



# June 30, 2021 Actuarial Valuation Report

for the

## New York City Fire Pension Fund

prepared by the

**New York City  
Office of the Actuary**

**CONTRIBUTIONS REQUIRED FOR FISCAL YEAR 2023**



## OFFICE OF THE ACTUARY

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MAREK TYSZKIEWICZ  
CHIEF ACTUARY

October 16, 2023

Board of Trustees  
New York City Fire Pension Fund and Group Life Insurance Plan  
One Battery Park Plaza, 9<sup>th</sup> Floor  
New York, NY 10004

Re: June 30, 2021 Actuarial Valuation Report (Report)

Dear Trustees:

This Report presents the results of the June 30, 2021 actuarial valuation of the benefits under both the New York City Fire Pension Fund (FIRE) and Group Life Insurance Plan (collectively, the Plan). This valuation, known as the June 30, 2021 valuation, forms the basis for determining the statutorily required contribution (Statutory Contribution) of \$1,423,600,676 for Fiscal Year 2023 (i.e., for the period beginning July 1, 2022 and ending June 30, 2023). It is not intended, nor necessarily suitable, for other purposes. Calculations made for other purposes may differ significantly from those shown herein.

Results of the June 30, 2020 actuarial valuation are shown in this Report for comparative purposes. Other historical information that the Actuary believes useful is also included.

The June 30, 2021 and June 30, 2020 actuarial valuations are based upon census data as of those dates submitted by the Plan's administrative staff and the employer's payroll facilities. Financial information was provided by FIRE and the Office of the Comptroller as of June 30, 2021 and June 30, 2020.

Consistent with Actuarial Standards of Practice, the Office of the Actuary has reviewed census data and financial information for consistency and reasonability but has not audited it. The accuracy of the results and calculations presented in this Report are dependent on the accuracy of this census data and financial information. To the extent any such data or information provided is materially inaccurate or incomplete, the results contained herein will require revision.

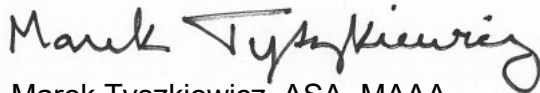
A summary of the benefits available under the terms of the Plan is shown in SECTION VIII – SUMMARY OF PLAN PROVISIONS. This valuation reflects the enactment of Chapter 782 of the Laws of 2022 which extends the eligibility of Special Accidental Death Benefits to parents of certain deceased members who died in the line-of-duty. All other benefits under the Plan are unchanged from the prior valuation.

A summary of the actuarial assumptions and methods used in the valuation of the Plan is shown in SECTION XI – ACTUARIAL ASSUMPTIONS AND METHODS. The actuarial assumptions and methods are unchanged from the prior valuation.

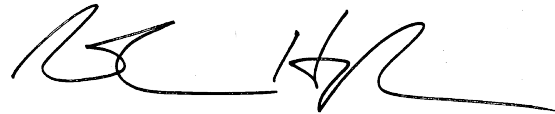
This Report does not present Governmental Accounting Standards Board (GASB) results. The Office of the Actuary publishes the Fiscal Year 2023 GASB67 and GASB68 results under separate cover. Reports published by the Office of the Actuary are available on the website [www.nyc.gov/actuary](http://www.nyc.gov/actuary).

Marek Tyszkiewicz is the Chief Actuary for, and independent of, the New York City Retirement Systems and Pension Funds. He is an Associate of the Society of Actuaries and a Member of the American Academy of Actuaries. Anderson Huynh is a Fellow of the Society of Actuaries, an Enrolled Actuary under the Employee Retirement Income Security Act of 1974, a Member of the American Academy of Actuaries, and a Fellow of the Conference of Consulting Actuaries. We meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein. To the best of our knowledge, the results contained herein have been prepared in accordance with generally accepted actuarial principles and procedures and with the Actuarial Standards of Practice issued by the Actuarial Standards Board.

Best Regards,



Marek Tyszkiewicz, ASA, MAAA  
Chief Actuary



Anderson Huynh, FSA, EA, MAAA, FCA  
Assistant Deputy Chief Actuary

MT/eh

cc: Patrick Dunn - New York City Fire Pension Fund  
Lei Tian - New York City Fire Pension Fund

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## SECTION I – EXECUTIVE SUMMARY

This Report presents the results of the June 30, 2021 actuarial valuation of the New York City Fire Pension Fund (FIRE) and Group Life Insurance Plan (collectively, the Plan).

The purposes of the valuation are:

- To determine the actuarially required contribution (Actuarial Contribution) for Fiscal Year 2023 (i.e., July 1, 2022 to June 30, 2023),
- To measure the funding progress of the Plan,
- To disclose the census data and financial information used in the valuation, and
- To disclose the actuarial assumptions and actuarial methods used to determine the Actuarial Contribution.

The statutorily required contribution (Statutory Contribution) is also shown and compared to the Actuarial Contribution in historical years.

This Report does not provide financial and accounting information required by current GASB standards. That information is provided in a separate report.

All results are based on preliminary transferable earnings amounts for Fiscal Year 2021 as determined by the Actuary in a letter dated September 9, 2021 to the Comptroller's Office. All results are without regard to the Variable Supplements Funds, unless specifically noted.

Future measurements of this information may differ from current measurements for many reasons including, but not limited to, experience differing from economic or demographic assumptions, changes in actuarial assumptions and methods, and changes in applicable statute and plan provisions. These and additional risks may be present for the Plan. A further discussion is presented in SECTION VII – RISK AND UNCERTAINTY for consideration.

**Table I-1**  
**Executive Summary**

Presented in **Table I-1** are the principal results of the June 30, 2021 actuarial valuation and, for comparative purposes, the June 30, 2020 actuarial valuation.

NEW YORK CITY FIRE PENSION FUND		
SUMMARY OF VALUATION RESULTS		
Valuation Date	June 30, 2021	June 30, 2020
Fiscal Year	2023	2022
<b>Funded Status</b>		
1. Accrued Liability <sup>1</sup>	\$ 24,394,754,991	\$ 23,491,616,573
2. Actuarial Value of Assets (AVA) <sup>2</sup>	<u>16,943,734,000</u>	<u>16,745,000,411</u>
3. Unfunded Accrued Liability (AVA Basis) (1. - 2.)	\$ 7,451,020,991	\$ 6,746,616,162
4. Market Value of Assets (MVA)	18,908,561,000	15,086,575,000
5. Unfunded Accrued Liability (MVA Basis) (1. - 4.)	\$ 5,486,193,991	\$ 8,405,041,573
6. Funded Ratio (MVA Basis) (4. / 1.)	77.5%	64.2%
<b>Contribution<sup>3</sup></b>		
1. Normal Cost	\$ 610,269,938	\$ 603,605,747
2. Amortization of Unfunded Accrued Liability	801,486,747	832,931,793
3. Administrative Expenses	<u>11,843,991</u>	<u>10,454,082</u>
4. Actuarial Contribution (1. + 2. + 3.)	\$ 1,423,600,676	\$ 1,446,991,622
5. Statutory Contribution (4.)	\$ 1,423,600,676	\$ 1,446,991,622
<b>Participant Data</b>		
1. Active Members		
a. Number	10,793	11,079
b. Annual Salary <sup>4</sup>	\$ 1,401,377,517	\$ 1,348,006,398
c. Average Salary	\$ 129,841	\$ 121,672
2. Terminated Nonvested Members	2	0
3. Deferred Vested Members	62	64
4. Retirees and Beneficiaries		
a. Number	16,578	16,624
b. Total Annual Benefits	\$ 1,383,669,309	\$ 1,341,351,103
c. Average Annual Benefit	\$ 83,464	\$ 80,688

<sup>1</sup> Includes unfunded Accrued Liability for VSFs, if any.

<sup>2</sup> AVA as of June 30, 2020 includes receivable contributions of \$1,398,623,411; AVA as of June 30, 2021 does not include receivable contributions.

<sup>3</sup> Includes results for VSFs.

<sup>4</sup> Salaries shown are the base salary plus assumed overtime paid and reflect certain salary increases with retroactive dates, if any, that are not yet reflected in census data.

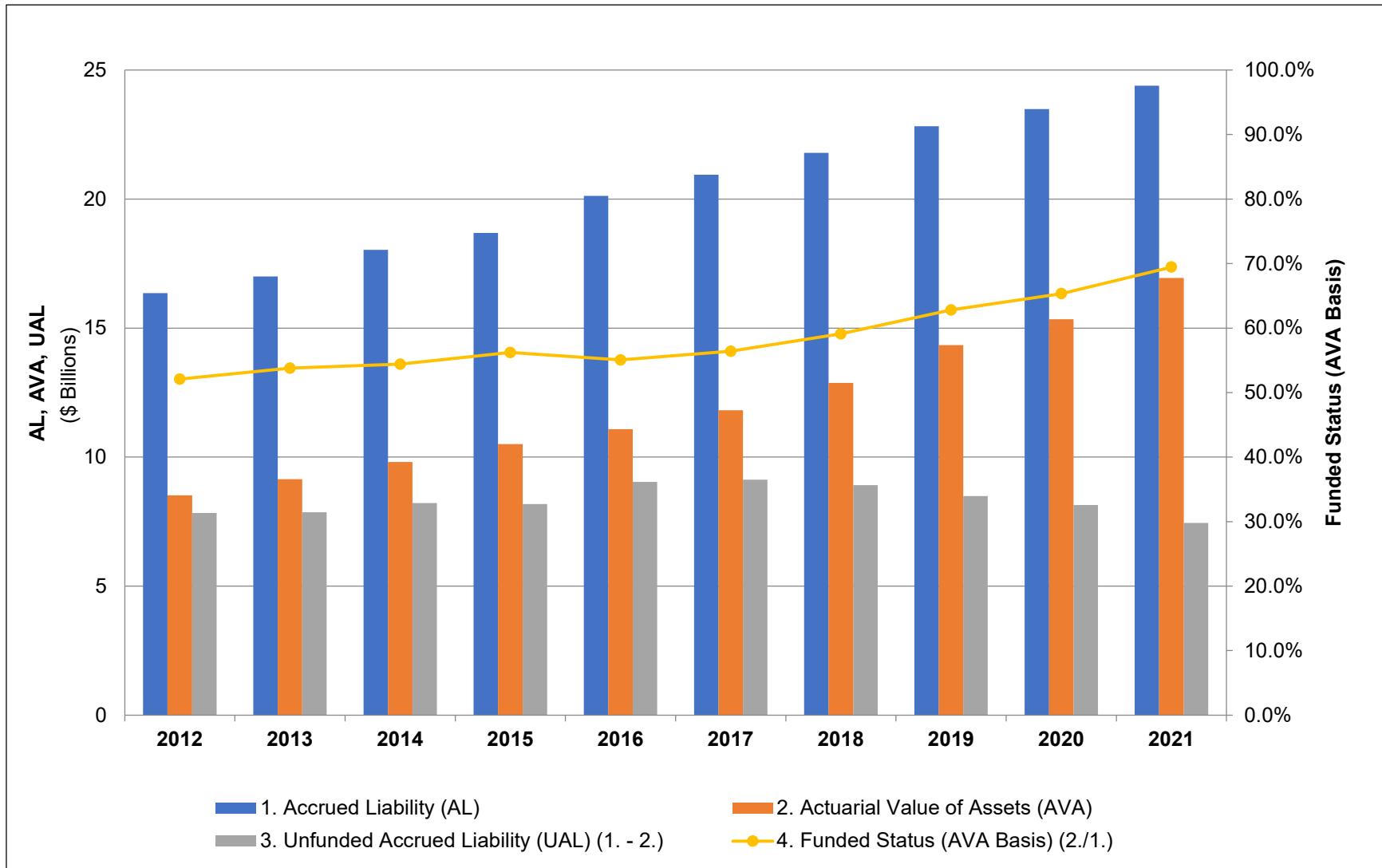
**Table I-2**  
**Actuarial Liabilities**

NEW YORK CITY FIRE PENSION FUND		
ACTUARIAL LIABILITIES BY STATUS		
Valuation Date	June 30, 2021	June 30, 2020
Fiscal Year	2023	2022
<b>Accrued Liability</b>		
1. Active Members	\$ 8,744,373,215	\$ 8,350,779,789
2. Terminated Nonvested Members	15,729	0
3. Deferred Vested Members	16,185,100	15,986,181
4. Retirees and Beneficiaries	15,634,180,947	15,124,850,603
5. Unfunded VSF	<u>0</u>	<u>0</u>
6. Total Accrued Liability	\$ 24,394,754,991	\$ 23,491,616,573
<b>Present Value of Benefits</b>		
1. Active Members	\$ 14,411,133,537	\$ 14,109,006,950
2. Terminated Nonvested Members	15,729	0
3. Deferred Vested Members	16,185,100	15,986,181
4. Retirees and Beneficiaries	15,634,180,947	15,124,850,603
5. VSF <sup>1</sup>	<u>908,353,439</u>	<u>78,673,567</u>
6. Total Present Value of Benefits	\$ 30,969,868,752	\$ 29,328,517,301

<sup>1</sup> VSF present value of benefits as of June 30, 2020 reflects only the unfunded portion of VSF present value of benefits; VSF present value of benefits as of June 30, 2021 reflects the total VSF present value of benefits.



Graph I-3  
Historical Funded Status



## SECTION II – MARKET AND ACTUARIAL VALUES OF ASSETS

Information on the Market Value of Assets (MVA) of the Plan is provided by the Office of the Comptroller. An asset smoothing method is used to determine the Actuarial Value of Assets (AVA) of the Plan.

The Actuary reset the AVA to the MVA as of June 30, 2011 and as of June 30, 2019. Beginning with the June 30, 2020 actuarial valuation, the asset smoothing method recognizes investment returns greater or less than expected over a period of five years, phasing these gains and losses into the AVA at a rate of 20% per year.

The expected investment return is derived using the Actuarial Interest Rate of 7%, beginning-of-fiscal-year MVA, and net cash flows which are assumed to occur midyear.

The AVA is further constrained to be within a corridor of 80% to 120% of the MVA.

**Table II-1**  
**Statement of Plan Net Assets**

(\$ Thousands)		
	June 30, 2021	June 30, 2020
<b>ASSETS</b>		
Cash	\$ 22,894	\$ 3,118
Receivables		
Investment Securities Sold	\$ 406,775	\$ 372,313
Member Loans	15,173	20,559
Accrued Interest and Dividends	65,923	37,900
Other Receivables	0	91
Total Receivables	\$ 487,871	\$ 430,863
<b>INVESTMENTS AT FAIR VALUE</b>		
Short-Term Investments		
Commercial Paper	\$ 227,013	\$ 115,094
Short-Term Investment Fund	205,068	156,248
U.S. Treasury Bills	185,564	470,090
Debt Securities		
U.S. Government and Agencies	2,347,865	1,383,806
Mortgage Debt Security	865,263	696,105
Corporate and Other	1,757,335	1,341,212
Treasury Inflation Protected Securities	813,528	667,049
Bank Loans	65,367	61,355
Equity Securities		
Equity Securities	6,121,847	4,895,777
International Equity	2,351,785	1,186,338
Alternative Investments	3,743,576	3,174,702
Collective Trust Funds		
Bank Loans	436	101,784
Corporate and Other	0	624
International Equity	491,133	877,623
Domestic Equity	23,202	80,603
Mortgage Debt Security	54,320	52,601
Opportunistic Fixed Income	58,843	50,189
Collateral From Securities Lending	2,067,990	914,986
Total Investments	\$ 21,380,135	\$ 16,226,186
<b>OTHER ASSETS</b>	3,431	2,970
<b>TOTAL ASSETS</b>	\$ 21,894,331	\$ 16,663,137
<b>LIABILITIES</b>		
Accounts Payable	\$ 100,679	\$ 65,828
Payable for Investment Securities Purchased	796,171	580,330
Accrued Benefits Payable	20,930	15,418
Accrued Transfers to VSFs	0	0
Security Lending	2,067,990	914,986
<b>TOTAL LIABILITIES</b>	\$ 2,985,770	\$ 1,576,562
<b>PLAN ASSETS HELD IN TRUST FOR PENSION BENEFITS</b>	\$ 18,908,561	\$ 15,086,575

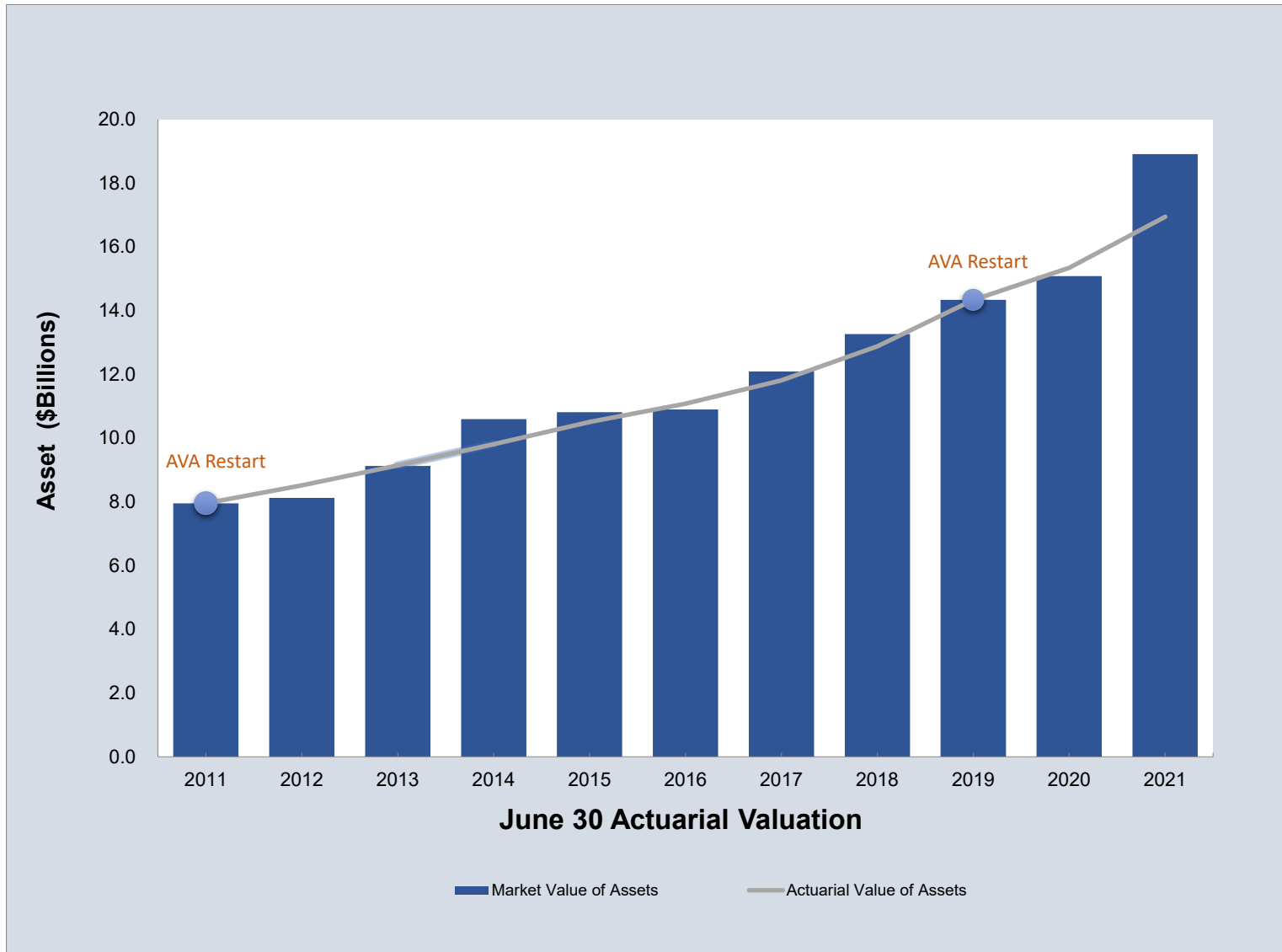
**Table II-2**  
**Statement of Changes in Plan Net Assets**

(\$ Thousands)		
	June 30, 2021	June 30, 2020
<b>ADDITIONS</b>		
Contributions		
Member Contributions	\$ 112,566	\$ 106,821
Employer Contributions	1,436,977	1,419,270
<b>Total Contributions</b>	<u>\$ 1,549,543</u>	<u>\$ 1,526,091</u>
Investment Income (Loss)		
Interest Income	\$ 197,929	\$ 172,679
Dividend Income	173,022	174,436
Net Appreciation (Depreciation) in Fair Value	3,487,916	411,582
<b>Total Investment Income (Loss)</b>	<u>\$ 3,858,867</u>	<u>\$ 758,697</u>
Less Investment Expenses	\$ 103,577	\$ 80,078
<b>Net Income (Loss)</b>	<u>\$ 3,755,290</u>	<u>\$ 678,619</u>
Securities Lending Transactions		
Securities Lending Income	2,843	3,047
Securities Lending Fees	(268)	(283)
<b>Net Securities Lending Income (Loss)</b>	<u>\$ 2,575</u>	<u>\$ 2,764</u>
Other		
Net Receipts from Other Retirement Systems	51	1,337
Litigation Income	707	1,505
<b>Other Total</b>	<u>758</u>	<u>2,842</u>
Transferable Earnings due from VSFs to QPP	0	15,000
<b>TOTAL ADDITIONS</b>	<u>\$ 5,308,166</u>	<u>\$ 2,225,316</u>
<b>DEDUCTIONS</b>		
Benefit Payments and Withdrawals	\$ 1,475,835	\$ 1,447,071
Accrued Transfers to VSFs	0	0
Administrative Expenses	10,345	9,131
Payment to VSFs - Interest on SKIM	0	20,157
<b>TOTAL DEDUCTIONS</b>	<u>\$ 1,486,180</u>	<u>\$ 1,476,359</u>
<b>NET INCREASE (DECREASE) IN PLAN NET ASSETS</b>	<u>\$ 3,821,986</u>	<u>\$ 748,957</u>
<b>PLAN NET ASSETS HELD IN TRUST FOR PENSION BENEFITS</b>		
Beginning of Year	\$ 15,086,575	\$14,337,618
End of Year	\$ 18,908,561	\$15,086,575

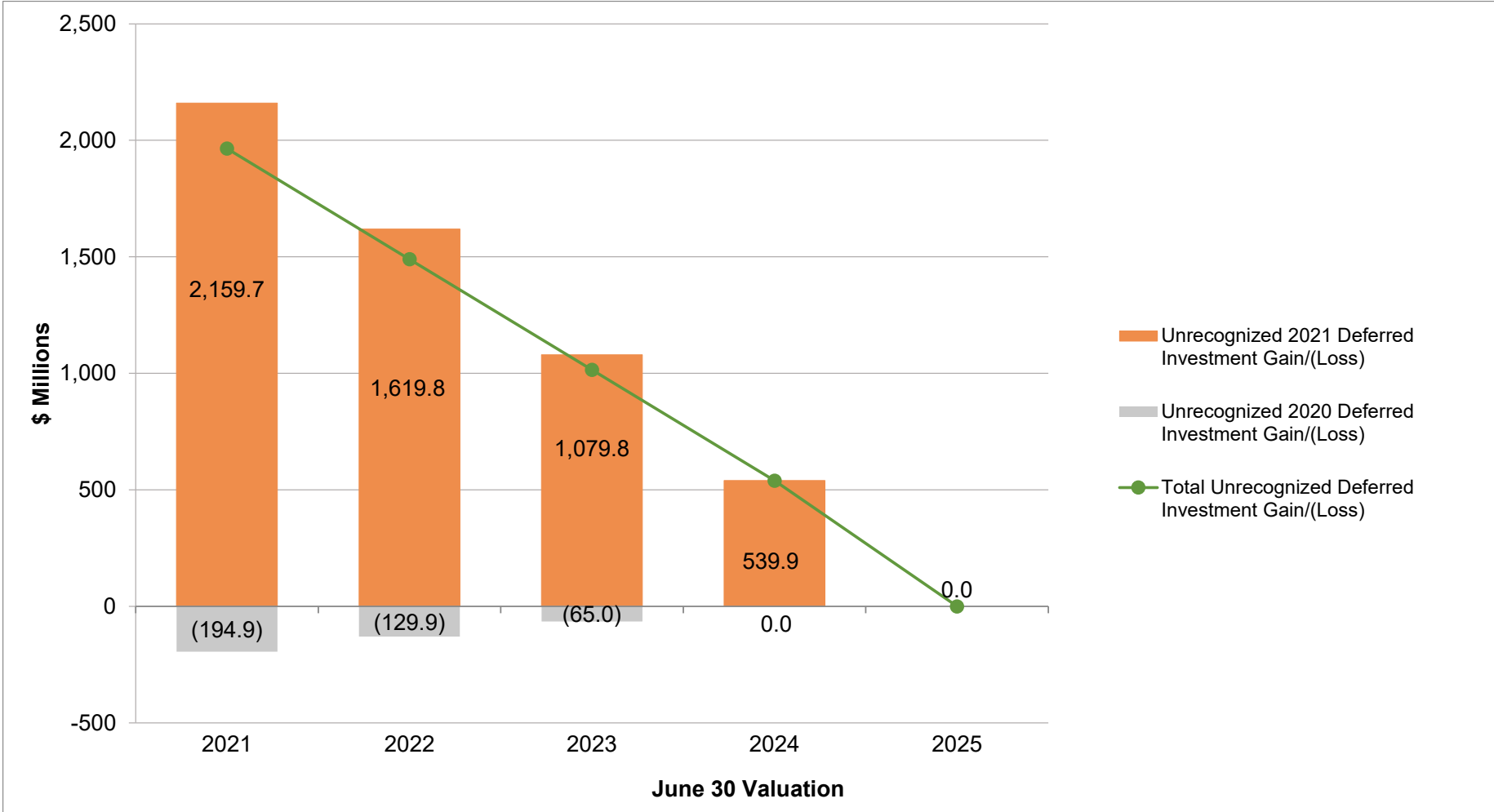
**Table II-3**  
**Development of Actuarial Value of Assets**

(\$ Thousands)		
Valuation Date	June 30, 2021	June 30, 2020
1. Market Value of Assets (MVA)		
a. Beginning of Year (BOY)	\$ 15,086,575	\$ 14,337,618
b. End of Year (EOY)	\$ 18,908,561	\$ 15,086,575
2. Contributions		
a. Employee	\$ 112,566	\$ 106,821
b. Employer	<u>1,436,977</u>	<u>1,419,270</u>
c. Total Contributions	\$ 1,549,543	\$ 1,526,091
3. Net Investment Income		
a. Investment Income	\$ 3,861,442	\$ 761,461
b. Investment Expenses	<u>(103,577)</u>	<u>(80,078)</u>
c. Total Net Investment Income	\$ 3,757,865	\$ 681,383
4. Benefit Payments and Other Cash Flow	\$ (1,485,422)	\$ (1,453,360)
5. Preliminary Transferable Earnings from FIRE to VSFs - EOY	\$ 0	\$ (5,157)
6. Net Cash Flow (2.c. + 4. + 5.)	\$ 64,121	\$ 67,574
7. Expected Investment Return (EIR)	\$ 1,058,266	\$ 1,006,136
8. Unexpected Investment Return (UIR) (3.c. - 7.)	\$ 2,699,599	\$ (324,753.00)
9. Preliminary AVA @ EOY		
a. AVA @ BOY (prior to corridor limit)	\$ 15,346,377	\$ 14,337,618
b. Net Cash Flow (6.)	\$ 64,121	\$ 67,574
c. Expected Investment Return (7.)	\$ 1,058,266	\$ 1,006,136
d. Phase in of UIR		
20% of UIR for prior year	\$ 539,921	\$ (64,951)
20% of UIR for second prior year	(64,951)	N/A
20% of UIR for third prior year	N/A	N/A
20% of UIR for fourth prior year	N/A	N/A
20% of UIR for fifth prior year	N/A	N/A
Total	<u>\$ 474,970</u>	<u>\$ (64,951)</u>
e. Preliminary AVA (9.a. + 9.b. + 9.c. + 9.d.)	\$ 16,943,734	\$ 15,346,377
10. Corridor		
a. Lower Corridor Bound (80% of 1.b.)	\$ 15,126,849	\$ 12,069,260
b. Upper Corridor Bound (120% of 1.b.)	\$ 22,690,273	\$ 18,103,890
<b>11. AVA @ EOY (9.e. bounded by 10.a. and 10.b.)</b>	<b>\$ 16,943,734</b>	<b>\$ 15,346,377</b>

Graph II-4  
Historical Market and Actuarial Value of Assets



**Graph II-5**  
**Future Recognition of Unexpected Investment Return**



## SECTION III – CONTRIBUTION DEVELOPMENT AND HISTORY

**Table III-1  
Statutory Contributions**

**Table III-1** shows the components of the Fiscal Year 2023 and the Fiscal Year 2022 Statutory Contributions.

COMPONENTS OF CURRENT AND PRIOR FISCAL YEAR STATUTORY CONTRIBUTIONS		
Valuation Date	June 30, 2021	June 30, 2020
Fiscal Year	2023	2022
Normal Cost	\$ 610,269,938	\$ 603,605,747
Unfunded Accrued Liability Amortization <sup>1</sup>	\$ 801,486,747	\$ 832,931,793
Administrative Expenses	<u>\$ 11,843,991</u>	<u>\$ 10,454,082</u>
<b>Total Contribution to the New York City Fire Pension Fund</b>	<b>\$ 1,423,600,676</b>	<b>\$ 1,446,991,622</b>

<sup>1</sup> See Table III-2 for additional details.



## Table III-2 Schedule of Unfunded Accrued Liability Bases

The Initial Unfunded Accrued Liability (UAL) established with the 6/30/2010 valuation is being amortized as a level percent of pay (with payments increasing by 3% per year) over a 22-year period.

Increments to the UAL established after June 30, 2010 are amortized as using level dollars over the following periods:

- Benefit Changes: Over the remaining working lifetimes of those impacted unless the amortization period is determined by statute.
- Assumption and Method Changes: Over a 20-year period.
- Actuarial Gains and Losses: Over a 15-year period.

Under the One-Year Lag methodology (OYLM), the number of payments is one fewer than the number of years in the amortization period (e.g., 14 payments over a 15-year amortization period).

**Table III-2**  
**Schedule of Unfunded Accrued Liability Bases (cont'd)**

**Table III-2** shows the Schedule of UAL Bases as of June 30, 2021.

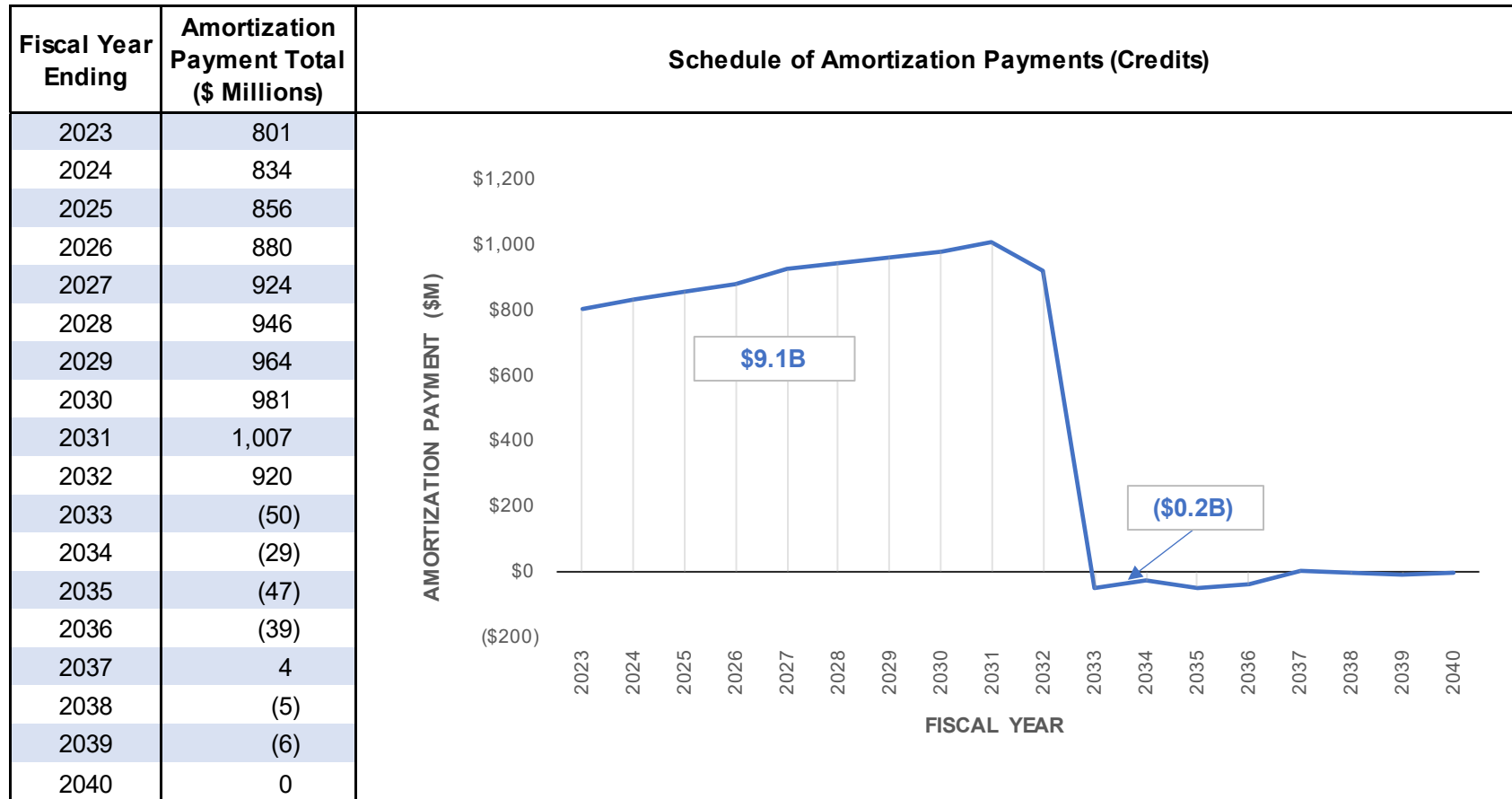
<b>NEW YORK CITY FIRE PENSION FUND</b>					
<b>SCHEDULE OF UNFUNDED ACCRUED LIABILITY BASES</b>					
<b>Amortization Base</b>	<b>Date Established</b>	<b>Original \$ Amount</b>	<b>Amortization Years</b>	<b>Payments Remaining</b>	<b>Amortization \$ Payment</b>
Initial UAL	6/30/10	7,095,864,159	22	11	737,972,402
(Gain)/Loss	6/30/11	(168,320,189)	15	5	(19,908,798)
(Gain)/Loss	6/30/12	26,297,732	15	6	3,110,478
(Gain)/Loss	6/30/13	61,311,940	15	7	7,251,935
(Gain)/Loss	6/30/14	84,382,762	15	8	9,980,736
Assumption Change <sup>1</sup>	6/30/14	327,575,238	20	13	32,784,417
(Gain)/Loss	6/30/15	4,282,552	15	9	506,537
(Gain)/Loss	6/30/16	158,483,315	15	10	18,745,299
SADB	6/30/16	820,067,832	15	10	96,997,069
Enhanced ADR	6/30/16	2,612,048	22	17	249,358
(Gain)/Loss	6/30/17	59,849,221	15	11	7,078,925
No VSF Escalation Offset	6/30/17	462,349	21	17	45,144
Non-Uniformed Service	6/30/17	2,645,107	20	16	264,728
Assumption Change <sup>2</sup>	6/30/17	407,308,674	20	16	40,764,306
Method Change <sup>2</sup>	6/30/17	(320,832,740)	20	16	(32,109,613)
(Gain)/Loss	6/30/18	(178,668,664)	15	12	(21,132,809)
(Gain)/Loss	6/30/19	(127,003,510)	15	13	(15,021,890)
Assumption Change <sup>3</sup>	6/30/19	99,175,360	20	18	9,925,679
Method Change <sup>3</sup>	6/30/19	(156,147,033)	20	18	(15,627,522)
(Gain)/Loss	6/30/20	(62,988,586)	15	14	(7,450,247)
(Gain)/Loss	6/30/21	(394,165,627)	15	14	(46,621,645)
415 Limit	6/30/21	(9,020,007)	2	1	(9,983,494)
SADB for Parents	6/30/21	30,992,336	15	14	3,665,752
<b>TOTAL</b>					<b>801,486,747</b>

<sup>1</sup> Change in post-retirement mortality assumptions including the change to the mortality improvement scale MP-2015.

<sup>2</sup> 2019 A&M.

<sup>3</sup> Revised 2021 A&M.

**Graph III-3**  
**Remaining UAL Amortizations as of June 30, 2021**



**Table III-4**  
**Reconciliation of Outstanding UAL Bases**

Cost Component	Date Established	Original Amount	Amort Years	Outstanding Balance 6/30/2021	FY 2022 Payment on 12/31/2021	Outstanding Balance 6/30/2022	FY 2023 Payment on 12/31/2022	Additional Payments
Initial UAL	6/30/10	\$7,095,864,159	22	\$6,343,345,908	\$716,478,061	\$6,046,249,452	\$737,972,402	9
(Gain)/Loss	6/30/11	(168,320,189)	15	(84,438,734)	(19,908,798)	(69,755,625)	(19,908,798)	3
(Gain)/Loss	6/30/12	26,297,732	15	15,336,356	3,110,478	13,192,397	3,110,478	4
(Gain)/Loss	6/30/13	61,311,940	15	40,427,536	7,251,935	35,756,004	7,251,935	5
(Gain)/Loss	6/30/14	84,382,762	15	61,648,602	9,980,736	55,639,851	9,980,736	6
Assumption Change	6/30/14	327,575,238	20	283,428,531	32,784,417	269,356,064	32,784,417	11
(Gain)/Loss	6/30/15	4,282,552	15	3,413,765	506,537	3,128,763	506,537	7
(Gain)/Loss	6/30/16	158,483,315	15	136,189,273	18,745,299	126,332,234	18,745,299	8
SADB	6/30/16	820,067,832	15	704,707,881	96,997,069	653,702,884	96,997,069	8
Enhanced ADR	6/30/16	2,612,048	22	2,518,302	249,358	2,436,645	249,358	15
(Gain)/Loss	6/30/17	59,849,221	15	54,909,024	7,078,925	51,430,159	7,078,925	9
No VSF Escalation Offset	6/30/17	462,349	21	455,918	45,144	441,135	45,144	15
Non-Uniformed Service	6/30/17	2,645,107	20	2,586,837	264,728	2,494,079	264,728	14
Assumption Change	6/30/17	407,308,674	20	398,336,134	40,764,306	384,052,737	40,764,306	14
Method Change	6/30/17	(320,832,740)	20	(313,765,166)	(32,109,613)	(302,514,286)	(32,109,613)	14
(Gain)/Loss	6/30/18	(178,668,664)	15	(173,626,704)	(21,132,809)	(163,920,626)	(21,132,809)	10
(Gain)/Loss	6/30/19	(127,003,510)	15	(129,867,555)	(15,021,890)	(123,419,520)	(15,021,890)	11
Assumption Change	6/30/19	99,175,360	20	103,278,667	9,925,679	100,240,971	9,925,679	16
Method Change	6/30/19	(156,147,033)	20	(162,607,503)	(15,627,522)	(157,824,794)	(15,627,522)	16
(Gain)/Loss	6/30/20	(62,988,586)	15	(67,397,787)	(7,450,247)	(64,409,037)	(7,450,247)	12
Admin Expenses	6/30/20	9,445,180	2	10,106,343	10,454,082	0	0	0
Normal Cost	7/1/20	545,352,991	2	583,527,709	603,605,747	0	0	0
(Gain)/Loss	6/30/21	(394,165,627)	15	(394,165,627)	0	(421,757,221)	(46,621,645)	13
415 Limit	6/30/21	(9,020,007)	2	(9,020,007)	0	(9,651,407)	(9,983,494)	0
SADB for Parents	6/30/21	30,992,336	15	30,992,336	0	33,161,800	3,665,752	13
Admin Expenses	6/30/21	10,700,952	2	10,700,952	0	11,450,019	11,843,991	0
Normal Cost	7/1/21	551,374,035	2	0	0	589,970,217	610,269,938	0
<b>TOTAL</b>		<b>\$8,881,037,427</b>		<b>\$7,451,020,991</b>	<b>\$1,446,991,622</b>	<b>\$7,065,782,895</b>	<b>\$1,423,600,676</b>	

Payment for amortization bases, normal costs and administrative expenses are deferred 1.5 years to the middle of the fiscal year under the One-Year Lag Methodology. The number of amortization payments is one less than the number of years amortized. Required contributions are the sum of all cost components after interest adjustments due to the lag.

**Table III-4**  
**Reconciliation of Outstanding UAL Bases (cont'd)**

<b>Cost Component</b>	<b>Outstanding Balance 6/30/2021</b>	<b>FY 2022 Payment on 12/31/2021</b>	<b>Outstanding Balance 6/30/2022</b>	<b>FY 2023 Payment on 12/31/2022</b>
Initial UAL	\$6,343,345,908	\$716,478,061	\$6,046,249,452	\$737,972,402
Method Change	(476,372,669)	(47,737,135)	(460,339,080)	(47,737,135)
Assumption Change	785,043,332	83,474,402	753,649,772	83,474,402
Plan Change	741,261,274	97,556,299	692,236,543	101,222,051
415 Limit	(9,020,007)	0	(9,651,407)	(9,983,494)
(Gain)/Loss	(537,571,851)	(16,839,834)	(557,782,621)	(63,461,479)
Normal Cost	583,527,709	603,605,747	589,970,217	610,269,938
Admin Expenses	20,807,295	10,454,082	11,450,019	11,843,991
<b>TOTAL</b>	<b>\$7,451,020,991</b>	<b>\$1,446,991,622</b>	<b>\$7,065,782,895</b>	<b>\$1,423,600,676</b>

	<b>6/30/2021</b>
(A) Actuarial Accrued Liability	\$ 24,394,754,991
(B) Actuarial Value of Assets	16,943,734,000
(C) Unfunded Accrued Liabilities (A) - (B)	\$ 7,451,020,991

	<b>FY 2023</b>
Normal Cost	\$ 610,269,938
UAL Payment	801,486,747
Admin Expenses	11,843,991
<b>Total</b>	<b>\$ 1,423,600,676</b>

**Table III-5**  
**Actuarial and Statutory Contribution History**

**Table III-5** compares the Statutory Contributions to the Actuarial Contributions for Fiscal Years 2014 through 2023.

(\$ Thousands)			
Fiscal Year Ended June 30	Actuarial Contribution Certified	Statutory Contribution Contributed	Percentage of Actuarial Contribution Contributed
2014	969,956	969,956	100.0%
2015	988,784	988,784	100.0%
2016	1,054,478	1,054,478	100.0%
2017	1,061,170	1,061,170	100.0%
2018	1,200,417	1,200,417	100.0%
2019	1,398,565	1,398,565	100.0%
2020	1,419,270	1,419,270	100.0%
2021	1,436,977	1,436,977	100.0%
2022	1,446,992	1,446,992	100.0%
2023	1,423,601	1,423,601	100.0%

**Table III-6**  
**City Rates: Contributions as a Percentage of Salary**

**Table III-6** shows the City Rates defined to be the contributions as a percentage of salary for the Fiscal Years 2014 through 2023.

CITY RATES (\$ Thousands)			
Fiscal Year Ended June 30	Actuarial Contribution	Salary <sup>1</sup> at Beginning of Fiscal Year	City Rate
2014	969,956	1,102,396	88.0%
2015	988,784	1,111,744	88.9%
2016	1,054,478	1,129,470	93.4%
2017	1,061,170	1,145,919	92.6%
2018	1,200,417	1,164,528	103.1%
2019	1,398,565	1,272,490	109.9%
2020	1,419,270	1,326,177	107.0%
2021	1,436,977	1,362,579	105.5%
2022	1,446,992	1,372,178	105.5%
2023	1,423,601	1,419,221	100.3%

<sup>1</sup> Includes assumed overtime paid, the impact of recent labor contract settlements and certain non-union salary increases with retroactive effective dates, if any.

## SECTION IV – (GAIN)/LOSS ANALYSIS

**Table IV-1**  
**Development of Experience (Gain)/Loss**

NEW YORK CITY FIRE PENSION FUND			
DEVELOPMENT OF EXPERIENCE (GAIN) / LOSS			
JUNE 30, 2021			
(\$ Thousands)			
<b>1. Expected Accrued Liability (AL)</b>	<b>QPP</b>	<b>VSF</b>	<b>Total</b>
a. AL at June 30, 2020	\$ 23,491,617	\$ 766,390	\$ 24,258,007
b. Normal Cost and Administrative Expenses at June 30, 2020	650,500	13,676	664,176
c. Interest on 1.a. and 1.b. to June 30, 2021	1,689,948	54,605	1,744,553
d. Fiscal Year 2021 Benefit Payments	(1,475,835)	(64,076)	(1,539,911)
e. Interest on 1.d. to June 30, 2021	<u>(50,781)</u>	<u>(2,205)</u>	<u>(52,986)</u>
f. Expected AL at June 30, 2021	\$ 24,305,449	\$ 768,390	\$ 25,073,839
<b>2. Actual AL at June 30, 2021<sup>1</sup></b>	<b>\$ 24,372,783</b>	<b>\$ 762,662</b>	<b>\$ 25,135,445</b>
<b>3. Expected Actuarial Value of Assets (AVA)</b>			
a. AVA at June 30, 2020	\$ 15,346,377	\$ 859,442	\$ 16,205,819
b. Interest on 3.a. to June 30, 2021	1,074,246	60,161	1,134,407
c. Total Contributions Paid in Fiscal Year 2021 <sup>2</sup>	1,549,543	0	1,549,543
d. Interest on 3.c. to June 30, 2021	53,317	0	53,317
e. Fiscal Year 2021 Benefit Payments	(1,475,835)	(64,076)	(1,539,911)
f. Interest on 3.e. to June 30, 2021	(50,781)	(2,205)	(52,986)
g. Change in VSF Assets in Excess of Liabilities at June 30, 2021	<u>0</u>	<u>14,587</u>	<u>14,587</u>
h. Expected AVA at June 30, 2021	\$ 16,496,867	\$ 867,909	\$ 17,364,776
<b>4. Actual AVA at June 30, 2021</b>	<b>\$ 16,943,734</b>	<b>\$ 876,814</b>	<b>\$ 17,820,548</b>
<b>5. Liability (Gain) / Loss (2. - 1.f.)</b>	<b>\$ 67,334</b>	<b>\$ (5,728)</b>	<b>\$ 61,606</b>
<b>6. Actuarial Asset (Gain) / Loss (3.h. - 4.)</b>	<b>\$ (446,867)</b>	<b>\$ (8,905)</b>	<b>\$ (455,772)</b>
<b>7. Total Actuarial (Gain) / Loss (5. + 6.)</b>	<b>\$ (379,533)</b>	<b>\$ (14,633)</b>	<b>\$ (394,166)</b>

<sup>1</sup> Actual accrued liability used to determine (gain)/loss excludes any new plan changes reflected in the valuation.

<sup>2</sup> Contributions include SKIM amounts, if any, transferred from QPP to VSF.



## **SECTION V – SCHEDULE OF FUNDING PROGRESS**

A schedule of funding progress is provided below. This schedule of funding progress was previously required by GASB25, which has been superseded by GASB67, and is provided for historical context. These liability and asset measures are used to develop the Actuarial Contribution and are not suitable for other purposes including, but not limited to, settlement of plan obligations. For more information, see SECTION II – MARKET AND ACTUARIAL VALUES OF ASSETS.

**Table V-1**  
**Schedule of Funding Progress**

<b>NEW YORK CITY FIRE PENSION FUND</b> (\$ Thousands)						
<b>June 30 Valuation Date</b>	<b>(1) Actuarial Value of Assets (AVA)</b>	<b>(2) Accrued Liability (AL)</b>	<b>(3) Unfunded AL (UAL) (2) - (1)</b>	<b>(4) Funded Ratio (1) / (2)</b>	<b>(5) Covered Payroll<sup>1</sup></b>	<b>(6) UAL as a % of Covered Payroll (3) / (5)</b>
2012	8,520,769	16,358,108	7,837,339	52.1%	1,106,113	708.5%
2013	9,144,587	17,003,722	7,859,135	53.8%	1,129,706	695.7%
2014	9,808,854	18,028,695	8,219,841	54.4%	1,150,390	714.5%
2015	10,504,728	18,688,642	8,183,914	56.2%	1,164,994	702.5%
2016	11,082,451	20,125,429	9,042,978	55.1%	1,180,226	766.2%
2017	11,814,576	20,942,655	9,128,079	56.4%	1,256,001	726.8%
2018	12,876,671	21,787,888	8,911,217	59.1%	1,305,960	682.3%
2019	14,337,618	22,824,419	8,486,801	62.8%	1,336,843	634.8%
2020	15,346,377	23,491,617	8,145,240	65.3%	1,348,006	604.2%
2021	16,943,734	24,394,755	7,451,021	69.5%	1,401,378	531.7%

<sup>1</sup> Salaries shown are base salaries plus assumed overtime paid and reflect the impact of recent labor contract settlements and certain non-union salary increases with retroactive effective dates, if any.

## **SECTION VI – VARIABLE SUPPLEMENTS FUNDS (VSF)**

The New York City Fire Pension Fund administers both the Firefighters' Variable Supplements Fund (FFVSF) and the Fire Officers' Variable Supplements Fund (FOVSF). The FFVSF and FOVSF (the Funds) operate pursuant to the provisions of Title 13, Chapter 3 of the Administrative Code of the City of New York (ACCNYS) and provide supplemental benefits to retirees who were Firefighters and Fire Officers, respectively, of the New York City Fire Department, Subchapter One Pension Fund or New York City Fire Department, Subchapter Two Pension Fund and who retired for service with 20 or more years of service on or after October 1, 1968.

**Table VI-1**  
**VSF Accrued Liability**

(\$ Thousands)		
Valuation Date	June 30, 2021	June 30, 2020
FFVSF		
Active	\$ 147,955	\$ 143,169
Retiree	<u>321,403</u>	<u>330,941</u>
Total	\$ 469,358	\$ 474,110
FOVSF		
Active	\$ 142,991	\$ 139,332
Retiree	<u>150,048</u>	<u>152,948</u>
Total	\$ 293,039	\$ 292,280
Total VSF AL	\$ 762,397	\$ 766,390

**Table VI-2  
VSF Member Data**

VARIABLE SUPPLEMENTS FUNDS				
MEMBERS INCLUDED IN THE JUNE 30, 2021 AND JUNE 30, 2020 ACTUARIAL VALUATIONS				
	June 30, 2021		June 30, 2020	
	FFVSF	FOVSF	FFVSF	FOVSF
Actives				
Number	8,203	2,590	8,389	2,690
Average Age	38.9	48.4	38.4	47.8
Retirees				
Number	3,130	1,467	3,215	1,490
Average Age	73.2	73.5	73.1	73.3

**Table VI-3**  
**VSF Statement of Assets**

(\$ Thousands)				
Valuation Date	June 30, 2021 <sup>1</sup>		June 30, 2020 <sup>2</sup>	
	MVA <sup>3</sup>	AVA	MVA <sup>4</sup>	AVA
FFVSF	\$ 568,740	\$ 507,821	\$ 493,727	\$ 504,358
FOVSF	414,297	368,993	348,788	355,084
Total	\$ 983,037	\$ 876,814	\$ 842,515	\$ 859,442

<sup>1</sup> Includes preliminary SKIM amounts as determined by the Actuary in a letter dated September 9, 2021 to the Comptroller's Office.

<sup>2</sup> Includes preliminary SKIM amounts as determined by the Actuary in a letter dated August 28, 2020 to the Comptroller's Office.

<sup>3</sup> Includes Accrued Benefits Payable for 6/30/2021 of \$18,924,000 for FFVSF and \$8,665,000 for FOVSF.

<sup>4</sup> Includes Accrued Benefits Payable for 6/30/2020 of \$19,451,000 for FFVSF and \$8,932,000 for FOVSF.

**Table VI-4**  
**Development of VSF Actuarial Value of Assets**

(\$ Thousands)				
	June 30, 2021		June 30, 2020	
	FFVSF	FOVSF	FFVSF	FOVSF
1. Market Value of Assets (MVA)				
a. Beginning of Year (BOY) <sup>1</sup>	\$ 493,727	\$ 348,788	\$ 519,268	\$ 351,386
b. End of Year (EOY) <sup>2</sup>	\$ 568,740	\$ 414,297	\$ 493,727	\$ 348,788
2. Contributions				
a. Employee	\$ 0	\$ 0	\$ 0	\$ 0
b. Employer	0	0	0	0
c. Total Contributions	\$ 0	\$ 0	\$ 0	\$ 0
3. Net Investment Income				
a. Investment Income	\$ 119,414	\$ 86,422	\$ 21,737	\$ 15,993
b. Investment Expenses	(257)	(187)	(220)	(154)
c. Total Net Investment Income	\$ 119,157	\$ 86,235	\$ 21,517	\$ 15,839
4. Benefit Payments and Other Cash Flow	\$ (44,144)	\$ (20,726)	\$ (44,850)	\$ (25,802)
5. Preliminary Transferable Earnings from FIRE to VSFs - EOY <sup>3</sup>	\$ 0	\$ 0	\$ (2,208)	\$ 7,365
6. Net Cash Flow (2.c. + 4. + 5.)	\$ (44,144)	\$ (20,726)	\$ (47,058)	\$ (18,437)
7. Expected Investment Return (EIR)	\$ 33,042	\$ 23,702	\$ 34,806	\$ 23,709
8. Unexpected Investment Return (UIR) (3.c. - 7.)	\$ 86,115	\$ 62,533	\$ (13,289)	\$ (7,870)
9. AVA @ EOY				
a. AVA @ BOY	\$ 504,358	\$ 355,084	\$ 519,268	\$ 351,386
b. Net Cash Flow (6.)	\$ (44,144)	\$ (20,726)	\$ (47,058)	\$ (18,437)
c. Expected Investment Return (7.)	\$ 33,042	\$ 23,702	\$ 34,806	\$ 23,709
d. Phase in of UIR				
20% of UIR for prior year	\$ 17,223	\$ 12,507	\$ (2,658)	\$ (1,574)
20% of UIR for second prior year	\$ (2,658)	\$ (1,574)	N/A	N/A
20% of UIR for third prior year	N/A	N/A	N/A	N/A
20% of UIR for fourth prior year	N/A	N/A	N/A	N/A
20% of UIR for fifth prior year	N/A	N/A	N/A	N/A
Total	\$ 14,565	\$ 10,933	\$ (2,658)	\$ (1,574)
e. AVA (9.a. + 9.b. + 9.c. + 9.d.)	<b>\$ 507,821</b>	<b>\$ 368,993</b>	<b>\$ 504,358</b>	<b>\$ 355,084</b>

<sup>1</sup> Includes Accrued Benefits Payable for 6/30/2020 of \$19,451,000 for FFVSF and \$8,932,000 for FOVSF and Accrued Benefits Payable for 6/30/2019 of \$19,953,000 for FFVSF and \$9,008,000 for FOVSF

<sup>2</sup> Includes Accrued Benefits Payable for 6/30/2021 of \$18,924,000 for FFVSF and \$8,665,000 for FOVSF and Accrued Benefits Payable for 6/30/2020 of \$19,451,000 for FFVSF and \$8,932,000 for FOVSF.

<sup>3</sup> Reflects preliminary SKIM amounts as determined by the Actuary in a letter dated September 9, 2021 for 6/30/2021 and a letter dated August 28, 2020 for 6/30/2020 to the Comptroller's Office.

**Table VI-5**  
**Preliminary Transferable Earnings Calculation as of June 30, 2021**

For details, see Summary of VSF Actuarial Assumptions and Methods.

(\$ Thousands)	Preliminary	
Total FIRE Pension Fund		
1. FY2021 Equity Earnings	\$	3,491,768
2. FY2021 Hypothetical Earnings		123,803
3. FY2021 Excess Earnings (1. - 2.)		3,367,964
4. Deficit at June 30, 2020		0
5. Hypothetical Interest Rate (HIR)		1.272%
6. Deficit with interest (4. x (1+HIR))		0
7. Potential Transferable Earnings (3. - 6.), not less than zero	\$	3,367,964
	<b>FFVSF</b>	<b>FOVSF</b>
Allocations to VSF		
8. Allocation Percentage	64.585%	35.415%
9. Potential Transferable Earnings (7. x 8.)	\$ 2,175,200	\$ 1,192,765
10. APV of Accumulated Plan Benefits	418,807	255,710
11. MVA Prior to Transferable Earnings	568,740	414,297
12. Unfunded APV of Accumulated Plan Benefits (10. - 11.), not less than zero	0	0
<b>13. Transferable Earnings Payable (Lesser of 9. and 12., not less than zero)</b>	0	0
14. Rounded Estimate, for FY21 Financial Statements <sup>1</sup>	\$ 0	\$ 0

<sup>1</sup> Included in MVA at June 30, 2021



## Summary of VSF Plan Provisions

### A. Eligibility

Service Retirement with at least 20 years of allowable service on or after October 1, 1968. This benefit is not payable to disability retirees, vested retirees, or beneficiaries of members who die while eligible for service retirement.

### B. Benefits

The benefit is currently \$12,000 per year, prorated in the first year and in the year of death based on the number of full months of retirement. The month of retirement and the month of death are not included in these two prorations.

### C. Cost-of-Living Benefits

Any AutoCOLA payable to a retiree reduces VSF benefits by an amount equal to such AutoCOLA until the attainment of age 62.

### D. Form of Payment

Firefighters: Life annuity payable annually on or about December 15 for the current calendar year.

Fire Officers: Life annuity payable annually on or about January 31 for the prior calendar year.

### E. VSF DROP

Firefighters who retire on and after January 1, 2002 with 20 or more years of service are entitled to an additional one-time special lump sum payment (VSF DROP) payable on or about December 15 succeeding the date of retirement equal to the cumulative Fund benefits that would have been paid after January 1, 2002 had the member retired at the completion of the 20th year of service.

Fire Officers who retire on and after January 1, 2002 with 20 or more years of service are entitled to an additional one-time special lump sum payment (VSF DROP) payable on or about January 31 of the calendar year succeeding the date of retirement equal to the cumulative Fund benefits that would have been paid after January 1, 2002 had the member retired at the completion of the 20th year of service.

## Summary of VSF Actuarial Assumptions and Methods

Assumptions not detailed below are as described in SECTION XI – ACTUARIAL ASSUMPTIONS AND METHODS.

1. **FFVSF vs. FOVSF Membership:** Amongst current active members, 70% of members who become eligible for VSF benefits are assumed to retire as Firefighters, while the remaining 30% are assumed to retire as Fire Officers.
2. **COLA:** 1.5% per year for AutoCOLA, used to estimate future COLA on the first \$18,000 of FIRE benefits which, in general, reduces benefits payable by **the Fund until age 62**.
3. **Asset Smoothing Method:** Information on the MVA of the VSF is provided by the Office of the Comptroller. The same Asset Smoothing Method is used to determine the AVA of the FFVSF and the FOVSF as is used to determine the AVA of the Plan, except there is no corridor of 80% to 120% of the MVA for the VSFs. For more information, see SECTION II – MARKET AND ACTUARIAL VALUES OF ASSETS.
4. **Liability Method:** The obligations of FIRE to the FFVSF and the FOVSF are recognized through a methodology where the present value (PV) of future VSF transfers from FIRE to the FFVSF and FOVSF is included directly as an actuarial liability of FIRE. This amount is computed as the excess, if any, of the PV of benefits of the FFVSF and FOVSF over the AVA of the FFVSF and FOVSF, respectively. Under Entry Age Normal (EAN) cost method, a portion of the PV of future VSF transfers is reflected in the PV of Future Normal Costs (PVFNC) and a portion is reflected in the UAL.
5. **Transferable Earnings Calculation:** The ACCNY provides that FIRE transfer to the Funds a portion of the amount by which earnings on equity investments of FIRE exceed what the earnings would have been had such funds been invested at the Hypothetical Interest Rate, less any negative Cumulative Earnings Differentials and other limitations, determined as follows:
  - a. *Hypothetical Interest Rate:* 115% of the 12-month average of monthly 10-year U.S. Treasury Note yields
  - b. *Hypothetical Fixed Income Securities Earnings:* Investment earnings had equities been invested in fixed income securities earning the Hypothetical Interest Rate
  - c. *Earnings Differential:* Difference between actual equity investment earnings and Hypothetical Fixed Income Securities Earnings

- d. *Cumulative Earnings Differential*: The current year's Earnings Differential, offset by any negative Earnings Differentials from prior years, accumulated with interest at the corresponding year's Hypothetical Interest Rate
- e. *Proportionate Transferable Earnings*: The portion of the Cumulative Earnings Differential allocable to the VSFs based on the ratio of total contributions between Firefighters and Fire Officers, limited to not allow assets to exceed the actuarial PV of accumulated plan benefits of the VSFs

## **SECTION VII – RISK AND UNCERTAINTY**

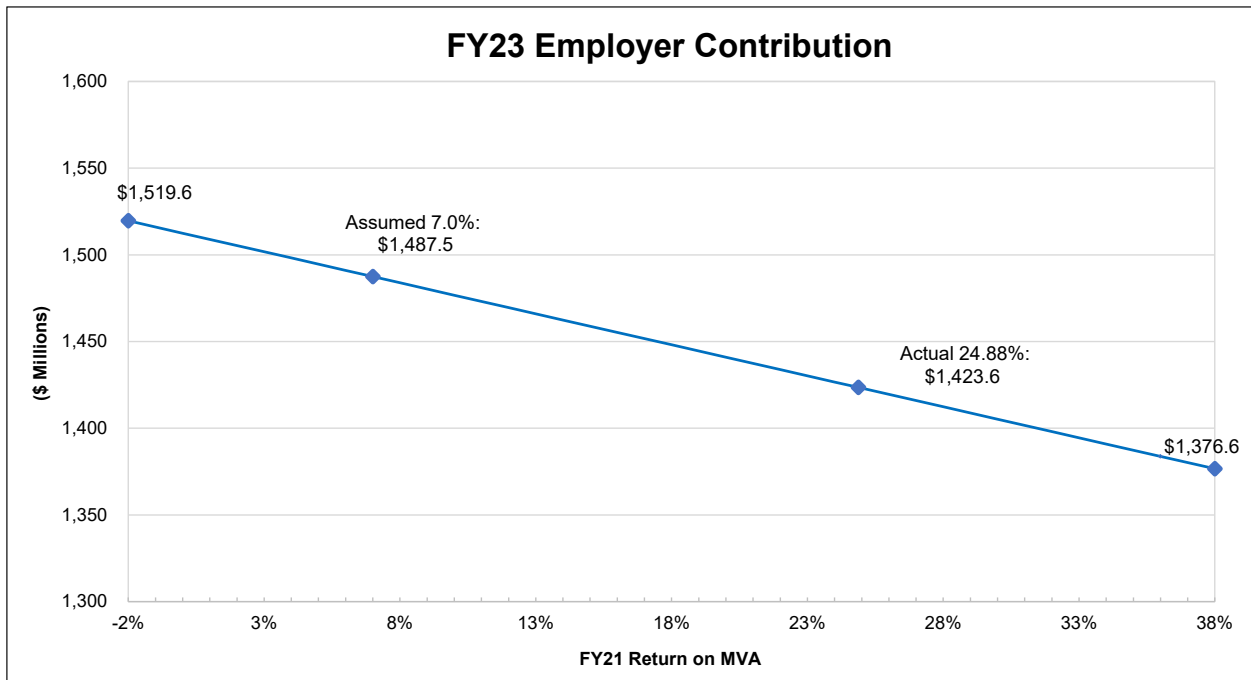
The funded status of FIRE depends highly on the realization of the actuarial assumptions used, certain demographic characteristics of the Plan, and other factors. Risks faced by the Plan are described in this Section and have been separated into high, medium, and other risk categories.

## High Risk Types

### Investment Risk: The Risk of Not Realizing Expected Returns

The most substantial risk for most pension systems, FIRE included, is the risk of investment returns being less than assumed. For FIRE this assumed investment return is 7%.

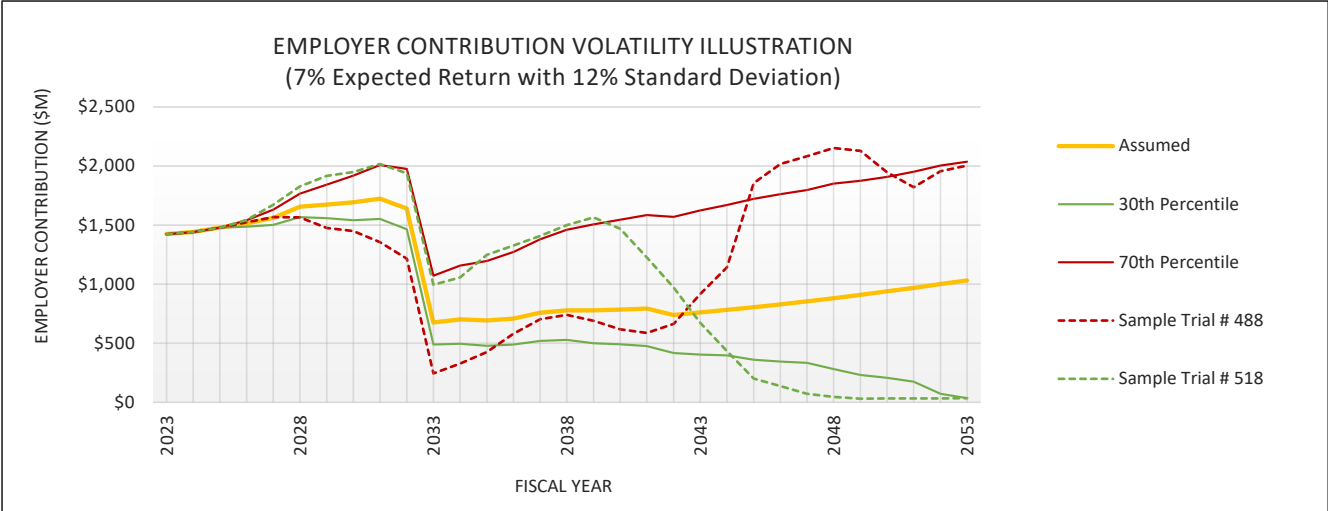
The graph below illustrates the potential FY23 employer contributions for a range of investment return outcomes if returns had differed from the assumed rate of return (i.e., from -2% to 38%). In addition, the actual investment return and employer contribution are shown.



### Investment Risk: The Risk of Volatile Realized Returns

Even when long-term investment returns meet actuarial assumptions, investment volatility can contribute substantially to contribution and funded status volatility. The following charts illustrate the impact of investment return volatility on employer contributions and funded ratios based on 5,000 30-year investment return trials. Each stochastic investment return within each 30-year trial was generated from a normal distribution with an expected return of 7% and a standard deviation of 12%. Note that individual asset classes within the portfolio were NOT separately modeled and no attempt was made to rebalance the asset classes during the 30-year trials. The actual investment return for the next valuation year was known prior to the publication of this report and was also incorporated into this projection.

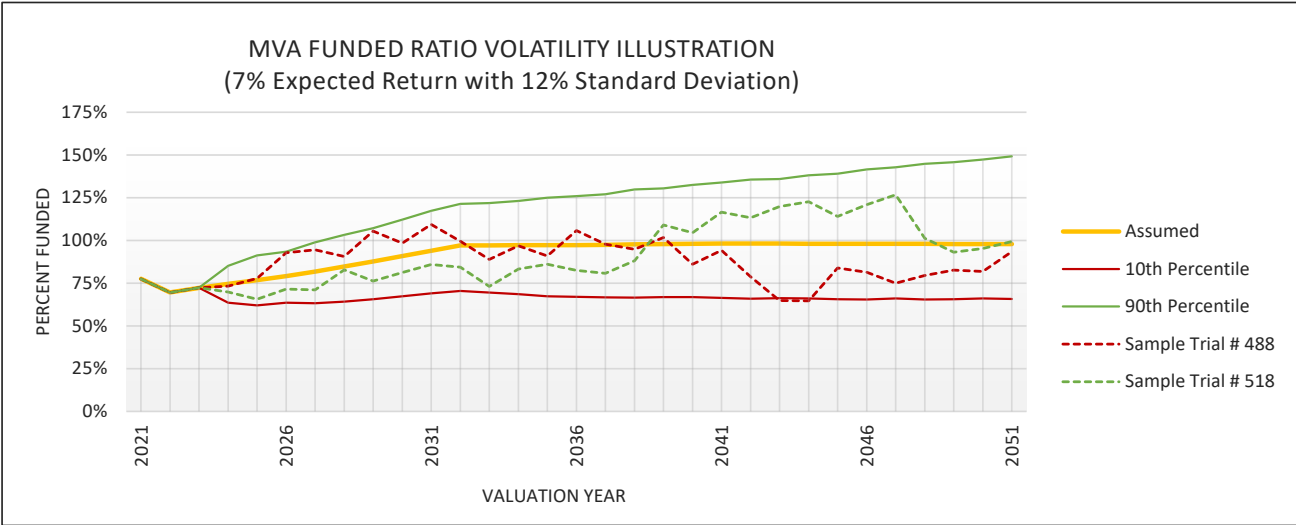
The yellow line in the charts show the results if investment returns were exactly 7% as expected. The two solid lines show results for the indicated percentile range and together frame a range of results based on all 5,000 trials. The two dashed lines illustrate sample results from among the 5,000 trials.



Please note how in the two sample trials above (the dotted lines), the actual employer contribution fluctuates above and below the assumed contribution rate due to investment return volatility.

The impact on the funded status for these two trials can also be seen below, where for example, the green dotted line exceeds 100% funding at the end of the 30-year period (below) with a corresponding employer contribution approaching \$0 (above). The converse is shown in the red dotted line where at the end of the 30-year period, the employer contribution rate approaches \$2B (above) with a corresponding funded ratio below 100% (below).

On average, the 5,000 trials result in the yellow assumed line with a funded status of 100% achieved around the fiscal year ending in 2032.

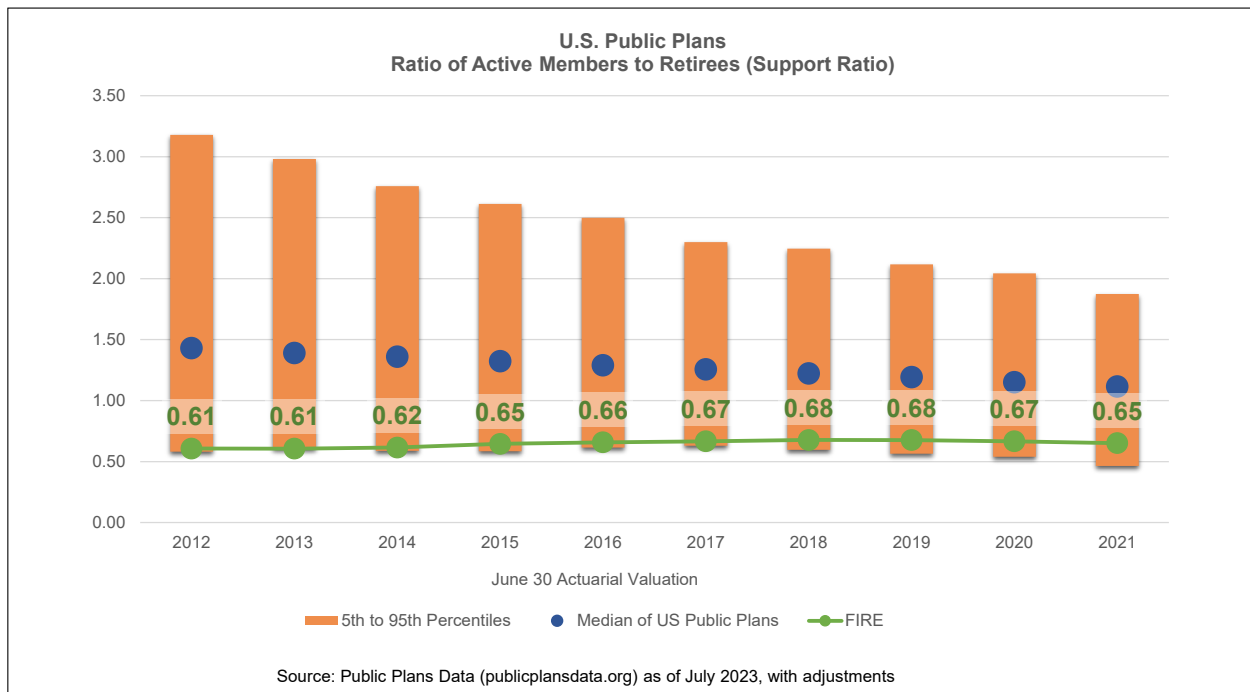


## Maturity Risk: The Risk of Demographic Imbalance

In this subsection, the maturity of the Plan is examined with several metrics.

### Ratio of Active Members to Retirees (Support Ratio)

A plan's Support Ratio (i.e., the ratio of active members to retirees) is an indicator of the Plan's maturity level. In a plan's early years, the ratio is very high as the plan contains mostly active members. As it matures, more active members transition to retirement, leading to a decrease in the Support Ratio over time that can result in a ratio near or below one. For FIRE, this ratio has been below one, meaning fewer active workers exist to support pensioner payments.

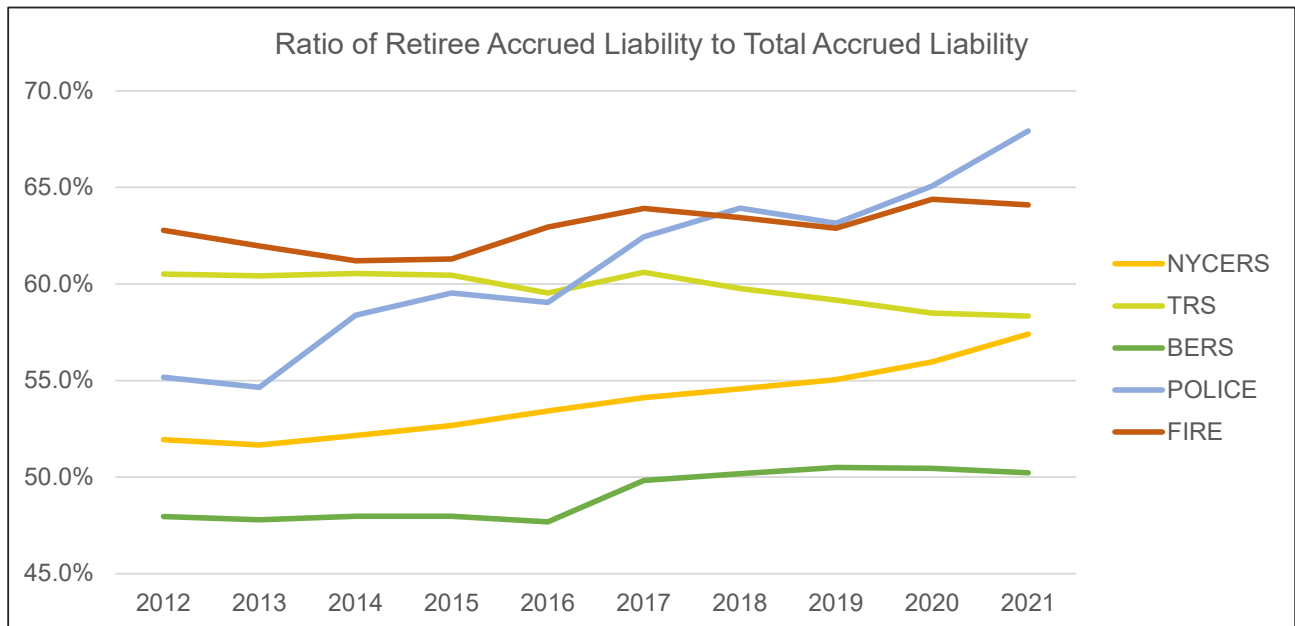


The chart above shows U.S. public pension plan Support Ratios in comparison to the Plan's. The median Support Ratio amongst U.S. public pensions has declined from 1.43 in the 2012 valuation year to 1.12 in the 2021 valuation year. Over that same period, the Plan's Support Ratio has increased from 0.61 to 0.65, meaning there are still fewer active workers to support guaranteed pensioner payments.

Because the Plan's Support Ratio is below the median, FIRE's contributions for active members form a smaller proportion of the total actuarial contribution than other pension funds in the U.S. with average maturity.

## Ratio of Retiree Accrued Liability to Total Accrued Liability

We can also consider the ratio of the Plan's retiree liability to its total liability. A new pension plan begins with this ratio at zero; as the plan matures, the ratio increases. Mature plans often have ratios above 60%. This measure is shown in the graph below for FIRE; the other New York City Retirement Systems (NYCRS)<sup>1</sup> are included for comparison. The ratio for FIRE has been between 60-65% for the past few years, indicating that FIRE is a mature retirement system.



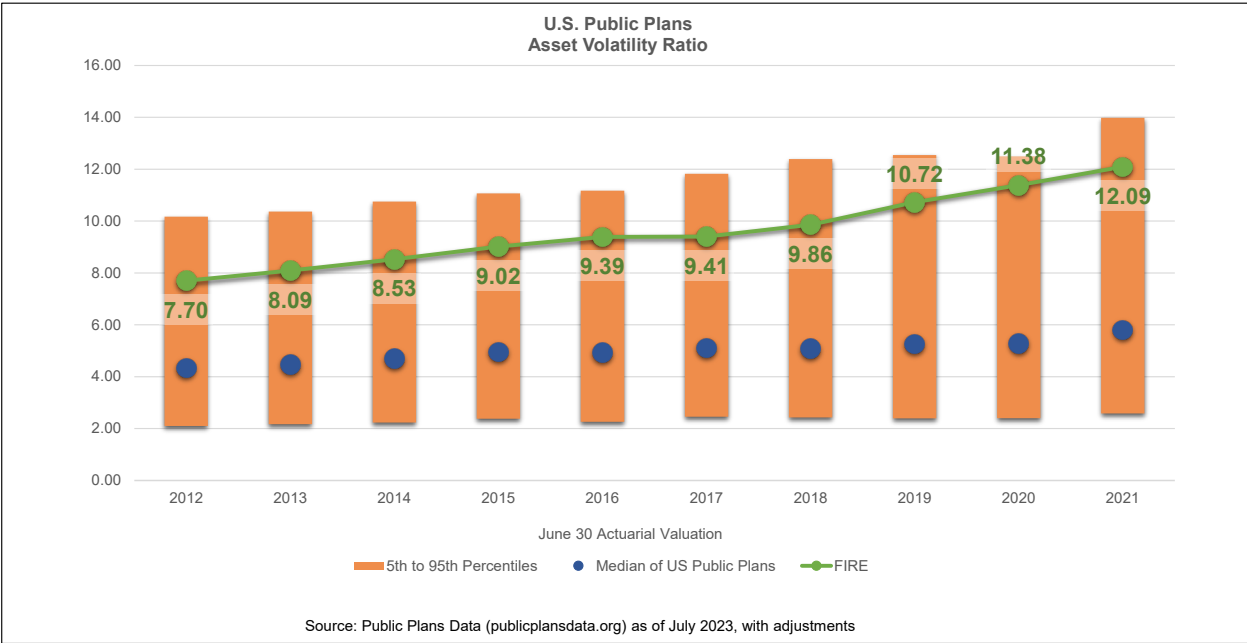
## Asset Volatility Ratio

Another way to look at plan maturity is the Asset Volatility Ratio (AVR), or ratio of assets to payroll. This ratio tends to rise as plans mature because assets generally need to accumulate to provide for benefit payments. The chart below compares the AVR (on an AVA basis) for FIRE to the population of public pension systems.

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<sup>1</sup> New York City Employees' Retirement System (NYCERS); Teachers' Retirement System (TRS); Board of Education Retirement System (BERS); Police Pension Fund (POLICE)





As a plan approaches maturity, AVRs tend to increase, and the plan’s actuarially determined contribution becomes more sensitive to investment losses. For example, the same percentage of investment losses in more mature plans with a larger asset base can increase contributions as a percentage of payroll more than in less mature plans, leading to additional volatility. Therefore, mature plans may wish to consider more conservative investment strategies. Typical AVRs for a mature retirement system are between five and six. As shown in the tables above, for FIRE, since ratios are greater than the average, FIRE is considered a mature plan under this measure.

## Medium Risk Types

**Interest Rate Risk: The Risk of Reduction in the Long-Term Rate of Return**

The Accrued Liability for the Plan depends heavily on the actuarial assumption used for future investment returns. While the returns themselves can produce substantial volatility, as detailed in the Investment Risk subsection above, the long-term rate of return assumption of 7.0% is highly dependent on the allocation of Plan assets.

If market conditions and/or the allocation of Plan assets no longer support a long-term rate of return assumption of 7.0%, the AIR may have to be reduced, which can significantly increase the Accrued Liability, Unfunded Accrued Liability, Normal Cost, and resulting contribution of the Plan. The sensitivity of the Accrued Liability, the Unfunded Accrued Liability, and Normal Cost of the Plan are shown below:

NEW YORK CITY FIRE PENSION FUND	
SENSITIVITY ANALYSIS AS OF JUNE 30, 2021	
Valuation Date	June 30, 2021
<b>Results at 7.0%</b>	
1. Accrued Liability (AL)	\$ 24,394,754,991
2. Actuarial Value of Assets (AVA)	<u>16,943,734,000</u>
3. Unfunded Accrued Liability (1. - 2.)	\$ 7,451,020,991
4. Normal Cost	\$ 610,269,938
<b>Results at 6.0%</b>	
1. Accrued Liability (AL)	\$ 27,178,105,830
2. Actuarial Value of Assets (AVA)	<u>16,943,734,000</u>
3. Unfunded Accrued Liability (1. - 2.)	\$ 10,234,371,830
4. Normal Cost	\$ 753,903,831
<b>Sensitivity Analysis for 1.0% Reduction in Interest Rate</b>	
1. Increase in Accrued Liability	11.4%
2. Increase in Unfunded Accrued Liability	37.4%
3. Increase in Normal Cost	23.5%

**Longevity Risk: The Risk of Higher than Assumed Mortality Improvement**

FIRE faces risk in its assumption of future mortality rates. Actuarial experience studies were used to develop the base mortality rates assumed in the valuation; Society of Actuaries mortality improvement scale MP-2020 was subsequently applied to these base rates.

This scale MP-2020 is an assumption regarding the *improvement* of future mortality rates as compared to mortality when the experience studies were completed. The scale was developed using large amounts of historical data from the Social Security Administration. Risk therefore exists such that the mortality improvement inherent in the Plan population is higher than the improvement seen in the population provided by the Social Security Administration. When mortality improvement is higher than assumed, plan participants will live longer than expected, and the plan will pay more pension benefits than had been previously funded.<sup>1</sup>

Furthermore, while the scale uses recent experience to develop short-term mortality improvement rates, an actuarial assumption is applied to long-term mortality improvement rates based on expert opinion. A rate of 1.0% is assumed, which the Society of Actuaries characterizes as “neither overly optimistic nor too pessimistic with respect to future longevity improvements.”<sup>2</sup> Risk to the Plan exists, however, if Plan mortality experience shows higher levels of long-term mortality improvement; expert opinion can in some cases be flawed, particularly when past experience is not indicative or predictive of future experience.

In a letter dated June 28, 2019, Buck analyzed historical Plan experience and noted “it appears that historical mortality improvement in NYC pensioners has kept pace with, and in some cases may have exceeded slightly, the mortality improvement trends in historical Social Security Administration graduated rates that are based on a broad US population” and that “continued use of MP-20xx mortality improvement scales seems reasonable.” It may be prudent in future years, after longer trends can be observed, to quantify the effect of changing the ultimate mortality improvement rate to be higher than 1.0%.

#### Litigation Risk: The Risk of Legal Claims and Lawsuits

It is not uncommon for New York City to be a defendant in legal claims and lawsuits.<sup>3</sup> In its most recent claims report, the Comptroller reports that in FY2022, NYC settled 12,188 claims and lawsuits for \$1.5 billion. On occasion, these settlements involve NYCERS. The 1996 case *Gulino v. Board of Education* awards damages to plaintiffs that in some cases include counterfactual service and salary in NYCERS. It remains a continuing risk that litigation may expand the scope of pension benefits beyond what is intended or codified in statute

#### Credit/Solvency Risk: The Risk of Potential Insolvency of Contributing Entities

All public pension systems face credit risk in the event their sponsoring entities become unable to pay their debts and obligations. Credit rating agencies currently consider New York City bonds to be of high quality, and the Actuary believes the City faces low credit risk as the main contributing entity to FIRE.

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<sup>1</sup> Retirement Plans Experience Committee. “Mortality Improvement Scale MP-2020 Report,” “Mortality Improvement Scale MP-2018 Report,” and “Mortality Improvement Scale MP-2014 Report.” *Society of Actuaries*.

<sup>2</sup> Retirement Plans Experience Committee. “Mortality Improvement Scale BB Report” 5.5 Selection of 1.0% Long-Term Rate of Mortality Improvement. *Society of Actuaries*.

<sup>3</sup> <https://comptroller.nyc.gov/reports/annual-claims-report>

## Other Risk Types

### Inflation Risk: The Risk of Higher than Assumed Inflation

FIRE faces risk if inflation is higher than expected. Inflation is a key driver of the salary increase assumptions (affecting active members) and COLA assumptions (affecting both active members and pensioners/beneficiaries). A quantitative analysis is not available at this time. Notably, however, the pensioner COLA is limited to half of CPI on the first \$18,000 of annual benefits, which limits the risk exposure to inflation.

### Contribution Risk: The Risk that Future Contributions Are Less Than the Actuarially Determined Contributions

Public pension systems can suffer from contribution risk when sponsoring governmental entities fail to make contributions as determined by the actuary under their funding policies.

The New York City Retirement Systems and Pension Funds face low contribution risk. Participating employers have historically contributed the actuarial contribution as certified by the Actuary. The Actuary believes the City will continue to do so in future years. See Table III-5 ACTUARIAL AND STATUTORY CONTRIBUTION HISTORY.

Contribution risk may also increase in future years if the actuarial contribution determined for the Plan grows to be a larger part of the City budget. The five New York City Retirement Systems and Pension Funds currently require contributions of approximately 10% of the City's annual budget, and contribution risk may increase if this contribution rate becomes untenable.

### Agency/Political Risk: The Risk of Stakeholder Influences

With assumed long-term asset returns and gradual amortization of unfunded liabilities, the funded status of the Plan is expected to improve over time. Many public pension systems suffer from agency risk, wherein different stakeholders or agents want to influence the cost calculations in directions favorable to their interests. Agents may also downplay other risks (e.g., investment risk) to advance specific agendas. These situations create cases where promises for future funding can be disregarded for political expediency or other priorities. In other cases, certain plan provisions or administrative practices intended to provide occasional clarity or relief become commonplace or intentionally sought for the benefit of members at the expense of taxpayers.

### Intergenerational Equity Risk: The Risk of Inequity in the Actuarially Determined Contributions

Intergenerational inequity could exist for certain stakeholders (e.g., public taxpayers). If, for example, liabilities are valued using overly conservative assumptions, aggressive funding patterns may occur, thus causing current taxpayers to shoulder a disproportionately high share of the funding burden, as compared to past and future taxpayers. The reverse can also be true if aggressive or unrealistic assumptions are used. As the Plan is ongoing, taxpayers across all generations should be expected to offer similar funding contributions over the lifetime of the Plan.

Additionally, in future years of higher or lower funded status, changes in the statute may take place that can improve or diminish plan provisions. If so, intergenerational equity risk could increase as taxpayers and plan members at that time may receive preferential or less preferential treatment over the taxpayers and plan members prior to and subsequent to them.

## SECTION VIII – SUMMARY OF PLAN PROVISIONS

### A. Effective Date

July 15, 1941.

### B. Tier Membership

**Tier 1:** Prior to July 1, 1973

**Tier 2:** July 1, 1973 to June 30, 2009

**Tier 3:** July 1, 2009 to March 31, 2012 and did not elect to join Tier 3 Enhanced

**Tier 3 Modified:** April 1, 2012 to June 14, 2016 and did not elect to join Tier 3 Enhanced

**Tier 3 Enhanced:** On or after June 15, 2016 and those in Tier 3 and Tier 3 Modified who elected to join.

Eligible service includes City service in positions in the competitive class of the civil service for probationary periods or permanent appointments in the Fire Department.

### C. Member Contributions

**Tier 1 and Tier 2:** Required Member Contributions – Based upon age at entry and elected retirement age, credited with regular and special interest. Contributions are required for the first 20 years.

Voluntary Member Contributions – Additional contributions to the Annuity Savings Fund credited with regular and special interest.

**Tier 3, Tier 3 Modified, and Tier 3 Enhanced:** Basic Member Contributions (BMC) - Members contribute 3.0% of salary for a maximum of 25 years.

Additional Member Contributions (AMC) – Effective September 8, 2019, Tier 3 Enhanced Plan members are required to contribute an additional 2.1% (previously 2.0%) of salary for a maximum of 25 years. Chapter 298/16 states that the AMC rate for Tier 3 Enhanced Plan members is required to be reviewed by the Actuary every 3 years.

### D. Increased-Take-Home-Pay (ITHP) Contributions

**Tier 1 and Tier 2:** The City of New York pays a portion of member contributions. Effective October 1, 2000, the rate of ITHP contributions is 5.0% of salary, accumulated with regular and additional interest. The member may elect to waive the ITHP reduction

from the full member rate and contribute at the full member rate, which results in additional benefits attributable to the ITHP contributions.

**Tier 3, Tier 3 Modified, and Tier 3 Enhanced:** The City of New York does not pay any portion of member contributions.

## E. Credited Service

Credited Service is classified as Allowable Fire Service or certain other Credited Service:

- Members are credited with one year of service for two hundred fifty or more days of service and not more than one year for all service in any calendar year.
- **Tier 1 and Tier 2:** Allowable Fire Service includes service in the Uniformed Force of the New York City Police Department, Uniformed Transit Police Force, Uniformed Housing Police Force, Uniformed Correction Force, Uniformed Sanitation Force, and as an Emergency Medical Technician, provided all such service immediately precedes the Uniformed Fire Force service.
- **Tier 3, Tier 3 Modified, and Tier 3 Enhanced:** Fire Service includes service in the Uniformed Force of the New York City Police Department and the New York State and Local Fire and Police Retirement System.
- Members may purchase, subject to limitations in the law, years of certain wartime military service, combined military service, and service as police officers in a foreign country for the United States Government, and authorized Child Care Leave.

## F. Salary Base

**Tier 1:** Final Salary (FS): The contract rate of base pay and holiday pay on the last day paid, plus any overtime, night differential, and worked vacation earned in the previous 12 months, plus applicable longevity pay.

For members appointed on or after June 17, 1971, the pensionable compensation for the final year of service is limited by the Kingston Law to 120% of the pensionable compensation for the year immediately preceding the final year.

**Tier 2:** Final Average Salary (FAS): Total pensionable compensation (i.e., wages, overtime, night differential, worked vacation, etc.) a member earned during the 12 months preceding the date of retirement, not in excess of 120% of the immediate previous 12 months' pensionable compensation.

For members hired prior to July 1, 2000 (original Tier 2 members), if greater, FAS will equal the greatest average three consecutive years' pensionable compensation, where each year's salary cannot exceed 120% of the average of the two previous years.

**Tier 3:** FAS: The average total pensionable compensation earned by a member during any three consecutive year period based on the month and day of retirement that provides the highest average wages. If the wages earned during any year included in the period exceed the average of the prior two years by more than 10%, the amount in excess of 10% shall be excluded. Additionally, if the member was on a leave of absence without pay (e.g., suspension) at any time during the three-year period, that time, not in excess of 12 months, will be excluded from the calculation and the same period of time immediately preceding the three-year period will be included for the final average salary.

**Tier 3 Modified and Tier 3 Enhanced:** FAS: The average total pensionable compensation earned by a member during any five consecutive years based on the month and day of retirement that provides the highest average wages. If the wages earned during any year included in the period exceed the average of the prior four years by more than 10%, the amount in excess of 10% shall be excluded. Additionally, if the member was on a leave of absence without pay (e.g., suspension) at any time during the five-year period, that time, not in excess of 12 months, will be excluded from the calculation and the same period of time immediately preceding the five-year period will be included for the final average salary.

## G. Service Retirement

### 1. Eligibility

The eligibility requirements for normal service retirement and early service retirement are summarized in the table below:

Tier	Minimum Service for Normal Retirement	Minimum Service for Early Retirement
1	20	NA
2	20	NA
3	22	20
3 Modified	22	20
3 Enhanced	22	20

### 2. Benefits

#### a. Tier 1 and Tier 2

- i. 50% of [FS (Tier 1) or FAS (Tier 2)] plus 1/60<sup>th</sup> of the sum of all salary after 20 or 25 years, as applicable, of Credited Service.
- ii. The benefit is adjusted by the annuitized value of the net excess or deficit of accumulated member contributions and ITHP over or under the required amounts.

#### b. Tier 3, Tier 3 Modified, and Tier 3 Enhanced



- i. 2.1% of FAS times number of years of Credited Service for first 20 years plus 4.0% of FAS times number of years of Credited Service in excess of 20 years (total benefit limited to 50% of FAS), less 50% of the Primary Social Security Retirement benefit at age 62.

## H. Disability Retirement

### 1. Accidental Disability (ADR)

- a. Eligibility for all Tiers: Immediate. Must be found by the Medical Board and the Board of Trustees to be physically or mentally unable to perform regular job duties as a result of an injury received in the performance of duty and such disability was not the result of willful negligence on the part of the member.

- b. Benefits

- i. Tier 1 and Tier 2

- 75% of [FS (Tier 1) or FAS (Tier 2)] plus 1/60<sup>th</sup> of the sum of all salary after 20 or 25 years in accordance with the Member's selection of the minimum period of Credited Service, plus annuitized value of actual member accumulated contributions and ITHP.

- ii. Tier 3 and Tier 3 Modified

- 50% of FAS less 50% of the Primary Social Security Disability Benefits.

- iii. Tier 3 Enhanced Plan

- 75% of FAS.

### 2. Ordinary Disability (ODR)

- a. Eligibility

- i. Tier 1 and Tier 2

- Immediate. Must be found by the Medical Board and the Board of Trustees to be physically or mentally unable to perform regular job duties as a result of an injury not received in the performance of duty.

- ii. Tier 3, Tier 3 Modified and Tier 3 Enhanced

Five years of Credited Service and eligibility for Social Security disability benefit.

b. Benefits

i. Tier 1 and Tier 2

(a) For members choosing 20 years as their minimum period of Membership service: 2.5% times [FS (Tier 1) or FAS (Tier 2)] times Credited Service.

(b) For members choosing 25 years as their minimum period of Membership service: 2.0% times [FS (Tier 1) or FAS (Tier 2)] times Credited Service.

Minimum Benefit:

Less than 10 years of service:  $\frac{1}{3}$  of [FS (Tier 1) or FAS (Tier 2)]

10 or more years of service:  $\frac{1}{2}$  of [FS (Tier 1) or FAS (Tier 2)],

plus (regardless of service) the annuitized value of the net excess or deficit of member accumulated contributions and ITHP over or under the required amounts.

ii. Tier 3, Tier 3 Modified, and Tier 3 Enhanced

The greater of:

(a) 33-1/3% of FAS

(b) 2.0% of FAS times number of years of Credited Service (not in excess of 22 years),

less 50% of the Primary Social Security Disability Benefit (non-Enhanced Plan only).

## I. Death Benefits:

### 1. Accidental Death Benefits (New York City-paid)

a. Eligibility for all Tiers: No age or service requirement. Death due to the performance of duties while an active member.

b. Benefits

i. Tier 1 and Tier 2

50% of the average of the final salary as defined as the last 12 months of earnings, payable annually to surviving spouse or other eligible dependents for life.

In addition, a lump sum of accumulated member contributions and ITHP.

ii. Tier 3, Tier 3 Modified, and Tier 3 Enhanced

50% of FAS, payable annually to surviving spouse or other eligible dependents for life.

### 2. Special Accidental Death Benefits (New York State-paid)

a. Eligibility: No age or service requirement. Death due to the performance of duties while an active member. Payable only to the surviving spouse, eligible parent, or children until age 18 (or age 23, if a full-time student), if there is no surviving spouse.

b. Benefits: A monthly pension is payable to the beneficiary in an amount that when added to the New York City-paid Accidental Death Benefit (outlined in 1.) and any payable Social Security benefit is equal to the decedent's last year's wages including overtime and any other type of pensionable earnings.

### 3. Ordinary Death Benefit

a. Eligibility

i. Tier 1: Immediate

ii. Tier 2, Tier 3, Tier 3 Modified, and Tier 3 Enhanced: 90 days of service

b. Benefits

i. Tier 1

Less than 10 years of Credited Service: 50% of FS plus accumulated member contributions and ITHP with interest.

At least 10 years of Credited Service: 100% of FS plus accumulated member contributions and ITHP with interest.

However, if a member would have been eligible for a service retirement benefit at the date of death, the beneficiary may elect to receive the pension reserve had the member retired on the day before his or her death plus the accumulated member contributions. The beneficiary can also elect to receive the death benefit in the form of an annuity.

ii. Tier 2

Three times final year's salary raised to the next highest multiple of \$1,000 plus accumulated member contributions.

However, if a member would have been eligible for a service retirement benefit at the date of death, the beneficiary may elect to receive the pension reserve had the member retired on the day before his or her death plus the accumulated member contributions. The beneficiary can also elect to receive any death benefit and ITHP, if applicable, in the form of an annuity. The accumulated member contributions would still be paid as a lump sum.

iii. Tier 3, Tier 3 Modified, and Tier 3 Enhanced

Three times final year's salary raised to the next highest multiple of \$1,000 plus accumulated member contributions.

- c. Form of Payment: Lump sum. The first \$50,000 of benefit on account of death in active service will be paid from the Group Life Insurance Plan.

**J. Vested Retirement After Termination**

1. Eligibility: Five years of Credited Service for all Tiers
2. Benefits: A vestee may elect a refund of accumulated member contributions, but would then lose entitlement to a vested benefit. The Benefit at Service Retirement Date:

a. Tier 1 and Tier 2

2.5% for members choosing 20 years as their minimum period of Membership service, or 2.0% for members choosing 25 years as their minimum period of Membership service, times [FS (Tier 1) or FAS (Tier 2)]

times number of years of Credited Service plus annuitized value of the net excess or deficit of accumulated member contributions and ITHP over or under the required amounts with interest to normal retirement date.

b. Tier 3

2.1% of FAS times number of years of Credited Service payable at the Early Retirement Age (i.e., the earlier of the date when 20 years of Credited Service would have been completed or age 62) or at age 55. If the benefit commences before the Early Retirement Age, there are reductions.

In addition, the benefit is reduced by 50% of the Primary Social Security Retirement benefit at age 62.

c. Tier 3 Modified and Tier 3 Enhanced

2.1% of FAS times number of years of Credited Service payable at the Early Retirement Age (i.e., the date when 20 years of Credited Service would have been completed) or at age 55. If the benefit commences before the Early Retirement Age, there are reductions.

In addition, the benefit is reduced by 50% of the Primary Social Security Retirement benefit at age 62 (non-Enhanced Plan only).

**K.** Forms of Payment

1. Normal Form of Payment: Single Life Annuity.
2. Optional Forms of Payment: Joint and Survivor Annuities, Certain and Life Annuities.

**L.** Loans

Applicable to Tier 1 and Tier 2 only.

1. Eligibility: After three years of membership and up to the day of retirement.
2. Amount: Up to 90% of accumulated member contributions with a limit of \$50,000 for tax-free treatment under Internal Revenue Code (IRC) Section 72(p).

**M.** Cost-of-Living Adjustments (COLA)

Annuity payments are increased annually on September 1<sup>st</sup>, but only after a pensioner has attained the applicable eligibility threshold. Some beneficiaries are not eligible for COLA increases. The COLA increase is equal to a base benefit times a COLA percentage. The COLA increase for a spouse receiving a joint & survivor annuity is one

half of the COLA increase that would have been applicable to the member had he or she survived.

1. Eligibility Thresholds:
  - a. Service Retirement and Vested Retirement: The earlier of (i) and (ii):
    - i. Attainment of age 62 and 5 years since commencement
    - ii. Attainment of age 55 and 10 years since commencement
  - b. Disability Retirement: 5 years since commencement
  - c. Beneficiaries of an Accidental Death benefit: 5 years since commencement
2. Eligible beneficiaries: Spouses receiving a joint & survivor annuity or beneficiaries of an Accidental Death benefit. All others are non-eligible.
3. Base Benefit: The lesser of \$18,000 and the maximum retirement allowance plus the sum of prior years' COLA increases.
4. COLA percentage: 50% of the Consumer Price Index (CPI-U) based upon the 12 months ending March 31 prior to each September 1 effective date, rounded to the next higher 0.1%. Such percentage shall not be less than 1.0% nor greater than 3.0%.

## **N. Escalation**

1. Eligibility:
  - a. Tier 3 and Tier 3 Modified members receiving service, vesting, disability retirement, and survivor benefits.
  - b. Tier 3 Enhanced Plan members receiving vested or service retirement benefits.
  - c. All members above receive COLA, if greater.
2. Full Escalation Date
  - a. Vested and Service Pensions: The first day of the month following the day which a member completes or would have completed 25 years of service.
  - b. Disability Pensions: The first day of the month following the day which a non-Enhanced Plan disability retiree first becomes eligible for ODR/ADR.
  - c. Death Benefits: The first day of the month following the day which a beneficiary first becomes eligible for a death benefit paid other than in a

lump sum.

### 3. Amount

If a member first begins receiving benefits on the same date as the Full Escalation Date, the member will receive Full Escalation which is the lesser of 3.0% or the Cost-of-Living Index increase, as computed on the December 31 of each prior year for benefits being escalated the following April.

In the event of a decrease in the Cost-of-Living Index, the current benefit will be decreased by the lesser of 3% or the Cost-of-Living Index. However, the benefit will not be reduced below the benefit payable at the initial commencement date.

In addition, Cost-of-Living Index changes are computed on a cumulative basis so that any increases or decreases not affected in an adjustment are carried forward and applied in subsequent years.

### 4. Partial Escalation

Partial Escalation is calculated on benefits that commence prior to the member's Full Escalation Date. For each month that the benefit commencement date succeeds the date when a member completes or would have completed 22 years of service, a member will receive 1/36th of the Full Escalation, to a maximum of Full Escalation at 25 years of service.

## **O.** WTC Disability Benefits

Certain active, vested, and retired members of the Plan, who participated in the rescue, recovery, or clean-up operations at the WTC site, and who become disabled due to certain diseases (e.g., diseases in the respiratory tract, gastroesophageal tract, psychological axis, and skin), are presumed to have become disabled in the performance of duty and therefore may be entitled to be reclassified with an Accidental Disability Retirement.

## **P.** WTC Death Benefits

Certain active, vested, and retired members of the Plan, who participated in the rescue, recovery, or clean-up operations at the WTC site, and who die due to certain diseases (e.g., diseases in the respiratory tract, gastroesophageal tract, psychological axis, and skin) are presumed to have died in the performance of duty potentially entitling eligible beneficiaries to receive Accidental Death Benefits.

## **Q.** Others

None.

## SECTION IX – CHAPTER AMENDMENTS

The June 30, 2021 actuarial valuation results reflect the following Chapter amendments from the prior five years.

- **Chapter 782 of the Laws of 2022** (Chapter 782/22) extends eligibility of Special Accidental Death Benefits to parents of certain deceased members who died in the line-of-duty.
- **Chapter 704 of the Laws of 2021** (Chapter 704/21) establishes a presumption with respect to Parkinson’s Disease that results in death or disability for paid firefighters in New York State.
- **Chapter 540 of the Laws of 2021** (Chapter 540/21) amends Section 443 of the Retirement and Social Security Law to change the salary base for FIRE Tier 2 members who are hired on or after July 1, 2000 to a salary base used for such members who joined prior to July 1, 2000.
- **Chapter 424 of the Laws of 2021** (Chapter 424/21) expands eligibility of certain public service employees for participation in the World Trade Center Rescue, Recovery, or Clean-up Operations.
- **Chapter 327 of the Laws of 2021** (Chapter 327/21) grants a 3% COLA increase to beneficiaries receiving Special Accidental Death Benefits pursuant to Section 208(f) of the General Municipal Law (GML). (Similar legislation was enacted in each of the previous years.)
- **Chapter 89 of the Laws of 2020** (Chapter 89/20) provides death benefits to statutory beneficiaries of members whose death was a result of or was attributed to COVID-19. **Chapter 78 of the Laws of 2021** (Chapter 78/21) amends Chapter 89/20 by extending the eligibility window of these death benefits through December 31, 2022.
- **Chapter 250 of the Laws of 2019** (Chapter 250/19) relates to presumptive evidence of disability caused by cancer of firefighters who have been retired for five years or less.
- **Chapter 266 of the Laws of 2018** (Chapter 266/18) extends the deadline to file a Notice of Participation in the World Trade Center Rescue, Recovery, and Cleanup Operations to September 11, 2022.



## SECTION X – SUBSEQUENT EVENTS

The following legislation was adopted after the June 30, 2021 valuation date and could have an impact on future years' valuations:

- **Chapter 783 of the Laws of 2022** (Chapter 783/22) amends Chapter 78/21 and Chapter 89/20 by extending the eligibility window of these death benefits through December 31, 2024.
- **Chapter 528 of the Laws of 2022** (Chapter 528/22) and **Chapter 213 of the Laws of 2023** (Chapter 213/23) extend the 3% COLA increase to beneficiaries receiving Special Accidental Death Benefits. Note that the June 30, 2021 valuation assumes that future legislation on this 3% COLA increase will continue to pass in subsequent years. For more information on this COLA assumption, see page 65.

## SECTION XI – ACTUARIAL ASSUMPTIONS AND METHODS

The results in this valuation report are based upon standard actuarial models (including but not limited to Entry Age Normal and related parameters) that are widely used in actuarial practice. The models are intended to calculate the liabilities associated with these plan provisions using data and assumptions as of the measurement date, and using actuarial assumptions and methods further described below. Most of this liability and cashflow modeling is currently implemented using ProVal, an actuarial valuation and projection software program developed by Winklevoss Technologies. These results are reviewed for accuracy, reasonability, and consistency with prior results, consistent with the requirements of Actuarial Standard of Practice 56. The model is also reviewed extensively when significant changes are made to the software and additionally typically biennially by outside actuarial auditors hired by the New York City Comptroller.

Pension payments that exceed the Internal Revenue Code Section 415 Limit which have been or are expected to be made from the Excess Benefit Plan are excluded from this valuation. There were no other changes in actuarial assumptions and methods compared to the June 30, 2020 valuation.

**Table XI-1a**  
**Service Retirement, Unreduced with Full COLA/Escalation**

NEW YORK CITY FIRE PENSION FUND		
PROBABILITIES OF SERVICE RETIREMENT RETIREMENT WITH FULL COLA/ESCALATION FOR THOSE ELIGIBLE FOR UNREDUCED		
Age	Years of Service Since First Eligible	
	Year 1	Ultimate
19	0.00%	0.00%
20	0.00%	0.00%
21	0.00%	0.00%
22	0.00%	0.00%
23	0.00%	0.00%
24	0.00%	0.00%
25	0.00%	0.00%
26	0.00%	0.00%
27	0.00%	0.00%
28	0.00%	0.00%
29	0.00%	0.00%
30	0.00%	0.00%
31	0.00%	0.00%
32	0.00%	0.00%
33	0.00%	0.00%
34	0.00%	0.00%
35	0.00%	0.00%
36	5.00%	0.00%
37	5.00%	0.00%
38	5.00%	1.50%
39	5.00%	1.50%
40	5.00%	1.50%
41	5.00%	1.50%
42	5.00%	1.50%
43	5.00%	1.50%
44	5.00%	1.50%
45	5.00%	1.50%
46	5.50%	1.50%
47	6.00%	1.50%
48	6.50%	1.50%
49	7.00%	1.50%
50	7.50%	1.50%
51	8.00%	1.50%
52	8.50%	2.25%
53	9.00%	3.00%
54	9.50%	3.75%
55	10.00%	4.50%
56	10.00%	5.25%
57	10.00%	6.00%
58	10.00%	6.75%
59	10.00%	7.50%
60	10.00%	9.00%
61	15.00%	11.25%
62	20.00% <sup>1</sup>	15.00% <sup>1</sup>
63	25.00% <sup>1</sup>	25.00% <sup>1</sup>
64	25.00% <sup>1</sup>	25.00% <sup>1</sup>
65	100.00%	100.00%

<sup>1</sup> 100% for Tier 3, Tier 3 Modified, and Tier 3 Enhanced members

**Table XI-1b**  
**Early Service Retirement**

NEW YORK CITY FIRE PENSION FUND		
PROBABILITIES OF EARLY SERVICE RETIREMENT FOR TIER 3, TIER 3 MODIFIED, AND TIER 3 ENHANCED MEMBERS		
Years of Service	Reduced Service Retirement	Unreduced Before Full Escalation
20	5.00%	N/A
21	2.00%	N/A
22	N/A	5.00%
23	N/A	2.00%
24	N/A	2.00%

**Table XI-2**  
**Active Termination Rates**

NEW YORK CITY FIRE PENSION FUND	
PROBABILITIES OF TERMINATION	
Years Of Service	Probability of Termination
0	2.00%
1	0.80%
2	0.40%
3	0.40%
4	0.40%
5	0.40%
6	0.36%
7	0.32%
8	0.28%
9	0.24%
10	0.20%
11	0.18%
12	0.16%
13	0.14%
14	0.12%
15	0.10%
16	0.10%
17	0.10%
18	0.10%
19	0.10%
20	N/A

**Table XI-3  
Active Disability Rates**

NEW YORK CITY FIRE PENSION FUND				
PROBABILITIES OF DISABILITY RETIREMENT				
		Accidental Disability		
Age	Ordinary Disability	Tier 1 & Tier 2 Eligible for WTC Benefits	Tier 1 & Tier 2 Not Eligible for WTC AND Tier 3 Enhanced Plan	Tier 3 & Tier 3 Modified Non- Enhanced Plan
15	0.0025%	0.050%	0.035%	0.030%
16	0.0025%	0.050%	0.035%	0.030%
17	0.0025%	0.050%	0.035%	0.030%
18	0.0025%	0.050%	0.035%	0.030%
19	0.0025%	0.050%	0.035%	0.030%
20	0.0025%	0.050%	0.035%	0.030%
21	0.0025%	0.050%	0.035%	0.030%
22	0.0025%	0.050%	0.035%	0.030%
23	0.0025%	0.050%	0.035%	0.030%
24	0.0025%	0.050%	0.035%	0.030%
25	0.0025%	0.050%	0.035%	0.030%
26	0.0025%	0.090%	0.045%	0.040%
27	0.0050%	0.130%	0.055%	0.050%
28	0.0075%	0.170%	0.075%	0.070%
29	0.0100%	0.210%	0.115%	0.100%
30	0.0125%	0.250%	0.175%	0.150%
31	0.0150%	0.400%	0.275%	0.240%
32	0.0175%	0.550%	0.375%	0.330%
33	0.0200%	0.700%	0.475%	0.420%
34	0.0225%	0.850%	0.575%	0.510%
35	0.0250%	1.000%	0.700%	0.600%
36	0.0275%	1.200%	0.850%	0.720%
37	0.0300%	1.400%	1.000%	0.840%
38	0.0325%	1.600%	1.150%	0.960%
39	0.0350%	1.800%	1.300%	1.080%
40	0.0375%	2.000%	1.500%	1.200%
41	0.0400%	2.200%	1.650%	1.320%
42	0.0425%	2.400%	1.800%	1.440%
43	0.0450%	2.600%	1.950%	1.560%
44	0.0475%	2.800%	2.100%	1.680%
45	0.0500%	3.000%	2.300%	1.800%
46	0.0550%	3.400%	2.650%	1.920%
47	0.0600%	3.800%	3.000%	2.040%
48	0.0650%	4.200%	3.350%	2.160%
49	0.0700%	4.600%	3.700%	2.280%
50	0.0750%	5.000%	4.050%	2.400%
51	0.1100%	5.600%	4.400%	2.520%
52	0.1450%	6.200%	4.750%	2.640%
53	0.1800%	6.800%	5.100%	2.760%
54	0.2150%	7.400%	5.450%	2.880%
55	0.2500%	8.000%	5.800%	3.000%
56	0.5000%	10.000%	8.000%	4.000%
57	0.7500%	12.000%	10.000%	5.000%
58	1.0000%	15.000%	12.500%	6.000%
59	1.2500%	18.000%	15.000%	7.000%
60	1.5000%	21.000%	17.500%	8.000%
61	2.0000%	25.000%	20.000%	9.000%
62	2.5000% <sup>1</sup>	30.000%	22.000% <sup>1</sup>	N/A
63	2.5000% <sup>1</sup>	30.000%	22.000% <sup>1</sup>	N/A
64	2.5000% <sup>1</sup>	30.000%	22.000% <sup>1</sup>	N/A
65	N/A	N/A	N/A	N/A

<sup>1</sup>N/A for Tier 3, Tier 3 Modified, and Tier 3 Enhanced members.

**Table XI-4  
Active Mortality Rates**

NEW YORK CITY FIRE PENSION FUND			
PROBABILITIES OF MORTALITY FOR ACTIVE MEMBERS BASE RATES			
	Ordinary Death		Accidental Death
Age	Males	Females	All
15	0.020%	0.015%	0.010%
16	0.020%	0.015%	0.010%
17	0.020%	0.015%	0.010%
18	0.020%	0.015%	0.010%
19	0.020%	0.015%	0.010%
20	0.020%	0.015%	0.010%
21	0.020%	0.015%	0.010%
22	0.020%	0.015%	0.010%
23	0.020%	0.015%	0.010%
24	0.020%	0.015%	0.010%
25	0.020%	0.015%	0.010%
26	0.020%	0.015%	0.010%
27	0.020%	0.015%	0.010%
28	0.020%	0.015%	0.010%
29	0.020%	0.015%	0.010%
30	0.020%	0.015%	0.010%
31	0.020%	0.015%	0.010%
32	0.020%	0.015%	0.010%
33	0.020%	0.015%	0.010%
34	0.020%	0.015%	0.010%
35	0.020%	0.015%	0.010%
36	0.021%	0.016%	0.010%
37	0.022%	0.017%	0.010%
38	0.023%	0.018%	0.010%
39	0.024%	0.019%	0.010%
40	0.025%	0.020%	0.010%
41	0.030%	0.023%	0.013%
42	0.035%	0.026%	0.016%
43	0.040%	0.029%	0.019%
44	0.045%	0.032%	0.022%
45	0.050%	0.035%	0.025%
46	0.055%	0.038%	0.030%
47	0.060%	0.041%	0.035%
48	0.065%	0.044%	0.040%
49	0.070%	0.047%	0.045%
50	0.075%	0.050%	0.050%
51	0.080%	0.055%	0.060%
52	0.085%	0.060%	0.070%
53	0.090%	0.065%	0.080%
54	0.095%	0.070%	0.090%
55	0.100%	0.075%	0.100%
56	0.110%	0.080%	0.110%
57	0.120%	0.085%	0.120%
58	0.130%	0.090%	0.130%
59	0.140%	0.095%	0.140%
60	0.150%	0.100%	0.150%
61	0.160%	0.110%	0.200%
62	0.170% <sup>1</sup>	0.120% <sup>1</sup>	0.250% <sup>1</sup>
63	0.180% <sup>1</sup>	0.130% <sup>1</sup>	0.300% <sup>1</sup>
64	0.190% <sup>1</sup>	0.140% <sup>1</sup>	0.350% <sup>1</sup>
65	N/A	N/A	N/A

<sup>1</sup>Probabilities are N/A for Tier 3 and Tier 3 Modified members.

**Table XI-5  
Service Retiree Mortality**

NEW YORK CITY FIRE PENSION FUND					
PROBABILITIES OF MORTALITY FOR SERVICE RETIREES BASE RATES					
Age	Males	Females	Age	Males	Females
15	0.0100%	0.0084%	68	1.2063%	0.7604%
16	0.0135%	0.0103%	69	1.2653%	0.8243%
17	0.0181%	0.0112%	70	1.4084%	0.9061%
18	0.0217%	0.0131%	71	1.5806%	0.9954%
19	0.0240%	0.0140%	72	1.7538%	1.0940%
20	0.0251%	0.0142%	73	1.9842%	1.2060%
21	0.0268%	0.0150%	74	2.2163%	1.3283%
22	0.0284%	0.0158%	75	2.4510%	1.4362%
23	0.0301%	0.0168%	76	2.6879%	1.6455%
24	0.0315%	0.0179%	77	2.9280%	1.8563%
25	0.0327%	0.0191%	78	3.3690%	2.0670%
26	0.0342%	0.0204%	79	3.8155%	2.3446%
27	0.0354%	0.0217%	80	4.2660%	2.6218%
28	0.0371%	0.0231%	81	4.7728%	2.8997%
29	0.0394%	0.0247%	82	5.2958%	3.1772%
30	0.0427%	0.0265%	83	6.2483%	3.4554%
31	0.0503%	0.0323%	84	7.2266%	3.9664%
32	0.0581%	0.0372%	85	8.2335%	4.4805%
33	0.0655%	0.0415%	86	9.2715%	4.9967%
34	0.0725%	0.0448%	87	10.3365%	5.5147%
35	0.0799%	0.0478%	88	11.2397%	6.0388%
36	0.0851%	0.0505%	89	12.1663%	7.0317%
37	0.0901%	0.0532%	90	13.1242%	8.0312%
38	0.0961%	0.0561%	91	14.6163%	9.4265%
39	0.1037%	0.0595%	92	16.2757%	10.8698%
40	0.1138%	0.0634%	93	18.9667%	12.3822%
41	0.1230%	0.0688%	94	21.5036%	13.7895%
42	0.1327%	0.0725%	95	23.9289%	15.2575%
43	0.1430%	0.0775%	96	25.8261%	16.7330%
44	0.1542%	0.0843%	97	27.5777%	18.2626%
45	0.1666%	0.0931%	98	29.2887%	19.6947%
46	0.1798%	0.1041%	99	30.8020%	21.1460%
47	0.1941%	0.1166%	100	32.1584%	22.1859%
48	0.2093%	0.1295%	101	33.7521%	23.0680%
49	0.2250%	0.1425%	102	35.1259%	24.0803%
50	0.2412%	0.1555%	103	36.3671%	25.2770%
51	0.2975%	0.1681%	104	37.3834%	26.6309%
52	0.3514%	0.1797%	105	38.1051%	28.0912%
53	0.4018%	0.1902%	106	38.4698%	29.6244%
54	0.4483%	0.1996%	107	38.6325%	31.1943%
55	0.4895%	0.2075%	108	38.8076%	32.7579%
56	0.5352%	0.2144%	109	38.9794%	34.2712%
57	0.5757%	0.2629%	110	50.0000%	50.0000%
58	0.6104%	0.3090%	111	50.0000%	50.0000%
59	0.6391%	0.3530%	112	50.0000%	50.0000%
60	0.6625%	0.3957%	113	50.0000%	50.0000%
61	0.7126%	0.4377%	114	50.0000%	50.0000%
62	0.7621%	0.4800%	115	50.0000%	50.0000%
63	0.8255%	0.5231%	116	50.0000%	50.0000%
64	0.9079%	0.5675%	117	50.0000%	50.0000%
65	0.9997%	0.6138%	118	50.0000%	50.0000%
66	1.0607%	0.6613%	119	50.0000%	50.0000%
67	1.1308%	0.7103%	120	100.0000%	100.0000%



**Table XI-6  
Disabled Retiree Mortality**

NEW YORK CITY FIRE PENSION FUND					
PROBABILITIES OF MORTALITY FOR DISABLED RETIREES					
BASE RATES					
Age	Males	Females	Age	Males	Females
15	0.0238%	0.0098%	68	1.5909%	1.2517%
16	0.0321%	0.0120%	69	1.7622%	1.4342%
17	0.0433%	0.0131%	70	1.9120%	1.6327%
18	0.0517%	0.0153%	71	2.1153%	1.8400%
19	0.0573%	0.0164%	72	2.3101%	2.0561%
20	0.0608%	0.0173%	73	2.4968%	2.2946%
21	0.0660%	0.0191%	74	2.6752%	2.5649%
22	0.0716%	0.0211%	75	2.8786%	2.8625%
23	0.0772%	0.0234%	76	3.2717%	3.1737%
24	0.0831%	0.0259%	77	3.6597%	3.4562%
25	0.0886%	0.0282%	78	4.0420%	3.7889%
26	0.0936%	0.0307%	79	4.4200%	4.3087%
27	0.1008%	0.0332%	80	4.8490%	4.8485%
28	0.1089%	0.0359%	81	5.6563%	5.4107%
29	0.1170%	0.0386%	82	6.4729%	5.8954%
30	0.1254%	0.0412%	83	7.2988%	6.3864%
31	0.1342%	0.0438%	84	8.1300%	7.2278%
32	0.1426%	0.0464%	85	8.9696%	8.0743%
33	0.1544%	0.0491%	86	9.7646%	8.8707%
34	0.1602%	0.0506%	87	10.5803%	9.6600%
35	0.1670%	0.0528%	88	11.4245%	10.5768%
36	0.1696%	0.0551%	89	12.3269%	11.9527%
37	0.1721%	0.0580%	90	13.2834%	13.2782%
38	0.1754%	0.0608%	91	15.7515%	14.7506%
39	0.1792%	0.0648%	92	18.1410%	15.8458%
40	0.1836%	0.0709%	93	20.4240%	16.9974%
41	0.1891%	0.0790%	94	22.5700%	18.2075%
42	0.1957%	0.0892%	95	24.6643%	19.3408%
43	0.2038%	0.1023%	96	26.5127%	20.3502%
44	0.2134%	0.1184%	97	28.2029%	21.2709%
45	0.2247%	0.1371%	98	29.5441%	21.9254%
46	0.2374%	0.1586%	99	30.9728%	22.3227%
47	0.2518%	0.1824%	100	32.1584%	22.4341%
48	0.2672%	0.2079%	101	33.7521%	23.0680%
49	0.2837%	0.2388%	102	35.1259%	24.0803%
50	0.3022%	0.2719%	103	36.3671%	25.2770%
51	0.3597%	0.2959%	104	37.3834%	26.6309%
52	0.4188%	0.3426%	105	38.1051%	28.0912%
53	0.4788%	0.3791%	106	38.4698%	29.6244%
54	0.5392%	0.4326%	107	38.6325%	31.1943%
55	0.5986%	0.4868%	108	38.8076%	32.7579%
56	0.6556%	0.5294%	109	38.9794%	34.2712%
57	0.7090%	0.5421%	110	50.0000%	50.0000%
58	0.7577%	0.5621%	111	50.0000%	50.0000%
59	0.8017%	0.6003%	112	50.0000%	50.0000%
60	0.8498%	0.6343%	113	50.0000%	50.0000%
61	0.9095%	0.6687%	114	50.0000%	50.0000%
62	0.9862%	0.7391%	115	50.0000%	50.0000%
63	1.0698%	0.8094%	116	50.0000%	50.0000%
64	1.1631%	0.8897%	117	50.0000%	50.0000%
65	1.2477%	0.9710%	118	50.0000%	50.0000%
66	1.3403%	1.0569%	119	50.0000%	50.0000%
67	1.4168%	1.1551%	120	100.0000%	100.0000%

**Table XI-7  
Beneficiary Mortality**

NEW YORK CITY FIRE PENSION FUND					
PROBABILITIES OF BENEFICIARY MORTALITY BASE RATES					
Age	Males	Females	Age	Males	Females
15	0.0105%	0.0092%	68	1.8256%	1.3605%
16	0.0142%	0.0112%	69	1.9386%	1.4332%
17	0.0191%	0.0122%	70	2.0542%	1.5007%
18	0.0222%	0.0133%	71	2.2359%	1.6745%
19	0.0240%	0.0143%	72	2.4230%	1.8463%
20	0.0251%	0.0145%	73	2.6165%	2.0157%
21	0.0268%	0.0153%	74	2.8157%	2.1838%
22	0.0284%	0.0161%	75	3.0220%	2.3492%
23	0.0301%	0.0171%	76	3.4928%	2.6652%
24	0.0315%	0.0183%	77	3.9787%	2.9831%
25	0.0327%	0.0195%	78	4.4792%	3.3011%
26	0.0342%	0.0208%	79	4.9963%	3.6207%
27	0.0354%	0.0221%	80	5.5282%	3.9391%
28	0.0371%	0.0236%	81	6.1051%	4.4386%
29	0.0394%	0.0252%	82	6.6894%	4.9473%
30	0.0427%	0.0270%	83	7.2805%	5.4665%
31	0.0495%	0.0330%	84	7.8749%	5.9942%
32	0.0562%	0.0384%	85	8.4753%	6.5354%
33	0.0625%	0.0431%	86	9.6136%	7.4659%
34	0.0682%	0.0471%	87	10.8005%	8.3995%
35	0.0743%	0.0511%	88	12.0443%	9.3428%
36	0.0780%	0.0542%	89	13.3397%	10.2918%
37	0.0818%	0.0579%	90	14.6958%	11.2477%
38	0.0861%	0.0618%	91	16.4185%	12.8868%
39	0.0917%	0.0666%	92	18.1416%	14.4887%
40	0.0997%	0.0719%	93	19.8574%	16.0801%
41	0.1394%	0.0775%	94	21.6187%	17.5854%
42	0.1774%	0.0859%	95	23.5884%	19.0626%
43	0.2143%	0.0968%	96	25.4266%	20.2474%
44	0.2507%	0.1111%	97	27.2119%	21.2937%
45	0.2875%	0.1287%	98	29.0202%	22.0663%
46	0.3207%	0.1501%	99	30.6654%	22.5443%
47	0.3534%	0.1748%	100	32.1584%	22.6473%
48	0.3849%	0.2022%	101	33.7521%	23.5294%
49	0.4150%	0.2319%	102	35.1259%	24.5619%
50	0.4431%	0.2633%	103	36.3671%	25.7825%
51	0.5156%	0.2999%	104	37.3834%	27.1635%
52	0.5928%	0.3376%	105	38.1051%	28.6530%
53	0.6740%	0.3762%	106	38.4698%	30.2169%
54	0.7583%	0.4151%	107	38.6325%	31.8182%
55	0.8440%	0.4540%	108	38.8076%	33.4131%
56	0.9048%	0.5132%	109	38.9794%	34.9566%
57	0.9604%	0.5735%	110	50.0000%	50.0000%
58	1.0101%	0.6353%	111	50.0000%	50.0000%
59	1.0536%	0.6981%	112	50.0000%	50.0000%
60	1.0919%	0.7631%	113	50.0000%	50.0000%
61	1.1835%	0.8329%	114	50.0000%	50.0000%
62	1.2676%	0.8908%	115	50.0000%	50.0000%
63	1.3473%	0.9493%	116	50.0000%	50.0000%
64	1.4238%	1.0146%	117	50.0000%	50.0000%
65	1.4985%	1.0876%	118	50.0000%	50.0000%
66	1.6059%	1.1681%	119	50.0000%	50.0000%
67	1.7146%	1.2609%	120	100.0000%	100.0000%

**Table XI-8  
Salary Scale**

NEW YORK CITY FIRE PENSION FUND		
ANNUAL RATES OF MERIT AND SALARY INCREASE		
<b>Years of Service</b>	<b>Merit Increase</b>	<b>Salary Increase<sup>1</sup></b>
0	20.00%	23.00%
1	12.00%	15.00%
2	12.00%	15.00%
3	12.00%	15.00%
4	27.00%	30.00%
5	16.00%	19.00%
6	1.65%	4.65%
7	1.80%	4.80%
8	1.95%	4.95%
9	4.05%	7.05%
10	2.25%	5.25%
11	2.40%	5.40%
12	2.55%	5.55%
13	2.70%	5.70%
14	4.65%	7.65%
15	3.00%	6.00%
16	2.85%	5.85%
17	2.70%	5.70%
18	2.55%	5.55%
19	4.20%	7.20%
20	2.25%	5.25%
21	2.10%	5.10%
22	1.95%	4.95%
23	1.80%	4.80%
24	1.65%	4.65%
25	1.50%	4.50%
26	1.35%	4.35%
27	1.20%	4.20%
28	1.05%	4.05%
29	0.90%	3.90%
30+	0.75%	3.75%

<sup>1</sup> Salary Increase is the General Wage Increase of 3.00% plus the Merit Increase.

**Table XI-9  
Overtime Assumptions**

NEW YORK CITY FIRE PENSION FUND				
OVERTIME ASSUMPTION				
<b>Years of Service</b>	<b>All Tiers Baseline</b>	<b>Tier 1 &amp; Tier 2 Dual Service</b>	<b>Tier 3, Tier 3 Modified, &amp; Tier 3 Enhanced Dual Service</b>	<b>All Tiers Dual Disability</b>
0-13	20.00%	21.00%	21.00%	20.00%
14	20.00%	22.00%	21.00%	20.00%
15	20.00%	24.00%	21.00%	20.00%
16	20.00%	25.00%	22.00%	21.00%
17	20.00%	26.00%	24.00%	22.00%
18	21.00%	28.00%	25.00%	24.00%
19	22.00%	29.00%	26.00%	25.00%
20	24.00%	30.00%	28.00%	26.00%
21	22.00%	29.00%	26.00%	25.00%
22	21.00%	28.00%	25.00%	24.00%
23	20.00%	26.00%	24.00%	22.00%
24	19.00%	25.00%	22.00%	21.00%
25	17.00%	24.00%	21.00%	20.00%
26	16.00%	21.00%	19.00%	17.00%
27	15.00%	19.00%	18.00%	15.00%
28	13.00%	16.00%	15.00%	13.00%
29	12.00%	15.00%	13.00%	12.00%
30	11.00%	13.00%	12.00%	11.00%
31	9.00%	12.00%	11.00%	10.00%
32	8.00%	11.00%	9.00%	8.00%
33	7.00%	9.00%	8.00%	7.00%
34+	7.00%	8.00%	8.00%	7.00%

## Additional Assumptions and Methods

1. **Actuarial Interest Rate (AIR):** 7.0% per annum, net of investment expenses.
2. **Mortality Assumption:** The mortality base tables are projected from 2012 using mortality improvement table MP-2020. The post-commencement base tables are also multiplied by adjustment factors to convert them from lives-weighted to amounts-weighted tables to account for socioeconomic effects on mortality. The adjustment factors used are as follows:

	<b>Adjustment Factor</b>	
	<b>Male</b>	<b>Female</b>
Service Retiree	0.910	0.910
Disabled Retiree	0.830	0.830
Beneficiary	0.890	0.951

3. **Marital Assumption:** All active members are assumed to be married and females are assumed to be two years younger than their male spouses.
4. **Credited Service:** Calculated in whole year increments for valuation purposes.
5. **Loans:** Except for Death Benefits, it is assumed that Tier 1 and 2 members take a loan at retirement equal to 25% of their member contribution balances.
6. **Inflation:** The long-term Consumer Price Index inflation rate is assumed to be 2.5% per year. AutoCOLA is assumed to be 1.5% per year, and Escalation is assumed at 2.5% per year. Beneficiaries receiving Special Accidental Death Benefits, if any, are assumed to receive increases at 3.0% per year.
7. **Form of Payment:** Retiring members are assumed to elect the Maximum Retirement Allowance (i.e., single life annuity) form of payment.
8. **Actuarial Asset Valuation Method (AAVM):**

The Actuary reset the Actuarial Value of Assets to Market Value as of June 30, 2019.

Beginning with the June 30, 2020 actuarial valuation, the AAVM recognizes investment returns greater or less than expected over a period of five years.

In accordance with this AAVM, any investment return over or under the expected 7% return on the MVA is phased into the AVA over a five-year period at 20% per year.

The AVA is further constrained to be within a corridor of 80% to 120% of the MVA.

For more information, see SECTION II – MARKET AND ACTUARIAL VALUES OF ASSETS.

9. **Actuarial Cost Method:** The Entry Age Normal (EAN) cost method of funding is used by the Actuary to calculate the Employer Contribution.

Under this method, the Present Value (PV) of Future Benefits (PVFB) of each individual included in the actuarial valuation is allocated on a level basis over the expected earnings (or service) of the individual between entry age and the assumed exit age(s). The employer portion of this PVFB allocated to a valuation year is the Normal Cost. The portion of this PVFB not provided for at a valuation date by the PV of Future Normal Costs or future member contributions is the Accrued Liability (AL).

The excess, if any, of the AL over the Actuarial Value of Assets is the Unfunded Accrued Liability (UAL).

Under this method, actuarial gains and losses, as they occur, reduce and increase the UAL, respectively, and are explicitly identified and amortized. Increases or decreases in obligations due to benefit changes, actuarial assumption changes, and actuarial method changes are also explicitly identified and amortized.

The explicit UALs that are developed under EAN each year are financed over fixed periods. For more information see Page 12.

Under EAN, the Normal Cost as a percentage of pay remains constant by individual and changes gradually over time for the entire plan as the characteristics of the group changes (e.g., more Tier 3 Enhanced active members decrease the average Normal Cost as a percentage of pay).

10. **Allowances for Administrative Expenses:** The Employer Contribution for a fiscal year is increased by the interest-adjusted amount of administrative expenses paid from FIRE during the second prior fiscal year.
11. **WTC Disability and Death Benefits:** Obligations attributable to the WTC Disability Benefits Law and to the WTC Death Benefits Law are determined through estimation techniques for post-retirement reclassifications.
12. **One-Year Lag Methodology (OYLM):** The One-Year Lag Methodology uses a June 30, XX valuation date to determine the Fiscal Year XX+2 employer contributions as follows:

- a. Normal Cost

The normal cost as of July 1, XX (calculated in the June 30, XX valuation) is rolled forward with the assumed AIR of 7.0% to the mid-point of Fiscal Year XX+2 (i.e., December 31, XX+1).

b. Administrative Expenses

A reimbursement for administrative expenses deducted from plan assets during the year ending June 30, XX is rolled forward with the assumed AIR of 7.0% to the mid-point of Fiscal Year XX+2.

c. UAL Payments

New amortization bases for gains and losses, method and assumption changes, and any benefit improvements are established each year XX such that the UAL, as of June 30, XX is equal to the sum of the:

- 1) Outstanding prior amortization bases;
- 2) Unpaid prior year normal cost with interest;
- 3) Unreimbursed administrative expenses with interest, and
- 4) New amortization bases.

The UAL payment is the sum of the payments on the amortization bases scheduled for Fiscal Year XX+2.

13. **Excess Benefit Plan:** The valuation excludes liabilities and costs, if any, associated with benefits in excess of the IRC Section 415 limitation.

## SECTION XII – SUMMARY OF DEMOGRAPHIC DATA

The June 30, 2021 and June 30, 2020 actuarial valuations are based upon census data as of those dates submitted by the Plan's administrative staff and the employer's payroll facilities. Financial information was provided by the Office of the Comptroller as of June 30, 2021 and June 30, 2020.

Beginning at June 30, 2021, FIRE members who are no longer on payroll but not otherwise classified have been classified as Active, Terminated Nonvested, or Deferred Vested members, using actuarial judgment and consideration of available data, including leave of absence data when available.

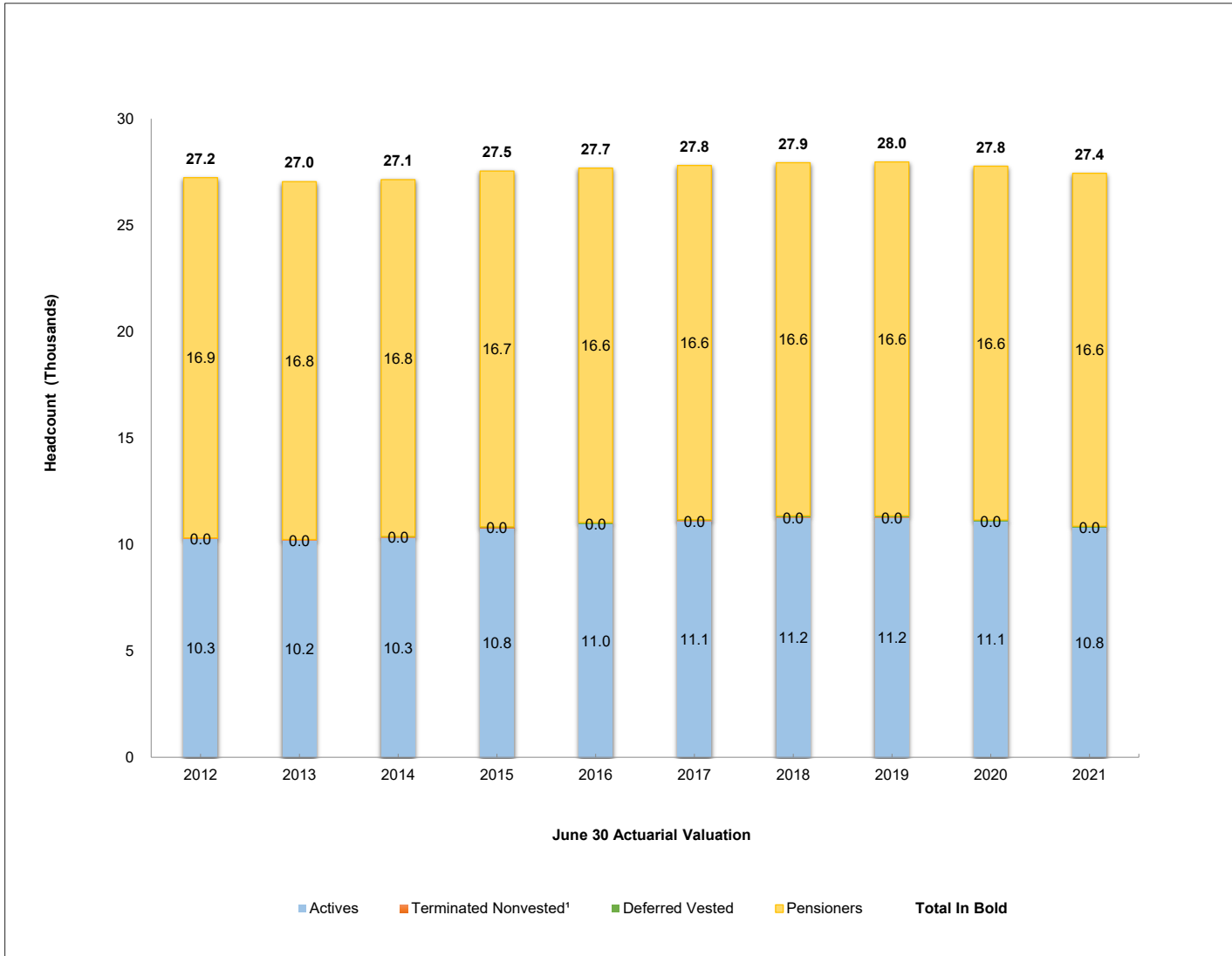
Consistent with Actuarial Standards of Practice, the Office of the Actuary has reviewed census data and financial information for consistency and reasonability but has not audited it. The accuracy of the results and calculations contained in this Report are dependent on the accuracy of this census data and financial information. To the extent any such data or information provided is materially inaccurate or incomplete, the results contained herein will require revision.



**Table XII-1**  
**Status Reconciliation**

CHANGES IN THE NUMBER OF ACTIVES AND PENSIONERS DURING THE FISCAL YEAR CLASSIFIED BY STATUS										
Status	(1) Active Members	(2) Terminated Nonvested	(3) Terminated Vested	(4) Service Pension	(5) Ordinary Disability	(6) Accidental Disability	(7) Accidental Death	(8) Other Beneficiary	(9) Pensioners Subtotal (4) to (8)	(10) Grand Total (1) + (2) + (3) +
<b>Number at June 30, 2020</b>	<b>11,079</b>	<b>0</b>	<b>64</b>	4,779	638	10,218	670	319	<b>16,624</b>	<b>27,767</b>
New Entrants	146	0	0	0	0	0	7	2	9	155
Rehires	0	0	0	0	0	0	0	0	0	0
Terminated Nonvested	(2)	2	0	0	0	0	0	0	0	0
Vested Termination	(2)	0	2	0	0	0	0	0	0	0
Withdrawal / Cashout	(16)	0	0	0	0	0	0	0	0	(16)
Accidental Death	(2)	0	0	0	0	0	2	0	2	0
Ordinary Death	(5)	0	0	0	0	0	0	0	0	(5)
Service Retirement	(120)	0	(4)	124	0	0	0	0	124	0
Ordinary Disability Retirement	(5)	0	0	0	5	0	0	0	5	0
Accidental Disability Retirement	(280)	0	0	0	0	280	0	0	280	0
Reclassifications	0	0	0	(43)	(2)	41	4	0	0	0
Pensioner Death with Beneficiary	0	0	0	(3)	(1)	(10)	0	14	0	0
Pensioner Death without Beneficiary	0	0	0	(190)	(49)	(194)	(13)	(18)	(464)	(464)
Pension Payroll Adjustments	0	0	0	0	(1)	0	0	(1)	(2)	(2)
Net Change	(286)	2	(2)	(112)	(48)	117	0	(3)	(46)	(332)
<b>Number at June 30, 2021</b>	<b>10,793</b>	<b>2</b>	<b>62</b>	4,667	590	10,335	670	316	<b>16,578</b>	<b>27,435</b>

**Graph XII-2  
Headcount Summary by Status**



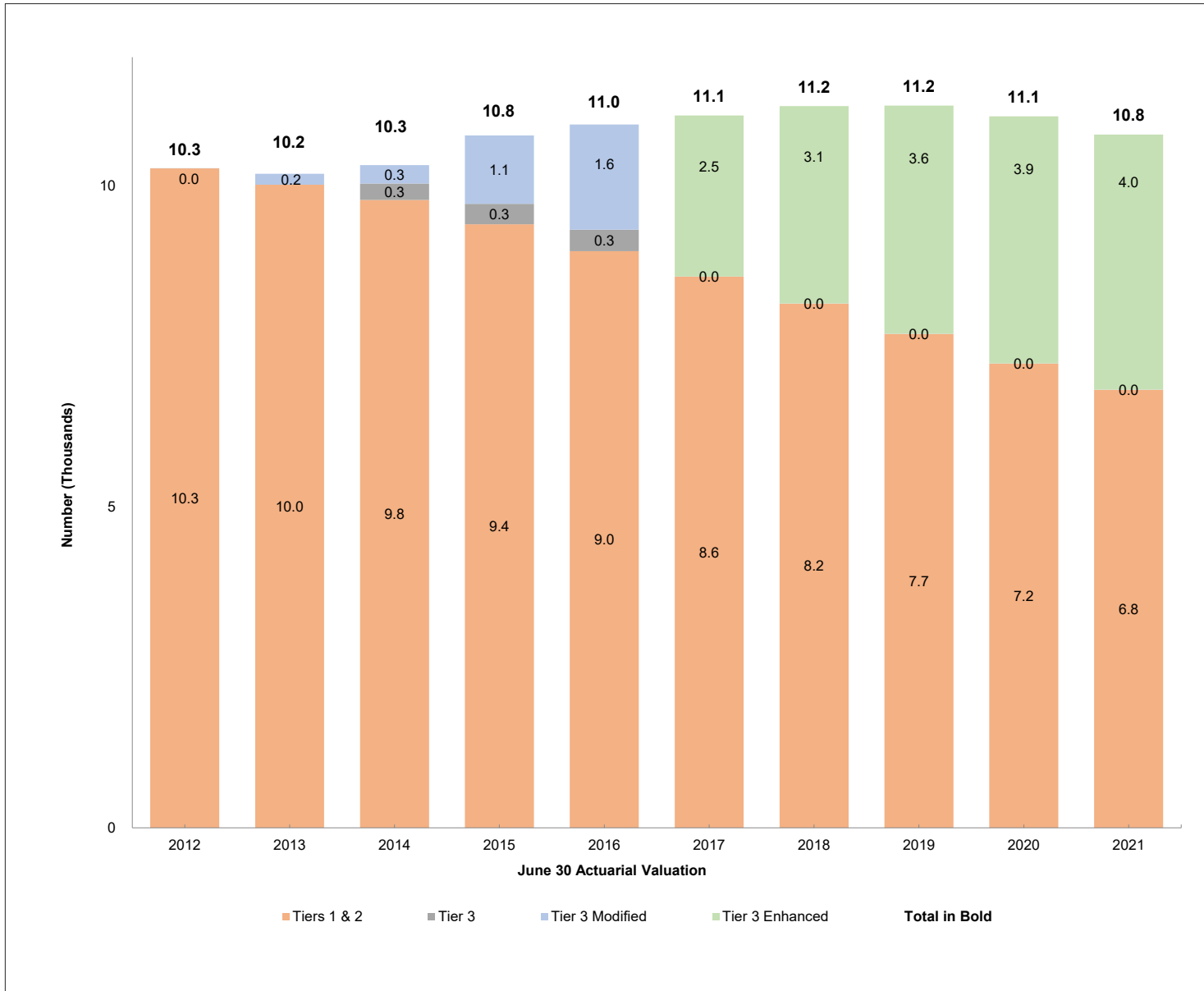
<sup>1</sup> Active Off Payroll prior to June 30, 2020.

**Table XII-3**  
**Summary of Active Membership**

NEW YORK CITY FIRE PENSION FUND		
ACTIVE MEMBERS INCLUDED IN THE JUNE 30, 2021 AND JUNE 30, 2020 ACTUARIAL VALUATIONS		
	June 30, 2021	June 30, 2020
Number		
Males	10,657	10,945
Females	136	134
Total	10,793	11,079
Annual Salary <sup>1</sup>		
Males	\$1,386,412,261	\$1,334,436,033
Females	14,965,256	13,570,365
Total	\$1,401,377,517	\$1,348,006,398
Average Salary <sup>1</sup>		
Males	\$ 130,094	\$ 121,922
Females	110,039	101,271
Total Average	\$ 129,841	\$ 121,672
Average Age		
Males	41.2	40.8
Females	37.5	36.7
Total Average	41.2	40.7
Average Past Service		
Males	14.5	14.1
Females	8.4	7.8
Total Average	14.5	14.0

<sup>1</sup> Salaries shown are base salaries plus assumed overtime paid and reflect the impact of recent labor contract settlements and certain non-union salary increases with retroactive effective dates, if any.

Graph XII-4  
Active Membership by Tier



**Table XII-5**  
**Schedule of Active Member Salary Data**

<b>June 30 Actuarial Valuation</b>	<b>Number</b>	<b>Annual Salary</b>	<b>Average Annual Salary</b>	<b>Percentage Increase/ (Decrease) In Avg. Salary</b>
2012	10,267	1,106,113,386	107,735	1.9%
2013	10,182	1,129,706,314	110,951	3.0%
2014	10,319	1,150,389,645	111,483	0.5%
2015	10,780	1,164,994,036	108,070	(3.1%)
2016	10,951	1,180,226,281	107,773	(0.3%)
2017	11,091	1,256,001,332	113,245	5.1%
2018	11,237	1,305,960,137	116,220	2.6%
2019	11,244	1,336,843,002	118,894	2.3%
2020	11,079	1,348,006,398	121,672	2.3%
2021	10,793	1,401,377,517	129,841	6.7%

Salaries shown are base salaries plus assumed overtime paid and reflect the impact of recent labor contract settlements and certain non-union salary increases with retroactive effective dates, if any.

**Table XII-6**  
**Detailed Active Membership and Salaries as of June 30, 2021**

AGE \ SVC	MALE TOTAL									
	UNDER 5	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 & UP	ALL YEARS
<i>NUMBER:</i>										
UNDER 20	0	0	0	0	0	0	0	0	0	0
20 TO 24	33	0	0	0	0	0	0	0	0	33
25 TO 29	679	193	0	0	0	0	0	0	0	872
30 TO 34	864	1,077	74	1	0	0	0	0	0	2,016
35 TO 39	103	786	482	573	1	0	0	0	0	1,945
40 TO 44	18	87	285	1,372	326	3	0	0	0	2,091
45 TO 49	1	2	71	908	590	109	2	0	0	1,683
50 TO 54	1	0	2	190	458	362	107	0	0	1,120
55 TO 59	1	0	1	0	143	218	196	92	0	651
60 TO 64	0	0	0	1	1	36	70	82	45	235
65 TO 69	0	0	0	0	1	0	3	5	0	9
70 & UP	0	0	0	1	0	1	0	0	0	2
<b>TOTAL</b>	<b>1,700</b>	<b>2,145</b>	<b>915</b>	<b>3,046</b>	<b>1,520</b>	<b>729</b>	<b>378</b>	<b>179</b>	<b>45</b>	<b>10,657</b>

<i>SALARIES (IN THOUSANDS):</i>										
UNDER 20	0	0	0	0	0	0	0	0	0	0
20 TO 24	1,970	0	0	0	0	0	0	0	0	1,970
25 TO 29	45,306	22,910	0	0	0	0	0	0	0	68,215
30 TO 34	61,856	129,302	9,628	147	0	0	0	0	0	200,932
35 TO 39	8,283	97,571	64,642	80,691	138	0	0	0	0	251,325
40 TO 44	1,577	10,753	38,453	195,983	49,959	406	0	0	0	297,130
45 TO 49	75	324	9,567	130,145	91,330	17,281	324	0	0	249,046
50 TO 54	151	0	306	27,251	69,267	57,914	18,118	0	0	173,006
55 TO 59	143	0	174	0	21,396	33,785	32,759	16,180	0	104,438
60 TO 64	0	0	0	175	176	5,506	11,037	13,749	7,842	38,485
65 TO 69	0	0	0	0	175	0	406	933	0	1,514
70 & UP	0	0	0	175	0	176	0	0	0	351
<b>TOTAL<sup>1</sup></b>	<b>119,360</b>	<b>260,860</b>	<b>122,769</b>	<b>434,566</b>	<b>232,441</b>	<b>115,069</b>	<b>62,644</b>	<b>30,862</b>	<b>7,842</b>	<b>1,386,412</b>

<i>AVERAGE SALARIES:<sup>2</sup></i>										
UNDER 20	0	0	0	0	0	0	0	0	0	0
20 TO 24	59,699	0	0	0	0	0	0	0	0	59,699
25 TO 29	66,724	118,703	0	0	0	0	0	0	0	78,229
30 TO 34	71,592	120,058	130,102	146,726	0	0	0	0	0	99,669
35 TO 39	80,413	124,137	134,112	140,822	138,048	0	0	0	0	129,216
40 TO 44	87,596	123,595	134,921	142,845	153,248	135,432	0	0	0	142,100
45 TO 49	75,380	161,762	134,751	143,331	154,797	158,543	161,794	0	0	147,977
50 TO 54	150,801	0	152,811	143,425	151,239	159,984	169,326	0	0	154,470
55 TO 59	143,306	0	173,890	0	149,624	154,976	167,139	175,873	0	160,427
60 TO 64	0	0	0	174,955	175,918	152,954	157,678	167,666	174,259	163,766
65 TO 69	0	0	0	0	174,955	0	135,416	186,529	0	168,205
70 & UP	0	0	0	174,600	0	176,000	0	0	0	175,300
<b>TOTAL</b>	<b>70,212</b>	<b>121,613</b>	<b>134,174</b>	<b>142,668</b>	<b>152,922</b>	<b>157,845</b>	<b>165,726</b>	<b>172,411</b>	<b>174,259</b>	<b>130,094</b>

Note: Age is nearest birthdate. Service is nearest year.

<sup>1</sup>Total may not add up due to rounding.

<sup>2</sup>Average based on unrounded salary.

**Table XII-6**  
**Detailed Active Membership and Salaries as of June 30, 2021 (cont'd)**

AGE \ SVC	FEMALE TOTAL									ALL YEARS	
	UNDER 5	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 & UP		
<i>NUMBER:</i>											
UNDER 20	0	0	0	0	0	0	0	0	0	0	0
20 TO 24	0	0	0	0	0	0	0	0	0	0	0
25 TO 29	20	3	0	0	0	0	0	0	0	0	23
30 TO 34	31	11	2	0	0	0	0	0	0	0	44
35 TO 39	3	11	2	2	0	0	0	0	0	0	18
40 TO 44	1	6	3	9	4	0	0	0	0	0	23
45 TO 49	1	0	2	8	4	0	0	0	0	0	15
50 TO 54	1	1	0	2	4	0	0	0	0	0	8
55 TO 59	1	1	0	0	0	1	0	0	0	0	3
60 TO 64	0	0	1	0	0	0	0	0	0	0	1
65 TO 69	0	0	0	0	0	0	0	0	0	0	0
70 & UP	0	0	0	0	1	0	0	0	0	0	1
<b>TOTAL</b>	<b>58</b>	<b>33</b>	<b>10</b>	<b>21</b>	<b>13</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>136</b>

<i>SALARIES (IN THOUSANDS):</i>											
UNDER 20	0	0	0	0	0	0	0	0	0	0	0
20 TO 24	0	0	0	0	0	0	0	0	0	0	0
25 TO 29	1,327	302	0	0	0	0	0	0	0	0	1,629
30 TO 34	2,214	1,266	205	0	0	0	0	0	0	0	3,685
35 TO 39	319	1,450	287	278	0	0	0	0	0	0	2,334
40 TO 44	85	726	394	1,288	547	0	0	0	0	0	3,041
45 TO 49	138	0	306	1,147	589	0	0	0	0	0	2,180
50 TO 54	146	173	0	271	659	0	0	0	0	0	1,249
55 TO 59	145	193	0	0	0	161	0	0	0	0	499
60 TO 64	0	0	173	0	0	0	0	0	0	0	173
65 TO 69	0	0	0	0	0	0	0	0	0	0	0
70 & UP	0	0	0	0	176	0	0	0	0	0	176
<b>TOTAL<sup>1</sup></b>	<b>4,373</b>	<b>4,110</b>	<b>1,366</b>	<b>2,984</b>	<b>1,972</b>	<b>161</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>14,965</b>

<i>AVERAGE SALARIES:<sup>2</sup></i>											
UNDER 20	0	0	0	0	0	0	0	0	0	0	0
20 TO 24	0	0	0	0	0	0	0	0	0	0	0
25 TO 29	66,336	100,771	0	0	0	0	0	0	0	0	70,828
30 TO 34	71,410	115,064	102,682	0	0	0	0	0	0	0	83,745
35 TO 39	106,422	131,778	143,494	139,244	0	0	0	0	0	0	129,683
40 TO 44	84,752	120,986	131,496	143,106	136,861	0	0	0	0	0	132,198
45 TO 49	138,384	0	153,041	143,317	147,242	0	0	0	0	0	145,331
50 TO 54	145,622	173,444	0	135,433	164,773	0	0	0	0	0	156,128
55 TO 59	144,513	193,363	0	0	0	160,646	0	0	0	0	166,174
60 TO 64	0	0	173,085	0	0	0	0	0	0	0	173,085
65 TO 69	0	0	0	0	0	0	0	0	0	0	0
70 & UP	0	0	0	0	176,000	0	0	0	0	0	176,000
<b>TOTAL</b>	<b>75,396</b>	<b>124,555</b>	<b>136,600</b>	<b>142,088</b>	<b>151,654</b>	<b>160,646</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>110,039</b>

Note: Age is nearest birthdate. Service is nearest year.

<sup>1</sup>Total may not add up due to rounding.

<sup>2</sup>Average based on unrounded salary.

**Table XII-6**  
**Detailed Active Membership and Salaries as of June 30, 2021 (cont'd)**

		TOTAL (ALL TIERS, ALL MEMBERS)									
AGE \ SVC	UNDER 5	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 & UP	ALL YEARS	
<i>NUMBER:</i>											
UNDER 20	0	0	0	0	0	0	0	0	0	0	
20 TO 24	33	0	0	0	0	0	0	0	0	33	
25 TO 29	699	196	0	0	0	0	0	0	0	895	
30 TO 34	895	1,088	76	1	0	0	0	0	0	2,060	
35 TO 39	106	797	484	575	1	0	0	0	0	1,963	
40 TO 44	19	93	288	1,381	330	3	0	0	0	2,114	
45 TO 49	2	2	73	916	594	109	2	0	0	1,698	
50 TO 54	2	1	2	192	462	362	107	0	0	1,128	
55 TO 59	2	1	1	0	143	219	196	92	0	654	
60 TO 64	0	0	1	1	1	36	70	82	45	236	
65 TO 69	0	0	0	0	1	0	3	5	0	9	
70 & UP	0	0	0	1	1	1	0	0	0	3	
<b>TOTAL</b>	<b>1,758</b>	<b>2,178</b>	<b>925</b>	<b>3,067</b>	<b>1,533</b>	<b>730</b>	<b>378</b>	<b>179</b>	<b>45</b>	<b>10,793</b>	

<i>SALARIES (IN THOUSANDS):</i>										
UNDER 20	0	0	0	0	0	0	0	0	0	0
20 TO 24	1,970	0	0	0	0	0	0	0	0	1,970
25 TO 29	46,632	23,212	0	0	0	0	0	0	0	69,844
30 TO 34	64,069	130,568	9,833	147	0	0	0	0	0	204,617
35 TO 39	8,602	99,021	64,929	80,969	138	0	0	0	0	253,659
40 TO 44	1,661	11,479	38,847	197,271	50,506	406	0	0	0	300,171
45 TO 49	214	324	9,873	131,291	91,919	17,281	324	0	0	251,226
50 TO 54	296	173	306	27,522	69,926	57,914	18,118	0	0	174,255
55 TO 59	288	193	174	0	21,396	33,945	32,759	16,180	0	104,936
60 TO 64	0	0	173	175	176	5,506	11,037	13,749	7,842	38,658
65 TO 69	0	0	0	0	175	0	406	933	0	1,514
70 & UP	0	0	0	175	176	176	0	0	0	527
<b>TOTAL <sup>1</sup></b>	<b>123,733</b>	<b>264,970</b>	<b>124,135</b>	<b>437,550</b>	<b>234,413</b>	<b>115,229</b>	<b>62,644</b>	<b>30,862</b>	<b>7,842</b>	<b>1,401,378</b>

<i>AVERAGE SALARIES:<sup>2</sup></i>										
UNDER 20	0	0	0	0	0	0	0	0	0	0
20 TO 24	59,699	0	0	0	0	0	0	0	0	59,699
25 TO 29	66,713	118,429	0	0	0	0	0	0	0	78,038
30 TO 34	71,586	120,007	129,381	146,726	0	0	0	0	0	99,329
35 TO 39	81,149	124,242	134,151	140,816	138,048	0	0	0	0	129,220
40 TO 44	87,446	123,426	134,886	142,847	153,049	135,432	0	0	0	141,992
45 TO 49	106,882	161,762	135,253	143,331	154,746	158,543	161,794	0	0	147,954
50 TO 54	148,212	173,444	152,811	143,342	151,356	159,984	169,326	0	0	154,482
55 TO 59	143,910	193,363	173,890	0	149,624	155,002	167,139	175,873	0	160,453
60 TO 64	0	0	173,085	174,955	175,918	152,954	157,678	167,666	174,259	163,805
65 TO 69	0	0	0	0	174,955	0	135,416	186,529	0	168,205
70 & UP	0	0	0	174,600	176,000	176,000	0	0	0	175,533
<b>TOTAL</b>	<b>70,383</b>	<b>121,658</b>	<b>134,200</b>	<b>142,664</b>	<b>152,911</b>	<b>157,848</b>	<b>165,726</b>	<b>172,411</b>	<b>174,259</b>	<b>129,841</b>

Note: Age is nearest birthdate. Service is nearest year.

<sup>1</sup>Total may not add up due to rounding.

<sup>2</sup>Average based on unrounded salary.



**Table XII-7**  
**Detailed Reconciliation of Active Membership**

TOTAL ACTIVE MEMBERS AS OF JUNE 30, 2021							TOTAL ACTIVE MEMBERS AS OF JUNE 30, 2020				
TIER	GENDER	NUMBER	SALARY	AVG SAL	AVG AGE	AVG SVC	NUMBER	SALARY	AVG SAL	AVG AGE	AVG SVC
I	M	0	0	0	0.0	0.0	0	0	0	0.0	0.0
I	F	0	0	0	0.0	0.0	0	0	0	0.0	0.0
		0	0	0	0.0	0.0	0	0	0	0.0	0.0
II	M	6,775	1,000,660,812	147,699	46.3	20.1	7,180	1,002,457,089	139,618	45.6	19.4
II	F	45	6,428,337	142,852	45.0	17.4	47	6,254,659	133,078	44.0	16.4
		6,820	1,007,089,149	147,667	46.2	20.1	7,227	1,008,711,748	139,575	45.6	19.4
III	M	0	0	0	0.0	0.0	0	0	0	0.0	0.0
III	F	0	0	0	0.0	0.0	0	0	0	0.0	0.0
		0	0	0	0.0	0.0	0	0	0	0.0	0.0
III Revised	M	2	262,020	131,010	35.5	7.0	2	249,889	124,945	34.5	6.0
III Revised	F	0	0	0	0.0	0.0	0	0	0	0.0	0.0
		2	262,020	131,010	35.5	7.0	2	249,889	124,945	34.5	6.0
III Enhancec	M	3,880	385,489,429	99,353	32.4	4.9	3,763	331,729,055	88,155	31.5	4.0
III Enhancec	F	91	8,536,919	93,812	33.8	4.0	87	7,315,706	84,089	32.7	3.1
		3,971	394,026,348	99,226	32.4	4.9	3,850	339,044,761	88,064	31.6	4.0
<b>ALL TIERS</b>		<b>10,793</b>	<b>1,401,377,517</b>	<b>129,841</b>	<b>41.2</b>	<b>14.5</b>	<b>11,079</b>	<b>1,348,006,398</b>	<b>121,672</b>	<b>40.7</b>	<b>14.0</b>

JUNE 30, 2021 MEMBERS ALSO PRESENT AS OF JUNE 30, 2020							JUNE 30, 2020 MEMBERS ALSO PRESENT AS OF JUNE 30, 2021				
TIER	GENDER	NUMBER	SALARY	AVG SAL	AVG AGE	AVG SVC	NUMBER	SALARY	AVG SAL	AVG AGE	AVG SVC
I	M	0	0	0	0.0	0.0	0	0	0	0.0	0.0
I	F	0	0	0	0.0	0.0	0	0	0	0.0	0.0
		0	0	0	0.0	0.0	0	0	0	0.0	0.0
II	M	6,770	1,000,133,266	147,730	46.3	20.1	6,770	944,471,210	139,508	45.3	19.1
II	F	45	6,428,337	142,852	45.0	17.4	45	5,997,057	133,268	44.0	16.4
		6,815	1,006,561,603	147,698	46.3	20.1	6,815	950,468,267	139,467	45.3	19.1
III	M	0	0	0	0.0	0.0	0	0	0	0.0	0.0
III	F	0	0	0	0.0	0.0	0	0	0	0.0	0.0
		0	0	0	0.0	0.0	0	0	0	0.0	0.0
III Revised	M	2	262,020	131,010	35.5	7.0	2	249,889	124,945	34.5	6.0
III Revised	F	0	0	0	0.0	0.0	0	0	0	0.0	0.0
		2	262,020	131,010	35.5	7.0	2	249,889	124,945	34.5	6.0
III Enhancec	M	3,738	377,805,634	101,072	32.5	5.1	3,738	329,703,466	88,203	31.5	4.1
III Enhancec	F	87	8,232,007	94,621	33.7	4.1	87	7,315,706	84,089	32.7	3.1
		3,825	386,037,641	100,925	32.5	5.0	3,825	337,019,172	88,110	31.5	4.0
<b>ALL TIERS</b>		<b>10,642</b>	<b>1,392,861,264</b>	<b>130,883</b>	<b>41.3</b>	<b>14.7</b>	<b>10,642</b>	<b>1,287,737,328</b>	<b>121,005</b>	<b>40.3</b>	<b>13.7</b>

ADDITIONS DURING THE YEAR <sup>1</sup>							SEPARATIONS FROM MEMBERSHIP DURING THE YEAR <sup>1</sup>				
TIER	GENDER	NUMBER	SALARY	AVG SAL	AVG AGE	AVG SVC	NUMBER	SALARY	AVG SAL	AVG AGE	AVG SVC
I	M	0	0	0	0.0	0.0	0	0	0	0.0	0.0
I	F	0	0	0	0.0	0.0	0	0	0	0.0	0.0
		0	0	0	0.0	0.0	0	0	0	0.0	0.0
II	M	5	527,546	105,509	34.6	6.4	410	57,985,879	141,429	51.2	24.5
II	F	0	0	0	0.0	0.0	2	257,602	128,801	45.0	18.5
		5	527,546	105,509	34.6	6.4	412	58,243,481	141,368	51.2	24.4
III	M	0	0	0	0.0	0.0	0	0	0	0.0	0.0
III	F	0	0	0	0.0	0.0	0	0	0	0.0	0.0
		0	0	0	0.0	0.0	0	0	0	0.0	0.0
III Revised	M	0	0	0	0.0	0.0	0	0	0	0.0	0.0
III Revised	F	0	0	0	0.0	0.0	0	0	0	0.0	0.0
		0	0	0	0.0	0.0	0	0	0	0.0	0.0
III Enhancec	M	142	7,683,795	54,111	28.8	0.0	25	2,025,589	81,024	32.6	3.1
III Enhancec	F	4	304,912	76,228	34.3	0.3	0	0	0	0.0	0.0
		146	7,988,707	54,717	29.0	0.0	25	2,025,589	81,024	32.6	3.1
<b>ALL TIERS</b>		<b>151</b>	<b>8,516,253</b>	<b>56,399</b>	<b>29.2</b>	<b>0.2</b>	<b>437</b>	<b>60,269,070</b>	<b>137,915</b>	<b>50.1</b>	<b>23.2</b>

Note: Age is nearest birthday. Service is nearest year. The member is considered also present if active with the same tier and gender as of both valuation dates.

<sup>1</sup>Separations and additions do not include members who joined after June 30, 2020 and are no longer members on June 30, 2021. Members are included as separations and additions if the tier or gender has changed.

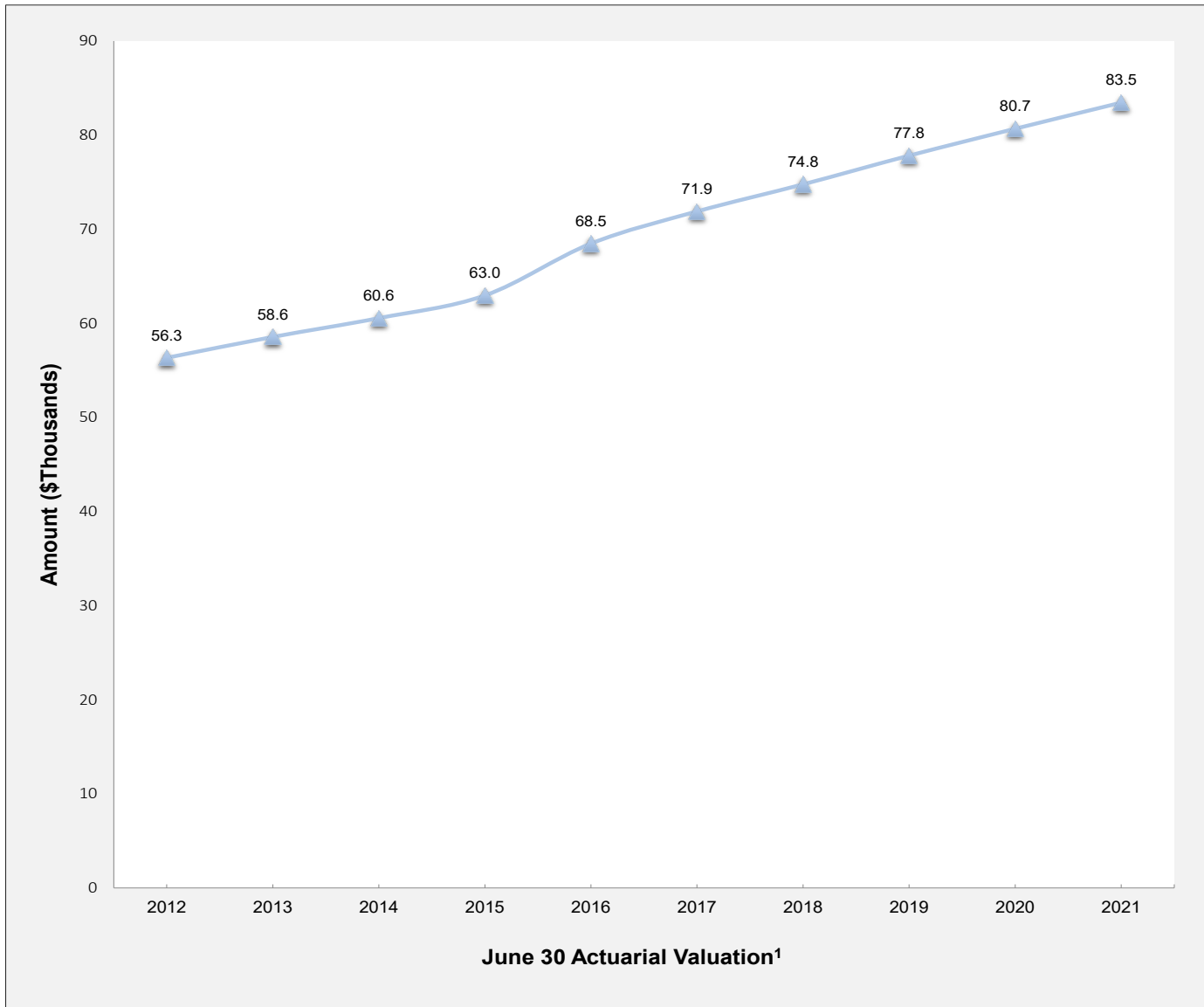
**Table XII-8**  
**Distribution of Pension Benefits as of June 30, 2021**

AGE	MALE			FEMALE			BOTH MALE & FEMALE		
	NUMBER	BENEFITS	AVERAGE	NUMBER	BENEFITS	AVERAGE	NUMBER	BENEFITS	AVERAGE
<i>SERVICE RETIREMENT:</i>									
UNDER 30	0	0	0	0	0	0	0	0	0
30 TO 34	0	0	0	0	0	0	0	0	0
35 TO 39	0	0	0	0	0	0	0	0	0
40 TO 44	14	1,117,573	79,827	0	0	0	14	1,117,573	79,827
45 TO 49	59	4,134,113	70,070	2	159,876	79,938	61	4,293,989	70,393
50 TO 54	147	12,060,386	82,043	0	0	0	147	12,060,386	82,043
55 TO 59	316	26,963,161	85,326	0	0	0	316	26,963,161	85,326
60 TO 64	599	46,177,715	77,091	1	109,156	109,156	600	46,286,871	77,145
65 TO 69	721	51,353,609	71,226	4	187,942	46,986	725	51,541,551	71,092
70 TO 74	545	30,332,950	55,657	3	259,015	86,338	548	30,591,965	55,825
75 TO 79	700	33,789,567	48,271	0	0	0	700	33,789,567	48,271
80 TO 84	762	32,359,081	42,466	0	0	0	762	32,359,081	42,466
85 TO 89	537	20,224,220	37,661	0	0	0	537	20,224,220	37,661
90 & UP	257	9,323,751	36,279	0	0	0	257	9,323,751	36,279
<b>TOTAL</b>	<b>4,657</b>	<b>267,836,126</b>	<b>57,513</b>	<b>10</b>	<b>715,989</b>	<b>71,599</b>	<b>4,667</b>	<b>268,552,115</b>	<b>57,543</b>
<i>ORDINARY DISABILITY:</i>									
UNDER 30	0	0	0	0	0	0	0	0	0
30 TO 34	0	0	0	0	0	0	0	0	0
35 TO 39	1	61,466	61,466	0	0	0	1	61,466	61,466
40 TO 44	9	429,449	47,717	0	0	0	9	429,449	47,717
45 TO 49	9	431,410	47,934	0	0	0	9	431,410	47,934
50 TO 54	9	348,363	38,707	0	0	0	9	348,363	38,707
55 TO 59	12	430,294	35,858	0	0	0	12	430,294	35,858
60 TO 64	31	853,228	27,523	1	29,940	29,940	32	883,168	27,599
65 TO 69	40	1,075,433	26,886	0	0	0	40	1,075,433	26,886
70 TO 74	41	1,995,619	48,674	0	0	0	41	1,995,619	48,674
75 TO 79	69	5,088,169	73,742	0	0	0	69	5,088,169	73,742
80 TO 84	164	10,182,363	62,088	0	0	0	164	10,182,363	62,088
85 TO 89	129	7,600,279	58,917	0	0	0	129	7,600,279	58,917
90 & UP	75	4,131,253	55,083	0	0	0	75	4,131,253	55,083
<b>TOTAL</b>	<b>589</b>	<b>32,627,326</b>	<b>55,394</b>	<b>1</b>	<b>29,940</b>	<b>29,940</b>	<b>590</b>	<b>32,657,266</b>	<b>55,351</b>
<i>ACCIDENTAL DISABILITY:</i>									
UNDER 30	0	0	0	0	0	0	0	0	0
30 TO 34	0	0	0	0	0	0	0	0	0
35 TO 39	56	5,169,983	92,321	1	69,352	69,352	57	5,239,335	91,918
40 TO 44	326	33,043,190	101,359	1	136,534	136,534	327	33,179,724	101,467
45 TO 49	613	64,662,271	105,485	2	171,730	85,865	615	64,834,001	105,421
50 TO 54	1,060	115,251,791	108,728	1	87,218	87,218	1,061	115,339,009	108,708
55 TO 59	1,622	182,049,677	112,238	1	104,724	104,724	1,623	182,154,401	112,233
60 TO 64	1,969	213,707,453	108,536	5	472,812	94,562	1,974	214,180,265	108,501
65 TO 69	1,708	172,184,572	100,811	4	304,946	76,237	1,712	172,489,518	100,753
70 TO 74	868	73,204,226	84,337	5	540,819	108,164	873	73,745,045	84,473
75 TO 79	771	53,765,861	69,735	0	0	0	771	53,765,861	69,735
80 TO 84	733	43,201,616	58,938	0	0	0	733	43,201,616	58,938
85 TO 89	439	22,258,926	50,704	0	0	0	439	22,258,926	50,704
90 & UP	150	7,090,396	47,269	0	0	0	150	7,090,396	47,269
<b>TOTAL</b>	<b>10,315</b>	<b>985,589,962</b>	<b>95,549</b>	<b>20</b>	<b>1,888,135</b>	<b>94,407</b>	<b>10,335</b>	<b>987,478,097</b>	<b>95,547</b>

**Table XII-8**  
**Distribution of Pension Benefits as of June 30, 2021 (cont'd)**

AGE	MALE			FEMALE			TOTAL		
	NUMBER	BENEFITS	AVERAGE	NUMBER	BENEFITS	AVERAGE	NUMBER	BENEFITS	AVERAGE
<i>ACCIDENTAL DEATH:</i>									
UNDER 30	0	0	0	8	817,344	102,168	8	817,344	102,168
30 TO 34	0	0	0	1	96,565	96,565	1	96,565	96,565
35 TO 39	0	0	0	3	487,745	162,582	3	487,745	162,582
40 TO 44	0	0	0	3	353,274	117,758	3	353,274	117,758
45 TO 49	0	0	0	31	3,924,274	126,589	31	3,924,274	126,589
50 TO 54	0	0	0	59	7,536,924	127,744	59	7,536,924	127,744
55 TO 59	0	0	0	103	13,739,050	133,389	103	13,739,050	133,389
60 TO 64	1	53,800	53,800	130	17,661,005	135,854	131	17,714,805	135,228
65 TO 69	0	0	0	87	11,928,944	137,114	87	11,928,944	137,114
70 TO 74	3	315,047	105,016	69	8,974,131	130,060	72	9,289,178	129,016
75 TO 79	0	0	0	67	8,222,367	122,722	67	8,222,367	122,722
80 TO 84	0	0	0	48	5,611,191	116,900	48	5,611,191	116,900
85 TO 89	1	74,107	74,107	35	3,551,089	101,460	36	3,625,196	100,700
90 & UP	0	0	0	21	1,972,847	93,945	21	1,972,847	93,945
<b>TOTAL</b>	<b>5</b>	<b>442,954</b>	<b>88,591</b>	<b>665</b>	<b>84,876,750</b>	<b>127,634</b>	<b>670</b>	<b>85,319,704</b>	<b>127,343</b>
<i>OTHER BENEFICIARIES:</i>									
UNDER 30	1	56,989	56,989	0	0	0	1	56,989	56,989
30 TO 34	0	0	0	3	183,009	61,003	3	183,009	61,003
35 TO 39	0	0	0	5	310,376	62,075	5	310,376	62,075
40 TO 44	0	0	0	3	155,423	51,808	3	155,423	51,808
45 TO 49	0	0	0	0	0	0	0	0	0
50 TO 54	1	122,869	122,869	5	389,618	77,924	6	512,487	85,415
55 TO 59	1	23,535	23,535	11	650,169	59,106	12	673,704	56,142
60 TO 64	0	0	0	26	1,061,521	40,828	26	1,061,521	40,828
65 TO 69	0	0	0	31	1,205,404	38,884	31	1,205,404	38,884
70 TO 74	0	0	0	20	735,982	36,799	20	735,982	36,799
75 TO 79	0	0	0	43	1,503,261	34,960	43	1,503,261	34,960
80 TO 84	0	0	0	57	1,748,445	30,674	57	1,748,445	30,674
85 TO 89	0	0	0	38	732,462	19,275	38	732,462	19,275
90 & UP	0	0	0	71	783,189	11,031	71	783,189	11,031
<b>TOTAL</b>	<b>3</b>	<b>203,393</b>	<b>67,798</b>	<b>313</b>	<b>9,458,859</b>	<b>30,220</b>	<b>316</b>	<b>9,662,252</b>	<b>30,577</b>
<i>ALL PENSIONERS AND BENEFICIARIES:</i>									
UNDER 30	1	56,989	56,989	8	817,344	102,168	9	874,333	97,148
30 TO 34	0	0	0	4	279,574	69,894	4	279,574	69,894
35 TO 39	57	5,231,449	91,780	9	867,473	96,386	66	6,098,922	92,408
40 TO 44	349	34,590,212	99,112	7	645,231	92,176	356	35,235,443	98,976
45 TO 49	681	69,227,794	101,656	35	4,255,880	121,597	716	73,483,674	102,631
50 TO 54	1,217	127,783,409	104,999	65	8,013,760	123,289	1,282	135,797,169	105,926
55 TO 59	1,951	209,466,667	107,364	115	14,493,943	126,034	2,066	223,960,610	108,403
60 TO 64	2,600	260,792,196	100,305	163	19,334,434	118,616	2,763	280,126,630	101,385
65 TO 69	2,469	224,613,614	90,974	126	13,627,236	108,153	2,595	238,240,850	91,808
70 TO 74	1,457	105,847,842	72,648	97	10,509,947	108,350	1,554	116,357,789	74,876
75 TO 79	1,540	92,643,597	60,158	110	9,725,628	88,415	1,650	102,369,225	62,042
80 TO 84	1,659	85,743,060	51,684	105	7,359,636	70,092	1,764	93,102,696	52,779
85 TO 89	1,106	50,157,532	45,350	73	4,283,551	58,679	1,179	54,441,083	46,176
90 & UP	482	20,545,400	42,625	92	2,756,036	29,957	574	23,301,436	40,595
<b>TOTAL</b>	<b>15,569</b>	<b>1,286,699,761</b>	<b>82,645</b>	<b>1,009</b>	<b>96,969,673</b>	<b>96,105</b>	<b>16,578</b>	<b>1,383,669,434</b>	<b>83,464</b>

**Graph XII-9  
Pensioner Average Benefits**



<sup>1</sup> Disclosed 2020 allowances updated to reflect only allowances presented in census data.

**Table XII-10**  
**Reconciliation of Pensioner and Beneficiary Data**

SCHEDULE OF PENSIONERS AND BENEFICIARIES ADDED TO AND REMOVED FROM THE ROLLS								
June 30 Actuarial Valuation	Added to Rolls		Removed from Rolls		End of Year Rolls		% Increase In Annual Allowances	Average Annual Allowances
	Number	Annual Allowances <sup>1</sup>	Number	Annual Allowances	Number	Annual Allowances <sup>1</sup>		
2012	538	58,288,645	638	26,379,782	16,917	953,119,245	3.5%	56,341
2013	453	54,522,199	563	23,448,369	16,807	984,193,075	3.3%	58,559
2014	490	54,256,974	534	23,299,539	16,763	1,015,150,510	3.1%	60,559
2015	500	59,578,951	553	22,526,507	16,710	1,052,202,954	3.6%	62,968
2016	498	110,481,515	561	22,667,718	16,647	1,140,016,751	8.3%	68,482
2017	497	77,245,492	508	21,127,518	16,636	1,196,134,725	4.9%	71,900
2018	456	65,902,484	499	21,226,999	16,593	1,240,810,210	3.7%	74,779
2019	559	78,160,361	524	24,799,933	16,628	1,294,170,638	4.3%	77,831
2020 <sup>2</sup>	560	75,661,961	564	28,481,496	16,624	1,341,351,103	3.6%	80,688
2021	482	69,949,959	528	27,631,628	16,578	1,383,669,434	3.2%	83,464

<sup>1</sup> Allowances shown are those presented in the census data. Beginning 2016, SADB payments to beneficiaries are included.

<sup>2</sup> Disclosed 2020 allowances updated to reflect only allowances presented in census data.

## APPENDIX: ACRONYMS AND ABBREVIATIONS

Revised 2021 A&M	Actuarial Assumptions and Methods proposed by the Actuary and adopted by the Board of Trustees during Fiscal Year 2021
2019 A&M	Actuarial Assumptions and Methods proposed by the Actuary and adopted by the Board of Trustees during Fiscal Year 2019
AAVM	Actuarial Asset Valuation Method
ACCNY	Administrative Code of the City of New York
ADR	Accidental Disability Retirement
AIR	Actuarial Interest Rate
AL	Accrued Liability
AMC	Additional Member Contributions
AVA	Actuarial Value of Assets
BERS	Board of Education Retirement System
BMC	Basic Member Contributions
COLA	Cost-of-Living Adjustment
EAN	Entry Age Normal cost method
FAS	Final Average Salary
FIRE	Fire Pension Fund
FFVSF	Firefighters' Variable Supplements Fund
FOVSF	Fire Officers' Variable Supplements Fund
FS	Final Salary
GASB	Governmental Accounting Standards Board
IRC	Internal Revenue Code
ITHP	Increased-Take-Home-Pay
MVA	Market Value of Assets
NYCERS	New York City Employees' Retirement System
NYCRS	New York City Retirement Systems
ODR	Ordinary Disability Retirement
OYLM	One-Year Lag Methodology
POLICE	Police Pension Fund
PV	Present Value
PVFB	Present Value of Future Benefits
PVFNC	Present Value of Future Normal Costs
TRS	Teachers' Retirement System
UAL	Unfunded Accrued Liability
VSF	Variable Supplements Fund
WTC	World Trade Center