

**PLYMOUTH COUNTY
CONTRIBUTORY RETIREMENT SYSTEM**

December 31, 2019 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, 2020, 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, 2020.
- 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, 2019

The valuation and appropriation forecast are prepared in accordance with Chapter 32 of the M.G.L. as of January 1, 2020.

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 35 years ending as of December 31, 2019 was 9.01%. The average return for the past 10 years ending December 31, 2019 was 8.50%.

Net Position Restricted for Pensions

The Net Position Restricted for Pensions as of December 31, 2019 is \$1,094,928,104. The 2019 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, 2018 Net Position	936,639,806
Employer Contributions	74,673,703
Employee Contributions	29,270,635
Other Payments	8,449,627
Benefit Payments	(121,133,872)
Expenses	(2,200,936)
Investment Income	<u>169,229,141</u>
December 31, 2019 Net Position	1,094,928,104

Pension Liability as of December 31, 2019

The following presents the changes in the pension liability during 2019.

December 31, 2018 Liability	1,669,196,814
Service Cost	28,883,376
Interest on Liability and Service Cost	129,044,546
Change in Plan Provisions	15,202,584
Experience (Gain) and Loss	55,982,071
Change in Assumptions	0
Benefit Payments	(121,133,872)
Other	0
December 31, 2019 Liability	1,777,175,519

Net Pension Liability as of December 31, 2019

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	1,961,364,647	1,777,175,519	1,620,193,312
Plan Fiduciary Net Position	<u>1,094,928,104</u>	<u>1,094,928,104</u>	<u>1,094,928,104</u>
Net Pension Liability	866,436,543	682,247,415	525,265,208

The Plan Fiduciary Net Position as a percentage of the Total Pension Liability is 61.6%.

	Unit	1% Decrease (6.875%)	Current Discount Rate (7.875%)	1% Increase (8.875%)
County of Plymouth	1	42,691,019	33,615,695	25,880,841
Hospital	2	0	0	0
Abington	3	31,663,025	24,932,050	19,195,273
Bridgewater	4	41,792,525	32,908,204	25,336,142
Bridgewater Housing	5	756,398	595,602	458,556
Bridgewater/Raynham				
Regional School	6	20,141,164	15,859,523	12,210,303
Carver	7	23,886,765	18,808,879	14,481,022
Carver/Marion/Wareham				
Regional Refuse	8	918,422	723,182	556,781
Duxbury	9	44,816,385	35,289,248	27,169,316
Duxbury Housing	10	282,458	222,413	171,236
East Bridgewater	11	30,565,251	24,067,642	18,529,762
East Bridgewater Housing	12	431,485	339,759	261,582
Halifax	13	13,836,978	10,895,491	8,388,477
Hanover	14	39,747,737	31,298,100	24,096,517
Hanson	15	18,239,337	14,361,990	11,057,347
Kingston	16	26,821,383	21,119,651	16,260,094
Kingston Housing	17	22,527	17,738	13,657
Lakeville	18	12,167,356	9,580,800	7,376,292
Marion	19	12,314,650	9,696,783	7,465,587
Marshfield	20	70,066,920	55,171,984	42,477,104
Marshfield Housing	21	368,235	289,955	223,237
Mattapoisett	22	13,523,328	10,648,518	8,198,331
Middleborough	23	78,624,705	61,910,542	47,665,144
Middleborough Housing	24	1,296,188	1,020,642	785,796
Norwell	25	30,451,748	23,978,268	18,460,953
Norwell Housing	26	394,228	310,423	238,995
Old Rochester Regional				
School	27	8,188,684	6,447,920	4,964,277
Onset Fire District	28	2,700,680	2,126,565	1,637,250
Pembroke	29	39,463,546	31,074,323	23,924,231
Plymouth County Mosquito				
Control	30	2,385,297	1,878,227	1,446,054
Plympton	31	5,545,188	4,366,383	3,361,694
Rochester	32	8,800,387	6,929,587	5,335,113
Rockland	33	47,054,389	37,051,493	28,526,074
Scituate	34	57,085,981	44,950,553	34,607,589
Scituate Housing	35	1,107,305	871,912	671,288
Silver Lake Regional School	36	8,564,717	6,744,016	5,192,241
South Shore Regional				
School	38	4,428,353	3,486,967	2,684,628
Wareham	39	46,102,176	36,301,703	27,948,809

	<u>Unit</u>	1% Decrease (6.875%)	Current Discount Rate (7.875%)	1% Increase (8.875%)
Wareham Fire District	40	9,067,249	7,139,719	5,496,895
Wareham Housing	41	350,906	276,310	212,732
West Bridgewater	42	24,266,264	19,107,703	14,711,088
Whitman	43	23,370,370	18,402,260	14,167,964
Whitman/Hanson Regional School	44	14,186,151	11,170,437	8,600,159
Whitman Housing	45	446,214	351,357	270,511
Abington Housing	46	476,540	375,236	288,896
Pembroke Housing	47	1,146,294	902,613	694,925
Hanson Housing	48	350,906	276,310	212,732
Rockland Housing	49	727,806	573,088	441,222
Halifax Housing	50	223,540	176,020	135,518
Mattapoissett Housing	51	228,739	180,113	138,670
Hanover Housing	52	0	0	0
Acushnet/Rochester/Marion Health District	53	181,085	142,590	109,780
West Bridgewater Housing	54	158,558	124,851	96,123
South Shore Tri Town Development	55	1,431,352	1,127,073	867,737
Carver Housing	56	241,736	190,347	146,549
Retirement Staff	59	<u>2,335,911</u>	<u>1,839,339</u>	<u>1,416,114</u>
Total		866,436,543	682,248,098	525,265,208

Employer Contributions during 2019

	<u>Unit</u>	<u>Contribution</u>	<u>Portion</u>
County of Plymouth	1	4,321,029	0.049272
Hospital	2	-	-
Abington	3	2,704,179	0.036544
Bridgewater	4	3,569,333	0.048235
Bridgewater Housing	5	64,571	0.000873
Bridgewater/Raynham			
Regional School	6	1,720,164	0.023246
Carver	7	2,040,060	0.027569
Carver/Marion/Wareham			
Regional Refuse	8	78,426	0.001060
Duxbury	9	3,827,610	0.051725
Duxbury Housing	10	24,117	0.000326
East Bridgewater	11	2,610,451	0.035277
East Bridgewater Housing	12	36,860	0.000498
Halifax	13	1,181,789	0.015970
Hanover	14	3,394,659	0.045875
Hanson	15	1,557,775	0.021051
Kingston	16	2,290,716	0.030956
Kingston Housing	17	1,935	0.000026
Lakeville	18	1,039,150	0.014043
Marion	19	1,051,710	0.014213
Marshfield	20	5,984,136	0.080868
Marshfield Housing	21	31,454	0.000425
Mattapoissett	22	1,154,986	0.015608
Middleborough	23	6,715,034	0.090745
Middleborough Housing	24	110,732	0.001496
Norwell	25	2,600,777	0.035146
Norwell Housing	26	33,683	0.000455
Old Rochester Regional			
School	27	699,331	0.009451
Onset Fire District	28	230,621	0.003117
Pembroke	29	3,370,446	0.045547
Plymouth County Mosquito			
Control	30	203,688	0.002753
Plympton	31	473,604	0.006400
Rochester	32	751,595	0.010157
Rockland	33	4,018,752	0.054308
Scituate	34	4,875,453	0.065886
Scituate Housing	35	94,553	0.001278
Silver Lake Regional School	36	731,463	0.009885
South Shore Regional			
School	38	378,178	0.005111
Wareham	39	3,937,419	0.053209

	<u>Unit</u>	<u>Contribution</u>	<u>Portion</u>
Wareham Fire District	40	774,365	0.010465
Wareham Housing	41	29,943	0.000405
West Bridgewater	42	2,072,457	0.028007
Whitman	43	1,995,986	0.026973
Whitman/Hanson Regional School	44	1,211,606	0.016373
Whitman Housing	45	38,139	0.000515
Abington Housing	46	40,707	0.000550
Pembroke Housing	47	97,934	0.001323
Hanson Housing	48	29,999	0.000405
Rockland Housing	49	62,177	0.000840
Halifax Housing	50	19,075	0.000258
Mattapoisett Housing	51	19,503	0.000264
Hanover Housing	52	-	-
Acushnet/Rochester/Marion Health District	53	15,465	0.000209
West Bridgewater Housing	54	13,543	0.000183
South Shore Tri Town Development	55	122,242	0.001652
Carver Housing	56	20,627	0.000279
Retirement Staff	59	199,497	0.002696
		<u>74,673,703</u>	<u>100.0000%</u>

Pension Expense for 2019

Service Cost	28,883,376
Interest	129,044,546
Difference in Experience - Amortization	31,435,032
Change in Assumptions - Amortization	(754,493)
Changes in Plan Provisions	15,202,584
Employee Contributions	(29,270,635)
Projected Earnings	(73,337,752)
Administration Expense	2,200,936
Other Changes in Fiduciary Net Position	0
Asset (Gain) / Loss Amortization	<u>11,397,982</u>
Total Expense	114,801,576

Schedules of Required Supplementary Information

	<u>2019</u>
Total Pension Liability – Beginning	1,669,196,814
Total Pension Liability – Ending (a)	1,777,175,519
Plan Fiduciary Net Position – Beginning	936,639,806
Plan Fiduciary Net Position – Ending (b)	1,094,928,104
Net Pension Liability – Ending (a) – (b)	682,247,415
Plan Fiduciary Net Positions as a percentage of the Total Pension Liability	61.6%
Covered-employee payroll	294,614,062
Net Pension Liability as a percentage of Covered-employee Payroll	231.6%

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>2019</u>	<u>2020</u>	<u>2021</u>	<u>2022</u>	<u>2023</u>
2019	(95,891,389)	5	(19,178,278)	(19,178,278)	(19,178,278)	(19,178,278)	(19,178,279)
2018	150,935,263	5	30,187,053	30,187,053	30,187,053	30,187,051	
2017	(74,900,971)	5	(14,980,194)	(14,980,194)	(14,980,194)		
2016	8,756,807	5	1,751,361	1,751,363			
2015	68,091,068	5	13,618,040				

Experience

<u>Year</u>	<u>(Gain) / Loss</u>	<u>Period</u>	<u>Increase (Decrease) arising from (Gains) or Losses</u>				
			<u>2019</u>	<u>2020</u>	<u>2021</u>	<u>2022</u>	<u>2023</u>
2019	55,982,071	4.36	12,839,925	12,839,925	12,839,925	12,839,925	4,622,371
2018	59,806,942	4.35	13,748,722	13,748,722	13,748,722	4,812,054	
2016	21,421,023	4.42	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>2023</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	1,589,085	
2016	(23,402,726)	4.42	(5,294,734)	(2,223,790)			

Reconciliation of Net Pension Liability for 2019

NPL Beginning	732,557,008
Expense	114,801,576
Contribution	(74,673,703)
Deferred Outflow Changes	(25,549,656)
Deferred Inflow Changes	(56,438,183)
Revenue	<u>(8,449,627)</u>
NPL Ending	682,247,415

	<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	33,615,695	0	24,932,050	32,908,204	595,602	15,859,523
Deferred Outflows of Resources						
Differences between Expected and Actual Experience	3,817,946	0	2,831,690	3,737,591	67,647	1,801,266
Net Asset Loss	4,548,422	0	3,373,469	4,452,694	80,588	2,145,896
Changes in Assumptions	525,711	0	389,910	514,648	9,315	248,024
Changes in Proportion and Differences between Employer Contributions and proportionate share of contributions	2,068,452	0	167,693	136,474	32,826	46,614
Total Deferred Outflows	10,960,531	0	6,762,762	8,841,407	190,376	4,241,800
Deferred Inflows of Resources						
Differences between Expected and Actual Experience	0	0	0	0	0	0
Net Asset Gain	5,256,016	0	3,898,276	5,145,397	93,127	2,479,733
Changes in Assumptions	109,571	0	81,266	107,265	1,941	51,694
Changes in Proportion and Differences between Employer Contributions and proportionate share of contributions	1,619,737	0	94,139	428,112	81,888	180,150
Total Deferred Inflows	6,985,324	0	4,073,681	5,680,774	176,956	2,711,577
Pension Expense						
Proportionate share of plan Pension Expense	5,656,503	0	4,195,309	5,537,454	100,222	2,668,677
Net Amortization from changes in Share Proportions	983,474	0	(45,809)	(277,157)	(6,106)	(25,281)
Total Employer Pension Expense	6,639,977	0	4,149,500	5,260,297	94,116	2,643,396
Revenue	416,330	0	308,783	407,568	7,377	196,420

		<u>Carver/Marion/ Wareham Regional</u>		<u>Duxbury Housing</u>	<u>East Bridgewater</u>	<u>East Bridgewater Housing</u>
	<u>Carver</u>	<u>Refuse</u>	<u>Duxbury</u>	<u>Housing</u>	<u>Bridgewater</u>	<u>Housing</u>
Net Pension Liability	18,808,879	723,182	35,289,248	222,413	24,067,642	339,759
Deferred Outflows of Resources						
Differences between Expected and Actual Experience	2,136,244	82,137	4,008,022	25,261	2,733,513	38,589
Net Asset Loss	2,544,964	97,851	4,774,865	30,094	3,256,510	45,971
Changes in Assumptions	294,149	11,310	551,883	3,478	376,390	5,313
Changes in Proportion and Differences between Employer Contributions and proportionate share of contributions	102,159	148,008	599,592	12,839	223,798	10,172
Total Deferred Outflows	5,077,516	339,306	9,934,362	71,672	6,590,211	100,045
Deferred Inflows of Resources						
Differences between Expected and Actual Experience	0	0	0	0	0	0
Net Asset Gain	2,940,882	113,074	5,517,688	34,776	3,763,120	53,123
Changes in Assumptions	61,308	2,357	115,026	725	78,449	1,107
Changes in Proportion and Differences between Employer Contributions and proportionate share of contributions	593,046	26,081	301,674	14,547	153,391	33,903
Total Deferred Inflows	3,595,236	141,512	5,934,388	50,048	3,994,960	88,133
Pension Expense						
Proportionate share of plan Pension Expense	3,164,965	121,690	5,938,112	37,425	4,049,855	57,171
Net Amortization from changes in Share Proportions	(141,143)	70,216	174,080	(4,351)	7,784	1,895
Total Employer Pension Expense	3,023,822	191,906	6,112,192	33,074	4,057,639	59,066
Revenue	232,948	8,957	437,057	2,755	298,077	4,208

	<u>Halifax</u>	<u>Hanover</u>	<u>Hanson</u>	<u>Kingston</u>	<u>Kingston Housing</u>	<u>Lakeville</u>
Net Pension Liability	10,895,491	31,298,100	14,361,990	21,119,651	17,738	9,580,800
Deferred Outflows of Resources						
Differences between Expected and Actual Experience	1,237,470	3,554,722	1,631,181	2,398,691	2,014	1,088,152
Net Asset Loss	1,474,231	4,234,837	1,943,272	2,857,626	2,400	1,296,345
Changes in Assumptions	170,394	489,467	224,606	330,288	277	149,834
Changes in Proportion and Differences between Employer Contributions and proportionate share of contributions	173,976	314,065	189,974	175,213	8,163	132,324
Total Deferred Outflows	3,056,071	8,593,091	3,989,033	5,761,818	12,854	2,666,655
Deferred Inflows of Resources						
Differences between Expected and Actual Experience	0	0	0	0	0	0
Net Asset Gain	1,703,576	4,893,646	2,245,584	3,302,185	2,773	1,498,016
Changes in Assumptions	35,514	102,016	46,813	68,840	58	31,229
Changes in Proportion and Differences between Employer Contributions and proportionate share of contributions	189,381	154,388	187,997	107,975	11,586	136,000
Total Deferred Inflows	1,928,471	5,150,050	2,480,394	3,479,000	14,417	1,665,245
Pension Expense						
Proportionate share of plan Pension Expense	1,833,381	5,266,522	2,416,688	3,553,798	2,985	1,612,159
Net Amortization from changes in Share Proportions	(40,154)	31,806	(69,243)	4,225	(2,657)	(23,503)
Total Employer Pension Expense	1,793,227	5,298,328	2,347,445	3,558,023	328	1,588,656
Revenue	134,941	387,627	177,873	261,567	220	118,658

	<u>Marion</u>	<u>Marshfield</u>	<u>Marshfield</u> <u>Housing</u>	<u>Mattapoissett</u>	<u>Middleboroug</u> <u>h</u>	<u>Middleboroug</u> <u>h Housing</u>
Net Pension Liability	9,696,783	55,171,984	289,955	10,648,518	61,910,542	1,020,642
Deferred Outflows of Resources						
Differences between Expected and Actual Experience	1,101,325	6,266,229	32,931	1,209,420	7,031,570	115,921
Net Asset Loss	1,312,039	7,465,129	39,232	1,440,814	8,376,900	138,100
Changes in Assumptions	151,646	862,826	4,535	166,530	968,210	15,961
Changes in Proportion and Differences between Employer Contributions and proportionate share of contributions	74,507	473,817	14,648	176,472	442,077	11,955
Total Deferred Outflows	2,639,517	15,068,001	91,346	2,993,236	16,818,757	281,937
Deferred Inflows of Resources						
Differences between Expected and Actual Experience	0	0	0	0	0	0
Net Asset Gain	1,516,150	8,626,472	45,337	1,664,960	9,680,087	159,583
Changes in Assumptions	31,607	179,833	945	34,709	201,798	3,327
Changes in Proportion and Differences between Employer Contributions and proportionate share of contributions	48,094	259,583	19,964	214,338	298,467	18,539
Total Deferred Inflows	1,595,851	9,065,888	66,246	1,914,007	10,180,352	181,449
Pension Expense						
Proportionate share of plan Pension Expense	1,631,675	9,283,774	48,791	1,791,823	10,417,669	171,743
Net Amortization from changes in Share Proportions	(8,549)	189,841	(3,145)	(112,494)	(170,581)	(14,253)
Total Employer Pension Expense	1,623,126	9,473,615	45,646	1,679,329	10,247,088	157,490
Revenue	120,095	683,304	3,591	131,882	766,761	12,641

		<u>Old Rochester</u>				<u>Plymouth</u>
	<u>Norwell</u>	<u>Norwell</u>	<u>Regional</u>	<u>Onset Fire</u>	<u>Pembroke</u>	<u>County</u>
		<u>Housing</u>	<u>School</u>	<u>District</u>		<u>Mosquito</u>
						<u>Control</u>
Net Pension Liability	23,978,268	310,423	6,447,920	2,126,565	31,074,323	1,878,227
Deferred Outflows of Resources						
Differences between Expected and Actual Experience	2,723,363	35,257	732,331	241,527	3,529,306	213,322
Net Asset Loss	3,244,416	42,002	872,446	287,738	4,204,559	254,136
Changes in Assumptions	374,992	4,855	100,838	33,257	485,966	29,373
Changes in Proportion and Differences between Employer Contributions and proportionate share of contributions	233,067	17,842	156,254	63,940	486,892	9,430
Total Deferred Outflows	6,575,838	99,956	1,861,869	626,462	8,706,723	506,261
Deferred Inflows of Resources						
Differences between Expected and Actual Experience	0	0	0	0	0	0
Net Asset Gain	3,749,147	48,536	1,008,172	332,501	4,858,658	293,671
Changes in Assumptions	78,157	1,012	21,017	6,932	101,287	6,122
Changes in Proportion and Differences between Employer Contributions and proportionate share of contributions	150,495	11,089	86,810	148,803	250,455	100,713
Total Deferred Inflows	3,977,799	60,637	1,115,999	488,236	5,210,400	400,506
Pension Expense						
Proportionate share of plan Pension Expense	4,034,816	52,235	1,084,990	357,837	5,228,867	316,049
Net Amortization from changes in Share Proportions	71,907	3,862	45,247	(69,125)	287,047	(51,573)
Total Employer Pension Expense	4,106,723	56,097	1,130,237	288,712	5,515,914	264,476
Revenue	296,971	3,845	79,857	26,337	384,855	23,262

	<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	4,366,383	6,929,587	37,051,493	44,950,553	871,912	6,744,016
Deferred Outflows of Resources						
Differences between Expected and Actual Experience	495,918	787,037	4,208,172	5,105,316	99,029	765,960
Net Asset Loss	590,800	937,618	5,013,307	6,082,102	117,975	912,509
Changes in Assumptions	68,286	108,370	579,442	702,974	13,635	105,468
Changes in Proportion and Differences between Employer Contributions and proportionate share of contributions	149,067	128,352	375,498	445,144	57,508	19,368
Total Deferred Outflows	1,304,071	1,961,377	10,176,419	12,335,536	288,147	1,803,305
Deferred Inflows of Resources						
Differences between Expected and Actual Experience	0	0	0	0	0	0
Net Asset Gain	682,710	1,083,483	5,793,224	7,028,290	136,329	1,054,467
Changes in Assumptions	14,232	22,587	120,770	146,517	2,842	21,982
Changes in Proportion and Differences between Employer Contributions and proportionate share of contributions	191,095	176,340	356,616	322,808	115,196	136,884
Total Deferred Inflows	888,037	1,282,410	6,270,610	7,497,615	254,367	1,213,333
Pension Expense						
Proportionate share of plan Pension Expense	734,730	1,166,040	6,234,644	7,563,817	146,716	1,134,814
Net Amortization from changes in Share Proportions	89,141	48,849	(182,019)	96,749	(4,781)	(258,089)
Total Employer Pension Expense	823,871	1,214,889	6,052,625	7,660,566	141,935	876,725
Revenue	54,078	85,823	458,882	556,712	10,799	83,525

	<u>South Shore</u> <u>Mosquito</u> <u>Control</u>	<u>South Shore</u> <u>Regional</u> <u>School</u>	<u>Wareham</u>	<u>Wareham Fire</u> <u>District</u>	<u>Wareham</u> <u>Housing</u>	<u>West</u> <u>Bridgewater</u>
Net Pension Liability	0	3,486,967	36,301,703	7,139,719	276,310	19,107,703
Deferred Outflows of Resources						
Differences between Expected and Actual Experience	0	396,037	4,123,013	810,903	31,383	2,170,181
Net Asset Loss	0	471,809	4,911,857	966,051	37,387	2,585,397
Changes in Assumptions	0	54,532	567,718	111,658	4,322	298,824
Changes in Proportion and Differences between Employer						
Contributions and proportionate share of contributions	0	37,408	128,547	58,603	12,501	265,964
Total Deferred Outflows	0	959,786	9,731,135	1,947,215	85,593	5,320,366
Deferred Inflows of Resources						
Differences between Expected and Actual Experience	0	0	0	0	0	0
Net Asset Gain	0	545,209	5,675,990	1,116,339	43,203	2,987,604
Changes in Assumptions	0	11,366	118,326	23,272	901	62,282
Changes in Proportion and Differences between Employer						
Contributions and proportionate share of contributions	0	19,233	704,963	55,038	7,502	141,863
Total Deferred Inflows	0	575,808	6,499,279	1,194,649	51,606	3,191,749
Pension Expense						
Proportionate share of plan Pension Expense	0	586,751	6,108,477	1,201,398	46,495	3,215,248
Net Amortization from changes in Share Proportions	0	10,514	(302,441)	56,455	(955)	12,250
Total Employer Pension Expense	0	597,265	5,806,036	1,257,853	45,540	3,227,498
Revenue	0	43,186	449,596	88,425	3,422	236,649

	<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	18,402,260	11,170,437	351,357	375,236	902,613	276,310
Deferred Outflows of Resources						
Differences between Expected and Actual Experience	2,090,060	1,268,697	39,906	42,618	102,516	31,383
Net Asset Loss	2,489,945	1,511,434	47,540	50,772	122,129	37,387
Changes in Assumptions	287,790	174,692	5,494	5,868	14,116	4,322
Changes in Proportion and Differences between Employer Contributions and proportionate share of contributions	232,202	69,781	34,327	10,000	48,304	5,533
Total Deferred Outflows	5,099,997	3,024,604	127,268	109,258	287,065	78,625
Deferred Inflows of Resources						
Differences between Expected and Actual Experience	0	0	0	0	0	0
Net Asset Gain	2,877,305	1,746,566	54,937	58,670	141,129	43,203
Changes in Assumptions	59,982	36,410	1,145	1,223	2,942	901
Changes in Proportion and Differences between Employer Contributions and proportionate share of contributions	238,349	92,009	251,571	4,347	33,214	4,676
Total Deferred Inflows	3,175,636	1,874,985	307,653	64,240	177,285	48,780
Pension Expense						
Proportionate share of plan Pension Expense	3,096,543	1,879,646	59,123	63,141	151,882	46,495
Net Amortization from changes in Share Proportions	(87,119)	(143,159)	(139,317)	2,177	(6,608)	3,956
Total Employer Pension Expense	3,009,424	1,736,487	(80,194)	65,318	145,274	50,451
Revenue	227,912	138,346	4,352	4,647	11,179	3,422

	<u>Rockland</u>	<u>Halifax</u>	<u>Mattapoisett</u>	<u>Hanover</u>	<u>Acushnet/Roc hester/Marion</u>	<u>West Bridgewater</u>
	<u>Housing</u>	<u>Housing</u>	<u>Housing</u>	<u>Housing</u>	<u>Health District</u>	<u>Housing</u>
Net Pension Liability	573,088	176,020	180,113	0	142,590	124,851
Deferred Outflows of Resources						
Differences between Expected and Actual Experience	65,089	19,992	20,457	0	16,195	14,181
Net Asset Loss	77,542	23,816	24,370	0	19,293	16,893
Changes in Assumptions	8,963	2,752	2,818	0	2,230	1,953
Changes in Proportion and Differences between Employer Contributions and proportionate share of contributions	31,839	88,972	2,947	0	4,721	7,095
Total Deferred Outflows	183,434	135,532	50,592	0	42,439	40,122
Deferred Inflows of Resources						
Differences between Expected and Actual Experience	0	0	0	0	0	0
Net Asset Gain	89,605	27,522	28,162	0	22,295	19,520
Changes in Assumptions	1,868	574	587	0	465	407
Changes in Proportion and Differences between Employer Contributions and proportionate share of contributions	20,291	224,517	4,169	0	4,034	4,157
Total Deferred Inflows	111,764	252,613	32,918	0	26,794	24,084
Pension Expense						
Proportionate share of plan Pension Expense	96,433	29,619	30,308	0	23,994	21,009
Net Amortization from changes in Share Proportions	7,910	(82,385)	(3,558)	0	(5,977)	1,531
Total Employer Pension Expense	104,343	(52,766)	26,750	0	18,017	22,540
Revenue	7,098	2,180	2,231	0	1,766	1,546

	<u>South Shore</u>			<u>Other</u>	
	<u>Tri Town</u>	<u>Carver</u>	<u>No Carver</u>	<u>(Retirement</u>	
	<u>Development</u>	<u>Housing</u>	<u>Water District</u>	<u>Staff)</u>	<u>Total</u>
Net Pension Liability	1,127,073	190,347	0	1,839,339	682,248,098
Deferred Outflows of Resources					
Differences between Expected and Actual Experience	128,010	21,620	0	208,905	77,487,215
Net Asset Loss	152,500	25,755	0	248,874	92,312,608
Changes in Assumptions	17,625	2,977	0	28,764	10,669,579
Changes in Proportion and Differences between Employer					
Contributions and proportionate share of contributions	132,295	3,688	0	175,090	9,227,999
Total Deferred Outflows	430,430	54,040	0	661,633	189,697,401
Deferred Inflows of Resources					
Differences between Expected and Actual Experience	0	0	0	0	0
Net Asset Gain	176,224	29,761	0	287,593	106,673,607
Changes in Assumptions	3,674	620	0	5,995	2,223,795
Changes in Proportion and Differences between Employer					
Contributions and proportionate share of contributions	76,242	4,065	0	117,106	9,227,629
Total Deferred Inflows	256,140	34,446	0	410,694	118,125,031
Pension Expense					
Proportionate share of plan Pension Expense	189,652	32,030	0	309,505	114,801,695
Net Amortization from changes in Share Proportions	65,186	(6,618)	0	22,194	142
Total Employer Pension Expense	254,838	25,412	0	331,699	114,801,837
Revenue	13,959	2,357	0	22,780	8,449,639

EXHIBITS

Exhibit 1 - Age/Service Distribution with Salary as of January 1, 2020

Attained Age	Average Salary	<5	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40+	Total
< 20	6	0	0	0	0	0	0	0	0	0	6
	34,578	0	0	0	0	0	0	0	0	0	34,578
20-24	178	5	0	0	0	0	0	0	0	0	183
	33,991	58,978	0	0	0	0	0	0	0	0	34,674
25-29	366	50	0	0	0	0	0	0	0	0	416
	43,884	59,336	0	0	0	0	0	0	0	0	45,741
30-34	235	144	32	0	0	0	0	0	0	0	411
	48,532	68,061	70,607	0	0	0	0	0	0	0	57,093
35-39	188	116	104	32	1	0	0	0	0	0	441
	44,198	62,124	74,519	75,492	61,003	0	0	0	0	0	58,373
40-44	180	95	59	78	35	1	0	0	0	0	448
	35,645	54,098	74,199	75,915	84,002	83,820	0	0	0	0	55,533
45-49	216	153	99	99	111	32	1	0	0	0	711
	34,070	42,464	57,805	71,366	85,162	90,333	91,533	0	0	0	54,964
50-54	227	189	150	128	100	71	55	1	0	0	921
	36,572	37,404	44,406	59,943	74,198	97,236	99,626	177,043	0	0	53,947
55-59	145	155	195	193	129	73	62	18	1	0	971
	40,095	41,160	41,401	47,064	57,585	76,697	92,527	95,617	147,778	0	51,476
60-64	87	102	120	175	151	63	52	23	8	0	781
	40,146	44,233	43,201	44,055	48,047	53,644	73,444	91,155	80,927	0	48,779
65-69	29	28	47	67	57	37	25	1	4	0	295
	33,395	35,863	38,515	47,592	48,453	47,794	58,383	69,740	77,557	0	45,224
70+	21	17	13	22	15	12	13	6	6	0	125
	27,567	40,190	53,066	36,802	43,864	35,436	35,846	36,507	48,544	0	38,569
Total Employees	1,878	1,054	819	794	599	289	208	49	19	0	5,709
Average Salary	39,917	48,912	51,927	55,247	63,401	72,839	81,982	87,418	73,510	0	51,616

Exhibit 2 - Retiree Distribution as of January 1, 2020

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	3	0	3	42,494	0	42,494
35-39	2	0	2	23,233	0	23,233
40-44	0	0	0	0	0	0
45-49	3	9	12	35,715	218,248	253,963
50-54	15	17	32	387,009	596,048	983,057
55-59	90	103	193	1,379,327	4,322,199	5,701,526
60-64	243	189	432	3,764,091	8,853,850	12,617,941
65-69	481	326	807	9,562,464	12,844,675	22,407,139
70-74	527	337	864	10,358,196	12,476,715	22,834,911
75-79	461	263	724	8,424,424	8,627,143	17,051,567
80-84	296	136	432	5,267,504	3,591,672	8,859,175
85-89	190	64	254	2,879,210	1,387,758	4,266,968
90-94	100	28	128	1,329,251	608,557	1,937,807
95+	49	11	60	403,291	185,063	588,354
Total	2460	1483	3943	43,856,207	53,711,929	97,568,136
Average (Age/Payment)	74.34	71.73	73.36	17,828	36,218	24,745
Frequency Percent	62.4	37.6	100	44.9	55.1	100

Exhibit 3 - Disabled Retiree Distribution as of January 1, 2020

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	5	7	56,083	259,471	315,554
45-49	4	15	19	181,427	687,983	869,410
50-54	8	31	39	341,167	1,331,579	1,672,746
55-59	14	42	56	423,947	1,750,633	2,174,580
60-64	11	44	55	305,629	1,818,867	2,124,496
65-69	12	49	61	220,299	1,706,012	1,926,310
70-74	11	60	71	253,598	1,999,946	2,253,544
75-79	10	38	48	275,216	1,205,254	1,480,470
80-84	2	22	24	34,241	657,242	691,482
85-89	1	10	11	449	278,026	278,475
90-94	0	3	3	0	59,358	59,358
95-99	0	0	0	0	0	0
Total	75	319	394	2,092,055	11,754,371	13,846,427
Average (Age/Payment)	64.16	66.73	66.24	27,894	36,848	35,143
Frequency Percent	19.0	81.0	100	15.1	84.9	100

EXHIBIT 4 – SUMMARY OF PLAN PROVISIONS:

This summary is prepared in accordance with Chapter 32 as of January 1, 2020, 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 \$16,000. 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. The previous valuation had a COLA base of \$14,000.

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, 2020.

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 9.01%. 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 \$16,000 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 2020 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, 2019, 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

October, 2020