

City of Worcester Retirement System

Actuarial Valuation and Review as of
January 1, 2012

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May 10, 2012

*City of Worcester Retirement System
City Hall, Room 103, 455 Main Street
Worcester, MA 01608*

Dear Board Members:

We are pleased to submit this Actuarial Valuation and Review as of January 1, 2012. It summarizes the actuarial data used in the valuation, establishes the funding requirements for fiscal 2013 and later years and analyzes the preceding year's experience.

This report was prepared in accordance with generally accepted actuarial principles and practices at the request of the Board to assist in administering the Retirement System. The census information and financial information on which our calculations were based was prepared by the staff of the Worcester Retirement System. That assistance is gratefully acknowledged.

The measurements shown in this actuarial valuation may not be applicable for other purposes. Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; 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); and changes in plan provisions or applicable law.

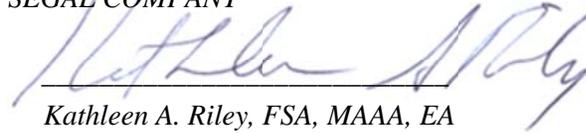
The actuarial calculations were directed under my supervision. I am a member of the American Academy of Actuaries and I meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion herein. To the best of my knowledge, the information supplied in the actuarial valuation is complete and accurate. Further, in my opinion, the assumptions as approved by the Board are reasonably related to the experience of and the expectations for the Plan.

We look forward to reviewing this report at your next meeting and to answering any questions.

Sincerely,

THE SEGAL COMPANY

By:

A handwritten signature in blue ink, appearing to read "Kathleen A. Riley", written over a horizontal line.

*Kathleen A. Riley, FSA, MAAA, EA
Senior Vice President and Actuary*

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SECTION 1: Valuation Summary for the City of Worcester Retirement System

Purpose

This report has been prepared by The Segal Company to present a valuation of the City of Worcester Retirement System as of January 1, 2012. The valuation was performed to determine whether the assets and contributions are sufficient to provide the prescribed benefits. The contribution requirements presented in this report are based on:

- The benefit provisions of M.G.L. Chapter 32;
- The characteristics of covered active participants, inactive participants, and retired participants and beneficiaries as of January 1, 2012;
- The assets of the Plan as of December 31, 2011;
- Economic assumptions regarding future salary increases and investment earnings; and
- Other actuarial assumptions, regarding employee terminations, retirement, death, etc.

Significant Issues in Valuation Year

The following key findings were the result of this actuarial valuation:

1. The actuarial valuation report as of January 1, 2012 is based on financial information as of that date. Changes in the value of assets subsequent to that date are not reflected.
2. During the plan year ended 2011, the market value rate of return was -0.84%, compared to the assumed rate of return of 8.00%. Because the actuarial value of assets gradually recognizes market value fluctuations over a five-year period, the actuarial rate of return was 1.03%. The actuarial value of assets as of December 31, 2011 was \$712.1 million, or 108.6% of the market value of assets of \$656.0 million reported in the Annual Statement. As of December 31, 2010, the actuarial value of assets was 106.3% of the market value.
3. As indicated in Section 2, Subsection B of this report, the total unrecognized investment loss as of December 31, 2011 is \$56,108,593. This investment loss will be recognized in the determination of the actuarial value of assets for funding purposes in the next few years, to the extent it is not offset by recognition of investment gains derived from future experience. This implies that earning the assumed rate of investment return of 8.00% per year (net of investment expenses) on a market value basis will result in investment losses on the actuarial value of assets in the next few years. A projection of the market value and actuarial value of assets indicates that a large loss will be recognized as of December 31, 2012. This loss is reflected in the projected unfunded actuarial accrued liability (UAAL) shown in the funding schedule in Section 3, Exhibit G.

SECTION 1: Valuation Summary for the City of Worcester Retirement System

4. The unfunded liability has increased from \$300.1 million as of January 1, 2011 to \$339.1 million as of January 1, 2012. The unfunded liability was expected to increase to \$301.4 million. The greater than expected increase of \$37.7 million is primarily due to an investment loss on an actuarial basis of \$49.8 million, partially offset by a \$14.3 million gain from salary increases less than expected and a \$1.3 million gain due to the election of a 2.5% retiree Cost of Living Adjustment (“COLA”) on July 1, 2011, rather than the 3% COLA previously assumed (see Chart 13 in Section 2 and Exhibit E in Section 3 for more detail). There were also changes in liability due to the assumption and plan provision changes described below.
5. This valuation reflects the following changes in assumptions:
 - The administrative expense assumption was lowered from \$625,000 for calendar 2011 to \$600,000 for calendar 2012, based on the projected 2012 budget.
 - The mortality table for healthy participants was changed from the 1994 Group Annuity Mortality Table to the RP-2000 Combined Healthy Mortality Table projected 12 years with Scale AA.
 - The mortality table for disabled participants was changed from the 1994 Group Annuity Mortality Table set forward 5 years to the RP-2000 Combined Healthy Mortality Table set forward 5 years projected 12 years with Scale AA.
 - The assumed rates of retirement and disability were changed to better reflect past experience and future expectations.
 - The net 3(8)(c) liability assumption was reduced from an estimated liability of \$15.7 million based on net annual benefits of \$1.8 million to an estimated liability of \$15.3 million based on net annual benefits of \$1.7 million.

Changing these assumptions resulted in a net decrease in the unfunded liability of \$2,843,152 and a net decrease in the employer normal cost of \$160,926.

6. The Board has increased the Section 101 annual allowance from \$6,000 to \$9,000.
7. As permitted by Section 19 of Chapter 188 of the Acts of 2010, the Board has adopted an increase to the COLA base from \$12,000 to \$13,000 as of July 1, 2012. This change resulted in an increase in the unfunded liability of \$5,186,817 and an increase in the employer normal cost of \$115,650.

SECTION 1: Valuation Summary for the City of Worcester Retirement System

8. The recommended contribution for fiscal 2013 is \$35,322,855. This amount is equal to the fiscal 2012 appropriation of \$32,706,347, increased by 8%. The fiscal 2014 contribution is 8% higher than fiscal 2013. These amounts are based on a funding schedule that amortizes the 2002 ERI in level dollar amounts through fiscal 2018 (six payments remaining), the 2010 ERI in level dollar amounts through fiscal 2021 (nine payments remaining), and the Section 90 ACD liability in level dollar amounts through fiscal 2014 (two payments remaining). In fiscal 2015, the payment on the remaining unfunded liability is 10.75% greater than in fiscal 2014. Beginning in fiscal 2016, the payment on the remaining unfunded liability is 4% greater than the prior year's payment. This results in a funding schedule that fully funds the System by June 30, 2035 (23 payments remaining). In the prior funding schedule, the System was fully funded by June 30, 2035 and the remaining unfunded liability was amortized in increasing (4.0% per year) payments beginning in fiscal 2014.
9. The funded ratio has decreased from 70.73% as of January 1, 2011 to 67.74% as of January 1, 2012.

SECTION 1: Valuation Summary for the City of Worcester Retirement System

Summary of Key Valuation Results

	2012	2011
Contributions for fiscal year beginning July 1:		
Recommended for fiscal 2013 and fiscal 2012	\$35,322,855	\$32,706,347
Recommended for fiscal 2014 and fiscal 2013	38,148,683	35,322,855
Funding elements for plan year beginning January 1:		
Normal cost, including administrative expenses	\$23,720,313	\$23,414,464
Market value of assets	656,001,767	681,901,180
Actuarial value of assets	712,110,360	724,997,822
Actuarial accrued liability	1,051,190,790	1,025,075,423
Unfunded actuarial accrued liability	339,080,430	300,077,601
GASB 25/27:		
Annual required contributions (ARC)	\$35,322,855	\$32,706,347
Actual contributions	--	32,706,347
Percentage of ARC contributed	--	100.00%
Funded ratio	67.74%	70.73%
Demographic data for plan year beginning January 1:		
Number of retired participants and beneficiaries	2,776	2,798
Number of inactive participants entitled to a return of their employee contributions	692	691
Number of inactive participants with a vested right to a deferred or immediate benefit	67	62
Number of active participants	3,178	3,208
Total payroll in prior calendar year	\$152,705,056	\$150,758,766*
Average payroll in prior calendar year	48,051	46,955*

* Calendar year 2010 payroll figures were reduced by 4.5% for police officers to reflect retroactive payments made in 2010.

SECTION 2: Valuation Results for the City of Worcester Retirement System

A. PARTICIPANT DATA

The Actuarial Valuation and Review considers the number and demographic characteristics of covered participants, including active participants, inactive participants, retired participants and beneficiaries.

This section presents a summary of significant statistical data on these participant groups.

More detailed information for this valuation year and the preceding valuation can be found in Section 3, Exhibits A and B.

A historical perspective of how the participant population has changed over the past ten valuations can be seen in this chart.

CHART 1
Participant Population: 2002 – 2011

Year Ended December 31	Active Participants	Inactive Participants	Retired Participants and Beneficiaries	Ratio of Non-Actives to Actives
2002	3,679	1,094	3,001	1.11
2003	3,409	1,102	2,996	1.20
2004	3,498	1,017	2,964	1.14
2005	3,430	1,007	2,919	1.14
2006	3,397	1,072	2,864	1.16
2007	3,299	898	2,849	1.14
2008	3,352	910	2,792	1.10
2009	3,262	770	2,774	1.09
2010	3,208	753	2,798	1.11
2011	3,178	759	2,776	1.11

SECTION 2: Valuation Results for the City of Worcester Retirement System

Active Participants

Plan costs are affected by the age, years of service and payroll of active participants. In this year's valuation, there were 3,178 active participants with an average age of 47.3, average years of service of 14.2 years and average payroll of \$48,051. The 3,208 active participants in the prior valuation had an average age of 47.0, average service of 13.9 years and average payroll of \$46,995.

Among the active participants, there were none with unknown age and/or service information.

Inactive Participants

In this year's valuation, there were 67 participants with a vested right to a deferred or immediate vested benefit and 692 participants entitled to a return of their employee contributions.

These graphs show a distribution of active participants by age and by years of service.

CHART 2
Distribution of Active Participants by Age as of December 31, 2011

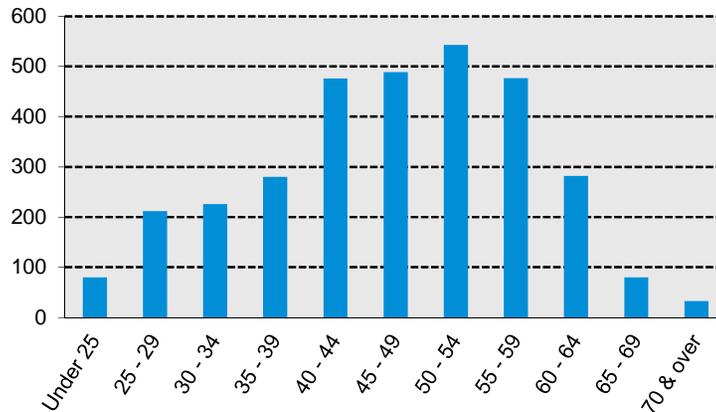
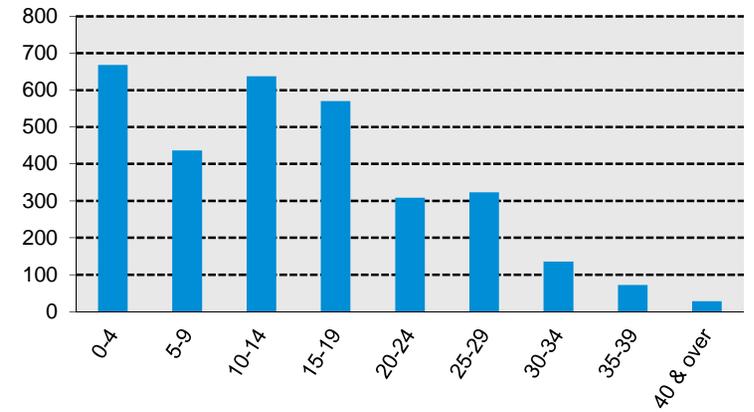


CHART 3
Distribution of Active Participants by Years of Service as of December 31, 2011



SECTION 2: Valuation Results for the City of Worcester Retirement System

Retired Participants and Beneficiaries

As of December 31, 2011, 2,267 retired participants and 509 beneficiaries were receiving total monthly benefits of \$5,265,945, excluding COLAs reimbursed by the Commonwealth. For comparison, in the previous valuation, there were 2,284 retired participants and 514 beneficiaries receiving monthly benefits of \$5,138,267, excluding COLAs reimbursed by the Commonwealth. There was one retired participant in suspended status this year and none in the prior valuation.

These graphs show a distribution of the current retired participants and beneficiaries based on their monthly amount and age, by type of pension.

CHART 4
Distribution of Retired Participants and Beneficiaries by Type and by Monthly Amount as of December 31, 2011

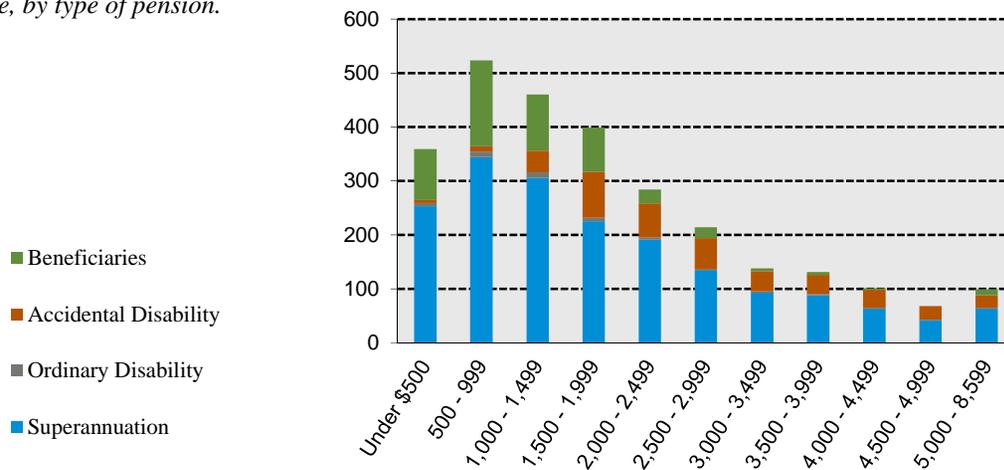
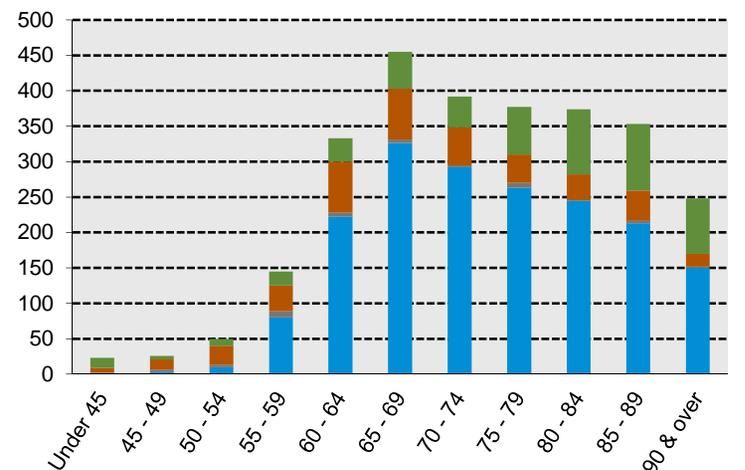


CHART 5
Distribution of Retired Participants and Beneficiaries by Type and by Age as of December 31, 2011



SECTION 2: Valuation Results for the City of Worcester Retirement System

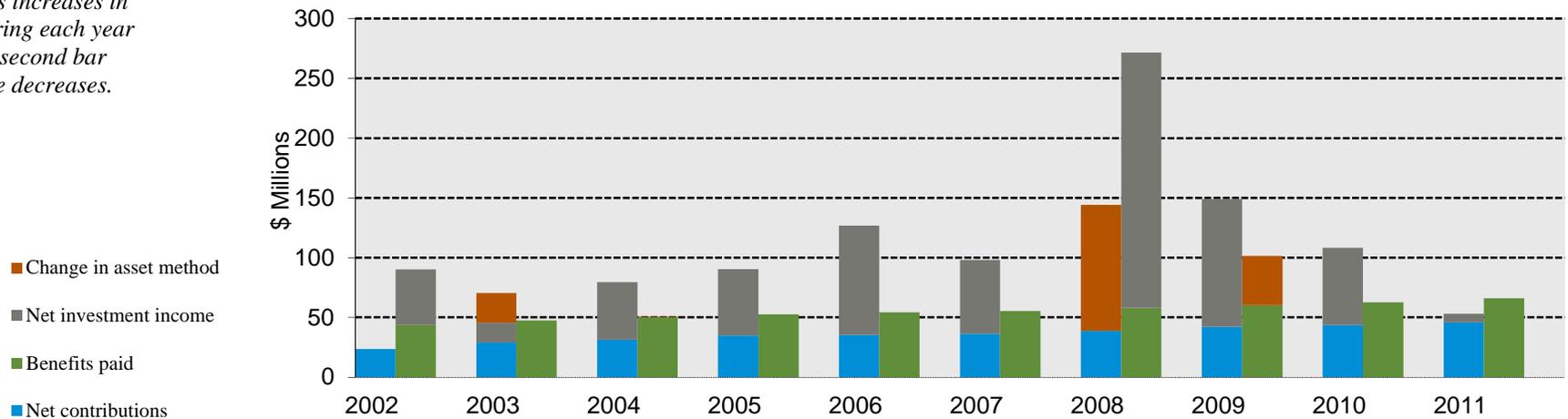
B. FINANCIAL INFORMATION

Retirement plan funding anticipates that, over the long term, both net contributions (less administrative expenses) and net investment earnings (less investment fees) will be needed to cover benefit payments.

Retirement plan assets change as a result of the net impact of these income and expense components. Additional financial information, including a summary of these transactions for the valuation year, is presented in Section 3, Exhibits C and D.

The chart depicts the components of changes in the actuarial value of assets over the last ten years. Note: The first bar represents increases in assets during each year while the second bar details the decreases.

CHART 6
Comparison of Increases and Decreases in the Actuarial Value of Assets for Years Ended December 31, 2002 – 2011



SECTION 2: Valuation Results for the City of Worcester Retirement System

It is desirable to have level and predictable plan costs from one year to the next. For this reason, the Board has approved an asset valuation method that gradually adjusts to market value. Under this valuation method, the full value of market fluctuations is not recognized in a single year and, as a result, the asset value and the plan costs are more stable.

The amount of the adjustment to recognize market value is treated as income, which may be positive or negative. Realized and unrealized gains and losses are treated equally and, therefore, the sale of assets has no immediate effect on the actuarial value.

The chart shows the determination of the actuarial value of assets as of the valuation date.

**CHART 7
Determination of Actuarial Value of Assets for Year Ended December 31, 2011**

1. Market value of assets, December 31, 2011			\$656,001,767
2. Calculation of unrecognized return*	Original Amount	Unrecognized Return	
(a) Year ended December 31, 2011	-\$59,381,998	-\$47,505,598	
(b) Year ended December 31, 2010	33,090,580	19,854,348	
(c) Year ended December 31, 2009	66,613,685	26,645,474	
(d) Year ended December 31, 2008	-275,514,085	-55,102,817	
(e) Year ended December 31, 2007	3,341,587	<u>0</u>	
(f) Total unrecognized return			-56,108,593
3. Preliminary actuarial value: (1) - (2f)			712,110,360
4. Adjustment to be within 10% corridor			0
5. Final actuarial value of assets as of December 31, 2011: (3) + (4)			<u>\$712,110,360</u>
6. Actuarial value as a percentage of market value: (5) ÷ (1)			108.6%

* Unrecognized return is the difference between the total return and the expected return on a market value basis and is recognized over a five-year period.

SECTION 2: Valuation Results for the City of Worcester Retirement System

In 2001, the Board approved an asset valuation method that gradually adjusts to market value. A smoothing method was used through 2004.

From 2005 through 2008, the actuarial value of assets was set equal to market value.

In 2009, the Board approved an asset valuation method that gradually adjusts to market value.

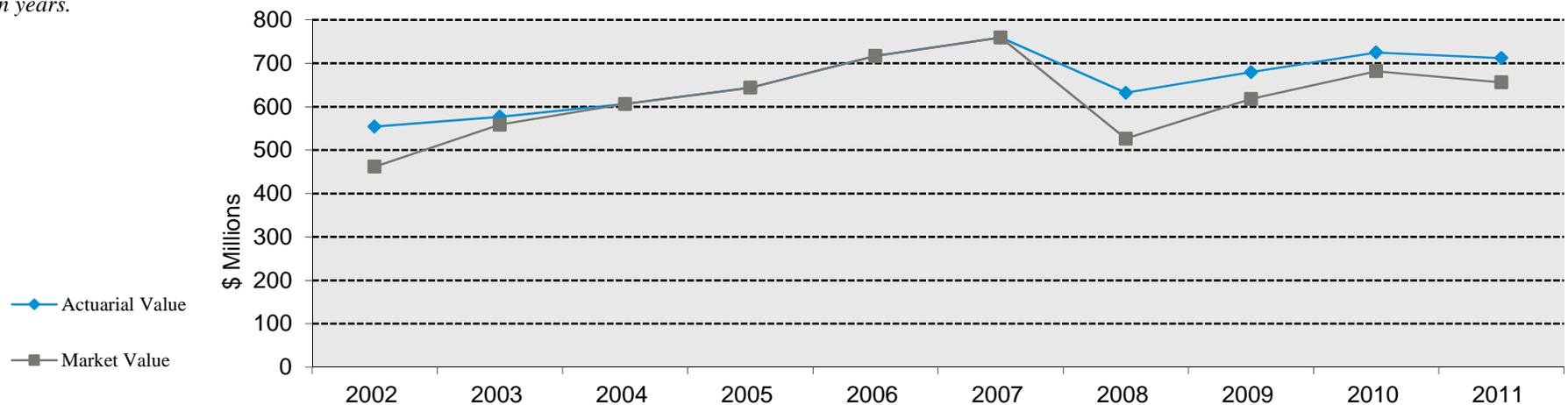
Effective with the 2010 valuation, the corridor around market value was reduced from 20% to 10%.

The actuarial asset value is significant because the Worcester Retirement System's liabilities are compared to these assets to determine what portion, if any, remains unfunded. Amortization of the unfunded actuarial accrued liability is an important element in determining the contribution requirement.

This chart shows the change in the actuarial value of assets versus the market value over the past ten years.

CHART 8

Actuarial Value of Assets vs. Market Value of Assets as of December 31, 2002 – 2011



SECTION 2: Valuation Results for the City of Worcester Retirement System

C. ACTUARIAL EXPERIENCE

To calculate the required contribution, assumptions are made about future events that affect the amount and timing of benefits to be paid and assets to be accumulated. Each year actual experience is measured against the assumptions. If overall experience is more favorable than anticipated (an actuarial gain), the contribution requirement will decrease from the previous year. On the other hand, the contribution requirement will increase if overall actuarial experience is less favorable than expected (an actuarial loss).

Taking account of experience gains or losses in one year without making a change in assumptions reflects the belief that the single year's experience was a short-term

development and that, over the long term, experience will return to the original assumptions. For contribution requirements to remain stable, assumptions should approximate experience.

If assumptions are changed, the contribution requirement is adjusted to take into account a change in experience anticipated for all future years.

The total experience loss for the year ended December 31, 2011 is \$35,348,484, as shown in Chart 9. A discussion of the major components of the actuarial experience is on the following pages.

This chart provides a summary of the actuarial experience during the past year.

**CHART 9
Actuarial Experience for Year Ended December 31, 2011**

1. Net loss from investments*	-\$49,817,777
2. Net gain from administrative expenses	60,216
3. Net gain from other experience**	<u>14,409,077</u>
4. Net experience loss: (1) + (2) + (3)	-\$35,348,484

* Details in Chart 10

** Details in Chart 13

SECTION 2: Valuation Results for the City of Worcester Retirement System

Investment Rate of Return

A major component of projected asset growth is the assumed rate of return. The assumed return should represent the expected long-term rate of return, based on the Worcester Retirement System’s investment policy. For valuation purposes, the assumed rate of return on the actuarial value of assets is 8.00%. The actual rate of return on an actuarial basis for the 2011 plan year was 1.03%.

Since the actual return for the year was less than the assumed return, the Worcester Retirement System experienced an actuarial loss during the year ended December 31, 2011 with regard to its investments.

This chart shows the gain/(loss) due to investment experience.

CHART 10
Actuarial Value Investment Experience for Year Ended December 31, 2011

1. Actual return	\$7,371,682
2. Average value of assets	714,868,250
3. Actual rate of return: (1) ÷ (2)	1.03%
4. Assumed rate of return	8.00%
5. Expected return: (2) x (4)	\$57,189,459
6. Actuarial gain/(loss): (1) – (5)	<u>-\$49,817,777</u>

SECTION 2: Valuation Results for the City of Worcester Retirement System

Because actuarial planning is long term, it is useful to see how the assumed investment rate of return has followed actual experience over time. The chart below shows the rate of return on an actuarial basis compared to the market value investment return for the last 13 years including five-year, ten-year and 13-year averages.

Based upon future expectations, we have maintained the assumed rate of return of 8.00%.

CHART 11

Investment Return – Actuarial Value vs. Market Value: 1999 - 2011

Year Ended December 31	Actuarial Value Investment Return		Market Value Investment Return	
	Amount	Percent	Amount	Percent
1999	\$101,149,011	19.38%	\$101,149,011	19.38%
2000	35,128,309	5.80	2,494,022	0.41
2001	8,897,926	1.43	-29,978,425	-5.09
2002	-46,582,424	-7.63	-67,436,801	-12.50
2003	41,670,173	7.65	115,476,574	25.52
2004	47,848,351	8.43	66,406,965	12.09
2005	55,470,778	9.29	55,470,778	9.29
2006	91,535,234	14.42	91,535,234	14.42
2007	61,690,401	8.72	61,690,401	8.72
2008	-108,338,166	-14.45	-213,653,832	-28.49
2009	65,765,691	10.56	109,307,722	21.12
2010	64,588,917	9.64	83,265,908	13.69
2011	<u>7,371,682</u>	1.03	<u>-5,640,269</u>	-0.84
Total	\$426,195,833		\$370,087,288	
	Five-year average return	2.63%		1.07%
	Ten-year average return	4.38%		4.92%
	13-year average return	5.22%		4.78%

Notes: Each year's yield is weighted by the average asset value in that year.

2000, 2003, 2004, 2008 and 2009 actuarial value investment returns include a change in asset method.

SECTION 2: Valuation Results for the City of Worcester Retirement System

Subsection B described the actuarial asset valuation method that gradually takes into account fluctuations in the market value rate of return. The effect of this is to stabilize the actuarial rate of return, which contributes to leveling pension plan costs.

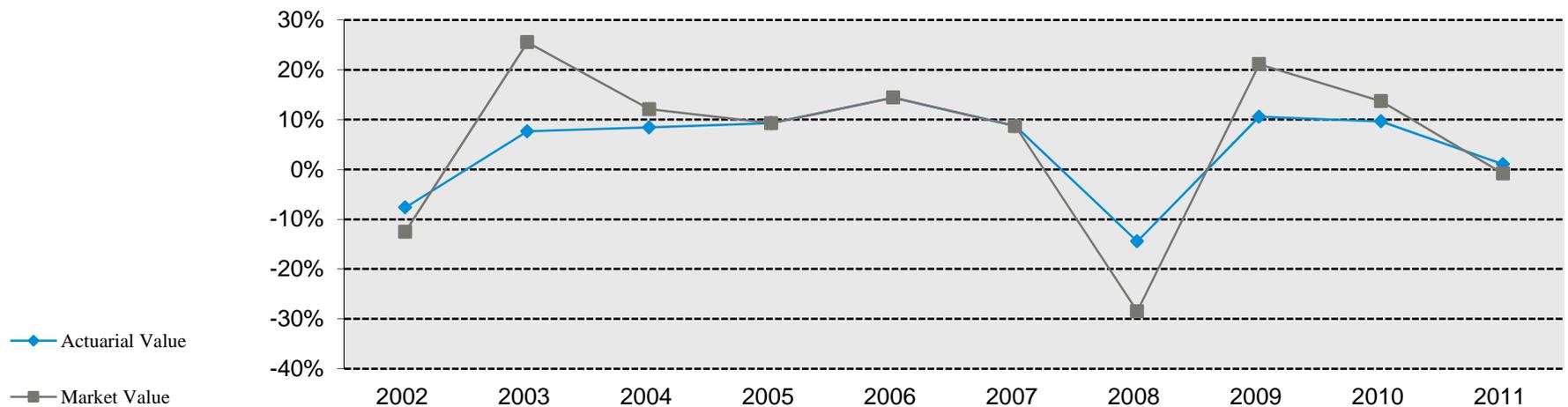
Administrative Expenses

Administrative expenses for the year ended December 31, 2011 totaled \$569,245 compared to the assumption of \$625,000 payable at the beginning of the year. This resulted in a gain of \$60,216 for the year. We have changed the assumption to \$600,000 for calendar 2012.

This chart illustrates how this leveling effect has actually worked over the years 2002 - 2011.

CHART 12

Market and Actuarial Rates of Return for Years Ended December 31, 2002 - 2011



SECTION 2: Valuation Results for the City of Worcester Retirement System

Other Experience

There are other differences between the expected and the actual experience that appear when the new valuation is compared with the projections from the previous valuation. These include:

- the extent of turnover among the participants,
- retirement experience (earlier or later than expected),
- mortality (more or fewer deaths than expected),
- the number of disability retirements, and
- salary increases different than assumed.

The net gain from this other experience for the year ended December 31, 2011 amounted to \$14,409,077, which is 1.4% of the actuarial accrued liability.

A brief summary of the demographic gain/(loss) experience of the Worcester Retirement System for the year ended December 31, 2011 is shown in Chart 13 on the following page.

This valuation reflects the following changes in assumptions:

- The administrative expense assumption was lowered from \$625,000 for calendar 2011 to \$600,000 for calendar 2012, based on the projected 2012 budget.
- The mortality table for healthy participants was changed from the 1994 Group Annuity Mortality Table to the RP-2000 Combined Healthy Mortality Table projected 12 years with Scale AA.
- The mortality table for disabled participants was changed from the 1994 Group Annuity Mortality Table set forward 5 years to the RP-2000 Combined Healthy Mortality Table set forward 5 years projected 12 years with Scale AA.
- The assumed rates of retirement and disability were changed to better reflect past experience and future expectations.
- The net 3(8)(c) liability assumption was reduced from an estimated liability of \$15.7 million based on net annual benefits of \$1.8 million to an estimated liability of \$15.3 million based on net annual benefits of \$1.7 million.

Changing these assumptions resulted in a net decrease in the unfunded liability of \$2,843,152 and a net decrease in the employer normal cost of \$160,926.

SECTION 2: Valuation Results for the City of Worcester Retirement System

The Board has increased the Section 101 annual allowance from \$6,000 to \$9,000.

As permitted by Section 19 of Chapter 188 of the Acts of 2010, the Board has adopted an increase to the retiree Cost of Living Adjustment base from \$12,000 to \$13,000 as of July 1, 2012. This change resulted in an increase in the unfunded liability of \$5,186,817 and an increase in the employer normal cost of \$115,650.

The chart shows elements of the experience gain/(loss) for the most recent year.

CHART 13

Experience Due to Changes in Demographics for Year Ended December 31, 2011

1. Salary increases for continuing actives less than expected	\$14,316,745
2. Impact of lower COLA than expected	1,343,313
3. Mortality experience amongst retired members and beneficiaries more favorable than expected	44,593
4. Miscellaneous experience loss	<u>-1,295,574</u>
5. Total	\$14,409,077

SECTION 2: Valuation Results for the City of Worcester Retirement System

D. RECOMMENDED CONTRIBUTION

The amount of annual contribution required to fund the Plan is comprised of an employer normal cost payment and a payment on the unfunded actuarial accrued liability.

The recommended contribution for fiscal 2013 is \$35,322,855. This amount is equal to the fiscal 2012 appropriation of \$32,706,347, increased by 8%. The fiscal 2014 contribution is 8% higher than fiscal 2013. These amounts are based on a funding schedule that amortizes the 2002 ERI in level dollar amounts through fiscal 2018 (six payments remaining), the 2010 ERI in level dollar amounts through fiscal 2021 (nine payments remaining), and the Section 90 ACD liability in level dollar amounts through fiscal 2014 (two payments remaining). In fiscal 2015, the

payment on the remaining unfunded liability is 10.75% greater than in fiscal 2014. Beginning in fiscal 2016, the payment on the remaining unfunded liability is 4% greater than the prior year's payment. This results in a funding schedule that fully funds the System by June 30, 2035 (23 payments remaining). In the prior funding schedule, the System was fully funded by June 30, 2035 and the remaining unfunded liability was amortized in increasing (4.0% per year) payments beginning in fiscal 2014.

Exhibit G in Section 3 shows the recommended contributions through fiscal 2035 based on this funding schedule.

The chart compares this valuation's recommended contribution with the prior valuation.

**CHART 14
Recommended Contribution**

	Year Beginning January 1			
	2012	% of Payroll	2011	% of Payroll
1. Total normal cost	\$23,120,313	14.48%	\$22,789,464	14.45%
2. Administrative expenses	600,000	0.38%	625,000	0.40%
3. Expected employee contributions	<u>-14,582,635</u>	<u>-9.13%</u>	<u>-14,212,715</u>	<u>-9.01%</u>
4. Employer normal cost: (1) + (2) + (3)	\$9,137,678	5.72%	\$9,201,749	5.83%
5. Actuarial accrued liability	1,051,190,790		1,025,075,423	
6. Actuarial value of assets	<u>712,110,360</u>		<u>724,997,822</u>	
7. Unfunded actuarial accrued liability: (5) - (6)	\$339,080,430		\$300,077,601	
8. Employer normal cost projected to July 1, 2012 and 2011	9,307,433	5.72%	9,372,694	5.83%
9. Projected unfunded actuarial accrued liability	352,382,720		311,849,791	
10. Payment on projected unfunded actuarial accrued liability	26,015,422	16.00%	23,333,653	13.74%
11. Recommended contribution: (8) + (10)	<u>\$35,322,855</u>	<u>21.72%</u>	<u>\$32,706,347</u>	<u>20.36%</u>
12. Projected payroll as of July 1	\$162,636,116		\$160,650,921	

**Recommended contributions are assumed to be paid at the beginning of the fiscal year.*

SECTION 2: Valuation Results for the City of Worcester Retirement System

E. INFORMATION REQUIRED BY THE GASB

Governmental Accounting Standards Board (GASB) reporting information provides standardized information for comparative purposes of governmental pension plans. This information allows a reader of the financial statements to compare the funding status of one governmental plan to another on relatively equal terms.

Critical information to the GASB is the historical comparison of the GASB required contribution to the actual contributions. This comparison demonstrates whether a plan is being funded within the range of the GASB reporting requirements. Chart 15 below presents a graphical representation of this information for the Plan.

The other critical piece of information regarding the Plan's financial status is the funded ratio. This ratio compares the

actuarial value of assets to the actuarial accrued liabilities of the Plan as calculated under the GASB Standards. High ratios indicate a well-funded plan with assets sufficient to cover the plan's actuarial accrued liabilities. Lower ratios may indicate recent changes to benefit structures, funding of the plan below actuarial requirements, poor asset performance, or a variety of other factors.

Although the GASB requires that the actuarial value of assets be used to determine the funded ratio, Chart 16 shows the funded ratio calculated using both the actuarial value of assets (67.74%) and the market value of assets (62.41%).

The details regarding the calculations of these values and other GASB numbers may be found in Section 4, Exhibits II, III, and IV.

These graphs show key GASB factors.

CHART 15
Required Versus Actual Contributions

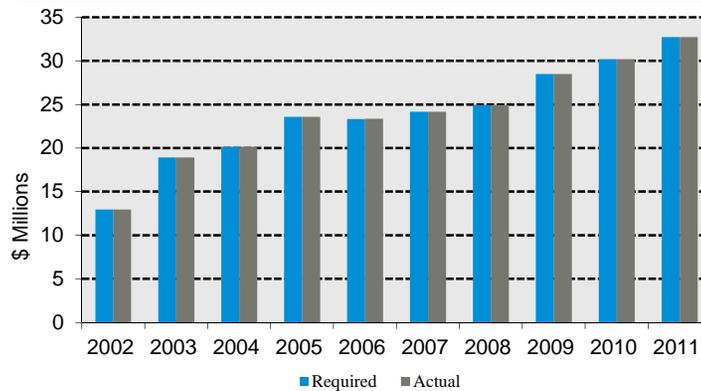
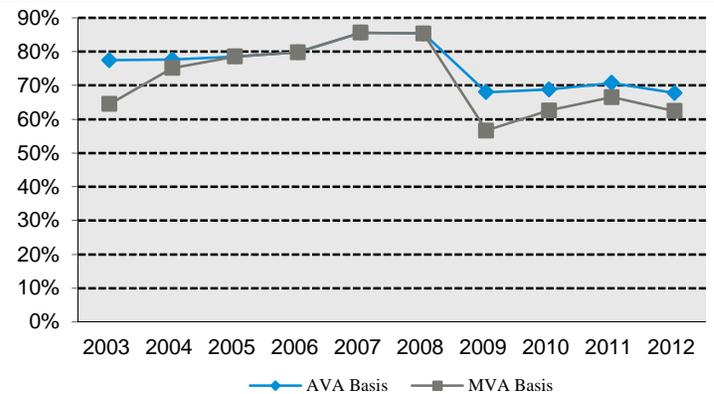


CHART 16
Funded Ratio



SECTION 3: Supplemental Information for the City of Worcester Retirement System

EXHIBIT A

Table of Plan Coverage

Category	Year Ended December 31		Change From Prior Year
	2011	2010	
Active participants in valuation:			
Number	3,178	3,208	-0.9%
Average age	47.3	47.0	N/A
Average years of service	14.2	13.9	N/A
Total payroll	\$152,705,056	\$150,758,766*	1.3%
Average payroll	48,051	46,995*	2.2%
Member contributions	159,541,719	152,215,911	4.8%
Inactive participants entitled to a return of their employee contributions			
	692	691	0.1%
Inactive participants with a vested right to a deferred or immediate benefit			
	67	62	8.1%
Retired participants:			
Number in pay status	1,805	1,826	-1.2%
Average age	74.7	74.5	N/A
Average monthly benefit	\$1,882	\$1,814	3.7%
Number in suspended status	1	0	N/A
Disabled participants:			
Number in pay status	462	458	0.9%
Average age	69.0	68.8	N/A
Average monthly benefit	\$2,653	\$2,616	1.4%
Beneficiaries in pay status:			
Number in pay status	509	514	-1.0%
Average age	77.2	77.3	N/A
Average monthly benefit	\$1,263	\$1,221	3.4%

* Calendar year 2010 payroll figures were reduced by 4.5% for police officers to reflect retroactive salary payments made in 2010.

SECTION 3: Supplemental Information for the City of Worcester Retirement System

EXHIBIT B

**Participants in Active Service as of December 31, 2011
By Age, Years of Service, and Average Payroll**

Age	Years of Service									
	Total	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 & over
Under 25	80	80	--	--	--	--	--	--	--	--
	\$26,693	\$26,693	--	--	--	--	--	--	--	--
25 - 29	212	160	49	3	--	--	--	--	--	--
	\$38,256	\$35,884	\$45,540	\$45,751	--	--	--	--	--	--
30 - 34	226	97	86	40	3	--	--	--	--	--
	\$45,615	\$37,642	\$53,193	\$48,330	\$49,984	--	--	--	--	--
35 - 39	280	80	64	101	35	--	--	--	--	--
	\$49,557	\$32,825	\$52,660	\$56,259	\$62,790	--	--	--	--	--
40 - 44	476	79	71	125	148	48	5	--	--	--
	\$53,090	\$34,213	\$45,384	\$51,430	\$66,278	\$57,190	\$72,557	--	--	--
45 - 49	489	64	51	112	117	74	68	3	--	--
	\$50,819	\$31,107	\$38,949	\$37,718	\$57,622	\$68,073	\$68,474	\$71,133	--	--
50 - 54	543	50	52	105	105	83	113	30	5	--
	\$48,282	\$32,066	\$32,924	\$32,376	\$42,667	\$57,936	\$69,632	\$67,636	\$63,251	--
55 - 59	477	37	35	78	98	52	72	71	33	1
	\$50,325	\$31,488	\$36,907	\$37,909	\$44,422	\$52,183	\$54,874	\$72,221	\$72,760	\$44,706
60 - 64	282	20	21	53	42	30	45	28	28	15
	\$48,306	\$42,344	\$42,762	\$33,142	\$40,603	\$42,603	\$46,750	\$71,152	\$72,114	\$68,143
65 - 69	80	1	4	15	17	13	15	2	5	8
	\$40,341	\$29,971	\$43,099	\$43,643	\$35,138	\$38,037	\$38,173	\$39,139	\$53,658	\$44,913
70 & over	33	--	3	6	4	8	5	2	1	4
	\$32,761	--	\$23,387	\$28,201	\$41,650	\$30,952	\$34,285	\$45,668	\$46,810	\$29,491
Total	3,178	668	436	638	569	308	323	136	72	28
	\$48,051	\$33,672	\$44,792	\$42,857	\$53,078	\$56,250	\$60,948	\$70,088	\$70,162	\$55,147

SECTION 3: Supplemental Information for the City of Worcester Retirement System

EXHIBIT C

Summary Statement of Income and Expenses on an Actuarial Value Basis

	Year Ended December 31, 2011	Year Ended December 31, 2010
Net assets at actuarial value at the beginning of the year	\$724,997,822	\$679,509,973
Contribution income:		
Employer contributions	\$32,706,347	\$30,196,905
Employee contributions	13,602,407	13,960,465
Less administrative expenses	<u>-569,245</u>	<u>-557,170</u>
Net contribution income	\$45,739,509	\$43,600,200
Net investment income	<u>7,371,682</u>	<u>64,588,917</u>
Total income available for benefits	\$53,111,191	\$108,189,117
Less benefit payments:		
Pensions	-\$55,937,057	-\$53,379,555
Net 3(8)(c) reimbursements	-1,639,758	-1,806,378
Refunds, annuities, & Option B refunds	-10,027,040	-9,250,746
State reimbursements	1,596,702	1,726,411
Workers' Compensation settlement	<u>8,500</u>	<u>9,000</u>
Net benefit payments	-\$65,998,653	-\$62,701,268
Change in reserve for future benefits	-\$12,887,462	\$45,487,849
Net assets at actuarial value at the end of the year	\$712,110,360	\$724,997,822

SECTION 3: Supplemental Information for the City of Worcester Retirement System

EXHIBIT D

Development of the Fund Through December 31, 2011

Year Ended December 31	Employer Contributions	Employee Contributions	Net Investment Return*	Administrative Expenses	Benefit Payments	Actuarial Value of Assets at End of Year
2002	\$12,956,778	\$11,182,339	-\$46,582,424	\$573,697	\$43,607,213	\$554,190,090
2003	18,928,252	10,333,125	41,670,173	440,295	47,558,278	577,123,067
2004	20,150,377	11,692,796	47,848,351	518,078	50,196,897	606,099,616
2005	23,579,478	11,905,078	55,470,778	556,781	52,481,665	644,016,504
2006	23,354,603	12,607,303	91,535,234	621,648	54,095,226	716,796,770
2007	24,166,318	12,829,448	61,690,401	555,774	55,516,831	759,410,332
2008	24,947,158	14,428,460	-108,338,166	554,276	57,999,513	631,893,995
2009	28,505,066	14,190,598	65,765,691	538,983	60,306,394	679,509,973
2010	30,196,905	13,960,465	64,588,917	557,170	62,701,268	724,997,822
2011	32,706,347	13,602,407	7,371,682	569,245	65,998,653	712,110,360

* Net of investment expenses. Reflects changes in asset method in 2003, 2004, 2008 and 2009.

SECTION 3: Supplemental Information for the City of Worcester Retirement System

EXHIBIT E

Development of Unfunded Actuarial Accrued Liability and (Gain)/Loss for Year Ended December 31, 2011

1. Unfunded actuarial accrued liability at beginning of year		\$300,077,601
2. Normal cost at beginning of year		23,414,464
3. Total contributions		-46,308,754
4. Interest		
(a) For whole year on (1) + (2)	\$25,879,365	
(b) For half year on (3)	<u>-1,674,395</u>	
(c) Total interest		<u>24,204,970</u>
5. Expected unfunded actuarial accrued liability		\$301,388,281
6. Changes due to:		
(a) Investment loss	\$49,817,777	
(b) Net gain from other experience	-14,469,293	
(c) Assumption changes	-2,843,152	
(d) Increase to COLA base	<u>5,186,817</u>	
(e) Total changes		<u>37,692,149</u>
7. Unfunded actuarial accrued liability at end of year		<u>\$339,080,430</u>

SECTION 3: Supplemental Information for the City of Worcester Retirement System

EXHIBIT F

Table of Amortization Bases as of July 1, 2012

Type	Annual Payment	Rate of Increase	Years Remaining	Outstanding Balance
2002 ERI	\$1,547,977	0.0%	6	\$7,728,601
2010 ERI	556,347	0.0%	9	3,753,470
Section 90 ACD liability	1,114,537	0.0%	2	2,146,515
Remaining unfunded liability	<u>22,796,561</u>	4.0%	23	<u>338,754,134</u>
Total	\$26,015,422			\$352,382,720

Notes: Recommended contributions are assumed to be paid at the beginning of the fiscal year.

Payment on remaining unfunded liability is \$25,273,360 in fiscal 2014, \$27,990,246 in fiscal 2015, and will increase 4% per year thereafter.

SECTION 3: Supplemental Information for the City of Worcester Retirement System

EXHIBIT G

Funding Schedule

(1) Fiscal Year Ended June 30	(2) Employer Normal Cost	(3) Amortization of 2002 ERI Liability	(4) Amortization of 2010 ERI Liability	(5) Amortization of Section 90 ACD Liability	(6) Amortization of Remaining Unfunded Liability	(7) Total Plan Cost: (2) + (3) + (4) + (5) + (6)	(8) Total UAAL at the Beginning of the Fiscal Year	(9) Total Plan Cost % Increase
2013	\$9,307,433	\$1,547,977	\$556,347	\$1,114,537	\$22,796,561	\$35,322,855	\$352,382,720	--
2014	9,656,462	1,547,977	556,347	1,114,537	25,273,360	38,148,683	406,838,125	8.00%
2015	10,018,579	1,547,977	556,347	-	27,990,246	40,113,149	401,832,184	5.15%
2016	10,394,276	1,547,977	556,347	-	29,109,856	41,608,456	409,245,427	3.73%
2017	10,784,061	1,547,977	556,347	-	30,274,250	43,162,635	422,519,117	3.74%
2018	11,188,463	1,547,977	556,347	-	31,485,220	44,778,007	421,351,786	3.74%
2019	11,608,030	-	556,347	-	32,744,629	44,909,006	418,783,222	0.29%
2020	12,043,331	-	556,347	-	34,054,414	46,654,092	416,320,826	3.89%
2021	12,494,956	-	556,347	-	35,416,591	48,467,894	412,246,874	3.89%
2022	12,963,517	-	-	-	36,833,255	49,796,772	406,375,851	2.74%
2023	13,449,649	-	-	-	38,306,585	51,756,234	399,106,004	3.93%
2024	13,954,011	-	-	-	39,838,848	53,792,859	389,663,373	3.94%
2025	14,477,286	-	-	-	41,432,402	55,909,688	377,810,487	3.94%
2026	15,020,184	-	-	-	43,089,698	58,109,882	363,288,332	3.94%
2027	15,583,441	-	-	-	44,813,286	60,396,727	345,814,525	3.94%
2028	16,167,820	-	-	-	46,605,817	62,773,637	325,081,338	3.94%
2029	16,774,113	-	-	-	48,470,050	65,244,163	300,753,563	3.94%
2030	17,403,142	-	-	-	50,408,852	67,811,994	272,466,194	3.94%
2031	18,055,760	-	-	-	52,425,206	70,480,966	239,821,929	3.94%
2032	18,732,851	-	-	-	54,522,214	73,255,065	202,388,461	3.94%
2033	19,435,333	-	-	-	56,703,103	76,138,436	159,695,547	3.94%
2034	20,164,158	-	-	-	58,971,227	79,135,385	111,231,840	3.94%
2035	20,920,314	-	-	-	56,441,462	77,361,776	56,441,462	-2.24%

Notes: Assumes payment at beginning of fiscal year.

Normal cost and expenses are assumed to increase at 3.75% per year.

Fiscal 2013 contribution is the budgeted contribution of \$35,322,855.

Fiscal 2014 is the fiscal 2013 contribution increased by 8%.

Item 6 increases 10.75% in fiscal 2015, then 4% per year beginning fiscal 2016.

Projected unfunded actuarial accrued liability reflects deferred investment losses.

SECTION 3: Supplemental Information for the City of Worcester Retirement System

EXHIBIT H

Department Allocations of 2002 and 2010 ERI Amortization Payments and Section 90 ACD Amortization Payments

The total recommended employer contribution for fiscal 2013, excluding the ERI and Section 90 ACD amortizations, is \$32,103,994. This amount will be allocated to each department based on September 30 payroll. The ERI and Section 90 ACD amortizations

are allocated to each department based on actual ERI and Section 90 ACD participants, as shown below.

Department Allocation of ERI Amortizations

Department	Allocation of 2002 ERI Amortization	Allocation of 2010 ERI Amortization	Allocation of Section 90 ACD Amortization
Airport	--	\$20,929	--
Auditing	--	20,461	--
Clerk	--	5,522	--
DPW – Other	--	124,239	\$20,771
DPW - Parks	--	11,714	--
DPW – Sewer	\$74,142	32,987	11,333
DPW – Water	98,439	126,091	25,807
Fire	295,264	--	426,045
Health	--	6,677	--
Housing Authority	147,672	--	--
Inspectional Services	--	31,635	--
Library	--	51,630	--
Police	112,260	13,502	365,773
Public Schools	354,103	106,535	49,558
Treasury	--	4,425	--
Other	<u>466,097</u>	<u>--</u>	<u>215,250</u>
Total Fiscal Year 2013 Payment	\$1,547,977	\$556,347	\$1,114,537

SECTION 3: Supplemental Information for the City of Worcester Retirement System

EXHIBIT I

Definitions of Pension Terms

The following list defines certain technical terms for the convenience of the reader:

Assumptions or actuarial assumptions:

The estimates on which the cost of the Plan is calculated including:

- (a) Investment return — the rate of investment yield that the Plan will earn over the long-term future;
- (b) Mortality rates — the death rates of employees and pensioners; life expectancy is based on these rates;
- (c) Retirement rates — the rate or probability of retirement at a given age;
- (d) Turnover rates — the rates at which employees of various ages are expected to leave employment for reasons other than death, disability, or retirement.

Normal cost:

The amount of contributions required to fund the benefit allocated to the current year of service.

Actuarial accrued liability for actives:

The equivalent of the accumulated normal costs allocated to the years before the valuation date.

Actuarial accrued liability for pensioners:

The single sum value of lifetime benefits to existing pensioners. This sum takes account of life expectancies appropriate to the ages of the pensioners and the interest that the sum is expected to earn before it is entirely paid out in benefits.

Unfunded actuarial accrued liability:

The extent to which the actuarial accrued liability of the Plan exceeds the assets of the Plan. There are many approaches to paying off the unfunded actuarial accrued liability, from meeting the interest accrual only to amortizing it over a specific period of time.

SECTION 3: Supplemental Information for the City of Worcester Retirement System

**Amortization of the unfunded
actuarial accrued liability:**

Payments made over a period of years equal in value to the Plan's unfunded actuarial accrued liability.

Investment return:

The rate of earnings of the Plan from its investments, including interest, dividends and capital gain and loss adjustments, computed as a percentage of the average value of the fund. For actuarial purposes, the investment return often reflects a smoothing of the capital gains and losses to avoid significant swings in the value of assets from one year to the next.

SECTION 4: Reporting Information for the City of Worcester Retirement System

EXHIBIT I

Summary of Actuarial Valuation Results

The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including 509 beneficiaries in pay status and one retired participant in suspended status)	2,777
2. Participants active during the year ended December 31, 2011 with total accumulated contributions of \$159,541,719 and projected 2012 payroll as of January 1, 2012 of \$159,669,859	3,178
3. Inactive participants with a vested right to a return of their employee contributions as of December 31, 2011	692
4. Inactive participants with a vested right to a deferred or immediate benefit as of December 31, 2011	67

The actuarial factors as of January 1, 2012 are as follows:

1. Normal cost, including administrative expenses	\$23,720,313
2. Expected employer contributions	<u>-14,582,635</u>
3. Employer normal cost: (1) + (2)	\$9,137,678
4. Actuarial accrued liability	1,051,190,790
Retired participants and beneficiaries	\$586,490,665
Active participants	455,154,875
Inactive participants	9,545,250
5. Actuarial value of assets (\$656,001,767 at market value as reported in the draft Annual Statement)	712,110,360
6. Unfunded actuarial accrued liability: (4) – (5)	339,080,430

The determination of the recommended contribution is as follows:

1. Employer normal cost projected to July 1, 2012	\$9,307,433
2. Projected unfunded actuarial accrued liability as of July 1, 2012	352,382,720
3. Payment on projected unfunded actuarial accrued liability (final payment in fiscal 2035) as of July 1, 2012	26,015,422
4. Recommended fiscal 2013 contribution: (1) + (3)	35,322,855
5. Projected payroll as of July 1, 2012	162,636,116
6. Total recommended contribution as a percentage of projected payroll: (4) ÷ (5)	21.72%

Note: Recommended contributions are assumed to be paid at the beginning of the fiscal year.

SECTION 4: Reporting Information for the City of Worcester Retirement System

EXHIBIT II

Supplementary Information Required by the GASB – Schedule of Employer Contributions

Plan Year Ended December 31	Annual Required Contributions	Actual Contributions	Percentage Contributed
2002	\$12,956,778	\$12,956,778	100.0%
2003	18,928,252	18,928,252	100.0%
2004	20,150,377	20,150,377	100.0%
2005	22,228,892	23,579,478	106.1%
2006	23,316,836	23,354,603	100.2%
2007	24,166,318	24,166,318	100.0%
2008	24,947,158	24,947,158	100.0%
2009	28,505,066	28,505,066	100.0%
2010	30,196,905	30,196,905	100.0%
2011	32,706,347	32,706,347	100.0%

SECTION 4: Reporting Information for the City of Worcester Retirement System

EXHIBIT III

Supplementary Information Required by the GASB – Schedule of Funding Progress

Actuarial Valuation Date	Actuarial Value of Assets (a)	Actuarial Accrued Liability (AAL) (b)	Unfunded/ (Overfunded) AAL (UAAL) (b) - (a)	Funded Ratio (a) / (b)	Projected Payroll as of January 1 (c)	UAAL as a Percentage of Projected Payroll [(b) - (a)] / (c)
01/01/2003	\$554,190,090	\$715,855,564	\$161,665,474	77.42%	\$142,802,508	113.21%
01/01/2004	577,123,067	743,570,440	166,447,373	77.62%	138,796,895	119.92%
01/01/2005	606,099,616	771,948,311	165,848,695	78.52%	147,126,606	112.73%
01/01/2006	644,016,504	806,957,464	162,940,960	79.81%	145,830,593	111.73%
01/01/2007	716,796,770	837,608,233	120,811,463	85.58%	152,838,201	79.05%
01/01/2008	759,410,332	889,924,310	130,513,978	85.33%	156,585,326	83.35%
01/01/2009	631,893,995	929,569,464	297,675,469	67.98%	166,050,095	179.27%
01/01/2010	679,509,973	987,692,295	308,182,322	68.80%	166,392,075	185.21%
01/01/2011	724,997,822	1,025,075,423	300,077,601	70.73%	157,720,871	190.26%
01/01/2012	712,110,360	1,051,190,790	339,080,430	67.74%	159,669,859	212.36%

SECTION 4: Reporting Information for the City of Worcester Retirement System

EXHIBIT IV

Supplementary Information Required by the GASB

Valuation date	January 1, 2012
Actuarial cost method	Entry Age Normal Cost Method
Amortization method	Level payments on the 2002 and 2010 ERI liability and the Section 90 ACD liability; payment on the remaining unfunded liability increases 4% per year beginning with fiscal 2016 payment. Prior to fiscal 2016, the appropriation for fiscal 2013 and 2014 are 8% higher than the prior fiscal year; the payment on the remaining unfunded liability for fiscal 2015 is 10.75% higher than the prior year.
Remaining amortization period	6 years for the 2002 ERI liability 9 years for the 2010 ERI liability 2 years for the Section 90 ACD liability and 23 years for the remaining unfunded liability
Asset valuation method	Market value of assets less unrecognized returns in each of the last five years. Unrecognized return is equal to the difference between the actual and expected return on a market value basis, and is recognized over a five-year period, further adjusted, if necessary, to be within 10% of the market value.
Actuarial assumptions:	
Investment rate of return	8.00%
Projected salary increases	4.75%
Cost of living adjustments	3.00% of first \$13,000 of retirement income (previously, 3.00% of first \$12,000 of retirement income)
Plan membership:	
Retired participants and beneficiaries receiving benefits	2,777
Inactive participants entitled to a return of their employee contributions	692
Inactive participants with a vested right to a deferred or immediate benefit	67
Active participants	<u>3,178</u>
Total	6,714

SECTION 4: Reporting Information for the City of Worcester Retirement System

EXHIBIT V

Actuarial Assumptions and Actuarial Cost Method

Mortality Rates:

Healthy: RP-2000 Combined Healthy Mortality Table projected 12 years with Scale AA (previously, 1994 Group Annuity Mortality Table)

Disabled: RP-2000 Combined Healthy Mortality Table set forward 5 years projected 12 years with Scale AA (previously, 1994 Group Annuity Mortality Table set forward 5 years)

The RP-2000 Combined Healthy Mortality Table projected 12 years with Scale AA was determined to contain provision appropriate to reasonably reflect future mortality improvement, based on a review of mortality experience as of the measurement date.

Termination Rates before Retirement:

Age	Rate (%)			
	Mortality		Groups 1 and 2	
	Male	Female	Disability	Withdrawal
20	0.03	0.02	0.01	12.00
25	0.03	0.02	0.03	8.78
30	0.04	0.02	0.04	5.55
35	0.07	0.04	0.07	3.93
40	0.10	0.06	0.13	2.31
45	0.13	0.09	0.18	1.89
50	0.17	0.14	0.24	1.46
55	0.29	0.25	0.30	0.00
60	0.56	0.48	0.35	0.00

*Notes: 55% of the disability rates shown represent accidental disability.
 20% of the accidental disabilities will die from the same cause as the disability.
 55% of the death rates shown represent accidental death.*

SECTION 4: Reporting Information for the City of Worcester Retirement System

Age	Mortality		Group 4	
	Male	Female	Disability	Withdrawal
20	0.03	0.02	0.13	2.10
25	0.03	0.02	0.25	1.88
30	0.04	0.02	0.38	1.65
35	0.07	0.04	0.38	1.11
40	0.10	0.06	0.38	0.56
45	0.13	0.09	1.25	0.28
50	0.17	0.14	1.56	0.00
55	0.29	0.25	1.50	0.00
60	0.56	0.48	1.06	0.00

*Notes: 90% of the disability rates shown represent accidental disability.
 60% of the accidental disabilities will die from the same cause as the disability.
 90% of the death rates shown represent accidental death.*

Retirement Rates:

Age	Rate (%)	
	Groups 1 and 2	Group 4
50	3.0	5.0
51-54	1.0	1.0
55	2.0	16.0
56	2.0	9.0
57	3.0	9.0
58	3.0	12.0
59	3.0	11.0
60	8.0	24.0
61	7.0	14.0
62	15.0	20.0
63	11.0	13.0
64	10.0	19.0
65	36.0	100.00

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		Rate (%)	
Age	Groups 1 and 2	Group 4	
66	22.0		
67	22.0		
68	22.0		
69	25.0		
70	100.0		

Previously,

Groups 1 and 2		Group 4	
Age	Rate (%)	Age	Rate (%)
55	12.55	50	32.00
56	3.21	51	7.21
57	3.10	52	5.90
58	3.34	53	8.00
59	3.48	54	7.71
60	7.84	55	15.51
61	6.92	56	9.11
62	15.11	57	9.09
63	10.71	58	11.90
64	10.37	59	11.42
65	35.68	60	23.95
66	22.14	61	13.60
67	21.59	62	19.50
68	21.64	63	12.53
69	25.36	64	18.73
70	100.00	65	100.00

Unknown Data for Participants: Same as those exhibited by participants with similar known characteristics.

Age of Spouse: Females three years younger than their spouses.

Percent Married: 80%

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Benefit Election:	All participants are assumed to elect Option A.
Net Investment Return:	8.00%
Salary Increases:	4.75% (Includes allowance for inflation of 3.75%)
Interest on Employee Contributions:	3.50%
Administrative Expenses:	\$600,000 for calendar 2012, increasing 3.75% per year (previously, \$625,000 for calendar 2011)
2011 Salary:	2011 salary equal to salaries provided in the data, except for new hires where salaries were calculated from annualized contributions divided by the contribution rate(s) reported.
Total Service:	Total creditable service based on adjusted date of hire.
Net 3(8)(c) Liability:	Estimated liability of \$15.3 million based on net annual benefits of \$1.7 million. (Previously, estimated liability of \$15.7 million based on net annual benefits of \$1.8 million.)
Actuarial Value of Assets:	Market value of assets as reported in the System's Annual Statement less unrecognized return in each of the last five years. Unrecognized return is equal to the difference between the actual market value return and the expected market value return and is recognized over a five-year period, further adjusted, if necessary, to be within 10% of the market value.
Actuarial Cost Method:	Entry Age Normal Actuarial Cost Method. Entry Age is the age of the participant less Total Service as defined above. Normal Cost and Actuarial Accrued Liability are calculated on an individual basis and are allocated by salary. This valuation reflects a change in valuation software.

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Changes in Assumptions:

This valuation reflects the following changes in assumptions:

- The administrative expense assumption was lowered from \$625,000 for calendar 2011 to \$600,000 for calendar 2012, based on the projected 2012 budget.
- The mortality table for healthy participants was changed from the 1994 Group Annuity Mortality Table to the RP-2000 Combined Healthy Mortality Table projected 12 years with Scale AA.
- The mortality table for disabled participants was changed from the 1994 Group Annuity Mortality Table set forward 5 years to the RP-2000 Combined Healthy Mortality Table set forward 5 years projected 12 years with Scale AA.
- The assumed rates of retirement and disability were changed to better reflect past experience and future expectations.
- The net 3(8)(c) liability assumption was reduced from an estimated liability of \$15.7 million based on net annual benefits of \$1.8 million to an estimated liability of \$15.3 million based on net annual benefits of \$1.7 million.

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EXHIBIT VII

Summary of Plan Provisions

This exhibit summarizes the major provisions of Chapter 32 of the Laws of Massachusetts.

Plan Year: January 1 – December 31

Retirement Benefits

Employees covered by the Contributory Retirement Law are classified into one of four groups depending on job classification. Group 1 comprises most positions in state and local government. It is the general category of public employees. Group 4 comprises mainly police and firefighters. Group 2 is for other specified hazardous occupations. (Officers and inspectors of the State Police are classified as Group 3.)

The annual amount of the retirement allowance is based on the member’s final three-year average salary multiplied by the number of years and full months of creditable service at the time of retirement and multiplied by a percentage according to the following table based on the age of the member at retirement:

Age Last Birthday at Date of Retirement			
Percent	Group 1	Group 2	Group 4
2.5	65 or over	60 or over	55 or over
2.4	64	59	54
2.3	63	58	53
2.2	62	57	52
2.1	61	56	51
2.0	60	55	50
1.9	59	--	49
1.8	58	--	48
1.7	57	--	47
1.6	56	--	46
1.5	55	--	45

A member’s final three-year average salary is defined as the greater of the highest consecutive three-year average annual rate of regular compensation and the average

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annual rate of regular compensation received during the last three years of creditable service prior to retirement.

The maximum annual amount of the retirement allowance is 80 percent of the member's final three-year average salary. Any member who is a veteran also receives an additional yearly retirement allowance of \$15 per year of creditable service, not exceeding \$300. The veteran allowance is paid in addition to the 80 percent maximum.

Employee Contributions

<u>Date of Hire</u>	<u>Contribution Rate</u>
Prior to January 1, 1975	5%
January 1, 1975 – December 31, 1983	7%
January 1, 1984 – June 30, 1996	8%
July 1, 1996 onward	9%

In addition, employees hired after December 31, 1978 contribute an additional 2 percent of salary in excess of \$30,000.

Employees hired after 1983 who leave with less than five years of credited service receive no interest on their contributions, and employees who leave with five but less than ten years receive one-half the rate of regular interest otherwise payable.

Retirement Benefits (Superannuation)

Members of Group 1, 2 or 4 may retire upon the attainment of age 55. For retirement at ages below 55, twenty years of creditable service is required.

Members who terminate before age 55 with ten or more years of creditable service are eligible for a retirement allowance upon the attainment of age 55 (provided they have not withdrawn their accumulated deductions from the Annuity Savings Fund of the System).

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Ordinary Disability Benefits

A member who is unable to perform his or her job due to a non-occupational disability will receive a retirement allowance if he or she has ten or more years of creditable service and has not reached age 55. The annual amount of such allowance shall be determined as if the member retired for superannuation at age 55, based on the amount of creditable service at the date of disability. For veterans, there is a minimum benefit of 50 percent of the member's most recent year's pay plus an annuity based on his or her own contributions.

Accidental Disability Benefit

For a job-connected disability, the benefit is 72 percent of the member's most recent annual pay plus an annuity based on his or her own contributions, plus additional amounts for surviving children. Benefits are capped at 75 percent of annual rate of regular compensation for employees who become members after January 1, 1988.

Death Benefits

In general, the beneficiary of an employee who dies in active service will receive a refund of the employee's own contributions. Alternatively, if the employee were eligible to retire on the date of death, a spouse's benefit will be paid equal to the amount the employee would have received under Option C. The surviving spouse of a member who dies with two or more years of credited service has the option of a refund of the employee's contributions or a monthly benefit regardless of eligibility to retire, if they were married for at least one year. There is also a minimum widow's pension of \$250 per month, and there are additional amounts for surviving children. If an employee's death is job-connected, the spouse will receive 72 percent of the member's most recent annual pay, in addition to a refund of the member's accumulated deductions, plus additional amounts for surviving children. However, in accordance with Section 100 of Chapter 32, the surviving spouse of a police officer, firefighter or corrections officer is killed in the line of duty will be eligible to receive an annual benefit equal to the maximum salary held by the member at the time of death.

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Upon the death of a job-connected disability retiree who retired prior to November 7, 1996 and could not elect an Option C benefit, a surviving spouse will receive an allowance of \$9,000 per year (previously \$6,000) if the member dies for a reason unrelated to cause of disability.

"Heart And Lung Law" And Cancer Presumption

Any case of hypertension or heart disease resulting in total or partial disability or death to a uniformed fireman, permanent member of a police department, or certain employees of a county correctional facility is presumed to have been suffered in the line of duty, unless the contrary is shown by competent evidence. Any case of disease of the lungs or respiratory tract resulting in total disability or death to a uniformed fireman is presumed to have been suffered in the line of duty, unless the contrary is shown by competent evidence. There is an additional presumption for uniformed firemen that certain types of cancer are job-related if onset occurs while actively employed or within five years of retirement.

Options

Members may elect to receive a full retirement allowance payable for life under Option A. Under Option B a member may elect to receive a lower monthly allowance in exchange for a guarantee that at the time of death any contributions not expended for annuity payments will be refunded to the beneficiary. Option C allows the member to take a lesser retirement allowance in exchange for providing a survivor with two-thirds of the lesser amount. Option C pensioners will have benefits converted from a reduced to a full retirement if the beneficiary predeceases the retiree.

Post-Retirement Benefits

The Board has adopted the provisions of Section 51 of Chapter 127 of the Acts of 1999, which provide that the Retirement Board may approve an annual COLA in excess of the Consumer Price Index but not to exceed a 3% COLA on the first \$12,000 of a retirement allowance. As of July 1, 2012, this will increase to an annual COLA in excess of the CPI but not to exceed 3% of the first \$13,000 of a retirement allowance. Cost-of-living increases granted prior to July 1, 1998 are reimbursed by the Commonwealth and not reflected in this report.

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Changes in Plan Provisions

The Board has increased the Section 101 annual allowance from \$6,000 to \$9,000.
As permitted by Section 19 of Chapter 188 of the Acts of 2010, the Board has adopted an increase to the retiree Cost of Living Adjustment base from \$12,000 to \$13,000 as of July 1, 2012.