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City of Memphis

City of Memphis Retirement System

Funding Valuation for Plan Year Ending June 30, 2018

September 22, 2016

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, 2018 for the City of Memphis Retirement System ("the Plan"), pursuant to our engagement letter with the City of Memphis ("the City") dated July 26, 2016.

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, 2018. These calculations are not suitable for any other purpose. Pursuant to the City's current funding policy that became effective for the fiscal 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, 2018 is based on a valuation date of July 1, 2016. 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) or with Government Accounting Standards Board Statement No. 68 (GASB 68), as amended by Government Accounting Standards Board Statement No. 82.

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, employee and employer contributions and benefit payments. The census data and plan asset information used in calculating the results herein were collected as of July 1, 2016. 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

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,

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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, 2018 is $62,433,000. Pursuant to the City's funding policy effective July 1, 2015, the ADC is determined using a measurement date of July 1, 2016, which is twelve (12) months prior to the first day of the plan year. The ADC is comprised of the normal cost of $24,526,000, the current year amortization charge of

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 7.7%. It is based on the same actuarial assumptions and methods and summary of plan provisions detailed in Section V and Section VI of this report, respectively.

The second component of the ADC is the current year amortization charge. 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 assets, 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 unfunded actuarial accrued liability for the current plan year is $416,335,000 and the sum of remaining balances for shortfall tiers established in prior plan years is $413,371,000, resulting in a new shortfall amortization tier of $2,964,000. The total amortization charges for both the current plan year and all prior plan years is $33,551,000.

As of July 1, 2016, the actuarial value of assets are $2,202,477,000, which is more than the market value of assets of $2,091,586,000 as a result of the deferral of net asset losses from the prior fiscal years within the smoothing period. 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

Actuarially Determined Contribution for Funding Purposes (Cont.)

The ADC for the current year is $62,433,000 compared to $58,185,000 in the prior valuation year. The increase in the ADC is primarily attributable to acturial gains as a result of employee compensation remaining relatively flat compared to an assumed estimated compensation increase of 4.25%. This results in both a decrease in the normal cost over the prior year and an actuarial experience gain in the liability, which is amortized over thirty years and included in the current year ADC.

Valuation Date	July 1, 2015	**July 1, 2016**	
Applicable Fiscal Year Beginning	July 1, 2016	**July 1, 2017**	
Unfunded Actuarial Accrued Liability			Difference
1. Actuarial Accrued Liability	$ 2,582,865,000	**$ 2,618,812,000**	$ 35,947,000
2. Actuarial Value of Assets	2,165,016,000	**2,202,477,000**	37,461,000
3. Unfunded Actuarial Accrued Liability (1) - (2)	$ 417,849,000	**$ 416,335,000**	$ (1,514,000)

Actuarially Determined Contribution (ADC):

1. Employer Normal Cost as of the Beginning of the Period	$ 20,808,000	**$ 24,526,000**	$ 3,718,000
2. Total Amortization Charge	33,318,000	**33,551,000**	233,000
3. Interest: [(1) + (2)] × 7.5%	4,059,000	**4,356,000**	297,000
4. Actuarially Determined Contribution: (1) + (2) + (3)	$ 58,185,000	**$ 62,433,000**	$ 4,248,000

SECTION I - EXECUTIVE SUMMARY

HIGHLIGHTS OF THE ACTUARY'S REPORT

Assumptions and Methods

There were no changes to the actuarial assumptions and methods from the prior plan year. Actuarial assumptions were last updated for the July 1, 2014 actuarial valaution following the completion of an assumption study performed in April of 2014. A summary of the actuarial assumptions may be found in Section V - Summary of Assumptions and Methods.

Plan Provisions

There were no changes to the plan provisions from the prior plan year. The plan provisions were last updated for the July 1, 2014 actuarial valuation and they reflected amendments for the new plan design that become effective July 1, 2016. Under the new plan design, 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, 2015 census information are expected to be grandfathered. Details regarding the new plan design may be found in Section VI - Summary of Plan Provisions.

Census Data

The valuation is based on census information collected as of July 1, 2016. The active headcount decreased slightly from 5,756 as of July 1, 2014 to 5,691 as of July 1, 2015. As a result of the change in headcount and relatively flat pay increases from the prior year, the covered employee payroll decreased from $340 million to $316 million. Details of the census information used in the valuation are summarized Section IV.

SECTION II - FUNDING

FUNDING

A. Development of Funded Status as of July 1, 2016

		General Employees	Police and Fire	Total
1.	Actuarial Accrued Liability [1]			
	a. Active Participants	$ 253,193,000	$ 614,478,000	$ 867,671,000
	b. Terminated Vested Participants	5,510,000	3,063,000	8,573,000
	c. Retiree/Beneficiary/Disabled /DROP Participants	514,502,000	1,228,066,000	1,742,568,000
	d. Total: (1)(a) + (1)(b) + (1)(c)	$ 773,205,000	$ 1,845,607,000	$ 2,618,812,000
2.	Actuarial Value of Assets [2]	$ 650,282,000	$ 1,552,195,000	$ 2,202,477,000
3.	Unfunded Actuarial Accrued Liability: (1)(d) - (2)	$ 122,923,000	$ 293,412,000	$ 416,335,000
4.	Funded Percentage: (2) ÷ (1)(d)	84.1%	84.1%	84.1%

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. Reconciliation of Actuarial Accrued Liability

1.	July 1, 2015 Actuarial Accrued Liability for Funding Purposes	$	2,582,865,000
2.	Employer Normal Cost		23,944,000
3.	Estimated Employee Contributions in Normal Cost		20,399,000
4.	Actual Benefit Payments		176,566,000
5.	Interest of 7.5% on (1) + (2) + (3) - (4) ÷ 2		190,419,000
6.	Expected July 1, 2016 Actuarial Accrued Liability: (1) + (2) + (3) - (4) + (5)	$	2,641,061,000

				Dollar Change in Liability	Percent Change in Liability
7.	(Gain)/Loss Components				
	a.	Census Experience	$	5,374,000	0.20%
	b.	Salary Experience		(17,741,000)	(0.67%)
	c.	Assumption Change - Mortality Update		(9,882,000)	(0.37%)
	d.	Total: (7)(a) + (7)(b) + (7)(c)	$	(22,249,000)	(0.84%)
8.	July 1, 2016 Actuarial Accrued Liability: (6) + (7)(d)		$	2,618,812,000	

C. Reconciliation of Unfunded Actuarial Accrued Liability

			July 1, 2016
1.	Unfunded Actuarial Accrued Liability, Prior Year		$ 417,849,000
2.	Change in Unfunded Actuarial Accrued Liability (Decrease) / Increase		
	a.	Change Due to Not Funding the Full ADC [1]	$ 6,310,000
	b.	Change due to Actuarial Value of Asset Experience [2]	18,903,000
	c.	Plan Experience - Updated Census [3]	5,374,000
	d.	Plan Experience - Updated for Actual Salary	(17,741,000)
	e.	Assumption Change - Mortality	(9,882,000)
	f.	Total New Amortization Base for Current Plan Year: (2)(a) + (2)(b) + (2)(c) + (2)(d) + (2)(e)	$ 2,964,000
	g.	Reduction in Existing Bases Due to Prior Year Amortization, Net of Interest	(4,478,000)
	h.	Change in Unfunded Actuarial Accrued Liability: (2)(f) + (2)(g)	$ (1,514,000)
3.	Unfunded Actuarial Accrued Liability at July 1, 2016: (1) + (2)(h)		$ 416,335,000

[1] The ADC for the prior year was $58,185,000 and the actual City contribution was $51,875,000.

[2] 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. See Section III - Exhibit C for the development of the actuarial value of assets.

[3] Includes the difference between expected employee contributions of $20,399,000 and actual employee contributions of $23,912,000.

D. Development of Actuarially Determined Contribution [1]

Development of actuarially determined contribution for the plan year ending June 30, 2018.

		General Employees	Police and Fire	Total
1.	Annual Anticipated Payroll [2]			
	a. Annual Anticipated Payroll - Grandfathered	$ 63,506,000	$ 158,683,000	$ 222,189,000
	b. Annual Anticipated Payroll - Nongrandfathered	$ 56,752,000	$ 40,879,000	$ 97,631,000
	c. Annual Anticipated Payroll - Total	$ 120,258,000	$ 199,562,000	$ 319,820,000
2.	Development of Employer Normal Cost			
	a. Total Normal Cost as of July 1, 2016	$ 13,654,000	$ 29,024,000	$ 42,678,000
	b. Estimated Employee Contributions - Grandfathered [3]	5,080,000	11,119,000	16,199,000
	c. Estimated Employee Contributions - Nongrandfathered [3]	1,135,000	818,000	1,953,000
	d. Employer Normal Cost as of July 1, 2016 (a) - (b) - (c)	$ 7,439,000	$ 17,087,000	$ 24,526,000
3.	Development of Actuarially Determined Contribution			
	a. Employer Normal Cost as of the Beginning of the Period			$ 24,526,000
	b. Total Amortization Charge			33,551,000
	c. Interest: [(a) + (b)] × 7.5%			4,356,000
	d. Actuarially Determined Contribution: (a) + (b) + (c)			$ 62,433,000
4.	Percent of Annual Covered Payroll: (3)(d) ÷ (1)(c)			19.52%

[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.

[2] The annual anticipated payroll is for the period from July 1, 2015 through July 1, 2016.

[3] Employee contributions are equal to a fixed percentage of compensation. Nongrandfathered participants contribute 2.0% of pay under the cash balance formula and 6.0% of pay under the IRC section 401(a) plan. Other details regarding the employee contributory rate may be found in Section VI.

E. Development of Amortization of Tier for the Current Plan Year

Development of Amortization of Tier for the Current Plan Year

1.	Unfunded Actuarial Accrued Liability		$	416,335,000
2.	Present Value of Annual Installments from Prior Fiscal Years			413,371,000
3.	Current Year Tier: (1) - (2)		$	2,964,000
4.	Amortization Factor			
	a.	Interest Rate		7.50%
	b.	Amortization Period		30
	c.	Amortization Factor for Current Year Tier		12.6962
5.	Amortization of Tier for Current Plan Year: (3) ÷ (4)(c)		$	233,000

[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.

F. Unfunded Accrued Liability Amortization Schedule

Date Tier Established	Reason	Original Shortfall Tier	Original Amortization Period	Remaining Shortfall Tier	Remaining Amortization Period	Current Amortization Charge
7/1/2016	Gain/(Loss) for 2018 Budget Year	$ 2,964,000	30	$ 2,964,000	30	$ 233,000
7/1/2015	Gain/(Loss) for 2017 Budget Year	(110,353,000)	30	(109,286,000)	29	(8,692,000)
7/1/2014	Fresh Start for 2016 Budget Year	533,360,000	30	522,657,000	28	42,010,000
Total				$ 416,335,000		$ 33,551,000

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

ASSETS

A. Market Value of Assets

	Market Value June 30, 2015	Market Value June 30, 2016
1607 Capital Partners	$ 137,498,161	$ 110,405,458
Acadian EM Equity II	$ 88,673,180	$ 99,326,396
Barrow, Hanley, et al	$ 90,167,953	$ 62,921,990
Bernzott	$ -	$ 11,751,480
Matarin	$ -	$ 11,126,777
Profit	$ -	$ 11,041,935
Summit Creek	$ -	$ 5,304,460
BlackRock Granite Property Fund	$ 37,148,935	$ 41,439,755
City Managed	$ -	$ 15,817,230
Cash Management Account (In-House)	$ 9,572,626	$ -
Cornerstone	$ 7,194,524	$ -
Cornerstone VIII	$ -	$ 5,006,305
Cornerstone X	$ -	$ 5,937,463
Fidelity Real Estate Growth III Fund	$ 8,773,991	$ 5,726,103
Herndon	$ 98,134,284	$ 65,573,313
Long Wharf Real Estate Partners	$ 15,109,382	$ -
Long Wharf Fund IV	$ -	$ 19,351,252
Long Wharf Fund V	$ -	$ 5,210,839
Mackay Shields	$ 194,977,577	$ 162,960,095
Marathon Asset Management	$ 121,688,052	$ 111,220,302
T.A. Realty	$ -	$ 4,872,132
Martin Currie	$ 634	$ -
Navellier & Associates	$ 101,051,876	$ 65,692,982
Nicholas Investment Partners	$ 28,122,630	$ 33,500,239
Northern Trust	$ 100,663,060	$ 52,894,228
Paradigm Small Cap	$ 45,414,464	$ 31,831,572
PIMCO	$ 189,193,619	$ 125,892,322
Gerding Edlen	$ -	$ 5,403,649
Principal Global Investors	$ 94,138,464	$ 78,245,123
Prudential Core Conserv Bond	$ 204,662,406	$ 143,970,272
Pantheon Fund V	$ -	$ 8,523,167
NB Crossroads Fund XXI	$ -	$ 4,636,020
SSM Partners	$ -	$ 2,840,174
Grosvenor	$ -	$ 40,741,748
Aetos	$ -	$ 40,362,400
Rhumbline S&P 500	$ 221,845,032	$ 160,118,411
Rowe Price Fleming	$ 247	$ -
RREEF America REIT II	$ 13,633,390	$ 14,658,570
RREEF Real Estate Securities Commingled Fund	$ 22,433,118	$ 27,524,652
Smith Graham	$ 190,727,520	$ 140,030,411
SouthernSun	$ 40,401,885	$ 28,321,170
Brandywine	$ -	$ 226,828,538
Strategic Global Advisors	$ 31,972,220	$ 29,148,197
Winslow Capital Management	$ 107,349,767	$ 75,428,919
Total	$ 2,200,549,000	$ 2,091,586,000

B. Reconciliation of Market Value of Assets and Investment Return

1.	Market Value of Assets at July 1, 2015	$	2,200,549,000
2.	Contributions		
	a. Employer Contributions	$	51,875,000
	b. Employee Contributions		23,912,000
	c. Total	$	75,787,000
3.	Benefit Payments in 2015 - 2016	$	176,566,000
4.	Expenses		
	a. Investment Fees	$	12,846,000
	b. Administrative Fees		2,228,000
	c. Total	$	15,074,000
5.	Interest and Dividend Income	$	53,554,000
6.	Unrealized Gain/(Loss)	$	(82,543,000)
7.	Net Realized Gain/(Loss)	$	19,957,000
8.	Other Revenue [1]	$	15,922,000
9.	Total Income: (5) + (6) + (7) + (8)	$	6,890,000
10.	Market Value of Assets at July 1, 2016: (1) + (2)(c) - (3) - (4)(c) + (9)	$	2,091,586,000
11.	Investment Return: [2 × (9)] ÷ [(1) + (10) - (9)]		0.3%

[1] Provided by the City.

C. Development of Actuarial Value of Assets for Funding Purposes

1.	Market Value of Assets (MVA) at July 1, 2016			$ 2,091,586,000
2.	Development of Expected Market Value of Assets at July 1, 2016:			
a.	Market Value of Assets at July 1, 2015:			$ 2,200,549,000
b.	Actual Employee and Employer Contributions:			75,787,000
c.	Actual Benefit Payments:			(176,566,000)
d.	Expected Investment Earnings[1] at July 1, 2015 MVA:			161,262,000
e.	Expected Market Value of Assets at July 1, 2016: (2)(a) + (2)(b) + (2)(c) + (2)(d)			$ 2,261,032,000
3.	Gains/(Losses) at July 1, 2016: (1) - (2)(e)			$ (169,446,000)
4.	Asset Gains/(Losses)	Gains/(Losses)	% Not Yet Recognized	Gains/(Losses) Not Yet Recognized
a.	2016 Asset Gain (Loss):	$ (169,446,000)	80%	$ (135,557,000)
b.	2015 Asset Gain (Loss):	(104,622,000)	60%	(62,773,000)
c.	2014 Asset Gain (Loss):	184,075,000	40%	73,630,000
d.	2013 Asset Gain (Loss):	69,045,000	20%	13,809,000
5.	Total Unrecognized Asset Gains/(Losses): sum of (4)(a) to (4)(d)			$ (110,891,000)
6.	Actuarial Value of Assets Current for Year Prior to Corridor: (1) - (5)			$ 2,202,477,000
7.	90% of Market Value of Assets: (1) × 90%			$ 1,882,427,000
8.	110% of Market Value of Assets: (1) × 110%			$ 2,300,745,000
9.	Actuarial Value of Assets at July 1, 2016: (6), but not less than (7) or greater than (8)			$ 2,202,477,000

[1] Includes half year of interest on net cash flows (conributions less benefit payments).

SECTION IV - CENSUS DATA

CENSUS DATA

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A. Census Information

		June 30, 2015		June 30, 2016	
1.	Active				
	a. Number [1]		5,691		5,710 [1]
	b. Average Age		44.2		44.2
	c. Average Years of Service		12.0		12.0
	d. Covered Payroll of Actives	$	316,439,000	$	319,820,000
	e. Actual Covered Payroll	$	327,627,000	$	300,123,000
2.	Terminated Vested				
	a. Number		704		798
	b. Lump Sum- Refund of Contribution	$	5,273,000 [2]	$	8,573,000 [2]
3.	Retiree, Beneficiary, and DROP Enrollees [2]				
	a. Number		4,348		4,427
	b. Annual Benefits Payable	$	149,000,000	$	152,660,000
	c. DROP Account Balance	$	15,576,000	$	18,479,000
4.	Disabled				
	a. Number		642		632
	b. Annual Benefits Payable	$	17,089,380	$	16,925,000

1 As of June 30, 2016, actives include 3,753 grandfathered participants (2,519 Police & Fire and 1,234 General employees).

2 Includes deferred beneficiaries

B. Distribution of Active Members by Age and Service

Attained Age	Distribution of Active Members by Age and Service as of June 30, 2016										
	Under 1 year	1 to 4 years	5 to 9 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	94	40									134
25-29	125	248	68								441
30-34	84	229	310	39	1						663
35-39	55	158	299	206	50						768
40-44	29	106	160	274	274	62					905
45-49	28	108	128	222	370	246	25				1,127
50-54	26	93	69	142	185	172	87	9			783
55-59	12	68	69	78	120	86	52	29	5	1	520
60-64	11	41	32	53	63	35	15	6		1	257
65-69	3	18	27	22	22	14	4		1	1	112
70&Up											
Total	467	1,109	1,162	1,036	1,085	615	183	44	6	3	5,710

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, 2016							
	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	7							7
25-29	41	80						121
30-34	42	148	3					193
35-39	35	102	13	4				154
40-44	17	68	11	6	2			104
45-49	19	39	13	8	2	1		82
50-54	6	38	5	10	4	3	1	67
55-59	6	17	8	4	1			36
60-64	10	3		3				16
65-69	5	9	2	1	1			18
70&Up								
Total	188	504	55	36	10	4	1	798

D. Distribution of Retired, Beneficiaries, Disabled, and DROP Members by Age and Number of Years Retired[1]

Attained Age	Distribution of Retired Members, Beneficiaries, and Disabled Members by Age and Number of Years Retired as of June 30, 2016							
	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	11	9	18	3	5	6	53
40-44		3	11	13	7	4	2	40
45-49		2	10	33	20	90	4	159
50-54		5	10	21	29	202	99	366
55-59	1	6	11	24	27	134	337	540
60-64		3	12	19	50	90	586	760
65-69		11	14	33	38	62	806	964
70-74		2	5	13	19	37	731	807
75-79		1		7	17	16	560	601
80-84				1	3	10	402	416
85-89						3	237	240
90&Up						2	111	113
Total	2	44	82	182	213	655	3,881	5,059

[1] Includes 206 employees currently participating in the DROP and 88 employees who temporarily froze participation in the DROP Program effective November 1, 2015.

E. Flow of Lives from June 30, 2015 to June 30, 2016

	Actives	Terminated [1]	Disabled	Retired [2]	Beneficiary	DROP [3]	Total
June 30, 2015	5,691	704	642	3,080	966	302	11,385
New Entrants:	474	39 [4]					513
Rehires:	15	(12)		(3)			
DROP:	(74)					74	
Vested Terminations:	(106)	106					
Retirements:	(72)	(2)	(1)	157		(82)	
Disablements:	(19)		21	(3)	1		
Beneficiary:					82		82
Death:	(12)	(1)	(29)	(93)	(46)		(181)
Refunded:	(187)	(36)	(1)	(2)	(6)		(232)
Data Adjustments:							
June 30, 2016	5,710	798	632	3,136	997	294	11,567

1 Includes nonvested terminated participants scheduled to receive a refund of their employee contributions.

2 As of June 30, 2015, this included 11 participants who are retirement eligible, but have not commenced benefit payments. As of June 30, 2016, this includes 11 participants who are retirement eligible, but have not commenced benefit payments.

3 Includes 88 participants who elected to temporarily suspend (or freeze) in the DROP participation effective November 1, 2015.

4 These participants were hired after the prior valuation date and terminated employment prior to the current valuation date.

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 / Investment Return	7.5% per year for funding purposes 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	The salary scale was based on an experience study performed in 2014. Rates vary by age and service with a weighted average of 4.25%.

	Years of Service			
Age	1	2	3	4+
< 25	7.25%	10.75%	8.75%	6.50%
26-30	8.25%	10.25%	8.00%	5.75%
31-35	7.75%	9.25%	7.00%	5.00%
36-40	6.75%	8.00%	6.00%	4.50%
41-45	5.50%	6.75%	5.50%	4.44%
46- 50	5.50%	6.75%	5.50%	4.38%
51- 55	5.50%	6.75%	5.50%	4.31%
56	5.50%	6.75%	5.50%	4.23%
57	5.50%	6.75%	5.50%	4.20%
58	5.50%	6.75%	5.50%	4.18%
59	5.50%	6.75%	5.50%	4.15%
60	5.50%	6.75%	5.50%	4.13%
61	5.50%	6.75%	5.50%	4.11%
62	5.50%	6.75%	5.50%	4.10%
63	5.50%	6.75%	5.50%	4.09%
64	5.50%	6.75%	5.50%	4.08%
>=65	5.50%	6.75%	5.50%	4.06%

SECTION V - ACTUARIAL ASSUMPTIONS AND METHODS

A. Actuarial Assumptions

Cost of Living Increases	None assumed
Mortality	
Service Cost	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-2015 projection scale and adjusted by a 3 year set back.
Net Pension Liability	General: Fully Generational RP-2014 Mortality Table for males and females with MP-2015 projection scale from 2014 forward 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-2015 projection scale from 2014 forward and adjusted by a 1 year set forward.
	Disabled: Fully Generational RP-2014 Disabled Mortality Table with MP-2015 projection scale from 2014 forward and adjusted by a 3 year set back.
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 current 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%

Disability

1968 Social Security Experience Table. Sample rates are shown below:

Age	Combined Male / Female
20	0.10%
25	0.10%
30	0.10%
35	0.10%
40	0.17%
45	0.28%
50	0.63%
55+	1.33%

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

General			Police and Fire
Males	Females	Age	Males & Females
20%	15%	45 - 49	25%
25%	20%	50 - 54	25%
25%	30%	55 - 59	25%
25%	20%	60 - 64	40%
100%	100%	65 - 69	100%
100%	100%	70	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 not 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 (1948 Plan or 1978 Plan only) who terminate prior to retirement age are assumed to elect to receive their employee contributions times the applicable return multiple. All nongrandfathered General Employees who terminate prior to ten years of service will elect to receive a refund of their employee contributions under the 1978 Plan times the applicable return multiple, plus the employee account balance under the 2016 Plan. Those who withdraw after ten years of service will elect to receive their entire accrued benefit as a lifetime annuity and commencing at age 60. All Police and Fire Employees who terminate prior to ten years of service will receive a refund of their employee contributions under the 1978 Plan times the applicable return multiple, plus the employee account balance under the 2016 Plan. Those who withdraw after ten years of service will receive their entire accrued benefit as a liftime annuity and commencing at age 60.
Expense Load	None.
Changes in Assumptions	The healthy mortality assumption was changed from the Fully Generational RP-2014 Mortality Table with MP-2014 projection scale (adjusted by a 1 year set forward) to the Fully Generational RP-2014 Mortality Table with MP-2015 projection scale (adjusted by a 1 year set forward). The disabled mortality assumption was changed from the Fully Generational RP-2014 Disabled Mortality Table with MP-2014 projection scale (adjusted by a 3 year set back) to the Fully Generational RP-2014 Disabled Mortality Table with MP-2015 projection scale (adjusted by a 3 year set back).

B. Actuarial Assumptions Rationale

Interest Rate / Investment Return	Equal to the single rate of return as the City's funding policy requires fully funding the actuarially determined contribution by the 2020 fiscal year. It is developed pursuant to paragraphs 40 - 45 of GASB 67 and paragraphs 26 - 31 of GASB 68.
Future Salary Increases [1]	This assumption is set considering underlying inflation and historical salary increases coupled with management's best estimate of future expectations.
Cost of Living Increases	This assumption is set considering underlying inflation and historical cost of living increases coupled with management's best estimate of future expectations.
Mortality [1]	Mortality rates are set based on the SOA's recent study of US mortality trends for pensions and adjusted based on future expectations with periodic monitoring of observed gains and losses caused by mortality patterns different than assumed.
Disability [1]	Disability rates are set based on the plan's historical experience observed in the 2014 experience study and future expectations with periodic monitoring of observed gains and losses caused by disability patterns different than assumed.
Termination [1]	Termination rates are set based on the plan's historical experience observed in the 2014 experience study and future expectations with periodic monitoring of observed gains and losses caused by termination patterns different than assumed.
Retirement [1]	Retirement rates are set based on the plan's historical experience observed in the 2014 experience study and future expectations with periodic monitoring of observed gains and losses caused by retirement patterns different than assumed.
Marriage [1]	Marital rates are set based on the plan's historical experience and future expectations with periodic monitoring of observed gains and losses caused by marital patterns different than assumed.
Form of Payment	This assumption is based on historical experience and management's best expectations given the current plan provisions.

[1] Note, assumptions were updated based on an experience study performed on May 1, 2014 based on 10 years of census data (between 2003-2012).

C. 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

The following is a summary of the plan provisions. Please refer to the plan document for a full explanation of the plan and plan provisions.

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.

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

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

Normal Retirement

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

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.

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

Normal Retirement (continued)

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

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.
Non Line-of-Duty Benefit:	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.
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.

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 nongrandfathered employee, only Employee Contributions through July , 2016 are refunded.
2016 Plan	The portion of the cash balance account funded by employee contributions plus applicable interest credits.

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.

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.
Changes From Prior Valuation	None.

B. Summary of Plan Provisions: Police and Fire Employees

The following is a summary of the plan provisions. Please refer to the plan document for a full explanation of the plan and plan provisions.

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 Providers: 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
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.

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 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.
Non Line-of-Duty:	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.
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.

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 nongrandfathered employee, only Employee Contributions through July 1, 2016 are refunded.
2016 Plan	The portion of the cash balance account funded by employee contributions plus applicable interest credits.

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%

Changes From Prior Valuation

None.

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.

Allocation of Actuarially Determined Contribution ("ADC") by Service Center for the Plan Year Ending June 30, 2018

I.	Total Actuarial Accrued Liability ("AAL")	$ 2,618,812,071
II.	Total Employer Normal Cost ("NC")	$ 24,526,188
III.	Total Amortization of Unfunded Actuarial Accrued Liability ("UAAL")	$ 33,551,000
IV.	Total Interest	$ 4,355,789
V.	Total Actuarially Determined Contribution ("ADC") = II + III + IV	$ 62,432,977

Service Center	Total Participant Counts	AAL	Allocation % of AAL	Employer Normal Cost at January 1, 2016	Amortization of UAAL	Interest to EOY	ADC
	(1)	(2)	(3) = (2) ÷ (I)	(4)	(5) = (3) × (III)	(6) = [(4)+(5)] × (7.5%)	(7) = (4) + (5) + (6)
0111 - General Fund	10,660	$ 2,447,631,030	93.463%	$ 22,133,591	$ 31,357,908	$ 4,011,862	$ 57,503,361
0204 - Solid Waste Management Fund	71	9,890,411	0.378%	221,573	126,711	$ 26,121	374,405
0205 - Miscellaneous Grants Fund	2	698,196	0.027%	-	8,945	$ 671	9,616
0211 - Workforce Investment Act Fund				-	-	$ -	-
0221 - Community Development Fund				-	-	$ -	-
0228 - CRA Programs	1	244,696	0.009%	8,805	3,135	$ 896	12,836
0601 - Sewer Treatment & Collection - Operating Fund	239	37,521,789	1.433%	657,362	480,712	$ 85,356	1,223,430
0661 - Metro Alarm Fund	5	675,875	0.026%	11,377	8,659	$ 1,503	21,539
0671 - Storm Water Fund	115	12,650,958	0.483%	329,692	162,078	$ 36,883	528,653
0741 -Fleet Management Fund	2	36,193	0.001%	-	464	$ 35	499
0721 - Health Insurance Fund	11	892,691	0.034%	27,339	11,437	$ 2,908	41,684
0999 - Airport Authority	461	108,570,232	4.146%	1,136,450	1,390,951	$ 189,555	2,716,956
Totals - unrounded	11,567	$ 2,618,812,071	100.000%	$ 24,526,189	$ 33,551,000	$ 4,355,789	$ 62,432,978
Totals - rounded		$ 2,618,812,000		$ 24,526,000	$ 33,551,000	$ 4,356,000	$ 62,433,000

Notes

1 As instructed by the City of Memphis, the allocation of the unfunded actuarial accrued liability will be a pro rata percentage of the actuarial accrued liability for each service center over the total actuarial accrued liability for the Plan. Normal cost for each service center will equal the sum of the normal cost for each participant in that service center.