# SOMERVILLE CONTRIBUTORY RETIREMENT SYSTEM

Actuarial Valuation Report

January 1, 2022

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# Report Summary:

| Highlights | January 1, 2021 | January 1, 2022 |
|---|---|---|
| Contributions | | |
| Funding Schedule FY 2023 | $17,162,384 | $17,162,384 |
| Funding Schedule FY 2024 | 18,097,135 | 17,814,222 |
| Funded Ratios | | |
| GAS No. 25 | 69.7% | 77.3% |
| Participants | | |
| Actives | 1,251 | 1,266 |
| Retirees and Beneficiaries | 810 | 829 |
| Vested | 0 | 0 |
| Inactives | 534 | 551 |
| Disabled | 130 | 129 |
| Total | 2,725 | 2,775 |
| Payroll | | |
| Payroll of Active Members | $88,312,485 | $93,793,672 |
| Average Payroll | 70,594 | 74,087 |
| Normal Cost | | |
| Employer | 1,830,399 | 2,236,029 |
| Employee | 8,026,913 | 8,624,580 |
| Administrative Expenses | 580,000 | 675,000 |
| Total | 10,437,312 | 11,535,609 |
| Actuarial Accrued Liabilities | | |
| Actives | 201,041,599 | 209,092,842 |
| Retirees, Beneficiaries, Disabilities and Inactives | 294,145,251 | 317,801,835 |
| Total | 495,186,850 | 526,894,677 |
| Actuarial Value of Assets | 345,262,987 | 407,386,109 |
| Unfunded Actuarial Accrued Liabilities | $149,923,863 | $119,508,568 |

## Introduction

The purpose of this report is to present the findings of an actuarial valuation as of January 1, 2022, of Somerville Contributory Retirement System.

The actuarial valuation is based on:

- Provisions Chapter 32 of the Massachusetts General Laws, "M.G.L", as of January 1, 2022.
- Employee data provided by the Retirement Board
- Asset information reported to the Public Employee Retirement Administration Commission by the Somerville Contributory Retirement System
- Actuarial assumptions approved by the Retirement Board

The valuation and appropriation forecast are prepared in accordance with Chapter 32 of the M.G.L. as of January 1, 2022.

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.

## Actuarial Experience

In performing the actuarial valuation, various assumptions are made regarding such factors as mortality, retirement, disability, and withdrawal rates as well as both payroll, salary increases, and investment returns. A comparison of the current valuation and the prior valuation is made to determine how closely actual experience corresponded to anticipated occurrences. This analysis of the system provides insight into the overall quality of the actuarial assumptions and helps explain any change in the annual appropriation.

During the last year, the total unfunded actuarial accrued liability decreased by 20.3% to $119,508,568. The decrease is the result of net favorable actuarial experience during the preceding year and payments against the unfunded liability. The sources of change are as follows:

| | |
|---|---:|
| Assets | (36,984,014) |
| Salary Increases | 6,162,126 |
| New Participants | 516,405 |
| Active - Retirements | (1,933,062) |
| Active - Terminations | (2,052,276) |
| Active - Mortality | (121,142) |
| Active - Disabilities | 2,154,858 |
| Inactive - Mortality | (3,231,110) |
| Inactive - data adjustments | 5,949,739 |
| Other | 394,910 |
| Benefit Payments | (1,782,785) |
| Total (Gain) / Loss | (30,926,352) |

In addition, the assumed investment return and the maximum COLA base were changed. The assumed investment return decreased from 7.75% to 7.5%. This increased the Unfunded Actuarial Liability and the Normal Cost by $12,510,076 and $480,448, respectively. The COLA base was increased from $14,000 to $15,000 during 2021. This increased the Unfunded Actuarial Liability and the Normal Cost by $1,796,398 and $28,436, respectively.

# Actuarial Costs and Liabilities:

## Normal Costs

The normal cost is the sum of the individual normal costs determined for each member as if the assumptions underlying the cost determinations had been exactly realized. An individual normal cost represents that part of the cost of a member's future benefits which are assigned to the current year as if the costs are to remain level as a percentage of the member's pay. Benefits payable under all circumstances (i.e., retirement, death, disability, and terminations) are included in this calculation. Anticipated employee contributions to be made during the year are subtracted from the total normal cost to determine employer normal cost. The total normal cost is divided by total payroll to determine the normal cost as a percent of pay. The normal cost is shown in Table I.

**Table I**

| | January 1, 2021 | January 1, 2022 |
|---|---|---|
| Superannuation | $6,332,974 | $7,036,482 |
| Termination | 1,979,167 | 2,067,726 |
| Death | 335,915 | 370,412 |
| Disability | 1,209,256 | 1,385,989 |
| Administrative Expenses | 580,000 | 675,000 |
| Total Normal Cost | 10,437,312 | 11,535,609 |
| % of Pay | 11.8% | 12.3% |
| Employee Contributions | 8,026,913 | 8,624,580 |
| % of Pay | 9.1% | 9.2% |
| Employer Normal Cost | $2,410,399 | $2,911,029 |
| % of Pay | 2.7% | 3.1% |

## Present Value of Actuarial Accrued Liabilities

The actuarial accrued liabilities (AAL) represents today's value of all benefits based on the past service of the actives and inactives. The AAL can be compared to the assets to determine the funded status of the Plan. The value of these earned benefits is shown in Table II below.

**Table II**

| | January 1, 2021 | January 1, 2022 |
|---|---|---|
| Actives | | |
| Superannuations | $194,634,496 | $201,535,829 |
| Termination | (3,162,231) | (3,293,591) |
| Death | 2,884,898 | 3,089,425 |
| Disability | 6,684,436 | 7,761,179 |
| | | |
| Retirees and Inactives | | |
| Retirees and Beneficiaries | 229,190,671 | 246,402,429 |
| Terminated (Refund) | 5,614,649 | 7,003,337 |
| Disabled | 59,339,931 | 64,396,069 |
| | | |
| Total | $495,186,850 | $526,894,677 |

## Present Value of Future Benefits

The present value of future benefits represents today's value of all benefits earned by the inactive participants as well as all benefits earned and expected to be earned in the coming years by the active participants. The difference between the present value of future benefits and the present value of actuarial accrued liabilities is the value of benefits to be earned in the coming years. The value of the total expected benefits is shown in Table III.

**Table III**

| | January 1, 2021 | January 1, 2022 |
|---|---|---|
| Actives | | |
| Superannuation | $241,557,689 | $257,011,335 |
| Termination | 12,502,644 | 13,410,609 |
| Death | 5,448,134 | 6,043,183 |
| Disability | 16,898,462 | 20,258,076 |
| | | |
| Retirees and Inactives | | |
| Retirees and Beneficiaries | 229,190,671 | 246,402,429 |
| Terminated (Refund) | 5,614,649 | 7,003,337 |
| Disabled | 59,339,931 | 64,396,069 |
| | | |
| Total | $570,552,180 | $614,525,038 |

# Funded Status and Appropriations:

## Market Value of Plan Assets

The trust fund composition on a market value basis is shown in Table IV.

**Table IV**

| | January 1, 2021 | January 1, 2022 |
|---|---|---|
| Cash equivalents | $5,499,369 | $10,618,506 |
| Short term investments | 0 | 0 |
| Fixed income securities | 64,270,268 | 65,491,457 |
| Equities | 279,542,066 | 333,039,766 |
| International | 13,436,438 | 13,930,762 |
| Real Estate | 17,939,599 | 20,695,272 |
| Venture Capital | 0 | 0 |
| Other | 3,110,698 | 9,123,798 |
| Accounts receivable | 70,576 | 65,459 |
| Accounts payable | (246,049) | (316,403) |
| Accrued income | 2,576 | 2,615 |
| Total Market Value | $383,625,541 | $452,651,232 |
| Total Actuarial Value | $345,262,987 | $407,386,109 |

## Actuarial Value of Assets

The actuarial value of assets is determined by projecting the actuarial value of assets as of the beginning of the prior plan year with the assumed rate of return during that year (7.75%) and accounting for deposits and disbursements with interest at the assumed rate of return. An adjustment is then applied to recognize the difference between the actual investment return and expected return over a five year period. This preliminary actuarial value is not allowed to differ from the market value of assets by more than 10%. The calculation of the actuarial value of assets as of January 1, 2022 is presented in Table V.

### Table V

| | | January 1, 2022 |
|---|---|---|
| (1) | Market value at January 1, 2021 | $383,625,541 |
| (2) | 2021 Contributions | $34,715,638 |
| (3) | 2021 Benefit Payments | ($36,275,109) |
| (4) | Net interest adjustment at 7.75% on (1), (2), and (3) to December 31, 2021 | $29,668,601 |
| (5) | Expected market value on January 1, 2022<br>(1) + (2) + (3) + (4) | $411,734,671 |
| (6) | Actual market value on January 1, 2022 | $452,651,232 |
| (7) | 2021 (Gain) / Loss | ($40,916,561) |
| (8) | 80% of 2021 (Gain) / Loss | ($32,733,249) |
| (9) | 2020 (Gain) / Loss | ($57,643,926) |
| (10) | 60% of 2020 (Gain) / Loss | ($34,586,356) |
| (11) | 2019 (Gain) / Loss | ($41,422,232) |
| (12) | 40% of 2019 (Gain) / Loss | ($16,568,893) |
| (13) | 2018 (Gain) / Loss | $31,111,071 |
| (14) | 20% of 2018 (Gain) / Loss | $6,222,214 |
| (15) | Actuarial value on January 1, 2022, (6) + (8) + (10) + (12) + (14) | $374,984,949 |
| (16) | but not less than 90% nor greater than 110% of (6) | $407,386,109 |
| | Ratio of actuarial value to market value | 90.00% |
| (17) | Actuarial Value Return for 2020 | 22.61% |
| (18) | Actuarial Value Return for 2021 | 18.49% |
| (19) | Market Value Return for 2020 | 26.38% |
| (20) | Market Value Return for 2021 | 18.44% |

## Unfunded Actuarial Accrued Liabilities

Under the Entry Age Normal Actuarial Cost Method, the Actuarial Accrued Liability represents what the accumulated assets would have been as of the valuation date if:

- current plan provisions and assumptions had always been in effect,
- experience conformed exactly to assumptions, and
- the normal cost had been contributed each year since inception.

The actuarial value of the Fund's assets as of the end of the prior year are subtracted from the Actuarial Accrued Liability (AAL) to determine the Unfunded Actuarial Accrued Liability (UAAL) as of the valuation date. Over time, annual pension contributions will accumulate Plan assets equal to the AAL, and the UAAL will be eliminated. Thereafter, annual contributions equal to the normal cost will keep the Plan's assets and liabilities in balance. The UAAL is developed in Table VI.

**Table VI**

| | January 1, 2021 | January 1, 2022 |
|---|---|---|
| Actuarial Accrued Liability | $495,186,850 | $526,894,677 |
| Actuarial Assets | 345,262,987 | 407,386,109 |
| Unfunded Actuarial Accrued Liability | $149,923,863 | $119,508,568 |
| Funded Status | 69.7% | 77.3% |
| | | |
| Market Value of Assets | 383,625,541 | 452,651,232 |
| Funded Status for Chapter 68 of the 2007 MGL* | 77.5% | 85.9% |

* (Greater of Actuarial and Market Value, divided by Actuarial Accrued Liability)

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## Appropriations

The pension appropriation for the upcoming fiscal years have been calculated in accordance with the requirements set forth in Section 22D of Chapter 32 of the Massachusetts General Laws. These amounts were calculated to comply with the June 30, 2040, full funding mandate for all accrued liabilities. The pension appropriation is the sum of the:

- Employer normal cost,
- Increasing amortization of the unfunded actuarial accrued liability by June 30, 2033
  $ 119,508,568 over 11 years with 2.00% increasing payments
- Interest adjustment for payments deposited at the beginning of the fiscal year.

The pension appropriation is shown in Table VII.

**Table VII**

| | January 1, 2021 | January 1, 2022 |
|---|---|---|
| Normal cost | $2,410,399 | $2,911,029 |
| Amortization payment of the accrued liability | 13,284,181 | 13,933,984 |
| Amortization payment of 2002 ERI liability | 0 | 0 |
| Amortization payment of 2003 ERI liability | 0 | 0 |
| Total cost | $15,694,580 | $16,845,013 |
| % of Pay | 17.8% | 18.0% |
| Fiscal 2023 cost | $17,162,384 | $17,162,384 |
| Fiscal 2024 cost | $18,097,135 | $17,814,222 |

## Appropriation Forecast

The following exhibit forecasts employer and employee contributions over the next 32 years under the adopted funding schedule.

Note that the forecast is based upon an "open group" method. This method assumes that sufficient employees will be hired each year to keep the number constant. The total payroll of the system is expected to increase 4.5% per year. The employee contribution rate is expected to increase to 10.5% by 2036 as members contributing base percentages 5%, 7%, and 8% are replaced by new members, whose base contribution is 9%. Payments are assumed to be made at the beginning of the year.

The employer total cost is expected to increase during the next 10 years until the unfunded liabilities are completely paid off, at which time only the normal cost will remain. The initial total cost represents about 18% of payroll, decreasing to about 16% until the time the unfunded liabilities are fully paid off, leaving only a normal cost of about 2% thereafter. The decrease in the cost as a percentage of payroll is a result a Board decision to aggressively fund the obligation in the future.

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**Appropriation Forecast**

| Fiscal Year Ending | Payroll* | Employee Contribution | Employer Normal Cost with Interest | Amortization Payments with Interest | Employer Total Cost with Interest | Employer Total Cost % of Payroll | Funded Ratio %** |
|---|---|---|---|---|---|---|---|
| 2023 | $93,793,672 | $8,624,580 | $3,018,219 | $14,144,165 | $17,162,384 | 18.3 | 77.3 |
| 2024 | $97,545,419 | $9,067,464 | $3,037,443 | $14,776,779 | $17,814,222 | 18.3 | 78.7 |
| 2025 | $100,471,781 | $9,440,325 | $3,024,015 | $15,072,315 | $18,096,330 | 18.0 | 80.4 |
| 2026 | $103,485,935 | $9,827,397 | $3,007,049 | $15,373,761 | $18,380,810 | 17.8 | 82.2 |
| 2027 | $106,590,513 | $10,229,198 | $2,986,343 | $15,681,237 | $18,667,580 | 17.5 | 84.1 |
| 2028 | $109,788,228 | $10,646,261 | $2,961,688 | $15,994,861 | $18,956,549 | 17.3 | 86.0 |
| 2029 | $113,081,875 | $11,079,143 | $2,932,866 | $16,314,758 | $19,247,624 | 17.0 | 88.1 |
| 2030 | $116,474,331 | $11,528,415 | $2,899,649 | $16,641,054 | $19,540,703 | 16.8 | 90.2 |
| 2031 | $119,968,561 | $11,994,673 | $2,861,800 | $16,973,875 | $19,835,675 | 16.5 | 92.5 |
| 2032 | $123,567,618 | $12,478,530 | $2,819,070 | $17,313,352 | $20,132,422 | 16.3 | 94.9 |
| 2033 | $127,274,647 | $12,980,624 | $2,771,201 | $17,659,619 | $20,430,820 | 16.1 | 97.4 |
| 2034 | $131,092,886 | $13,501,613 | $2,717,922 | $0 | $2,717,922 | 2.1 | 100.0 |
| 2035 | $135,025,673 | $14,042,179 | $2,658,952 | $0 | $2,658,952 | 2.0 | 100.0 |
| 2036 | $139,076,443 | $14,603,027 | $2,593,999 | $0 | $2,593,999 | 1.9 | 100.0 |
| 2037 | $143,248,736 | $15,041,117 | $2,671,819 | $0 | $2,671,819 | 1.9 | 100.0 |
| 2038 | $147,546,198 | $15,492,351 | $2,751,973 | $0 | $2,751,973 | 1.9 | 100.0 |
| 2039 | $151,972,584 | $15,957,121 | $2,834,532 | $0 | $2,834,532 | 1.9 | 100.0 |
| 2040 | $156,531,762 | $16,435,835 | $2,919,568 | $0 | $2,919,568 | 1.9 | 100.0 |
| 2041 | $161,227,715 | $16,928,910 | $3,007,155 | $0 | $3,007,155 | 1.9 | 100.0 |
| 2042 | $166,064,546 | $17,436,777 | $3,097,370 | $0 | $3,097,370 | 1.9 | 100.0 |
| 2043 | $171,046,482 | $17,959,881 | $3,190,291 | $0 | $3,190,291 | 1.9 | 100.0 |
| 2044 | $176,177,877 | $18,498,677 | $3,286,000 | $0 | $3,286,000 | 1.9 | 100.0 |
| 2045 | $181,463,213 | $19,053,637 | $3,384,580 | $0 | $3,384,580 | 1.9 | 100.0 |
| 2046 | $186,907,110 | $19,625,247 | $3,486,117 | $0 | $3,486,117 | 1.9 | 100.0 |
| 2047 | $192,514,323 | $20,214,004 | $3,590,701 | $0 | $3,590,701 | 1.9 | 100.0 |
| 2048 | $198,289,753 | $20,820,424 | $3,698,422 | $0 | $3,698,422 | 1.9 | 100.0 |
| 2049 | $204,238,445 | $21,445,037 | $3,809,374 | $0 | $3,809,374 | 1.9 | 100.0 |
| 2050 | $210,365,599 | $22,088,388 | $3,923,656 | $0 | $3,923,656 | 1.9 | 100.0 |
| 2051 | $216,676,567 | $22,751,039 | $4,041,365 | $0 | $4,041,365 | 1.9 | 100.0 |
| 2052 | $223,176,863 | $23,433,571 | $4,162,606 | $0 | $4,162,606 | 1.9 | 100.0 |
| 2053 | $229,872,169 | $24,136,578 | $4,287,484 | $0 | $4,287,484 | 1.9 | 100.0 |
| 2054 | $236,768,334 | $24,860,675 | $4,416,109 | $0 | $4,416,109 | 1.9 | 100.0 |

* Calendar basis

** Beginning of Fiscal Year

# EXHIBITS

**Exhibit 1 - Age/Service Distribution with Salary as of January 1, 2022**

| Attained Age | Average Salary <5 | 5-9 | 10-14 | 15-19 | 20-24 | 25-29 | 30-34 | 35-39 | 40+ | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| < 20 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| | 39,733 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 39,733 |
| 20-24 | 34 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 34 |
| | 42,445 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 42,445 |
| 25-29 | 109 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 119 |
| | 53,076 | 56,024 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 53,323 |
| 30-34 | 76 | 52 | 14 | 1 | 0 | 0 | 0 | 0 | 0 | 143 |
| | 66,612 | 89,553 | 100,449 | 0 | 0 | 0 | 0 | 0 | 0 | 78,344 |
| 35-39 | 75 | 40 | 43 | 10 | 1 | 0 | 0 | 0 | 0 | 169 |
| | 60,155 | 94,663 | 100,581 | 90,323 | 0 | 0 | 0 | 0 | 0 | 80,219 |
| 40-44 | 62 | 41 | 34 | 20 | 8 | 0 | 0 | 0 | 0 | 165 |
| | 51,769 | 73,287 | 97,679 | 90,103 | 103,791 | 0 | 0 | 0 | 0 | 73,745 |
| 45-49 | 53 | 28 | 14 | 11 | 21 | 2 | 0 | 0 | 0 | 129 |
| | 47,837 | 64,847 | 88,662 | 102,161 | 107,135 | 136,383 | 0 | 0 | 0 | 71,618 |
| 50-54 | 38 | 26 | 16 | 15 | 28 | 24 | 10 | 2 | 0 | 159 |
| | 54,691 | 63,807 | 80,610 | 86,581 | 93,812 | 108,264 | 83,172 | 66,005 | 0 | 78,708 |
| 55-59 | 25 | 21 | 19 | 28 | 24 | 24 | 16 | 5 | 0 | 162 |
| | 59,513 | 54,478 | 70,831 | 60,102 | 77,905 | 87,923 | 106,463 | 135,711 | 0 | 74,212 |
| 60-64 | 18 | 15 | 9 | 9 | 33 | 17 | 12 | 11 | 0 | 124 |
| | 52,000 | 50,642 | 51,769 | 58,319 | 69,945 | 71,082 | 88,322 | 103,472 | 0 | 67,750 |
| 65-69 | 6 | 6 | 3 | 4 | 9 | 8 | 2 | 3 | 5 | 46 |
| | 40,324 | 70,253 | 64,502 | 65,878 | 53,391 | 76,850 | 74,685 | 99,203 | 91,136 | 67,792 |
| 70+ | 1 | 1 | 2 | 2 | 3 | 1 | 1 | 1 | 3 | 15 |
| | 143,698 | 55,855 | 41,898 | 52,323 | 36,619 | 87,297 | 97,606 | 68,728 | 86,305 | 67,360 |
| Total Employees | 498 | 240 | 154 | 100 | 127 | 76 | 41 | 22 | 8 | 1,266 |
| Average Salary | 55,171 | 74,433 | 88,782 | 77,036 | 82,482 | 90,681 | 93,706 | 105,232 | 89,324 | 71,929 |

## Exhibit 2 - Retiree Distribution as of January 1, 2022

| | Number of Employees | | | Total Payments | | |
|---|---|---|---|---|---|---|
| Attained Age | Female | Male | Total | Female | Male | Total |
| < 20 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20-24 | 0 | 1 | 1 | 0 | 11,654 | 11,654 |
| 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 | 1 | 0 | 1 | 5,686 | 0 | 5,686 |
| 45-49 | 0 | 0 | 0 | 0 | 0 | 0 |
| 50-54 | 4 | 4 | 8 | 153,504 | 353,871 | 507,375 |
| 55-59 | 13 | 16 | 29 | 368,395 | 1,169,954 | 1,538,349 |
| 60-64 | 37 | 37 | 74 | 856,257 | 2,312,438 | 3,168,694 |
| 65-69 | 95 | 69 | 164 | 2,288,745 | 3,373,849 | 5,662,594 |
| 70-74 | 94 | 93 | 187 | 2,214,303 | 4,210,221 | 6,424,524 |
| 75-79 | 81 | 49 | 130 | 1,603,185 | 2,103,283 | 3,706,468 |
| 80-84 | 59 | 35 | 94 | 1,218,785 | 1,156,992 | 2,375,777 |
| 85-89 | 48 | 13 | 61 | 938,563 | 478,938 | 1,417,501 |
| 90-94 | 35 | 19 | 54 | 507,873 | 519,760 | 1,027,634 |
| 95+ | 19 | 7 | 26 | 233,621 | 174,439 | 408,060 |
| Total | 486 | 343 | 829 | 10,388,917 | 15,865,400 | 26,254,316 |
| Average (Age/Payment) | 76.2 | 73.3 | 75.0 | 21,376 | 46,255 | 31,670 |
| Frequency Percent | 58.6 | 41.4 | 100 | 39.6 | 60.4 | 100 |

**Exhibit 3 - Disabled Retiree Distribution as of January 1, 2022**

| | Number of Employees | | | Total Payments | | |
|---|---|---|---|---|---|---|
| Attained Age | Male | Female | Total | Male | Female | 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 | 1 | 0 | 1 | 43,302 | 0 | 43,302 |
| 45-49 | 1 | 0 | 1 | 36,756 | 0 | 36,756 |
| 50-54 | 6 | 2 | 8 | 362,128 | 34,029 | 396,157 |
| 55-59 | 8 | 1 | 9 | 466,291 | 57,886 | 524,177 |
| 60-64 | 18 | 1 | 19 | 958,828 | 21,614 | 980,442 |
| 65-69 | 24 | 4 | 28 | 1,194,444 | 111,892 | 1,306,336 |
| 70-74 | 27 | 3 | 30 | 1,354,947 | 137,907 | 1,492,854 |
| 75-79 | 16 | 2 | 18 | 807,683 | 41,104 | 848,787 |
| 80-84 | 6 | 0 | 6 | 179,616 | 0 | 179,616 |
| 85-89 | 4 | 1 | 5 | 104,048 | 15,323 | 119,371 |
| 90-94 | 4 | 0 | 4 | 125,235 | 0 | 125,235 |
| 95-99 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 115 | 14 | 129 | 5,633,277 | 419,756 | 6,053,033 |
| Average (Age/Payment) | 67.69 | 69.57 | 69.37 | 48,985 | 29,983 | 46,923 |
| Frequency Percent | 89.1 | 10.9 | 100 | 93.1 | 6.9 | 100 |

# EXHIBIT 4 - CASHFLOW FORECAST:

The following is a 30 year forecast of benefit payments net of state reimbursable COLA payments, Contribution Income and Investment Returns.

| Plan Year Ending | Benefit Payments | Employee Contributions | Employer Contributions | Investment Returns | Net change in plan assets |
|---|---|---|---|---|---|
| 2022 | $42,942,167 | $8,624,580 | $17,162,384 | $29,514,348 | $12,359,145 |
| 2023 | 37,912,743 | 9,067,464 | 17,814,222 | 30,667,791 | 19,636,735 |
| 2024 | 39,531,712 | 9,440,325 | 18,096,330 | 32,096,677 | 20,101,620 |
| 2025 | 40,989,998 | 9,827,397 | 18,380,810 | 33,566,820 | 20,785,029 |
| 2026 | 42,351,238 | 10,229,198 | 18,667,580 | 35,092,282 | 21,637,821 |
| 2027 | 43,482,318 | 10,646,261 | 18,956,549 | 36,690,684 | 22,811,176 |
| 2028 | 44,534,151 | 11,079,143 | 19,247,624 | 38,380,529 | 24,173,145 |
| 2029 | 45,611,427 | 11,528,415 | 19,540,703 | 40,172,123 | 25,629,813 |
| 2030 | 46,714,763 | 11,994,673 | 19,835,675 | 42,072,565 | 27,188,150 |
| 2031 | 47,844,788 | 12,478,530 | 20,132,422 | 44,089,475 | 28,855,639 |
| 2032 | 49,002,149 | 12,980,624 | 20,430,820 | 46,231,033 | 30,640,328 |
| 2033 | 50,187,506 | 13,501,613 | 2,717,922 | 47,840,859 | 13,872,889 |
| 2034 | 51,401,536 | 14,042,179 | 2,658,952 | 48,844,569 | 14,144,164 |
| 2035 | 52,644,934 | 14,603,027 | 2,593,999 | 49,867,929 | 14,420,021 |
| 2036 | 53,918,409 | 15,041,117 | 2,671,819 | 50,905,983 | 14,700,509 |
| 2037 | 55,222,690 | 15,492,351 | 2,751,973 | 51,964,042 | 14,985,676 |
| 2038 | 56,558,521 | 15,957,121 | 2,834,532 | 53,042,434 | 15,275,566 |
| 2039 | 57,926,666 | 16,435,835 | 2,919,568 | 54,141,486 | 15,570,223 |
| 2040 | 59,327,906 | 16,928,910 | 3,007,155 | 55,261,533 | 15,869,692 |
| 2041 | 60,763,042 | 17,436,777 | 3,097,370 | 56,402,907 | 16,174,012 |
| 2042 | 62,232,893 | 17,959,881 | 3,190,291 | 57,565,947 | 16,483,225 |
| 2043 | 63,738,300 | 18,498,677 | 3,286,000 | 58,750,992 | 16,797,368 |
| 2044 | 65,280,123 | 19,053,637 | 3,384,580 | 59,958,384 | 17,116,477 |
| 2045 | 66,859,243 | 19,625,247 | 3,486,117 | 61,188,467 | 17,440,588 |
| 2046 | 68,476,561 | 20,214,004 | 3,590,701 | 62,441,586 | 17,769,730 |
| 2047 | 70,133,002 | 20,820,424 | 3,698,422 | 63,718,089 | 18,103,933 |
| 2048 | 71,829,512 | 21,445,037 | 3,809,374 | 65,018,325 | 18,443,225 |
| 2049 | 73,567,060 | 22,088,388 | 3,923,656 | 66,342,644 | 18,787,628 |
| 2050 | 75,346,639 | 22,751,039 | 4,041,365 | 67,691,398 | 19,137,162 |
| 2051 | 77,595,921 | 23,433,571 | 4,162,606 | 69,049,227 | 19,049,483 |

# EXHIBIT 5 – SUMMARY OF PLAN PROVISIONS:

This summary is prepared in accordance with Chapter 32 as of January 1, 2022, 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:

| **Date of Hire** | **Member Contribution Rate** |
|---|---|
| Prior to 1975 | 5.0% of Salary |
| 1975 to 1983 | 7.0% of Salary |
| 1984 to 1996 | 8.0% of Salary |
| 1996 and Later plus | 9.0% of Salary |
| 1979 and Later | 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:

| Age at | Percentage of Average Salary | | |
|---|---|---|---|
| Retirement | Group 1 | Group 2 | Group 4 |
| 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:

| Age at Retirement | Percentage of Average Salary Group 1 | Group 2 | Group 4 |
|---|---|---|---|
| 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 $15,000. 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 6 – 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, 2022.

**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 7.5% per annum, net of investment expenses. This is a reduction from the previous valuation.

**5. Salary Scale**

It is assumed that salaries including longevity will increase at a rate of 3% per year.

**6. Cost-of-Living Increases**

Cost-of-living increases have been assumed to be 2.75% of the lesser of the pension amount and $15,000 per year.

**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 10% 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:

| Service | General Employees | Police and Fire Employees |
|---|---|---|
| 0 | 0.2080 | 0.0150 |
| 5 | 0.1020 | 0.0150 |
| 10 | 0.0650 | 0.0150 |
| 15 | 0.0417 | 0.0150 |
| 20 | 0.0400 | 0.0000 |
| 30 | 0.0000 | 0.0000 |

## 9. Annual Rate of Mortality

It is assumed that mortality for is represented by the various SOA Pub-2010 Public Retirement Plans Mortality Tables specific to the Group, Pre-retirement versus Post, Disabled and Beneficiaries, with Scale MP-2018 improvements until 2025.

## 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:

| Age | Male General Employees | Female General Employees | Male and Female Police and Fire Employees |
|---|---|---|---|
| 50 | 0.019964 | 0.1019 | 0.01986 |
| 51 | 0.019962 | 0.0714 | 0.01985 |
| 52 | 0.019960 | 0.0562 | 0.01985 |
| 53 | 0.019956 | 0.0448 | 0.04960 |
| 54 | 0.039908 | 0.0488 | 0.07435 |
| 55 | 0.039898 | 0.0469 | 0.2500 |
| 56 | 0.049858 | 0.0518 | 0.2000 |
| 57 | 0.049846 | 0.0509 | 0.2500 |
| 58 | 0.099660 | 0.0552 | 0.2500 |
| 59 | 0.129518 | 0.0645 | 0.3000 |
| 60 | 0.119515 | 0.0774 | 0.2500 |
| 61 | 0.120000 | 0.1038 | 0.2500 |
| 62 | 0.200000 | 0.1168 | 0.2500 |
| 63 | 0.200000 | 0.1440 | 0.3000 |
| 64 | 0.200000 | 0.1708 | 0.5000 |
| 65 | 0.200000 | 0.1939 | 1.00000 |
| 66 | 0.300000 | 0.1959 | 1.00000 |
| 67 | 0.300000 | 0.2000 | 1.00000 |
| 68 | 0.300000 | 0.2000 | 1.00000 |
| 69 | 0.300000 | 0.2000 | 1.00000 |
| 70 to 76 | 0.300000 | 0.2500 | 1.00000 |
| 77 to 79 | 0.350000 | 0.2500 | 1.00000 |
| 80 | 1.000000 | 1.0000 | 1.00000 |

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:

| Age | Male General Employees | Female General Employees | Male and Female Police and Fire Employees |
|---|---|---|---|
| 50 | 0.0477 | 0.0000 | 0.0072 |
| 51 | 0.0574 | 0.0000 | 0.0072 |
| 52 | 0.0632 | 0.0000 | 0.0062 |
| 53 | 0.0765 | 0.0000 | 0.0105 |
| 54 | 0.0917 | 0.0000 | 0.0105 |
| 55 | 0.1057 | 0.0000 | 0.0389 |
| 56 | 0.1224 | 0.0000 | 0.0631 |
| 57 | 0.1473 | 0.0000 | 0.0897 |
| 58 | 0.1777 | 0.0000 | 0.0846 |
| 59 | 0.2136 | 0.0000 | 0.1022 |
| 60 | 0.2615 | 0.0469 | 0.1455 |
| 61 | 0.2682 | 0.0518 | 0.1844 |
| 62 | 0.0477 | 0.0509 | 0.2741 |
| 63 | 0.0574 | 0.0552 | 0.1984 |
| 64 | 0.0632 | 0.0645 | 0.4139 |
| 65 | 0.0765 | 0.0774 | 1.0000 |
| 66 | 0.0917 | 0.1038 | 1.0000 |
| 67 | 0.1057 | 0.1168 | 1.0000 |
| 68 | 0.1224 | 0.1440 | 1.0000 |
| 69 | 0.1473 | 0.1708 | 1.0000 |
| 70 | 0.1777 | 0.1939 | 1.0000 |
| 71 to 76 | 0.2136 | 0.2000 | 1.0000 |
| 77 to 79 | 0.2500 | 0.2000 | 1.0000 |
| 80 | 1.0000 | 1.0000 | 1.0000 |

## 11. **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:

| Attained Age | General Employees | Police and Fire Employees |
|---|---|---|
| 20 | 0.0001 | 0.0005 |
| 30 | 0.0002 | 0.0010 |
| 40 | 0.0006 | 0.0025 |
| 50 | 0.0013 | 0.0076 |

In addition, it is assumed for the general employees that 40% of all disabilities are ordinary (60% are service connected). For police and fire employees, 10% of all disabilities are assumed to be ordinary (90% are service connected).

## 12. **Family Composition**

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

## 13. **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 2023 is $675,000 and is anticipated to increase at 4% per year.

# EXHIBIT 7 – GLOSSARY OF TERMS:

This glossary summarizes the technical terms contained in this report.

1. **Actuarial Accrued Liability**

   That portion of the Actuarial Present Value of projected plan benefits that is not provided for by future employer Normal Costs or employee contributions.

2. **Actuarial Assumptions**

   Assumptions as to the occurrence of future events affecting the Retirement System such as:

   - Rates of investment returns
   - Increases in a member's salary
   - Inflation
   - The probability of mortality, turnover, disablement
   - Retirement at each age and other relevant items

3. **Actuarial Cost Method**

   A procedure for allocating the Actuarial Present Value of projected pension plan benefits between Normal Cost and Actuarial Accrued Liability.

4. **Actuarial Present Value**

   The single sum amount required at the valuation date that is required to provide for anticipated future events based upon the terms of the plan and the Actuarial Assumptions.

5. **Forecast**

   A projection of future benefit payments or contribution requirements based upon the terms of the plan, the current asset amounts, the Actuarial Assumptions, and additional assumptions as to the replacement of terminating employees with new employees.

**6. Normal Cost**

That portion of the Actuarial Present Value of future benefits that is assigned to the current year.

**7. Unfunded Actuarial Accrued Liability**

That portion of the Actuarial Accrued Liability that is not provided for by current actuarial value of assets.

**8. Actuarial Valuation Method**

The method used to divide the cost of future benefits among the Actuarial Accrued Liability, the current year's Normal Costs, and future years' Normal Costs. The resulting current funding requirement is then determined as the current year's Normal Cost plus the payment necessary to amortize the Unfunded Actuarial Liability.

**9. Vested Liability**

That portion of the Actuarial Present Value of Accrued Benefits that a member would be entitled to if the member terminated employment with the employer as of the valuation date.

## CERTIFICATION:

This report fairly represents the actuarial position of the City of Somerville Retirement System contributing as of January 1, 2022, 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 2022