

**PLYMOUTH COUNTY
CONTRIBUTORY RETIREMENT SYSTEM**

December 31, 2018 Actuarial Valuation Report

GASB 67 & 68

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Introduction

This report presents the Governmental Accounting Standards Statements 67 & 68 based on the findings of an actuarial valuation as of January 1, 2019, of the Plymouth County Contributory Retirement System.

The actuarial valuation is based on:

- Provisions of Chapter 32 of the Massachusetts General Laws, "M.G.L.", as of January 1, 2019.
- Employee data provided by the Retirement Board
- Asset information reported to the Public Employee Retirement Administration Commission by the Plymouth County Contributory Retirement System
- Actuarial assumptions approved by the Retirement Board
- Assets as of December 31, 2018

The valuation and appropriation forecast are prepared in accordance with Chapter 32 of the M.G.L. as of January 1, 2019.

The valuation and forecast do not account for:

- Any subsequent changes in the law
- Chapter 32 of the M.G.L., Section 3(8)(c) transfers between systems
- State-mandated benefits
- Cost-of-living increases granted to retired members between 1982 and 1997. The cost of these benefits has been assumed by the State under Proposition Two and One-Half.

GASB Statements No. 67 and No. 68

Effective for periods beginning after June 15, 2013, the Governmental Accounting Standards Board (GASB) requires the disclosure of pension related liabilities for public employer financial statements in accordance with Statements 67 and 68. These statements, which amend GASB Statements No. 25 and No. 27, must be adhered to by any public employee retirement system that follows Generally Accepted Accounting Principles (GAAP).

These disclosures are intended to establish a reporting framework that distinguishes between:

- current financial information about plan assets and financial activities,
- actuarially determined information from a long-term perspective,
- the funded status of the plan, and
- progress being made in accumulating sufficient assets to pay benefits when due.

The statement requires the system to present two financial statements – a statement of fiduciary net position and a statement of changes in fiduciary net position. The statement of fiduciary net position presents the following items as of the end of the plan’s reporting period, as applicable:

- Assets
- Deferred outflows of resources (consumption of net assets by the employers that is applicable to a future reporting period)
- Liabilities
- Deferred inflows of resources (acquisition of net assets by the employers that is applicable to a future reporting period)
- Fiduciary net position (Assets + Deferred outflows – Liabilities – Deferred inflows)

The system is considered a cost-sharing multiple-employer pension plan since pension obligations exist for employees of more than one employer and plan assets can be used to pay the benefits of the employees of any employer.

This report does not include all items required under GASB Statements No. 67 and No. 68. Rather, it provides all items required that are not readily available from other sources such as the Annual Statement of the Financial Condition prepared by the Board, Chapter 32 of the Massachusetts General Laws and investment reports prepared by the plan’s investment consultant.

Discount Rate

The discount rate, and all other actuarial assumptions, are the as those described in Exhibit 5. The discount rate was selected based on a projection of employer and employee contributions, benefit payments, expenses and the long term expected rate of return on trust assets. Under Chapter 32 of the Massachusetts Laws, employers are required to make the necessary contributions to the trust such that the plan reaches a full funding status by 2040. In addition, Chapter 32 also gives the Retirement Board the right to go directly to the Assessors of the community and add an additional property tax to bills for amounts not paid by employer.

Based on these laws and assumptions, the pensions 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.

The Board selected 7.875% as the long term expectation of investment returns. The average return for the 34 years ending as of December 31, 2018 was 8.75%. The average return for the past 10 years ending December 31, 2018 was 8.70%.

Net Position Restricted for Pensions

The Net Position Restricted for Pensions as of December 31, 2018 is \$936,639,806. The 2018 Annual Statement of the Financial Condition contains the values for previous years and the changes in Net Position Restricted for Pensions. Investments are reported at fair value.

December 31, 2017 Net Position	1,019,707,446
Employer Contributions	72,811,480
Employee Contributions	41,258
Other Payments	3,778,803
Benefit Payments	(115,748,560)
Expenses	(1,965,813)
Investment Income	<u>(41,984,808)</u>
December 31, 2018 Net Position	936,639,806

Pension Liability as of December 31, 2018

The following presents the changes in the pension liability during 2018.

December 31, 2017 Liability	1,555,495,352
Service Cost	27,772,477
Interest on Liability and Service Cost	122,120,554
Change in Plan Provisions	0
Experience (Gain) and Loss	59,806,942
Change in Assumptions	19,750,049
Benefit Payments	(115,748,560)
Other	0
December 31, 2018 Liability	1,669,196,814

Net Pension Liability as of December 31, 2018

The following presents the net pension liability of the system calculated using the discount rate of 7.875%, as well as what the system's 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 Rate (7.875%)	1% Increase (8.875%)
Total Pension Liability	1,842,393,078	1,669,196,814	1,521,542,174
Plan Fiduciary Net Position	<u>936,639,806</u>	<u>936,639,806</u>	<u>936,639,806</u>
Net Pension Liability	905,753,272	732,557,008	584,902,368

The Plan Fiduciary Net Position as a percentage of the Total Pension Liability is 56.1%.

	Unit	1% Decrease (6.875%)	Current Discount Rate (7.875%)	1% Increase (8.875%)
County of Plymouth	1	43,328,894	34,797,166	27,980,217
Hospital	2	4,098,722	3,291,658	2,646,805
Abington	3	32,685,242	26,249,315	21,106,935
Bridgewater	4	44,289,588	35,568,693	28,600,598
Bridgewater Housing	5	914,507	734,435	590,556
Bridgewater/Raynham				
Regional School	6	21,367,871	17,160,405	13,798,590
Carver	7	26,298,220	21,119,937	16,982,429
Carver/Marion/Wareham				
Regional Refuse	8	641,154	514,907	414,034
Duxbury	9	46,252,101	37,144,775	29,867,917
Duxbury Housing	10	286,067	229,739	184,732
East Bridgewater	11	31,572,757	25,355,886	20,388,533
East Bridgewater Housing	12	523,095	420,094	337,795
Halifax	13	14,289,747	11,476,007	9,227,796
Hanover	14	41,077,460	32,989,053	26,526,323
Hanson	15	18,814,152	15,109,529	12,149,492
Kingston	16	27,687,690	22,235,812	17,879,699
Kingston Housing	17	22,704	18,233	14,661
Lakeville	18	12,564,261	10,090,280	8,113,541
Marion	19	12,715,922	10,212,078	8,211,478
Marshfield	20	72,403,200	58,146,561	46,755,341
Marshfield Housing	21	380,515	305,589	245,723
Mattapoisett	22	13,950,099	11,203,238	9,008,464
Middleborough	23	81,157,770	65,177,302	52,408,723
Middleborough Housing	24	1,358,593	1,091,078	877,330
Norwell	25	31,474,677	25,277,118	20,325,197
Norwell Housing	26	405,943	326,010	262,143
Old Rochester Regional				
School	27	8,459,421	6,793,709	5,462,785
Onset Fire District	28	2,925,153	2,349,172	1,888,957
Pembroke	29	40,566,171	32,578,440	26,196,151
Plymouth County Mosquito				
Control	30	2,720,819	2,185,073	1,757,005
Plympton	31	5,972,905	4,796,803	3,857,084
Rochester	32	9,456,570	7,594,513	6,106,708
Rockland	33	48,565,160	39,002,379	31,361,606
Scituate	34	59,002,533	47,384,568	38,101,680
Scituate Housing	35	1,373,123	1,102,747	886,713
Silver Lake Regional School	36	9,011,577	7,237,141	5,819,347
South Shore Regional				
School	38	4,586,160	3,683,116	2,961,574
Wareham	39	49,603,176	39,836,003	32,031,919

	<u>Unit</u>	1% Decrease (7.00%)	Current Discount Rate (8.00%)	1% Increase (9.00%)
Wareham Fire District	40	9,542,845	39,836,003	6,162,420
Wareham Housing	41	362,352	7,663,799	233,994
West Bridgewater	42	25,046,789	291,003	16,174,301
Whitman	43	24,114,118	20,114,921	15,572,016
Whitman/Hanson Regional School	44	14,657,548	19,365,899	9,465,309
Whitman Housing	45	1,021,669	11,771,386	659,757
Abington Housing	46	492,218	820,496	317,856
Pembroke Housing	47	1,186,044	395,297	765,904
Hanson Housing	48	365,985	952,505	236,339
Rockland Housing	49	761,938	293,920	492,032
Halifax Housing	50	642,970	611,908	415,207
Mattapoisett Housing	51	238,844	516,366	154,236
Acushnet/Rochester/Marion Health District	53	184,355	148,054	119,049
West Bridgewater Housing	54	164,375	132,009	106,148
South Shore Tri Town Development	55	1,473,928	1,183,703	951,809
Carver Housing	56	248,833	199,836	160,687
Retirement Staff	59	<u>2,444,741</u>	<u>1,963,356</u>	<u>1,578,724</u>
Total		905,753,272	727,422,147	584,902,368

Employer Contributions during 2018

	<u>Unit</u>	<u>Contribution</u>	<u>Portion</u>
County of Plymouth	1	3,664,199	0.050327
Hospital	2	330,311	0.004537
Abington	3	2,620,527	0.035991
Bridgewater	4	3,550,969	0.048769
Bridgewater Housing	5	73,324	0.001007
Bridgewater/Raynham			
Regional School	6	1,713,192	0.023529
Carver	7	2,108,507	0.028958
Carver/Marion/Wareham			
Regional Refuse	8	51,427	0.000706
Duxbury	9	3,708,285	0.05093
Duxbury Housing	10	22,939	0.000315
East Bridgewater	11	2,531,361	0.034766
East Bridgewater Housing	12	41,911	0.000576
Halifax	13	1,145,686	0.015735
Hanover	14	3,293,420	0.045232
Hanson	15	1,508,408	0.020717
Kingston	16	2,219,898	0.030488
Kingston Housing	17	1,834	0.000025
Lakeville	18	1,007,318	0.013835
Marion	19	1,019,533	0.014002
Marshfield	20	5,804,983	0.079726
Marshfield Housing	21	30,517	0.000419
Mattapoissett	22	1,118,486	0.015361
Middleborough	23	6,506,872	0.089366
Middleborough Housing	24	108,892	0.001496
Norwell	25	2,523,519	0.034658
Norwell Housing	26	32,577	0.000447
Old Rochester Regional			
School	27	678,267	0.009315
Onset Fire District	28	234,534	0.003221
Pembroke	29	3,252,447	0.044669
Plymouth County Mosquito			
Control	30	218,123	0.002996
Plympton	31	478,880	0.006577
Rochester	32	758,181	0.010413
Rockland	33	3,893,717	0.053477
Scituate	34	4,730,553	0.06497
Scituate Housing	35	110,121	0.001512
Silver Lake Regional School	36	722,524	0.009923
South Shore Regional			
School	38	367,693	0.00505
Wareham	39	3,976,952	0.05462

	<u>Unit</u>	<u>Contribution</u>	<u>Portion</u>
Wareham Fire District	40	765,127	0.010508
Wareham Housing	41	29,054	0.000399
West Bridgewater	42	2,008,165	0.02758
Whitman	43	1,933,377	0.026553
Whitman/Hanson Regional School	44	1,175,190	0.01614
Whitman Housing	45	81,932	0.001125
Abington Housing	46	39,490	0.000542
Pembroke Housing	47	95,075	0.001306
Hanson Housing	48	29,357	0.000403
Rockland Housing	49	61,080	0.000839
Halifax Housing	50	51,545	0.000708
Mattapoissett Housing	51	19,137	0.000263
Acushnet/Rochester/Marion Health District	53	14,796	0.000203
West Bridgewater Housing	54	13,186	0.000181
South Shore Tri Town Development	55	118,161	0.001623
Carver Housing	56	19,928	0.000274
Retirement Staff	59	<u>195,993</u>	<u>0.002692</u>
		72,811,480	100.0000%

Pension Expense for 2018

Service Cost	27,772,477
Interest	122,120,554
Difference in Experience - Amortization	18,595,107
Change in Assumptions - Amortization	(754,493)
Changes in Plan Provisions	0
Employee Contributions	(41,258)
Projected Earnings	(79,964,896)
Administration Expense	1,965,813
Other Changes in Fiduciary Net Position	0
Asset (Gain) / Loss Amortization	<u>31,517,899</u>
Total Expense	121,211,203

Schedules of Required Supplementary Information

	<u>2018</u>
Total Pension Liability – Beginning	1,555,495,352
Total Pension Liability – Ending (a)	1,669,196,814
Plan Fiduciary Net Position – Beginning	1,019,707,446
Plan Fiduciary Net Position – Ending (b)	936,639,806
Net Pension Liability – Ending (a) – (b)	732,557,008
Plan Fiduciary Net Positions as a percentage of the Total Pension Liability	56.1%
Covered-employee payroll	281,665,696
Net Pension Liability as a percentage of Covered-employee Payroll	260.1%

Schedule of Net Position Restricted for Pensions Amortization Recognition

Below is the schedule of amortization adjustments to the Pension Expense for the coming years. A positive number indicates that the actual return was less than the expected return and will be added to the Pension Expense.

Assets

<u>Year</u>	<u>(Gain) / Loss</u>	<u>Period</u>	<u>Increase (Decrease) arising from (Gains) or Losses</u>				
			<u>2018</u>	<u>2019</u>	<u>2020</u>	<u>2021</u>	<u>2022</u>
2018	121,949,704	5	24,389,941	24,389,941	24,389,941	24,389,941	24,389,940
2017	(74,900,971)	5	(14,980,194)	(14,980,194)	(14,980,194)	(14,980,194)	
2016	8,756,807	5	1,751,361	1,751,361	1,751,363		
2015	68,091,068	5	13,618,039	13,618,040			
2014	33,693,756	5	6,738,752				

Experience

<u>Year</u>	<u>(Gain) / Loss</u>	<u>Period</u>	<u>Increase (Decrease) arising from (Gains) or Losses</u>				
			<u>2018</u>	<u>2019</u>	<u>2020</u>	<u>2021</u>	<u>2022</u>
2018	59,806,942	4.35	13,748,722	13,748,722	13,748,722	13,748,722	4,812,054
2016	21,421,023	4.42	4,846,385	4,846,385	4,846,385	4,846,385	2,035,483

Assumptions

<u>Year</u>	<u>(Gain) / Loss</u>	<u>Period</u>	<u>Increase (Decrease) arising from (Gains) or Losses</u>				
			<u>2018</u>	<u>2019</u>	<u>2020</u>	<u>2021</u>	<u>2022</u>
2018	19,750,049	4.35	4,540,241	4,540,241	4,540,241	4,540,241	1,589,085
2016	(23,402,726)	4.42	(5,294,734)	(5,294,734)	(5,294,734)	(5,294,734)	(2,223,790)

Reconciliation of Net Pension Liability for 2018

NPL Beginning	535,787,906
Expense	121,120,735
Contribution	(72,811,480)
Deferred Outflows	132,098,205
Deferred Inflows	20,123,127
Revenue	<u>(3,778,802)</u>
NPL Ending	732,539,691

	<u>County of Plymouth</u>	<u>Hospital</u>	<u>Abington</u>	<u>Bridgewater</u>	<u>Bridgewater Housing</u>	<u>Bridgewater/ Raynham Regional School</u>
Net Pension Liability	38,387,855	0	26,434,124	35,819,115	739,606	17,281,223
Deferred Outflows of Resources						
Differences between Expected and Actual Experience	2,904,505	0	1,905,366	2,581,834	53,311	1,245,628
Net Asset Loss	6,291,833	0	4,127,466	5,592,854	115,484	2,698,319
Changes in Assumptions	834,471	0	547,416	741,767	15,316	357,872
Changes in Proportion and Differences between Employer Contributions and proportionate share of contributions	3,741,172	0	0	218,493	70,341	157,596
Total Deferred Outflows	13,771,981	0	6,580,249	9,134,949	254,451	4,459,414
Deferred Inflows of Resources						
Differences between Expected and Actual Experience	0	0	0	0	0	0
Net Asset Gain	2,465,619	0	1,617,456	2,191,707	45,255	1,057,407
Changes in Assumptions	412,496	0	270,599	366,671	7,571	176,904
Changes in Proportion and Differences between Employer Contributions and proportionate share of contributions	1,693,082	0	199,076	352,507	45,383	91,970
Total Deferred Inflows	4,571,197	0	2,087,131	2,910,885	98,209	1,326,281
Pension Expense						
Proportionate share of plan Pension Expense	6,650,131	0	4,362,512	5,911,349	122,060	2,851,978
Net Amortization from changes in Share Proportions	1,701,513	0	(137,706)	(602)	2,800	40,572
Total Employer Pension Expense	8,351,644	0	4,224,806	5,910,747	124,860	2,892,550
Revenue	207,320	0	136,003	184,288	3,805	88,911

	<u>Carver</u>	<u>Carver/Marion/ Wareham Regional</u>	<u>Duxbury</u>	<u>Duxbury Housing</u>	<u>East Bridgewater</u>	<u>East Bridgewater Housing</u>
Net Pension Liability	21,268,633	518,532	37,406,294	231,356	25,534,404	423,052
Deferred Outflows of Resources						
Differences between Expected and Actual Experience	1,533,040	37,376	2,696,238	16,676	1,840,515	30,494
Net Asset Loss	3,320,919	80,964	5,840,680	36,124	3,986,984	66,056
Changes in Assumptions	440,446	10,738	774,636	4,791	528,784	8,761
Changes in Proportion and Differences between Employer Contributions and proportionate share of contributions	345,399	33,073	687,524	15,652	145,184	31,418
Total Deferred Outflows	5,639,803	162,151	9,999,077	73,244	6,501,467	136,729
Deferred Inflows of Resources						
Differences between Expected and Actual Experience	0	0	0	0	0	0
Net Asset Gain	1,301,388	31,728	2,288,823	14,157	1,562,403	25,887
Changes in Assumptions	217,722	5,308	382,919	2,368	261,389	4,331
Changes in Proportion and Differences between Employer Contributions and proportionate share of contributions	99,337	43,819	543,778	27,253	272,720	6,665
Total Deferred Inflows	1,618,447	80,855	3,215,520	43,778	2,096,512	36,883
Pension Expense						
Proportionate share of plan Pension Expense	3,510,034	85,575	6,173,287	38,182	4,214,029	69,818
Net Amortization from changes in Share Proportions	188,435	(19,619)	265,251	(14,418)	(144,468)	16,096
Total Employer Pension Expense	3,698,469	65,956	6,438,538	23,764	4,069,561	85,914
Revenue	109,427	2,668	192,454	1,190	131,374	2,177

	<u>Halifax</u>	<u>Hanover</u>	<u>Hanson</u>	<u>Kingston</u>	<u>Kingston Housing</u>	<u>Lakeville</u>
Net Pension Liability	11,556,804	33,221,313	15,215,908	22,392,364	18,362	10,161,321
Deferred Outflows of Resources						
Differences between Expected and Actual Experience	833,012	2,394,586	1,096,760	1,614,038	1,323	732,426
Net Asset Loss	1,804,499	5,187,230	2,375,837	3,496,380	2,867	1,586,605
Changes in Assumptions	239,326	687,970	315,102	463,717	380	210,428
Changes in Proportion and Differences between Employer Contributions and proportionate share of contributions	175,704	234,861	149,422	65,397	13,289	118,416
Total Deferred Outflows	3,052,541	8,504,648	3,937,120	5,639,532	17,860	2,647,875
Deferred Inflows of Resources						
Differences between Expected and Actual Experience	0	0	0	0	0	0
Net Asset Gain	707,139	2,032,752	931,035	1,370,148	1,125	621,753
Changes in Assumptions	118,304	340,077	155,761	229,225	188	104,019
Changes in Proportion and Differences between Employer Contributions and proportionate share of contributions	326,559	298,382	356,365	185,858	19,893	230,138
Total Deferred Inflows	1,152,002	2,671,211	1,443,161	1,785,231	21,206	955,910
Pension Expense						
Proportionate share of plan Pension Expense	1,907,258	5,482,625	2,511,132	3,695,487	3,030	1,676,957
Net Amortization from changes in Share Proportions	(176,354)	30,067	(212,574)	(116,105)	(9,425)	(125,737)
Total Employer Pension Expense	1,730,904	5,512,692	2,298,558	3,579,382	(6,395)	1,551,220
Revenue	59,459	170,923	78,285	115,208	94	52,280

	<u>Marion</u>	<u>Marshfield</u>	<u>Marshfield</u> <u>Housing</u>	<u>Mattapoisett</u>	<u>Middleboroug</u> <u>h</u>	<u>Middleboroug</u> <u>h Housing</u>
Net Pension Liability	10,283,977	58,555,943	307,741	11,282,114	65,636,184	1,098,759
Deferred Outflows of Resources						
Differences between Expected and Actual Experience	741,267	4,220,702	22,182	813,212	4,731,044	79,198
Net Asset Loss	1,605,757	9,143,020	48,052	1,761,608	10,248,540	171,562
Changes in Assumptions	212,968	1,212,617	6,373	233,638	1,359,240	22,754
Changes in Proportion and Differences between Employer						
Contributions and proportionate share of contributions	18,014	355,871	22,245	171,865	39,865	20,375
Total Deferred Outflows	2,578,006	14,932,209	98,852	2,980,323	16,378,688	293,889
Deferred Inflows of Resources						
Differences between Expected and Actual Experience	0	0	0	0	0	0
Net Asset Gain	629,259	3,582,933	18,831	690,333	4,016,160	67,230
Changes in Assumptions	105,275	599,422	3,150	115,492	671,900	11,248
Changes in Proportion and Differences between Employer						
Contributions and proportionate share of contributions	85,976	406,330	33,100	425,410	633,547	37,380
Total Deferred Inflows	820,510	4,588,685	55,081	1,231,235	5,321,607	115,858
Pension Expense						
Proportionate share of plan Pension Expense	1,697,199	9,663,684	50,787	1,861,925	10,832,160	181,332
Net Amortization from changes in Share Proportions	(60,929)	(94,227)	(15,358)	(249,222)	(475,688)	(20,052)
Total Employer Pension Expense	1,636,270	9,569,457	35,429	1,612,703	10,356,472	161,280
Revenue	52,911	301,269	1,583	58,046	337,697	5,653

		<u>Old Rochester</u>				<u>Plymouth</u>
		<u>Norwell</u>	<u>Regional</u>	<u>Onset Fire</u>	<u>Pembroke</u>	<u>County</u>
	<u>Norwell</u>	<u>Housing</u>	<u>School</u>	<u>District</u>		<u>Mosquito</u>
						<u>Control</u>
Net Pension Liability	25,455,082	328,306	6,841,540	2,365,711	32,807,810	2,200,457
Deferred Outflows of Resources						
Differences between Expected and Actual Experience	1,834,798	23,664	493,137	170,520	2,364,781	158,608
Net Asset Loss	3,974,598	51,262	1,068,249	369,386	5,122,665	343,583
Changes in Assumptions	527,142	6,799	141,679	48,991	679,407	45,569
Changes in Proportion and Differences between Employer						
Contributions and proportionate share of contributions	207,183	26,428	214,935	108,967	516,079	23,177
Total Deferred Outflows	6,543,721	108,153	1,918,001	697,863	8,682,932	570,937
Deferred Inflows of Resources						
Differences between Expected and Actual Experience	0	0	0	0	0	0
Net Asset Gain	1,557,552	20,088	418,623	144,753	2,007,450	134,643
Changes in Assumptions	260,577	3,361	70,035	24,217	335,844	22,525
Changes in Proportion and Differences between Employer						
Contributions and proportionate share of contributions	245,429	19,299	154,804	194,457	385,019	17,731
Total Deferred Inflows	2,063,558	42,748	643,462	363,427	2,728,313	174,899
Pension Expense						
Proportionate share of plan Pension Expense	4,200,938	54,181	1,129,082	390,421	5,414,383	363,149
Net Amortization from changes in Share Proportions	(74,118)	11,523	91,080	(100,780)	8,062	8,024
Total Employer Pension Expense	4,126,820	65,704	1,220,162	289,641	5,422,445	371,173
Revenue	130,966	1,689	35,200	12,172	168,795	11,321

	<u>Plympton</u>	<u>Rochester</u>	<u>Rockland</u>	<u>Scituate</u>	<u>Scituate Housing</u>	<u>Silver Lake Regional School</u>
Net Pension Liability	4,830,575	7,647,982	39,276,976	47,718,180	1,110,511	7,288,095
Deferred Outflows of Resources						
Differences between Expected and Actual Experience	348,187	551,264	2,831,077	3,439,518	80,046	525,325
Net Asset Loss	754,255	1,194,169	6,132,770	7,450,794	173,397	1,137,976
Changes in Assumptions	100,035	158,380	813,375	988,181	22,997	150,927
Changes in Proportion and Differences between Employer Contributions and proportionate share of contributions	337,827	300,137	209,073	361,784	124,911	27,610
Total Deferred Outflows	1,540,303	2,203,950	9,986,296	12,240,277	401,352	1,841,837
Deferred Inflows of Resources						
Differences between Expected and Actual Experience	0	0	0	0	0	0
Net Asset Gain	295,575	467,967	2,403,288	2,919,789	67,950	445,944
Changes in Assumptions	49,449	78,290	402,068	488,479	11,368	74,607
Changes in Proportion and Differences between Employer Contributions and proportionate share of contributions	171,375	124,321	714,705	504,613	48,134	355,597
Total Deferred Inflows	516,399	670,578	3,520,061	3,912,881	127,452	876,148
Pension Expense						
Proportionate share of plan Pension Expense	797,206	1,262,172	6,482,011	7,875,092	183,271	1,202,779
Net Amortization from changes in Share Proportions	57,814	166,060	(457,892)	(204,661)	73,141	(220,205)
Total Employer Pension Expense	855,020	1,428,232	6,024,119	7,670,431	256,412	982,574
Revenue	24,853	39,349	202,079	245,509	5,714	37,497

	<u>South Shore</u>	<u>South Shore</u>		<u>Wareham Fire</u>	<u>Wareham</u>	<u>West</u>
	<u>Mosquito</u>	<u>Regional</u>	<u>Wareham</u>	<u>District</u>	<u>Housing</u>	<u>Bridgewater</u>
	<u>Control</u>	<u>School</u>				
Net Pension Liability	0	3,709,047	40,116,469	7,717,756	293,051	20,256,540
Deferred Outflows of Resources						
Differences between Expected and Actual Experience	0	267,347	2,891,588	556,295	21,123	1,460,088
Net Asset Loss	0	579,136	6,263,850	1,205,063	45,757	3,162,889
Changes in Assumptions	0	76,810	830,760	159,825	6,069	419,487
Changes in Proportion and Differences between Employer						
Contributions and proportionate share of contributions	0	42,367	341,885	173,752	16,073	234,772
Total Deferred Outflows	0	965,659	10,328,083	2,094,934	89,022	5,277,235
Deferred Inflows of Resources						
Differences between Expected and Actual Experience	0	0	0	0	0	0
Net Asset Gain	0	226,950	2,454,654	472,236	17,931	1,239,462
Changes in Assumptions	0	37,968	410,661	79,005	3,000	207,361
Changes in Proportion and Differences between Employer						
Contributions and proportionate share of contributions	0	35,883	263,677	61,692	14,441	274,104
Total Deferred Inflows	0	300,801	3,128,992	612,933	35,372	1,720,927
Pension Expense						
Proportionate share of plan Pension Expense	0	612,117	6,620,556	1,273,687	48,363	3,343,005
Net Amortization from changes in Share Proportions	0	14,330	119,470	91,196	5,242	42,777
Total Employer Pension Expense	0	626,447	6,740,026	1,364,883	53,605	3,385,782
Revenue	0	19,083	206,398	39,708	1,508	104,219

	<u>Whitman</u>	<u>Whitman/Han son Regional School</u>	<u>Whitman Housing</u>	<u>Abington Housing</u>	<u>Pembroke Housing</u>	<u>Hanson Housing</u>
Net Pension Liability	19,502,245	11,854,262	826,273	398,080	959,211	295,989
Deferred Outflows of Resources						
Differences between Expected and Actual Experience	1,405,718	854,454	59,557	28,694	69,139	21,334
Net Asset Loss	3,045,112	1,850,944	129,016	62,156	149,772	46,217
Changes in Assumptions	403,866	245,486	17,111	8,244	19,864	6,130
Changes in Proportion and Differences between Employer Contributions and proportionate share of contributions	177,181	0	50,327	12,539	61,568	11,335
Total Deferred Outflows	5,031,877	2,950,884	256,011	111,633	300,343	85,015
Deferred Inflows of Resources						
Differences between Expected and Actual Experience	0	0	0	0	0	0
Net Asset Gain	1,193,307	725,340	50,559	24,357	58,692	18,111
Changes in Assumptions	199,639	121,349	8,459	4,075	9,819	3,030
Changes in Proportion and Differences between Employer Contributions and proportionate share of contributions	444,782	258,476	51,235	7,943	59,578	6,665
Total Deferred Inflows	1,837,728	1,105,165	110,253	36,375	128,089	27,806
Pension Expense						
Proportionate share of plan Pension Expense	3,218,521	1,956,349	136,363	65,696	158,302	48,848
Net Amortization from changes in Share Proportions	(263,338)	(188,858)	15,097	5,800	20,589	1,098
Total Employer Pension Expense	2,955,183	1,767,491	151,460	71,496	178,891	49,946
Revenue	100,339	60,990	4,251	2,048	4,935	1,523

	<u>Rockland</u>	<u>Halifax</u>	<u>Mattapoisett</u>	<u>Hanover</u>	<u>Acushnet/Roc</u> <u>hester/Marion</u>	<u>West</u> <u>Bridgewater</u>
	<u>Housing</u>	<u>Housing</u>	<u>Housing</u>	<u>Housing</u>	<u>Health District</u>	<u>Housing</u>
Net Pension Liability	616,216	520,001	193,164	0	149,096	132,938
Deferred Outflows of Resources						
Differences between Expected and Actual Experience	44,417	37,481	13,923	0	10,747	9,582
Net Asset Loss	96,217	81,194	30,161	0	23,281	20,757
Changes in Assumptions	12,761	10,769	4,000	0	3,088	2,753
Changes in Proportion and Differences between Employer						
Contributions and proportionate share of contributions	54,987	149,319	5,021	0	4,126	10,867
Total Deferred Outflows	208,381	278,763	53,106	0	41,241	43,959
Deferred Inflows of Resources						
Differences between Expected and Actual Experience	0	0	0	0	0	0
Net Asset Gain	37,704	31,818	11,820	0	9,123	8,133
Changes in Assumptions	6,308	5,323	1,978	0	1,526	1,361
Changes in Proportion and Differences between Employer						
Contributions and proportionate share of contributions	33,959	105,160	9,666	0	12,361	7,086
Total Deferred Inflows	77,971	142,301	23,464	0	23,010	16,580
Pension Expense						
Proportionate share of plan Pension Expense	101,696	85,818	31,879	0	24,606	21,939
Net Amortization from changes in Share Proportions	27,086	65,848	(5,646)	0	(5,166)	5,266
Total Employer Pension Expense	128,782	151,666	26,233	0	19,440	27,205
Revenue	3,170	2,675	994	0	767	684

	<u>South Shore</u> <u>Tri Town</u> <u>Development</u>	<u>Carver</u> <u>Housing</u>	<u>No Carver</u> <u>Water District</u>	<u>Other</u> <u>(Retirement</u> <u>Staff)</u>	<u>Total</u>
Net Pension Liability	1,192,036	201,243	0	1,977,179	732,557,008
Deferred Outflows of Resources					
Differences between Expected and Actual Experience	85,922	14,506	0	142,515	52,940,090
Net Asset Loss	186,126	31,422	0	308,720	114,680,534
Changes in Assumptions	24,686	4,167	0	40,945	15,209,808
Changes in Proportion and Differences between Employer					
Contributions and proportionate share of contributions	238,595	3,174	0	291,162	11,168,337
Total Deferred Outflows	535,330	53,270	0	783,341	193,998,769
Deferred Inflows of Resources					
Differences between Expected and Actual Experience	0	0	0	0	0
Net Asset Gain	72,939	12,315	0	120,981	44,940,582
Changes in Assumptions	12,202	2,060	0	20,239	7,518,522
Changes in Proportion and Differences between Employer					
Contributions and proportionate share of contributions	129,933	12,330	0	206,343	11,345,327
Total Deferred Inflows	215,074	26,705	0	347,563	63,804,431
Pension Expense					
Proportionate share of plan Pension Expense	196,726	33,212	0	326,301	121,211,200
Net Amortization from changes in Share Proportions	124,070	(5,868)	0	127,560	(73,148)
Total Employer Pension Expense	320,796	27,344	0	453,861	121,138,052
Revenue	6,133	1,035	0	10,173	3,778,802

EXHIBITS

Exhibit 1 - Age/Service Distribution with Salary as of January 1, 2019

Attained Age	Average Salary	<5	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40+	Total
< 20	2 26,007	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	2 26,007
20-24	187 33,140	3 58,672	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	190 33,543
25-29	340 43,969	51 63,794	1 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	392 46,523
30-34	216 47,416	123 61,879	43 64,310	0 0	0 0	0 0	0 0	0 0	0 0	0 0	382 53,974
35-39	174 43,456	93 59,268	117 73,415	28 73,153	3 87,047	0 0	0 0	0 0	0 0	0 0	415 57,764
40-44	188 35,872	77 51,205	68 71,697	74 74,736	41 83,199	0 0	0 0	0 0	0 0	0 0	448 54,696
45-49	230 32,221	139 40,588	110 53,129	116 68,915	107 82,568	33 84,791	1 157,823	0 0	0 0	0 0	736 52,557
50-54	226 35,180	164 37,822	194 40,415	135 56,112	104 75,554	68 91,247	54 97,146	1 128,421	0 0	0 0	946 51,803
55-59	166 39,282	125 38,400	242 40,212	181 45,332	143 52,649	64 71,140	75 87,849	15 91,396	2 152,132	1,013 48,966	
60-64	93 34,341	73 41,289	143 41,927	185 41,059	136 46,979	66 55,116	52 65,335	18 89,345	6 66,605	772 45,636	
65-69	26 29,381	23 37,233	49 41,174	51 42,066	47 49,602	33 48,064	26 48,812	2 122,165	3 63,265	260 43,861	
70+	20 28,442	11 32,897	15 39,190	17 35,583	15 35,589	13 38,493	14 35,100	5 42,325	4 43,552	114 35,394	
Total Employees	1,868	882	982	787	596	277	222	41	15	5,670	
Average Salary	38,627	46,907	49,132	52,985	62,328	69,603	77,254	86,915	71,193	49,685	

Exhibit 2 - Retiree Distribution as of January 1, 2019

Attained Age	Number of Employees			Total Payments		
	Female	Male	Total	Female	Male	Total
< 20	0	0	0	0	0	0
20-24	0	0	0	0	0	0
25-29	0	0	0	0	0	0
30-34	0	2	2	0	14,956	14,956
35-39	1	1	2	13,236	10,219	23,455
40-44	0	0	0	0	0	0
45-49	1	7	8	8,776	219,264	228,039
50-54	10	23	33	180,879	827,634	1,008,513
55-59	74	87	161	952,768	3,317,860	4,270,628
60-64	231	213	444	3,188,294	10,002,393	13,190,687
65-69	477	337	814	9,256,838	13,183,067	22,439,905
70-74	480	330	810	9,016,162	11,099,946	20,116,107
75-79	393	270	663	7,171,690	8,279,717	15,451,407
80-84	260	166	426	4,261,619	3,997,656	8,259,275
85-89	172	82	254	2,468,256	1,577,159	4,045,416
90-94	90	35	125	1,119,733	636,431	1,756,164
95+	34	16	50	264,182	228,398	492,580
Total	2223	1569	3792	37,902,433	53,394,699	91,297,132
Average (Age/Payment)	74.2	72.1	73.3	17,050	34,031	24,076
Frequency Percent	58.6	41.4	100	41.5	58.5	100

Exhibit 3 - Disabled Retiree Distribution as of January 1, 2019

Attained Age	Number of Employees			Total Payments		
	Female	Male	Total	Female	Male	Total
< 20	0	0	0	0	0	0
20-24	0	0	0	0	0	0
25-29	0	0	0	0	0	0
30-34	0	0	0	0	0	0
35-39	0	0	0	0	0	0
40-44	2	4	6	55,095	175,223	230,318
45-49	5	18	23	189,423	798,971	988,394
50-54	6	29	35	278,940	1,139,174	1,418,114
55-59	14	35	49	405,319	1,362,524	1,767,843
60-64	11	45	56	305,546	1,821,072	2,126,618
65-69	12	52	64	231,861	1,750,409	1,982,270
70-74	10	52	62	267,993	1,743,841	2,011,834
75-79	9	40	49	210,908	1,237,695	1,448,603
80-84	1	22	23	7,490	630,908	638,398
85-89	0	9	9	0	218,719	218,719
90-94	0	2	2	0	38,694	38,694
95-99	0	0	0	0	0	0
Total	70	308	378	1,952,577	10,917,228	12,869,805
Average (Age/Payment)	63.4	66.6	66	27,894	35,446	34,047
Frequency Percent	18.5	81.5	100	15.2	84.8	100

EXHIBIT 4 – SUMMARY OF PLAN PROVISIONS:

This summary is prepared in accordance with Chapter 32 as of January 1, 2019, and does not take into account any subsequent changes.

1. Administration

Each of the 104 contributory retirement systems for public employees of the Commonwealth of Massachusetts are guided by the applicable provisions of Chapter 32 of the Massachusetts General Laws and other applicable statutes. Although these boards operate semi-independently, there is a uniform set of rules governing benefits, eligibility, contributions, financing, and accounting.

2. Participation

Participation is mandatory for all full-time employees whose employment commences prior to age 65. Eligibility with respect to part-time, professional, temporary, or intermittent employment is governed by the local board. Membership is optional for certain elected officials, State officials appointed by the Governor, and certain hospital interns.

There are four classes of membership as follows:

- (i) Group 1: Most general employees in State and local government
- (ii) Group 2: Certain specified hazardous duty positions
- (iii) Group 3: State police officers and inspectors
- (iv) Group 4: Local police officers, firefighters, and designated employees of the municipal light department.

For members in more than one group, participation will be proportional.

Chapter 176 of the Acts of 2011 created different plan provisions within these groups for those hired on or after April 2, 2012.

3. **Salary**

Salary is defined as gross regular compensation. Salary does not include bonuses, overtime, severance pay, unused sick leave credit, or other similar compensation.

4. **Member Contributions**

Member contributions vary depending upon date hired as follows:

<u>Date of Hire</u>	<u>Member Contribution Rate</u>
Prior to 1975	5.0% of Salary
1975 to 1983	7.0% of Salary
1984 to 1996	8.0% of Salary
1996 and Later	9.0% of Salary
1979 and Later	Plus 2.0% of Salary in excess of \$30,000

For Group 1 employees who become members on or after April 2, 2012, the Contribution Rate shall be 6% after the completion of 30 years of service.

5. **Average Salary**

Average salary is used to determine a participant's benefit. It is defined as the average salary during the three consecutive-year period that produces the highest average. (Alternatively, if a greater amount results, it is the average rate of salary earned during the period or periods, whether or not consecutive, that constitutes the last three years preceding retirement.). For employees who become members on or after April 2, 2012, the averaging period shall be five years.

6. **Creditable Service**

In general, creditable service is awarded during the period in which a member contributes to the retirement system.

7. Service Retirement

a. Eligibility:

For an employee to be eligible for service retirement (also referred to as superannuation), one of the following conditions must be met:

- (i) completion of 20 years of service
- (ii) for an employee hired prior to January 1, 1978, attainment of age 55 as an active member
- (iii) for an employee hired on or after January 1, 1978, attainment of age 55 as an active member and completion of ten years of service
- (iv) for a Group 1 employee hired on or after April 2, 2012, attainment of age 60 and completion of ten years of service

b. Benefit Amount:

The retirement allowance is determined as a product of the participant's Benefit Rate times Average Salary times Creditable Service, where Benefit Rate is determined from the following table for those hired prior to April 2, 2012:

<u>Age at Retirement</u>	<u>Percentage of Average Salary</u>		
	<u>Group 1</u>	<u>Group 2</u>	<u>Group 4</u>
65 or Over	.025	.025	.025
64	.024	.025	.025
63	.023	.025	.025
62	.022	.025	.025
61	.021	.025	.025
60	.020	.025	.025
59	.019	.024	.025
58	.018	.023	.025
57	.017	.022	.025
56	.016	.021	.025
55	.015	.020	.025
54	.014	.014	.024
53	.013	.013	.023
52	.012	.012	.022
51	.011	.011	.021
50	.010	.010	.020
49	.009	.009	.019
48	.008	.008	.018
47	.007	.007	.017
46	.006	.006	.016
45	.005	.005	.015
44	.004	.004	.004
43	.003	.003	.003
42	.002	.002	.002
41	.001	.001	.001

For those hired after April 1, 2012 who retire with less than 30 years of service, the following rates are applied:

<u>Age at Retirement</u>	<u>Percentage of Average Salary</u>		
	<u>Group 1</u>	<u>Group 2</u>	<u>Group 4</u>
67 or Over	.0250	.0250	.0250
66	.0235	.0250	.0250
65	.0220	.0250	.0250
64	.0205	.0250	.0250
63	.0190	.0250	.0250
62	.0175	.0250	.0250
61	.0160	.0235	.0250
60	.0145	.0220	.0250
59		.0205	.0250
58		.0190	.0250
57		.0175	.0250
56		.0160	.0235
55		.0145	.0220
54			.0205
53			.0190
52			.0175
51			.0160
50			.0145

For those hired after April 1, 2012 who retire with at least 30 years of service, the following rates are applied:

Age at Retirement	Percentage of Average Salary		
	Group 1	Group 2	Group 4
67 or Over	.02500	.02500	.02500
66	.02375	.02500	.02500
65	.02250	.02500	.02500
64	.02125	.02500	.02500
63	.02000	.02500	.02500
62	.01875	.02500	.02500
61	.01750	.02375	.02500
60	.01625	.02250	.02500
59		.02125	.02500
58		.02000	.02500
57		.01875	.02500
56		.01750	.02375
55		.01625	.02250
54			.02125
53			.02000
52			.01875
51			.01750
50			.01625

8. Deferred Vested Retirement

a. Eligibility:

A participant who has completed ten or more years of creditable service is eligible for a deferred vested retirement benefit. If termination is involuntary, the participant is vested after six years.

b. Benefit Amount:

The participant's accrued benefit is payable commencing at age 55, or may be deferred until later at the employee's option.

c. Refund of Contributions:

In lieu of the deferred pension benefit, a member may elect to receive a refund of their accumulated contributions. Members with ten or more years of service are entitled to 100% of the credited interest on their contributions. Members with five to ten years of service are entitled to 50% of the credited interest on their contributions. No credited interest is provided for members with less than five years of service.

9. Accidental Disability

a. Eligibility:

Participants are eligible for an accidental disability benefit, regardless of service or age, if they become permanently and totally incapacitated for further duty as a result of personal injury sustained while in the performance of duties.

b. Benefit Amount:

The accidental disability amount is 72% of annual salary plus \$450 per year for each child plus an additional annuity based upon accumulated Member Contributions with credited interest.

10. Ordinary Disability

a. Eligibility:

An ordinary disability occurs when a member becomes permanently and totally disabled due to sickness or injury that is not job related. In order to be eligible for an ordinary disability benefit, a member must have ten years of service (and be less than age 55 or age 60 if hired on or after April 2, 2012).

b. Benefit Amount:

The ordinary disability amount is equal to the accrued retirement benefit as if the member were age 55 (age 60 if hired on or after April 2, 2012). If the member was a veteran, the benefit is 50% of the member's final rate of Salary during the preceding 12 months, plus an annuity based upon accumulated Member Contributions plus credited interest. If the participant is over age 55 (age 60 if hired on or after April 2, 2012), he

will receive not less than the superannuation allowance to which he is entitled.

11. Survivor Benefits

a. Occupational Death:

The survivors of a member who dies due to an occupational injury will be entitled to a lump sum return of contributions plus a pension benefit equal to 72% of the participant's annual Salary.

b. Non-Occupational Death:

Upon the death of a member other than due to an occupational injury, the designated beneficiary will be entitled to a retirement benefit as if Option C had been elected with a minimum of \$250 per month to the surviving spouse, plus \$120 for the first child, plus \$90 for each additional child. If no beneficiary is designated and if the employee worked two years, and is married at least one year, the spouse may elect benefits. If there is no designated beneficiary or surviving spouse, then member contributions are returned. If there are dependent children but no surviving spouse, they may elect minimum survivor benefits of \$250 per month plus \$120 for the first child and \$90 for each additional child.

c. Refund of Contributions:

Upon the death of a member not entitled to survivor benefits, the beneficiary is entitled to a refund of all member contributions with interest.

12. Cost-of-Living Increases

In accordance with the adoption of Chapter 17 of the Acts of 1997, the granting of a cost-of-living adjustment will be determined by an annual vote by the Retirement Board. The amount of increase will be based upon the Consumer Price Index, limited to a maximum of 3.0%, beginning on July 1. All retirees, disabled retirees, and beneficiaries who have been receiving benefits payments for at least one year as of July 1 are eligible for the adjustment. The maximum amount of pension benefit subject to a COLA is \$14,000. All COLAs granted to members after 1981 and prior to July 1, 1998 are deemed to be an obligation of the State and are not the liability of the Retirement System.

13. Postretirement Death Benefits

Any benefits following the death of a member after retirement are based upon the form of benefit the participant elected at the time of retirement. There are three available forms as follows:

- (i) Option A – Life annuity
- (ii) Option B – Life annuity with death benefit equal to excess of member contributions plus credited interest to retirement over annuity benefit paid to member
- (iii) Option C – Life annuity with 66-2/3% of benefit continued after death of member to designated joint annuitant

EXHIBIT 5 – ACTUARIAL METHODS AND ASSUMPTIONS:

The actuarial cost method, factors, and assumptions used in determining cost estimates are presented below.

1. Member Data

The member data used in the determination of cost estimates consist of pertinent information with respect to the active, inactive, retired, and disabled members of the employer as supplied by the employer to the actuary.

2. Valuation Date

January 1, 2019.

3. Actuarial Cost Method

The costs of the Plan have been determined in accordance with the individual entry age normal actuarial cost method.

4. Rate of Investment Return

It is assumed that the assets of the fund will accumulate at a compound annual rate of 7.875% per annum, net of investment expenses. The rationale for the selection of this rate is based on past performance and future expectations. Since 1987 the fund has had an average return of 8.70%. The asset policy continues to have a high concentration in equities and equity like investments. The Board continues to take an aggressive posture in its investment allocations.

5. Salary Scale

It is assumed that salaries including longevity will increase at a rate of 3.75% per year. The rationale for this assumption is based on the 2015 Experience Study and the history of municipal revenue and Proposition 2-1/2. The member units are limited to how much it can raise in property tax revenue to 2.5% of the previous year's figure, plus new growth. This restriction limits the largest portion of their revenue to about 3% per year. By extension, payroll increases are limited by the growth in revenue. Over an employee's career, promotions are expected to add .75% to the increases.

6. Cost-of-Living Increases

Cost-of-living increases have been assumed to be 3.0% of the lesser of the pension amount and \$14,000 per year. Under State law the increase is limited to 3% or CPI. The Board has always granted 3%.

7. Value of Investments

Assets held by the fund are valued at market value as reported by the Public Employees' Retirement Administration Commission (PERAC). The actuarial value of assets is determined using a five-year smoothing of asset returns greater than or less than the assumed rate of return, with a 20% corridor.

8. Annual Rate of Withdrawal Prior to Retirement

Based on an analysis of experience, the assumed annual rates of withdrawal may best be illustrated by the following rates at the following ages:

<u>Service</u>	<u>General Employees</u>	<u>Police and Fire Employees</u>
0	0.1821	0.1500
5	0.1020	0.1000
10	0.0650	0.0600
15	0.0417	0.0600
20	0.0400	0.0000
25	0.0400	0.0000

9. Annual Rate of Mortality

It is assumed that both pre-retirement mortality and beneficiary mortality is represented by the RP-2014 Blue Collar Mortality with Scale MP-2016, fully generational. Mortality for retired members for Group 1 and 2 is represented by the RP-2014 Blue Collar Mortality Table set forward five years for males and 3 years for females, fully generational. Mortality for retired members for Group 4 is represented by the RP-2014 Blue Collar Mortality Table set forward three years for males, and six years for females, fully generational. Mortality for disabled members for Group 1 and 2 is represented by the RP-2000 Mortality Table set forward six years. Mortality for disabled members for Group 4 is represented by the RP-2000 Mortality Table set forward two years. Generational adjusting is based on Scale MP-2016.

10. Service Retirement

Based on an analysis of experience, the assumed annual retirement rates are illustrated at the following ages for those hired prior to April 2, 2012:

<u>Age</u>	<u>Male General Employees</u>	<u>Female General Employees</u>	<u>Male and Female Police and Fire Employees</u>
50	0.0360	0.1019	0.0382
51	0.0405	0.0714	0.0351
52	0.0437	0.0562	0.0436
53	0.0366	0.0448	0.0527
54	0.0451	0.0488	0.0999
55	0.0477	0.0469	0.1110
56	0.0574	0.0518	0.1413
57	0.0632	0.0509	0.1292
58	0.0765	0.0552	0.1499
59	0.0917	0.0645	0.1679
60	0.1057	0.0774	0.1871
61	0.1224	0.1038	0.2073
62	0.1473	0.1168	0.2176
63	0.1777	0.1440	0.3338
64	0.2136	0.1708	0.5664
65	0.2615	0.1939	1.0000
66	0.2682	0.1959	1.0000
67	0.2500	0.2000	1.0000
68	0.2500	0.2000	1.0000
69	0.2500	0.2000	1.0000
70 to 76	0.2500	0.2500	1.0000
77 to 79	0.3500	0.2500	1.0000
80	1.0000	1.0000	1.0000

Based on an analysis of experience, the assumed annual retirement rates are illustrated at the following ages for those hired on or after April 2, 2012:

<u>Age</u>	<u>Male General Employees</u>	<u>Female General Employees</u>	<u>Male and Female Police and Fire Employees</u>
50	0.0000	0.0000	0.0191
51	0.0000	0.0000	0.0176
52	0.0000	0.0000	0.0436
53	0.0000	0.0000	0.0211
54	0.0000	0.0000	0.0266
55	0.0000	0.0000	0.0370
56	0.0000	0.0000	0.1060
57	0.0000	0.0000	0.1938
58	0.0000	0.0000	0.1499
59	0.0000	0.0000	0.1119
60	0.0477	0.0469	0.0936
61	0.0574	0.0518	0.1555
62	0.0632	0.0509	0.1741
63	0.0765	0.0552	0.2670
64	0.0917	0.0645	0.4720
65	0.1057	0.0774	1.0000
66	0.1224	0.1038	1.0000
67	0.1473	0.1168	1.0000
68	0.1777	0.1440	1.0000
69	0.2136	0.1708	1.0000
70	0.2615	0.1939	1.0000
70 to 76	0.2682	0.1959	1.0000
77 to 79	0.2500	0.2000	1.0000

12. Annual Rate of Disability Prior to Retirement

Based on an analysis of experience, the assumed annual rates of disability may best be illustrated by the following probabilities at the following ages:

<u>Attained Age</u>	<u>General Employees</u>	<u>Police and Fire Employees</u>
20	0.000100	0.000500
30	0.000152	0.000967
40	0.000663	0.002500
50	0.001271	0.007634

In addition, it is assumed for the general employees that 45% of all disabilities are ordinary (55% are service connected). For police and fire employees, 10% of all disabilities are assumed to be ordinary (90% are service connected).

13. Family Composition

It is assumed that 80% of all male members will be survived by a spouse and 60% of all female members will be survived by a spouse. Females (males) are three years younger (older) than members.

14. Administrative Expenses

The normal cost is increased by an amount equal to the anticipated administrative expenses for the upcoming fiscal year. The amount for fiscal year 2019 is \$2,000,000 and is anticipated to increase at 3.75% per year.

CERTIFICATION:

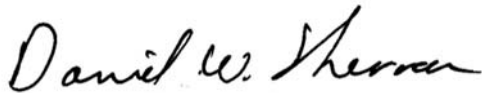
This report fairly represents the actuarial position of the Plymouth County Retirement System as of December 31, 2018, in accordance with generally accepted actuarial principles applied consistently with the preceding valuation. In our opinion, the actuarial assumptions used to compute actuarial accrued liability and normal cost are reasonably related to plan experience and to reasonable expectations and represents our best estimate of anticipated plan experience.

The funded status measure is appropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations. The funded status measure is appropriate for assessing the need for or the amount of future contributions. The funded status measure would be different if the measure reflected the market value of assets rather than the actuarial value of assets.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period or additional cost or contribution requirements based on the plan's funded status); and changes in plan provisions or applicable law. Due to the limited scope of our assignment, we did not perform an analysis of the potential range of such future measurements.

The report was prepared under the supervision of Daniel Sherman, an Associate of the Society of Actuaries and a Member of the American Academy of Actuaries, who takes responsibility for the overall appropriateness of the analysis, assumptions and results. Daniel Sherman is deemed to meet the General Qualification Standard and the basic education and experience requirement in the pension area. Based on over thirty years of performing valuations of similar complexity, Mr. Sherman is qualified by experience. Daniel Sherman has met the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

Sherman Actuarial Services, LLC



Daniel W. Sherman, ASA, MAAA

September, 2019