Gabriel Roeder Smith & Company
Consultants & Actuaries

CITY OF MADISON HEIGHTS
POLICEMEN AND FIREMEN RETIREMENT SYSTEM

ACTUARIAL VALUATION REPORT

JUNE 30, 2015

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December 17, 2015

The Retirement Board
City of Madison Heights Policemen
and Firemen Retirement System
Madison Heights, Michigan

Dear Board Members:

Submitted in this report are the results of the Fifty-Ninth Annual Actuarial Valuation of the City of Madison Heights Policemen and Firemen Retirement System, based upon Act No. 345 of the Public Acts of 1937, as amended. The purpose of the June 30, 2015 valuation and gain/loss analysis is to measure funding progress in relation to the actuarial cost method and to determine employer contribution rates for the fiscal year ending June 30, 2017. The results of the valuation are not applicable for other purposes. No adjustments have been made for events after June 30, 2015.

Calculations required for compliance with the Governmental Accounting Standards Board (GASB) Statement Nos. 67 and 68 were issued in a separate report dated August 26, 2015.

This report was prepared at the request of the Board and is intended for use by the Retirement System and those designated or approved by the Board. This report may be provided to parties other than the System only in its entirety and only with the permission of the Board. This report should not be relied on for any purpose other than the purpose described. GRS is not responsible for unauthorized use of this report.

The valuation was based upon information, furnished by the Assistant City Manager, concerning the Retirement System's benefits, financial transactions, and active members, terminated members, retirees and beneficiaries. We checked for internal and year-to-year consistency, but did not otherwise audit the data. We are not responsible for the accuracy or completeness of the data provided.

The valuation results summarized in this report involve actuarial calculations that require assumptions about future events. We believe that the assumptions and methods used in this report are reasonable and appropriate for the purpose for which they have been used. However, other assumptions and methods could also be reasonable and could result in materially different results. In addition, because it is not possible or practical to consider every possible contingency, we may use summary information, estimates or simplifications of calculations to facilitate the modeling of future events. We may also exclude factors or data that are deemed to be immaterial. The actuarial method and assumptions used in the actuarial valuation are summarized in Section D of this report. The assumptions are established by the Board after consulting with the actuary.

The findings in this report are based on data and other information through June 30, 2015. Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as: plan experience differing from that anticipated by the economic and demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology 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); and changes in plan provisions or applicable law. Due to the limited scope of the actuary's assignment, the actuary did not perform an analysis of the potential range of such future measurements.

To the best of our knowledge, this report is complete and accurate and was made in accordance with generally recognized actuarial methods recognized by the Actuarial Standards Board of the American Academy of Actuaries and in compliance with the provisions of Act 345, as amended. The actuarial assumptions used for the valuation produce results which individually and, in the aggregate, are reasonable.

Brad Lee Armstrong and Heidi G. Barry are independent of the plan sponsor and are Members of the American Academy of Actuaries (MAAA), and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein.

Respectfully submitted,

Brad Lee Armstrong, ASA, EA, FCA, MAAA

Heidi G. Barry, ASA, MAAA

BLA/HGB:ah

SECTION A

BASIC FINANCIAL OBJECTIVE AND OPERATION OF THE RETIREMENT SYSTEM

Basic Financial Objective and Operation of the Retirement System

Benefit Promises Made Which Must Be Paid For. A retirement system is an orderly means of handing out, keeping track of, and financing contingent pension promises to a group of employees. As each member of the retirement system acquires a unit of service credit he is, in effect, handed an "IOU" which reads: "The Employees Retirement System promises to pay you one unit of retirement benefits, payments in cash commencing when you retire."

The principal related financial question is: When shall the money required to cover the "IOU" be contributed? This year, when the benefit of the member's service is received? Or, some future year when the "IOU" becomes a cash demand?

The constitution of the State of Michigan is directed to the question:

> "Financial benefits arising on account of service rendered in each fiscal year shall be funded during that year and such funding shall not be used for financing unfunded accrued liabilities."

Section 9(2) of Act 345 is also directed to the question:

> "Sec. 9(2). - - - For the purpose of creating and maintaining a fund for the payment of the pensions and other benefits payable hereunder the said city, village or municipality, subject to the provisions of this act, shall appropriate, at the end of such regular intervals as may be adopted, quarterly, semi-annually, or annually, an amount sufficient to maintain actuarially determined reserves covering pensions payable or which might be payable on account of service performed and to be performed by active members and pensions being paid retired members and beneficiaries - - - ."

This retirement system meets this constitutional requirement by having as its ***financial objective to establish and receive contributions, expressed as percents of active member payroll, which will remain approximately level from year-to-year*** and will not have to be increased for future generations of taxpayers.

Translated into actuarial terminology, a level percent-of-payroll contribution objective means that the contribution rate must be at least:

> **Normal Cost** (the current value of benefits likely to be paid on account of members' service being rendered in the current year)
>
> ... plus ...
>
> Interest on the Unfunded Actuarial Accrued Liability (the difference between the actuarial accrued liability and current system assets).

A by-product of the level percent-of-payroll contribution objective is the accumulation of invested assets for varying periods of time. ***Invested assets are a by-product of level percent-of-payroll contributions, not the objective***. Investment income becomes a major contributor to the retirement system and the amount is directly related to the amount of contributions and investment performance.

If contributions to the retirement system are less than the preceding amount, the difference, plus investment earnings not realized thereon, will have to be contributed at some later time, or, benefits will have to be reduced, to satisfy the fundamental fiscal equation under which all retirement programs must operate; that is:

B = C + I - E

The aggregate amount of **B**enefit payments to any group of members and their beneficiaries cannot exceed the sum of:

The aggregate amount of **C**ontributions received on behalf of the group

... plus ...

Investment earnings on contributions received and not required for immediate payment of benefits

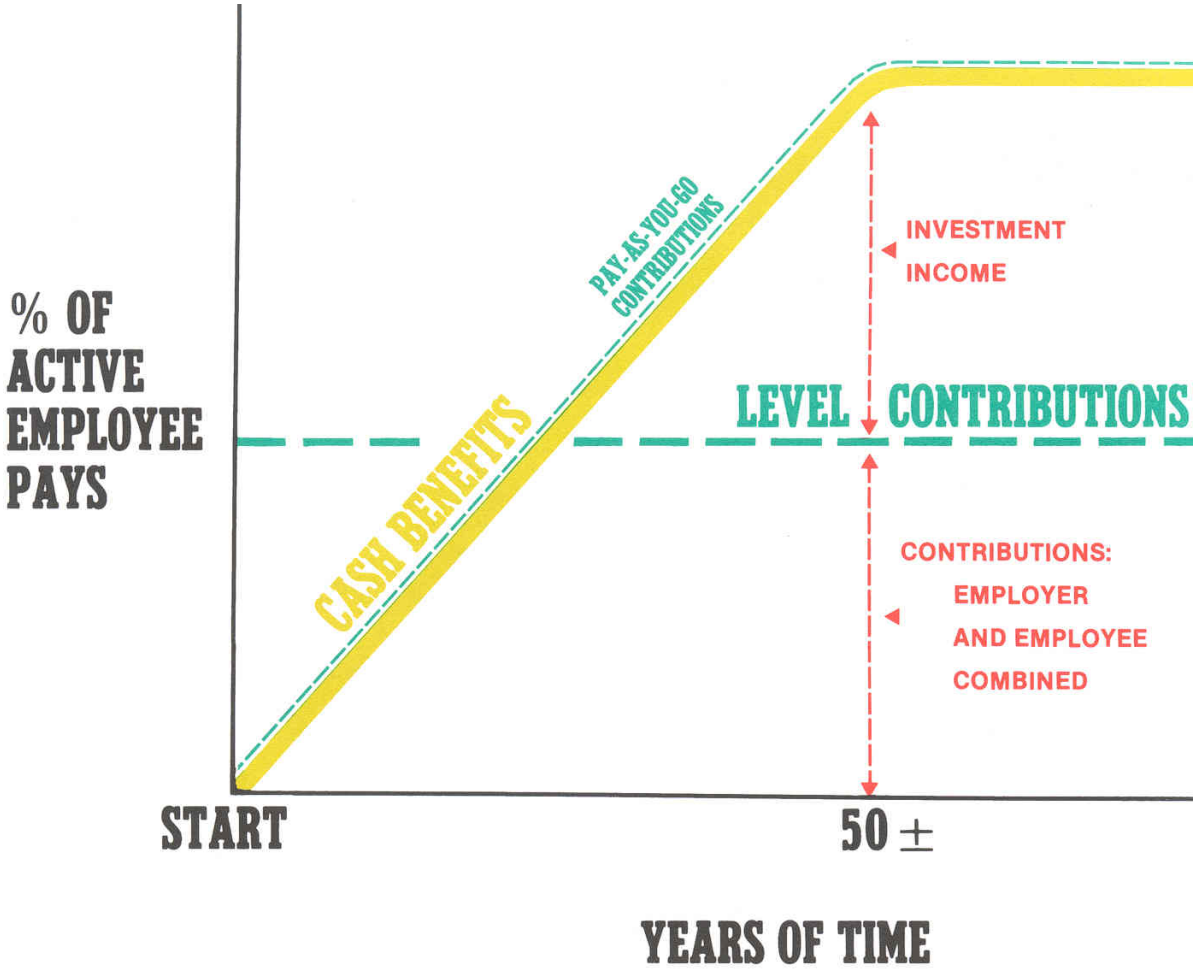
... minus ...

The **E**xpenses of operating the program.

There are retirement systems designed to defer the bulk of contributions far into the future. Lured by artificially low present contributions, the inevitable consequence of a relentlessly increasing contribution rate -- to a level greatly in excess of the level percent-of-payroll rate -- is ignored.

This method of financing is prohibited in Michigan by the state constitution.

Computed Contribution Rate Needed to Finance Benefits. From a given schedule of benefits and from the data furnished him, the actuary calculates the contribution rate by means of an actuarial valuation - the technique of assigning monetary values to the risks assumed in operating a retirement system.



CASH BENEFITS LINE. **This relentlessly increasing line is the fundamental reality of retirement plan financing. It happens each time a new benefit is added for future retirements (and happens regardless of the design for contributing for benefits).**

LEVEL CONTRIBUTION LINE. **Determining the level contribution line requires detailed assumptions concerning a variety of experiences in future decades, including:**

Economic Risk Areas

- **Rates of investment return**
- **Rates of pay increase**
- **Changes in active member group size**

Non-Economic Risk Areas

- **Ages at actual retirement**
- **Rates of mortality**
- **Rates of withdrawal of active members (turnover)**
- **Rates of disability**

SECTION B

VALUATION RESULTS

City's Computed Contributions for the Fiscal Year Beginning July 1, 2016

Contributions for	Contributions Expressed as Percents of Annual Pay: Department Heads	Police: Command	Police: Other	Fire: Command	Fire: Other	Totals
NORMAL COST						
Age and service pensions	24.56 %	22.18 %	20.68 %	19.96 %	19.33 %	20.77
Disability pensions	0.69	0.81	1.11	1.29	1.19	1.07
Death pensions	0.31	0.26	0.27	0.32	0.34	0.30
Totals	25.56	23.25	22.06	21.57	20.86	22.14
MEMBERS' CONTRIBUTIONS						
Gross contributions	8.90	8.90	8.90	8.90	8.90	8.90
Less prospective refunds	0.49	0.66	0.59	0.41	0.41	0.53
Available for pensions	8.41	8.24	8.31	8.49	8.49	8.37
CITY'S NORMAL COST	17.15	15.01	13.75	13.08	12.37	13.77
UNFUNDED ACTUARIAL ACCRUED LIABILITIES						
Retirees and beneficiaries						3.51
Active members*						22.07
Totals						25.58
CITY'S TOTAL CONTRIBUTION (PENSIONS)						39.35
Administrative and Investment Expenses						8.56

Retiree health insurance costs are not included in this report.

* *Financed as a level percent-of-payroll over a closed period of 29 years.*

In financing the actuarial accrued liabilities, the funding value of assets, $47,383,538 were distributed as shown at the bottom of the page. Please see page C-10 for information concerning the reporting of assets, and page C-11 for the derivation of the funding value of assets.

	Present Reserves Reported for		
Market Value	**Member Actuarial Accrued Liabilities**	**Retired Life Actuarial Liabilities**	**Totals**
Employees Contributions	$ 7,759,766		$ 7,759,766
Employer Contributions	(13,481,283)	$ 22,504,502	9,023,219
Retired Benefit Payments		29,139,056	29,139,056
Totals *	$ (5,721,517)	$ 51,643,558	$ 45,922,041

** As reported.*

Assets were applied against actuarial accrued liabilities in determining unfunded actuarial accrued liabilities as follows:

	Retired Lives	**Active Members**	**Totals**
Computed Actuarial Accrued Liabilities	$ 51,643,558	$ 26,783,156	$ 78,426,714
Applied Assets (4-yr. smoothed market value)	47,383,538	0	47,383,538
Unfunded Actuarial Accrued Liabilities	$ 4,260,020	$ 26,783,156	$ 31,043,176

Derivation of Experience Gain (Loss)
Year Ended June 30, 2015

Actual experience will never (except by coincidence) coincide exactly with assumed experience. It is hoped that aggregate gains and losses will cancel each other over a period of years, but sizeable year-to-year fluctuations are common. Detail on the derivation of the experience gain (loss) is shown below, along with a year-by-year comparative schedule.

	Total
(1) UAAL* at start of year	$ 21,170,774
(2) Employer normal cost from the last valuation	655,728
(3) Actual employer contributions	1,408,153
(4) Interest accrual: [(1) + 1/2 [(2) - (3)]] x .075	1,559,592
(5) Expected UAAL before changes: (1) + (2) - (3) + (4)	21,977,941
(6) Change from the benefit provision application	(2,672)
(7) Change from the revised actuarial assumptions and methods	5,859,891
(8) Expected UAAL after changes: (5) + (6) + (7)	27,835,160
(9) Actual UAAL at end of year	31,043,176
(10) Gain (loss): (8) - (9)	(3,208,016)
(11) Actuarial accrued liability at the start of the year	70,493,480
(12) Gain (loss) as a percent of actuarial accrued liabilities at start of year	**(4.6)%**

* *Unfunded Actuarial Accrued Liabilities.*

Valuation Date June 30,	Experience Gain (Loss) as % of Beginning Accrued Liability Total
2006	(0.7) %
2007	2.3
2008	(1.2)
2009	(5.2)
2010	(2.1)
2011	(9.0)
2012	(8.5)
2013	(1.5)
2014	(2.3)
2015	(4.6)

Summary Statement of Retirement System Resources and Obligations

PRESENT RESOURCES AND EXPECTED FUTURE RESOURCES

A. Present valuation assets:	
1. Net assets from Retirement System financial statements	$ 45,922,041
2. Market value adjustment	1,461,497
3. Valuation assets	47,383,538
B. Actuarial present value of expected future employer contributions:	
1. For normal costs	6,624,395
2. For unfunded actuarial accrued liability	31,043,176
3. Total of (1) + (2)	37,667,571
C. Actuarial present value of expected future member contributions	4,380,877
D. Total present and expected future resources	$ 89,431,986

ACTUARIAL PRESENT VALUE OF EXPECTED FUTURE BENEFIT PAYMENTS

A. To retirees and beneficiaries	$ 51,643,558
B. To vested terminated members	912,745
C. To present active members:	
1. Allocated to service rendered prior to valuation date - actuarial accrued liability	25,870,411
2. Allocated to service likely to be rendered after valuation date	11,005,272
3. Total	36,875,683
D. Total actuarial present value of expected future benefit payments	$ 89,431,986

Comments, Recommendation and Conclusion

COMMENT A: The overall actuarial experience was less favorable than anticipated as shown on page B-3 primarily due to a recognized investment return rate of 3.8% compared to the assumed rate of 7.5% and greater than expected liabilities for new retirees. Market performance from 2012 to 2015 was smoothed over 4 years by the Board's use of an asset smoothing technique. Unrecognized losses in investment return will put upward pressure on the City's contribution rate in each of the next 3 years. As an indication of the magnitude, the contribution rate in this valuation would be 40.56% of payroll plus expenses on a market value basis.

COMMENT B: This valuation does not include funding requirements for retiree health care insurance (this is submitted in a separate report).

COMMENT C: A 29-year closed amortization period was used for this valuation. Historical funded ratios are shown on page B-7. As of June 30, 2015, the Retirement System's funded ratio was 60.4% compared to 70.0% as of June 30, 2014. On a market value basis, the funded ratio would be 58.6% compared to 70.5% last year. 4.3% of the decrease is attributed to the mortality assumption change discussed in Comment E below.

COMMENT D: The ratio of the funding value of assets to the market value of assets is 103.2%. Over time, this ratio is intended to stay near 100%. However, highly volatile markets can create distortions in this ratio. The Board may wish to establish a "corridor" around the market value of assets such as 80% to 120%.

COMMENT E: The mortality tables used in this valuation have been updated to the RP-2014 mortality tables projected to 2015 as recommended in last year's actuarial valuation report. The member contribution rates for Police, Police Command, and Department Heads were reduced to 8.90%. The changes in assumptions, methods and benefit changes increased the actuarial accrued liabilities by about $5.9 million and resulted in a 6.95% increase in the computed employer contribution for the fiscal year beginning July 1, 2016.

COMMENT F: Useful and reliable valuation results are dependent on an underlying set of appropriate actuarial assumptions. We recommend performing a study to review the economic assumptions for investment return and wage inflation. (Note if there was ever one performed.)

COMMENT G: The retiree liability is only 92% funded. In addition, the amortization period (currently 29 years) exceeds the average expected future lifetime of the current retired members (which is approximately 20 years). We recommend that the Board consider lowering the amortization period for at least the portion of the unfunded liability attributable to retiree liability.

CONCLUSION: The City's contributions (member contributions are additional) to the City of Madison Heights Policemen and Firemen Retirement System, for the fiscal year beginning July 1, 2016, have been computed to be 39.35% of active member payroll for pensions with an additional 8.56% for administrative and investment expenses.

It is the actuary's opinion that the required contribution rates determined by the most recent actuarial valuation are sufficient to meet the Retirement System's funding objective, presuming continued timely receipt of required contributions.

Other Observations

General Implications of Contribution Allocation Procedure or Funding Policy on Future Expected Plan Contributions and Funded Status

Given the plan's contribution allocation procedure, if all actuarial assumptions are met (including the assumption of the plan earning 7.5% on the actuarial value of assets), it is expected that:

1) The unfunded actuarial accrued liabilities will be fully amortized after 29 years;
2) The funded status of the plan will increase gradually towards a 100% funded ratio; and
3) The unfunded accrued liability will increase for an extended period before beginning to decline. This is particularly true when the plan sponsor is contributing on a percent-of-payroll basis and there is no payroll growth.

Limitations of Funded Status Measurements

Unless otherwise indicated, a funded status measurement presented in this report is based upon the actuarial accrued liability and the actuarial value of assets. Unless otherwise indicated, with regard to any funded status measurements presented in this report:

1) The measurement is inappropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations, in other words, of transferring the obligations to a unrelated third party in an arm's length market value type transaction.
2) The measurement is dependent upon the actuarial cost method which, in combination with the plan's amortization policy, affects the timing and amounts of future contributions. A funded status measurement in this report of 100% is not synonymous with no required future contributions. If the funded status were 100%, the plan would still require future normal cost contributions (i.e., contributions to cover the cost of the active membership accruing an additional year of service credit).
3) The measurement would produce a different result if the market value of assets were used instead of the actuarial value of assets, unless the market value of assets is used in the measurement.

Limitations of Project Scope

Actuarial standards do not require the actuary to evaluate the ability of the plan sponsor or other contributing entity to make required contributions to the plan when due. Such an evaluation was not within the scope of this project and is not within the actuary's domain of expertise. Consequently, the actuary performed no such evaluation.

Risks to Future Employer Contribution Requirements

There are ongoing risks to future employer contribution requirements to which the Retirement System is exposed, such as:

- Actual and Assumed Investment Rate of Return
- Actual and Assumed Mortality Rates
- Amortization Policy

Comparative Statement

Valuation Date June 30	Fiscal Year	Actuarial Accrued Liabilities & Reserves	Actuarial Accrued Assets	Funded Ratio	Unfunded Actuarial Accrued Liabilities & Reserves			City's Contribution Rate		
									Dollars	
					Dollars	Amortiz. Period	% of Payroll	Percents	Recommended	Actual
1996	97-98	$ 36,147,252	$ 35,924,274	99.4 %	$ 222,978	19	4.3 %	17.01 %	$ 892,281	$ 948,377
1997	98-99	38,437,709	38,540,778	100.3	(103,069)	18	-	16.77	883,868	988,090
1998	99-00	40,087,394	41,907,540	104.5	(1,820,146)	17	-	14.25	750,633	909,016
1999 #	00-01	44,416,775	45,285,637	102.0	(868,862)	16	-	14.44	802,364	850,457
2000	01-02	46,244,023	47,689,403	103.1	(1,445,380)	15	-	13.45	727,203	845,881
2001	02-03	48,139,671	48,997,093	101.8	(857,422)	14	-	13.76	798,609	951,923
2002 #	03-04	50,633,078	49,200,870	97.2	1,432,208	13	22.3	17.31	1,113,946	1,221,459
2003 #	04-05	51,665,535	48,919,496	94.7	2,746,039	12	43.5	20.49	1,292,438	1,513,225
2004 *#	05-06	56,133,839	48,976,377	87.2	7,157,462	20	102.4	23.15	1,618,638	1,656,681
2005	06-07	57,733,862	49,887,362	86.4	7,846,500	19	110.3	23.86	1,697,809	1,794,618
2006 @	07-08	59,879,584	51,533,008	86.1	8,346,576	25	118.2	22.88	1,615,365	1,745,795
2007	08-09	61,959,805	55,004,366	88.8	6,955,439	25	96.3	21.90	1,581,304	1,625,338
2008 *	09-10	61,187,814	57,130,630	93.4	4,057,184	25	53.4	17.48	1,327,971	1,589,770
2009 @	10-11	63,175,083	56,156,781	88.9	7,018,302	30	93.6	18.82	1,411,463	1,391,859
2010	11-12	63,161,498	54,888,388	86.9	8,273,110	30	120.9	19.92	1,363,478	1,240,859
2011 #	12-13	65,466,348	51,374,542	78.5	14,091,806	30	234.5	22.72	1,365,401	1,338,103
2012	13-14	67,929,700	47,691,751	70.2	20,237,949	30	356.5	27.82	1,711,368	1,566,747
2013 **	14-15	67,745,324	48,067,300	71.0	19,678,024	30	335.4	24.99	1,588,802	1,408,153
2014 @	15-16	70,493,480	49,322,706	70.0	21,170,774	30	380.7	27.94	1,683,896	
2015	**16-17**	**72,569,495**	**47,383,538**	**65.3**	**25,185,957**	**29**	**476.8**	**32.40**	**1,854,563**	
2015 *#	**16-17**	**78,426,714**	**47,383,538**	**60.4**	**31,043,176**	**29**	**587.7**	**39.35**	**2,252,379**	

** Revised actuarial assumptions and methods.* *# Retirement System was amended.*
*** Changes in the application of the benefit provisions.* *@ Amortization policy of Unfunded Actuarial Accrued Liabilities was changed.*

The Ratio of Valuation Assets to Actuarial Accrued Liabilities is a traditional measure of a system's funding progress. Except in years when the system is amended or actuarial assumptions are revised, this ratio can be expected to increase gradually toward 100%.

The Ratio of Unfunded Actuarial Accrued Liabilities to Valuation Payroll is another relative index of condition. Unfunded actuarial accrued liabilities represent debt, while active member payroll represents the system's capacity to collect contributions to pay toward the debt. The lower the ratio, the greater the financial strength and vice-versa.

SECTION C

SUMMARY OF BENEFIT PROVISIONS AND VALUATION DATA

Brief Summary of Act 345 Benefit Provisions
(June 30, 2015)

Eligibility	Amount
SERVICE RETIREMENT	
Members hired after 7/1/2009 (excluding Dept. Heads) Age 55 with 25 or more years of service or age 60 with 10 years of service.	Straight life pension equals 2.0% (2.5% if member has at least 25 years of service) of 3-year Average Final Compensation (AFC) times the first 25 years of service plus 1.0% of AFC times years of service in excess of 25 years.
Dept. Heads and Members hired before 7/1/2009 25 or more years of service regardless of age or age 60 with 10 years of service.	Straight life pension equals 2.0% (2.8% if member has at least 25 years of service) of 3-year AFC times first 25 years of service plus 1.0% of AFC times years of service in excess of 25 years.
DEFERRED RETIREMENT	
10 or more years of service.	Computed as service retirement but based upon service, AFC and benefits in effect at termination. Benefit begins at the date retirement would have occurred had the member remained in employment.
DEATH AFTER RETIREMENT SURVIVOR'S PENSION	
Payable to a surviving spouse, if any, upon the death of a retired member who was receiving a straight life pension which was effective July 1, 1975 or later.	Spouse's pension equals 60% of the straight life pension the deceased retiree was receiving.
NON-DUTY DEATH-IN-SERVICE SURVIVOR'S PENSION	
Payable to a surviving spouse, if any, upon the death of a member with 20 or more years of service.	Accrued straight life pension actuarially reduced in accordance with an Option I election.

DUTY DEATH-IN-SERVICE SURVIVOR'S PENSION

Payable upon the expiration of Workers' Compensation to the survivors of a member who died in the line of duty.	Same amount that was paid by Workers' Compensation.

NON-DUTY DISABILITY

Payable upon the total and permanent disability of a member with 5 or more years of service.	To age 55: 1.5% of AFC times years of service. At age 55: Same as Service Retirement Pension.

DUTY DISABILITY

Payable upon the total and permanent disability of a member in the line of duty.	To age 55: 50% of AFC. At age 55: Same as Service Retirement Pension with service credit from the date of disability to age 55.

MEMBER CONTRIBUTIONS

8.90% of pay for Firefighters
8.90% of pay for Fire Command
8.90% for Police
8.90% for Police Command
8.90% for Department Heads

Annuity withdrawal based on Merrill Lynch Bond Index available at retirement with 25 years of service.

Interest earned on Member Contributions is 3.5% annually effective July 1, 2011.

Retirees and Beneficiaries Added to and Removed from Rolls
Comparative Statement

Year Ended June 30	Added to Rolls		Removed from Rolls		Rolls End of Year				% Incr. in Annual Pensions	Average Pension	Present Value of Pensions
	No.	Annual Pensions	No.	Annual Pensions	No.	Active Per Retired	Annual Pensions Dollars	Annual Pensions % of Pay			
1996	9	$ 284,932	3	$ 47,452	66	1.5	$ 1,369,442	26.1 %	32.3 %	$ 20,749	$ 14,974,854
1997	9	378,255	1	37,802	74	1.3	1,709,895	32.4	24.9	23,107	18,742,035
1998	9	239,598	3	50,033	80	1.2	1,899,460	36.1	11.1	23,743	20,770,987
1999	11	350,221	4	71,463	87	1.1	2,178,218	37.5	14.7	25,037	24,146,654
2000	13	515,306	3	59,400	97	1.0	2,634,124	47.1	20.9	27,156	29,462,600
2001	5	233,147	1	34,484	101	0.9	2,832,787	48.8	7.5	28,047	31,482,029
2002	2	38,323	2	63,872	101	1.0	2,807,238	43.6	(0.9)	27,794	30,706,301
2003	3	122,791	2	15,098	102	1.0	2,914,931	46.2	3.8	28,578	31,583,764
2004	4	99,475	3	76,875	103	1.0	2,937,531	42.0	0.8	28,520	31,928,907
2005	1	23,232	3	79,834	101	1.0	2,880,929	40.5	(1.9)	28,524	30,919,712
2006	3	170,036	1	3,880	103	0.9	3,047,085	43.2	5.8	29,583	32,399,560
2007	2	93,031	4	83,266	101	0.9	3,056,850	42.3	0.3	30,266	32,176,238
2008	5	78,960	4	114,827	102	0.9	3,020,983	39.8	(1.2)	29,617	30,142,812
2009	3	82,044	1	25,502	104	0.9	3,077,525	41.0	1.9	29,592	30,340,870
2010	5	142,333	4	104,122	105	0.8	3,115,736	45.5	1.2	29,674	30,412,190
2011	12	634,045	2	32,757	115	0.7	3,717,024	61.9	19.3	32,322	37,300,027
2012	7	440,833	2	27,202	120	0.6	4,130,655	72.8	11.1	34,422	41,541,931
2013	4	195,238	4	148,883	120	0.6	4,177,010	71.2	1.1	34,808	41,555,510
2014	4	223,638	0	0	124	0.5	4,400,648	79.1	5.4	35,489	43,344,843
2015	**11**	**483,755**	**4**	**73,399**	**131**	**0.5**	**4,811,004**	**91.1**	**9.3**	**36,725**	**51,643,558**

Retirees and Beneficiaries as of June 30, 2015
Tabulated by Type of Pensions Being Paid

Type of Pensions Being Paid	Number	Annual Pensions
Age and Service Pensions		
Regular pensions - benefit terminating at death of retiree	15	$ 543,021
Regular pensions - automatic 60% to spouse	72	3,389,309
Regular pension - survivor	26	451,677
Option 1 pension	1	55,531
Option 2 pension - modified joint and survivor benefit	0	0
Total age and service pensions	114	$ 4,439,538
Casualty Pensions		
Duty disability pensions	7	$ 196,134
Non-duty disability pensions	3	81,717
Duty disability pension - survivor	3	29,423
Non-duty disability pension - survivor	0	0
Duty death pension - survivor	1	14,484
Non-duty death pensions - survivor	3	49,708
Total casualty pensions	17	$ 371,466
Total Pensions Being Paid	**131**	**$ 4,811,004**

Retirees and Beneficiaries as of June 30, 2015
Tabulated by Attained Ages

Attained Ages	No.	Annual Pensions
34	1	$ 14,484
41	1	35,858
45	1	42,050
47	1	37,589
49	1	53,089
50	4	232,676
51	3	85,244
52	6	273,970
53	4	229,705
54	3	185,009
55	2	138,958
56	4	171,206
57	4	244,966
58	1	34,814
59	4	208,823
60	6	262,662
61	8	334,721
62	1	46,462
63	2	80,491
64	1	44,864
65	3	130,693
66	6	227,934
67	3	160,624
68	2	60,041
69	4	172,939
70	3	79,520
72	5	109,927
73	10	296,602
74	3	103,183
75	5	93,156
76	2	57,477
77	6	179,258
78	4	129,764
79	1	23,674
80	2	42,659
81	2	20,567
82	1	10,819
83	1	18,941
84	4	64,572
85	2	37,053
86	1	8,783
89	1	13,205
91	1	9,458
92	1	2,514
Totals	**131**	**$ 4,811,004**

Vested Terminated Members as of June 30, 2015*
Tabulated by Attained Ages

Attained Ages	No.	Estimated Annual Pensions
33	1	$ 30,664
36	1	23,125
41	1	23,998
43	1	23,876
46	1	36,997
Totals	**5**	**$ 138,660**

* *Members currently on leave of absence from service*.

Active Members Included in Valuation by Division

Division	No.	Valuation Payroll	Average Pay
Police - Command	9	$ 878,043	$ 97,560
- Other	28	2,150,115	76,790
Fire - Command	7	659,904	94,272
- Other	19	1,273,823	67,043
Department Heads	3	320,353	106,784
Totals	**66**	**$5,282,238**	**$ 80,034**

Active Members Added to and Removed from Rolls

Year Ended June 30	Number Added During Year		Terminations										Active Members End of Year
			Normal Retirement		Disabled		Died-in Service		Withdrawal				
									Vested	Other	Total		
	A	E	A	E	A	E	A	E	A	A	A	E	
1996	4	7	6	3.1	1	0.2	0	0.2	0	0	0	1.1	99
1997	8	9	8	2.1	0	0.2	0	0.3	0	1	1	2.2	98
1998	8	8	5	1.8	1	0.2	0	0.2	0	2	2	1.2	98
1999	7	8	7	2.4	0	0.2	0	0.2	0	1	1	1.2	97
2000	8	11	11	1.0	0	0.2	0	0.1	0	0	0	1.0	94
2001	4	5	4	0.7	0	0.2	0	0.1	0	1	1	0.9	93
2002	6	0	0	0.2	0	0.2	0	0.1	0	0	0	1.0	99
2003	1	2	2	0.6	0	0.2	0	0.1	0	0	0	1.1	98
2004	1	1	1	1.0	0	0.2	0	0.1	0	0	0	1.1	98
2005	0	2	0	0.5	0	0.2	0	0.1	0	2	2	1.9	96
2006	1	3	3	0.4	0	0.3	0	0.1	0	0	0	1.6	94
2007	1	3	1	0.5	0	0.3	0	0.1	0	2	2	1.4	92
2008	0	0	0	0.4	0	0.3	0	0.1	0	0	0	1.3	92
2009	0	2	1	0.6	0	0.3	1	0.1	0	0	0	1.1	90
2010	0	8	1	0.6	1	0.4	0	0.2	0	6	6	1.0	82
2011	3	10	10	2.1	0	0.3	0	0.2	0	0	0	0.8	75
2012	4	9	7	1.5	0	0.3	0	0.2	2	0	2	0.7	70
2013	5	3	2	1.0	0	0.3	0	0.2	1	0	1	0.8	72
2014	2	6	4	3.0	0	0.3	0	0.1	0	2	2	1.3	68
2015	7	9	6	3.6	2	0.2	0	0.1	1	0	1	1.0	66
5-Yr. Totals	21	37	29	11.2	2	1.4	0	0.8	4	2	6	4.6	
Expected for 2016				2.8		0.2		0.1				1.4	

A = actual
E = expected

Active Members in Valuation
Comparative Schedule

Valuation Date June 30	No.	Valuation Payroll	Average Pay	% Incr.	Age	Service
1996	99	$ 5,245,624	$ 52,986	4.3 %	40.5 yrs.	14.1 yrs.
1997	98	5,270,531	53,781	1.5	39.4	12.8
1998	98	5,267,598	53,751	0.0	38.8	12.2
1999	97	5,801,619	59,811	11.3	38.5	11.5
2000	94	5,593,871	59,509	(0.5)	36.9	9.9
2001	93	5,799,631	62,362	4.8	37.1	9.8
2002	99	6,435,274	65,003	4.2	37.5	10.2
2003	98	6,307,652	64,364	(1.0)	38.1	10.8
2004	98	6,991,955	71,346	10.8	38.8	11.6
2005	96	7,115,713	74,122	3.9	39.9	12.6
2006	94	7,060,160	75,108	1.3	40.2	13.0
2007	92	7,220,564	78,484	4.5	41.0	13.8
2008	92	7,597,087	82,577	5.2	42.0	14.8
2009	90	7,499,803	83,331	0.9	43.1	15.8
2010	82	6,844,767	83,473	0.2	44.1	16.8
2011	75	6,009,688	80,129	(4.0)	44.0	16.6
2012	70	5,676,851	81,098	1.2	43.8	16.2
2013	72	5,867,119	81,488	0.5	43.8	15.8
2014	68	5,561,732	81,790	0.4	44.2	16.3
2015	66	5,282,238	80,034	(2.1)	43.0	14.7

Active Members as of June 30, 2015
By Near Age and Years of Service

Near Age	Years of Service to Valuation Date							Totals	
	0-4	5-9	10-14	15-19	20-24	25-29	30 Plus	No.	Valuation Payroll
20-24	1							1	$ 41,644
25-29	6							6	267,489
30-34	5	1	1					7	390,026
35-39	1		2	2				5	418,435
40-44	1		2	12				15	1,304,423
45-49	1		2	7	5	1		16	1,458,200
50-54			2	3	8			13	1,159,234
55-59					1			1	76,205
60+					2			2	166,582
Totals	**15**	**1**	**9**	**24**	**16**	**1**		**66**	**$ 5,282,238**

While not used in the financial computations, the following group averages are computed and shown because of their general interest.

Age: 43.0 years.

Service: 14.7 years.

Annual Pay: $ 80,034

Summary of
Current Asset Information
Furnished for Valuation

BALANCE SHEET

Current Assets (Market Value)		Reserve for	
Accrued Interest & Dividends	$ 185,221	Employees Contributions	$ 7,759,766
Contributions Receivable	479,367	Employer Contributions	9,023,219
Stocks	9,334,727	Retired Benefit Payments	29,139,056
Stock Mutual Funds	26,083,527		
U.S. Government Bonds	4,114,813		
Corporate Bonds	4,710,315		
Cash and Short Term Investments	1,014,071		
Accounts Payable	0		
Total Current Assets	$ 45,922,041	Total Reserves *	$ 45,922,041

* *As reported.*

RECEIPTS AND DISBURSEMENTS

	2014-15	2013-14
Balance - July 1,	$ 49,685,203	$ 45,451,011
Receipts:		
Employees contributions	501,899	549,025
- for EE service purchase	0	30,780
Employer contributions	1,408,153	1,566,747
- for retiree health insurance	0	95,232
- for admin. & inv. expenses	452,289	443,714
Investment income	34,916	6,943,979
Disbursements:		
Benefit payments	4,688,700	4,311,787
Refund of member contributions	978,759	544,552
Retiree health insurance	0	95,232
Administrative & investment expenses	452,289	443,714
Audit Adjustment	(40,671)	0
Balance June 30,	$ 45,922,041	$ 49,685,203
Gross rate of investment return	0.1%	15.7%

Development of Funding Value of Retirement System Assets

Year Ended June 30:	2013	2014	2015	2016	2017	2018
(A) Funding Value Beginning of Year	$47,691,751	$48,067,300	$49,322,706			
(B) Market Value End of Year	45,451,011	49,685,203	45,922,041			
(C) Market Value Beginning of Year	45,299,336	45,451,011	49,685,203			
(D) Non Investment Net Cash Flow (EE+ER cont.)-(Ret. Ben.+Refunds +Health Ret. Ben.)	(2,227,467)	(2,266,073)	(3,757,407)			
(E) Investment Income:						
(E1) Market Total: B-C-D	2,379,142	6,500,265	(5,755)			
(E2) Assumed Rate	7.50%	7.50%	7.50%			
(E3) Amount for Immediate Recognition E2 * (A + D/2)	3,493,351	3,520,070	3,558,300			
(E4) Amount for Phased-In Recognition: E1-E3	(1,114,209)	2,980,195	(3,564,055)			
(F) Phased-In Recognition Investment Income:						
(F1) From Current Year = .25 x (E3)	(278,552)	745,049	(891,014)			
(F2) First Year Prior	(1,315,546)	(278,552)	745,049	$ (891,014)		
(F3) Second Year Prior	850,458	(1,315,546)	(278,552)	745,049	$ (891,014)	
(F4) Third Year Prior	(146,695)	850,458	(1,315,544)	(278,553)	745,048	$ (891,013)
(F5) Total Recognized Investment Gain	(890,335)	1,409	(1,740,061)	(424,518)	(145,966)	(891,013)
(G) Funding Value End of Year = (A) + (D) + (E3) + (F5)	**$48,067,300**	**$49,322,706**	**$47,383,538**			
(H) Difference between Market & Funding Value	(2,616,289)	362,497	(1,461,497)			
(I) Recognized Rate of Return	5.6%	7.5%	3.8%			
(J) Ratio of Funding Value of Assets to Market Value	105.8%	99.3%	103.2%			

The Funding Value of Assets recognizes assumed investment income (line E2) fully each year. Differences between actual and assumed investment income (line E3) are phased-in over a closed 4-year period. During periods when investment performance exceeds the assumed rate, Funding Value of Assets will tend to be less than Market Value. During periods when investment performance is less than the assumed rate, Funding Value of Assets will tend to be greater than Market Value. The Funding Value of Assets is ***unbiased*** with respect to Market Value. At any time, it may be either greater or less than Market Value. If actual and assumed rates of investment income are exactly equal for 3 consecutive years, the Funding Value will become equal to Market Value.

SECTION D

SUMMARY OF ACTUARIAL COST METHOD AND ASSUMPTIONS

Actuarial Cost Method

Normal cost and the allocation of benefit values between service rendered before and after the valuation date was determined using an individual ***entry-age normal cost*** method having the following characteristics:

(i) The annual normal costs for each individual active member, payable from the date of employment to the date of retirement, are sufficient to accumulate the value of the member's benefit at the time of retirement; and

(ii) Each annual normal cost is a constant percentage of the member's year-by-year projected covered pay.

Financing of Unfunded Actuarial Accrued Liabilities. Unfunded actuarial accrued liabilities (the portion of total liabilities not covered by present assets or expected future normal cost contributions) were amortized by level (principal or interest combined) percent-of-payroll contributions over a closed period of 29 years beginning July 1, 2016.

Actuarial Assumptions Used for the Valuations

The actuary calculates the contribution requirements and benefit values of the Retirement System by applying actuarial assumptions to the benefit provisions and people information furnished, using the actuarial cost method described on the previous page. All actuarial assumptions used in this report are estimates of future experience not market measures.

The principal areas of financial risk which require assumptions about future experiences are:

(i) Long-term rates of investment return to be generated by the assets of the Retirement System.

(ii) Patterns of pay increases to members.

(iii) Rates of mortality among members, retirees and beneficiaries.

(iv) Rates of withdrawal of active members (without entitlement to a retirement benefit).

(v) Rates of disability among members.

(vi) The age patterns of actual retirement.

In making a valuation, the actuary calculates the monetary effect of each assumption for as long as a present covered person survives - - - a period of time which can be as long as a century.

Actual experience of the Retirement System will not coincide exactly with assumed experience, regardless of the wisdom of the assumptions, or the skill of the actuary and the precision of the many calculations made. Each valuation provides a complete recalculation of assumed future experience and takes into account all past differences between assumed and actual experience. The result is a continual series of adjustments (usually small) to the computed contribution rate.

From time-to-time it becomes appropriate to modify one or more of the assumptions, to reflect experience trends (but not random year-to-year fluctuations).

Valuation Assumptions

The rate of investment return was 7.5% a year, compounded annually. This assumption is used to make money payable at one point in time equal in value to a different amount of money payable at another point in time.

This rate is not the assumed real return which, for funding purposes, is the rate of return in excess of average salary increases. Considering other assumptions used in the valuation, the 7.5% translates to a real return of approximately 2.0%. Experience over the last 5 years has been as illustrated below:

	Year Ending June 30,					5-Year
	2015	2014	2013	2012	2011	Average
1) Recognized rate*	3.8 %	7.5 %	5.6 %	(0.7) %	(0.7) %	3.1 %
2) Increase in CPI	0.1	2.1	1.8	1.7	3.6	1.9
3) Average salary increase	3.6	1.1	4.4	4.7	(2.5)	2.3
4) Real return						
- investment purposes	3.7	5.4	3.8	(2.4)	(4.3)	1.2
- funding purposes	0.2	6.4	1.2	(5.4)	1.8	0.8

* *The recognized rate of return was computed using the approximate formula: i = I divided by 1/2 (A+B-I), where I is realized investment income, A is the beginning of year asset value and B is the end of year asset value.*

The rates of salary increase used for individual members are in accordance with the following table. This assumption is used to project a member's current salary to the salaries upon which benefit amounts will be based.

	Salary Increase Assumptions for an Individual Member		
Sample Ages	Merit & Seniority	Base (Economic)	Increase Next Year
20	3.0 %	5.5 %	8.5 %
25	3.0	5.5	8.5
30	2.6	5.5	8.1
35	1.1	5.5	6.6
40	0.2	5.5	5.7
45	0.2	5.5	5.7
50	0.2	5.5	5.7
55	0.1	5.5	5.6
60	0.0	5.5	5.5

If the number of active members remains constant, then the total active member payroll will increase 5.5% annually, the base portion of the individual salary increase assumptions. This increasing payroll was recognized in amortizing unfunded actuarial accrued liabilities.

The mortality table used to measure post-retirement mortality is the RP-2014 Healthy Annuitant Mortality for males and females projected 1 year to 2015, with MP-2014 Mortality Improvement Scale. The corresponding Disability and Employee tables were used to measure Disabled mortality and Pre-Retirement mortality, respectively. Mortality rates include some margin for future mortality improvements. The mortality table was last updated for the June 30, 2015 actuarial valuation.

	Single Life Retirement Values			
	Present Value of $1 Monthly for Life		Future Life Expectancy (Years)	
Sample Ages	Males	Females	Males	Females
45	$147.75	$151.15	37.09	39.89
50	142.54	146.75	32.64	35.33
55	136.16	140.98	28.34	30.83
60	128.26	133.48	24.19	26.42
65	118.35	124.01	20.17	22.16
70	106.26	112.48	16.34	18.13
75	92.10	98.91	12.79	14.38
80	76.34	83.55	9.61	10.98

For purposes of the pre-retirement death benefit, it was assumed that 100% of members were married at the time of death. 25% of pre-retirement deaths were assumed to be duty related.

Probabilities of retirement for members eligible to retire were:

Hired Before July 1, 2009		
	Percent of Active Members Retiring within Next Year	
Retirement Ages	Police	Fire & Dept. Heads
45	40 %	20 %
46	40	20
47	40	20
48	40	20
49	40	20
50	40	20
51	35	15
52	20	10
53	15	10
54	15	10
55	15	10
56	15	10
57	15	10
58	15	10
59	25	20
60	100	100

Hired On or After July 1, 2009		
	Percent of Active Members Retiring within Next Year	
Retirement Ages	Police	Fire & Dept. Heads
55	62.5 %	50 %
56	47.5	30
57	47.5	30
58	47.5	30
59	47.5	30
60	100.0	100

Sample Rates of Separation from Active Employment before Retirement, Other than Death or Disability

Sample Ages	Years of Service	% of Active Members Separating within Next Year	
		Police	Fire & Dept. Heads
ALL	0	12.00 %	10.00 %
	1	9.00	7.00
	2	7.00	5.00
	3	5.00	4.00
	4	4.50	3.50
25	5 & Over	4.50	3.50
30		3.90	2.90
35		2.30	1.50
40		0.90	0.60
45		0.50	0.50
50		0.50	0.50
55		0.50	0.50
60		0.50	0.50

Sample Rates of Disability

Sample Ages	Probabilities of Becoming Disabled During Next Year	
	Males	Females
20	0.07 %	0.03 %
25	0.09	0.05
30	0.10	0.07
35	0.14	0.13
40	0.21	0.19
45	0.32	0.28
50	0.52	0.45
55	0.92	0.76
60	1.53	1.10

50% of disabilities were assumed to be duty related.

Summary of Assumptions Used
June 30, 2015

Pensions in an Inflationary Environment

Value of $1,000/month Retirement Benefit To an Individual Who Retires at Age 50 In an Environment of 5.5% Wage Inflation

Age	Value
50	$ 1,000
51	948
52	898
53	852
54	807
55	765
60	585
65	448
70	343
75	262
80	201
85	154

Miscellaneous and Technical Assumptions

Marriage Assumption. 100% of members are assumed to be married for purposes of death-in-service benefits. 90% of members are assumed to be married at time of retirement for purposes of death after retirement benefits.

Pay Increase Timing. Beginning of (fiscal) year. This is equivalent to assuming that reported pays represent amounts paid to members during the year ended on the valuation date.

Decrement Timing. Decrements of all types are assumed to occur at the middle of the year.

Eligibility Testing. Eligibility for benefits is determined based upon the age nearest birthday and service nearest whole year on the date the decrement is assumed to occur.

Benefit Service. Exact fractional service is used to determine the amount of benefit payable.

Decrement Relativity. Decrement rates are used directly from tabular rates, without adjustment for multiple decrement table effects.

Decrement Operation. Disability and mortality decrements do not operate during the first 5 years of service. Disability and separation do not operate during retirement eligibility.

Normal Form of Benefit. The assumed normal form of benefit is straight life for single members and joint and 60% survivor for married members.

Loads. Normal Retirement Present Values were loaded by 5% of age and service actuarial liabilities for Police and Fire hired before July 1, 2009 and 20% of age and service actuarial liabilities for Department Heads hired before July 1, 2009 for lump sums payable at retirement.

Incidence of Contributions. Contributions are assumed to be received continuously throughout the year based upon the computed percent-of-payroll shown in this report, and the actual payroll payable at the time contributions are made. New entrant normal cost contributions are applied to the funding of new entrant benefits.

Annuity Withdrawal. It was assumed that 80% of all future retirees will elect to withdraw their employee contributions at retirement resulting in a corresponding reduction to the monthly annuity. A 4% interest rate assumption was used to determine the annuity equivalent of the member contribution balance at retirement.

Glossary

Actuarial Accrued Liability. The difference between (i) the actuarial present value of future plan benefits, and (ii) the actuarial present value of future normal cost. Sometimes referred to as "accrued liability" or "past service liability."

Accrued Service. The service credited under the plan which was rendered before the date of the actuarial valuation.

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

Actuarial Cost Method. A mathematical budgeting procedure for allocating the dollar amount of the "actuarial present value of future plan benefits" between the actuarial present value of future normal cost and the actuarial accrued liability. Sometimes referred to as the "actuarial funding method."

Actuarial Equivalent. A single amount or series of amounts of equal value to another single amount or series of amounts, computed on the basis of the rate(s) of interest and mortality tables used by the plan.

Actuarial Present Value. The amount of funds presently required to provide a payment or series of payments in the future. It is determined by discounting the future payments at a predetermined rate of interest, taking into account the probability of payment.

Amortization. Paying off an interest-bearing liability by means of periodic payments of interest and principal, as opposed to paying it off with a lump sum payment.

Experience Gain (Loss). A measure of the difference between actual experience and that expected based upon a set of actuarial assumptions during the period between two actuarial valuation dates, in accordance with the actuarial cost method being used.

Funding Value of Assets. Also referred to as actuarial value of assets, smoothed market value of assets, or valuation assets.

Valuation assets recognize assumed investment return fully each year. Differences between actual and assumed investment return are phased in over a closed 4-year period. During periods when investment performance exceeds the assumed rate, valuation assets will tend to be less than market value. During periods when investment performance is less than the assumed rate, valuation assets will tend to be greater than market value. If assumed rates are exactly realized for 3 consecutive years, valuation assets will become equal to market value.

Normal Cost. The annual cost assigned, under the actuarial funding method, to current and subsequent plan years. Sometimes referred to as "current service cost." Any payment toward the unfunded actuarial accrued liability is not part of the normal cost.

Plan Termination Liability. The actuarial present value of future plan benefits based on the assumption that there will be no further accruals for the future service and salary. The termination liability will generally be less than the liabilities computed on a "going concern" basis and is not normally determined in a routine actuarial valuation.

Reserve Account. An account used to indicate that funds have been set aside for a specific purpose and are not generally available for other uses.

Unfunded Actuarial Accrued Liability. The difference between the actuarial accrued liability and the funding value of assets. Sometimes referred to as "unfunded accrued liability."

Most retirement systems have unfunded actuarial accrued liability. An amount arises each time new benefits are added and each time an experience loss occurs.

The existence of unfunded actuarial accrued liability is not in itself bad, any more than a mortgage on a house is bad. Unfunded actuarial accrued liability does not represent a debt that is payable today. What is important is the ability to control the amount of unfunded actuarial accrued liability and the trend in the amount (after due allowance for devaluation of the dollar).

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December 17, 2015

The Retirement Board
City of Madison Heights Policemen
and Firemen Retirement System
300 West Thirteen Mile Road
Madison Heights, Michigan 48071

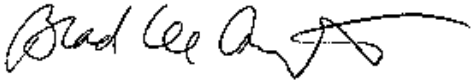
Attention: Ms. Melissa R. Marsh, Assistant City Manager-Director of Administrative Services

Dear Board Members:

Enclosed are 7 copies of the report of the June 30, 2015 Actuarial Valuation of liabilities for the City of Madison Heights Policemen and Firemen Retirement System.

I would be pleased to meet with you and the Board to discuss the report.

Sincerely,



Brad Lee Armstrong, ASA, EA, FCA, MAAA

BLA:ah
Enclosures