www.pwc.com

City of Memphis

City of Memphis Retirement System

Funding Valuation for Plan Year Ending June 30, 2016

pwc

April 15, 2015

Mr. Brian Collins
Director, Division of Finance
City of Memphis
125 North Main Street
Memphis, Tennessee 38103

Dear Mr. Collins,

We are pleased to present this report containing the funding results of the plan year ending June 30, 2016 for the City of Memphis Retirement System ("the Plan"), pursuant to our engagement letter with the City of Memphis ("the City") dated September 26, 2013 and as amended December 31, 2014.

The City of Memphis retained PricewaterhouseCoopers LLP to perform an actuarial valuation of the Retirement System for the purpose of calculating the Actuarially Determined Contribution as defined in The Public Employee Defined Benefit Financial Security Act of 2014 for the State of Tennessee (the "Financial Security Act of 2014") for the plan year ending June 30, 2016. Pursuant to the City's current funding policy effective fiscal plan year beginning July 1, 2015, the measurement date used to determine the Actuarially Determined Contribution is twelve (12) months prior to the beginning of the plan year. Therefore, the funding requirement for the plan year ending June 30, 2016 is based on a valuation date of July 1, 2014. This report is not intended to satisfy the necessary information for accounting and reporting requirements in accordance with Government Accounting Standards Board Statement No. 67 (GASB 67), which replaced the requirements under Government Accounting Standards Board Statement No. 25 (GASB 25), and Government Accounting Standards Board Statement No. 27 (GASB 27).

This valuation has been conducted in accordance with the required Actuarial Standards of Practice as issued by the American Academy of Actuaries.

In preparing the results presented in this report, we have relied upon information the City of Memphis provided to us regarding plan provisions, plan participants, unaudited plan assets and benefit payments. The census data and plan asset information used in calculating the results herein were collected as of July 1, 2014. While the scope of our engagement did not call for us to perform an audit or independent verification of this information, we have reviewed this information for reasonableness. The accuracy of the results presented in this report is dependent upon the accuracy and completeness of the underlying information.

The City of Memphis has determined and taken responsibility for the actuarial assumptions and methods employed in the valuation of obligations and costs for purposes of complying with the Financial Security Act of 2014.

A range of results, different from those presented in this report could be considered reasonable. Future actuarial measurements may differ significantly from the current measurement presented in this report due to a number of factors including but not limited to: plan experience differing from that anticipated by the economic and demographic assumptions, increases or decreases expected as part of the natural operation of the methods used for these measurements (such as the end of an amortization period or additional cost or contribution requirements based on the plan's funded status), rounding conventions and changes in plan provisions or applicable law. Due to the limited scope of this report, an analysis of the potential range of such future measurements has not been performed.

This report was prepared for the internal use of the City of Memphis in connection with our actuarial valuation of the Plan for determining the Actuarially Determined Contribution only and not for reliance by any other person. PwC disclaims any contractual or other responsibility or duty of care to others based upon the services or deliverables provided in connection with this report.

This report does not purport to comply with any other purposes not stated herein. Significantly different results from what is presented in this report may be needed for other purposes.

The content of this document is limited to the matters specifically addressed herein and does not address any other potential tax consequences, or the potential application of tax penalties, to any matter other than as set forth herein. Our conclusions are not binding upon any taxing authority or the courts and there is no assurance that any relevant taxing authority will not successfully assert a contrary position. In addition, no exceptions (including the reasonable cause exception) are available for any federal or state penalties imposed if any portion of a transaction is determined to lack economic substance or fails to satisfy any similar rule of law, and our advice will not protect you from any such penalties. This document supersedes all prior written or oral advice with respect to the issues addressed in this document and all such prior communications should not be relied upon by any person for any purpose.

The undersigned actuaries are each a member of the Society of Actuaries and the American Academy of Actuaries and meet the "Qualification Standards for Actuaries Issuing Statements of Actuarial Opinion in the United States" relating to pension plans. To the best of our knowledge, the individuals involved in this engagement have no relationship that may impair, or appear to impair, the objectivity of our work.

We appreciate this opportunity to be of service to the City of Memphis. We are available to answer any questions with respect to our report.

Respectfully submitted,

Jerrold Dubner
jerrold.dubner@us.pwc.com
(678) 419-1320
Member, American Academy of Actuaries
Associate of the Society of Actuaries

Cindy Fraterrigo
cindy.fraterrigo@us.pwc.com
(312) 298-4320
Member, American Academy of Actuaries
Fellow of the Society of Actuaries

Shepherd M. Price
shepherd.m.price@us.pwc.com
(312) 298-2457
Member, American Academy of Actuaries
Associate of the Society of Actuaries

TABLE OF CONTENTS

HIGHLIGHTS OF THE ACTUARY'S REPORT

Actuarially Determined Contribution for Funding Purposes

The City's Actuarially Determined Contribution ("ADC") for purposes of complying with both The City's Funding Policy and The Public Employee Defined Benefit Financial Security Act of 2014 for the State of Tennessee (the "Financial Security Act of 2014") for the plan year ending June 30, 2016 is $73,913,000. Pursuant to the City's funding policy effective July 1, 2015, the ADC is determined using a measurement date of July 1, 2014, which is twelve (12) months prior to the first day of the plan year. The ADC is based on a measurement date of July 1, 2014 and is comprised of the normal cost $26,746,000, the current year amortization charge $42,010,000, with interest on both of these components $5,157,000. Details of this calculation can be found in Section II - Funding, Exhibit C.

As described above, there are two main components that comprise the ADC. The first component is the normal cost, which is the cost of additional benefits accruing during the current year. The employer normal cost for the current plan year as a percentage of anticipated payroll is approximately 7.9%. It is based on the same actuarial assumptions and methods used to develop the annual required contribution described in the 2015 fiscal year GASB report we issued on October 31, 2014 , but also includes an amendment to the plan to change the benefit structure for nongrandfathered employees effective July 1, 2016 from a traditional defined benefit formula to hybrid defined benefit plan that includes a market based cash balance plan.

The second component of the ADC is the current year amortization charge. Starting for the plan year ending June 30, 2016, the current year amortization charge is the sum of all amortization charges for both the current year and as established in prior plan years. An amortization charge for any given year is the funding shortfall base (or "tier") amortized over a closed 30-year period. The funding shortfall tier is calculated as the unfunded actuarial accrued liability, defined as the actuarial accrued liability less the actuarial value of asset, for the current plan year less the sum of all remaining balances for shortfall tiers established in prior plan years. This method is determined by the City of Memphis and is consistent with our understanding of the requirements described in The City's Funding Policy. The plan year ending June 30, 2016 marks the first year that the City is required to comply with the Financial Security Act of 2014, so there are no prior year funding shortfall tiers for the current year.

The method for determining the actuarial value of assets used to determine the ADC is an actuarial value that "smoothes" fluctuations in the market value over a five (5) year period, while ensuring that the actuarial value stays within a 10% corridor of the market value of assets. This method for determining the actuarial value of assets consistent with the City's funding policy and complies with the Financial Security Act of 2014. The development of the actuarial value of assets can be found in Section III - Assets, Exhibit C.

HIGHLIGHTS OF THE ACTUARY'S REPORT

Assumptions and Methods

Retirement rates for nongrandfathered employees are different than those for grandfathered employees. Nongrandfathered General employees are assumed to retire between ages 62 and 65. Nongrandfathered Police & Fire employees are assumed to retire between ages 52 and 60.

The actuarial assumptions and methods are the same as those summarized in the July 1, 2014 actuarial valuation report issued on October 31, 2014 for accounting and reporting requirements in accordance wit the Government Accounting Standards board Statement No. 67 and Government Accounting Standards Board Statements No. 27. This included updates per an assumption study that was performed in May of 2014 resulting in updates to several demographic assumptions. For a summary of the actuarial assumptions and methods see Section V.

Plan Provisions

The plan was amended effective July 1, 2016. Any participant with seven and one-half (7½) Years of Service or more will be grandfathered in their current plan and all other employees will participate in the new hybrid plan design. Nongrandfathered employees will move from a traditional defined benefit formula to a hybrid defined benefit formula that includes both a market based cash balance component and defined contribution component. The City of Memphis was responsible for indicating which active employees in the July 1, 2014 census information are expected to be grandfathered. Details regarding the new plan design may be found in Section VI - Summary of Plan Provisions.

The plan amendment *decreased* the July 1, 2014 actuarial accrued liability by $20,805,000.

Census Data

The valuation is based on census information collected as of July 1, 2014. Details of the census information used in the valuation are summarized Section IV.

FUNDING

A. Development of Funded Status as of July 1, 2014

		General Employees	Police and Fire	Total
1.	Actuarial Accrued Liability [1]			
	a. Active Participants	$ 214,416,000	$ 699,903,000	$ 914,319,000
	b. Terminated Vested Participants	2,341,000	1,861,000	4,202,000
	c. Retiree/Beneficiary/Disabled Participants	485,104,000	1,174,640,000	1,659,744,000
	d. Total: (1)(a) + (1)(b) + (1)(c)	$ 701,861,000	$ 1,876,404,000	$ 2,578,265,000
2.	Actuarial Value of Assets [2]	$ 556,669,000	$ 1,488,236,000	$ 2,044,905,000
3.	Unfunded Actuarial Accrued Liability: (1)(d) - (2)	$ 145,192,000	$ 388,168,000	$ 533,360,000
4.	Funded Percentage: (2) ÷ (1)(d)	79.3%	79.3%	79.3%

1 The actuarial accrued liability above reflects the impact of the plan amendment effective July 1, 2016.

2 The actuarial value of assets are allocated in proportion to the actuarial accrued liability of General employees and Police and Fire employees.

B. Actuarial Accrued Liability Reconciliation – Impact of Plan Change

1.	July 1, 2014 Actuarial Accrued Liability for GASB Purposes [1]	$	2,599,070,000
2.	Change in Plan Provisions [2]		(20,805,000)
3.	July 1, 2014 Actuarial Accrued Liability: (1) + (2)	$	2,578,265,000

[1] The development of this figure may be found in the GASB report issued on October 31, 2014

[2] The plan was amended effective July 1, 2016 to have employees with 7½ years of service or less as of July 1, 2016 earn benefits under a new retirement benefit formula. Details may be found in the Section VI - Summary of Plan Provisions.

C. Development of Actuarially Determined Contribution

Development of actuarially determined contribution for the plan year ending June 30, 2016.

		General Employees	Police and Fire	Total
1.	Annual Anticipated Payroll	$ 92,128,000	$ 248,404,000	$ 340,532,000
2.	Development of Employer Normal Cost			
	a. Total Normal Cost as of July 1, 2014	$ 12,101,000	$ 36,087,000	$ 48,188,000
	b. Estimated Employee Contributions	5,618,000	15,824,000	21,442,000
	c. Employer Normal Cost as of July 1, 2014	6,483,000	20,263,000	26,746,000
3.	Actuarially Determined Contribution (ADC):			
	a. Employer Normal Cost as of July 1, 2014			$ 26,746,000
	b. Total Amortization Charge			42,010,000
	c. Interest: [(a) + (b)] × 7.5%			5,157,000
	d. Actuarially Determined Contribution: (a) + (b) + (c)			$ 73,913,000
4.	Percent of Annual Covered Payroll: (3)(d) ÷ (1)			21.71%

1 The ADC is determined pursuant to the City's funding policy and complies with our understanding of the provisions The Financial Security Act of 2014.

D. Unfunded Accrued Liability Amortization Schedule

Date Tier Established	Reason	Original Shortfall Tier	Original Amortization Period	Remaining Shortfall Tier	Remaining Amortization Period	Current Amortization Charge
7/1/2014	Gain/(Loss) for 2016 Plan Year	$ 533,360,000	30	$ 533,360,000	30	$ 42,010,000
Total				$ 533,360,000		$ 42,010,000

[1] The amortization of the shortfall tier for the current year is calculated using the valuation interest rate of 7.5%.

ASSETS

SECTION IV - ASSETS

A. Market Value of Assets	Market Value June 30, 2013	Market Value June 30, 2014
1607 Capital Partners	$ 108,273,642	$ 138,571,589
Acadian EM Equity II	87,751,316	100,558,982
Barrow, Hanley, et al	89,406,052	83,180,245
BlackRock Granite Property Fund	29,882,770	32,828,993
Cash Management Account (In-House)	6,529,944	21,275,205
Cornerstone	6,141,502	8,154,426
Fidelity Real Estate Growth III Fund	24,129,256	15,349,923
Herndon	97,662,669	99,870,281
Long Wharf Real Estate Partners	-	8,820,168
Mackay Shields	196,308,221	205,141,816
Marathon Asset Management	122,615,262	122,319,095
Navellier & Associates	86,495,334	104,525,523
Nicholas Investment Partners	28,014,435	24,300,418
Northern Trust	85,518,509	107,084,318
Paradigm Small Cap	56,352,852	40,522,375
PIMCO	188,571,569	196,136,219
Platte River	24,557,275	30,074,010
Principal Global Investors	84,518,318	93,581,094
Prudential Core Conserv Bond	164,772,127	208,031,886
Rhumbline S&P 500	189,714,510	182,653,222
Rowe Price Fleming	139	139
RREEF America REIT II	11,439,596	12,358,308
RREEF Real Estate Securities Commingled Fund	29,612,437	33,200,255
Smith Graham	151,928,244	193,733,390
SouthernSun	48,621,015	44,021,166
Strategic Global Advisors	24,227,606	31,562,613
Winslow Capital Management	97,024,725	107,302,374
Total	$ 2,040,069,000	$ 2,245,158,000

B. Reconciliation of Market Value of Assets and Investment Return

1.	Market Value of Assets at July 1, 2013	$	2,040,069,000
2.	Contributions		
	a. Employer Contributions	$	19,440,000
	b. Employee Contributions		24,173,000
	c. Total	$	43,613,000
3.	Benefit Payments in 2013 - 2014	$	170,833,000
4.	Expenses		
	a. Investment Fees	$	8,827,000
	b. Administrative Fees		1,478,000
	c. Total	$	10,305,000
5.	Interest and Dividend Income	$	48,734,000
6.	Unrealized Gain/(Loss)	$	262,674,000
7.	Net Realized Gain/(Loss)	$	29,120,000
8.	Other Revenue [1]	$	2,086,000
9.	Total Income: (5) + (6) + (7) + (8)	$	342,614,000
10.	Market Value of Assets at July 1, 2014: (1) + (2) - (3) - (4) + (9)	$	2,245,158,000
11.	Investment Return: [2 × (9)] ÷ [(1) + (10) - (9)]		17.4%

[1] Does not reflect adjustment to DROP Benefit Payments, as the amount is immaterial, per the City.

C. Development of Actuarial Value of Assets for Funding Purposes

1.	Market Value of Assets at July 1, 2014				$ 2,245,158,000
2.	Development of Expected Market Value of Assets at July 1, 2014:				
	a. Market Value of Assets at July 1, 2013:				$ 2,040,069,000
	b. Expected Investment Earnings at July 1, 2013 MVA:				153,005,000
	c. Contributions with half a year of interest at 7.5%:				45,248,000
	d. Benefit Payments with half a year of interest at 7.5%:				(177,239,000)
	e. Expected Market Value of Assets at July 1, 2014: (2)(a) + (2)(b) + (2)(c) - (2)(d)				$ 2,061,083,000
3.	Gains/(Losses) at July 1, 2014: (1) - (2)(e)				$ 184,075,000
4.	Asset Gains/(Losses)		Gains/(Losses)	% Not Yet Recognized	Gains/(Losses) Not Yet Recognized
	a. 2014 Asset Gain (Loss):		$ 184,075,000	80%	$ 147,260,000
	b. 2013 Asset Gain (Loss):		69,045,000	60%	41,427,000
	c. 2012 Asset Gain (Loss):		(94,160,000)	40%	(37,664,000)
	d. 2011 Asset Gain (Loss):		246,152,000	20%	49,230,000
5.	Total Unrecognized Asset Gains/(Losses): sum of (4)(a) to (4)(d)				$ 200,253,000
6.	Actuarial Value of Assets Current for Year Prior to Corridor: (1) - (5)				$ 2,044,905,000
7.	90% of Market Value of Assets: (1) × 90%				$ 2,020,642,000
8.	110% of Market Value of Assets: (1) × 110%				$ 2,469,674,000
9.	Actuarial Value of Assets at July 1, 2014: (6), but not less than (7) or greater than (8)				$ 2,044,905,000

SECTION V - CENSUS DATA

CENSUS DATA

Page

SECTION V - CENSUS DATA

A. Census Information

		June 30, 2013	June 30, 2014
1.	Active		
	a. Number	6,020	5,756 [1]
	b. Average Age	44.0	43.9
	c. Average Years of Service	11.2	12.0
	d. Covered Payroll of Actives[2]	$ 304,686,000	$ 340,029,000
2.	Terminated Vested		
	a. Number	168	646
4.	Retiree and Beneficiary		
	a. Number	4,147	4,239
	b. Annual Benefits Payable	$ 138,892,000	$ 144,189,000
5.	Disabled		
	a. Number	635	653
	b. Annual Benefits Payable	$ 16,613,000	$ 17,370,000

[1] The number of grandfathered active participants as of July 1, 2014 are 4,372, as provided by the City of Memphis.

[2] The increase in anticipated payroll between 2013 and 2014, despite the decrease in number of actives, is the result of the change in the retirement assumption.

B. Distribution of Active Members by Age and Service

Attained Age	Distribution of Active Members by Age and Service as of June 30, 2014										
	Under 1 year	1 to 4 years years	5 to 9 years years	10 to 14 years	15 to 19 years	20 to 24 years	25 to 29 years	30 to 34 years	35 to 39 years	Over 40 years	Total
<25	11	39	3								53
25-29	31	283	146	4							464
30-34	31	250	311	105	1						698
35-39	26	142	264	282	83						797
40-44	20	100	207	290	417	80	7				1,121
45-49	24	86	124	209	326	220	73				1,062
50-54	20	65	75	137	185	178	99	14	2		775
55-59	11	57	68	86	108	75	53	12	2		472
60-64	8	27	27	63	43	30	16	4	2	4	224
65-69	2	11	16	17	16	11	2	1	1		77
70&Up	1	1	2		5	1	3				13
Total	185	1,061	1,243	1,193	1,184	595	253	31	7	4	5,756

C. Distribution of Terminated Vested Members by Age and Service

Attained Age	Distribution of Terminated Vested Members by Age and Service as of June 30, 2014							
	Under 5 years	5 to 9 years	10 to 14 years	15 to 19 years	20 to 24 years	25 to 29 years	Over 30 years	Total
<25	8	3						11
25-29	105	49						154
30-34	69	71						140
35-39	49	47	10					106
40-44	31	45	10	3				89
45-49	21	16	10	6	1	5		59
50-54	14	15	6	4	1			40
55-59	6	11	5					22
60-64	7	4	3	2				16
65-69		6		1				7
70&Up		2						2
Total	310	269	44	16	2	5		646

D. Distribution of Retired Members, Beneficiaries, and Disabled Members by Age and Number of Years Retired

Attained Age	Distribution of Retired Members, Beneficiaries, and Disabled Members by Age and Number of Years Retired as of June 30, 2014							
	Under 5 years	5 to 9 years	10 to 14 years	15 to 19 years	20 to 24 years	25 to 29 years	Over 30 years	Total
<40	1	6	21	7	3	3	4	45
40-44			20	21	4	5	3	53
45-49		2	11	27	23	89	3	155
50-54	1	1	16	13	24	206	76	337
55-59	2	2	10	22	25	135	356	552
60-64		5	18	29	43	100	605	800
65-69		5	12	21	27	64	802	931
70-74		1	6	12	27	30	666	742
75-79			4	5	13	24	525	571
80-84				2	2	13	382	399
85-89					2	5	199	206
90&Up							101	101
Total	4	22	118	159	193	674	3,722	4,892

E. Flow of Lives from June 30, 2013 to June 30, 2014

	Actives	Terminated Vested	Disabled	Retired [1]	DROP	Total
June 30, 2013	6,020	168	635	3,837	310	10,970
New Entrants:	190	-	-	-	-	190
Rehires:	32	(3)	(1)	(1)		27
DROP:	(120)			-	120	-
Vested Terminations:	(65)	65		-		-
Terminations:	(198)	(91)		-		(289)
Retirements:	(69)			203	(134)	-
Disablements:	(17)		17	-		-
Death with Beneficiary:	(4)			4		-
Death without Beneficiary:	(13)		(25)	(86)		(124)
Lump Sums:	(5)			(3)		(8)
Data Adjustments:	5	507	27	(11)		528
June 30, 2014	5,756	646	653	3,943	296	11,294

[1] Last year this count included 903 beneficiaries and 7 participants who were retirement eligible but had not commenced benefit payments. This year this count includes 927 beneficiaries and 12 participants who are retirement eligible but have not commenced benefit payments.

ACTUARIAL ASSUMPTIONS AND METHODS

SECTION VI - ACTUARIAL ASSUMPTIONS AND METHODS

A. Actuarial Assumptions

The assumptions used in the valuation were selected and approved by the City of Memphis. The actuary and other economic and investment professionals provide advice for selecting the economic and demographic assumptions. In our opinion, the assumptions are reasonable for purposes of this valuation.

Interest Rate /	7.5% per year for funding purposes
Investment Return	7.5% per year
Interest Crediting Rate	
Cash Balance Account	6.5% (Valuation interest rate less 1.0%)
IRC 401(a) Account	5.5%
Future Salary Increases	Scale that varies by age and service with a weighted average of 4.25% per year
Cost of Living Increases	N/A
Mortality	General: Fully Generational RP-2014 Mortality Table for males and females with MP-2014 projection scale and adjusted by a 1 year set forward
	Police and Fire: Fully Generational RP-2014 Mortality Table with Blue Collar adjustment for males and females with MP-2014 projection scale and adjusted by a 1 year set forward
	Disabled: Fully Generational RP-2014 Disabled Mortality Table with MP-2014 projection scale and adjusted by a 3 year set back
Disability	1968 Social Security Experience Table. Sample rates are shown below:
Account Balance Conversion	Account balances under the 2016 Plan (effective July 1, 2016) are converted at 5.0% interest and the applicable mortality table under IRC 417(e) in effect on the valuation date.

A. Actuarial Assumptions (continued)

Termination — Select and Ultimate rates. Sample rates are shown below:

Police & Fire: Males

	Years of Service					
Age	0	1	2	3	4	5+
20	13.0%	5.0%	5.0%	5.0%	5.0%	5.0%
25	15.0%	5.0%	5.0%	5.0%	5.0%	4.0%
30	17.0%	5.0%	4.0%	4.0%	3.0%	3.0%
35	15.0%	5.0%	5.0%	5.0%	4.0%	3.0%
40	18.0%	4.0%	4.0%	4.0%	2.0%	2.0%
45	17.0%	20.0%	5.0%	5.0%	2.0%	2.0%
50	15.0%	20.0%	5.0%	5.0%	2.0%	2.0%
55	15.0%	20.0%	5.0%	5.0%	2.0%	2.0%

General: Males

	Years of Service					
Age	0	1	2	3	4	5+
20	55.0%	52.0%	47.0%	45.0%	40.0%	40.0%
25	63.0%	57.0%	31.0%	17.0%	7.0%	9.5%
30	46.0%	46.0%	18.0%	14.0%	14.0%	8.0%
35	22.0%	22.0%	17.0%	7.0%	7.0%	6.0%
40	26.0%	4.0%	11.0%	11.0%	10.0%	5.0%
45	5.0%	5.0%	5.0%	5.0%	5.0%	4.0%
50	5.0%	5.0%	5.0%	5.0%	3.0%	4.0%
55	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%

A. Actuarial Assumptions (continued)

Termination (cont.)

General, Police & Fire:
Females

	Years of Service					
Age	0	1	2	3	4	5+
20	25.0%	22.0%	20.0%	20.0%	20.0%	5.0%
25	24.0%	16.0%	14.0%	10.0%	12.0%	6.0%
30	26.0%	17.0%	12.0%	13.0%	13.0%	6.0%
35	14.0%	11.0%	15.0%	11.0%	11.0%	4.0%
40	18.0%	14.0%	8.0%	8.0%	7.0%	4.0%
45	18.0%	14.0%	8.0%	8.0%	5.0%	4.0%
50	6.0%	6.0%	7.0%	7.0%	5.0%	4.0%
55	6.0%	6.0%	7.0%	7.0%	5.0%	4.0%

A. Actuarial Assumptions (continued)

Retirement Rates

For both General employees and Police and Fire employees, the rates vary by age, gender and grandfather status:

Grandfathered

Age	Police and Fire Males & Females	General Males
45 - 49	25%	20%
50 - 54	25%	25%
55 - 59	25%	25%
60 - 64	40%	25%
65 - 69	100%	100%
70	100%	100%

Nongrandfathered

General - Males & Females

Age	Rate
62	20%
63	20%
64	20%
65	100%

Police & Fire - Males and Females

Age	Rate
52	20%
53	20%
54	20%
55	20%
56	20%
57	20%
58	20%
59	20%
60	100%

A. Actuarial Assumptions (continued)

Marriage	80% of male General Employees, 50% of female General Employees, and 80% of Police and Fire Employees are assumed to be married. Wives are assumed to be three years younger than their husbands.
Death/Disability	Deaths and disabilities for active General Employees are assumed to be other than line-of-duty. Deaths and disabilities for active Police and Fire Employees are assumed to be line-of-duty.
Form of Payment	It has been assumed that benefits will be paid in the normal annuity form applicable to the particular benefit. All grandfathered General Employees who terminate prior to retirement age are assumed to elect to receive their employee contributions time the applicable return multiple. All nongrandfathered General Employees who terminate prior to ten years of service will receive their account balance, and those who withdraw after ten years of service will receive their accrued benefit commencing at age 60. All Police and Fire Employees who terminate prior to ten years of service will receive their employee contributions, and those who withdraw after ten years of service will receive their accrued benefit.
Expense Load	None.

B. Actuarial Methods for Funding Purposes

1. Actuarial Cost Method

The actuarial cost method is the Entry Age Normal Actuarial Cost Method. This method determines a normal cost rate as a fixed percentage of compensation for each active participant. The current year's normal cost is the participant's compensation multiplied by the normal cost rate. Annual contributions in this amount, from the date the participant entered the plan (or would have entered, if the plan had always been in effect and the participant had entered at the earliest possible date) until retirement, would be sufficient to provide for the actuarial present value of the participant's plan benefits. The total normal cost is the sum of the normal costs for all active participants.

The actuarial accrued liability is the present value of future benefits, for both active and inactive participants, less the present value of future normal costs.

2. Asset Valuation Method

The actuarial value of assets is equal to the fair value of assets adjusted for gains and losses on investments recognized over a five-year period. The annual investment gain/loss amount is equal to the difference between the expected return on the fair value of assets and the actual return on assets. If the resulting value is outside the 90% to 110% range, the amount is further adjusted to be a maximum of 110% of market value or a minimum of 90% of market value. Last year, the actuarial value of assets were developed using a rolling actuarial value with 10% a corridor.

3. Anticipated Payroll

The Anticipated Payroll is equal to actual payroll during the prior year for members who are still active on the valuation date, adjusted for one year of assumed salary increases. The Anticipated Payroll does not include amounts for members who have reached the age at which retirement is assumed to occur immediately. This does not include payroll pertaining to members of the DROP as employee and City contributions cease upon entering the DROP Program.

4. Changes in Actuarial Methods

This marks the first year of calculating the ADC per the City's Funding Policy. Therefore, there are no changes to the actuarial methods.

SUMMARY OF PLAN PROVISIONS

A. Summary of Plan Provisions: General Employees

Effective Date	Originally effective October 1, 1948. Revised July 1, 1978, January 1, 1990, December 1, 2000, July 1, 2012 and July 1, 2016.
Participation	
1948 Plan	All regular salaried employees on their date of hire and hired before July 1, 1978.
1978 Plan	All regular salaried employees on their date of hire and hired on or after July 1, 1978 but prior to July 1, 2016.
2016 Plan	All regular salaried employees on their date of hire and hired on or after July 1, 2016. In addition, any nongrandfathered employee in the 1978 Plan will participate in the 2016 Plan as of July 1, 2016. For this purpose, a nongrandfathered employee is any employee with less than 7½ Years of Service as of July 1, 2016.
Compensation	Basic salary, excluding overtime, but including shift premium, hazardous pay, longevity pay and incentive pay.
Average Monthly Compensation	For 1948 Plan employees and 1978 Plan employees hired before July 1, 2012, the highest average monthly Compensation received for any five consecutive years of service, or the most recent year's earnings, if greater. For 1978 Plan employees hired after June 30, 2012, highest average monthly Compensation received for any three consecutive years of service.
Year of Service	One year of service is earned for each 12-month period beginning at date of employment. Fractional periods (months and days) are also credited.

A. Summary of Plan Provisions: General Employees (continued)

Accrued Benefit

1948 Plan

An employee in the 1948 Plan may choose between (1) and (2):

(1) The sum of (a) and (b):

(a) 2¼% of Average Monthly Compensation times Years of Service before 1/1/90, *plus* 2½% of Average Monthly Compensation times Years of Service after 1/1/90.

Total Years of Service in part (a) must not exceed 25 years.

(b) 1% of Average Monthly Compensation times Years of Service in excess of 25

The maximum total retirement benefit is 72½ % of the Average Monthly Compensation.

(2) Return of Employee Contributions in accordance with the following schedule:

Years of Service	Return Multiple
less than 5	1.0
5 to 14	1.5 - 2.9
15 or more	3.0

A. Summary of Plan Provisions: General Employees (continued)

Accrued Benefit (continued)

1978 Plan

A grandfathered employee is any employee hired before July 1, 2016 and who has 7½ or more Years of Service as of July 1, 2016. All other employees are nongrandfathered.

The Accrued Benefit for nongrandfathered employees will be based on Average Monthly Compensation and Years of Service as of June 30, 2016 after which future benefits will be earned under the 2016 Plan.

An employee in the 1978 Plan may choose between (1) and (2):

(1) The sum of (a) and (b):

(a) For employees hired before July 1, 2012: 2¼% of Average Monthly Compensation times Years of Service before 1/1/90, plus 2½% of Average Monthly Compensation times Years of Service after 1/1/90.

For employees hired after June 30, 2012: 2¼% of Average Monthly Compensation times Years of Service

Total Years of Service in part (a) must not exceed 25 years.

(b) 1% of Average Monthly Compensation times Years of Service in excess of 25, up to a maximum total retirement benefit of 72½ %.

(2) Return of Employee Contributions in accordance with the following schedule:

Years of Service	Return Multiple
less than 5	1.0
5 to 14	1.5 - 2.9
15 or more	3.0

A. Summary of Plan Provisions: General Employees (continued)

Accrued Benefit (continued)

2016 Plan

An employee in the 2016 Plan will be required to receive the Normal Form of Annuity derived by both a market-rate cash balance account and a defined contribution account.

Market-rate Cash Balance Account

Annual allocations to the cash balance account are equal to a percentage of Compensation that varies by Years of Service pursuant to the following allocation schedule:

Years of Service	Allocation %
0.00 - 4.99	5%
5.00 - 9.99	7%
10.00 - 14.99	9%
15.00 - 19.99	12%
20.00 +	15%

Interest Credits applied to the cash balance account are based on an interest crediting rate equal to the investment return on plan assets *less* one percent (1.0%).

The Normal Form of Annuity is determined based on Actuarial Equivalence of five percent (5.0%) per annum and the applicable mortality table pursuant to IRC Section 417(e)(3) for the Plan Year.

Defined Contribution Account Balance

Annual allocations to the defined contribution account are equal to seven and one-half percent (7.5%) of Compensation which consists of a six percent (6.0%) of Compensation as an employee contribution and one and one half percent (1.5%) of Compensation as an employer contribution. Assets are participant directed and the investment earnings are included in the defined contribution account balance.

The Normal Form of Annuity is determined based on Actuarial Equivalence of five percent (5.0%) per annum and the applicable mortality table pursuant to IRC Section 417(e)(3) for the Plan Year.

A. Summary of Plan Provisions: General Employees (continued)

Minimum Accrued Benefit

	Years of Service	At Age	Monthly Minimum Accrued Benefit
1948 Plan and 1978 Plan	25 or more	No Restriction	$525 plus $21 times the lesser of 10 or Years of Service in excess of 25
	15 or more	65 or after	$500 plus $1 times the lesser of 25 or Years of Service
	less than 25	Before 65	The greater of $262.50 or $21 times Years of Service

2016 Plan There is no minimum accrued benefit other than that provided for death and disability.

Normal Form of Annuity If single, an annuity for the life of the participant. A married participant will receive this annuity during his lifetime with a 75% continuation to his spouse upon his death. For 1948 Plan participants, 100% of the annuity is payable to the spouse upon the death of the participant.

A. Summary of Plan Provisions: General Employees (continued)

Normal Retirement

Elected & Appointed	For elected and appointed participants hired before November 1, 2004, first day of month coincident with or next following completion of 12 Years of Service. Otherwise, normal retirement eligibility follows their respective plan. Benefit Amount: Accrued Benefit
1948 Plan	For 1948 Plan employees, first day of the month coincident with or next following the earlier of the following dates: (a) Age 60 and completion of 10 Years of Service; or (b) Completion of 25 Years of Service. Benefit Amount: Accrued Benefit

A. Summary of Plan Provisions: General Employees (continued)

Normal Retirement (continued)

1978 Plan

For 1978 Plan employees hired before July 1, 2012, first day of the month coincident with or next following the earliest of the following dates:

(a) Age 60 and completion of 10 Years of Service;
(b) Age 65 and completion of 5 Years of Service; or
(c) Completion of 25 Years of Service.

Benefit Amount: Accrued Benefit

For 1978 Plan employees hired on or after June 30, 2012, first day of the month coincident with or next following the earliest of the following dates:

(a) Age 65 and the completion of 5 Years of Service; or
(b) Completion of 25 Years of Service

Benefit Amount: A reduction of five percent (5%) per year for each year that the commencement date precedes the date the participant will attain age 62 applied to the Accrued Benefit.

2016 Plan

For 2016 Plan employees, first day of the month coincident with or next following the earlier of the following dates:

(a) Age 65 and the completion of 5 Years of Service; or
(b) Completion of 25 Years of Service

Benefit Amount: Accrued Benefit

A. Summary of Plan Provisions: General Employees (continued)

Disability

Eligibility:	No service requirement for line-of-duty; five years of service for non line-of-duty.
Line-of-Duty:	A participant who becomes disabled while performing City duties is entitled to receive the greater of: (1) 60% of Average Monthly Compensation as of date of disability; or (2) Accrued Benefit as of date of disability.
Other:	For 1948 Plan participants, disabled employees while actively employed for reasons other than line-of-duty is entitled to receive the greater of: (1) 25% of Average Monthly Compensation as of date of disability; or (2) Accrued Benefit as of date of disability. For 1978 Plan participants, an employee who becomes disabled while actively employed for reasons other than line-of-duty is entitled to receive the Accrued Benefit as of date of disability. For 2016 Plan participants, an employee who becomes disabled while actively employed for reasons other than line-of-duty is entitled to receive the Accrued Benefit as of date of disability.

A. Summary of Plan Provisions: General Employees (continued)

Vested Termination

Eligibility:	Termination of employment after completion of 10 Years of Service.
Benefit Amount:	
1948 Plan	Accrued Benefit determined as of termination date becomes payable at age 65 for 1948 Plan employees and 1978 Plan employees hired before July 1, 2012.
1978 Plan	Accrued Benefit determined as of termination date becomes payable at age 60 if hired before July 1, 2012 and becomes payable at age 62 if hired on or after July 1, 2012.
2016 Plan	Accrued Benefit determined as of termination date becomes payable at age 60 for 2016 Plan employees.

Nonvested Termination

Eligibility:	Termination of employment before completion of 10 Years of Service.
Benefit Amount:	
1948 Plan	Return of Employee Contributions times the appropriate return multiple.
1978 Plan	Return of Employee Contributions times the appropriate return multiple for a grandfathered employee. A nongrandfathered employee under the 1978 Plan will receive their refund of contributions via the 2016 Plan.
2016 Plan	The portion of the cash balance account funded by employee contributions. For this purpose, a nongrandfathered employee will have an opening account balance as of July 1, 2016 equal to employee contributions as of July 1, 2016 times the appropriate return multiple.

A. Summary of Plan Provisions: General Employees (continued)

Involuntary Retirement

Eligibility:

1948 Plan	Completion of 15 years of service
1978 Plan	Completion of 12 years of service
	Note: This pension does not apply to any employee hired after November 1, 2004

Benefit Amount: Accrued Benefit determined as of involuntary retirement date becomes payable on date of retirement.

A. Summary of Plan Provisions: General Employees (continued)

Pre-Retirement Death Benefit

Eligibility:	No service requirement for Line-of-Duty; 5 years of service for non line-of-duty.
Line-of-Duty Benefit:	The surviving spouse (or children) of a participant who dies while performing City duties is entitled to receive the greater of: (1) 60% of Average Monthly Compensation as of date of death; or (2) Accrued Benefit as of date of death.
Non Line-of-Duty Benefit:	For the 1948 Plan, the surviving spouse (or children) of a participant who dies while actively employed will receive 100% of the participant’s Accrued Benefit as of date of the participant's death. For the 1978 Plan, the surviving spouse (or children) of a participant who dies while actively employed will receive 75% of the participant’s Accrued Benefit as of date of the participant's death. For the 2016 Plan, the surviving spouse (or children) of a participant who dies while actively employed will receive 75% of the Normal Form of Annuity as of the date of the participant's death.

A. Summary of Plan Provisions: General Employees (continued)

Employee Contributions

1948 Plan	Employees in the 1948 Plan must contribute five percent (5%) of Compensation.
1978 Plan	Employees in the 1978 Plan must contribute eight percent (8%) of Compensation.
2016 Plan	Employees in the 2016 Plan must contribute two percent (2%) of Compensation to the cash balance account and six percent (6%) of Compensation to the defined contribution account.

B. Summary of Plan Provisions: Police and Fire Employees

Effective Date	Originally effective October 1, 1948. Revised July 1, 1978, January 1, 1990, December 1, 2000, July 1, 2012 and July 1, 2016.
Participation	
1948 Plan	All regular salaried employees on their date of hire and hired before July 1, 1978.
1978 Plan	All regular salaried employees on their date of hire and hired on or after July 1, 1978 but prior to July 1, 2016.
2016 Plan	All regular salaried employees on their date of hire and hired on or after July 1, 2016. In addition, any nongrandfathered employee in the 1978 Plan will participate in the 2016 Plan as of July 1, 2016. For this purpose, a nongrandfathered employee is any employee with less than 7½ Years of Service as of July 1, 2016.
Compensation	Basic salary, excluding overtime and double time compensation for holiday pay, but including shift premium, hazardous pay, longevity pay and incentive pay.
Average Monthly Compensation	For 1948 Plan participants, the highest average monthly Compensation received for any five consecutive years of service, or the most recent year's earnings, if greater. For 1978 Plan employee and 2012 Plan employees, the highest average monthly Compensation received for any three consecutive years of service preceding the participant's date of termination. Police officers hired prior to January 31, 1979 who retire with thirty years of service have their accrued benefit determined based on Captain's compensation if greater than their actual compensation, regardless of their rank.
Year of Service	One year of service is earned for each 12-month period beginning at date of employment. Fractional periods (months and days) are also credited.

B. Summary of Plan Provisions: Police and Fire Employees (continued)

Accrued Benefit

1948 Plan

The sum of (1) and (2):

(1) 2¼% of Average Monthly Compensation times Years of Service before 1/1/90, *plus* 2½% of Average Monthly Compensation times Years of Service after 1/1/90.

Total Years of Service in part (a) must not exceed 25 years.

(2) 1% of Average Monthly Compensation times Years of Service in excess of 25, up to a maximum total retirement benefit of 72½ %.

1978 Plan

A grandfathered employee is any employee hired before July 1, 2016 and who has 7½ or more Years of Service as of July 1, 2016. All other employees are nongrandfathered.

The Accrued Benefit for nongrandfathered employees will be based on Average Monthly Compensation and Years of Service as of June 30, 2016 after which future benefits will be earned under the 2016 Plan.

The sum of (1) and (2):

(1) For employees hired before July 1, 2012: 2¼% of Average Monthly Compensation times Years of Service before 1/1/90, plus 2½% of Average Monthly Compensation times Years of Service after 1/1/90.

For employees hired after June 30, 2012: 2¼% of Average Monthly Compensation times Years of Service

Total Years of Service in part (a) must not exceed 25 years.

(2) 1% of Average Monthly Compensation times Years of Service in excess of 25, up to a maximum total retirement benefit of 72½ %.

B. Summary of Plan Provisions: Police and Fire Employees (continued)

Accrued Benefit (continued)

2016 Plan

An employee in the 2016 Plan will be required to receive the Normal Form of Annuity derived by both a market-rate cash balance account and a defined contribution account.

Market-rate Cash Balance Account

Annual allocations to the cash balance account are equal to a percentage of Compensation that varies by Years of Service pursuant to the following allocation schedule:

Years of Service	Allocation %
0.00 - 4.99	8%
5.00 - 9.99	10%
10.00 - 14.99	12%
15.00 - 19.99	15%
20.00 +	18%

Interest Credits applied to the cash balance account are based on an interest crediting rate equal to the investment return on plan assets *less* one percent (1.0%).

The Normal Form of Annuity is determined based on Actuarial Equivalence of five percent (5.0%) per annum and the applicable mortality table pursuant to IRC Section 417(e)(3) for the Plan Year.

Defined Contribution Account Balance

Annual allocations to the defined contribution account are equal to seven and one-half percent (7.5%) of Compensation which consists of a six percent (6.0%) of Compensation as an employee contribution and one and one half percent (1.5%) of Compensation as an employer contribution. Assets are participant directed and the investment earnings are included in the defined contribution account balance.

The Normal Form of Annuity is determined based on Actuarial Equivalence of five percent (5.0%) per annum and the applicable mortality table pursuant to IRC Section 417(e)(3) for the Plan Year.

B. Summary of Plan Provisions: Police and Fire Employees (continued)

Minimum Accrued Benefit

Years of Service	At Age	Monthly Minimum Accrued Benefit
25 or more	No Restriction	$525 plus $21 times the lesser of 10 or Years of Service in excess of 25
15 or more	65 or after	$500 plus $1 times the lesser of 25 or Years of Service
less than 25	Before 65	The greater of $262.50 or $21 times Years of Service

Normal Form of Annuity

If single, an annuity for the life of the participant. A married participant will receive this annuity during his lifetime with a 75% continuation to his spouse upon his death. For 1948 Plan participants, 100% of the annuity is payable to the spouse upon the death of the participant.

Normal Retirement

Elected & Appointed

For elected and appointed participants hired before November 1, 2004, first day of month coincident with o next following completion of 12 Years of Service. Otherwise, normal retirement eligibility follows their respective plan.

Benefit Amount: Accrued Benefit

1948 Plan

For 1948 Plan employees, first day of the month coincident with or next following the earlier of the following dates:

(a) Age 55 and completion of 10 Years of Service; or
(b) Completion of 25 Years of Service.

Benefit Amount: Accrued Benefit

B. Summary of Plan Provisions: Police and Fire Employees (continued)

Normal Retirement (continued)

1978 Plan

For 1978 Plan employees hired before July 1, 2012, first day of the month coincident with or next following the earliest of the following dates:

(a) Age 55 and completion of 10 Years of Service;
(b) Completion of 25 Years of Service.

Benefit Amount: Accrued Benefit

For 1978 Plan employees hired on or after June 30, 2012, first day of the month coincident with or next following the earliest of the following dates:

(a) Age 55 and completion of 10 Years of Service;
(b) Completion of 25 Years of Service.

Benefit Amount: A reduction of five percent (5%) per year for each year that the commencement date precedes the date the participant will attain age 52 applied to the Accrued Benefit.

2016 Plan

For 2016 Plan employees, first day of the month coincident with or next following the earlier of the following dates:

(a) Age 55 and completion of 10 Years of Service;
(b) Completion of 25 Years of Service.

Benefit Amount: Accrued Benefit

B. Summary of Plan Provisions: Police and Fire Employees (continued)

Disability

Eligibility:	No service requirement for line-of-duty; five years of service for non line-of-duty.
Line-of-Duty:	A participant who becomes disabled while performing City duties is entitled to receive the greater of: (1) 60% of Average Monthly Compensation as of date of disability; or (2) Accrued Benefit as of date of disability.
Other:	For 1948 Plan participants, an employee who becomes disabled while actively employed for reasons other than line-of-duty is entitled to receive the greater of: (1) 25% of Average Monthly Compensation as of date of disability; or (2) Accrued Benefit as of date of disability. For 1978 Plan participants, an employee who becomes disabled while actively employed for reasons other than line-of-duty is entitled to receive the Accrued Benefit as of date of disability. For 2016 Plan participants, an employee who becomes disabled while actively employed for reasons other than line-of-duty is entitled to receive the Accrued Benefit as of date of disability.

B. Summary of Plan Provisions: Police and Fire Employees (continued)

Vested Termination

Eligibility:	Termination of employment after completion of 10 Years of Service.
Benefit Amount:	
1948 Plan	Accrued Benefit determined as of termination date becomes payable at age 65 for 1948 Plan employees and 1978 Plan employees hired before July 1, 2012.
1978 Plan	Accrued Benefit determined as of termination date becomes payable at age 65 if hired before July 1, 2012 and becomes payable at age 62 if hired on or after July 1, 2012.
2016 Plan	Accrued Benefit determined as of termination date becomes payable at age 60 for 2016 Plan employees.

Nonvested Termination

Eligibility:	Termination of employment before completion of 10 Years of Service.
Benefit Amount:	
1948 Plan	Return of Employee Contributions.
1978 Plan	Return of Employee Contributions for a grandfathered employee. A nongrandfathered employee under the 1978 Plan will receive their refund of contributions via the 2016 Plan.
2016 Plan	The portion of the cash balance account funded by employee contributions. For this purpose, a nongrandfathered employee will have an opening account balance as of July 1, 2016 equal to employee contributions as of July 1, 2016.

B. Summary of Plan Provisions: Police and Fire Employees (continued)

Pre-Retirement Death Benefit

Eligibility:	No service requirement for line-of-duty; 5 years of service for non line-of-duty.
Line-of-Duty Benefit:	The surviving spouse (or children) of a participant who dies while performing City duties is entitled to receive the greater of: (1) 60% of Average Monthly Compensation as of date of death; or (2) Accrued Benefit as of date of death.
Non Line-of-Duty Benefit:	For the 1948 Plan, the surviving spouse (or children) of a participant who dies while actively employed will receive 100% of the participant's Accrued Benefit as of date of the participant's death. For the 1978 Plan, the surviving spouse (or children) of a participant who dies while actively employed will receive 75% of the participant's Accrued Benefit as of date of the participant's death. For the 2016 Plan, the surviving spouse (or children) of a participant who dies while actively employed will receive 75% of the Normal Form of Annuity as of the date of the participant's death.

B. Summary of Plan Provisions: Police and Fire Employees (continued)

Employee Contributions

Employees are required to contribute a percentage of Compensation in accordance with the following schedule:

1948 Plan

Years of Service at 1/1/90	Percentage
up to 15 years	5.50%
15-19 years	5.25%
20 years or more	5.00%

1978 Plan

Date of Hire	Percentage
After 6/30/12	8.00%
After 6/30/83	6.50%
Before 7/1/83	6.25%

The contribution rate for current non-vested employees as of July 1, 2012 will increase annually in 0.5% increments beginning July 1, 2012 until the contribution rate reaches 8.0%.

2016 Plan

Cash Balance Account	2.00%
Defined Contribution Account	6.00%

1. The City's funding policy is effective commencing July 1, 2015, and shall remain in effect until duly amended or preempted by state law.

2. The City will engage a professional actuary to compute the Actuarially Determined Contribution (ADC) each plan year.

3. The City will have the professional actuary conduct an actuarial experience study at least every six (6) years.

4. In determining the ADC each year, the actuary will

   a. use entry-age normal actuarial cost method
   b. use an actuarial value of assets equal to a smoothed value that recognizes gains and losses over a 5-year period; however, there shall be a corridor so that the actuarial value of assets cannot be 20% more than nor 20% less than the market value of assets existing as of the actuarial valuation date.
   c. determine actuarial gains and losses to be the result from the difference between experience versus assumptions, changes in demographic and economic assumptions, and changes in benefit provisions.
   d. amortize unfunded liabilities over a closed period of 30 years. A tiered approach will be utilized with new actuarial gains and losses from each actuarial valuation but no tier will exceed the 30 year maximum.

5. The ADC shall be calculated as of a valuation date twelve (12) months prior to the effective date and become applicable on the effective date that is the first day of July twelve (12) months following the valuation date

6. The investment earnings assumption in an actuarial valuation shall not be greater than fifty (50) basis points above the rate adopted by the Tennessee consolidated retirement system

7. Beginning in plan year commencing July 1, 2015 the City will fund the ADC each year over a graduated progress percentage so that in a maximum of five (5) years the City will be funding 100% of the ADC each year. The graduated progress percentage each year is at a minimum the percentage determined by dividing by five (5) the difference between the percentage of the ADC paid in the plan year commencing July 1, 2014, subtracted from one hundred percent (100%). The ADC shall be recalculated each year and the percentage of funding shall be based on the most recent recalculation of the ADC.