.50% is based on the expected return on assets and was first adopted by the Board in September 2013. For the stochastic projections, a standard deviation of 10.74% is assumed.

2. Salary Increase Rate

Individual salary increases are composed of a price inflation component, a real wage growth component, and a merit or longevity component that varies by age. In September 2013, the Board first adopted the current price inflation component. In August 2015, the Board adopted the current merit or longevity component.

Component	Adopted September 2013
Price inflation:	3.00%
Real wage growth	<u>0.50%</u>
Wage inflation	3.50%

The table below combines the various components of salary increases for sample ages.

Age	Price Inflation	Real Wage Growth	Merit or Longevity	Total
20	3.00%	0.50%	6.60%	10.10%
25	3.00%	0.50%	5.00%	8.50%
30	3.00%	0.50%	3.65%	7.15%
35	3.00%	0.50%	2.60%	6.10%
40	3.00%	0.50%	1.85%	5.35%
45	3.00%	0.50%	1.25%	4.75%
50	3.00%	0.50%	0.75%	4.25%
55	3.00%	0.50%	0.40%	3.90%
60	3.00%	0.50%	0.15%	3.65%
65	3.00%	0.50%	0.00%	3.50%

3. COLA Due to Pension Equalization Reserve (PER)

In September 2013, the Board first adopted an assumption valuing future benefits payable through the PER as a 1.5% annual compound cost-of-living adjustment (COLA). The PER only applies to Tier 1 and Tier 2 benefits.

APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

4. Rates of Mortality for Healthy and Disabled Lives

Mortality rates are based on the sex-distinct employee and annuitant mortality tables described below, including adjustment factors applied to the published tables for each group. Half of active member deaths are assumed to be duty related. Future mortality improvements are reflected by applying the MP-2015 projection scale on a generational basis to adjusted based tables from the base year shown below.

a) Non-Annuitant – CalPERS employee mortality table without scale BB projection

Gender	Adjustment Factor	Base Year
Male	1.054	2009
Female	1.112	2009

b) Healthy Annuitant – CalPERS healthy annuitant mortality table without scale BB projection

Gender	Adjustment Factor	Base Year
Male	1.019	2009
Female	1.061	2009

c) Disabled Annuitant RP-2014 disabled retiree mortality table without MP-2014 projection

Gender	Adjustment Factor	Base Year
Male	0.984	2006
Female	1.038	2006

Age	Base Year Rates of Mortality at Selected Ages After Adjustment Factor					
	Healthy Non-annuitant		Healthy Annuitant		Disabled Annuitant	
	Male	Female	Male	Female	Male	Female
25	0.0425%	0.0244%	0.0310%	0.0220%	0.9553%	0.2563%
30	0.0520	0.0265	0.0410	0.0300	0.8233	0.2876
35	0.0605	0.0372	0.0640	0.0490	0.9749	0.4139
40	0.0796	0.0531	0.1170	0.0970	1.3126	0.6492
45	0.1126	0.0754	0.2410	0.2120	2.1145	1.0447
50	0.1646	0.1062	0.5320	0.4950	2.3941	1.2438
55	0.2421	0.1526	0.6360	0.4600	2.4866	1.5013
60	0.3545	0.2225	0.8170	0.5340	2.8111	1.9459
65	0.5092	0.3272	1.0560	0.7480	3.6312	2.5299
70	0.7089	0.4672	1.7660	1.2650	4.8812	3.4253
75	0.9646	0.6696	2.9830	2.1930	6.7010	4.9120
80	1.3394	1.0363	5.2760	3.6950	9.4261	7.2590
85	9.4290	6.6750	9.4290	6.6750	13.7102	10.8498
90	16.1860	12.3350	16.1860	12.3350	20.4562	15.8639
95	25.3150	20.8530	25.3150	20.8530	27.9623	22.6687

**CITY OF PHOENIX EMPLOYEES' RETIREMENT SYSTEM
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2016**

APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

5. Family Composition

Upon the death of an active member, 90% are assumed to be married. Spouses of male members are assumed to be three years younger, and spouses of female members are assumed to be three years older.

6. Rates of Termination

Sample rates of termination are shown below.

Rates of Termination*						
Age	Years of Service					
	0	1	2	3	4	5+
20	17.00%	15.00%	9.00%	8.00%	6.25%	5.50%
25	17.00%	15.00%	9.00%	8.00%	6.25%	5.50%
30	15.00%	11.25%	8.00%	6.75%	5.25%	4.50%
35	15.00%	8.75%	7.00%	5.50%	4.50%	3.50%
40	15.00%	7.50%	6.25%	4.50%	4.00%	2.75%
45	15.00%	6.50%	5.50%	4.50%	4.00%	2.25%
50	15.00%	6.50%	5.50%	4.50%	4.00%	2.00%
55	15.00%	6.50%	5.50%	4.50%	4.00%	2.00%
60	15.00%	6.50%	5.50%	4.50%	4.00%	2.00%

** Termination rates do not apply once a member is eligible for retirement*

7. Rates of Disability

The disability incidence rates are 0.960 times the CalPERS Public Agency Miscellaneous Ordinary Disability Incidence table for Males. Half of disabilities are assumed to be duty related. Sample disability rates of active members are provided in the table below. These rates apply to both male and female COPERS members.

Rates of Disability	
Age	Disability
20	0.0163%
25	0.0163
30	0.0183
35	0.0471
40	0.1172
45	0.1834
50	0.2046
55	0.2122
60	0.2132

**CITY OF PHOENIX EMPLOYEES' RETIREMENT SYSTEM
ACTUARIAL VALUATION REPORT AS OF JUNE 30, 2016**

APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

8. Rates of Retirement

Rates of retirement are based on age and service as shown in the table below.

Rates of Retirement				
Age	Years of Service			
	< 15	15-24	25-31	≥ 32
50-51	0.00%	0.00%	40.00%	40.00%
52	0.00%	0.00%	35.00%	40.00%
53	0.00%	0.00%	32.50%	32.50%
54	0.00%	22.50%	27.50%	32.50%
55-58	0.00%	22.50%	22.50%	32.50%
59	0.00%	22.50%	22.50%	42.50%
60	10.00%	22.50%	27.50%	42.50%
61	17.00%	22.50%	32.50%	42.50%
62	17.00%	30.00%	32.50%	42.50%
63	17.00%	25.00%	32.50%	42.50%
64	17.00%	25.00%	37.50%	42.50%
65	30.00%	32.50%	40.00%	42.50%
66-69	25.00%	32.50%	40.00%	42.50%
70	100.00%	100.00%	100.00%	100.00%

9. Unused Vacation and Compensatory Time

For Tier 1 and Tier 2 members, compensatory service credits and lump sum payments for unused vacation and compensatory time are assumed to increase the present value of normal retirement benefits by 9.0%. No increase to the present value of normal retirement benefits was assumed for Tier 3 members.

10. Member Contribution Crediting Rate

Member contributions are credited with interest at 3.75% per annum.

11. Changes Since Last Valuation

The member contribution crediting rate was updated for the June 30, 2016 actuarial valuation to reflect the provisions of the ballot measure that passed in August, 2015.

APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

Contribution Allocation Procedure

The contribution allocation procedure primarily consists of an actuarial cost method, an asset smoothing method, and an amortization method as described below. The most recent changes were adopted by the Board in August 2015.

1. Actuarial Cost Method

The entry age (EA) actuarial cost method was used for active employees, whereby the normal cost is computed as the level annual percentage of pay required to fund the retirement benefits between each member's date of entry and assumed retirement. The Actuarial Liability is the difference between the present value of future benefits and the present value of future normal cost. Or, equivalently, it is the accumulation of normal costs for all periods prior to the valuation date. The normal cost and Actuarial Liability are calculated on an individual basis. The sum of the individual amounts is the normal cost and Actuarial Liability for the System.

2. Asset Valuation Method

For the purposes of determining contribution rates, an Actuarial Value of Assets is used that dampens the volatility in market values that occur because of the fluctuations in market conditions. Use of an asset smoothing method reduces the volatility of contribution rates and is consistent with the long-term process of funding a pension plan.

The Actuarial Value of Assets is calculated by recognizing the deviation of actual investment returns compared to the expected return on the actuarial value of assets over a four-year period. The dollar amount of the expected return on the Actuarial Value of Assets is determined using the actual contributions and benefit payments during the year. Any difference between this amount and the actual net investment earnings is considered a gain or loss.

3. Amortization Method

The Unfunded Actuarial Liability (UAL) is the difference between the Actuarial Liability and the Actuarial Value of Assets. The UAL is amortized over periods in accordance with the following amortization methods.

- The UAL as of June 30, 2013, developed prior to implementing the September 2013 assumption changes, is amortized over a closed 25-year period as a level percentage of payroll.
- The impact of the September 2013 assumption changes on the UAL is amortized over a closed 25-year period as a level percentage of payroll with a four-year phase-in to the full amortization rate. The phase-in is calculated by multiplying the first year amortization payment by 25 percent. For the second year, the amortization schedule is recalculated reflecting the 25 percent payment in the first year and the remaining 24-year period and the calculated amortization payment is then multiplied by 50 percent. The process is repeated until the full amortization payment is made beginning in the fourth year of the 25-year period.

APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

- The impact of the August 2015 assumption changes on the UAL is amortized over a closed 20-year period as a level percentage of payroll with a four-year phase-in to the full amortization rate. The phase-in is calculated by multiplying the first year amortization payment by 25 percent. For the second year, the amortization schedule is recalculated reflecting the 25 percent payment in the first year and the remaining 24-year period and the calculated amortization payment is then multiplied by 50 percent. The process is repeated until the full amortization payment is made beginning in the fourth year of the 25-year period.
- Future gains and losses are amortized over closed 20-year periods as a level percentage of payroll from the valuation date in which they are first recognized. However, gains will not be amortized over a shorter period than the remaining period on the amortization of the 2013 UAL.

The total contribution rate is the sum of the normal cost rate (including assumed administrative expenses) and the UAL rate. The normal cost rate is determined by dividing the total normal cost determined under the actuarial cost method by the payroll expected for members active on the valuation date. The UAL rate is determined by dividing the UAL payments determined under the amortization method described above by the total expected payroll for the year (including members active on the valuation date and new entrants expected to replace active members who are expected to leave employment). These rates are determined for the fiscal year immediately following the valuation date, but are applied one year later without adjustment.

For Tier 1, members contribute 5 percent of pay and the City contributes the remainder of the total contribution rate. For Tier 2, the members and the City each pay half of the total contribution rate until January 1, 2016. Thereafter, Tier 2 and Tier 3 members pay half of total contribution rate, not to exceed 11% of pay, and the City contributes the remainder of the total contribution rate.

Changes Since Last Valuation

None.

APPENDIX C – SUMMARY OF PLAN PROVISIONS

1. Membership

Full-time employees of the City of Phoenix other than police officers or firefighters who are covered by another retirement system to which the City contributes.

Members who were hired before July 1, 2013, as well as members who join the City after July 1, 2013 who were members of ASRS prior to July 1, 2011 and did not withdraw their contributions are Tier 1 members.

Members hired into employment with the City between July 1, 2013 and December 31, 2015 who are not Tier 1 members are Tier 2 members.

Members hired into employment with the City on or after January 1, 2016 who are not Tier 1 members or Tier 2 members are Tier 3 members.

2. Final Average Compensation (FAC)

Tier 1/Tier 2

The average of annual compensation for the period of 3 consecutive years producing the highest average contained within the last 10 years immediately preceding retirement.

Tier 3

The average of annual compensation for the period of 5 consecutive years producing the highest average contained within the last 10 years immediately preceding retirement. Annual compensation will be limited to the first \$125,000 of compensation, indexed to inflation (CPI-U) each January 1 beginning January 1, 2017.

3. Credited Service

Credited service is determined based on Section 14 of Chapter XXIV of the Phoenix City Charter as well as COPERS administrative policy number 43. In no case is more than a year of service credited to any member for all service rendered in any calendar year. The amount of service credited to members varies by Tier, as detailed below.

Tier 1

A member is credited with a month of service for each calendar month in which the member performs at least 10 days of City service. A member is credited with a year of service for any calendar year in which the member has at least 10 months of credited service. If a member has less than 10 months of credited service for any calendar year, they are credited for the actual number of months.

Tier 2/Tier 3

A member is credited with a month of service for each calendar month in which the member performs at least 20 days of City service. A member is credited with a year of service for any calendar year in which the member has at least 12 months of credited

APPENDIX C – SUMMARY OF PLAN PROVISIONS

service. If a member has less than 12 months of credited service for any calendar year, they are credited for the actual number of months.

4. Voluntary Retirement (no reduction for age)

Tier 1

Eligibility:

Sum of age and credited service equals 80 or more, age 60 with 10 or more years of credited service or age 62 with 5 or more years of credited service.

Annual Benefit:

Unused sick leave service multiplied by 2% of FAC plus 2% of FAC times credited service up to 32.5 years plus 1% of FAC times service in excess of 32.5 years plus 0.5% of FAC times service in excess of 35.5 years. Minimum monthly pension is \$250 (\$500 if member has 15 or more years of service).

Minimum Benefit:

Minimum monthly pension is \$250 (\$500 if member has 15 or more years of service).

Tier 2/Tier 3

Eligibility:

Sum of age and credited service equals 87 or more, age 60 with 10 or more years of credited service or age 62 with 5 or more years of credited service.

Annual Benefit:

Unused sick leave service multiplied by 2% of FAC for Tier 2 members only plus FAC times credited service times the corresponding accrual rate:

Tier 2		Tier 3	
Years of Service	Accrual Rate	Years of Service	Accrual Rate
0 < Service ≤ 20	2.10%	0 < Service ≤ 10	1.85%
20 < Service ≤ 25	2.15%	10 < Service ≤ 20	1.90%
25 < Service ≤ 30	2.20%	20 < Service ≤ 30	2.00%
Service > 30	2.30%	Service > 30	2.10%

Note that for Tier 2 and Tier 3, the same accrual rate will apply for each year of service, based on the total years of service.

5. Deferred Retirement

Eligibility:

Termination of City employment prior to age 62 with 5 or more years of credited service.

APPENDIX C – SUMMARY OF PLAN PROVISIONS

Annual Benefit:

Accrued regular retirement amount based on credited services, unused sick leave service, and FAC at time of termination, payable beginning at age 62.

6. Duty Disability Retirement

Eligibility:

Total and permanent disability incurred in line of duty with the City.

Annual Benefit:

Computed in the same manner as the regular retirement amount based on FAC and credited service at time of disability retirement. Minimum is 15% of FAC for Tier 1 members and 15.75% for Tier 2 and Tier 3 members. Maximum during worker's compensation period is difference between final compensation and annualized workers compensation. At expiration of worker's compensation period, amount is recomputed to include years during which worker's compensation was paid.

7. Non-Duty Disability

Eligibility:

Total and permanent disability after 10 or more years of credited service.

Annual Benefit:

Computed in the same manner as the regular retirement amount based on FAC and credited service at time of disability retirement.

8. Duty Death Before Retirement

Eligibility:

Death in line of duty with the City and compensable under worker's compensation.

Annual Benefit:

To the spouse: Joint and 100% survivor actuarial equivalent of accrued regular retirement amount based on FAC and credited service and unused sick leave service at time of death. Minimum of 10 years of service is credited. To the children of a deceased member with 10 or more years of credited service: each child shall receive a monthly pension of \$200 until adoption, marriage, death or attainment of age 18.

9. Non-Duty Death Before Retirement

Eligibility:

10 or more years of credited service.

Annual Benefit:

Same as Duty Death Before Retirement.

APPENDIX C – SUMMARY OF PLAN PROVISIONS

10. Refund of Contributions

Eligibility:

Termination of covered service employment prior to eligibility for any other benefits.

Benefit:

Accumulated member contributions with interest at no more than 3.75% annually after January 1, 2016.

11. Pension Equalization Reserve (PER)

The PER is credited with Excess Earnings, if any, each calendar year. Excess Earnings are defined as the excess over 8.0% of the annual average of the time-weighted rates of return for the immediately preceding five calendar years. The amounts credited to the PER are either used to fund percentage increases to pension amounts or one-time post retirement distribution benefits (13th checks).

On January 1 of each year, persons in receipt of a pension for at least 36 months receive a percentage increase based on the lesser of:

- i. Phoenix area Consumer Price Index (CPI) and
- ii. The amount the balance in the PER can fully fund

The increase, subject to the availability of funds in the PER, is payable beginning with the April 1 payment each year, retroactive to January 1 of the same year.

Also, after each plan year's return is known, all pensioners (excluding minors) as of the end of the plan year are eligible to receive a one-time post retirement distribution (13th check). The 13th check is a percentage of the pensioner's annual benefits based on the lesser of:

- i. One half of the Phoenix area Consumer Price Index (CPI) and
- ii. The excess of the rate of return over the assumed interest rate

The percentage cannot be more than three percent, but must at least be one percent and is subject to the availability of funds in the PER. The 13th check is payable on December 1.

The PER is only applicable for Tiers 1 and 2.

APPENDIX C – SUMMARY OF PLAN PROVISIONS

12. Projected Percentage

Actuarially determined normal cost rate plus an amortization rate on the unfunded actuarial liability and a rate for administrative expenses, stated as a percentage of projected member compensation.

13. Member Contribution Rates

Tier 1: 5% of pay
Tier 2/Tier 3: 50% of the Projected Percentage not to exceed 11% of pay on or after January 1, 2016

14. City Contribution Rates

Total Projected Percentage less Member Contribution Rates for each Tier.

Note: The summary of plan provisions is designed to outline principal plan benefits. If COPERS should find the plan summary not in accordance with the actual provisions, the actuary should immediately be alerted so the proper provisions are valued.

APPENDIX D – GLOSSARY OF TERMS

1. Actuarial Liability

The Actuarial Liability is the difference between the present value of all future plan benefits and the present value of total future normal costs. It represents the amount of assets the System should have today according to the allocation of costs in the actuarial cost method. It is also referred to by some actuaries as the “accrued liability” or “actuarial accrued liability.” This measure is not appropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan’s benefit obligations.

2. Actuarial Assumptions

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

3. Actuarial Cost Method

A mathematical budgeting procedure for allocating the dollar amount of the actuarial present value of a retirement Plan benefit between future normal cost and actuarial accrued liability. Sometimes referred to as the “actuarial funding method.”

4. Actuarial Gain or Loss

The difference between actual experience and assumed experience.

5. Actuarial Present Value

The amount of funds currently estimated to be required 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 payment.

6. Actuarially Determined Contribution

A target or recommended contribution for the reporting period, determined in conformity with Actuarial Standards of Practice based on the most recent measurement available when the contribution for the reporting period was adopted.

7. Amortization

Paying off an interest-discounted amount with periodic payments of interest and principal — as opposed to paying off with a lump sum payment.

APPENDIX D – GLOSSARY OF TERMS

8. Deferred Inflow of Resources

Under GASB 68, an acquisition of net assets by a government employer that is applicable to a future reporting period. These are experience gains on the Total Pension Liability, assumption changes reducing the Total Pension Liability, or investment gains that are recognized in future reporting periods.

9. Deferred Outflow of Resources

Under GASB 68, a consumption of net assets by a government employer that is applicable to a future reporting period. These are experience losses on the Total Pension Liability, assumption changes increasing the Total Pension Liability, or investment losses that are recognized in future reporting periods.

10. Entry Age Actuarial Cost Method

The actuarial cost method selected for funding calculations and required for GASB 67 and 68 calculations. Under this method, the actuarial present value of the projected benefits of each individual included in an actuarial valuation is allocated on a level basis over the earnings of the individual between entry age and assumed exit ages. The portion of this actuarial present value allocated to a valuation year is called the Normal Cost (Service Cost for GASB 67 and 68). The portion of this actuarial present value not provided for at a valuation date by the actuarial present value of future normal costs is called the Actuarial Liability (Total Pension Liability for GASB 67 and 68).

11. Measurement Date

Under GASB 67 and 68, the date as of which the Total Pension Liability and Plan Fiduciary Net Position are measured. The Total Pension Liability may be projected from the Actuarial Valuation Date to the Measurement Date. The Measurement Date must be the same as the Reporting Date for the plan.

12. Net Pension Liability

Under GASB 67 and 68, the liability of employers and nonemployer contributing entities to employees for benefits provided through a defined benefit pension plan. It is calculated as the Total Pension Liability less the Plan Fiduciary Net Position.

13. Normal Cost

The actuarial present value of retirement Plan benefits allocated to the current year by the actuarial cost method.

APPENDIX D – GLOSSARY OF TERMS

14. Plan Fiduciary Net Position

Under GASB 67 and 68, the fair or Market Value of Assets.

15. Reporting Date

The last day of the plan or employer's fiscal year.

16. Service Cost

The portion of the actuarial present value of projected benefit payments that is attributed to the current period of employee service in conformity with the requirements of GASB 67 and 68. The Service Cost is the normal cost calculated under the entry age actuarial cost method.

17. Total Pension Liability

The portion of the actuarial present value of projected benefit payments that is attributed to past periods of employee service in conformity with the requirements of GASB 67 and 68. The Total Pension Liability is the actuarial liability calculated under the entry age actuarial cost method.

18. Unfunded Actuarial Liability (UAL)

The Unfunded Actuarial Liability represents the difference between the Actuarial Liability and the assets. It can be measured either based on the Actuarial Value of Assets or the Market Value of Assets. This value is sometimes referred to as the “unfunded actuarial accrued liability.”



Classic Values, Innovative Advice