

Middlesex County Retirement System

Governmental Accounting Standards Board (GASB)
Statements No. 67 and 68 Accounting Valuation Report
as of December 31, 2015





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August 10, 2016

*Retirement Board
Middlesex County Retirement System
25 Linnell Circle
Billerica, MA 01865*

Dear Board Members:

We are pleased to submit this Governmental Accounting Standards Board (GASB) Statements No. 67 and 68 Accounting Valuation as of December 31, 2015 for the Middlesex County Retirement System, a cost-sharing multiple-employer defined benefit pension plan. It contains the actuarial information that will need to be disclosed in order to comply with GASB 67 and 68.

This report was prepared in accordance with generally accepted actuarial principles and practices at the request of the Board to assist the Board and the member units in preparing their financial reports. This valuation report may not otherwise be copied or reproduced in any form without the consent of the Board and may only be provided to other parties in its entirety. The census and financial information on which our calculations were based was provided by the Middlesex County 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; and changes in plan provisions or applicable law.


An actuarial valuation is a measurement at a specific date – it is not a prediction of a plan's future financial condition. We have not been retained to perform an analysis of the potential range of financial measurements, except where otherwise noted.

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 with you and to answering any questions.

Sincerely,

Segal Consulting, a Member of The Segal Group, Inc.

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

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SECTION 1: Valuation Summary for the Middlesex County Retirement System

Important Information About Actuarial Valuations

An actuarial valuation is a budgeting tool with respect to the financing of future uncertain obligations of a pension plan. As such, it will never forecast the precise future contribution requirements or the precise future stream of benefit payments. In any event, it is an estimated forecast – the actual cost of the plan will be determined by the benefits and expenses paid, not by the budgeting cost from the actuarial valuation.

In order to prepare a valuation, Segal Consulting (“Segal”) relies on a number of input items. These include:

- **Plan of benefits** Plan provisions define the rules that will be used to determine benefit payments, and those rules, or the interpretation of them, may change over time. It is important for the Board to keep Segal informed with respect to plan provisions and administrative procedures, and to review the plan summary included in our funding valuation report to confirm that Segal has correctly interpreted the plan of benefits.
- **Participant data** An actuarial valuation for a plan is based on data provided to the actuary by the plan. Segal does not audit such data for completeness or accuracy, other than reviewing it for obvious inconsistencies compared to prior data and other information that appears unreasonable. For most plans, it is not possible or desirable to take a snapshot of the actual work force on the valuation date. In any event, the actuarial valuation is based on a future work force that is presumed to be the same as the active population included in the valuation, but in fact, employment varies from year to year, sometimes quite considerably. It is not necessary to have perfect data for an actuarial valuation: the valuation is an estimated forecast, not a prediction. The uncertainties in other factors are such that even perfect data does not produce a “perfect” result. Notwithstanding the above, it is important for Segal to receive the best possible data and to be informed about any known incomplete or inaccurate data.
- **Assets** Part of the cost of a plan will be paid from existing assets – the balance will need to come from future contributions and investment income. The valuation is based on the asset values as of the valuation date, typically reported by the auditor. Some plans include assets, such as private equity holdings, real estate, or hedge funds, that are not subject to valuation by reference to transactions in the marketplace.
- **Actuarial assumptions** In preparing an actuarial valuation, Segal starts by developing a forecast of the benefits to be paid to existing plan participants for the rest of their lives and the lives of their beneficiaries. This requires actuarial assumptions as to the probability of death, disability, withdrawal, and retirement of each participant for each year, as well as forecasts of the plan’s benefits for each of those events. The forecasted benefits are then discounted to a present value, typically based on an estimate of the rate of return that will be achieved on the plan’s assets. All of these factors are uncertain and unknowable. Thus, there will be a range of reasonable assumptions, and the results may vary materially based on which assumptions the actuary selects within that range. That is, there is no right answer (except with hindsight). It is important for any user of an actuarial valuation to understand and accept this constraint. The actuarial model may use approximations and estimates that will have an immaterial impact on our results and will have no impact on the actual cost

SECTION 1: Valuation Summary for the Middlesex County Retirement System

of the plan. In addition, the actuarial assumptions may change over time, and while this can have a significant impact on the reported results, it does not mean that the previous assumptions or results were unreasonable or wrong.

Given the above, the user of Segal's actuarial valuation (or other actuarial calculations) needs to keep the following in mind:

- The actuarial valuation is prepared at the request of the Board to assist the sponsors of the Fund in preparing their financial report for the pension plan. It includes information for compliance with federal filing requirements and for the plan's auditor. Segal is not responsible for the use or misuse of its report, particularly by any other party.
- An actuarial valuation is a measurement at a specific date — it is not a prediction of a plan's future financial condition. Accordingly, Segal did not perform an analysis of the potential range of financial measurements, except where otherwise noted.
- Sections of this report include actuarial results that are not rounded, but that does not imply precision.
- Critical events for a plan include, but are not limited to, decisions about changes in benefits and contributions. The basis for such decisions needs to consider many factors such as the risk of changes in employment levels and investment losses, not just the current valuation results.
- Segal does not provide investment, legal, accounting, or tax advice. Segal's valuation is based on our understanding of applicable guidance in these areas and of the plan's provisions, but they may be subject to alternative interpretations. The Board should look to their other advisors for expertise in these areas.
- While Segal maintains extensive quality assurance procedures, an actuarial valuation involves complex computer models and numerous inputs. In the event that an inaccuracy is discovered after presentation of Segal's valuation, Segal may revise that valuation or make an appropriate adjustment in the next valuation.
- Segal's report shall be deemed to be final and accepted by the Board upon delivery and review. The Board should notify Segal immediately of any questions or concerns about the final content.

As Segal Consulting has no discretionary authority with respect to the management or assets of the Retirement System, it is not a fiduciary in its capacity as actuaries and consultants with respect to the Retirement System.

SECTION 1: Valuation Summary for the Middlesex County Retirement System

Purpose

This report has been prepared by Segal Consulting to present certain disclosure information required by Governmental Accounting Standards Board Statements No. 67 and 68 as of December 31, 2015. This report is based on financial information as of December 31, 2014 and December 31, 2015 provided by the Retirement System and the Middlesex County Retirement System Actuarial Valuation and Review as of January 1, 2014, dated February 26, 2015, which reflects:

- The benefit provisions of Massachusetts General Laws Chapter 32;
- The characteristics of covered active participants, inactive participants, and retired participants and beneficiaries as of January 1, 2014;
- The assets of the System as of December 31, 2013;
- 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:

- The Net Pension Liability (NPL) is equal to the difference between the Total Pension Liability (TPL) and the Plan's Fiduciary Net Position. The Plan's Fiduciary Net Position is equal to the market value of assets and therefore, the NPL measure is very similar to an Unfunded Actuarial Accrued Liability (UAAL) on a market value basis. The NPL increased from \$1.20 billion as of December 31, 2014 to \$1.29 billion as of December 31, 2015 and the Plan's Fiduciary Net Position as a percent of the TPL decreased from 47.65% to 46.13%.
- The NPL was measured as of December 31, 2015 and 2014 and determined based upon the results of the actuarial valuation as of January 1, 2014.
- The discount rate used to determine the TPL and NPL as of December 31, 2015 and 2014 was 7.875%.

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EXHIBIT 1

Net Pension Liability

The components of the net pension liability of the Middlesex County Retirement System are as follows:

	December 31, 2015	December 31, 2014
Total pension liability	\$2,394,501,842	\$2,294,876,389
Plan fiduciary net position	1,104,482,897	1,093,560,674
System's net pension liability	1,290,018,945	1,201,315,715
Plan fiduciary net position as a percentage of the total pension liability*	46.13%	47.65%

* These funded percentages are not necessarily appropriate for assessing the sufficiency of Plan assets to cover the estimated cost of settling the Plan's benefit obligation or the need for or the amount of future contributions.

Actuarial assumptions. The total pension liability as of December 31, 2015 and December 31, 2014 was determined by an actuarial valuation as of December 31, 2013, using the following actuarial assumptions, applied to all periods included in the measurement:

Inflation	4.00%			
Salary increases				
	Years of Service	Group 1	Group 2	Group 4
	0	6.00%	6.00%	7.00%
	1	5.50%	5.50%	6.50%
	2	5.50%	5.50%	6.00%
	3	5.25%	5.25%	5.75%
	4	5.25%	5.25%	5.25%
	5	4.75%	4.75%	5.25%
	6	4.75%	4.75%	4.75%
	7	4.50%	4.50%	4.75%
	8	4.50%	4.50%	4.75%
	9+	4.25%	4.50%	4.75%
Investment rate of return	7.875%, net of pension plan investment expense, including inflation			
Cost of Living Adjustments	3% of first \$14,000			

SECTION 2: Accounting Information for the Middlesex County Retirement System

Healthy:

Pre-Retirement RP-2000 Employee Mortality Table projected 22 years with Scale AA

Post-Retirement RP-2000 Healthy Annuitant Mortality Table projected 17 years with Scale AA

Disabled: RP-2000 Healthy Annuitant Mortality Table set forward three years projected 17 years with Scale AA

The long-term expected rate of return on pension plan investments was determined using a building-block method in which best-estimate ranges of expected future real rates of return (expected returns, net of pension plan investment expense and inflation) are developed for each major asset class. These ranges are combined to produce the long-term expected rate of return by weighting the expected future real rates of return by the target asset allocation percentage and by adding expected inflation. Best estimates of arithmetic real rates of return for each major asset class included in the pension plan’s target asset allocation as of December 31, 2015 are summarized in the following table:

Asset Class	Long-Term Expected Real Rate of Return
Domestic equity	6.49%
International developed markets equity	7.16%
International emerging markets equity	9.46%
Core fixed income	1.68%
High yield fixed income	4.76%
Real estate	4.37%
Commodities	4.13%
Hedge fund, GTAA, Risk parity	3.60%
Private equity	11.04%
Cash	1.11%

Discount rate: The discount rate used to measure the total pension liability was 7.875%. The projection of cash flows used to determine the discount rate assumed plan member contributions will be made at the current contribution rate and that contributions will be made at rates equal to the actuarially determined contribution rates. Based on those assumptions, the pension plan's fiduciary net position was projected to be available to make all projected future benefit payments of current plan members. Therefore, the long-term expected rate of return on pension plan investments was applied to all periods of projected benefit payments to determine the total pension liability.

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Sensitivity of the net pension liability to changes in the discount rate. The following presents the net pension liability, calculated using the discount rate of 7.875%, as well as what the net pension liability would be if it were calculated using a discount rate that is 1-percentage-point lower (6.875%) or 1-percentage-point higher (8.875%) than the current rate:

	1% Decrease (6.875%)	Current Discount (7.875%)	1% Increase (8.875%)
Middlesex County Retirement System's net pension liability as of December 31, 2015	\$1,549,069,449	\$1,290,018,945	\$1,069,419,459

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EXHIBIT 2

Schedule of Changes in the Net Pension Liability – Last Ten Years

	Year End December 31,									
	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006
Total pension liability										
Service cost	\$54,217,685	\$52,132,389								
Interest	179,703,272	172,094,226								
Differences between expected and actual experience	0	0								
Changes of assumptions	0	0								
Changes of benefit terms	0	0								
Benefit payments, including refunds of employee contributions	<u>-134,295,504</u>	<u>-125,082,678</u>								
Net change in total pension liability	\$99,625,453	\$99,143,937								
Total pension liability – beginning	<u>2,294,876,389</u>	<u>2,195,732,452</u>								
Total pension liability - ending (a)	\$2,394,501,842	\$2,294,876,389								
Plan fiduciary net position										
Contributions – employer	\$99,820,481	\$93,400,946								
Contributions – employee	40,870,163	39,806,980								
Net investment income	7,817,250	74,962,895								
Benefit payments, including refunds of employee contributions	<u>-134,295,504</u>	<u>-125,082,678</u>								
Administrative expenses	<u>-3,290,167</u>	<u>-3,540,884</u>								
Net change in fiduciary net position	\$10,922,223	\$79,547,259								
Plan fiduciary net position - beginning	<u>1,093,560,674</u>	<u>1,014,013,415</u>								
Plan fiduciary net position - ending (b)	\$1,104,482,897	\$1,093,560,674								
Net pension liability – ending: (a)-(b)	\$1,290,018,945	\$1,201,315,715								
Plan's fiduciary net position as a percentage of the total pension liability	46.13%	47.65%								
Covered-employee payroll	\$432,382,921	\$415,752,810								
Net pension liability as a percentage of covered-employee payroll	298.35%	288.95%								

(Historical information prior to implementation of GASB 67/68 is not required)

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Note: Covered-employee payroll for 2015 and 2014 as estimated in the January 1, 2014 funding valuation report.

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EXHIBIT 3

Schedule of Contributions – Last Ten Years

	Year End December 31,									
	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006
Actuarially determined contribution	\$98,792,642	\$92,826,743								
Contributions in relation to the actuarially determined contribution	<u>99,820,481</u>	<u>93,400,946</u>								
Contribution deficiency (excess)	-\$1,027,839	-\$574,203								
Covered-employee payroll	\$432,382,921	\$415,752,810								
Contributions as a percentage of covered-employee payroll	23.09%	22.47%								

(Historical information prior to implementation of GASB 67/68 is not required)

Note: Actuarially determined contributions for 2015 and 2014 are based on results from the January 1, 2014 and January 1, 2012 actuarial valuations (including assumptions and methods), respectively, which determined budgeted appropriations, adjusted to reflect actual timing of payments.

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EXHIBIT 4

Pension Expense and Deferred Outflows/Inflows of Resources Related to Pensions

A. Pension expense for the year ended June 30, 2016

Service cost	\$54,217,685
Interest	179,703,272
Contributions – employee	-40,870,163
Projected earnings on pension plan investments	-86,240,161
Administrative expenses	3,290,167
Recognized portion of current-period difference between expected and actual experience	0
Recognized portion of current-period difference between projected and actual earnings on pension plan investments	15,684,582
Recognized portion of current year period assumption change	0
Recognized portion of current year period plan change	0
Recognition of deferred outflows of resources	1,014,234
Recognition of deferred inflows of resources	<u>0</u>
Pension expense for fiscal year ended June 30, 2016	\$126,799,616

B. Deferred outflows/inflows of resources related to pensions

	Deferred Outflows of Resources	Deferred Inflows of Resources
Differences between expected and actual experience	\$0	\$0
Changes of assumptions	0	0
Net difference between projected and actual earnings on pension plan investments	<u>65,781,032</u>	<u>0</u>
Total	\$65,781,032	\$0

C. Projected recognition of deferred outflows/(inflows)

Year Ended June 30,	Recognition
2017	\$16,698,816
2018	16,698,816
2019	16,698,817
2020	15,684,583
Thereafter	0

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EXHIBIT 5

Determination of Proportionate Share

Employer Name	2015				2016			
	FY 2015 Total Appropriation	Percent of FY 2015 Total Appropriation	Share of NPL as of January 1, 2015	Percent of Total NPL as of January 1, 2015	FY 2016 Total Appropriation	Percent of FY 2016 Total Appropriation	Share of NPL as of January 1, 2016	Percent of Total NPL as of January 1, 2016
Middlesex County Retirement Board	\$307,873	0.329625%	\$0	0.000000%	\$311,767	0.312328%	\$0	0.000000%
Middlesex County	0	0.000000%	0	0.000000%	0	0.000000%	0	0.000000%
Middlesex Hospital	0	0.000000%	0	0.000000%	0	0.000000%	0	0.000000%
Town of Acton	2,512,579	2.690100%	41,050,336	3.417115%	3,243,883	3.249717%	44,369,446	3.439441%
Town of Ashby	150,378	0.161003%	1,427,805	0.118853%	163,640	0.163934%	1,611,292	0.124905%
Town of Ashland	2,233,252	2.391038%	24,556,017	2.044094%	2,311,579	2.315736%	26,910,611	2.086063%
Town of Ayer	1,344,155	1.439124%	15,773,883	1.313051%	1,343,292	1.345708%	17,086,573	1.324521%
Town of Bedford	3,372,935	3.611243%	43,939,870	3.657645%	3,481,523	3.487784%	47,296,776	3.666363%
Town of Billerica	8,541,268	9.144734%	119,887,544	9.979687%	9,204,554	9.221108%	127,076,615	9.850756%
Town of Boxborough	545,780	0.584341%	7,339,622	0.610965%	629,903	0.631036%	7,963,070	0.617283%
Town of Burlington	7,511,305	8.042001%	98,053,205	8.162151%	7,895,297	7.909496%	104,556,462	8.105033%
Town of Carlisle	726,609	0.777946%	7,984,515	0.664648%	771,117	0.772504%	8,912,755	0.690901%
Town of Chelmsford	6,483,706	6.941799%	88,099,468	7.333582%	7,096,040	7.108802%	93,051,442	7.213184%
Town of Dracut	3,864,705	4.137758%	48,701,871	4.054044%	3,970,321	3.977461%	52,368,527	4.059516%
Town of Dunstable	198,716	0.212756%	2,190,299	0.182325%	215,351	0.215738%	2,389,144	0.185202%
Town of Groton	1,560,704	1.670972%	19,495,870	1.622876%	1,737,842	1.740967%	20,586,198	1.595806%
Town of Holliston	1,946,930	2.084486%	21,225,487	1.766853%	1,861,516	1.864864%	23,403,449	1.814194%
Town of Hopkinton	1,812,062	1.940090%	16,828,857	1.400869%	1,728,744	1.731853%	19,499,185	1.511543%
Town of Hudson	4,153,464	4.446919%	52,755,296	4.391460%	4,397,249	4.405157%	56,963,462	4.415707%

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Employer Name	2015				2016			
	FY 2015 Total Appropriation	Percent of FY 2015 Total Appropriation	Share of NPL as of January 1, 2015	Percent of Total NPL as of January 1, 2015	FY 2016 Total Appropriation	Percent of FY 2016 Total Appropriation	Share of NPL as of January 1, 2016	Percent of Total NPL as of January 1, 2016
Town of Lincoln	1,622,193	1.736806%	21,739,395	1.809632%	1,802,909	1.806151%	23,666,611	1.834594%
Town of Littleton	1,711,410	1.832326%	19,021,595	1.583397%	1,762,316	1.765485%	21,397,309	1.658682%
Town of North Reading	3,126,208	3.347084%	41,397,005	3.445972%	3,283,343	3.289248%	44,145,145	3.422054%
Town of Pepperell	967,605	1.035969%	11,580,175	0.963958%	1,009,146	1.010961%	12,706,598	0.984993%
Town of Sherborn	706,278	0.756179%	9,464,261	0.787825%	821,360	0.822837%	10,262,053	0.795496%
Town of Shirley	649,803	0.695714%	8,549,600	0.711686%	710,468	0.711746%	9,134,041	0.708055%
Town of Stow	685,927	0.734390%	8,519,238	0.709159%	702,159	0.703422%	9,234,186	0.715818%
Town of Sudbury	3,458,181	3.702512%	48,635,848	4.048548%	3,710,907	3.717581%	51,874,232	4.021199%
Town of Tewksbury	6,304,010	6.749407%	81,064,434	6.747971%	6,586,336	6.598181%	85,301,248	6.612403%
Town of Townsend	673,724	0.721325%	6,742,808	0.561285%	650,040	0.651209%	7,475,618	0.579497%
Town of Tyngsborough	1,399,358	1.498227%	16,343,894	1.360500%	1,437,048	1.439632%	17,982,560	1.393976%
Town of Wayland	3,740,468	4.004743%	49,341,309	4.107272%	3,971,988	3.979131%	53,154,605	4.120452%
Town of Westford	3,808,963	4.078078%	42,997,563	3.579206%	3,993,806	4.000989%	47,358,134	3.671119%
Town of Weston	4,139,155	4.431599%	54,939,016	4.573237%	4,270,242	4.277922%	58,678,679	4.548668%
Town of Wilmington	4,952,939	5.302879%	69,798,925	5.810207%	5,342,251	5.351859%	74,403,164	5.767602%
Acton-Boxborough RSD	1,756,208	1.880289%	21,781,913	1.813171%	1,961,424	1.964951%	23,515,180	1.822855%
Acton Water Supply	133,367	0.142790%	2,562,079	0.213273%	165,791	0.166089%	2,784,648	0.215861%
Bedford Housing Authority	23,693	0.025367%	243,648	0.020282%	26,527	0.026575%	263,833	0.020452%
Billerica Housing Authority	86,316	0.092414%	1,012,365	0.084271%	82,988	0.083137%	1,068,744	0.082847%
Chelmsford Housing Authority	81,762	0.087539%	1,002,070	0.083414%	93,720	0.093889%	1,138,990	0.088293%
Chelmsford Water District	743,247	0.795760%	2,106,325	0.175335%	1,186,049	1.188182%	1,402,613	0.108728%

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Employer Name	2015				2016			
	FY 2015 Total Appropriation	Percent of FY 2015 Total Appropriation	Share of NPL as of January 1, 2015	Percent of Total NPL as of January 1, 2015	FY 2016 Total Appropriation	Percent of FY 2016 Total Appropriation	Share of NPL as of January 1, 2016	Percent of Total NPL as of January 1, 2016
Dracut Housing Authority	99,462	0.106489%	1,713,245	0.142614%	110,203	0.110401%	1,785,743	0.138428%
Dracut Water Supply	128,920	0.138029%	2,291,065	0.190713%	147,603	0.147868%	2,428,037	0.188217%
E. Chelmsford Water	19,234	0.020593%	250,496	0.020852%	24,608	0.024652%	286,759	0.022229%
E. Middlesex Mosq Control	39,179	0.041947%	404,042	0.033633%	37,103	0.037170%	496,144	0.038460%
Greater Lowell RVTSD	1,067,953	1.143407%	13,955,534	1.161687%	1,128,497	1.130527%	14,784,348	1.146057%
Groton-Dunstable RSD	684,179	0.732518%	7,593,692	0.632115%	707,990	0.709263%	8,509,375	0.659632%
Hudson Housing Authority	65,711	0.070354%	1,329,916	0.110705%	89,676	0.089837%	1,399,262	0.108468%
Lincoln Sudbury	523,265	0.560235%	7,427,692	0.618296%	548,534	0.549520%	7,913,832	0.613466%
Nashoba Vally THSD	183,580	0.196550%	3,059,922	0.254714%	230,992	0.231407%	3,156,315	0.244672%
N. Chelmsford Water	37,663	0.040324%	625,314	0.052052%	39,106	0.039176%	748,681	0.058036%
North Middlesex RSD	759,662	0.813334%	10,106,977	0.841326%	836,323	0.837827%	10,991,588	0.852049%
Shawsheen Valley RVS	448,563	0.480255%	6,940,284	0.577724%	520,323	0.521259%	7,364,846	0.570910%
South Middlesex RVTS	458,947	0.491373%	6,035,168	0.502380%	490,299	0.491181%	6,481,194	0.502411%
Sudbury Water District	85,316	0.091344%	1,332,112	0.110888%	82,136	0.082284%	1,446,469	0.112128%
Tewksbury Housing Authority	80,757	0.086463%	1,170,186	0.097409%	99,575	0.099754%	1,248,093	0.096750%
Wayland Housing Authority	34,540	0.036980%	388,273	0.032321%	30,339	0.030394%	447,164	0.034663%
Hopkinton Housing Authority	25,627	0.027438%	390,851	0.032535%	28,891	0.028943%	442,908	0.034333%
Sudbury Housing Authority	28,129	0.030116%	228,202	0.018996%	22,778	0.022819%	266,258	0.020640%
Wilmington Housing Authority	21,919	0.023468%	253,992	0.021143%	24,091	0.024134%	271,567	0.021051%

SECTION 2: Accounting Information for the Middlesex County Retirement System

Employer Name	2015				2016			
	FY 2015 Total Appropriation	Percent of FY 2015 Total Appropriation	Share of NPL as of January 1, 2015	Percent of Total NPL as of January 1, 2015	FY 2016 Total Appropriation	Percent of FY 2016 Total Appropriation	Share of NPL as of January 1, 2016	Percent of Total NPL as of January 1, 2016
Acton Housing Authority	60,393	0.064660%	753,333	0.062709%	65,147	0.065264%	827,882	0.064176%
Burlington Housing Authority	21,640	0.023169%	57,928	0.004822%	15,190	0.015217%	119,574	0.009269%
Ayer Housing Authority	33,261	0.035611%	394,227	0.032816%	16,010	0.016039%	441,841	0.034251%
Holliston Housing Authority	15,433	0.016523%	186,991	0.015566%	20,105	0.020141%	214,474	0.016626%
Littleton Housing Authority	25,490	0.027291%	354,194	0.029484%	29,540	0.029593%	367,115	0.028458%
Westford Housing Authority	31,870	0.034122%	388,239	0.032318%	35,704	0.035768%	427,017	0.033102%
Shirley Water District	17,261	0.018481%	317,690	0.026445%	17,865	0.017897%	358,461	0.027787%
Tyngsboro Housing Authority	25,001	0.026767%	387,394	0.032247%	31,734	0.031791%	399,306	0.030953%
Pepperell Housing Authority	7,350	0.007869%	90,362	0.007522%	8,913	0.008929%	100,348	0.007779%
Groton Housing Authority	2,770	0.002966%	8,010	0.000667%	2,247	0.002251%	12,029	0.000932%
Tyngsboro Water District	19,809	0.021209%	326,402	0.027170%	28,014	0.028064%	372,014	0.028838%
North Reading Housing Authority	14,453	0.015474%	76,277	0.006349%	10,459	0.010478%	84,100	0.006519%
West Groton Water	6,883	0.007369%	10,524	0.000876%	5,603	0.005613%	24,760	0.001919%
Ayer-Shirley RSD	289,491	0.309944%	4,313,770	0.359087%	400,447	0.401167%	4,808,243	0.372727%
Grand Totals:	\$ 93,400,946	100.000000%	\$1,201,315,715	100.000000%	\$ 99,820,481	100.000000%	\$1,290,018,945	100.000000%

Notes: Net Pension Liability for each employer was determined on an individual basis by rolling forward the Total Pension Liability from December 31, 2013 to December 31, 2015 for each employer and allocating the market value of assets as of December 31, 2015 to each employer based on detailed cash flow information provided by the Retirement System. The NPL for the Middlesex County Retirement Board, Middlesex County and the Middlesex Hospital has been allocated amongst the other units in the System because the obligation to fund these units is a shared responsibility of these other units.

SECTION 2: Accounting Information for the Middlesex County Retirement System

EXHIBIT 6

Determination of Pension Amounts by Employer as of June 30, 2016

Employer Name	Employer's Proportionate Share Allocation (1)	Net Pension Liability (2)	Covered Employee Payroll (3)	Discount Rate Sensitivity		
				1% Decrease (6.875%) (4)	Current Discount Rate (7.875%) (5)	1% Increase (8.875%) (6)
Middlesex County Retirement Board	0.000000%	\$0	\$1,465,931	\$0	\$0	\$0
Middlesex County	0.000000%	0	0	0	0	0
Middlesex Hospital	0.000000%	0	0	0	0	0
Town of Acton	3.439443%	44,369,446	13,048,335	53,279,358	44,369,446	36,782,072
Town of Ashby	0.124905%	1,611,292	926,336	1,934,865	1,611,292	1,335,758
Town of Ashland	2.086063%	26,910,611	11,676,182	32,314,565	26,910,611	22,308,764
Town of Ayer	1.324521%	17,086,573	5,391,242	20,517,750	17,086,573	14,164,685
Town of Bedford	3.666363%	47,296,776	16,858,665	56,794,509	47,296,776	39,208,799
Town of Billerica	9.850756%	127,076,615	31,382,222	152,595,052	127,076,615	105,345,902
Town of Boxborough	0.617283%	7,963,070	2,893,796	9,562,142	7,963,070	6,601,345
Town of Burlington	8.105033%	104,556,462	30,378,636	125,552,590	104,556,462	86,676,800
Town of Carlisle	0.690901%	8,912,755	4,723,787	10,702,536	8,912,755	7,388,630
Town of Chelmsford	7.213184%	93,051,442	24,062,042	111,737,230	93,051,442	77,139,193
Town of Dracut	4.059516%	52,368,527	14,583,214	62,884,722	52,368,527	43,413,254
Town of Dunstable	0.185202%	2,389,144	1,103,607	2,868,908	2,389,144	1,980,586
Town of Groton	1.595806%	20,586,198	6,891,765	24,720,143	20,586,198	17,065,860
Town of Holliston	1.814194%	23,403,449	10,190,662	28,103,125	23,403,449	19,401,344
Town of Hopkinton	1.511543%	19,499,185	12,526,442	23,414,851	19,499,185	16,164,735
Town of Hudson	4.415707%	56,963,462	21,010,326	68,402,368	56,963,462	47,222,430

SECTION 2: Accounting Information for the Middlesex County Retirement System

Employer Name	Employer's Proportionate Share Allocation (1)	Net Pension Liability (2)	Covered Employee Payroll (3)	Discount Rate Sensitivity		
				1% Decrease (6.875%) (4)	Current Discount Rate (7.875%) (5)	1% Increase (8.875%) (6)
Town of Lincoln	1.834594%	23,666,611	9,595,007	28,419,135	23,666,611	19,619,505
Town of Littleton	1.658682%	21,397,309	10,782,598	25,694,136	21,397,309	17,738,268
Town of North Reading	3.422054%	44,145,145	12,585,689	53,009,993	44,145,145	36,596,111
Town of Pepperell	0.984993%	12,706,598	4,458,982	15,258,226	12,706,598	10,533,707
Town of Sherborn	0.795496%	10,262,053	3,936,908	12,322,786	10,262,053	8,507,189
Town of Shirley	0.708055%	9,134,041	2,017,558	10,968,264	9,134,041	7,572,078
Town of Stow	0.715818%	9,234,186	3,198,487	11,088,518	9,234,186	7,655,097
Town of Sudbury	4.021199%	51,874,232	14,865,858	62,291,165	51,874,232	43,003,485
Town of Tewksbury	6.612403%	85,301,248	19,696,238	102,430,715	85,301,248	70,714,324
Town of Townsend	0.579497%	7,475,618	2,998,738	8,976,811	7,475,618	6,197,254
Town of Tyngsborough	1.393976%	17,982,560	7,440,290	21,593,656	17,982,560	14,907,451
Town of Wayland	4.120452%	53,154,605	18,096,912	63,828,663	53,154,605	44,064,915
Town of Westford	3.671119%	47,358,134	22,663,136	56,868,183	47,358,134	39,259,661
Town of Weston	4.548668%	58,678,679	19,366,732	70,462,026	58,678,679	48,644,341
Town of Wilmington	5.767602%	74,403,164	21,102,836	89,344,161	74,403,164	61,679,858
Acton-Boxborough RSD	1.822855%	23,515,180	12,897,778	28,237,290	23,515,180	19,493,966
Acton Water Supply	0.215861%	2,784,648	1,013,745	3,343,837	2,784,648	2,308,460
Bedford Housing Authority	0.020452%	263,833	134,739	316,816	263,833	218,718
Billerica Housing Authority	0.082847%	1,068,744	308,835	1,283,358	1,068,744	885,982
Chelmsford Housing Authority	0.088293%	1,138,990	1,369,463	1,367,720	1,138,990	944,223
Chelmsford Water District	0.108728%	1,402,613	1,222,528	1,684,272	1,402,613	1,162,758

SECTION 2: Accounting Information for the Middlesex County Retirement System

Employer Name	Employer's Proportionate Share Allocation (1)	Net Pension Liability (2)	Covered Employee Payroll (3)	Discount Rate Sensitivity		
				1% Decrease (6.875%) (4)	Current Discount Rate (7.875%) (5)	1% Increase (8.875%) (6)
Dracut Housing Authority	0.138428%	1,785,743	364,332	2,144,346	1,785,743	1,480,376
Dracut Water Supply	0.188217%	2,428,037	631,262	2,915,612	2,428,037	2,012,829
E. Chelmsford Water	0.022229%	286,759	191,066	344,343	286,759	237,721
E. Middlesex Mosq Control	0.038460%	496,144	367,510	595,772	496,144	411,299
Greater Lowell RVTSD	1.146057%	14,784,348	5,107,305	17,753,219	14,784,348	12,256,157
Groton-Dunstable RSD	0.659632%	8,509,375	4,686,751	10,218,158	8,509,375	7,054,233
Hudson Housing Authority	0.108468%	1,399,262	283,285	1,680,245	1,399,262	1,159,978
Lincoln Sudbury	0.613466%	7,913,832	2,829,979	9,503,014	7,913,832	6,560,525
Nashoba Vally THSD	0.244672%	3,156,315	816,229	3,790,139	3,156,315	2,616,570
N. Chelmsford Water	0.058036%	748,681	502,236	899,018	748,681	620,648
North Middlesex RSD	0.852049%	10,991,588	4,990,136	13,198,831	10,991,588	9,111,978
Shawsheen Valley RVS	0.570910%	7,364,846	2,710,777	8,843,792	7,364,846	6,105,423
South Middlesex RVTS	0.502411%	6,481,194	2,325,406	7,782,695	6,481,194	5,372,881
Sudbury Water District	0.112128%	1,446,469	805,254	1,736,941	1,446,469	1,199,119
Tewksbury Housing Authority	0.096750%	1,248,093	356,427	1,498,725	1,248,093	1,034,663
Wayland Housing Authority	0.034663%	447,164	260,997	536,954	447,164	370,693
Hopkinton Housing Authority	0.034333%	442,908	178,070	531,842	442,908	367,164
Sudbury Housing Authority	0.020640%	266,258	97,892	319,728	266,258	220,728
Wilmington Housing Authority	0.021051%	271,567	120,677	326,095	271,567	225,123

SECTION 2: Accounting Information for the Middlesex County Retirement System

Employer Name	Employer's Proportionate Share Allocation (1)	Net Pension Liability (2)	Covered Employee Payroll (3)	Discount Rate Sensitivity		
				1% Decrease (6.875%) (4)	Current Discount Rate (7.875%) (5)	1% Increase (8.875%) (6)
Acton Housing Authority	0.064176%	827,882	344,529	994,131	827,882	686,311
Burlington Housing Authority	0.009269%	119,574	259,737	143,583	119,574	99,124
Ayer Housing Authority	0.034251%	441,841	168,284	530,572	441,841	366,287
Holliston Housing Authority	0.016626%	214,474	140,089	257,548	214,474	177,802
Littleton Housing Authority	0.028458%	367,115	37,533	440,834	367,115	304,335
Westford Housing Authority	0.033102%	427,017	200,678	512,773	427,017	353,999
Shirley Water District	0.027787%	358,461	199,020	430,440	358,461	297,160
Tyngsboro Housing Authority	0.030953%	399,306	137,892	479,483	399,306	331,017
Pepperell Housing Authority	0.007779%	100,348	74,023	120,502	100,348	83,190
Groton Housing Authority	0.000932%	12,029	26,970	14,437	12,029	9,967
Tyngsboro Water District	0.028838%	372,014	185,390	446,721	372,014	308,399
North Reading Housing Authority	0.006519%	84,100	84,128	100,984	84,100	69,715
West Groton Water	0.001919%	24,760	181,438	29,727	24,760	20,522
Ayer-Shirley RSD	0.372727%	4,808,243	3,851,372	5,773,800	4,808,243	3,986,015
Grand Totals:	100.000000%	\$1,290,018,945	\$432,382,921	\$1,549,069,449	\$1,290,018,945	\$1,069,419,459

SECTION 2: Accounting Information for the Middlesex County Retirement System

Employer Name	Schedule of Contributions				Pension Expense		Total Employer Pension Expense (13)
	Statutory Required Contribution (7)	Contributions In Relation to the Statutory Required Contribution (8)	Contribution Deficiency/ (Excess) (9)	Contributions as a Percentage of Covered Employee Payroll (10)	Proportionate Share of Plan Pension Expense (11)	Net Amortization of Deferred Amounts from Changes in Proportion and Differences Between Employer Contributions and Proportionate Share of Contributions (12)	
Middlesex County Retirement Board	\$311,767	-\$311,767	\$0	21.27%	\$311,767	\$0	\$311,767
Middlesex County	0	0	0	N/A	0	0	0
Middlesex Hospital	0	0	0	N/A	0	0	0
Town of Acton	3,243,883	-3,243,883	0	24.86%	4,350,475	17,735	4,368,210
Town of Ashby	163,640	-163,640	0	17.67%	157,990	22,361	180,351
Town of Ashland	2,283,740	-2,311,579	-27,839	19.80%	2,638,616	147,650	2,786,266
Town of Ayer	1,343,292	-1,343,292	0	24.92%	1,675,359	32,522	1,707,881
Town of Bedford	3,481,523	-3,481,523	0	20.65%	4,637,503	-12,492	4,625,011
Town of Billerica	9,204,554	-9,204,554	0	29.33%	12,460,010	-428,288	12,031,722
Town of Boxborough	629,903	-629,903	0	21.77%	780,788	18,259	799,047
Town of Burlington	7,895,297	-7,895,297	0	25.99%	10,251,881	-170,754	10,081,127
Town of Carlisle	771,117	-771,117	0	16.32%	873,906	79,586	953,492
Town of Chelmsford	7,096,040	-7,096,040	0	29.49%	9,123,802	-304,635	8,819,167
Town of Dracut	3,970,321	-3,970,321	0	27.23%	5,134,795	-748	5,134,047
Town of Dunstable	215,351	-215,351	0	19.51%	234,259	13,101	247,360
Town of Groton	1,737,842	-1,737,842	0	25.22%	2,018,501	-34,846	1,983,655
Town of Holliston	1,861,516	-1,861,516	0	18.27%	2,294,735	124,605	2,419,340
Town of Hopkinton	1,728,744	-1,728,744	0	13.80%	1,911,919	309,936	2,221,855
Town of Hudson	4,397,249	-4,397,249	0	20.93%	5,585,333	58,708	5,644,041

SECTION 2: Accounting Information for the Middlesex County Retirement System

Employer Name	Schedule of Contributions				Pension Expense		Total Employer Pension Expense (13)
	Statutory Required Contribution (7)	Contributions In Relation to the Statutory Required Contribution (8)	Contribution Deficiency/ (Excess) (9)	Contributions as a Percentage of Covered Employee Payroll (10)	Proportionate Share of Plan Pension Expense (11)	Net Amortization of Deferred Amounts from Changes in Proportion and Differences Between Employer Contributions and Proportionate Share of Contributions (12)	
Town of Lincoln	1,802,909	-1,802,909	0	18.79%	2,320,538	55,238	2,375,776
Town of Littleton	1,762,316	-1,762,316	0	16.34%	2,098,031	202,629	2,300,660
Town of North Reading	3,283,343	-3,283,343	0	26.09%	4,328,482	-81,653	4,246,829
Town of Pepperell	1,009,146	-1,009,146	0	22.63%	1,245,897	56,167	1,302,064
Town of Sherborn	821,360	-821,360	0	20.86%	1,006,205	24,323	1,030,528
Town of Shirley	710,468	-710,468	0	35.21%	895,604	-7,517	888,087
Town of Stow	702,159	-702,159	0	21.95%	905,422	13,917	919,339
Town of Sudbury	3,710,907	-3,710,907	0	24.96%	5,086,328	-123,596	4,962,732
Town of Tewksbury	6,586,336	-6,586,336	0	33.44%	8,363,887	-323,336	8,040,551
Town of Townsend	650,040	-650,040	0	21.68%	732,993	58,286	791,279
Town of Tyngsborough	1,437,048	-1,437,048	0	19.31%	1,763,210	90,144	1,853,354
Town of Wayland	3,971,988	-3,971,988	0	21.95%	5,211,871	5,915	5,217,786
Town of Westford	3,993,806	-3,993,806	0	17.62%	4,643,520	288,232	4,931,752
Town of Weston	4,270,242	-4,270,242	0	22.05%	5,753,513	-110,047	5,643,466
Town of Wilmington	5,342,251	-5,342,251	0	25.32%	7,295,316	-181,421	7,113,895
Acton-Boxborough RSD	1,961,424	-1,961,424	0	15.21%	2,305,690	52,693	2,358,383
Acton Water Supply	165,791	-165,791	0	16.35%	273,038	-3,604	269,434
Bedford Housing Authority	26,527	-26,527	0	19.69%	25,870	1,643	27,513
Billerica Housing Authority	82,988	-82,988	0	26.87%	104,792	-3,301	101,491
Chelmsford Housing Authority	93,720	-93,720	0	6.84%	111,680	12,854	124,534
Chelmsford Water District	186,049	-1,186,049	-1,000,000	97.02%	137,527	56,080	193,607

SECTION 2: Accounting Information for the Middlesex County Retirement System

Employer Name	Schedule of Contributions				Pension Expense		Total Employer Pension Expense (13)
	Statutory Required Contribution (7)	Contributions In Relation to the Statutory Required Contribution (8)	Contribution Deficiency/ (Excess) (9)	Contributions as a Percentage of Covered Employee Payroll (10)	Proportionate Share of Plan Pension Expense (11)	Net Amortization of Deferred Amounts from Changes in Proportion and Differences Between Employer Contributions and Proportionate Share of Contributions (12)	
Dracut Housing Authority	110,203	-110,203	0	30.25%	175,094	-15,533	159,561
Dracut Water Supply	147,603	-147,603	0	23.38%	238,071	-13,915	224,156
E. Chelmsford Water	24,608	-24,608	0	12.88%	28,117	3,796	31,913
E. Middlesex Mosq Control	37,103	-37,103	0	10.10%	48,647	11,324	59,971
Greater Lowell RVTSD	1,128,497	-1,128,497	0	22.10%	1,449,623	-39,813	1,409,810
Groton-Dunstable RSD	707,990	-707,990	0	15.11%	834,354	76,211	910,565
Hudson Housing Authority	89,676	-89,676	0	31.66%	137,199	-9,008	128,191
Lincoln Sudbury	548,534	-548,534	0	19.38%	775,959	-23,951	752,008
Nashoba Vally THSD	230,992	-230,992	0	28.30%	309,480	-26,542	282,938
N. Chelmsford Water	39,106	-39,106	0	7.79%	73,409	10,599	84,008
North Middlesex RSD	836,323	-836,323	0	16.76%	1,077,739	23,369	1,101,108
Shawsheen Valley RVS	520,323	-520,323	0	19.19%	722,131	-25,871	696,260
South Middlesex RVTS	490,299	-490,299	0	21.08%	635,489	-1,854	633,635
Sudbury Water District	82,136	-82,136	0	10.20%	141,828	-2,918	138,910
Tewksbury Housing Authority	99,575	-99,575	0	27.94%	122,376	-917	121,459
Wayland Housing Authority	30,339	-30,339	0	11.62%	43,845	4,778	48,623
Hopkinton Housing Authority	28,891	-28,891	0	16.22%	43,428	3,250	46,678
Sudbury Housing Authority	22,778	-22,778	0	23.27%	26,107	4,385	30,492
Wilmington Housing Authority	24,091	-24,091	0	19.96%	26,627	409	27,036

SECTION 2: Accounting Information for the Middlesex County Retirement System

Employer Name	Schedule of Contributions				Pension Expense		Total Employer Pension Expense (13)
	Statutory Required Contribution (7)	Contributions In Relation to the Statutory Required Contribution (8)	Contribution Deficiency/ (Excess) (9)	Contributions as a Percentage of Covered Employee Payroll (10)	Proportionate Share of Plan Pension Expense (11)	Net Amortization of Deferred Amounts from Changes in Proportion and Differences Between Employer Contributions and Proportionate Share of Contributions (12)	
Acton Housing Authority	65,147	-65,147	0	18.91%	81,175	3,770	84,945
Burlington Housing Authority	15,190	-15,190	0	5.85%	11,724	11,841	23,565
Ayer Housing Authority	16,010	-16,010	0	9.51%	43,323	-180	43,143
Holliston Housing Authority	20,105	-20,105	0	14.35%	21,030	3,251	24,281
Littleton Housing Authority	29,540	-29,540	0	78.70%	35,996	-2,213	33,783
Westford Housing Authority	35,704	-35,704	0	17.79%	41,870	2,431	44,301
Shirley Water District	17,865	-17,865	0	8.98%	35,147	1,256	36,403
Tyngsboro Housing Authority	31,734	-31,734	0	23.01%	39,151	-2,913	36,238
Pepperell Housing Authority	8,913	-8,913	0	12.04%	9,840	849	10,689
Groton Housing Authority	2,247	-2,247	0	8.33%	1,179	899	2,078
Tyngsboro Water District	28,014	-28,014	0	15.11%	36,477	3,857	40,334
North Reading Housing Authority	10,459	-10,459	0	12.43%	8,246	1,200	9,446
West Groton Water	5,603	-5,603	0	3.09%	2,427	3,236	5,663
Ayer-Shirley RSD	400,447	-400,447	0	10.40%	471,455	38,571	510,026
Grand Totals:	\$98,792,642	-\$99,820,481	-\$1,027,839	23.09%	\$126,799,616	\$0	\$126,799,616

SECTION 2: Accounting Information for the Middlesex County Retirement System

Employer Name	Deferred Outflows of Resources					Deferred Inflows of Resources				
	Differences Between Expected and Actual Experience (14)	Net Difference Between Projected and Actual Investment Earnings on Pension Plan Investments (15)	Changes of Assumptions (16)	Changes in Proportion and Differences Between Employer Contributions and Proportionate Share of Contributions (17)	Total Deferred Outflows of Resources (18)	Differences Between Expected and Actual Experience (19)	Net Difference Between Projected and Actual Investment Earnings on Pension Plan Investments (20)	Changes of Assumptions (21)	Changes in Proportion and Differences Between Employer Contributions and Proportionate Share of Contributions (22)	Total Deferred Inflows of Resources (23)
Middlesex County Retirement Board	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Middlesex County	0	0	0	0	0	0	0	0	0	0
Middlesex Hospital	0	0	0	0	0	0	0	0	0	0
Town of Acton	0	2,262,498	0	213,858	2,476,356	0	0	0	142,929	142,929
Town of Ashby	0	82,164	0	89,441	171,605	0	0	0	0	0
Town of Ashland	0	1,372,234	0	590,599	1,962,833	0	0	0	0	0
Town of Ayer	0	871,284	0	130,087	1,001,371	0	0	0	0	0
Town of Bedford	0	2,411,771	0	83,497	2,495,268	0	0	0	133,462	133,462
Town of Billerica	0	6,479,929	0	0	6,479,929	0	0	0	1,713,152	1,713,152
Town of Boxborough	0	406,055	0	73,033	479,088	0	0	0	0	0
Town of Burlington	0	5,331,574	0	0	5,331,574	0	0	0	683,016	683,016
Town of Carlisle	0	454,482	0	318,346	772,828	0	0	0	0	0
Town of Chelmsford	0	4,744,907	0	0	4,744,907	0	0	0	1,218,542	1,218,542
Town of Dracut	0	2,670,392	0	52,409	2,722,801	0	0	0	55,401	55,401
Town of Dunstable	0	121,828	0	52,403	174,231	0	0	0	0	0
Town of Groton	0	1,049,738	0	119,901	1,169,639	0	0	0	259,283	259,283
Town of Holliston	0	1,193,396	0	498,420	1,691,816	0	0	0	0	0
Town of Hopkinton	0	994,309	0	1,239,748	2,234,057	0	0	0	0	0
Town of Hudson	0	2,904,698	0	234,831	3,139,529	0	0	0	0	0

SECTION 2: Accounting Information for the Middlesex County Retirement System

Employer Name	Deferred Outflows of Resources					Deferred Inflows of Resources				
	Differences Between Expected and Actual Experience (14)	Net Difference Between Projected and Actual Investment Earnings on Pension Plan Investments (15)	Changes of Assumptions (16)	Changes in Proportion and Differences Between Employer Contributions and Proportionate Share of Contributions (17)	Total Deferred Outflows of Resources (18)	Differences Between Expected and Actual Experience (19)	Net Difference Between Projected and Actual Investment Earnings on Pension Plan Investments (20)	Changes of Assumptions (21)	Changes in Proportion and Differences Between Employer Contributions and Proportionate Share of Contributions (22)	Total Deferred Inflows of Resources (23)
Town of Lincoln	0	1,206,815	0	239,087	1,445,902	0	0	0	18,138	18,138
Town of Littleton	0	1,091,098	0	810,512	1,901,610	0	0	0	0	0
Town of North Reading	0	2,251,062	0	0	2,251,062	0	0	0	326,609	326,609
Town of Pepperell	0	647,939	0	224,672	872,611	0	0	0	0	0
Town of Sherborn	0	523,285	0	97,295	620,580	0	0	0	0	0
Town of Shirley	0	465,766	0	4,714	470,480	0	0	0	34,781	34,781
Town of Stow	0	470,872	0	63,781	534,653	0	0	0	8,114	8,114
Town of Sudbury	0	2,645,186	0	0	2,645,186	0	0	0	494,383	494,383
Town of Tewksbury	0	4,349,707	0	5,135	4,354,842	0	0	0	1,298,478	1,298,478
Town of Townsend	0	381,199	0	233,146	614,345	0	0	0	0	0
Town of Tyngsborough	0	916,972	0	360,577	1,277,549	0	0	0	0	0
Town of Wayland	0	2,710,476	0	126,234	2,836,710	0	0	0	102,577	102,577
Town of Westford	0	2,414,900	0	1,152,928	3,567,828	0	0	0	0	0
Town of Weston	0	2,992,161	0	0	2,992,161	0	0	0	440,189	440,189
Town of Wilmington	0	3,793,988	0	0	3,793,988	0	0	0	725,683	725,683
Acton-Boxborough RSD	0	1,199,093	0	210,769	1,409,862	0	0	0	0	0
Acton Water Supply	0	141,996	0	24,790	166,786	0	0	0	39,208	39,208
Bedford Housing Authority	0	13,454	0	6,570	20,024	0	0	0	0	0
BillERICA Housing Authority	0	54,498	0	438	54,936	0	0	0	13,642	13,642
Chelmsford Housing Authority	0	58,080	0	51,417	109,497	0	0	0	0	0
Chelmsford Water District	0	71,522	0	862,284	933,806	0	0	0	637,965	637,965

SECTION 2: Accounting Information for the Middlesex County Retirement System

Employer Name	Deferred Outflows of Resources					Deferred Inflows of Resources				
	Differences Between Expected and Actual Experience (14)	Net Difference Between Projected and Actual Investment Earnings on Pension Plan Investments (15)	Changes of Assumptions (16)	Changes in Proportion and Differences Between Employer Contributions and Proportionate Share of Contributions (17)	Total Deferred Outflows of Resources (18)	Differences Between Expected and Actual Experience (19)	Net Difference Between Projected and Actual Investment Earnings on Pension Plan Investments (20)	Changes of Assumptions (21)	Changes in Proportion and Differences Between Employer Contributions and Proportionate Share of Contributions (22)	Total Deferred Inflows of Resources (23)
Dracut Housing Authority	0	91,059	0	0	91,059	0	0	0	62,130	62,130
Dracut Water Supply	0	123,811	0	0	123,811	0	0	0	55,658	55,658
E. Chelmsford Water	0	14,622	0	15,180	29,802	0	0	0	0	0
E. Middlesex Mosq Control	0	25,299	0	46,230	71,529	0	0	0	934	934
Greater Lowell RVTSD	0	753,888	0	0	753,888	0	0	0	159,254	159,254
Groton-Dunstable RSD	0	433,913	0	304,843	738,756	0	0	0	0	0
Hudson Housing Authority	0	71,351	0	0	71,351	0	0	0	36,033	36,033
Lincoln Sudbury	0	403,544	0	0	403,544	0	0	0	95,800	95,800
Nashoba Vally THSD	0	160,948	0	0	160,948	0	0	0	106,167	106,167
N. Chelmsford Water	0	38,177	0	57,312	95,489	0	0	0	14,916	14,916
North Middlesex RSD	0	560,487	0	102,710	663,197	0	0	0	9,232	9,232
Shawsheen Valley RVS	0	375,550	0	0	375,550	0	0	0	103,486	103,486
South Middlesex RVTS	0	330,491	0	298	330,789	0	0	0	7,715	7,715
Sudbury Water District	0	73,759	0	11,879	85,638	0	0	0	23,553	23,553
Tewksbury Housing Authority	0	63,643	0	2,640	66,283	0	0	0	6,309	6,309
Wayland Housing Authority	0	22,802	0	22,435	45,237	0	0	0	3,323	3,323
Hopkinton Housing Authority	0	22,585	0	17,219	39,804	0	0	0	4,218	4,218
Sudbury Housing Authority	0	13,577	0	17,538	31,115	0	0	0	0	0
Wilmington Housing Authority	0	13,848	0	2,514	16,362	0	0	0	879	879

SECTION 2: Accounting Information for the Middlesex County Retirement System

Employer Name	Deferred Outflows of Resources					Deferred Inflows of Resources				
	Differences Between Expected and Actual Experience (14)	Net Difference Between Projected and Actual Investment Earnings on Pension Plan Investments (15)	Changes of Assumptions (16)	Changes in Proportion and Differences Between Employer Contributions and Proportionate Share of Contributions (17)	Total Deferred Outflows of Resources (18)	Differences Between Expected and Actual Experience (19)	Net Difference Between Projected and Actual Investment Earnings on Pension Plan Investments (20)	Changes of Assumptions (21)	Changes in Proportion and Differences Between Employer Contributions and Proportionate Share of Contributions (22)	Total Deferred Inflows of Resources (23)
Acton Housing Authority	0	42,216	0	15,079	57,295	0	0	0	0	0
Burlington Housing Authority	0	6,097	0	47,368	53,465	0	0	0	0	0
Ayer Housing Authority	0	22,531	0	13,742	36,273	0	0	0	14,458	14,458
Holliston Housing Authority	0	10,937	0	13,007	23,944	0	0	0	0	0
Littleton Housing Authority	0	18,720	0	978	19,698	0	0	0	9,826	9,826
Westford Housing Authority	0	21,775	0	9,723	31,498	0	0	0	0	0
Shirley Water District	0	18,279	0	12,853	31,132	0	0	0	7,828	7,828
Tyngsboro Housing Authority	0	20,361	0	746	21,107	0	0	0	12,399	12,399
Pepperell Housing Authority	0	5,117	0	3,400	8,517	0	0	0	0	0
Groton Housing Authority	0	613	0	3,596	4,209	0	0	0	0	0
Tyngsboro Water District	0	18,970	0	15,972	34,942	0	0	0	546	546
North Reading Housing Authority	0	4,288	0	4,803	9,091	0	0	0	0	0
West Groton Water	0	1,262	0	12,944	14,206	0	0	0	0	0
Ayer-Shirley RSD	0	245,184	0	154,285	399,469	0	0	0	0	0
Grand Totals:	\$0	\$65,781,032	\$0	\$9,080,216	\$74,861,248	\$0		\$0	\$9,080,216	\$9,080,216

SECTION 2: Accounting Information for the Middlesex County Retirement System

**Deferred Inflows/(Outflows) Recognized In Future Pension Expense
(Year Ended June 30):**

Employer Name	2017 (24)	2018 (25)	2019 (26)	2020 (27)	2021 (28)	Thereafter (29)
Middlesex County Retirement Board	\$0	\$0	\$0	\$0	\$0	\$0
Middlesex County	0	0	0	0	0	0
Middlesex Hospital	0	0	0	0	0	0
Town of Acton	592,081	592,081	592,082	557,183	0	0
Town of Ashby	43,219	43,219	43,219	41,948	0	0
Town of Ashland	495,998	495,998	495,998	474,839	0	0
Town of Ayer	253,701	253,701	253,701	240,268	0	0
Town of Bedford	599,747	599,747	599,747	562,565	0	0
Town of Billerica	1,216,672	1,216,672	1,216,672	1,116,761	0	0
Town of Boxborough	121,338	121,338	121,338	115,074	0	0
Town of Burlington	1,182,691	1,182,691	1,182,691	1,100,485	0	0
Town of Carlisle	194,958	194,958	194,958	187,954	0	0
Town of Chelmsford	899,881	899,881	899,881	826,722	0	0
Town of Dracut	677,143	677,143	677,143	635,971	0	0
Town of Dunstable	44,028	44,028	44,028	42,147	0	0
Town of Groton	231,635	231,635	231,635	215,451	0	0
Town of Holliston	427,554	427,554	427,554	409,154	0	0
Town of Hopkinton	562,346	562,346	562,346	547,019	0	0
Town of Hudson	796,079	796,079	796,079	751,292	0	0

SECTION 2: Accounting Information for the Middlesex County Retirement System

Deferred Inflows/(Outflows) Recognized In Future Pension Expense (Year Ended June 30):						
Employer Name	2017 (24)	2018 (25)	2019 (26)	2020 (27)	2021 (28)	Thereafter (29)
Town of Lincoln	361,593	361,593	361,593	342,985	0	0
Town of Littleton	479,609	479,609	479,609	462,783	0	0
Town of North Reading	489,790	489,790	489,790	455,083	0	0
Town of Pepperell	220,649	220,649	220,649	210,664	0	0
Town of Sherborn	157,161	157,161	157,161	149,097	0	0
Town of Shirley	110,720	110,720	110,720	103,539	0	0
Town of Stow	133,450	133,450	133,450	126,189	0	0
Town of Sudbury	547,897	547,897	547,897	507,112	0	0
Town of Tewksbury	780,857	780,857	780,857	713,793	0	0
Town of Townsend	155,055	155,055	155,055	149,180	0	0
Town of Tyngsborough	322,921	322,921	322,921	308,786	0	0
Town of Wayland	693,982	693,982	693,982	652,187	0	0
Town of Westford	901,265	901,265	901,265	864,033	0	0
Town of Weston	649,527	649,527	649,527	603,391	0	0
Town of Wilmington	781,700	781,700	781,700	723,205	0	0
Acton-Boxborough RSD	357,088	357,088	357,088	338,598	0	0
Acton Water Supply	32,442	32,442	32,442	30,252	0	0
Bedford Housing Authority	5,058	5,058	5,058	4,850	0	0
Billerica Housing Authority	10,533	10,533	10,533	9,695	0	0
Chelmsford Housing Authority	27,598	27,598	27,598	26,703	0	0
Chelmsford Water District	74,236	74,236	74,236	73,133	0	0

SECTION 2: Accounting Information for the Middlesex County Retirement System

**Deferred Inflows/(Outflows) Recognized In Future Pension Expense
(Year Ended June 30):**

Employer Name	2017 (24)	2018 (25)	2019 (26)	2020 (27)	2021 (28)	Thereafter (29)
Dracut Housing Authority	7,583	7,583	7,583	6,180	0	0
Dracut Water Supply	17,515	17,515	17,515	15,608	0	0
E. Chelmsford Water	7,508	7,508	7,508	7,278	0	0
E. Middlesex Mosq Control	17,746	17,746	17,746	17,357	0	0
Greater Lowell RVTSD	151,565	151,565	151,565	139,939	0	0
Groton-Dunstable RSD	186,362	186,362	186,362	179,670	0	0
Hudson Housing Authority	9,105	9,105	9,105	8,003	0	0
Lincoln Sudbury	78,491	78,491	78,491	72,271	0	0
Nashoba Vally THSD	14,315	14,315	14,315	11,836	0	0
N. Chelmsford Water	20,290	20,290	20,290	19,703	0	0
North Middlesex RSD	165,651	165,651	165,651	157,012	0	0
Shawsheen Valley RVS	69,464	69,464	69,464	63,672	0	0
South Middlesex RVTs	82,043	82,043	82,043	76,945	0	0
Sudbury Water District	15,806	15,806	15,806	14,667	0	0
Tewksbury Housing Authority	15,239	15,239	15,239	14,257	0	0
Wayland Housing Authority	10,566	10,566	10,566	10,216	0	0
Hopkinton Housing Authority	8,983	8,983	8,983	8,637	0	0
Sudbury Housing Authority	7,832	7,832	7,832	7,619	0	0
Wilmington Housing Authority	3,924	3,924	3,924	3,711	0	0

SECTION 2: Accounting Information for the Middlesex County Retirement System

Deferred Inflows/(Outflows) Recognized In Future Pension Expense (Year Ended June 30):						
Employer Name	2017 (24)	2018 (25)	2019 (26)	2020 (27)	2021 (28)	Thereafter (29)
Acton Housing Authority	14,487	14,487	14,487	13,834	0	0
Burlington Housing Authority	13,389	13,389	13,389	13,298	0	0
Ayer Housing Authority	5,540	5,540	5,540	5,195	0	0
Holliston Housing Authority	6,027	6,027	6,027	5,863	0	0
Littleton Housing Authority	2,539	2,539	2,539	2,255	0	0
Westford Housing Authority	7,959	7,959	7,959	7,621	0	0
Shirley Water District	5,896	5,896	5,896	5,616	0	0
Tyngsboro Housing Authority	2,256	2,256	2,256	1,940	0	0
Pepperell Housing Authority	2,148	2,148	2,148	2,073	0	0
Groton Housing Authority	1,055	1,055	1,055	1,044	0	0
Tyngsboro Water District	8,673	8,673	8,673	8,377	0	0
North Reading Housing Authority	2,289	2,289	2,289	2,224	0	0
West Groton Water	3,556	3,556	3,556	3,538	0	0
Ayer-Shirley RSD	100,812	100,812	100,812	97,033	0	0
Grand Totals:	\$16,698,816	\$16,698,816	\$16,698,817	\$15,684,583	\$0	\$0

SECTION 2: Accounting Information for the Middlesex County Retirement System

EXHIBIT 7

Notes to Required Supplementary Information

Valuation date	Actuarial determined contributions for fiscal 2016 and 2017 are determined with the January 1, 2014 actuarial valuation.
Actuarial cost method	Entry Age Normal Cost Method
Amortization method	Prior year's total contribution increased by 6.5% for fiscal 2016 through fiscal 2020, and thereafter the remaining unfunded liability will be amortized on a 4.0% annual increasing basis; ERI liability amortized in level payments
Remaining amortization period	As of July 1, 2014, 5 years remaining for 2002 ERI liability, 6 years remaining for 2003 ERI liability, 8 years remaining for 2010 ERI liability and 21 years for remaining unfunded liability.
Asset valuation method	The difference between the expected return and the actual investment return on a market value basis is recognized over a five-year period. Asset value is adjusted as necessary to be within 20% of the market value.
Actuarial assumptions:	
Investment rate of return	7.875%
Discount rate	7.875%
Inflation rate	4.00%
Projected salary increases	Varies by length of service with ultimate rates of 4.25% for Group 1, 4.50% for Group 2, and 4.75% for Group 4
Cost of living adjustments	3.00% of first \$14,000 of retirement income
Plan membership:	
Retired participants and beneficiaries in pay status or with suspended benefits	5,077
Inactive participants entitled to a return of their employee contributions	2,632
Inactive participants with a vested right to a deferred or immediate benefit	384
Active participants	<u>9,082</u>
Total	17,175

SECTION 2: Accounting Information for the Middlesex County Retirement System

Changes in Assumptions:

The following changes were effective January 1, 2014:

- The actuarial cost method was changed to better reflect the impact of the plan changes effective for employees hired on or after April 2, 2012.
- The pre-retirement mortality assumption was changed from the RP-2000 Employee Mortality Table projected 12 years with Scale AA to the RP-2000 Employee Mortality Table projected 22 years with Scale AA.
- The mortality assumption for non-disabled retirees was changed from the RP-2000 Healthy Annuitant Mortality Table projected 12 years with Scale AA to the RP-2000 Healthy Annuitant Mortality Table projected 17 years with Scale AA.
- The mortality assumption for disabled participants was changed from the RP-2000 Healthy Annuitant Mortality Table set forward two years to the RP-2000 Healthy Annuitant Mortality Table set forward three years projected 17 years with Scale AA.
- The investment return assumption was lowered from 8.00% to 7.875%.
- The salary increase assumption was changed from level rates of 4.75% per year for Group 1 and Group 2 members and 5.25% per year for Group 4 members, including an allowance for inflation of 4.5% per year, to rates based on years of service with ultimate rates of 4.25% per year for Group 1 members, 4.5% per year for Group 2 members and 4.75% per year for Group 4 members, including an allowance for inflation of 4.0% per year.
- The assumed retirement age for inactive vested participants was changed from age 65 to age 60 for Group 1 and 2 members and remained the same at age 55 for Group 4 members hired prior to April 2, 2012. For participants hired April 2, 2012 or later, the assumption is 60 for Group 1 members, 55 for Group 2 members, and 50 for Group 4 members.
- The administrative expense assumption was increased from \$3,100,000 for calendar 2012 to \$3,400,000 for calendar 2014.

Changes in Plan Provisions:

The following change was reflected in the January 1, 2014 actuarial valuation:

- Members hired on or after April 2, 2012 are covered by the provisions of Chapter 32 as amended by Chapter 176 of the Acts of 2011 and Chapter 139 of the Acts of 2012.
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SECTION 3: Supplemental Information for the Middlesex County Retirement System

EXHIBIT I

Actuarial Assumptions and Actuarial Cost Method*

Mortality Rates:

Pre-Retirement:

RP-2000 Employee Mortality Table projected 22 years with Scale AA

Healthy Retiree:

RP-2000 Healthy Annuitant Mortality Table projected 17 years with Scale AA

Disabled Retiree:

RP-2000 Healthy Annuitant Mortality Table set forward 3 years projected 17 years with Scale AA

The RP-2000 Employee Mortality Table projected 22 years with Scale AA and the RP-2000 Healthy Annuitant Mortality Table projected 17 years with Scale AA were determined to contain provisions appropriate to reasonably reflect future mortality improvement, based on historical and current demographic data. As part of the analysis, a comparison was made between the actual number of retiree deaths and the projected number based on the prior years' assumptions over the three most recent valuations.

* Used in January 1, 2014 Actuarial Valuation and Review.

SECTION 3: Supplemental Information for the Middlesex County Retirement System

Termination Rates before Retirement:	Groups 1 and 2 - Rate (%)			Disability
	Age	Mortality		
		Male	Female	
20	0.02	0.01	0.02	
25	0.03	0.02	0.02	
30	0.04	0.02	0.03	
35	0.07	0.04	0.06	
40	0.09	0.05	0.10	
45	0.11	0.08	0.15	
50	0.14	0.11	0.19	
55	0.20	0.21	0.24	
60	0.34	0.35	0.28	

*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*

Termination Rates before Retirement (continued):	Group 4 – Rate (%)			Disability
	Age	Mortality		
		Male	Female	
20	0.02	0.01	0.20	
25	0.03	0.02	0.20	
30	0.04	0.02	0.30	
35	0.07	0.04	0.30	
40	0.09	0.05	0.30	
45	0.11	0.08	1.00	
50	0.14	0.11	1.25	
55	0.20	0.21	1.20	
60	0.34	0.35	0.85	

*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.*

SECTION 3: Supplemental Information for the Middlesex County Retirement System

The disability rates were based on historical and current demographic data, adjusted to reflect economic conditions of the area and estimated future experience and professional judgment. As part of the analysis, a comparison was made between the actual number of disability retirements and the projected number based on the prior years' assumptions over the three most recent valuations.

Withdrawal Rates:

		Rate per year (%)	
Years of Service	Groups 1 and 2	Years of Service	Group 4
0	15.0	0	1.5
1	12.0	1	1.5
2	10.0	2	1.5
3	9.0	3	1.5
4	8.0	4	1.5
5 – 9	7.6	5	1.5
10 – 14	5.4	6	1.5
15 – 19	3.3	7	1.5
20 – 24	2.0	8	1.5
25 - 29	1.0	9	1.5
30+	0.0	10	1.5
		11+	0.0

The termination rates were based on historical and current demographic data, adjusted to reflect economic conditions of the area and estimated future experience and professional judgment. As part of the analysis, a comparison was made between the actual number of terminations and the projected number based on the prior years' assumptions over the three most recent valuations.

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Retirement Rates:	Rate per year (%)		
	Groups 1 and 2		
Age	Male	Female	Group 4
45 – 49	--	--	1.0
50 – 54	--	--	2.0
55 – 59	2.0	5.5	15.0
60 – 61	12.0	5.0	20.0
62 – 64	30.0	15.0	25.0
65 – 68	40.0	15.0	100.0
69	50.0	20.0	--
70	100.0	100.0	--

The retirement rates were based on historical and current demographic data, adjusted to reflect economic conditions of the area and estimated future experience and professional judgment. As part of the analysis, a comparison was made between the actual number of retirements by age and the projected number based on the prior years' assumptions over the three most recent valuations.

Retirement Age for Inactive Vested Participants:

Age 60 for Group 1 and Group 2 members and age 55 for Group 4 members hired prior to April 2, 2012. For members hired April 2, 2012 or later, age 60 for Group 1 members, age 55 for Group 2 members and age 50 for Group 4 members.

The retirement age for inactive vested participants was based on historical and current demographic data, adjusted to reflect economic conditions of the area and estimated future experience and professional judgment.

Unknown Data for Participants:

Same as those exhibited by participants with similar known characteristics. If not specified, participants are assumed to be male.

Family Composition:

75% of participants are assumed to be married. None are assumed to have dependent children. Females are assumed to be three years younger than their spouses.

Benefit Election:

All participants are assumed to elect Option A. Benefit elections reflect the fact that all benefit options are actuarially equivalent.

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Net Investment Return: 7.875%

The net investment return assumption is a long-term estimate derived from historical data, current and recent market expectations, and professional judgment. As part of the analysis, a building block approach was used that reflects inflation expectations and anticipated risk premiums for each of the portfolio’s asset classes, as well as the Plan’s target asset allocation.

Interest on Employee Contributions: 3.5%

Salary Increases:

Years of Service	Group 1	Group 2	Group 4
0	6.00%	6.00%	7.00%
1	5.50%	5.50%	6.50%
2	5.50%	5.50%	6.00%
3	5.25%	5.25%	5.75%
4	5.25%	5.25%	5.25%
5	4.75%	4.75%	5.25%
6	4.75%	4.75%	4.75%
7	4.50%	4.50%	4.75%
8	4.50%	4.50%	4.75%
9+	4.25%	4.50%	4.75%

Includes an allowance for inflation of 4.0% per year.

The salary scale assumption is a long-term estimate derived from historical data, current and recent market expectations, and professional judgment.

Administrative Expenses: \$3,400,000 for calendar year 2014, increasing 4.0% per year

The administrative expense assumption is based on information on expenses provided by the Retirement System.

2013 Salary: 2013 salaries are equal to salaries provided in the data, except for actives missing salary and employees with less than one year of service, where salaries are calculated from annualized contributions divided by the contribution rates provided.

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Total Service:	Total creditable service reported in the data.
Net 3(8)(c) Liability:	No liability is valued for benefits paid to or received from other municipal systems.
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 at 20% per year over a five-year period, further adjusted, if necessary, to be within 20% of the market value.
Actuarial Cost Method:	Entry Age Normal Actuarial Cost Method. Entry Age is the age of the participant less total creditable service. Normal Cost and Actuarial Accrued Liability are calculated on an individual basis and are allocated by salary. Normal Cost is determined by using the plan of benefits applicable to each participant.
Changes in Assumptions:	None as of December 31, 2015.

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EXHIBIT II

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.)

For employees hired prior to April 2, 2012, 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

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

For employees hired on April 2, 2012 or later, the annual amount of the retirement allowance is based on the member's final five-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 tables based on the age and years of creditable service of the member at retirement:

For members with less than 30 years of creditable service:

Age Last Birthday at Date of Retirement

Percent	Group 1	Group 2	Group 4
2.50	67 or over	62 or over	57 or over
2.35	66	61	56
2.20	65	60	55
2.05	64	59	54
1.90	63	58	53
1.75	62	57	52
1.60	61	56	51
1.45	60	55	50

For members with 30 years of creditable service or greater:

Age Last Birthday at Date of Retirement

Percent	Group 1	Group 2	Group 4
2.500	67 or over	62 or over	57 or over
2.375	66	61	56
2.250	65	60	55
2.125	64	59	54
2.000	63	58	53
1.875	62	57	52
1.750	61	56	51
1.625	60	55	50

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A member’s final five-year average salary is defined as the greater of the highest consecutive five-year average annual rate of regular compensation and the average annual rate of regular compensation received during the last five years of creditable service prior to retirement.

For employees who became members after January 1, 2011, regular compensation is limited to 64% of the federal limit found in 26 U.S.C. 401(a)(17). In addition, regular compensation for members who retire after April 2, 2012 will be limited to prohibit “spiking” of a member’s salary to increase the retirement benefit.

For all employees, the maximum annual amount of the retirement allowance is 80 percent of the member’s final 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 voluntarily withdraw their contributions with less than 10 ten years of credited service receive 3% interest on their contributions.

Employees in Group 1 hired on or after April 2, 2012 with 30 years of creditable service or greater will pay a base contribution rate of 6%.

Retirement Benefits (Superannuation)

Members of Group 1, 2 or 4 hired prior to April 2, 2012 may retire upon the attainment of age 55. For retirement at ages below 55, twenty years of creditable service is required.

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Members hired prior to April 2, 2012 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).

Members of Group 1 hired April 2, 2012 or later may retire upon the attainment of age 60. Members of Group 2 or 4 hired April 2, 2012 or later may retire upon the attainment of age 55. Members of Group 4 may retire upon attainment of age 50 with ten years of creditable service.

Members hired April 2, 2012 or later who terminate before age 55 (60 for members of Group 1) with ten or more years of creditable service are eligible for a retirement allowance upon the attainment of age 55 (60 for members of Group 1) provided they have not withdrawn their accumulated deductions from the Annuity Savings Fund of the System.

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 (age 60 for Group 1 members hired on or after April 2, 2012), 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.

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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 \$500 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.

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 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.

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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 \$14,000 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.

Changes in Plan Provisions

None.

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Appendix A

Glossary

Definitions of certain terms *as they are used in Statement 68*; the terms may have different meanings in other contexts.

Active employees:	Individuals employed at the end of the reporting or measurement period, as applicable.
Actual contributions:	Cash contributions recognized as additions to a pension plan's fiduciary net position.
Actuarial present value of projected benefit payments:	Projected benefit payments discounted to reflect the expected effects of the time value (present value) of money and the probabilities of payment.
Actuarial valuation:	The determination, as of a point in time (the actuarial valuation date), of the service cost, total pension liability, and related actuarial present value of projected benefit payments for pensions performed in conformity with Actuarial Standards of Practice unless otherwise specified by the GASB.
Actuarial valuation date:	The date as of which an actuarial valuation is performed.
Actuarially determined contribution:	A target or recommended contribution to a defined benefit pension plan for the reporting period, determined in conformity with Actuarial Standards of Practice based on the most recent measurement available when the contribution for the reporting period was adopted.
Ad hoc cost-of-living adjustments (ad hoc COLAs):	Cost-of-living adjustments that require a decision to grant by the authority responsible for making such decisions.
Ad hoc postemployment benefit changes:	Postemployment benefit changes that require a decision to grant by the authority responsible for making such decisions.
Agent employer:	An employer whose employees are provided with pensions through an agent multiple-employer defined benefit pension plan.

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Agent multiple-employer defined benefit pension plan (agent pension plan):

A multiple-employer defined benefit pension plan in which pension plan assets are pooled for investment purposes but separate accounts are maintained for each individual employer so that each employer's share of the pooled assets is legally available to pay the benefits of only its employees.

Allocated insurance contract:

A contract with an insurance company under which related payments to the insurance company are currently used to purchase immediate or deferred annuities for individual employees. Also may be referred to as an annuity contract.

Automatic cost-of-living adjustments (automatic COLAs):

Cost-of-living adjustments that occur without a requirement for a decision to grant by a responsible authority, including those for which the amounts are determined by reference to a specified experience factor (such as the earnings experience of the pension plan) or to another variable (such as an increase in the consumer price index).

Automatic postemployment benefit changes:

Postemployment benefit changes that occur without a requirement for a decision to grant by a responsible authority, including those for which the amounts are determined by reference to a specified experience factor (such as the earnings experience of the pension plan) or to another variable (such as an increase in the consumer price index).

Closed period:

A specific number of years that is counted from one date and declines to zero with the passage of time. For example, if the recognition period initially is five years on a closed basis, four years remain after the first year, three years after the second year, and so forth.

Collective deferred outflows of resources and deferred inflows of resources related to pensions:

Deferred outflows of resources and deferred inflows of resources related to pensions arising from certain changes in the collective net pension liability.

Collective net pension liability:

The net pension liability for benefits provided through (1) a cost-sharing pension plan or (2) a single-employer or agent pension plan in circumstances in which there is a special funding situation.

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Collective pension expense:	Pension expense arising from certain changes in the collective net pension liability.
Contributions:	Additions to a pension plan's fiduciary net position for amounts from employers, nonemployer contributing entities (for example, state government contributions to a local government pension plan), or employees. Contributions can result from cash receipts by the pension plan or from recognition by the pension plan of a receivable from one of these sources.
Cost-of-living adjustments:	Postemployment benefit changes intended to adjust benefit payments for the effects of inflation.
Cost-sharing employer:	An employer whose employees are provided with pensions through a cost-sharing multiple-employer defined benefit pension plan.
Cost-sharing multiple-employer defined benefit pension plan (cost-sharing pension plan):	A multiple-employer defined benefit pension plan in which the pension obligations to the employees of more than one employer are pooled and pension plan assets can be used to pay the benefits of the employees of any employer that provides pensions through the pension plan.
Covered-employee payroll:	The payroll of employees that are provided with pensions through the pension plan.
Deferred retirement option program (DROP):	A program that permits an employee to elect a calculation of benefit payments based on service credits and salary, as applicable, as of the DROP entry date. The employee continues to provide service to the employer and is paid for that service by the employer after the DROP entry date; however, the pensions that would have been paid to the employee (if the employee had retired and not entered the DROP) are credited to an individual employee account within the defined benefit pension plan until the end of the DROP period.
Defined benefit pension plans:	Pension plans that are used to provide defined benefit pensions.

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- Defined benefit pensions:** Pensions for which the income or other benefits that the employee will receive at or after separation from employment are defined by the benefit terms. The pensions may be stated as a specified dollar amount or as an amount that is calculated based on one or more factors such as age, years of service, and compensation. (A pension that does not meet the criteria of a defined contribution pension is classified as a defined benefit pension for purposes of Statement 68.)
- Defined contribution pension plans:** Pension plans that are used to provide defined contribution pensions.
- Defined contribution pensions:** Pensions having terms that (1) provide an individual account for each employee; (2) define the contributions that an employer is required to make (or the credits that it is required to provide) to an active employee's account for periods in which that employee renders service; and (3) provide that the pensions an employee will receive will depend only on the contributions (or credits) to the employee's account, actual earnings on investments of those contributions (or credits), and the effects of forfeitures of contributions (or credits) made for other employees, as well as pension plan administrative costs, that are allocated to the employee's account.
- Discount rate:** The single rate of return that, when applied to all projected benefit payments, results in an actuarial present value of projected benefit payments equal to the total of the following:
1. The actuarial present value of benefit payments projected to be made in future periods in which (a) the amount of the pension plan's fiduciary net position is projected (under the requirements of Statement 68) to be greater than the benefit payments that are projected to be made in that period and (b) pension plan assets up to that point are expected to be invested using a strategy to achieve the long-term expected rate of return, calculated using the long-term expected rate of return on pension plan investments.
 2. The actuarial present value of projected benefit payments not included in (1), calculated using the municipal bond rate.

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Entry age actuarial cost method:	A method under which the actuarial present value of the projected benefits of each individual included in an actuarial valuation is allocated on a level basis over the earnings or service of the individual between entry age and assumed exit age(s). The portion of this actuarial present value allocated to a valuation year is called the <i>normal cost</i> . The portion of this actuarial present value not provided for at a valuation date by the actuarial present value of future normal costs is called the <i>actuarial accrued liability</i> .
Inactive employees:	Terminated individuals that have accumulated benefits but are not yet receiving them, and retirees or their beneficiaries currently receiving benefits.
Measurement period:	The period between the prior and the current measurement dates.
Multiple-employer defined benefit pension plan:	A defined benefit pension plan that is used to provide pensions to the employees of more than one employer.
Net pension liability:	The liability of employers and nonemployer contributing entities to employees for benefits provided through a defined benefit pension plan.
Nonemployer contributing entities:	Entities that make contributions to a pension plan that is used to provide pensions to the employees of other entities. For purposes of Statement 68, employees are not considered nonemployer contributing entities.
Other postemployment benefits:	All postemployment benefits other than retirement income (such as death benefits, life insurance, disability, and long-term care) that are provided separately from a pension plan, as well as postemployment healthcare benefits, regardless of the manner in which they are provided. Other postemployment benefits do not include termination benefits.
Pension plans:	Arrangements through which pensions are determined, assets dedicated for pensions are accumulated and managed, and benefits are paid as they come due.
Pensions:	Retirement income and, if provided through a pension plan, postemployment benefits other than retirement income (such as death benefits, life insurance, and disability benefits). Pensions do not include postemployment healthcare benefits and termination benefits.

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Plan members:	Individuals that are covered under the terms of a pension plan. Plan members generally include (1) employees in active service (active plan members) and (2) terminated employees who have accumulated benefits but are not yet receiving them and retirees or their beneficiaries currently receiving benefits (inactive plan members).
Postemployment:	The period after employment.
Postemployment benefit changes:	Adjustments to the pension of an inactive employee.
Postemployment healthcare benefits:	Medical, dental, vision, and other health-related benefits paid subsequent to the termination of employment.
Projected benefit payments:	All benefits estimated to be payable through the pension plan to current active and inactive employees as a result of their past service and their expected future service.
Public employee retirement system:	A special-purpose government that administers one or more pension plans; also may administer other types of employee benefit plans, including postemployment healthcare plans and deferred compensation plans.
Real rate of return:	The rate of return on an investment after adjustment to eliminate inflation.
Service costs:	The portions of the actuarial present value of projected benefit payments that are attributed to valuation years.
Single employer:	An employer whose employees are provided with pensions through a single-employer defined benefit pension plan.
Single-employer defined benefit pension plan (single-employer pension plan):	A defined benefit pension plan that is used to provide pensions to employees of only one employer.
Special funding situations:	<p>Circumstances in which a nonemployer entity is legally responsible for making contributions directly to a pension plan that is used to provide pensions to the employees of another entity or entities and either of the following conditions exists:</p> <p>The amount of contributions for which the nonemployer entity legally is responsible is <i>not</i> dependent upon one or more events or circumstances unrelated to the pensions.</p> <p>The nonemployer entity is the only entity with a legal obligation to make contributions directly to a pension plan.</p>

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Termination benefits:

Inducements offered by employers to active employees to hasten the termination of services, or payments made in consequence of the early termination of services. Termination benefits include early-retirement incentives, severance benefits, and other termination-related benefits.

Total pension liability:

The portion of the actuarial present value of projected benefit payments that is attributed to past periods of employee service in conformity with the requirements of Statement.

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