Segal Consulting

Nashoba Regional School District

Actuarial Valuation and Review of Other Postemployment Benefits (OPEB) as of December 31, 2017

Segal Consulting

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December 19, 2018

Ms. Patricia Marone
Business and Operations Manager
Nashoba Regional School District
Central Office
50 Mechanic Street
Bolton, MA 01740

Dear Ms. Marone:

We are pleased to submit this report on our actuarial valuation of postemployment welfare benefits as of December 31, 2017. The purpose of this report is to calculate an Actuarially Determined Contribution for the Nashoba Regional School District Other Postemployment Benefit (OPEB) plan for the fiscal year ending June 30, 2018. It summarizes the actuarial data used in the valuation and analyzes the expereince and changes in assumptions since the prior valuation. The GASB Statements Number 74 And 75 disclosure information for the fiscal year ending June 30, 2018 will be provided in a separate report.

This report is based on information received from the Nashoba Regional School District and vendors employed by the Nashoba Regional School District. Segal Consulting does not audit the data provided. The accuracy and comprehensiveness of the data is the responsibility of those supplying the data. Segal, however, does review the data for reasonableness and consistency.

The measurements shown in this actuarial valuation may not be applicable for other purposes. Accordingly, additional determinations may be needed for other purposes, such as judging benefit security at termination of the plan, or determining short-term cash flow requirements.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: retiree group benefits program experience or rates of return on assets differing from that anticipated by the assumptions; changes in 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 retiree group benefits program provisions or applicable law. Retiree group benefits models necessarily rely on the use of approximations and estimates, and are sensitive to changes in these approximations and estimates. Small variations in these approximations and estimates may lead to significant changes in actuarial measurements. 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 valuation has been completed in accordance with generally accepted actuarial principles and practices. The actuarial calculations were directed under our supervision. We are members of the American Academy of Actuaries and collectively meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion herein. To the best of our knowledge, the information supplied in the actuarial valuation is complete and accurate. Further, in our opinion, the assumptions as approved by the Nashoba Regional School District are reasonably related to the experience of and the expectations for the Plan.

We look forward to discussing this with you at your convenience.

Sincerely,

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

By:

S. Boustany

Samuel Boustani, ASA, MAAA
Consulting Actuary

Daniel J. Rhodes, FSA, MAAA
Vice President and Consulting Actuary

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Nashoba Regional School District Actuarial Valuation and Review of Other Postemployment Benefits (OPEB) as of December 31, 2017

Section 1: Executive Summary

Important Information about Actuarial Valuations

An actuarial valuation is a budgeting tool with respect to defining future uncertain obligations of a postemployment health plan. As such, it will never forecast the precise future stream of benefit payments. It is an estimated forecast – the actual cost of the plan will be determined by the benefits and expenses paid, not by 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. Even where they appear precise, outside factors may change how they operate. For example, a plan may provide health benefits to post-65 retirees that coordinates with Medicare. If so, changes in the Medicare law or administration may change the plan's costs without any change in the terms of the plan itself. It is important for the Nashoba Regional School District to keep Segal informed with respect to plan provisions and administrative procedures, and to review the plan summary included in our 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. 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 Nashoba Regional School District. 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. A snapshot as of a single date may not be an appropriate value for determining a single year's contribution requirement, especially in volatile markets. Plan sponsors often use an "actuarial value of assets" that differs from market value to reflect gradually year-to-year changes in the market value of assets in determining the contribution requirements.
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. To determine the future costs of benefits, Segal collects claims, premiums, and enrollment data in order to establish a baseline cost for the valuation measurement, and then develops short- and long-term health care cost trend rates to project increases in costs in future years. This forecast also 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 necessarily uses approximations and estimates that may lead to significant changes in our results but will have no impact on the actual cost 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 for use by the Nashoba Regional School District. It includes information for compliance with accounting standards and for the plan's auditor. Segal is not responsible for the use or misuse of its report, particularly by any other party.
- If the Nashoba Regional School District is aware of any event or trend that was not considered in this valuation that may materially change the results of the valuation, Segal should be advised, so that we can evaluate it.
- 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. The actual long-term cost of the plan will be determined by the actual benefits and expenses paid and the actual investment experience of the plan.
- 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 plan enrollment, emerging claims experience, health care trend, 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 Nashoba Regional School District 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 Nashoba Regional School District upon delivery and review. The Nashoba Regional School District 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 Plan, it is not a fiduciary in its capacity as actuaries and consultants with respect to the Plan.

Purpose

This report presents the results of our actuarial valuation of the Nashoba Regional School District postemployment welfare benefit plan as of December 31, 2017. The purpose of this report is to calculate a recommended Actuarially Determined Contribution (ADC) for the OPEB plan for the fiscal year ending June 30, 2018.

Highlights of the Valuation

- The unfunded actuarial accrued liability (UAAL) for the Nashoba Regional School District as of December 31, 2017 is $26,132,000 based on an actuarial accrued liability of $26,132,000 and an actuarial value of assets of $0. Going forward, net unfunded plan obligations will be expected to change due to normal plan operations, which consist of continuing accruals for active members, plus interest on the unfunded actuarial accrued liability, less contributions to the Trust. Future valuations will analyze the difference between actual and expected unfunded actuarial accrued liabilities.
- The UAAL of $26,132,000 as of December 31, 2017 represents an increase of $2,000,000 from $24,132,000 as of December 31, 2015. The unfunded liability had been expected to increase $3,709,000 due to normal plan operations. The difference between the expected increase and the actual increase was the net effect of the following:
  - An actuarial experience gain decreased obligations by $150,000. This was the net result of gains and losses due to demographic changes, contributions different than expected and an investment loss.
  - Valuation assumption changes decreased obligations by $1,559,000. This was the net result of a *decrease* in obligations due to: 1) revising the enrollment assumption for future retirees to better reflect future expectations, 2) revising the percentage of eligible spouses that elect coverage in the future to better reflect recent experience, 3) recalculating the valuation-year per capita health costs and contributions, 4) revising the future trend on per capita health costs, 5) decreasing the discount rate from 7.50% to 7.25%, partially offset by an *increase* in obligations due to 5) changing the funding method from Projected Unit Credit to Entry Age Normal to be consistent with the funding method required under GASB Statements Number 74 and 75, and 6) updating the mortality assumptions for teachers. The complete set of assumptions is shown in Exhibit II.
- The Actuarially Determined Contribution (ADC) for fiscal year ending June 30, 2018 is $2,133,000. We have selected a 30-year amortization of the UAAL, with payments increasing at 4.50% per year.
- A summary of the December 31, 2017 and December 31, 2015 valuation results appear on page 11.

OPEB Trust Information

As of December 31, 2017, the Nashoba Regional School District did not have a qualified OPEB Trust.

Summary of Funding Schedules

This report includes two funding schedules for the Nashoba Regional School District. Both schedules are based on the 7.25% discount rate with one schedule (Funding Schedule 1) using a 30-year closed amortization and one schedule (Funding Schedule 2) using a 30-year open amortization. In Funding Schedule 1, the employer contribution to the OPEB Trust is equal to the excess of the Actuarial Determined Contribution over benefit payments. With closed amortization (Funding Schedule 1) the NRSD will pay projected benefits plus a contribution to the OPEB Trust and will be fully funded in 30 years. With Funding Schedule 2, the NRSD will pay projected benefits plus the actual contributions of $326,510 in fiscal 2019 and expected contributions of $50,000 thereafter to the OPEB Trust, which is not sufficient to fully fund the Plan.

Other Considerations

Calculations are based on the benefits provided under the terms of the substantive plan in effect at the time of the valuation and on the pattern of sharing costs between the employer and plan members. The projection of benefits does not incorporate the potential effect of legal or contractual funding limitations on the pattern of cost sharing between the employer and plan members in the future.

Actuarial calculations reflect a long-term perspective, and the methods and assumptions use techniques designed to reduce short term volatility in accrued liabilities and the actuarial value of assets, if any.

Actuarial valuations involve estimates of the value of reported amounts and assumptions about the probability of events far into the future, and the actuarially determined amounts are subject to continual revision as actual results are compared to past expectations and new estimates are made about the future.

This valuation does not include the potential impact of any future changes due to the Patient Protection and Affordable Care Act (PPACA) and the Health Care and Education Reconciliation Act (HCERA) of 2010 other than the excise tax on high cost health plans beginning in 2022 (reflected in this valuation) and those previously adopted as of the valuation date.

Employer decisions regarding plan design, cost sharing between the Employer and its retirees, actuarial cost method, amortization techniques, and integration with Medicare are just some of the decisions that affect the magnitude of OPEB obligations. We are available to assist you with any investigation of such options you may wish to undertake.

Section 2: Valuation Results

Summary of Valuation Results

	December 31, 2017 (7.25% interest rate)		December 31, 2015 (7.50% interest rate)
Actuarial Accrued Liability by Participant Category			
1. Current retirees, beneficiaries and dependents	$11,681,542		$10,323,410
2. Current active employees	14,450,460		13,808,700
3. Total as of December 31, 2017: (1) + (2)	$26,132,002		$24,132,110
4. Actuarial value of assets	0		0
5. Unfunded actuarial accrued liability (UAAL)	$26,132,002		$24,132,110
Annual Determined Contribution for Fiscal Year Ending:	**June 30, 2018**	**June 30, 2017**	**June 30, 2016**
6. Normal Cost	$894,779	$1,039,746	$990.234
7. Amortization method for UAAL	30-year increasing at 4.5%	29-year increasing at 4.5%	30-year increasing at 4.5%
8. Amortization payment on UAAL	1,237,955	1,229,906	1,176,944
9. Total Annual Determined Contribution (ADC): (6) + (8)	$2,132,734	$2,259,652	$2,167,178
10. Projected Benefit Payments	1,093,953	1,046,466	947,785

Note: Assumes payment at the middle of fiscal year.

Department Results at 7.25%

	All Other	Teachers	Total
Actuarial Accrued Liability by Participant Category			
1. Current retirees, beneficiaries and dependents	$2,192,681	$9,488,861	$11,681,542
2. Current active employees	4,129,430	10,321,030	14,450,460
3. Total as of December 31, 2017: (1) + (2)	$6,322,111	$19,809,891	$26,132,002
4. Actuarial value of assets as of December 31, 2017	0	0	0
5. Unfunded actuarial accrued liability (UAAL) as of December 31, 2017	$6,322,111	$19,809,891	$26,132,002
Annual Determined Contribution for Fiscal Year Ending June 30, 2018:			
6. Normal Cost as of December 31, 2017	$307,000	$587,779	$894,779
7. 30-year amortization (4.50%) of the unfunded actuarial accrued liability (UAAL) as of December 31, 2017	299,498	938,457	1,237,955
8. Total Annual Determined Contribution (ARC): (6) + (7)	$606,498	$1,526,236	$2,132,734
9. Projected Benefit Payments	256,980	836,974	1,093,953

Note: Assumes payment in the middle of the fiscal year.

Funding Schedule 1

7.25% Discount Rate – Fully Funded in Fiscal 2047, 30 Year Closed Amortization

Fiscal Year Ending June 30	(1) Normal Cost	(2) Amortization of UAAL	(3) Actuarially Determined Contribution (1)+(2)	(4) Projected Benefits Paid by the Town	(5) Contribution to OPEB Trust (3) – (4)	(6) Assets at End of Year	(7) AAL at End of Year	(8) UAAL at End of Year (7)-(6)
2018	$894,779	$1,237,955	$2,132,734	$1,093,953	$1,038,781	$1,075,778	$26,856,445	$25,780,667
2019	923,903	1,293,663	2,217,566	1,161,686	1,055,880	2,247,258	28,557,285	26,310,027
2020	953,975	1,351,878	2,305,853	1,253,166	1,052,687	3,500,363	30,317,841	26,817,478
2021	985,026	1,412,713	2,397,739	1,384,272	1,013,467	4,803,702	32,102,419	27,298,717
2022	1,017,087	1,476,285	2,493,372	1,512,266	981,106	6,168,019	33,917,029	27,749,010
2023	1,050,192	1,542,718	2,592,910	1,600,381	992,529	7,643,079	35,806,229	28,163,150
2024	1,084,374	1,612,140	2,696,514	1,710,003	986,511	9,218,849	37,754,269	28,535,420
2025	1,119,669	1,684,686	2,804,355	1,844,305	960,050	10,881,458	39,741,009	28,859,551
2026	1,156,113	1,760,497	2,916,610	1,973,738	942,872	12,646,817	41,775,487	29,128,670
2027	1,193,743	1,839,719	3,033,462	2,112,911	920,551	14,517,048	43,852,305	29,335,257
2028	1,232,598	1,922,506	3,155,104	2,237,364	917,740	16,519,960	45,991,046	29,471,086
2029	1,272,718	2,009,019	3,281,737	2,338,045	943,692	18,694,959	48,222,127	29,527,168
2030	1,314,143	2,099,425	3,413,568	2,443,257	970,311	21,055,213	50,548,903	29,493,690
2031	1,356,917	2,193,899	3,550,816	2,553,204	997,612	23,614,859	52,974,805	29,359,946
2032	1,401,083	2,292,624	3,693,707	2,668,098	1,025,609	26,389,073	55,503,338	29,114,265
2033	1,446,687	2,395,792	3,842,479	2,788,163	1,054,316	29,394,147	58,138,076	28,743,929
2034	1,493,775	2,503,603	3,997,378	2,913,630	1,083,748	32,647,569	60,882,662	28,235,093
2035	1,542,396	2,616,265	4,158,661	3,044,743	1,113,918	36,168,109	63,740,801	27,572,692
2036	1,592,599	2,733,997	4,326,596	3,181,757	1,144,839	39,975,910	66,716,252	26,740,342
2037	1,644,436	2,857,027	4,501,463	3,324,936	1,176,527	44,092,593	69,812,828	25,720,235
2038	1,697,960	2,985,593	4,683,553	3,474,558	1,208,995	48,541,360	73,034,385	24,493,025
2039	1,753,226	3,119,945	4,873,171	3,630,913	1,242,258	53,347,111	76,384,816	23,037,705
2040	1,810,291	3,260,343	5,070,634	3,794,304	1,276,330	58,536,564	79,868,040	21,331,476
2041	1,869,214	3,407,058	5,276,272	3,965,048	1,311,224	64,138,389	83,487,994	19,349,605
2042	1,930,055	3,560,376	5,490,431	4,143,475	1,346,956	70,183,351	87,248,621	17,065,270
2043	1,992,876	3,720,593	5,713,469	4,329,931	1,383,538	76,704,458	91,153,855	14,449,397
2044	2,057,742	3,888,020	5,945,762	4,524,778	1,420,984	83,737,125	95,207,608	11,470,483
2045	2,124,719	4,062,981	6,187,700	4,728,393	1,459,307	91,319,348	99,413,754	8,094,406
2046	2,193,876	4,245,815	6,439,691	4,941,171	1,498,520	99,491,892	103,776,109	4,284,217
2047	2,265,284	4,436,877	6,702,161	5,163,523	1,538,638	108,298,492	108,298,492	0

Notes: Assumes payment at the middle of the fiscal year.
Normal cost is projected to increase 3.25% per year for inflation and 0.15% for future mortality improvement and does not reflect the future impact of pension reform for new hires.
Assets are assumed to return 7.25% per year.
Amortization payments calculated to increase 4.50% per year.

Funding Schedule 2

7.25% Discount Rate – Funding Policy Contributions of $50,000 per year, 30 Year Open Amortization

Fiscal Year Ending June 30	(1) Normal Cost	(2) Amortization of UAAL	(3) Actuarially Determined Contribution	(4) Projected Benefits to be Paid by the Town	(5) Contribution to OPEB Trust	(6) Total Town Cost (4)+(5)	(7) Assets at End of Year	(8) AAL at End of Year	(9) UAAL at End of Year (7)-(6)
2018	$894,779	$1,237,955	$2,132,734	$1,093,953	$0	$1,093,953	$0	$26,856,445	$26,856,445
2019	923,903	1,272,274	2,196,177	1,161,686	326,510	1,488,196	338,139	28,557,285	28,219,146
2020	953,975	1,344,245	2,298,220	1,253,166	50,000	1,303,166	414,435	30,317,841	29,903,406
2021	985,026	1,424,572	2,409,598	1,384,272	50,000	1,434,272	496,262	32,102,419	31,606,157
2022	1,017,087	1,505,813	2,522,900	1,512,266	50,000	1,562,266	584,022	33,917,029	33,333,007
2023	1,050,192	1,588,238	2,638,430	1,600,381	50,000	1,650,381	678,144	35,806,229	35,128,085
2024	1,084,374	1,673,939	2,758,313	1,710,003	50,000	1,760,003	779,090	37,754,269	36,975,179
2025	1,119,669	1,762,153	2,881,822	1,844,305	50,000	1,894,305	887,355	39,741,009	38,853,654
2026	1,156,113	1,851,905	3,008,018	1,973,738	50,000	2,023,738	1,003,469	41,775,487	40,772,018
2027	1,193,743	1,943,603	3,137,346	2,112,911	50,000	2,162,911	1,128,001	43,852,305	42,724,304
2028	1,232,598	2,036,966	3,269,564	2,237,364	50,000	2,287,364	1,261,562	45,991,046	44,729,484
2029	1,272,718	2,132,899	3,405,617	2,338,045	50,000	2,388,045	1,404,806	48,222,127	46,817,321
2030	1,314,143	2,232,816	3,546,959	2,443,257	50,000	2,493,257	1,558,435	50,548,903	48,990,468
2031	1,356,917	2,336,847	3,693,764	2,553,204	50,000	2,603,204	1,723,202	52,974,805	51,251,603
2032	1,401,083	2,445,125	3,846,208	2,668,098	50,000	2,718,098	1,899,915	55,503,338	53,603,423
2033	1,446,687	2,557,784	4,004,471	2,788,163	50,000	2,838,163	2,089,440	58,138,076	56,048,636
2034	1,493,775	2,674,957	4,168,732	2,913,630	50,000	2,963,630	2,292,705	60,882,662	58,589,957
2035	1,542,396	2,796,779	4,339,175	3,044,743	50,000	3,094,743	2,510,707	63,740,801	61,230,094
2036	1,592,599	2,923,387	4,515,986	3,181,757	50,000	3,231,757	2,744,514	66,716,252	63,971,738
2037	1,644,436	3,054,915	4,699,351	3,324,936	50,000	3,374,936	2,995,272	69,812,828	66,817,556
2038	1,697,960	3,191,498	4,889,458	3,474,558	50,000	3,524,558	3,264,210	73,034,385	69,770,175
2039	1,753,226	3,333,268	5,086,494	3,630,913	50,000	3,680,913	3,552,646	76,384,816	72,832,170
2040	1,810,291	3,480,356	5,290,647	3,794,304	50,000	3,844,304	3,861,994	79,868,040	76,006,046
2041	1,869,214	3,632,893	5,502,107	3,965,048	50,000	4,015,048	4,193,769	83,487,994	79,294,225
2042	1,930,055	3,791,002	5,721,057	4,143,475	50,000	4,193,475	4,549,598	87,248,621	82,699,023
2043	1,992,876	3,954,806	5,947,682	4,329,931	50,000	4,379,931	4,931,225	91,153,855	86,222,630
2044	2,057,742	4,124,419	6,182,161	4,524,778	50,000	4,574,778	5,340,520	95,207,608	89,867,088
2045	2,124,719	4,299,953	6,424,672	4,728,393	50,000	4,778,393	5,779,488	99,413,754	93,634,266
2046	2,193,876	4,481,509	6,675,385	4,941,171	50,000	4,991,171	6,250,282	103,776,109	97,525,827
2047	2,265,284	4,669,182	6,934,466	5,163,523	50,000	5,213,523	6,755,208	108,298,415	101,543,207

Notes: Assumes payment at the middle of the fiscal year.
Normal cost is projected to increase 3.25% per year for inflation and 0.15% for future mortality improvement and does not reflect the future impact of pension reform for new hires.
Assets are assumed to return 7.25% per year.
Amortization payments calculated to increase 4.50% per year.

Section 3: Supporting Information

Exhibit 1 – Summary of Participant Data

	December 31, 2017	December 31, 2015
Active employees covered for medical benefits		
• Number of employees		
– Male	91	90
– Female	289	267
– Total	380	357
• Average age	46.9	46.6
• Average service	10.9	10.7
Retired employees, spouses and beneficiaries covered for medical benefits		
• Number of individuals	227	203
• Average age	70.8	69.7
Retired employees with life insurance coverage only		
• Number of individuals	58	59

Exhibit II – Actuarial Assumptions and Methods

Data:	Detailed census data, premium rates and summary plan descriptions for postemployment welfare benefits were provided by the Nashoba Regional School District.
Actuarial Cost Method:	Entry Age Normal – Level percentage of payroll. (Previously, Projected Unit Credit)
Per Capita Cost Development: Medical and Drug, Dental	Per capita costs were based on the fully-insured premium rates for all participants in the Nashoba Regional School District health plans effective September 1, 2018. The premiums were combined by taking a weighted average based on the number of participants in each plan. Actuarial factors were applied to the premium to estimate individual retiree and spouse costs by age and by gender.
Valuation Date:	December 31, 2017 The results of the December 31, 2017 actuarial valuation were used to determine the Actuarial Determined Contribution as of June 30, 2018.
Expected Return on Assets:	7.25% The long-term expected rate of return on a portfolio assuming future assets will be invested in the PRIT Fund. The expected return of the PRIT Fund 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 a 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.
Discount Rate:	7.25% (previously 7.50%) The discount rate is set equal to the expected return on assets.

Salary Increases:

Years of Service	Rate per year (%)		Years of Service	Rate per year (%)	
	Non-Teachers	Teachers		Non-Teachers	Teachers
0	6.00	7.50	9	4.25	6.10
1	5.50	7.10	10	4.25	5.90
2	5.50	7.00	11	4.25	5.70
3	5.25	6.90	12	4.25	5.20
4	5.25	6.80	13	4.25	4.70
5	4.75	6.70	14	4.25	4.35
6	4.75	6.60	15-16	4.25	4.20
7	4.50	6.50	17-19	4.25	4.10
8	4.50	6.30	20 and later	4.25	4.00

Asset Valuation Method:	Market Value
Mortality Rates:	*Pre-Retirement (Non-Teachers):* RP-2000 Employee Mortality Table projected generationally with Scale BB2D from 2009 *Healthy (Non-Teachers):* RP-2000 Healthy Annuitant Mortality Table projected generationally with Scale BB2D from 2009 *Disabled (Non-Teachers):* RP-2000 Healthy Annuitant Mortality Table projected generationally with Scale BB2D from 2012 *Pre-Retirement (Teachers):* RP-2014 White Collar Employee Mortality Table projected generationally with Scale MP2016 (previously, RP-2014 Employee Mortality Table projected generationally with Scale BB2D from 2014) *Healthy (Teachers):* RP-2014 White Collar Annuitant Mortality Table projected generationally with Scale MP2016 (previously, RP-2014 Healthy Annuitant Mortality Table projected generationally with Scale BB2D from 2014) *Disabled (Teachers):* RP-2014 Healthy Annuitant Mortality Table projected generationally with Scale BB2D from 2014 set forward 4 years The underlying tables with generational projection to the ages of participants as of the measurement date reasonably reflect the mortality experience of the plan as of the measurement date. The mortality tables were then adjusted to future years using the generational projection to reflect future mortality improvement between the measurement date and those years.

Annuitant Mortality Rates:

- Non-Teachers

	Rate per year (%)	
Age	**Male**	**Female**
60	0.82	0.62
70	0.22	1.67
80	6.44	4.59
90	18.34	13.17

Note: Rates shown are before generational projection.

Annuitant Mortality Rates (continued):

- Teachers

	Rate per year (%)			
	Current		Previously	
Age	Male	Female	Male	Female
60	0.52	0.39	0.78	0.52
70	1.24	1.06	1.68	1.29
80	3.73	3.04	4.47	3.48
90	12.62	10.02	13.59	10.71

Note: Rates shown are before generational projection.

Termination Rates Before Retirement:

- Non-Teachers

	Rate per year (%)		
	Mortality		
	Male	Female	Disability
20	0.03	0.02	0.01
25	0.04	0.02	0.02
30	0.04	0.03	0.02
35	0.08	0.05	0.04
40	0.11	0.07	0.05
45	0.15	0.11	0.08
50	0.21	0.17	0.12
55	0.30	0.25	0.22
60	0.49	0.39	0.36

Notes: 55% of the rates shown represent accidental disability and death.
Rates shown are before generational projection.

Termination Rates Before Retirement (continued):

- Teachers

	Rate per year (%)				
	Mortality				
	Current		Previously		
Age	Male	Female	Male	Female	Disability
20	0.02	0.01	0.04	0.02	0.00
25	0.02	0.01	0.05	0.02	0.01
30	0.02	0.01	0.05	0.02	0.01
35	0.03	0.02	0.05	0.03	0.01
40	0.03	0.02	0.06	0.04	0.01
45	0.05	0.04	0.10	0.07	0.03
50	0.09	0.07	0.17	0.11	0.05
55	0.15	0.11	0.28	0.17	0.07
60	0.25	0.15	0.47	0.24	0.07

Notes: 75% of the death rates shown represent accidental death.
35% of the disability rates shown represent accidental disability.
Rates shown are before generational projection.

Withdrawal Rates:

- Non-Teachers

Years of Service	Rate per year (%)
0	15.0
1	12.0
2	10.0
3	9.0
4	8.0
5	7.6
6	7.5
7	6.7
8	6.3
9	5.9
10	5.4
11	5.0
12	4.6
13	4.1
14	3.7
15	3.3
16 – 20	2.0
21 – 29	1.0
30+	0.0

- Teachers

	Rate per year (%)					
	0 – 4 Years of Service		5 – 9 Years of Service		10+ Years of Service	
Age	Male	Female	Male	Female	Male	Female
20	13.0	10.0	5.5	7.0	1.5	5.0
30	15.0	15.0	5.4	8.8	1.5	4.5
40	13.3	10.5	5.2	5.0	1.7	2.2
50	16.2	9.8	7.0	5.0	2.3	2.0

Retirement Rates:

- Non-Teachers

	Rate per Year (%)	
Age	Male	Female
50	1.0	1.5
51	1.0	1.5
52	1.0	2.0
53	1.0	2.5
54	2.0	2.5
55	2.0	5.5
56	2.5	6.5
57	2.5	6.5
58	5.0	6.5
59	6.5	6.5
60	12.0	5.0
61	20.0	13.0
62	30.0	15.0
63	25.0	12.5
64	22.0	18.0
65	40.0	15.0
66	25.0	20.0
67	25.0	20.0
68	30.0	25.0
69	30.0	20.0
70	100.0	100.0

Retirement Rates (continued):

- Teachers

	Rate per year (%)					
	Years of Service					
	Less than 20		20 – 29		30 or more	
Age	Male	Female	Male	Female	Male	Female
50 - 52	- -	- -	1.0	1.0	2.0	1.5
53	- -	- -	1.5	1.0	2.0	1.5
54	- -	- -	2.5	1.0	2.0	2.0
55	5.0	3.0	3.0	3.0	6.0	5.0
56	5.0	3.0	6.0	5.0	20.0	15.0
57	5.0	4.0	10.0	8.0	40.0	35.0
58	5.0	8.0	15.0	10.0	50.0	35.0
59	10.0	8.0	20.0	15.0	50.0	35.0
60	10.0	10.0	25.0	20.0	40.0	35.0
61	20.0	12.0	30.0	25.0	40.0	35.0
62	20.0	12.0	35.0	30.0	35.0	35.0
63	25.0	15.0	40.0	30.0	35.0	35.0
64	25.0	20.0	40.0	30.0	35.0	35.0
65	25.0	25.0	40.0	40.0	35.0	35.0
66	30.0	25.0	30.0	30.0	40.0	35.0
67	30.0	30.0	30.0	30.0	40.0	30.0
68	30.0	30.0	30.0	30.0	40.0	30.0
69	30.0	30.0	30.0	30.0	40.0	30.0
70	100.0	100.0	100.0	100.0	100.0	100.0

- **Dependents:** Demographic data was available for spouses of current retirees. For future retirees, husbands were assumed to be three years older than their wives. For future retirees who elect to continue their health coverage at retirement, 60% (previously, 70%) were assumed to have an eligible spouse who also opts for health coverage at that time.

Per Capita Health Costs:	2018 medical and prescription drug claims costs are shown in the table below for retirees and for spouses at selected ages. These costs are net of deductibles and other benefit plan cost sharing provisions.

	Non-Medicare Plans				Medicare Plans			
	Retiree		Spouse		Retiree		Spouse	
Age	Male	Female	Male	Female	Male	Female	Male	Female
45	$10,543	$13,226	$6,540	$9,872	N/A	N/A	N/A	N/A
50	12,513	14,253	8,740	11,444	N/A	N/A	N/A	N/A
55	14,861	15,343	11,696	13,247	N/A	N/A	N/A	N/A
60	17,649	16,538	15,657	15,364	N/A	N/A	N/A	N/A
65	20,960	17,816	20,960	17,816	$4,465	$3,795	$4,465	$3,795
70	24,293	19,200	24,293	19,200	5,174	4,090	5,174	4,090
75	26,179	20,667	26,179	20,667	5,576	4,402	5,576	4,402
80	28,192	22,281	28,192	22,281	6,005	4,746	6,005	4,746

Weighted Average Annual Retiree Contribution Amounts:	Non-Medicare Plans: $7,027 Medicare Plans: $2,312
Annual Dental Cost:	$759

Health Care Cost Trend Rates:	Health care trend measures the anticipated overall rate at which health plan costs are expected to increase in future years. The rates shown below are "net" and are applied to the net per capita costs shown above. The trend shown for a particular plan year is the rate that is applied to that year's cost to yield the next year's projected cost.

Year Ending December 31	Medical/ Prescription Drug	Dental	Medicare Part B
2018	0.00%	0.00%	4.50%
2019	7.00%	3.50%	4.50%
2020	6.50%	3.50%	4.50%
2021	6.00%	3.50%	4.50%
2022	5.50%	3.50%	4.50%
2023	5.00%	3.50%	4.50%
2024 and later	4.50%	3.50%	4.50%

The trend rate assumptions were developed using Segal's internal guidelines, which are established each year using data sources such as the 2018 Segal Health Trend Survey, internal client results, trends from other published surveys prepared by the S&P Dow Jones Indices, consulting firms and brokers, and CPI statistics published by the Bureau of Labor Statistics.

Medical, prescription drug and dental trends reflect a first year trend of 0.00% since the valuation is based on September 1, 2018 premium rates.

Retiree Contribution Increase Rate:	Retiree contributions for medical and prescription drug coverage are expected to increase with medical trend.
Administrative Expenses:	Administrative expenses are assumed to be included in the fully-insured premium rates, as these expenses are a component of the rate.

Participation and Coverage Election:

- 85% (previously, 100%) of active employees with coverage are assumed to elect retiree coverage.
- 80% of retirees are assumed to elect dental coverage.
- 100% of retirees over age 65 are assumed to remain with their current medical plan for life.
- For future retirees hired before 1986 and current retirees under age 65, 95% are assumed to be eligible for Medicare and are assumed to enroll in a Medicare Supplement plan upon reaching age 65 and 5% are assumed to be ineligible for Medicare and remain enrolled in the non-Medicare plans.
- For future retirees hired after 1986, 100% are assumed to enroll in a Medicare Supplement Plan upon reaching age 65.

The participation and coverage election assumptions were based on a review of recent experience and reflect new plan offerings.

Plan Design:	Development of plan liabilities was based on the substantive plan of benefits in effect as described in Exhibit III.
Missing Participant Data:	A missing census item for a given participant was assumed to equal the average value of that item over all other participants of the same status for whom the item is known.
Health Care Reform Assumption:	This valuation does not include the potential impact of any future changes due to the Patient Protection and Affordable Care Act (PPACA) and the Health Care and Education Reconciliation Act (HCERA) of 2010 other than the excise tax on high cost health plans beginning in 2022 (reflected with this valuation) and those previously adopted as of the valuation date. The excise tax calculation assumes that the current cost sharing provisions of the postemployment benefits will also apply to the additional cost of the plan due to the excise tax.
Demographic and Salary Increase Assumptions:	Many of the non-teacher demographic assumptions (including mortality, disability, turnover, retirement and salary scale) used in this valuation are the same as used in the Worcester Regional Retirement System Actuarial Valuation as of January 1, 2018, dated September 13, 2018, completed by KMS Actuaries LLC. Many of the teacher demographic assumptions (including mortality, disability, turnover, retirement and salary scale) used in this valuation are based on the Teachers' Retirement System Actuarial Valuation Report as of January 1, 2017, dated September 25, 2017, completed by PERAC. A review of the demographic assumptions is beyond the scope of this assignment, however, we have no reason to doubt the reasonableness of the assumptions. The remaining demographic assumptions, such as percent married, relative ages of spouses and enrollment elections, were based on the experience of the Plan and the experience of similar plans.
Justification for Assumption Changes Since Prior Valuation:	Based on past experience and future expectations, the following actuarial assumptions were changed: • The per capita health care costs were updated to reflect recent experience. • The trend assumptions were revised to better reflect future expectations. • The funded discount rate was decreased from 7.50% to 7.25%. • The impact of the excise tax on high cost health plans beginning in 2022 was recalculated with this valuation. • The mortality assumption for Teachers was updated. • The funding method was changed to be Entry Age Normal (as a percent of pay) to be consistent with the funding method required under GASB Statements Number 74 and 75. • The percentage of eligible spouses that elect coverage in the future was revised to better reflect recent experience, and future expectations. • The enrollment assumption for future retirees was revised to better reflect future expectations.

Exhibit III – Summary of Plan

This exhibit summarizes the major benefit provisions as included in the valuation. To the best of our knowledge, the summary represents the substantive plans as of the measurement date. It is not intended to be, nor should it be interpreted as, a complete statement of all benefit provisions.

Eligibility:	Retired and receiving a pension from the Worcester Regional Retirement System or Massachusetts State Teachers Retirement System. • Members hired before April 2, 2012 – Group 1 (including Teachers): » Retirees with at least 10 years of creditable service are eligible at age 55; » Retirees with at least 20 years of creditable service are eligible at any age. • Members hired on or after April 2, 2012 – Group 1 (including Teachers): » Retirees with at least 10 years of creditable service are eligible at age 60.
Disability:	Accidental (job-related) Disability has no age or service requirement. Ordinary (non-job related) Disability has no age requirement but requires 10 years of creditable service.
Pre-Retirement Death:	Surviving spouses of members who die in active service on Accidental (job-related) Death are eligible at any age. Surviving spouses of members who die in active service on Ordinary (non-job related) Death are eligible after two years of service.
Post-Retirement Death:	Surviving spouse is eligible.
Benefit Types:	Medical and prescription drug benefits are provided to all eligible retirees through plans offered by Blue Cross Blue Shield of Massachusetts. Dental benefits are provided through Delta Dental. The Nashoba Regional School District pays 50% of the retiree life insurance premium and reimburses the Medicare Part B penalty for 24 retirees and spouses.
Duration of Coverage:	Lifetime.
Dependent Benefits:	Medical and Prescription Drugs.
Dependent Coverage:	Benefits are payable to a spouse for their lifetime, regardless of when the retirees dies.
MGL Chapter 32B, Section 18A:	Effective July 1, 2011.
Retiree Life:	$5,000

Retiree Contributions:

Premium rates and retiree contributions as of September 1, 2018 are summarized below:

	Active	Retiree	Total	Retirees 65 and over*	Monthly Premium (eff. 9/1/2018)	School District Cost	Retiree cost
HMO Blue							
• Individual	99	17	116	4	$842.17	$421.09	$421.09
• Family	225	5	230	1	$2,227.32	$1,113.66	$1,113.66
Blue Choice							
• Individual	8	0	8	0	$1,041.84	$520.92	$520.92
• Family	16	0	16	0	$2,732.91	$1,366.46	$1,366.46
Blue Care Elect PPO							
• Individual	11	9	20	1	$1,093.21	$546.61	$546.61
• Family	21	3	24	0	$2,867.77	$1,433.89	$1,433.89
Non-Medicare Total	380	34	414	6			

	Active	Retiree	Total	Monthly Premium (eff. 9/1/2018)	School District Cost	Retiree cost
Medicare Supplement Plans						
• Medex	N/A	112	112	$381.30	$190.65	$190.65
• MBFS	N/A	8	8	$307.77	$153.89	$153.88
Medicare Total		120	120			
Retiree Total**		154	154			

* 6 of 126 over-65 retirees are in a non-Medicare plan.

** In addition, there are 73 spouses of retirees covered under an individual or family policy.

Plan Changes Since the Prior Valuation: None.

Exhibit IV – Definition of 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.
Actuarial Accrued Liability (AAL):	Present value of all future benefit payments for current retirees and active employees taking into account assumptions about demographics, turnover, mortality, disability, retirement, health care trends, and other actuarial assumptions.
Unfunded Actuarial Accrued Liability (UAAL):	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.
Normal Cost:	The amount of contributions required to fund the benefit allocated to the current year of service.
Actuarially Determined Contribution:	A target or recommended contribution to an OPEB plan for the reporting period based on the most recent measurement available.
Valuation Date:	The date at which the actuarial valuation is performed
Covered Employee Payroll:	The payroll of the employees that are provided OPEB benefits
Entry Age Actuarial Cost Method:	An actuarial cost method where the present value of the projected benefits for an individual is allocated on a level basis over the earnings or service of the individual between entry age and assumed exit age
Healthcare Cost Trend Rates:	The rate of change in per capita health costs over time
Discount Rate:	The interest rate used to determine the actuarial present value of projected benefit payments.
Expected Return on Assets:	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.
Real Rate of Return:	The rate of return on an investment after removing inflation