Fire and Police Employees' Retirement System of the City of Baltimore

Actuarial Valuation Report as of June 30, 2013

Produced by Cheiron

October 2013

Classic Values, Innovative Advice

Table of Contents

October 14, 2013

Board of Trustees
Fire and Police Employees' Retirement System
of the City of Baltimore
7 East Redwood Street, 18th Floor
Baltimore, Maryland 21202-3470

Dear Members of the Board:

We are pleased to submit the June 30, 2013 Actuarial Valuation of the Fire and Police Employees' Retirement System of the City of Baltimore. This report contains information on System assets, liabilities, and contributions as well as discloses required employer contribution levels.

In preparing our report, we relied on information (some oral and some written) supplied by the System's staff. This information includes, but is not limited to, plan provisions, employee data, and financial information. The actuarial assumptions reflect our understanding of the likely future experience of the System, and represent our best estimate, in cooperation with the Board's views, for the future experience of the System. The required contribution developed in this report is only applicable to the employer contributions for Fiscal Year 2015 and relies on future System experience conforming to the underlying assumptions. To the extent that actual System experience deviates from the underlying assumptions, the results will vary accordingly.

We hereby certify that, to the best of our knowledge, this report and its contents, which are work products of Cheiron, Inc., are complete and have been prepared in accordance with generally recognized and accepted actuarial principles and practices that are consistent with the Code of Professional Conduct and applicable Actuarial Standards of Practice set out by the Actuarial Standards Board. Furthermore, as credentialed actuaries, we meet the Qualification Standards of the American Academy of Actuaries to render the opinions contained in this report. This report does not address any contractual or legal issues. We are not attorneys and our firm does not provide any legal services or advice.

This report was prepared solely for the Fire and Police Employees' Retirement System of the City of Baltimore for the purposes described herein, except that the System auditor may rely on this report solely for the purpose of completing an audit related to the matters herein. This valuation report is not intended to benefit any third party, and Cheiron assumes no duty or liability to any such party.

Sincerely,
Cheiron

Margaret Tempkin, FSA, MAAA	Fiona E. Liston, FSA, MAAA
Principal Consulting Actuary	Principal Consulting Actuary

1750 Tysons Boulevard, Suite 1100, McLean, VA 22102 Tel: 703.893.1456 Fax: 703.893.2006 www.cheiron.us

FOREWORD

Cheiron is pleased to provide the annual actuarial valuation report of the **Fire and Police Employees' Retirement System of the City of Baltimore** as of June 30, 2013. The purpose of this report is to:

1) **measure and disclose**, as of the valuation date, the financial condition of the System,

2) **report** on past and expected financial trends, and

3) **determine** the recommended employer contributions for Fiscal Year 2015.

An actuarial valuation establishes and analyzes System assets and liabilities on a consistent basis and traces the progress of both from one year to the next. It includes measurement of the System's investment performance as well as an analysis of actuarial liability gains and losses. This valuation report is organized as follows:

Section I presents a summary of the valuation and compares this year's results to last year's results.

Section II contains exhibits relating to the valuation of assets.

Section III shows the various measures of liabilities and required contributions and presents an analysis of the experience gains and losses over the past year and the source of changes to the unfunded actuarial liability.

Section IV develops the City and State contribution rates.

The appendices to this report contain a summary of the System's membership at the valuation date, a summary of the major provisions of the System, and the actuarial methods and assumptions used in developing the valuation.

In preparing our report, we relied, without audit, on information (some oral and some written) supplied by the System's staff. This information includes, but is not limited to, the plan provisions, employee data, and financial information.

The actuarial assumptions reflect our understanding of the likely future experience of the System, and the assumptions as a whole represent our best estimate for the future experience of the System. The results of this report are dependent upon future experience conforming to these assumptions. To the extent that future experience deviates from the actuarial assumptions, the true cost of the System could vary from our results.

SECTION I
SUMMARY

General Comments

This is the second actuarial valuation report prepared for the System by Cheiron. The results for June 30, 2011 and prior in the historic trend charts are those produced by the System's former actuary.

The City made additional contributions of $5.7 million in the Fiscal Year Ending (FYE) 2013, all of which was used to reduce the System's underfunding. The System continues to recognize the negative balance in the Benefit Improvement Fund (BIF), the Employer Reserve Fund (ERF), and the Minimum Stabilization Fund (MSF).

The employer's annual contribution to this System is determined as the sum of the net normal cost rate, an amortization of the System's unfunded liability, and a provision for expenses. The employer contribution rate will change when benefits are modified or assumptions are changed. The rate also changes in response to gains and losses on either the assets or the liabilities. Section III of this report contains a detailed reconciliation of the System's funded status as of June 30, 2012 versus the status as of June 30, 2013. Section IV shows the development of contributions for the City and State. The State makes the employer contributions for a group of airport employees.

The key results of the June 30, 2013 actuarial valuation are as follows:

- The total recommended employer contributions increased from $113,810,244 for FYE 2014 to $119,050,229 for FYE 2015 as a reflection of the prior year's experience. The City's portion of the contribution for FYE 2015 is $118,190,306 compared to the $113,003,943 for FYE 2014, which was the amount reported as being payable at July 1, 2013.

- This report was developed using the same assumptions as were adopted by the Board of Trustees in 2012. This includes the 7.75% rate of investment return. The assumptions and methods reflected in the results of our valuation are listed in Appendix C.

- Investments earned 9.53%, on a market value basis, for the period ending June 30, 2013. The expected rate of return for this period was 7.75%, resulting in an investment gain on the market value of assets of $38 million.

- The actuarial value of assets return was 4.59%, producing a net loss of $80 million to the System this year when measured against the prior year's 7.75% expected return.

- The unfunded actuarial liability increased from $713 million on June 30, 2012 to $765 million on June 30, 2013 due to the investment loss and a liability gain of $15 million. The System's funded ratio decreased from 78% to 77%.

SECTION I
SUMMARY

The tables below provide details on the development of the City's contribution, together with the corresponding figures from the June 30, 2012 report. Details of this development, along with the State contribution calculations, are provided in Section IV.

Table I-1
Valuation Summary

		2012 Valuation Applies to FYE 2014 Amount	2012 Valuation Applies to FYE 2014 % of Pay	2013 Valuation Applies to FYE 2015 Amount	2013 Valuation Applies to FYE 2015 % of Pay
1.	**Contributions**				
	Total Normal Cost	$ 63,571,853	22.38%	$ 62,627,201	22.60%
	Expense Load	4,260,102	1.50%	4,155,957	1.50%
	Expected Employee Contributions for FYE	(28,400,682)	(10.00%)	(27,706,381)	(10.00%)
	Net Normal Cost	$ 39,431,273	13.88%	$ 39,076,777	14.10%
	20-Year Amortization of Unfunded Actuarial Liability	$ 65,444,776	23.04%	$ 70,271,453	25.36%
	Net Plan Cost at Valuation Date	$ 105,624,356	37.12%	$ 110,146,302	39.69%
	Interest to Beginning of Next FY	$ 8,127,894	2.86%	$ 8,842,076 *	3.19%
	Net Plan Cost at Valuation Date + One Year	$ 113,003,943	39.78%	$ 118,190,306	42.65%
2.	**Unfunded Liabilities**				
	Actuarial Liability				
	Active	$ 1,048,984,213		$ 1,054,869,769	
	Retirees and dependents	2,104,836,516		2,178,527,297	
	Terminated vested	1,865,471		1,187,836	
	Total	$ 3,155,686,200		$ 3,234,584,902	
	Allocated Actuarial Value of Assets	$ 2,450,269,949		$ 2,477,142,854	
	Unfunded Actuarial Liability	$ 705,416,251		$ 757,442,048	

* FYE 2015 contribution assumed to be made 50% at July 1 and 50% at August 1.

SECTION I
SUMMARY

The following tables summarize changes in System membership over the past year.

Table I-2
Active Membership Summary

	Active Members (City & State)		
	2012	**2013**	**% Increase**
Active members	4,624	4,439	(4.00%)
Total payroll	$ 284,601,473	$ 277,524,356	(2.49%)
Average salary	$ 61,549	$ 62,520	1.58%
			Absolute Difference
Average age	39.23	39.62	0.39
Average service	12.73	12.68	(0.05)

Table I-3
Inactive Membership Summary

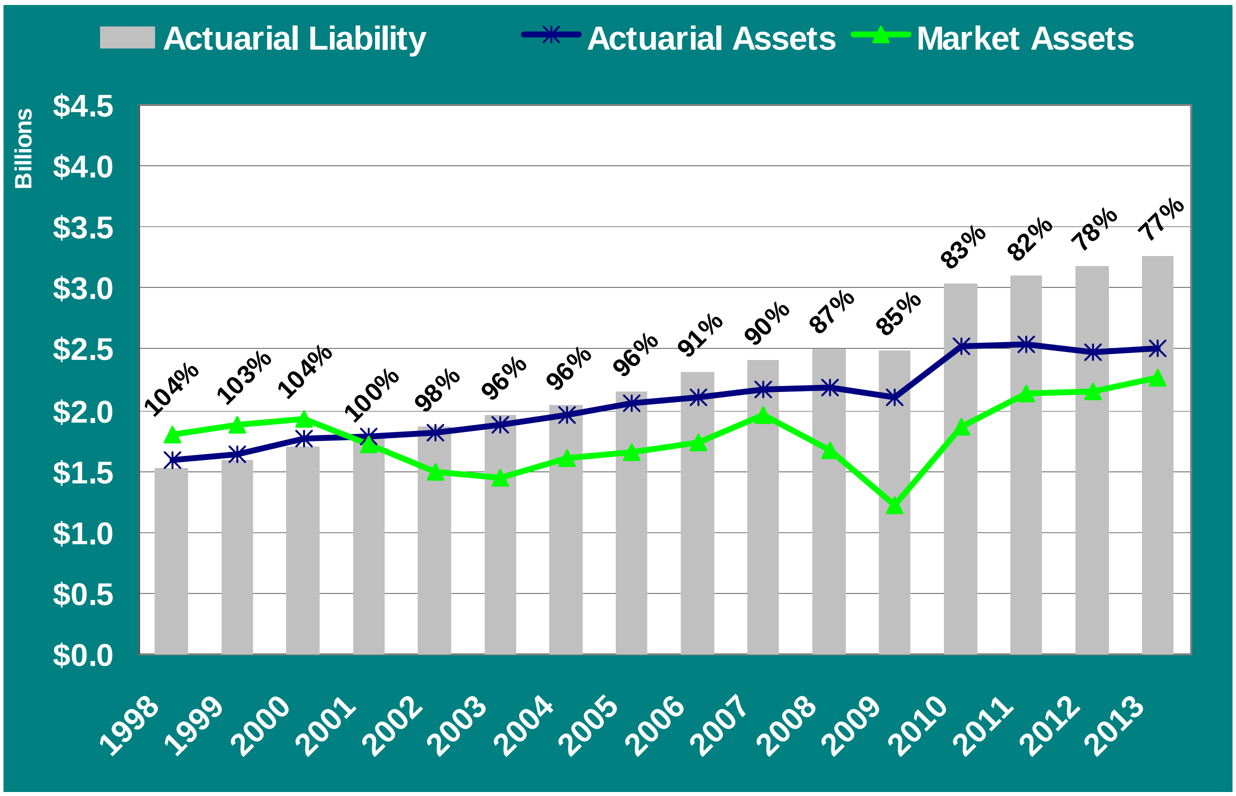
	Number of Retirees			Average Annual Benefit Amount		
	2012	**2013**	**% Increase**	**2012**	**2013**	**% Increase**
Normal Service Retirement	3,634	3,697	1.7%	$ 37,745	$ 38,675	2.5%
Discontinued Service	13	13	0.0%	31,186	31,234	0.2%
Non-Line-of-Duty Disability	276	269	(2.5%)	18,576	18,707	0.7%
Line-of-Duty Disability	734	733	(0.1%)	33,789	34,565	2.3%
Beneficiaries of Above	1,256	1,285	2.3%	16,688	16,919	1.4%
Non-Line-of-Duty Death	151	139	(7.9%)	21,925	22,765	3.8%
Line-of-Duty Death	72	70	(2.8%)	40,791	42,289	3.7%
Total	**6,136**	**6,206**	**1.1%**	**$31,732**	**$ 32,488**	**2.4%**

SECTION I
SUMMARY

Historical Trends

It is important to take a step back from these latest results and view them in the context of the System's recent history. Below we present a series of charts displaying key factors in the valuations of the last ten years.

Assets and Liabilities



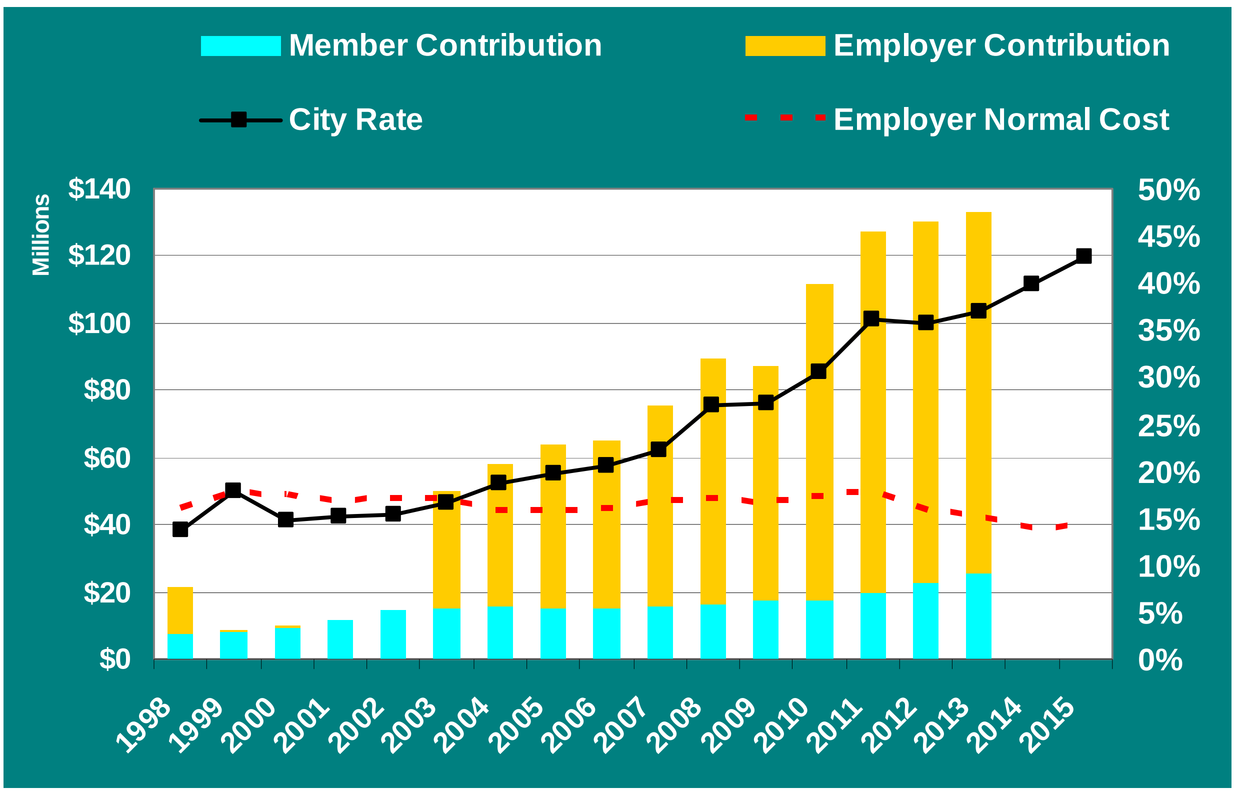
The bars represent the liability as measured for funding purposes in the valuations. We compared the actuarial value of assets in each report to this liability measure to develop the funded ratio for each year, these are the percentages shown in the graph along the top of each bar. As shown, the System had its highest funded ratio in the late 90's, when the ratio was over 100%. The two market declines in 2000 – 2002 and in 2007 – 2009 caused declines in the funded ratio. Both the liability and assets shown in 2010 and later include the former BIF, ERF, and MSF funds as well as their liabilities.

SECTION I
SUMMARY

Contribution Rates

The stacked bars in this graph show the contributions made by the City, State, and members and are read using the left-hand scale. The black line shows the City's contribution rate as a percent of payroll and is read using the right-hand scale. There are two more years of contribution rates shown than contribution dollar amounts since we already know the rates in effect for Fiscal Years Ending 2014 and 2015, but we will not know the actual dollar amounts contributed by the City and State until the close of those years.

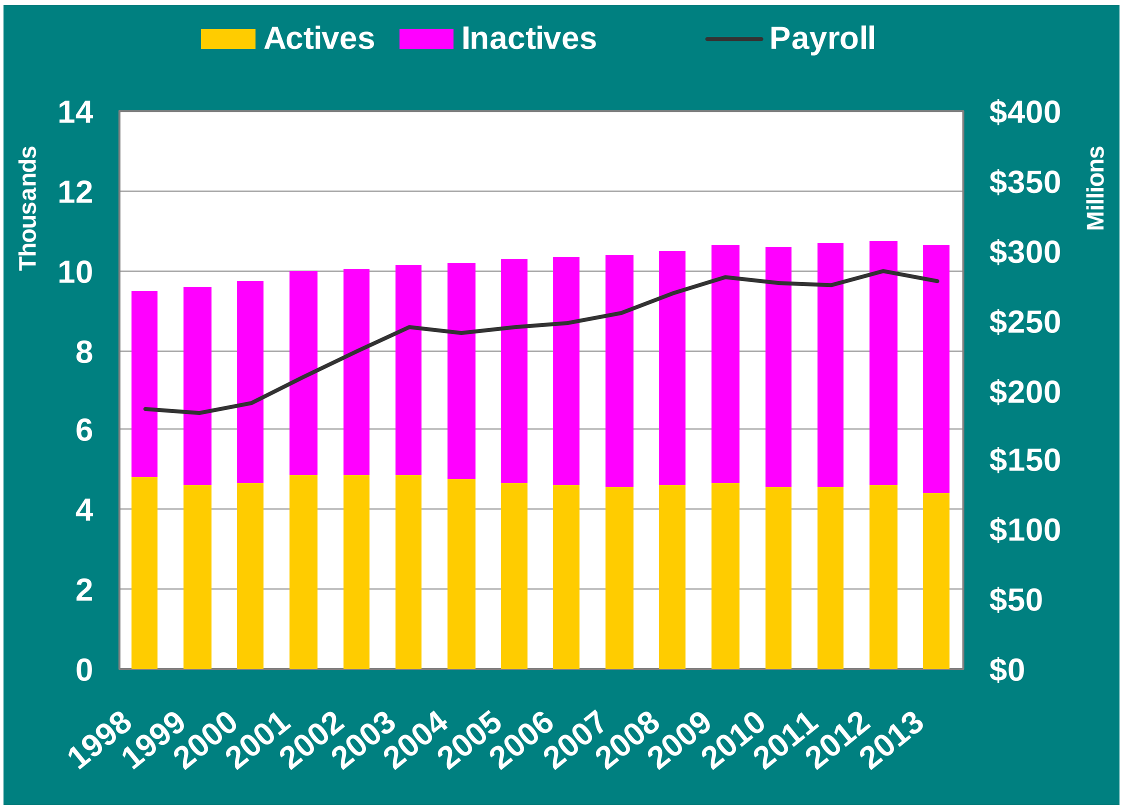
The red line shows the portion of the total normal cost rate that is paid by the employer rather than by the members. The normal cost measures the value of benefits to be accrued in the coming year. The employer-paid portion of the total normal cost decreases over the period FYE 2011 through FYE 2014, while member contributions increased.



SECTION I
SUMMARY

Participant Trends

The following chart shows that the number of actives covered by the System has remained relatively stable over the period shown. The number of inactive participants has increased over this period as more participants take retirement. The black line shows the total covered payroll over the period. Contributions are made as a percent of payroll so changes in this key statistic have an impact on the System's funding status.

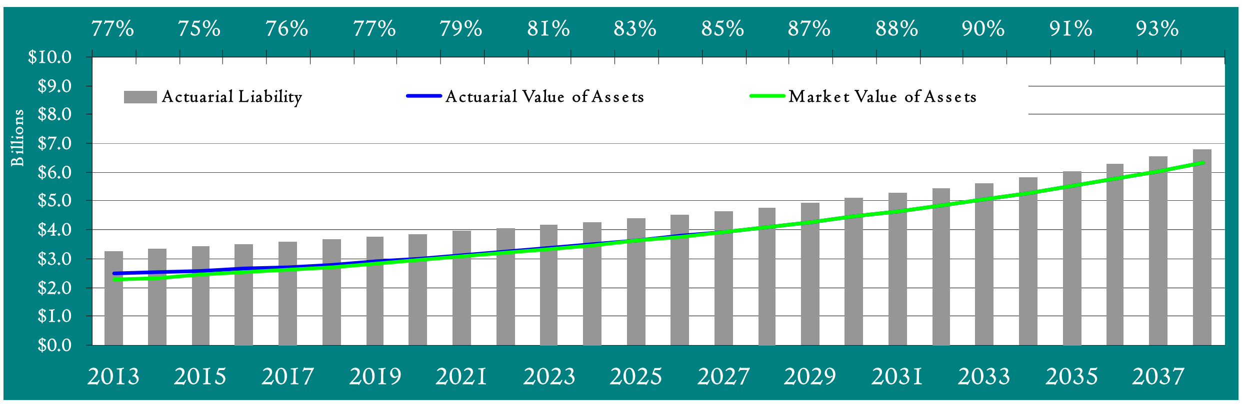


SECTION I
SUMMARY

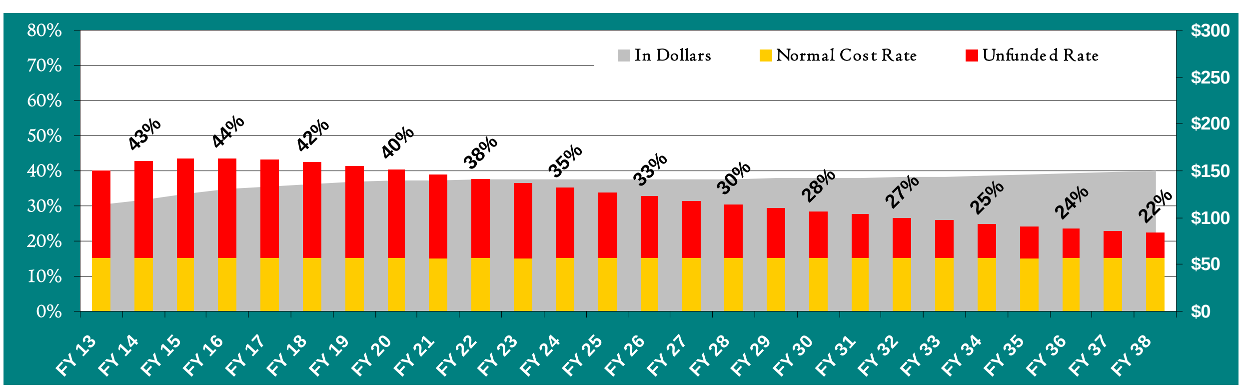
Base Line Projections

The final two charts in this section show the expected progress of the System's funding status over the next 25 years measured in terms of the expected employer contribution rates and dollar amounts and in terms of the funded ratio. Both are based on assuming all of the valuation assumptions are exactly met, including the long-term return rate of 7.75% and covered payroll increasing by 3.75% per year.

The first chart below compares assets and liabilities and shows that if all actuarial assumptions are exactly met, the System's funded ratio, shown along the top of the graph, is projected to improve from the current level of 77% to 93% over the 25-year period shown.



The second chart below shows that the employer contribution rate is projected to first increase as the balance of the 2008/2009 investment loss and the remainder of the BIF/ERF/MSF balances are included in the actuarial value of assets, and then decline as a percent of payroll as the unfunded actuarial liability (UAL) is paid down. The shaded area shows the dollar amount of employer contributions projected over this period based on all assumptions being met, and is read with the right axis.



SECTION II
ASSETS

Assets play a key role in the financial operation of the System and in the decisions the Board of Trustees may make with respect to future deployment of those assets. The level of assets, the allocation of assets among asset classes, and the methodology used to measure assets will likely impact upon benefit levels, employer contributions, and the ultimate security of participants' benefits.

In this section, we present detailed information on System assets including:

- Disclosure of System assets as of June 30, 2013,
- Statement of the changes in market values during the year,
- Development of the actuarial value of assets, and
- A comparison of the prior year' investment performance to the return assumption

Disclosure

The market values of assets represent "snap-shot" or "cash-out" values, which provide the principal basis for measuring financial performance from one year to the next. Market values, however, can fluctuate widely with corresponding swings in the marketplace. As a result, market values are usually not suitable for budgeting annual contributions.

The actuarial values of assets are market values that have been smoothed; they are used for evaluating the System's ongoing ability to meet its obligations.

Current methods employed by this System set the actuarial value equal to the market value, adjusted for a five-year phase-in of experience gains and losses. There is also a ten-year recognition of the remaining balances of the BIF, ERF and MSF. The last of these balances will be recognized in the June 30, 2014 valuation based on this ten-year recognition.

SECTION II
ASSETS

The assets below are based upon unaudited financial data furnished by the System's staff. The change in market value of assets of the six funds during the valuation year ending June 30, 2013 is summarized below.

Table II-1
Assets (Market Value) of the System as of June 30, 2013

	Annuity Savings Fund	Annuity Reserve Fund	Pension Accumulation Fund	Pension Reserve Fund	Paid Up Benefit Fund	Contingency Reserve Fund	Total
Fund Balance on 06/30/2012	$ 261,776,304	$ 276,444,000	$ (69,834,927)	$ 1,6,38,374,718	$ 36,742,429	$ 2,525,480	$ 2,146,028,004
Ordinance Transfer	$ 0	$ 0	$ 0	$ 39,267,909	$ (36,742,429)	$ (2,525,480)	$ 0
Actuarial Transfer	$ 0	$ 26,364,830	$(176,779,750)	$ 150,414,920	$ 0	$ 0	$ 0
Adjusted Fund Balance on 06/30/2012	$ 261,776,304	$ 320,808,830	$(246,614,677)	$ 1,828,057,547	$ 0	$ 0	$ 2,146,028,004
Contributions							
Member	$ 25,381,635	$ 0	$ 0	$ 0	$ 0	$ 0	$ 25,381,635
City/State	$ 0	$ 0	$ 107,778,859	$ 0	$ 0	$ 0	$ 107,778,859
Net Investment Income							
Interest, Dividends, and Realized Capital Gains	$ 8,164,455	$ 0	$ 81,684,189	$ 0	$ 48,892,439	$ 2,173,146	$ 140,914,229
Unrealized Gains (Losses)	$ 0	$ 0	$ 125,624,062	$ 0	$ (56,424,326)	$ (1,800,934)	$ 67,398,802
Expenses	$ 0	$ 0	$ (7,385,921)	$ 0	$ (352,294)	$ (37,529)	$ (7,775,744)
Total Investment Income	$ 8,164,455	$ 0	$ 199,922,330	$ 0	$ (7,884,181)	$ 334,683	$ 200,537,287
Net ERS Fund Transfers	$ (21,216,102)	$ 21,290,552	$ (74,450)	$ 0	$ 0	$ 0	$ 0
Payments of Benefit & Refunds	$ (4,029,234)	$ (27,246,780)	$ (12,105,141)	$ (136,673,046)	$ (34,769,631)	$ 0	$ (214,823,832)
Administrative Expenses	$ 0	$ 0	$ (3,568,855)	$ 0	$ 0	$ 0	$ (3,568,855)
Fund Balance on 06/30/2013	$ 270,077,058	$ 296,852,602	$ 45,338,066	$ 1,691,384,501	$ (42,653,812)	$ 334,683	$ 2,261,333,098
Ordinance Transfers	$ 0	$ 0	$ 0	$ (42,319,129)	$ 42,653,812	$ (334,683)	$ 0
Actuarial Transfers	$ 0	$ 24,105,849	$(261,415,279)	$ 237,309,430	$ 0	$ 0	$ 0
Adjusted Fund Balance on 06/30/2013	$ 270,077,058	$ 302,958,451	$(216,077,213)	$ 1,886,374,802	$ 0	$ 0	$ 2,261,333,098

SECTION II
ASSETS

The chart below shows the calculation of the investment gain/loss. On market value, the System earned a 9.53% return, a total investment income of $200.5 million during FYE 2013, resulting in a net System asset gain on a market value basis of $37.5 million.

Table II-2
Development of Investment Gain/(Loss)

1.	Market Value of Assets as of 6/30/2012	$ 2,146,028,004
2.	Market Value of Assets as of 6/30/2013	$ 2,261,333,098
3.	Earnings During 7/30/2012 to 6/30/2013 (Excluding Investment Expenses)	$ 200,537,287
4.	Mean Assets Half of [1. + 2. - 3.]	$ 2,103,411,908
5.	Investment Return 2012-2013 [3. ÷ 4.]	9.53%
6.	Investment Gain/(Loss): [5. – 7.75%] x 4.	$ 37,522,765

The investment gain for FYE 2013 is combined with prior investment experience to determine the actuarial value of assets used in determining the City's contribution obligations.

Ordinance 97-164 created two new funds that were credited with unallocated earnings from 1996 through 2005: The Employer Reserve Fund (ERF) and the Benefit Improvement Fund (BIF). In 1997, a Minimum Stabilization Fund (MSF) was established within each of these funds and were increased from 2000–2003. All of these funds expired as of June 30, 2005 with negative balances. These negative balances are being recognized in the actuarial value of assets over a ten-year phase-in period that began with the June 30, 2005 valuation.

The chart below shows the recognition of the remaining investment gains/(losses) along with the continued phased-in recognition of the funds described above.

Table II-3
Development of Unallocated Earnings

The development of current unallocated excess/(deficit) earnings over the most recent two years is as follows.

	Valuation Date	
	6/30/2012	**6/30/2013**
1. Remaining net excess earnings from prior valuation	$ (198,638,769)	$ (257,709,302)
2. New investment Gain/(Loss)	(87,429,289)	37,522,765
3. Current net excess earnings [1. + 2.]	$ (286,068,058)	$ (220,186,537)
4. Allocation for 10% of BIF, ERF &MSF	(36,068,570)	(36,068,570)
5. One-fifth (credit)/charge [3. + 4.] x 20%	64,427,326	51,251,021
6. Net unallocated excess/(deficit) earnings [3. + 4. +5.]	$ (257,709,302)	$ (205,004,086)

SECTION II
ASSETS

The chart below shows the calculation of the actuarial value of assets. The assets are smoothed using the unallocated excess/(deficit) earnings.

Table II-4
Actuarial Value of Assets

The actuarial value of assets used to calculate the unfunded actuarial liability is developed as follows.

1. Assets in the Fund on 6/30/2013	$	2,261,333,098
2. Remaining BIF, ERF & MSF balance	$	(36,068,570)
3. Net deferred recognition of unallocated excess/(deficit) earnings	$	(205,004,086)
4. Actuarial value of assets on 6/30/2013 [1. – 2. – 3. + 4. + 5.]	$	2,502,405,754 *

* The actuarial value of assets represents 110.7% of the market value, which is down from the 115.4% value of the same measurement last year.

On an actuarial value of assets basis, the investment results are below expectation with an investment return for the year of 4.59%, compared to the valuation interest rate of 7.75%. This is due to the continued gradual recognition of the 2008/2009 investment losses and the phase-in of the negative BIF/ERF/MSF balances.

The chart below shows the schedule of recognition of the phase-in of the BIF/ERF/MSF funds. There are two years remaining in this recognition.

Table II-5
Benefit Improvement Fund, Employer Reserve and Minimum Stabilization Fund

June 30,	Expected Charge	Excess Contribution	Fund Reserve
2005	$ 0	$ 0	$ 412,805,569
2006	82,561,114	0	330,244,455
2007	40,592,404	5,505,220	284,146,831
2008	39,773,570	5,731,841	238,641,420
2009	39,773,570	0	198,867,850
2010	37,493,570	11,400,000	149,974,280
2011	36,068,570	5,700,000	108,205,710
2012	36,068,570	0	72,137,140
2013	36,068,570	0	36,068,570
2014	36,068,570	0	0

SECTION III
LIABILITIES AND EXPERIENCE GAINS/(LOSSES)

The table below presents the actuarial liabilities by membership status and employer, then allocates the assets in proportion to each employer's liabilities to produce the unfunded actuarial liabilities by employer. In the next section, these unfunded actuarial liabilities are amortized over 20 years, and those amount are then added to the Net Normal Costs (cost to cover the upcoming year's expected benefit accruals less member contributions) to produce the recommended employer contributions. The System's funded ratio using market value of assets is also shown for informational purposes.

Table III-1
Liability By Employee Group

	As of June 30, 2013		
	Airport	**City**	**Total**
Number of Participants			
Active	6	4,433	4,439
Service Retired	59	3,651	3,710
Disabled	8	994	1,002
Beneficiaries	9	1,485	1,494
Total Participants	82	10,563	10,645
Annual Compensation of Active Participants	$ 460,551	$ 277,063,805	$ 277,524,356
Projected compensation for Plan Year 2013	$ 477,822	$ 287,453,698	$ 287,931,520
Average Age	55.89	39.60	39.62
Average Service	26.87	12.66	12.68
Development of Unfunded Actuarial Liability			
Actuarial Liability			
Active	$ 4,181,643	$ 1,054,869,769	$ 1,059,051,412
Service Retired	25,483,845	1,603,606,880	1,629,090,725
Disabled	2,247,088	335,293,548	337,540,636
Beneficiaries	1,075,023	239,626,869	240,701,892
Terminated Vesteds	0	1,187,836	1,187,836
Total Liabilities	$ 32,987,599	$ 3,234,584,902	$ 3,267,572,501
Actuarial Value of Assets (AVA)	$ 25,262,900	$ 2,477,142,854	$ 2,502,405,754
Unfunded Actuarial Liability*	$ 7,724,699	$ 757,442,048	$ 765,166,747
Funded Ratio using AVA	76.6%	76.6%	76.6%
Market Value of Assets (MVA)	$ 22,829,164	$ 2,238,503,934	$ 2,261,333,098
Funded Ration using MVA	69.2%	69.2%	69.2%

* Actuarial value of assets has been allocated in proportion to each employee group's actuarial liability.

SECTION III
LIABILITIES AND EXPERIENCE GAINS/(LOSSES)

The table below presents the changes in actuarial liabilities and assets during the plan year. In general, the unfunded actuarial liability (UAL) of any retirement system is expected to change at each subsequent valuation for a variety of reasons. In each valuation, we report on those elements of the change in the UAL that are of particular significance, potentially affecting the long-term financial outlook of the System. Below we present key changes in the actuarial liabilities and assets since the last valuation.

Table III-2
Development of 2013 Experience Gain/(Loss)

		Actuarial Liability	Actuarial Value of Assets	Unfunded Actuarial Liability
1.	Value as of June 30, 2012	$ 3,188,662,059	$ 2,475,874,446	$ 712,787,613
2.	Additions			
	a. Total Normal Cost with Expense	$ 67,955,851		$ 67,955,851
	b. Expected Employer Contributions		$ 102,068,652	$ (102,068,652)
	c. Expected Member Contributions		$ 25,381,635	$ (25,381,635)
3.	Decreases			
	a. Benefits	$ (214,823,832)	$ (214,823,832)	$ 0
	b. Actual Expenses	$ (3,568,855)	$ (3,568,855)	$ 0
4.	Expected Interest			
	a. On 1 for one year	$ 217,121,310	$ 191,880,270	$ 55,241,040
	b. On 2a for one year	$ 5,266,578	$ 0	$ 5,266,578
	c. On 2b for one year*	$ 0	$ 7,910,321	$ (7,910,321)
	d. On 2c for ½ year	$ 0	$ 983,538	$ (983,538)
	e. On 3a for ½ year	$ (8,324,423)	$ (8,324,423)	$ 0
	f. On 3b for ½ year	$ (138,293)	$ (138,293)	$ 0
5.	Expected Value June 30, 2013: [sum 1. - 4.]	$ 3,282,150,395	$ 2,577,243,459	$ 704,906,936
6.	Excess Contributions	$ 0	$ 5,710,207	$ (5,710,207)
7.	Due to Change in Actuarial Systems	$ 0	$ 0	$ 0
8	Assumption Change Gain/(Loss)	$ 0	$ 0	$ 0
9.	Expected Value After Changes:	$ 3,282,150,395	$ 2,582,953,666	$ 699,196,729
10.	Actual Value as of June 30, 2013	$ 3,267,572,501	$ 2,502,405,754	$ 765,166,747
11.	Actuarial Gain/(Loss):	$ 14,577,894	$ (80,547,912)	$ (65,970,018)
12.	Total Gain/(Loss):	$ 14,577,894	$ (80,547,912)	$ (65,970,018)

* Assumes employer contributions made at beginning of year.

SECTION III
LIABILITIES AND EXPERIENCE GAINS/(LOSSES)

The table below provides the components of the liability gain developed in the previous table.

Table III-3
Elements of Actuarial Liability – Gain/(Loss)

1.	Age and Service Retirements – Gain/(Loss)	$	(20,022,440)
2.	Disability Retirements – Gain/(Loss)		(6,736,905)
3.	Death in Service Benefits – Gain/(Loss)		31,063
4.	Withdrawal from Employment – Gain/(Loss)		19,738,403
5.	Pay Increases – Gain/(Loss)		19,987,316
6.	Death After Retirement – Gain/(Loss)		3,562,825
7.	New Entrants – Gain/(Loss)		(1,640,175)
8.	Continuing Inactives-Gain/(Loss)		(550,969)
9.	Other – Gain/(Loss) *		208,776
10.	Total Actuarial Liability – Gain/(Loss) [sum 1. to 8.]	$	14,577,894

* Includes the addition of terminated vested liability, gain/loss on administrative expenses, and data corrections.

SECTION IV
CONTRIBUTIONS

In the process of evaluating the financial condition of any pension plan, the actuary analyzes the assets and liabilities to determine the level of contributions needed based on the funding policy. Typically, the primary goal in setting contributions is to maintain a pattern of contributions that is both stable and predictable over time.

For this System, the funding methodology employed is the Projected Unit Credit actuarial cost method. Under this method, there are three components to the total contribution: the net normal cost, a provision for anticipated expenses, and an amortization of the unfunded actuarial liability (UAL). The total normal cost is determined for each active participant in accordance with the method described in the appendices. The anticipated member contributions for the year are then subtracted from the sum of the total normal costs to arrive at the employer, or net, normal cost. Expenses designed to approximate the administrative expenses for the coming year are then added to this number as well as the calculated amortization of the UAL.

The UAL amount is developed in Section III of this report. In this section, we develop the contribution amounts by amortizing the UAL over a 20-year period, using a level dollar amortization approach. Additional information about this approach is provided in Appendix C.

The table below develops the State and City contributions to be paid in Fiscal Year 2015.

Table IV-1
Contribution Summary

	State	City	Total	% of Payroll
Total Normal Cost	$ 120,562	$ 62,627,201	$ 62,747,763	22.61%
Expense Load	6,908	4,155,957	4,162,865	1.50%
Expected Employee Contributions for FYE 2014	(46,055)	(27,706,381)	(27,752,436)	(10.00%)
Net Normal Cost	$ 81,415	$ 39,076,777	$ 39,158,192	14.11%
20-Year Amortization of Unfunded Actuarial Liability	$ 716,657	$ 70,271,453	$ 70,988,110	25.58%
Net Plan Cost at 7/1/2013	$ 798,072	$109,348,230	$110,146,302	39.69%
Interest to Payment Date*	61,851	8,842,076	8,903,927	3.21%
Net Plan Cost at 7/1/2014	$ 859,923	$118,190,306	$119,050,229	42.90%

* City contribution assumed to be made 50% at July 1 and 50% at August 1.

APPENDIX A
SYSTEM MEMBERSHIP

The data for this valuation was provided electronically in Excel and text formats by the System office. Cheiron did not audit any of the data, but we did perform an informal examination of the obvious characteristics of the data for reasonableness and consistency in accordance with Actuarial Standard of Practice #23. The data for active and inactive participants is as of June 30, 2013.

The following pages contain a summary of the data provided.

- Reconciliation of active members as of June 30, 2013
- Reconciliation of retirees and beneficiaries as of June 30, 2013
- Age/service and age/salary/service distribution for active members as of June 30, 2013
- Counts and average benefit amount by age for retirees, beneficiaries, and disabled members as of June 30, 2013

APPENDIX A
SYSTEM MEMBERSHIP

Reconciliation of Active F&P Members				
A.	**Active Members as of June 30, 2012**			**4,624**
B.	Exits:			
	1.	Terminations:	Non-vested	163
	2.	Transfers	Out	0
	3.	Leaves:	Other	0
	4.	Prior Incorrect Inclusions		0
	5.	Deaths:	Line-of-Duty	0
			Non-Line-of-Duty w/ Survivor	18
			Non-Line-of-Duty w/out Survivor	0
	6.	Retirements:	Service	163
	7.	Disablements:	Line-of-Duty	23
			Line-of-Duty - 100%	0
			Non-Line-of-Duty	6
	8.	Subtotal (all exits):		373
	9.	Military Leaves:		7
	10.	Pending Disablement:		1
C.	**Remaining Active (A. - B.8)**			**4,251**
D.	Entrances:			
	1.	New Entrants		185
	2.	Prior Omissions		0
	3.	Transfers In		0
	4.	Restorations:	Pending	0
			Leave	0
			Retirement	0
			Disability - Non-Line-of-Duty	0
			Disability - Line-of-Duty	0
			Other Termination	3
	5.	Subtotal (all entrances):		188
E.	**Active Members as of June 30, 2013 (C. + D.5)**			**4,439**

APPENDIX A
SYSTEM MEMBERSHIP

Reconciliation of Inactive F&P Members

	Retired		Disabled		
	Primary	**Beneficiary**	**Primary**	**Beneficiary**	**Total**
A. Members as of June 30, 2012	**3,647**	**1,045**	**1,010**	**434**	**6,136**
B. Exits:					
1. Payments Ceased	0	0	0	0	0
2. Returned to Active Membership	0	0	0	0	0
3. Prior Incorrect Inclusion	0	0	0	0	0
4. Deaths: Primary with no Survivor	49	0	12	0	61
Beneficiary	0	65	0	18	83
Primary with Survivor	49	0	28	0	77
5. Subtotal (all exits):	98	65	40	18	221
C. Remaining Members (A - B.5)	3,549	980	970	416	5,915
Adjustments	(3)	0	3	0	0
Adjusted Remaining Members	3,546	980	973	416	5,915
D. Entrances:					
1. New Retirements: Primary	163	0	29	0	192
2. Active Death: Beneficiary	0	18	0	0	18
3. Beneficiary Assumes Payments	0	49	0	31	80
4. Prior Omissions	1	0	0	0	1
5. Ex-Spouse Receiving Payments	0	0	0	0	0
6. Subtotal (all exits):	164	67	29	31	291
E. Members as of June 30, 2013 (C + D.6)	**3,710**	**1,047**	**1,002**	**447**	**6,206**

APPENDIX A
SYSTEM MEMBERSHIP

AGE/SERVICE DISTRIBUTION OF ACTIVE PARTICIPANTS

ACTIVE PARTICIPANTS AS OF JUNE 30, 2013

	COMPLETED YEARS OF CREDITED SERVICE									
AGE	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 & Up	Total
Under 25	154	3	0	0	0	0	0	0	0	157
25-29	426	260	0	0	0	0	0	0	0	686
30-34	137	295	140	1	0	0	0	0	0	573
35-39	47	206	312	119	4	0	0	0	0	688
40-44	40	143	199	376	199	4	0	0	0	961
45-49	14	59	91	193	232	111	0	0	0	700
50-54	3	21	34	48	93	116	59	0	0	374
55-59	3	7	13	18	41	46	63	16	2	209
60-64	0	3	2	6	6	15	15	21	11	79
65-69	0	0	0	1	0	2	0	1	6	10
70 & Up	0	0	0	1	0	0	0	1	0	2
Total	824	997	791	763	575	294	137	39	19	**4,439**

Average Age = 39.72 Average Service = 13.09

APPENDIX A
SYSTEM MEMBERSHIP

AGE/SERVICE DISTRIBUTION OF ACTIVE PARTICIPANTS

ACTIVE PARTICIPANTS AS OF JUNE 30, 2013

AVERAGE EARNINGS

AGE	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 & Up	Total
Under 25	$ 43,151	$ 56,758	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 43,411
25-29	45,491	57,469	0	0	0	0	0	0	0	50,031
30-34	46,222	59,220	62,903	68,940	0	0	0	0	0	57,029
35-39	47,161	59,222	64,214	68,390	74,415	0	0	0	0	62,336
40-44	49,320	59,186	63,820	69,752	73,916	77,720	0	0	0	66,996
45-49	46,988	59,728	62,729	68,797	71,172	76,710	0	0	0	68,850
50-54	94,467	65,435	63,694	66,523	70,286	73,090	78,760	0	0	71,332
55-59	52,395	61,363	61,709	66,810	67,888	72,073	76,276	77,739	88,915	71,375
60-64	0	59,454	64,070	66,676	65,573	72,302	75,056	78,557	73,809	73,063
65-69	0	0	0	65,234	0	71,411	0	93,223	82,782	79,797
70 & Up	0	0	0	67,406	0	0	0	11,592	0	39,499
Total	$ 45,685	$ 58,928	$ 63,648	$ 68,991	$ 71,708	$ 74,309	$ 77,212	$ 76,880	$ 78,233	$ 62,519

Total Earnings = $ 277,524,356 Average Earnings = $ 62,520

APPENDIX A
SYSTEM MEMBERSHIP

Schedule of Benefit Recipients by Attained Age and Type of Retirement
June 30, 2013 - Primary Members

	TYPE OF RETIREMENT					
AGE	NR	DS	NLOD Dis	LOD Dis	LOD 100	Total
Under 20	0	0	0	0	0	0
20-24	0	0	0	0	0	0
25-29	0	0	0	10	0	10
30-34	0	0	3	17	0	20
35-39	1	0	10	44	0	55
40-44	51	1	20	78	0	150
45-49	228	6	29	107	1	371
50-54	339	4	24	85	1	453
55-59	490	0	18	50	0	558
60-64	664	1	19	59	0	743
65-69	715	1	30	73	0	819
70-74	476	0	24	64	1	565
75-79	330	0	34	53	0	417
80-84	240	0	29	57	1	327
85-89	124	0	20	27	0	171
90 & Up	39	0	9	5	0	53
Total	3,697	13	269	729	4	**4,712**
Average Annual Benefit	$ 38,675	$ 31,234	$ 18,707	$ 34,432	$ 58,864	$ 36,875

NR – Normal Retirement for Age and Service
DS - Discontinued Service
NLOD Dis – Non-Line-of-Duty Disability
LOD Dis – Line-of-Duty Disability
LOD 100 – Line-of-Duty Disability 100% of Compensation

APPENDIX A
SYSTEM MEMBERSHIP

Schedule of Benefit Recipients by Attained Age and Type of Retirement
June 30, 2013 - Beneficiaries

	TYPE OF RETIREMENT								
AGE	NR	DS	NLOD Dis	LOD Dis	LOD 100	NLOD DR	NLOD Dth	LOD Dth	Total
Under 20	1	0	2	0	0	0	5	6	14
20-24	0	0	1	1	0	0	0	0	2
25-29	0	0	0	0	0	0	0	0	0
30-34	0	0	0	2	0	0	1	0	3
35-39	1	0	0	0	0	0	1	2	4
40-44	8	0	1	1	0	0	2	6	18
45-49	27	0	3	4	0	1	2	2	39
50-54	46	0	3	4	0	4	3	3	63
55-59	62	0	6	12	0	8	4	5	97
60-64	84	1	11	14	0	17	8	8	143
65-69	91	0	13	14	0	8	8	9	143
70-74	114	0	27	37	1	11	8	4	202
75-79	115	0	40	53	0	10	6	7	231
80-84	121	0	45	59	0	14	2	4	245
85-89	110	0	25	36	0	8	1	9	189
90 & Up	57	0	12	20	0	6	1	5	101
Total	837	1	189	257	1	87	52	70	**1,494**
Average Annual Benefit	$ 17,525	$ 12,211	$ 14,167	$ 16,914	$ 0	$ 27,032	$ 15,627	$ 42,289	$ 18,652

NR – Normal Retirement for Age and Service
DS - Discontinued Service
NLOD Dis – Non-Line-of-Duty Disability
LOD Dis – Line-of-Duty Disability
LOD 100 – Line-of-Duty 100% of Compensation
NLOD DR – Non-Line-of-Duty Death Member Eligible for Service Retirement
NLOD Dth – Non-Line-of-Duty Death with 25% of Compensation
LOD Dth – Line-of-Duty Death

APPENDIX B
SUMMARY OF PLAN PROVISIONS

1. Effective Date:

The System was effective July 1, 1962 and has periodically been amended. This valuation incorporates the provisions of Ordinance 11-444 (Council Bill 10-0603).

2. Eligibility:

Any officer or employee of the Police Department or the Fire Department and certain Department of Aviation employees shall become a member as a condition of employment. Any officer or employee for whom the City makes contributions to Social Security shall be excluded.

3. Grandfathering:

Effective July 1, 2010, participants who have either met retirement eligibility (see item 7.A.i.) or have attained 15 years of service prior to July 1, 2010 are considered "Grandfathered" for retirement as well as DROP2 eligibility. All other members are "Non-Grandfathered." Members have until December 31, 2010 to purchase service to satisfy the 15-year "Grandfathering" requirement.

4. Member Contributions:

Members contribute at the rate of 6% of regular compensation for their entire period of service. Effective July 1, 2010, members contribute at the rate of 7% of regular compensation. This percentage increased to 8% starting July 1, 2011, 9% starting July 1, 2012 and 10% starting July 1, 2013. Contributions are treated as made by the employer and are made to the System pre-tax according to Section 414(h)(2) of the Internal Revenue Code. Members of the ERS who transferred to this system after July 1, 1967 and did not make up the contributions which would have been made from July 1, 1962 are to have their retirement allowance reduced by the actuarial equivalent of the deficient contributions with interest. Effective July 1, 2010, interest is credited on contributions at a rate of 3.0% per annum. Previously, interest was credited at 5.5% per annum. Members' contributions were reduced in several years by a specific ordinance for each year. For purposes of calculating benefits that depend on the amount of member contributions (e.g., DROP accounts), members are deemed to have contributed the full amount.

5. Compensation:

Earnable compensation is all usual including lodging, subsistence, etc. When compensation is not paid in money, the Board of Trustees shall fix the value of that part of compensation. This definition excludes overtime.

APPENDIX B
SUMMARY OF PLAN PROVISIONS

For grandfathered participants, Average Final Compensation is the average annual compensation during any 18 consecutive month period of service during which earnable compensation was highest or, if less than 18 months, the average during total service.

For non-grandfathered participants, Average Final Compensation is the average annual compensation during any 36 consecutive month period of service during which earnable compensation was highest or, if less than 36 months, the average during total service.

6. Military Service Credit:

A. Military Service Prior to Employment: A maximum of three years of service credit is granted provided the member has acquired 10 years of service and attained age 50, or has acquired 20 years of service regardless of age.

B. Military Service within Employment: Upon retirement or death, any member who, because of military duty, had a break in employment shall receive credit for the period of absence as provided by the Veterans Reemployment Rights Act.

7. Retirement Allowance Eligibility:

A. Service Retirement
   1) Grandfathered:
      a. Membership commencing prior to July 1, 2003: Age 50 or 20 years of service.
      b. Membership commencing on or after July 1, 2003: Age 50 with 10 years of service as a contributing member, or 20 years of service with 10 years of service as a contributing member.
   2) Non-grandfathered. Earlier of:
      a. Age 55 with 15 years of service, or
      b. 25 years of service, regardless of age, with 15 years of service as a contributing member.

B. Early Retirement (only non-grandfathered participants):
   1) Membership commencing prior to July 1, 2003: Age 50 or 20 years of service.
   2) Membership commencing on or after July 1, 2003: Age 50 with 10 years of service as a contributing member, or 20 years of service with 10 years of service as a contributing member.
   3) The normal retirement benefit is reduced by 6.5% per year for the first five years, 4.5% per year for the next five years, 3.0% for the next five years and 2% per year thereafter from the date the member would have been eligible for normal retirement assuming continued service.

C. Non-Line-of-Duty Disability Retirement: Five years of service and certified by a member of the Panel of Hearing Examiners to be mentally or physically incapacitated for the performance of duty and that incapacity is likely to be permanent.

APPENDIX B
SUMMARY OF PLAN PROVISIONS

D. Line-of-Duty Disability Retirement: No service or age constraints apply. The benefit is awarded when a participant becomes totally and permanently incapacitated for duty as the result of an injury while in performance of duty and certified by a Hearing Examiner as incapacitated for the performance of duty where such incapacity is likely to be permanent. Should such disability further result in extensive brain damage causing total incapacity or in the loss of use of both hands or both arms or both feet or both legs or both eyes or any two thereof, an additional pension will be payable.

8. Termination of Employment:

A. Eligible for a Termination Retirement Allowance payable immediately upon completion of 15 years of service if removed from a position without fault. Presently, this benefit is not reflected in the valuation.

B. Eligible for a refund of accumulated contributions if not eligible for any other benefits.

9. Retirement Allowances:

A. Service Retirement: The retirement allowance shall be the sum of:

1) An annuity equal to the actuarial equivalent of a member's accumulated contributions.

2) A pension, which together with the annuity in (1), equals 2.5% of Average Final Compensation times the first 20 years of service, plus 2.0% of Average Final Compensation times service in excess of 20 years.

DROP Benefits

Members with more than 20 years of service on or before December 31, 2009 can elect to participate in DROP at any time. A member's DROP participation period can be for one, two or three years. During that time the member will accrue no additional service. A member who continues employment at the end of his/her DROP participation period shall begin to earn additional service credit.

If a member retires during his/her DROP participation period or immediately at the end of this period, he/she shall be entitled to a Basic DROP Retirement Benefit. This shall equal:

1) The retirement benefit that would have been paid had the member retired at the time he/she began his/her DROP participation, plus

APPENDIX B
SUMMARY OF PLAN PROVISIONS

2) A lump sum equal to the member's DROP account. This equals the accumulation of the annuity payments the member would have received had he/she retired at the time his/her DROP participation began receiving benefits, plus the member contributions paid during his/her DROP participation period, plus interest at 8.25%.

If a member retires later than the end of the three-year DROP period but less than 18 months after the conclusion of his/her DROP participation period, he/she is entitled to an Intermediate DROP Retirement Benefit. This shall equal:

1) The retirement benefit that would have been paid had the member retired at the time he/she began his/her DROP participation, plus

2) Benefit accrual of 2% plus an extra 1.5% per year (not to exceed 18 months) for service after the DROP participation period.

3) A lump sum equal to the DROP account. No additions (other than interest) are added after the conclusion of the DROP participation period.

If a member retires more than 18 months after the conclusion of his/her DROP participation period, he/she is entitled to a Full DROP Retirement Benefit. This shall equal:

1) The retirement benefit based on current average final compensation and all service excluding service while a participant is in DROP.

2) Benefit accrual includes an extra 1.5% per year (not to exceed four years) for service after the DROP participation period.

3) A lump sum equal to the DROP account. No additions (other than interest) are added after the conclusion of the DROP participation period.

DROP2 Benefits

Members with more than 20 years of service on or after January 1, 2010, but not before December 31, 2009, can elect to participate in DROP2. Effective July 1, 2010, the 20-year requirement was moved to 25 years for non-grandfathered members. A member's DROP2 participation period can be for one, two or three years. The participant must remain in DROP2 for at least one year. Those participants who retire prior to the end of the first year are not entitled to receive any amounts accumulated in the DROP2 account. No additional service is accrued during DROP2 participation. A member who continues employment at the end of the DROP2 participation period shall begin to earn additional service credit.

APPENDIX B
SUMMARY OF PLAN PROVISIONS

If a member retires during the DROP2 participation period or immediately at the end of this period, the member is entitled to an Early DROP2 Retirement Benefit. This is equal to:

1) The retirement benefit that would have been paid had the member retired at the time he/she began his/her DROP2 participation, plus

2) A lump sum equal to the member's DROP2 account. This equals the accumulation of the annuity payments the member would have received had he/she retired at the time his/her DROP2 participation began plus the member contributions paid during his/her DROP2 participation period, plus interest at 5.5% for grandfathered participants and 3.0% for non-grandfathered participants.

If a member retires later than the end of the three-year DROP2 period but less than 3.5 years for police employees or five years for fire employees after the conclusion of his/her DROP2 participation period, he/she is entitled to a Mid DROP2 Retirement Benefit. This is equal to:

1) The retirement benefit that would have been paid had the member retired at the time he/she began his/her DROP2 participation, plus

2) Benefit accrual of 2% for service after the DROP2 participation period began.

3) An additional benefit accrual of 1.5% per year (not to exceed four years) for service after the DROP2 participation period for fire employees only. Police employees do not receive an additional benefit accrual.

4) A lump sum equal to the DROP2 account. No additions (other than interest) are added after the conclusion of the DROP2 participation period.

If a member retires more than 3.5 years for police employees or five years for fire employees after the conclusion of his/her DROP2 participation period, he/she is entitled to a Complete DROP2 Retirement Benefit. This shall equal:

1) The retirement benefit based on current average final compensation and all service excluding service while a participant is in DROP2.
2) Benefit accrual includes an extra 1.5% per year (no to exceed four years) for service after the DROP2 participation period for fire employees only. Police employees do not receive an additional benefit accrual.

3) A lump sum equal to the DROP2 account. No additions (other than interest) are added after the conclusion of the DROP2 participation period.

APPENDIX B
SUMMARY OF PLAN PROVISIONS

B. Non-Line-of Duty Disability Retirement: A member shall receive an annuity equal to the actuarial equivalent of a member's accumulated contributions plus a pension which, together with the annuity, shall equal 2.5% of his/her Average Final Compensation times service up to 20 years, plus 2.0% of his/her Average Final Compensation times service in excess of 20 years, but in no event less than 25% of Average Final Compensation.

NOTE: This allowance is offset by workers' compensation, if the member entered the system after July 1, 1970.

C. Line-of-Duty Disability Retirement: An annuity equal to the actuarial equivalent of a member's accumulated contributions, plus a pension equal to 66-2/3% of Average Final Compensation. An additional pension is paid for certain disabilities so that the retirement allowance is equal to 100% of compensation at the time of retirement.

NOTE: The same offsets apply as in Non-Line-of-Duty Disability.

D. Termination Retirement Allowance: Determined the same as if the member had retired on a Non-Line-of-Duty Disability Allowance.

10. Optional Methods of Receiving Benefit Payments:

These options are available for Service, Non-Line-of-Duty Disability and Line-of-Duty Disability Retirement. The option and/or beneficiary may be changed within 30 days after retirement. For purposes of determining the amount of an optional retirement benefit, a benefit of equivalent value is determined using 5% per annum compounded annually and the UP-84 mortality table set forward one year, except that in the case of disability retirements, the table is set forward seven years.

A. Joint and 50% to un-remarried spouse or dependent children until the last marries, dies or attains age 18 (age 22 if a full-time student) (this is known as the maximum service of allowance).

B. Cash refund to designated beneficiary with refund based on present value of allowance at retirement less payments made.

C. Joint and 100% to Contingent beneficiary.

D. Joint and 50% to Contingent beneficiary.

E. Some other periodic benefit subject to the approval of the Board of Trustees.

APPENDIX B
SUMMARY OF PLAN PROVISIONS

11. Non-Line-of-Duty-Death Benefits:

Upon the non-duty related death of a member in service, benefits are payable as follows:

A. The member's accumulated contributions shall be payable to the member's designated beneficiary or estate.

B. If a member had one or more years of service, 50% of the greater of his/her current annual compensation or Average Final Compensation will be payable as a lump sum.

C. In lieu of A and B above, if the member had at least two years of continuous service, the benefit is an annual sum equal to 25% of the member's regular gross compensation, plus 1.5% of regular gross compensation times years of service in excess of two years, up to a maximum benefit of 50% of regular gross compensation. The death benefit shall be payable to:

   1) the widow(er), if the beneficiary so elects, during widowhood only, or

   2) if no eligible widow(er), the child or children until the last marries, dies or attains age 18 (age 22 if a full-time student).

D. If the member was eligible for a service retirement or, if retired on account of service or non-line-of duty disability and dies within 30 days of retirement, and the member's designated beneficiary is the member's spouse with whom the member had been living for at least one year or the member's surviving parent(s), such beneficiary may elect, in lieu of (A) and (B) above, an allowance equal to the amount that would have been paid under the Joint and 100% Contingent Option.

E. If a member dies during or following the DROP participation period, the beneficiary will receive the non-line-of-duty death benefit according to the DROP provisions. The member's DROP account is payable according to the form of the non-line-of-duty death benefit as follows:

   1) Lump-sum benefit: The beneficiary of a decreased DROP participant will receive the balance of the deceased member's DROP account in a lump sum payment.

   2) 25% plus benefit: The beneficiary can elect to receive the balance of the deceased member's DROP account in a lump sum payment or in periodic payments.

   3) 100% survivorship benefit: The beneficiary can elect to receive the balance of the deceased member's DROP account in a lump sum payment or in periodic payments.

F. If a member dies after a minimum of one year of DROP2 participation or following the DROP2 participation period, the beneficiary will receive the non-line-of-duty death benefit according to the DROP2 provisions. The member's DROP2 account is payable according to the form of the non-line-of-duty death benefit as follows:

1) Lump-sum benefit: The beneficiary of a deceased DROP2 participant will receive the balance of the deceased member's DROP2 account in a lump sum payment.

2) 25% plus benefit: The beneficiary can elect to receive the balance of the deceased member's DROP2 account in a lump sum payment or periodic payments.

3) 100% survivorship benefit: The beneficiary can elect to receive the balance of the deceased member's DROP2 account in a lump sum payment or in periodic payments.

If a member dies within the first year of the DROP2 participation period, the benefit will be calculated as though the member has never participated in DROP2.

These benefits are offset by workers' compensation, if the member entered the system after July 1, 1970. If no beneficiary and if intestate without heirs, then the benefit shall remain part of the System.

12. Line-of-Duty Death Benefits:

If a member's death arose out of and in the performance of duty as certified by a Hearing Examiner, or if the member dies within five years as a result of the last injury which resulted in a Line-of-Duty Disability Retirement, a refund of accumulated contributions shall be paid, plus a pension of 100% of current compensation (not less than $15,000) shall be payable to:

A. the surviving spouse, or

B. if no eligible spouse or if the spouse dies, any children, equally, until age 18 (or age 22 if full-time students(s)), or

C. if no eligible spouse or children, any dependent father or dependent mother for their lifetime.

This benefit is offset by worker's compensation, if the member entered the system after July 1, 1970. If no beneficiary and if intestate without heirs, then the benefit shall remain part of the System.

13. Minimum Benefits:

Effective July 1, 2010 for current and future beneficiaries of "pre-DROP" retirees (members who retired prior to August 1, 1996 with 20 or more years of service), the minimum annual benefit is $16,000. Benefits will increase based on the applicable COLA. However, for future beneficiaries of the current pre-DROP retirees, the $16,000 minimum will not be adjusted while the primary annuitant (retiree) is still alive. Once payments to the beneficiaries commence, benefits will increase with the applicable COLA regardless of whether the minimum applies.

Effective January 1, 2012 for current and future beneficiaries of members who retired on account of line-of-duty disability prior to August 1, 1996 with less than 20 years of service, the minimum annual benefit is $16,000. Benefits will increase based on the applicable COLA.

14. Post-Retirement Benefit Increase:

Post-retirement benefit increases (Cost of Living Adjustments of COLAs) are automatically provided to all current and future retirees and beneficiaries according to the following schedule:

i. Under age 55 – No COLA
ii. Age 55 to age 65 – 1% annual COLA
iii. After age 65 – 2% annual COLA

For current and future members receiving a 100% line-of-duty disability benefit as well as their beneficiaries, the 2% annual COLA will apply regardless of age.

Only retirees and beneficiaries who have been receiving periodic benefit payments for two or more years as of the June 30 determination date are eligible for the increase. For a member who retires during or at the end of the DROP participation period, the member's DROP participation period counts toward the eligibility requirement for post-retirement benefit increases. The 2% COLA is first effective January 1, 2011 and the 1% COLA is first effective January 1, 2012.

Prior to June 30, 2010, investment return based increases were provided to retirees and beneficiaries.

15. Changes Since Last Valuation:

None.

APPENDIX C
ACTUARIAL ASSUMPTIONS AND METHODS

A. Actuarial Assumptions

1. Rate of Investment Return:

7.75% compounded annually (adopted 6/30/12)

2. Rates of Salary Increase:

Salary increases are split into a static inflation assumption of 3.75% and a merit scale based on service, shown below (adopted 6/30/12).

Service	Merit Scale
0	8.00%
1	6.50%
2	5.00%
3	4.50%
4	3.00%
5 – 11	1.50%
12 – 14	1.25%
15 – 20	1.00%
21+	0.50%

To reflect pay increases approved in recent bargaining, firefighter salaries were increased by an additional 2% for the year beginning July 1, 2013. Additionally, the static inflation component of the salary increase assumption of 3.75% was replaced by 7.00% for the year beginning July 1, 2014 for firefighters only.

3. System Expenses:

All expenses are paid from the fund. Administrative expenses are added to the contribution in the amount of 1.5% of covered payroll (adopted 6/30/12).

APPENDIX C
ACTUARIAL ASSUMPTIONS AND METHODS

4. Pre-Retirement Mortality and Disability:

Age	Non-Line-of-Duty Disability	Line-of-Duty Disability	Non-Line-of-Duty Death[1] Male	Non-Line-of-Duty Death[1] Female	Line-of-Duty Death[2]
20	0.000146	0.001073	0.000285	0.000163	0.000076
25	0.000149	0.001412	0.000340	0.000180	0.000119
30	0.000381	0.002224	0.000422	0.000239	0.000164
35	0.001227	0.004369	0.000735	0.000425	0.000253
40	0.001179	0.006191	0.000996	0.000607	0.000385
45	0.001699	0.007006	0.001323	0.000957	0.000433
50	0.001795	0.005710	0.001783	0.001412	0.000372
55	0.000927	0.005789	0.002991	0.002507	0.000300
60	0.000745	0.007706	0.005742	0.004808	0.000159
64	0.000520	0.007886	0.009797	0.008198	0.000062

[1] RP-2000 Combined Mortality Table projected to 2010 with scale AA.
[2] Benefit loaded ½% for post-disability line-of-duty death benefit.

5. Post-Retirement Mortality (adopted 6/30/2012):

Retirees and Beneficiaries: RP-2000 Combined Mortality Table projected to 2010 with scale AA.

Disabled members: RP-2000 Combined Mortality Table projected to 2010 with scale AA set forward four years.

Sample rates are shown below.

Age	Retirees and Beneficiaries Male	Retirees and Beneficiaries Female	Disabled Members Male	Disabled Members Female
55	0.002991	0.002507	0.005059	0.004224
60	0.005742	0.004808	0.009797	0.008198
65	0.011062	0.009231	0.017198	0.014133
70	0.019091	0.015923	0.029145	0.023731
75	0.032859	0.025937	0.051861	0.038690
80	0.058213	0.042767	0.093010	0.064801
85	0.103244	0.072923	0.158284	0.115627
90	0.176202	0.127784	0.243273	0.179176

Mortality through the 2010 experience study followed the RP 2000 tables, projected to 2005. The tables projected to 2010 should provide an additional ten years of projections, but this will be monitored at the next quinquennial experience review.

APPENDIX C
ACTUARIAL ASSUMPTIONS AND METHODS

6. Withdrawal:

Years of Service	Withdrawal[1]
0	7.50%
1	6.25%
2	5.00%
3	4.25%
4	3.75%
5	3.25%
6	2.75%
7	2.35%
8	1.95%
9	1.60%
10	1.30%
11	0.85%
12 – 19	0.35%
20+	0.00%

[1] Withdrawal decrements are reduced to zero when participant is eligible to retire.

APPENDIX C
ACTUARIAL ASSUMPTIONS AND METHODS

7. Service Retirement:

The valuation uses retirement rates that vary according to member plan (police or firefighter) and whether a member is eligible for DROP, grandfathered DROP2, or non-grandfathered DROP2.

Members with 20 or more years of service on or before December 31, 2009 are eligible for DROP.

Members who had less than 20 years of service on December 31, 2009, but had either 15 or more years of service on June 30, 2010 or were age 50 or older as of June 30, 2010 can elect to participate in grandfathered DROP2 when they have 20 or more years of service.

Members who were not age 50 or older as of June 30, 2010 and also had less than 15 years of service on June 30, 2010 can participate in non-grandfathered DROP2 when they have 25 or more years of service.

Non-grandfathered members, who are not eligible for DROP or grandfathered DROP2, can take early retirement, with a reduced benefit. Prior to reaching normal retirement eligibility, these non-grandfathered members are assumed to take early retirement according to the following tables:

Firefighter Non-Grandfathered DROP2 Early Retirement Rates

Non-grandfathered Early Retirement Rates for Firefighters

Age	Service <10	10	11	12	13	14	15	16	17	18	19	20	21-24	25+
<45												3.00%	2.00%	
45												3.00%	3.00%	
46	Members Not Yet Eligible for Early Retirement											3.00%	3.00%	
47												3.00%	3.00%	
48												3.00%	3.00%	
49												4.00%	4.00%	
50	3.00%	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%	
51	3.00%	6.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	
52	3.00%	6.00%	8.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	
53	3.00%	6.00%	8.00%	10.00%	12.00%	12.00%	12.00%	12.00%	12.00%	12.00%	12.00%	12.00%	12.00%	
54	3.00%	6.00%	8.00%	10.00%	12.00%	14.00%	14.00%	14.00%	14.00%	14.00%	14.00%	14.00%	14.00%	
55	4.50%	7.00%	9.50%	12.00%	14.50%	17.00%								
56	5.00%	8.00%	11.00%	14.00%	17.00%	20.00%								
57	5.00%	8.00%	11.00%	15.00%	19.00%	23.00%								
58	5.00%	8.00%	14.00%	18.00%	22.00%	26.00%								
59	5.00%	8.00%	15.00%	20.00%	25.00%	30.00%								
60	5.00%	15.00%	20.00%	25.00%	30.00%	35.00%	Members Eligible for Unreduced Benefits							
61	10.00%	20.00%	25.00%	30.00%	35.00%	40.00%								
62	15.00%	20.00%	25.00%	30.00%	35.00%	40.00%								
63	15.00%	20.00%	25.00%	30.00%	35.00%	40.00%								
64	15.00%	20.00%	25.00%	30.00%	35.00%	40.00%								
65	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%								

APPENDIX C
ACTUARIAL ASSUMPTIONS AND METHODS

Police Non-Grandfathered DROP2 Early Retirement Rates

Non-grandfathered Early Retirement Rates for Police

Age	Service <10	10	11	12	13	14	15	16	17	18	19	20	21-24	25+
<45												5.00%	4.00%	
45												5.00%	5.00%	
46					Members Not Yet Eligible for Early Retirement							5.00%	5.00%	
47												5.00%	5.00%	
48												5.00%	5.00%	
49												6.00%	6.00%	
50	5.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	
51	5.00%	8.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	
52	5.00%	8.00%	10.00%	12.00%	12.00%	12.00%	12.00%	12.00%	12.00%	12.00%	12.00%	12.00%	12.00%	
53	5.00%	8.00%	10.00%	12.00%	14.00%	14.00%	14.00%	14.00%	14.00%	14.00%	14.00%	14.00%	14.00%	
54	5.00%	8.00%	10.00%	12.00%	14.00%	16.00%	16.00%	16.00%	16.00%	16.00%	16.00%	16.00%	16.00%	
55	5.00%	8.00%	11.00%	14.00%	17.00%	20.00%								
56	7.00%	11.00%	15.00%	19.00%	23.00%	27.00%								
57	10.00%	15.00%	20.00%	25.00%	30.00%	35.00%								
58	15.00%	20.00%	25.00%	30.00%	35.00%	40.00%								
59	20.00%	25.00%	30.00%	35.00%	40.00%	45.00%								
60	25.00%	30.00%	35.00%	40.00%	45.00%	50.00%				Members Eligible for Unreduced Benefits				
61	30.00%	35.00%	40.00%	45.00%	50.00%	55.00%								
62	35.00%	40.00%	45.00%	50.00%	55.00%	60.00%								
63	35.00%	40.00%	45.00%	50.00%	55.00%	60.00%								
64	35.00%	40.00%	45.00%	50.00%	55.00%	60.00%								
65	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%								

Once participants reach eligibility for normal retirement, they are expected to follow one of two paths: they either enter the DROP/DROP2 program and follow the appropriate post-DROP or post-DROP2 retirement assumptions for their group, or they never enter the DROP/DROP2 program and follow the appropriate non-DROP or non-DROP2 retirement assumptions for their group. Active participants who are beyond their applicable DROP or DROP2 program eligibility as of the valuation date are assumed to have already made this decision and so are valuing only with the applicable DROP/DROP2 or non-DROP/non-DROP2 retirement assumptions. Those who are not yet normal retirement eligible are valued under both options and the resulting liabilities are blended according to the following probabilities table:

	Police	Fire
DROP Members		
DROP	90%	90%
Non-DROP	10%	10%
Grandfathered DROP2 Members		
Grandfathered DROP2	90%	90%
Grandfathered Non-DROP2	10%	10%
Non-Grandfathered DROP2 Members		
Non-Grandfathered DROP2	75%	85%
Non-Grandfathered Non-DROP2	25%	15%

APPENDIX C
ACTUARIAL ASSUMPTIONS AND METHODS

Non-DROP/Grandfathered Non-DROP2 Retirement Probabilities

Members who do not join DROP or grandfathered DROP2 are assumed to have retirement rates that vary by service until age 50. After age 50, the rates are assumed to vary solely by age.

Ages Less Than 50	
Years of Service	**Probability of Retirement**
20	30%
21	20%
22 and up	100%

Ages 50 and Higher	
Age	**Probability of Retirement**
50	6.4%
51	4.6%
52	4.6%
53	4.7%
54	5.9%
55	7.3%
56	6.9%
57	6.9%
58	6.9%
59	13.9%
60	21.2%
61	17.2%
62	25.5%
63	25.5%
64	32.3%
65	100.0%

Non-Grandfathered Non-DROP2 Retirement Probabilities

Assumptions vary between the rate applicable in the first year of eligibility for unreduced retirement and those for subsequent years for those who do not join non-grandfathered DROP2. Rates also vary by police and fire.

	Police		Fire	
Age	**First Eligible**	**Subsequent**	**First Eligible**	**Subsequent**
Less than 65	70.0%	60.0%	60.0%	50.0%
65 and up	100.0%	100.0%	100.0%	100.0%

APPENDIX C
ACTUARIAL ASSUMPTIONS AND METHODS

DROP Retirement Probabilities

	DROP Exit Rates	
Years After Electing DROP	**Police**	**Fire**
1	10.0%	4.0%
2	10.0%	5.0%
3	12.0%	8.0%
4	15.0%	10.0%
5	15.0%	10.0%
6	17.0%	10.0%
7	17.0%	18.0%
8	17.0%	18.0%
9	17.0%	10.0%
10	17.0%	15.0%
11	25.0%	20.0%
12	25.0%	20.0%
13	28.0%	20.0%
14	28.0%	25.0%
15 or more	28.0%	25.0%

NOTE: In all cases once the participant reaches age 65, there is 100% probability of leaving DROP to commence benefit receipt.

APPENDIX C
ACTUARIAL ASSUMPTIONS AND METHODS

Grandfathered DROP2 Retirement Probabilities

Years After Electing DROP2	DROP2 Exit Rates	
	Police	Fire
1	10.0%	4.0%
2	10.0%	5.0%
3	16.0%	11.0%
4	16.0%	11.0%
5	16.0%	11.0%
6	10.0%	8.0%
7	17.0%	8.0%
8	17.0%	22.0%
9	17.0%	10.0%
10	17.0%	15.0%
11	25.0%	20.0%
12	25.0%	20.0%
13	28.0%	20.0%
14	28.0%	25.0%
15 or more	28.0%	25.0%

NOTE: In all cases once the participant reaches age 65, there is 100% probability of leaving DROP2 to commence benefit receipt.

APPENDIX C
ACTUARIAL ASSUMPTIONS AND METHODS

Non-Grandfathered DROP2 Retirement Probabilities

Years After Electing DROP2	DROP2 Exit Rates: Police	DROP2 Exit Rates: Fire
1	6.0%	4.0%
2	7.0%	5.0%
3	16.0%	14.0%
4	15.0%	13.0%
5	18.0%	15.0%
6	14.0%	12.0%
7	36.0%	12.0%
8	36.0%	34.0%
9	36.0%	34.0%
10	36.5%	33.5%
11	36.5%	33.5%
12	36.5%	33.5%
13	36.5%	33.5%
14	37.0%	33.0%
15 or more	37.0%	33.0%

NOTE: In all cases once the participant reaches age 65, there is 100% probability of leaving DROP2 to commence benefit receipt.

8. Line-of-Duty Disability:

Benefit Types: 1% of line-of-duty disability retirements are assumed to receive a pension equal to 100% of compensation at the time of retirement. The rest are assumed to receive a pension equal to 66 2/3% of Average Final Compensation.

Form of Payment: All future withdrawal benefits are assumed to be paid in the form of a lump sum refund of employee contributions.

All future retirement benefits are assumed to be paid in the form of a 50% Joint and Survivor Annuity. In addition, members participating in DROP are assumed to receive their DROP account balance in the form of a lump sum upon retirement.

Future non-line-of-duty disability retirement benefits for current active members with fewer than five years of service (i.e., eligible only for the refund of employee contributions) are assumed to be

APPENDIX C
ACTUARIAL ASSUMPTIONS AND METHODS

paid in the form of a lump sum. All other disability retirement benefits are assumed to be paid in the form of a 50% Joint and Survivor Annuity. In addition, members participating in DROP are assumed to receive their DROP account in the form of a lump sum upon disability retirement.

Future death benefits for current active members who have not reached service retirement eligibility are assumed to be paid in the form of a lump sum. Certain line of duty death benefits for refund of employee contributions are assumed to be paid in the form of a lump sum. All other death benefits are assumed to be paid in the form of a single life annuity equal to the member's accrued benefit. Beneficiaries of members participating in DROP are assumed to additionally receive the member's DROP account in the form of a lump sum.

9. Cost-of-Living Adjustment Assumption:

Assumed to follow System provisions – 0%, 1% or 2% depending on age and type of retirement.

10. Percent Married: Males 70%, Females 70%.

11. Spouse Age: A husband is assumed to be four years older than his wife.

12. Remarriage Rates: None

13. Children:

All benefits with Joint & Survivor Forms of Payments for retirees had their survivor benefits increased by 2.0% to account for children's benefits.

14. Benefit Loads:

Benefits to certain types of future beneficiaries receiving Line-of-Duty death benefits were increased by 7.0% to allow for contingent beneficiaries.

Benefits to certain types of future members receiving Line-of-Duty disability benefits were increased by 1.5% to allow for possible conversion to Line-of-Duty death benefits.

Benefits payable in the form of a Joint and Survivor 100% Pop Up or Joint and Survivor 50% Pop Up were valued, respectively, as 100% Joint and Survivor with a 2.70% load and 50% Joint and Survivor with a 1.50% load to account for the additional value of the

APPENDIX C
ACTUARIAL ASSUMPTIONS AND METHODS

Pop Up form of benefit in the absence of data on the amount to which the benefit would increase. (6/30/2012)

All future retirement benefits were increased by 1% to account for possible child beneficiaries. (6/30/2012)

15. Funding Policy:

The City's funding policy is to contribute the amount equal to the net normal cost, plus the accrued liability contribution or less the amortization of the excess assets, as the case may be. However, the aggregate payment by the City must be sufficient, when combined with the amount in the Fund, to provide the pensions and other benefits payable out of the Fund during the then-current year.

16. Changes Since Last Valuation:

<u>None.</u>

APPENDIX C
ACTUARIAL ASSUMPTIONS AND METHODS

B. Actuarial Methods

1. Method of Funding

The Projected Unit Credit Funding Method has been in use since the effective date of 6/30/1988.

Liabilities and contributions shown in this report are computed using the Projected Unit Credit method of funding.

The objective under this method is to fund each participant's benefits under the System as they would accrue, taking into consideration future salary increases. The total pension, to which each participant is expected to become entitled, is broken down into units, each associated with a year of past or future credited service. When this method is introduced, there will be an initial liability for benefits credited for service prior to that date, and to the extent that the liability is not covered by assets of the System, there is an unfunded liability to be funded over a chosen period in accordance with an amortization schedule.

A description of the calculation follows:

An individual's **accrued benefit** for valuation purposes related to a particular separation date is the accrued benefit described under the System's provisions, but determined using the projected salary that would be used in the calculation of the benefit on the expected separation date.

The **benefit** deemed to accrue for an individual during a plan year is the prorated portion of the projected benefit attributable to one year of service. The projected benefit is calculated at the various anticipated separation dates.

An individual's **accrued (actuarial) liability** is the present value of the accrued benefit for valuation purposes at the beginning of the plan year, and the normal cost is the present value of the benefit deemed to accrue in the plan year. If multi-decrements are used, the accrued liability and the normal cost for an individual are the sum of the component accrued liabilities and normal costs associated with the various anticipated separation dates. Such accrued liabilities and normal costs reflect the accrued benefits as modified to obtain the benefits payable on those dates and the probability of the individual separating on those dates.

The System's **normal cost** is the sum of the individual normal costs, and the System's **accrued (actuarial) liability** is the sum of the accrued liabilities for all participants under the System.

The current unfunded actuarial liability is amortized as a level dollar figure over 20 years. This 20-year period is restarted each year. (Effective 7/1/1992)

APPENDIX C
ACTUARIAL ASSUMPTIONS AND METHODS

Because the Unfunded Actuarial Liability (UAL) is being amortized by an open or rolling amortization period (with re-amortization of the UAL in each valuation), the amortization amounts will never fully eliminate the UAL.

2. Asset Valuation

The actuarial value of assets is equal to the market value, adjusted for investment surpluses and deficits over a five-year period. This calculation is done in the following steps:

1. The investment gain or loss for the current year is calculated; this equals the actual investment earnings during the year minus the expected earnings. (Through the original June 30, 2009 valuation, expected earnings were calculated using a weighted average of the pre- and post-retirement interest rate assumptions multiplied by the mean market value of assets during the year.) Effective July 1, 2010, expected earnings are calculated using the interest rate assumption multiplied by the mean market value of assets during the year.

2. Through the original June 30, 2009 valuation, the amount allocated to the Variable Benefit Fund was deducted from this total.

3. Of this difference, 20% is used in the current actuarial value of assets. Beginning again at June 30, 2007 the remaining 80% is held in reserve.

The actuarial value of assets is the market value less cumulative unallocated earnings plus the remaining balance of the BIF, ERF, and MSF.