Fiscal Year 2021
Actuarial Valuation Report

for the

New York City
Police Pension Fund

JUNE 30, 2019 (LAG) ACTUARIAL VALUATION

prepared by the

New York City

Office of the Actuary

2021

OFFICE OF THE ACTUARY

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SHERRY S. CHAN
CHIEF ACTUARY

December 29, 2021

Board of Trustees
New York City Police Pension Fund
233 Broadway, Room 2501
New York, NY 10279

Re: Fiscal Year 2021 Actuarial Valuation Report (Report)

Dear Trustees:

This Report presents the results of the June 30, 2019 (Lag) actuarial valuation of the benefits under both the New York City Police Pension Fund (POLICE) and Group Life Insurance Plan (collectively, the Plan). This valuation, known as the June 30, 2019 (Lag) valuation, forms the basis for determining the statutorily-required contribution (Statutory Contribution) of $2,437,727,728 for Fiscal Year 2021 (i.e. for the period beginning July 1, 2020 and ending June 30, 2021). 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, 2018 (Lag) actuarial valuation are shown in this Report for comparative purposes. Other historical information that the Actuary believes useful is also included.

The June 30, 2019 (Lag) and June 30, 2018 (Lag) 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 POLICE and the Office of the Comptroller as of June 30, 2019 and June 30, 2018.

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. The 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 assumptions and methods used for the June 30, 2019 valuation have changed from the prior valuation and were

presented in the memorandum titled "Proposed Changes to Actuarial Assumptions and Methods (Revised 2021 A&M)" dated July 28, 2021 and were adopted by the Board of Trustees at the September 8, 2021 Board meeting.

This Report does not present Governmental Accounting Standards Board (GASB) results. The Office of the Actuary published the Fiscal Year 2021 GASB67 and GASB68 results in a report dated September 24, 2021, which is available on the website of the Office of the Actuary (www.nyc.gov/actuary).

I, Sherry S. Chan, am the Chief Actuary for, and independent of, the New York City Retirement Systems and Pension Funds. I am a Fellow of the Society of Actuaries, an Enrolled Actuary under the Employee Retirement Income and Security Act of 1974, a Member of the American Academy of Actuaries, and a Fellow of the Conference of Consulting Actuaries. I meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein. To the best of my 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,

Sherry S. Chan, FSA, EA, MAAA, FCA
Chief Actuary

SSC/eh

cc: Ms. Melissa Chacko - New York City Office of the Actuary
Mr. Craig Chu - New York City Office of the Actuary
Mr. Kevin Holloran - New York City Police Pension Fund
Mr. Anderson Huynh - New York City Office of the Actuary
Mr. Michael Samet - New York City Office of the Actuary
Keith Snow, Esq. - New York City Office of the Actuary
Mr. Stanley Thomas - New York City Police Pension Fund
Mr. Gregory Zelikovsky - New York City Office of the Actuary

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SECTION I – EXECUTIVE SUMMARY

This Report presents the results of the June 30, 2019 (Lag) actuarial valuation of the New York City Police Pension Fund (POLICE) 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 2021 (i.e. July 1, 2020 to June 30, 2021),
- 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 SKIM amounts as determined by the Actuary in a letter dated August 29, 2019 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, 2019 (Lag) actuarial valuation and, for comparative purposes, the June 30, 2018 (Lag) actuarial valuation.

NEW YORK CITY POLICE PENSION FUND

SUMMARY OF VALUATION RESULTS

Valuation Date	June 30, 2019 (Lag)	June 30, 2018 (Lag)
Fiscal Year	**2021**	**2020**
Funded Status		
1. Accrued Liability[1]	$ 50,614,795,903	$ 48,024,797,912
2. Actuarial Value of Assets (AVA)[2]	40,119,424,000	36,098,314,000
3. Unfunded Accrued Liability (AVA Basis) (1. - 2.)	$ 10,495,371,903	$ 11,926,483,912
4. Funded Ratio (AVA Basis) (2. / 1.)	79.3%	75.2%
5. Market Value of Assets (MVA)[2]	40,119,424,000	37,958,867,000
6. Unfunded Accrued Liability (MVA Basis) (1. - 5.)	$ 10,495,371,903	$ 10,065,930,912
7. Funded Ratio (MVA Basis) (5. / 1.)	79.3%	79.0%
Contribution[3]		
1. Normal Cost	$ 1,532,592,781	$ 1,485,740,396
2. Amortization of Unfunded Accrued Liability	871,927,122	948,956,957
3. Administrative Expenses	33,207,825	24,210,055
4. Actuarial Contribution (1. + 2. + 3.)	$ 2,437,727,728	$ 2,458,907,408
5. Statutory Contribution (4.)	$ 2,437,727,728	$ 2,458,907,408
Participant Data		
1. Active Members		
a. Number	36,401	36,562
b. Annual Salary[4]	$ 4,244,805,002	$ 4,053,204,563
c. Average Salary	$ 116,612	$ 110,858
2. Active Off Payroll Members[5]	1,640	1,940
3. Terminated Vested Members	497	491
4. Retirees and Beneficiaries		
a. Number	50,727	50,124
b. Total Annual Benefits	$ 2,716,137,415	$ 2,587,367,794
c. Average Annual Benefit	$ 53,544	$ 51,619

[1] Includes unfunded VSF Accrued Liability.

[2] Actuarial Value of Assets and Market Value of Assets are rounded to the nearest thousand.

[3] Including results for Variable Supplements Funds.

[4] Salaries shown are the base salary 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.

[5] Represents members no longer on payroll, but not otherwise classified.

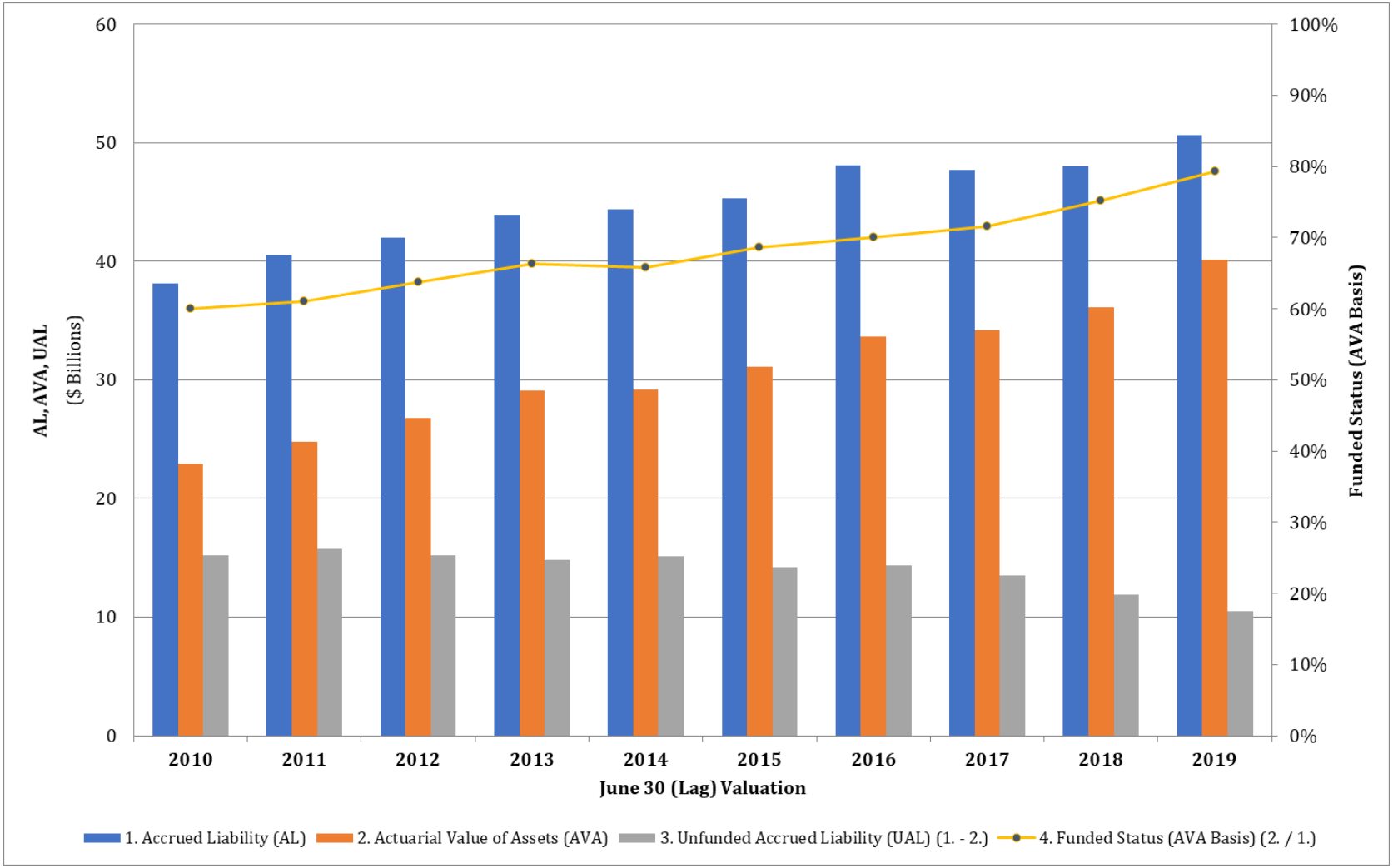
Table I-2
Actuarial Liabilities

NEW YORK CITY POLICE PENSION FUND ACTUARIAL LIABILITIES BY STATUS		
Valuation Date	**June 30, 2019 (Lag)**	**June 30, 2018 (Lag)**
Fiscal Year	**2021**	**2020**
Accrued Liability		
1. Active Members	$ 17,202,005,566	$ 16,169,364,385
2. Active Off Payroll Members[1]	66,025,523	69,981,429
3. Terminated Vested Members	97,941,392	77,488,066
4. Retirees and Beneficiaries	31,959,121,515	30,702,751,350
5. Accrued Liability Pre-Adjustments (1. to 4.)	$ 49,325,093,996	$ 47,019,585,230
6. Actuarial Adjustments[2]	1,289,701,907	1,005,212,682
7. Total Accrued Liability (5. + 6.)	$ 50,614,795,903	$ 48,024,797,912
Present Value of Benefits		
1. Active Members	$ 30,600,252,966	$ 29,231,334,911
2. Active Off Payroll Members[1]	66,025,523	69,981,429
3. Terminated Vested Members	97,941,392	77,488,066
4. Retirees and Beneficiaries	31,959,121,515	30,702,751,350
5. Present Value of Benefits (1. to 4.)	$ 62,723,341,396	$ 60,081,555,756
6. Actuarial Adjustments[2]	2,278,816,565	2,000,551,823
7. Total Present Value of Benefits (5. + 6.)	$ 65,002,157,961	$ 62,082,107,579

[1] Represents members no longer on payroll, but not otherwise classified.

[2] Includes unfunded VSF liability and other actuarial loading adjustments.

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 Actuarial Asset Valuation Method (AAVM) is used to determine the Actuarial Value of Assets (AVA) of the Plan.

The Actuary reset the AVA to the market value as of June 30, 2011 and as of June 30, 2019. Beginning with the June 30, 2020 (Lag) actuarial valuation, the AAVM recognizes investment returns greater or less than expected over a period of five years. In accordance with this AAVM, the Unexpected Investment Returns (UIR) are phased into the AVA at rates of 20% per year.

UIR is defined as the excess of net investment return over the Expected Investment Return (EIR) based on the expected rate of return and the MVA, where EIR equals the sum of beginning-of-fiscal-year MVA plus one-half of net cash flow, multiplied by the expected rate of return.

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

Table II-1
Statement of Plan Net Assets

($ Thousands)		
	June 30, 2019	**June 30, 2018**
ASSETS		
Cash	$ 23,690	$ 4,789
Receivables		
Investment Securities Sold	$ 865,477	$ 546,611
Member Loans	238,644	232,882
Transferrable Earnings due from VSFs to QPP	0	0
Accrued Interest and Dividends	2,294	5,754
Total Receivables	$ 1,106,415	$ 785,247
INVESTMENTS AT FAIR VALUE		
Short-Term Investments		
Commercial Paper	$ 235,970	$ 360,326
Discount Notes	162,145	1,999
Short-term Investment Fund	234,110	339,461
U.S. Treasury Bills	0	61,471
Debt Securities	10,795,466	9,951,025
Equity Securities	13,218,301	11,946,234
Alternative Investments	8,857,894	7,922,588
Collective Trust Funds		
Fixed Income	132,311	0
Bank Loans	536,357	615,119
Corporate and Other	50,620	75,491
Domestic Equity	87,942	124,872
International Equity	5,984,252	6,273,065
Mortgage Debt Security	204,347	186,862
Treasury Inflation Protected Securities	457,367	1,744,591
U.S. Government and Agency	25,958	69,204
Collateral From Securities Lending	3,733,667	4,832,615
Total Investments	$44,716,707	$44,504,923
OTHER ASSETS	7,093	6,583
TOTAL ASSETS	$45,853,905	$45,301,542
LIABILITIES		
Accounts Payable	$ 265,086	$ 302,529
Payable for Investment Securities Purchased	863,328	629,892
Accrued Benefits Payable	69,608	91,639
Accrued Transfers to VSFs	802,792	1,486,000
Security Lending	3,733,667	4,832,615
TOTAL LIABILITIES	$ 5,734,481	$ 7,342,675
PLAN ASSETS HELD IN TRUST FOR PENSION BENEFITS	$40,119,424	$37,958,867

Table II-2
Statement of Changes in Plan Net Assets

($ Thousands)	June 30, 2019	June 30, 2018
ADDITIONS		
Contributions		
Member Contributions	$ 278,087	$ 267,031
Employer Contributions	2,558,256	2,415,153
Total Contributions	$ 2,836,343	$ 2,682,184
Investment Income (Loss)		
Interest Income	$ 548,925	$ 517,469
Dividend Income	494,434	485,726
Net Appreciation (Depreciation) in Fair Value	1,772,808	3,190,498
Total Investment Income (Loss)	$ 2,816,167	$ 4,193,693
Less Investment Expenses	249,849	285,243
Net Income (Loss)	$ 2,566,318	$ 3,908,450
Securities Lending Transactions		
Securities Lending Income	$ 17,063	$ 18,703
Securities Lending Fees	(1,679)	(1,870)
Net Securities Lending Income (Loss)	$ 15,384	$ 16,833
Net Investment Income (Loss)	$ 2,581,702	$ 3,925,283
Other		
Net Receipts from Other Retirement Systems	$ 1,907	$ 1,627
Transferrable Earnings due from VSFs to QPP	139,836	0
Litigation Income	2,201	1,781
TOTAL ADDITIONS	$ 5,561,989	$ 6,610,875
DEDUCTIONS		
Benefit Payments and Withdrawals	$ 2,853,799	$ 2,774,387
Accrued Transfers to VSFs	518,628	1,280,000
Administrative Expenses	29,005	21,146
TOTAL DEDUCTIONS	$ 3,401,432	$ 4,075,533
NET INCREASE (DECREASE) IN PLAN NET ASSETS	$ 2,160,557	$ 2,535,342
PLAN NET ASSETS HELD IN TRUST FOR PENSION BENEFITS		
Beginning of Year	$ 37,958,867	$ 35,423,525
End of Year	$ 40,119,424	$ 37,958,867

Table II-3
Development of Actuarial Value of Assets

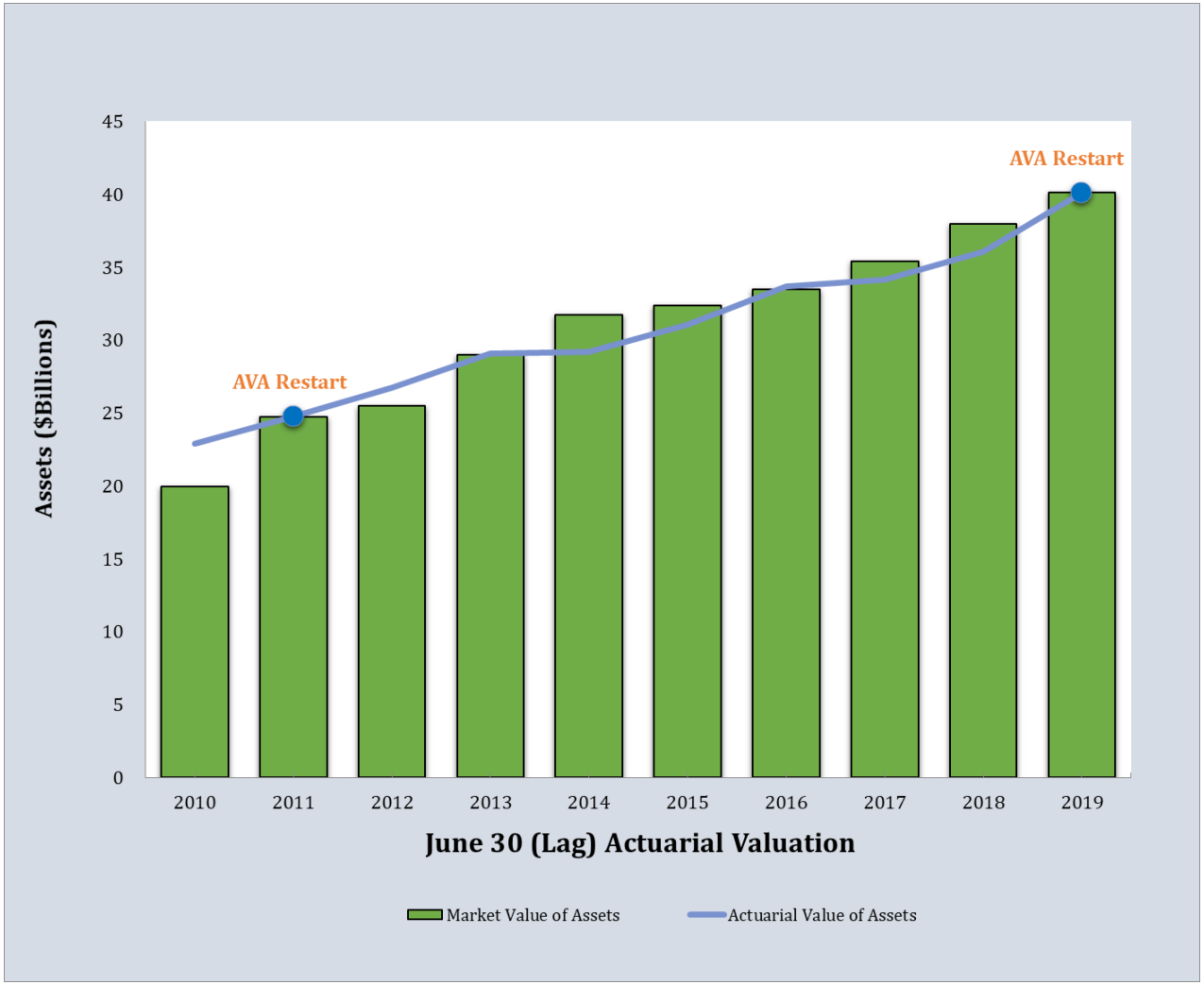
($ Thousands)		
Valuation Date	**June 30, 2019[1]**	**June 30, 2018**
1. Market Value of Assets (MVA)		
a. Beginning of Year (BOY)	$ 37,958,867	$ 35,423,525
b. End of Year (EOY)	$ 40,119,424	$ 37,958,867
2. Contributions		
a. Employee	$ 278,087	$ 267,031
b. Employer	2,558,256	2,415,153
c. Total Contributions	$ 2,836,343	$ 2,682,184
3. Benefit Payments and Other Cash Flow	$ (2,878,696)	$ (2,792,125)
4. Transferable Earnings from POLICE to VSFs - EOY	$ (378,792)	$ (1,280,000)
5. Net Cash Flow (2.c. + 3. + 4.)	$ (421,145)	$ (1,389,941)
6. Net Investment Income		
a. Investment Income	$ 2,831,551	$ 4,210,526
b. Investment Expenses	(249,849)	(285,243)
c. Total Net Investment Income	$ 2,581,702	$ 3,925,283
7. Average Invested Assets		
a. AVA @ BOY	N/A	$ 34,162,505
b. 1/2 Net Cash Flow before SKIM ((2.c. + 3.) / 2)	N/A	(54,971)
c. Total	N/A	$ 34,107,534
8. Expected Rate of Return (AIR)	7.00%	7.00%
9. Expected Investment Return (EIR) (7.c. x 8.)[2]	$ 2,581,702	$ 2,387,527
10. Unexpected Investment Return (UIR) (6.c. - 9.)	$ 0	$ 1,537,756
11. Preliminary AVA @ EOY		
a. AVA @ BOY (prior to corridor limit)[2]	N/A	$ 34,162,505
b. Net Cash Flow (5.)	N/A	(1,389,941)
c. Expected Investment Return (9.)	N/A	2,387,527
d. Phase in of UIR[3]		
20%/15% * UIR for prior year	N/A	230,663
20%/15% * UIR for second prior year	N/A	258,244
20%/15% * UIR for third prior year	N/A	(230,648)
20%/15% * UIR for fourth prior year	N/A	(154,887)
20%/20% * UIR for fifth prior year	N/A	607,069
0%/20% * UIR for sixth prior year	N/A	227,782
Total	N/A	$ 938,223
e. Preliminary AVA (11.a. + 11.b. + 11.c. + 11.d.)	N/A	$ 36,098,314
12. Corridor		
a. 80% of MVA	$ 32,095,539	$ 30,367,094
b. 120% of MVA	$ 48,143,309	$ 45,550,640
13. Final AVA @ EOY (11e. bounded by 12.)	**$ 40,119,424**	**$ 36,098,314**

[1] Calculations reflect the "Revised 2021 A&M," the actuarial assumptions and methods proposed in a memo dated July 28, 2021 and adopted by the Board at the September 8, 2021 Board meeting.

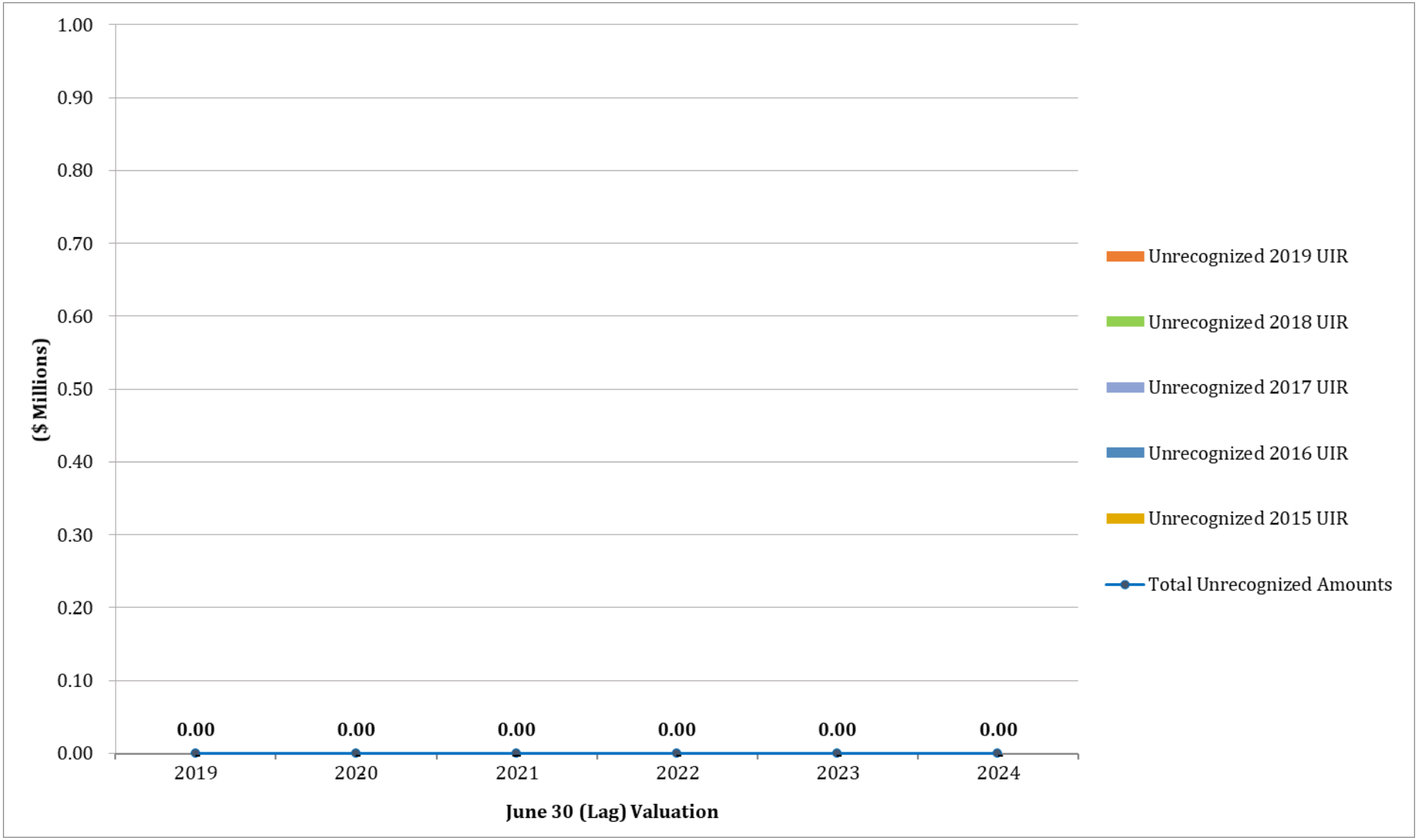
[2] Due to the "Revised 2021 A&M," AVA has been restarted by setting it equal to the MVA as of June 30, 2019 and Actual Investment Return rather than Expected Investment Return is used in the June 30, 2019 calculations.

[3] Due to the "Revised 2021 A&M," the recognition of future asset performance has been changed from the previous six-year period, from 15% for the first four years and 20% for the last two years, to a five-year period at 20% per year.

Graph II-4
Historical Market and Actuarial Value of Assets



Graph II-5
Future Recognition of UIR as of June 30, 2019



As a result of the AVA restart as of June 30, 2019, all previous UIRs have been recognized.

SECTION III – CONTRIBUTION DEVELOPMENT AND HISTORY

Table III-1
Statutory Contributions

Table III-1 shows the components of the Fiscal Year 2021 and the Fiscal Year 2020 Statutory Contributions.

COMPONENTS OF CURRENT AND PRIOR FISCAL YEAR STATUTORY CONTRIBUTIONS		
Valuation Date	**June 30, 2019 (Lag)**	**June 30, 2018 (Lag)**
Fiscal Year	**2021**	**2020**
Normal Cost[1]	$ 1,532,592,781	$ 1,485,740,396
Amortization of Unfunded Accrued Liability		
-Initial UAL	1,295,115,154	1,257,393,353
-2011 (Gain)/Loss	32,652,194	32,652,194
-2012 (Gain)/Loss	(58,789,449)	(58,789,449)
-2013 (Gain)/Loss	(27,789,355)	(27,789,355)
-2014 (Gain)/Loss	(25,983,043)	(25,983,043)
-2014 Assumption Change[2]	70,722,523	70,722,523
-2015 (Gain)/Loss	(104,289,367)	(104,289,367)
-2016 (Gain)/Loss	2,510,395	2,510,395
-2016 SADB	46,805,208	46,805,208
-2016 Enhanced ADR	1,442,093	1,442,093
-2017 (Gain)/Loss	4,907,592	4,907,592
-2017 No VSF Escalation Offset	1,515,961	1,515,961
-2017 Non-Uniformed Service	5,541,419	5,541,419
-2017 Assumption Change[3]	(39,298,270)	(39,298,270)
-2017 Method Change[3]	(43,410,786)	(43,410,786)
-2018 (Gain)/Loss	(174,973,511)	(174,973,511)
-2019 (Gain)/Loss	(39,400,185)	NA
-2019 Assumption Change[4]	9,683,002	NA
-2019 Method Change[4]	(85,034,453)	NA
Total	871,927,122	948,956,957
Administrative Expenses	33,207,825	24,210,055
Total Contribution to the New York City Police Pension Fund	**$ 2,437,727,728**	**$ 2,458,907,408**

[1] Includes amounts necessary, if any, to provide for financing of the Excess Benefit Plan established by Chapter 623/04.

[2] Change in post retirement mortality assumptions including the change to the mortality improvement scale MP-2015.

[3] 2019 A&M.

[4] Revised 2021 A&M.

Table III-2
Schedule of Unfunded Accrued Liability Bases

The Initial Unfunded Accrued Liability (UAL) is being amortized over a closed 22-year period using Increasing Dollar Payments (IDP). Under IDP, amortization payments increase by 3.0% per year, consistent with the assumed rate of General Wage Increases. Increments to the UAL established after June 30, 2010 are generally amortized using Level Dollar Payments (LDP) as follows:

- Benefit Changes – Over the remaining working lifetimes of those impacted, unless the amortization period is determined by statute.
- Assumption and Method Changes – Over a closed 20-year period.
- Actuarial Gains and Losses – Over a closed 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 closed 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, 2019.

NEW YORK CITY POLICE PENSION FUND SCHEDULE OF UNFUNDED ACCRUED LIABILITY BASES						
Amortization Base	**Date Established**	**Original Amount**	**Amortization Years**	**Amortization Payment**	**Payments Remaining**	**OYLM UAL June 30, 2019**
Initial UAL	6/30/10	$ 13,211,374,581	22	$ 1,295,115,154	12	$ 11,485,703,889
(Gain)/Loss	6/30/11	$ 276,060,031	15	$ 32,652,194	6	$ 150,460,912
(Gain)/Loss	6/30/12	$ (497,039,100)	15	$ (58,789,449)	7	$ (306,294,364)
(Gain)/Loss	6/30/13	$ (234,946,852)	15	$ (27,789,355)	8	$ (160,418,835)
(Gain)/Loss	6/30/14	$ (219,675,273)	15	$ (25,983,043)	9	$ (163,654,526)
Assumption Change[1]	6/30/14	$ 706,645,098	20	$ 70,722,523	14	$ 597,928,028
(Gain)/Loss	6/30/15	$ (881,721,022)	15	$ (104,289,367)	10	$ (708,119,852)
(Gain)/Loss	6/30/16	$ 21,224,294	15	$ 2,510,395	11	$ 18,198,463
SADB	6/30/16	$ 395,717,583	15	$ 46,805,208	11	$ 339,302,286
Enhanced ADR	6/30/16	$ 13,611,142	18	$ 1,442,093	14	$ 12,192,265
(Gain)/Loss	6/30/17	$ 41,491,543	15	$ 4,907,592	12	$ 37,682,867
No VSF Escalation Offset	6/30/17	$ 14,308,348	18	$ 1,515,961	15	$ 13,347,969
Non-Uniformed Service	6/30/17	$ 55,368,731	20	$ 5,541,419	17	$ 52,302,481
Assumption Change[2]	6/30/17	$ (392,660,331)	20	$ (39,298,270)	17	$ (370,915,296)
Method Change[2]	6/30/17	$ (433,751,763)	20	$ (43,410,786)	17	$ (409,731,137)
(Gain)/Loss	6/30/18	$ (1,479,324,567)	15	$ (174,973,511)	13	$ (1,413,724,010)
(Gain)/Loss	6/30/19	$ (333,111,349)	15	$ (39,400,185)	14	$ (333,111,349)
Assumption Change[3]	6/30/19	$ 96,750,593	20	$ 9,683,002	19	$ 96,750,593
Method Change[3]	6/30/19	$ (849,647,000)	20	$ (85,034,453)	19	$ (849,647,000)

[1] Change in post retirement mortality assumptions including the change to the mortality improvement scale MP-2015.

[2] 2019 A&M.

[3] Revised 2021 A&M.

Graph III-3
Remaining UAL Amortizations as of June 30, 2019

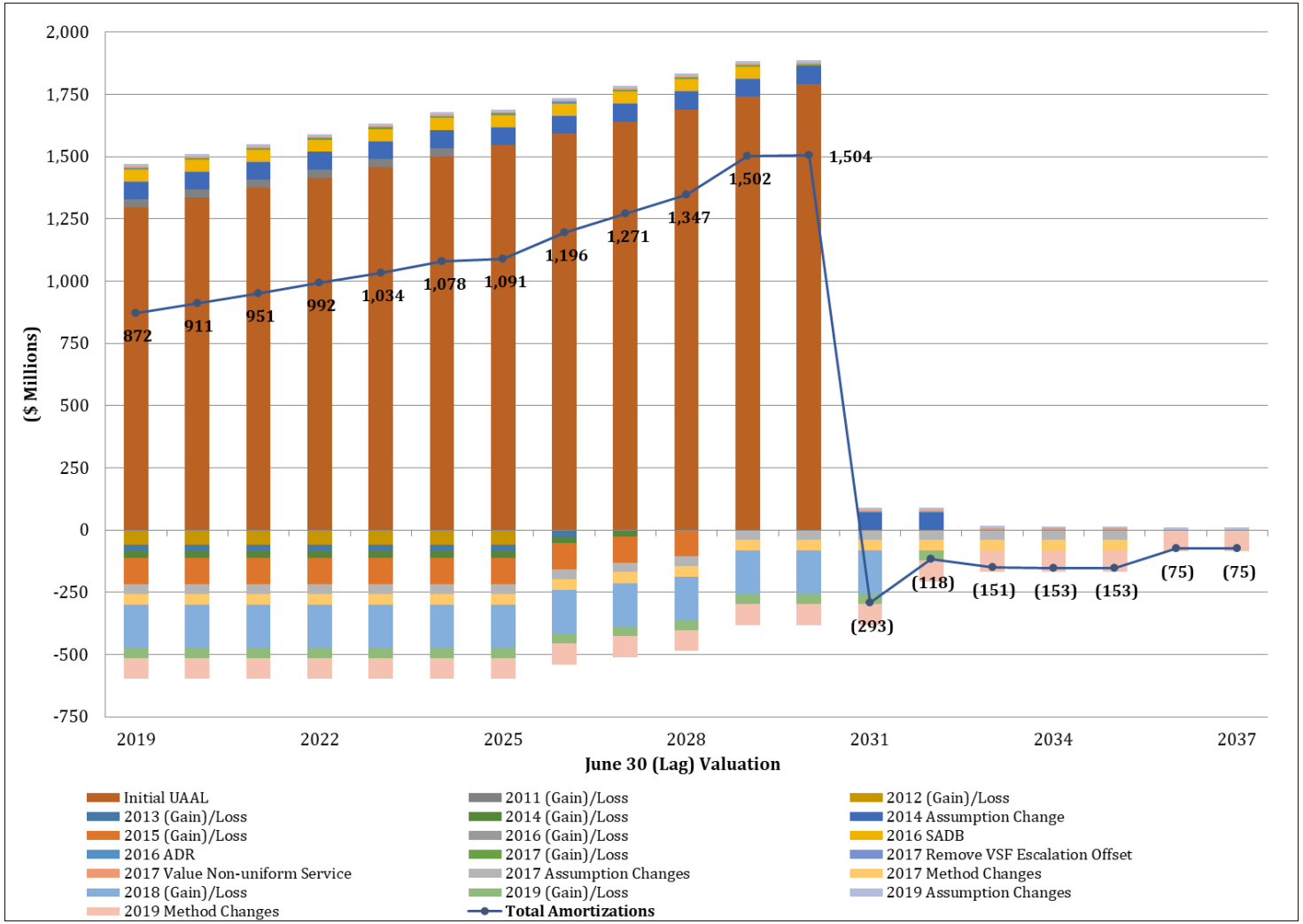


Table III-4
Reconciliation of Outstanding UAL Bases

Amounts (in $ Thousands) Remaining to be Amortized, as of										
June 30 (Lag) Valuation Date	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017 [1]**	**2018**	**2019**
Unfunded Accrued Liability, June 30, 2010	$ 13,211,375	$ 14,136,171	$ 14,098,951	$ 14,028,324	$ 13,921,027	$ 13,773,540	$ 13,582,070	$ 12,196,739	$ 11,870,348	$ 11,485,704
2011 (Gain)/Loss		276,060	295,384	282,285	268,270	253,273	237,226	188,490	170,119	150,461
2012 (Gain)/Loss			(497,039)	(531,832)	(508,248)	(483,013)	(456,011)	(370,286)	(339,372)	(306,294)
2013 (Gain)/Loss				(234,947)	(251,393)	(240,245)	(228,317)	(188,688)	(175,032)	(160,419)
2014 (Gain)/Loss					(219,675)	(235,053)	(224,629)	(188,357)	(176,424)	(163,655)
2014 Assumption Change					706,645	756,110	735,882	645,868	622,708	597,928
2015 (Gain)/Loss						(881,721)	(943,441)	(800,784)	(756,019)	(708,120)
2016 (Gain)/Loss							21,224	20,283	19,276	18,198
2016 SADB							395,717	378,170	359,393	339,302
2016 Enhanced ADR							13,611	13,170	12,698	12,192
2017 (Gain)/Loss								41,492	39,652	37,683
2017 Removal of VSF Escalation Offset								14,308	13,844	13,348
2017 Non-uniformed Service								55,369	53,887	52,302
2017 Assumption Changes								(392,660)	(382,155)	(370,915)
2017 Method Changes								(433,752)	(422,148)	(409,731)
2018 (Gain)/Loss									(1,479,325)	(1,413,724)
2019 (Gain)/Loss										(333,111)
2019 Assumption Changes										96,751
2019 Method Changes										(849,647)
Sum of Outstanding Amortization Amounts	**$ 13,211,375**	**$ 14,412,231**	**$ 13,897,296**	**$ 13,543,830**	**$ 13,916,626**	**$ 12,942,891**	**$ 13,133,332**	**$ 11,179,360**	**$ 9,431,451**	**$ 8,088,253**

June 30 (Lag) Valuation Date	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
1. Accrued Liability (AL)	$ 38,134,430	$ 40,524,580	$ 42,015,625	$ 43,900,094	$ 44,384,022	$ 45,297,561	$ 48,059,916	$ 47,696,250	$ 48,024,798	$ 50,614,796
2. Actuarial Value of Assets (AVA)	22,908,732	24,748,860	26,777,077	29,087,154	29,212,981	31,092,977	33,692,647	34,162,505	36,098,314	40,119,424
3. Unfunded Accrued Liability (UAL) (1. - 2.)	15,225,698	15,775,720	15,238,548	14,812,940	15,171,041	14,204,584	14,367,269	13,533,745	11,926,484	10,495,372
4. PV 1-year Adjusted Employer Contribution[2]	2,014,323	1,328,510	1,306,238	1,232,609	1,216,942	1,223,860	1,195,008	2,334,817	2,473,159	2,377,116
5. PV Future Administrative Expense Reimbursement	0	34,979	35,014	36,501	37,473	37,833	38,929	19,568	21,874	30,003
6. Adjusted UAL (3. - 4. - 5.)	**$ 13,211,375**	**$ 14,412,231**	**$ 13,897,296**	**$ 13,543,830**	**$ 13,916,626**	**$ 12,942,891**	**$ 13,133,332**	**$ 11,179,360**	**$ 9,431,451**	**$ 8,088,253**

[1] Beginning at June 30, 2017, amounts remaining to be amortized have been reduced by the prior valuation year's amortization payments. When considered with (2) below, this change has no effect.

[2] Beginning at June 30, 2017, the PV 1-year Adjusted Employer Contribution includes amounts used to pay UAL bases and one year of administrative expenses. When considered with (1) above, this change has no effect.

Table III-5
Actuarial and Statutory Contribution History

Table III-5 compares the Statutory Contributions to the Actuarial Contributions for Fiscal Years 2012 through 2021.

($ Thousands)			
Fiscal Year Ended June 30	**Actuarial Contribution Certified**	**Statutory Contribution Contributed**	**Percentage of Actuarial Contribution Contributed**
2012	2,385,731	2,385,731	100.0%
2013	2,424,690	2,424,690	100.0%
2014	2,320,910	2,320,910	100.0%
2015	2,309,619	2,309,619	100.0%
2016	2,393,940	2,393,940	100.0%
2017	2,293,840	2,293,840	100.0%
2018	2,415,153	2,415,153	100.0%
2019	2,558,256	2,558,256	100.0%
2020	2,458,907	2,458,907	100.0%
2021	2,437,728	2,437,728	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 2012 through 2021.

CITY RATES ($ Thousands)			
Fiscal Year Ended June 30	**Actuarial Contribution**	**Salary[1] at Beginning of Fiscal Year**	**City Rate**
2012	$ 2,385,731	$ 3,448,765	69.2%
2013	2,424,690	3,459,872	70.1%
2014	2,320,910	3,420,312	67.9%
2015	2,309,619	3,512,778	65.7%
2016	2,393,940	3,540,326	67.6%
2017	2,293,840	3,509,985	65.4%
2018	2,415,153	3,673,054	65.8%
2019	2,558,256	3,994,618	64.0%
2020	2,458,907	4,084,569	60.2%
2021	2,437,728	4,288,264	56.8%

[1]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

Table IV-1 develops the asset and liability (Gain)/Loss between the June 30, 2018 (Lag) actuarial valuation and the June 30, 2019 (Lag) actuarial valuation.[1]

DEVELOPMENT OF EXPERIENCE (GAIN)/LOSS JUNE 30, 2019 ($ Thousands)	
1. Expected Accrued Liability (AL)	
a. AL at June 30, 2018	$ 53,304,980
b. Total Normal Cost and Administrative Expenses at June 30, 2018	1,639,232
c. Interest on 1.a. and 1.b. to June 30, 2019	3,846,095
d. Fiscal Year 2019 Benefit Payments	(3,282,070)
e. Interest on 1.d. to June 30, 2019	(112,930)
f. Expected AL at June 30, 2019	$ 55,395,307
2. Actual AL at June 30, 2019 before Revised 2021 A&M	$ 55,591,800
3. Expected Total Actuarial Value of Assets (AVA)	
a. Total AVA at June 30, 2018	$ 41,378,496
b. Interest on 3.a. to June 30, 2019	2,896,495
c. Total Contributions Paid in Fiscal Year 2019	2,836,343
d. Interest on 3.c. to June 30, 2019	97,593
e. Fiscal Year 2019 Benefit Payments	(3,282,070)
f. Interest on 3.e. to June 30, 2019	(112,930)
g. Expected Total AVA at June 30, 2019	$ 43,813,927
4. Actual Total AVA at June 30, 2019 before Revised 2021 A&M	$ 44,343,532
5. Liability (Gain)/Loss (2. - 1.f.)	**$ 196,493**
6. Actuarial Asset (Gain)/Loss (3.g. - 4.)	**$ (529,605)**
7. Total Actuarial (Gain)/Loss (5. + 6.)	**$ (333,112)**

[1] Includes results for the Variable Supplements Funds.

SECTION V – SCHEDULE OF FUNDING PROGRESS

A schedule of funding progress is provided below. This schedule of funding progress was previously required by GASB 25, which has been superseded by GASB 67, 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

NEW YORK CITY POLICE PENSION FUND ($ Thousands)						
June 30 (Lag) Valuation Date	**(1) Actuarial Value of Assets (AVA)**	**(2) Accrued Liability (AL)**	**(3) Unfunded AL (UAL) (2) - (1)**	**(4) Funded Ratio (1) / (2)**	**(5) Covered Payroll**	**(6) UAL as a % of Covered Payroll (3) / (5)**
2010	$ 22,908,732	$ 38,134,430	$ 15,225,698	60.1%	$ 3,464,097	439.5%
2011	24,748,860	40,524,580	15,775,720	61.1%	3,480,066	453.3%
2012	26,777,077	42,015,625	15,238,548	63.7%	3,478,154	438.1%
2013	29,087,154	43,900,094	14,812,940	66.3%	3,607,607	410.6%
2014	29,212,981	44,384,022	15,171,041	65.8%	3,618,095	419.3%
2015	31,092,977	45,297,561	14,204,584	68.6%	3,564,030	398.6%
2016	33,692,647	48,059,916	14,367,269	70.1%	3,717,425	386.5%
2017	34,162,505	47,696,250	13,533,745	71.6%	3,968,885	341.0%
2018	36,098,314	48,024,798	11,926,484	75.2%	4,053,205	294.2%
2019	40,119,424	50,614,796	10,495,372	79.3%	4,244,805	247.3%

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 Police Pension Fund administers both the Police Officer's Variable Supplements Fund (POVSF) and the Police Superior Officers' Variable Supplements Fund (PSOVSF). The POVSF and PSOVSF (the Funds) operate pursuant to the provisions of Title 13, Chapter 2 of the Administrative Code of the City of New York (ACCNY) and provide supplemental benefits to retirees who were Police Officers and Police Superior Officers, respectively, of the New York City Police Department, Subchapter One Pension Fund or New York City Police 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, 2019**	**June 30, 2018**
POVSF		
Active	$ 443,491	$ 437,054
Retiree	1,594,428	1,586,911
Total	$ 2,037,919	$ 2,023,965
PSOVSF		
Active	$ 1,375,564	$ 1,375,012
Retiree	2,452,387	2,417,808
Total	$ 3,827,951	$ 3,792,820
Total VSF AL	$ 5,865,870	$ 5,816,785

Table VI-2
VSF Member Data

VARIABLE SUPPLEMENTS FUNDS

MEMBERS INCLUDED IN THE
JUNE 30, 2019 (LAG) AND JUNE 30, 2018 (LAG) ACTUARIAL VALUATIONS

	June 30, 2019		June 30, 2018	
	POVSF	**PSOVSF**	**POVSF**	**PSOVSF**
Actives				
Number	23,709	12,692	23,841	12,721
Average Age	35.0	43.0	34.8	43.0
Retirees				
Number	12,799	19,423	12,675	19,005
Average Age	62.6	62.2	62.4	61.8

Table VI-3
VSF Statement of Assets

($ Thousands)				
Valuation Date	**June 30, 2019[1]**		**June 30, 2018[2]**	
	MVA[3]	**AVA**	**MVA[4]**	**AVA**
POVSF	$ 1,976,399	$ 1,976,399	$ 2,068,782	$ 2,309,025
PSOVSF	3,097,356	3,097,356	2,771,210	2,971,157
Total	$ 5,073,755	$ 5,073,755	$ 4,839,992	$ 5,280,182

[1] Includes preliminary SKIM amounts as determined by the Actuary in a letter dated August 29, 2019 to the Comptroller's Office. AVA was restarted to equal MVA in the Revised 2021 A&M.

[2] Includes preliminary SKIM amounts as determined by the Actuary in a letter dated September 7, 2018 to the Comptroller's Office.

[3] Includes Accrued Benefits Payable of $77,820,000 for POVSF and $118,052,000 for PSOVSF.

[4] Includes Accrued Benefits Payable of $76,906,000 for POVSF and $115,640,000 for PSOVSF.

Table VI-4
Development of VSF Actuarial Value of Assets

($ Thousands)	June 30, 2019[1]		June 30, 2018	
	POVSF	**PSOVSF**	**POVSF**	**PSOVSF**
1. Market Value of Assets (MVA)				
a. Beginning of Year (BOY)[2]	$ 2,068,782	$ 2,771,210	$ 2,100,606	$ 1,839,768
b. End of Year (EOY)[3]	$ 1,976,399	$ 3,097,356	$ 2,068,782	$ 2,771,210
2. Contributions				
a. Employee	$ 0	$ 0	$ 0	$ 0
b. Employer	0	0	0	0
c. Total Contributions	$ 0	$ 0	$ 0	$ 0
3. Benefit Payments and Other Cash Flow	$ (164,241)	$ (260,629)	$ (162,118)	$ (256,991)
4. Transferable Earnings from POLICE to VSFs - EOY	$ (31,836)	$ 410,628	$ 130,000	$ 1,150,000
5. Net Cash Flow (2.c. + 3. + 4.)	$ (196,077)	$ 149,999	$ (32,118)	$ 893,009
6. Net Investment Income				
a. Investment Income	$ 104,816	$ 177,460	$ 1,420	$ 39,012
b. Investment Expenses	(1,122)	(1,313)	(1,126)	(579)
c. Total Net Investment Income	$ 103,694	$ 176,147	$ 294	$ 38,433
7. Average Invested Assets				
a. AVA @ BOY	N/A	N/A	$ 2,234,906	$ 1,996,403
b. 1/2 Net Cash Flow before SKIM ((2.c. + 3.) / 2)	N/A	N/A	(81,059)	(128,496)
c. Total	N/A	N/A	$ 2,153,847	$ 1,867,907
8. Expected Rate of Return (AIR)	7.00%	7.00%	7.00%	7.00%
9. Expected Investment Return (EIR) (7.c. x 8.)[4]	$ 103,694	$ 176,147	$ 150,769	$ 130,753
10. Unexpected Investment Return (UIR) (6.c. - 9.)	$ 0	$ 0	$ (150,475)	$ (92,320)
11. Preliminary AVA @ EOY				
a. AVA @ BOY[4]	N/A	N/A	$ 2,234,906	$ 1,996,403
b. Net Cash Flow (5.)	N/A	N/A	(32,118)	893,009
c. Expected Investment Return (9.)	N/A	N/A	150,769	130,753
d. Phase in of UIR[5]				
20%/15% * UIR for prior year	N/A	N/A	(22,571)	(13,848)
20%/15% * UIR for second prior year	N/A	N/A	8,946	(1,232)
20%/15% * UIR for third prior year	N/A	N/A	(39,384)	(26,551)
20%/15% * UIR for fourth prior year	N/A	N/A	(7,283)	(6,808)
20%/20% * UIR for fifth prior year	N/A	N/A	9,741	(216)
0%/20% * UIR for sixth prior year	N/A	N/A	6,019	(353)
Total	N/A	N/A	$ (44,532)	$ (49,008)
e. Preliminary AVA (11.a. + 11.b. + 11.c. + 11.d.)	N/A	N/A	$ 2,309,025	$ 2,971,157
12. Final AVA at EOY (11.e.)	**$ 1,976,399**	**$ 3,097,356**	**$ 2,309,025**	**$ 2,971,157**

[1] Calculations reflect the "Revised 2021 A&M," the actuarial assumptions and methods proposed in a memo dated July 28, 2021 and adopted by the Board at the September 8, 2021 Board meeting.

[2] Includes Accrued Benefits Payable for 6/30/2018 of $76,906,000 for POVSF and $115,640,000 for PSOVSF and Accrued Benefits Payable for 6/30/2017 of $75,739,000 for POVSF and $112,389,000 for PSOVSF.

[3] Includes Accrued Benefits Payable for 6/30/2019 of $77,820,000 for POVSF and $118,052,000 for PSOVSF and Accrued Benefits Payable for 6/30/2018 of $76,906,000 for POVSF and $115,640,000 for PSOVSF.

[4] Due to the "Revised 2021 A&M," AVA has been restarted by setting it equal to the MVA as of June 30, 2019 and Actual Investment Return rather than Expected Investment Return is used in the June 30,2019 calculations.

[5] Due to the "Revised 2021 A&M," the recognition of future asset performance has been changed from the previous six-year period, from 15% for the first four years and 20% for the last two years, to a five-year period at 20% per year.

Table VI-5
Preliminary SKIM Calculation as of June 30, 2019

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

($ Thousands)	Preliminary[1]	
Total POLICE Pension Fund		
1. FY2019 Equity Earnings	$	1,438,758
2. FY2019 Hypothetical Earnings		807,561
3. FY2019 Excess Earnings (1. - 2.)		631,197
4. Deficit at June 30, 2018		0
5. Hypothetical Interest Rate (HIR)		3.148%
6. Deficit with interest (4. x (1+HIR))		0
7. Potential SKIM (3. - 6.), not less than zero	$	631,197
	POVSF	**PSOVSF**
Allocations to VSF		
8. Allocation Percentage	50.798%	49.202%
9. Potential SKIM (7. x 8.)	$ 320,635	$ 310,561
10. APV of Accumulated Plan Benefits	1,976,685	3,727,920
11. MVA Prior to SKIM	1,868,399	2,786,357
12. Unfunded APV of Accumulated Plan Benefits (10. - 11.), not less than zero	108,286	941,563
13. SKIM Payable (Lesser of 9. and 12., not less than zero)	108,286	310,561
14. Rounded Estimate, for FY19 Financial Statements[1]	$ 108,000	$ 311,000

[1] Included in MVA at June 30, 2019.

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

D. Form of Payment

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

E. VSF DROP

Members 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.

Summary of VSF Actuarial Assumptions and Methods

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

1. **POVSF vs. PSOVSF Membership**: Amongst current active members, 40% of members who become eligible for VSF benefits are assumed to retire as Police Officers, while the remaining 60% are assumed to retire as Police Superior Officers.

2. **COLA**: 1.5% per year for Auto COLA, used to estimate future COLA on the first $18,000 of POLICE benefits which, in general, reduces benefits payable by the Fund until age 62.

3. **Actuarial Asset Valuation Method**: Information on the Market Value of Assets (MVA) of the Variable Supplements Funds (VSF) is provided by the Office of the Comptroller. The same Actuarial Asset Valuation Method (AAVM) is used to determine the Actuarial Value of Assets (AVA) of the POVSF and the PSOVSF 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 POLICE to the POVSF and the PSOVSF are recognized through a methodology where the PV of future VSF transfers from POLICE to the POVSF and PSOVSF is included directly as an actuarial liability of POLICE. This amount is computed as the excess, if any, of the PV of benefits of the POVSF and PSOVSF over the AVA of the POVSF and PSOVSF, respectively. Under EAN, a portion of the PV of future VSF transfers is reflected in the PV of future normal costs and a portion is reflected in the UAL.

5. **SKIM Calculation**: The ACCNY provides that POLICE transfer to the Funds a portion of the amount by which earnings on equity investments of POLICE 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 Police Officers and Police Superior Officers, limited to not allow assets to exceed the actuarial present value of accumulated plan benefits of the VSFs

SECTION VII – RISK AND UNCERTAINTY

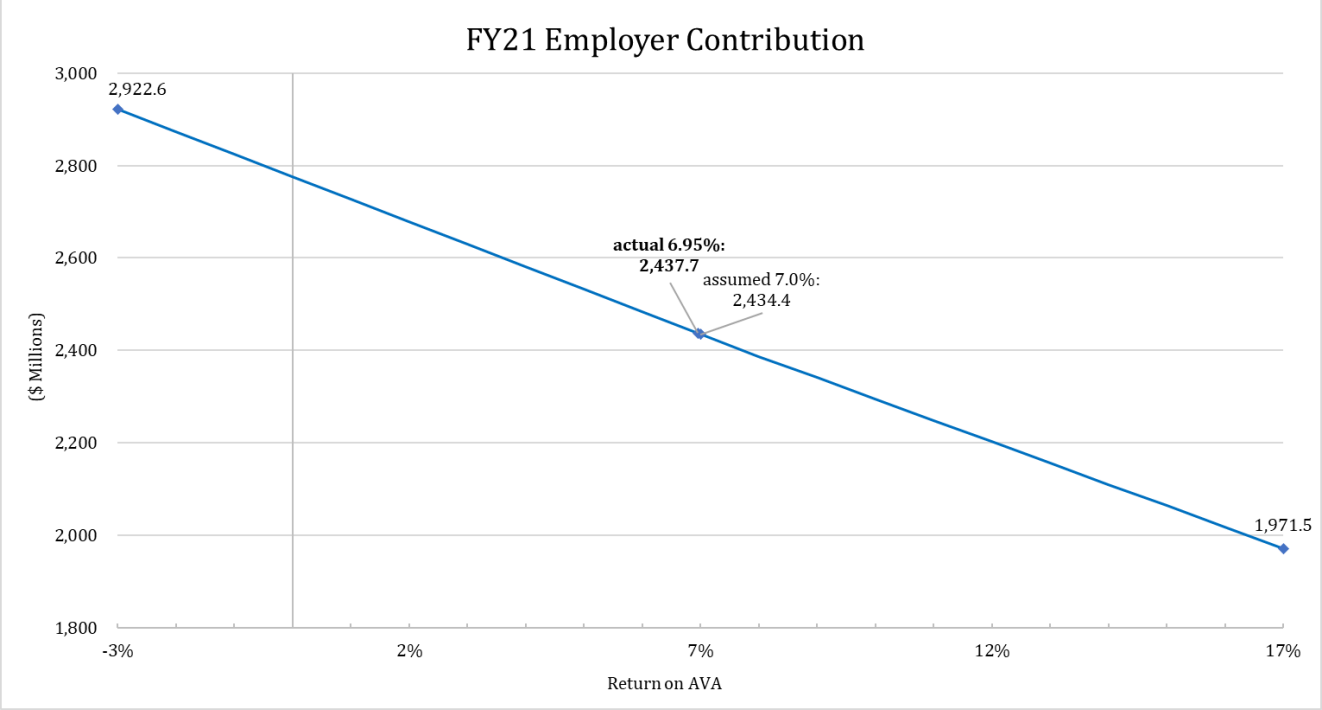
The funded status of POLICE depends highly on the realization of the actuarial assumptions used, as well as certain demographic characteristics of the Plan and other exogenous factors. Risks faced by the Plan are described in this Section. These risks have been separated, based on the Actuary's professional judgement, into high, medium, and other risks.

High Risk Types

Investment Risk: The Risk of Not Realizing Expected Returns

The most substantial risk for most pension systems, POLICE included, is the risk of investment returns being less than assumed. Generally speaking, as risk-free investment return rates have fallen in recent decades, more aggressive asset allocations have been taken to achieve long-term rates of return commensurate with the actuarial assumption of 7.0%.

The graph below illustrates the potential FY21 employer contributions if the annual investment return had differed from the actual rate, by up to 10%.[1]

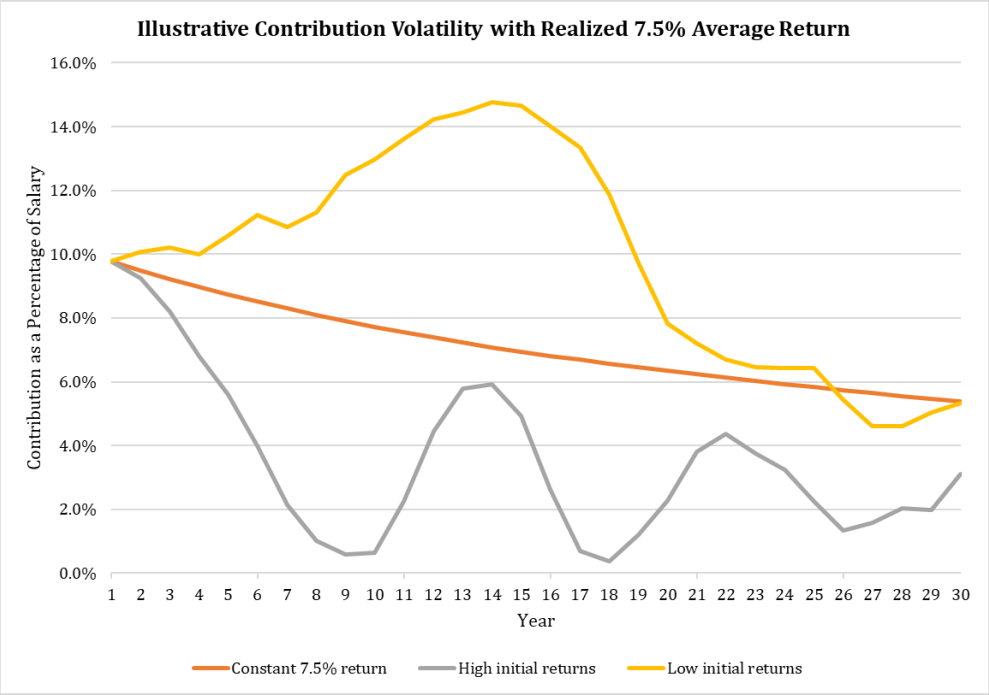


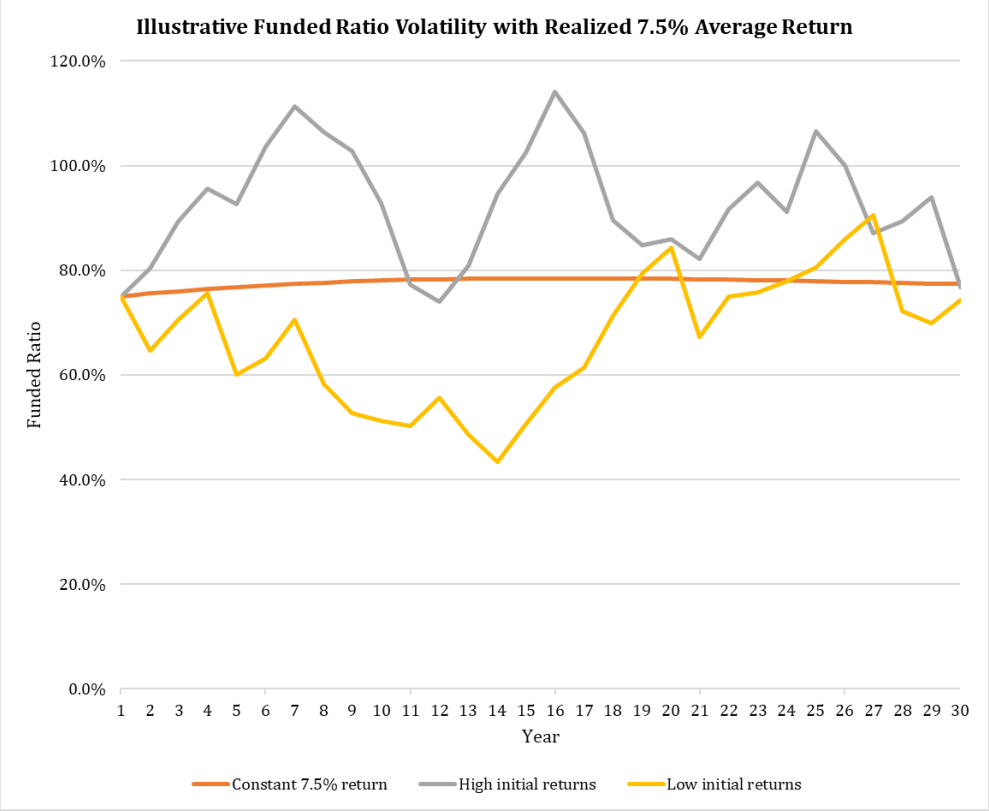
Investment Risk: The Risk of Volatile Realized Returns

Even when long-term investment returns meet actuarial assumptions, investment return volatility can contribute substantially to contribution and funded status volatility. While not yet available specifically for the Plan at this time, recent research demonstrates this volatility based on a sample public plan with typical characteristics, a typical contribution policy, and a long-term return assumption of 7.5%, which can be realized in different patterns.[2]

[1] The actual rate of return displayed in this graph is calculated as the overall rate of return for POLICE when combining the Plan and the VSFs together.

[2] Yin, Yiment; Boyd, Don. Pension Simulation Project. *The Nelson A. Rockefeller Institute of Government.*


Illustrative Contribution Volatility with Realized 7.5% Average Return
16.0%
14.0%
12.0%
10.0%
8.0%
6.0%
4.0%
2.0%
0.0%
Contribution as a Percentage of Salary
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
Year
Constant 7.5% return
High initial returns
Low initial returns

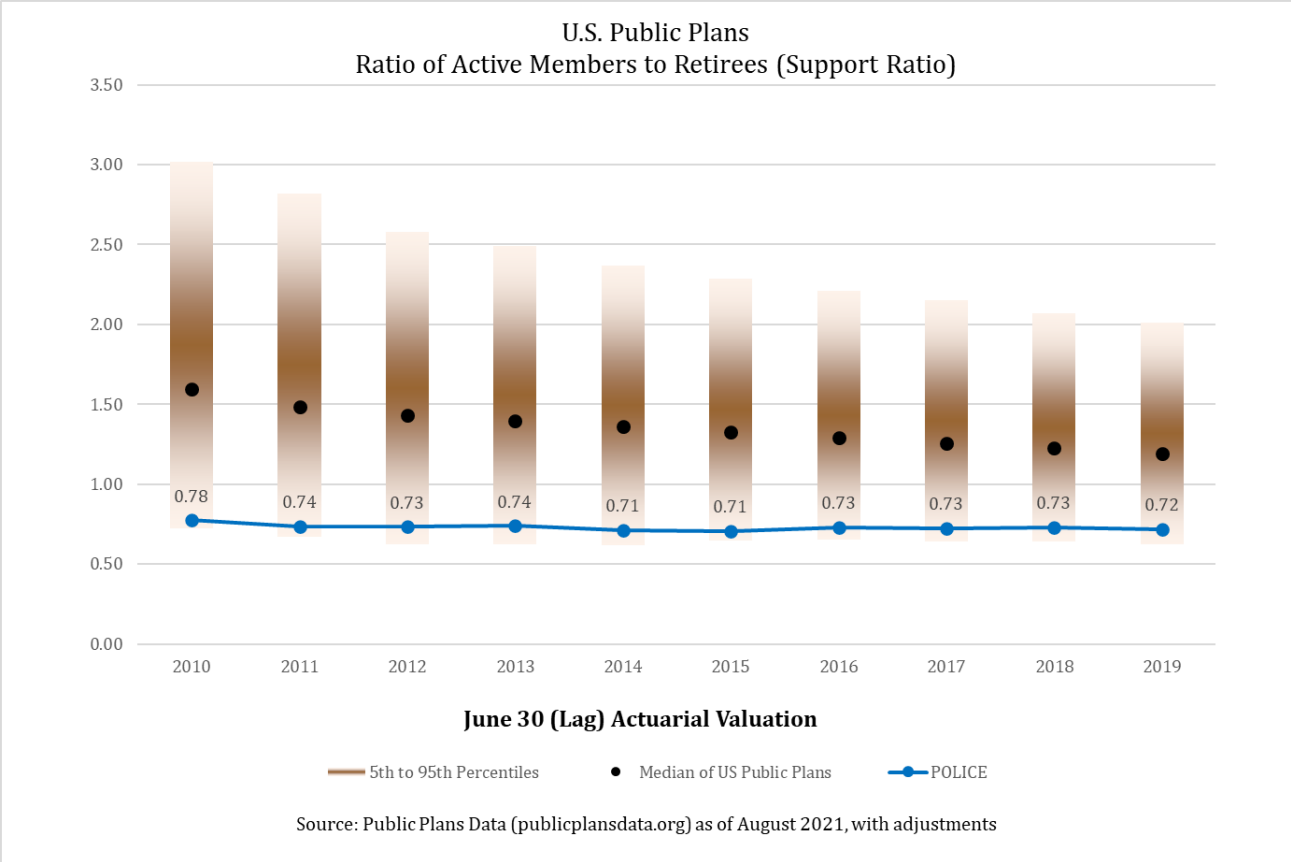

Illustrative Funded Ratio Volatility with Realized 7.5% Average Return
120.0%
100.0%
80.0%
60.0%
40.0%
20.0%
0.0%
Funded Ratio
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
Year
Constant 7.5% return
High initial returns
Low initial returns

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 POLICE, this ratio has been below one, meaning fewer active workers exist to support pensioner payments.

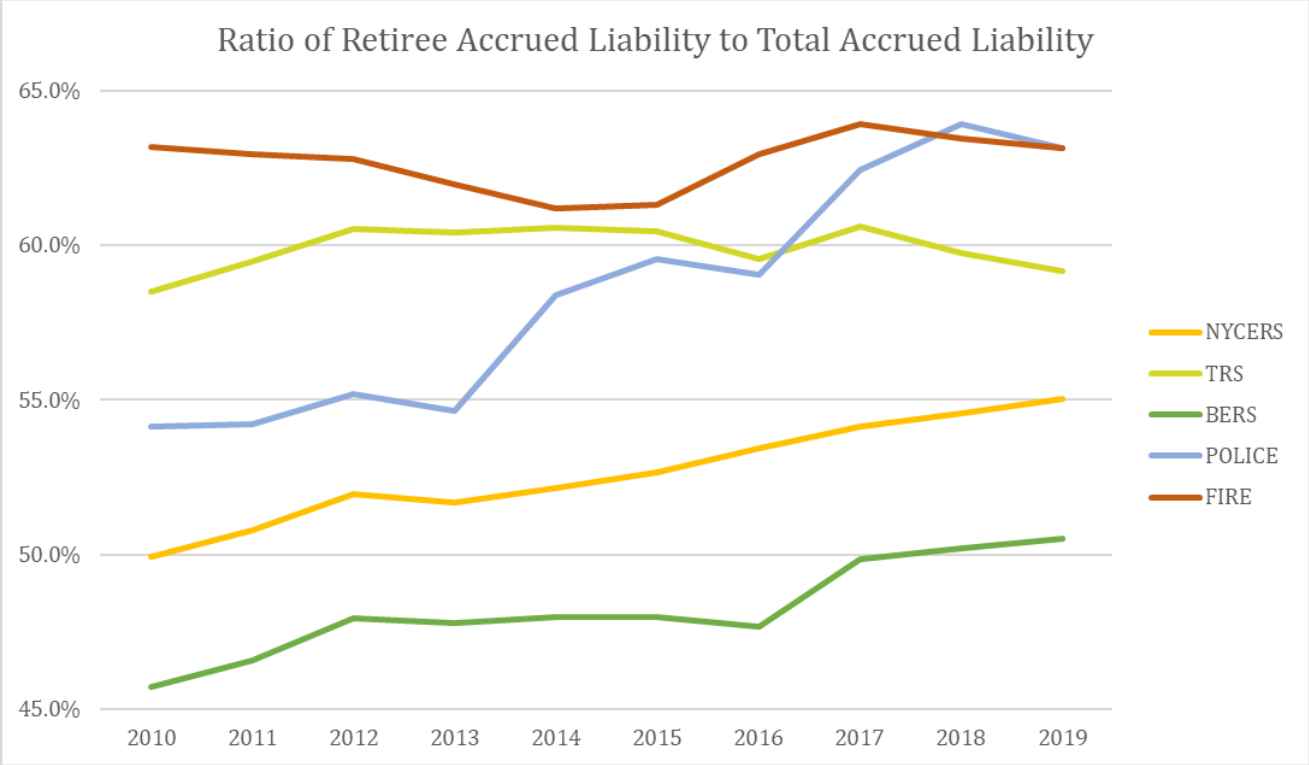


The chart above shows U.S. public pension plan Support Ratios in comparison to the Plan's. The median Support Ratio amongst US public pensions has declined from 1.60 in the 2010 valuation year to 1.19 in the 2019 valuation year. Over that same period, the Plan's Support Ratio declined from 0.78 to 0.72, meaning fewer active workers exist to support guaranteed pensioner payments.

Because the Plan's Support Ratio is below the median, POLICE'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

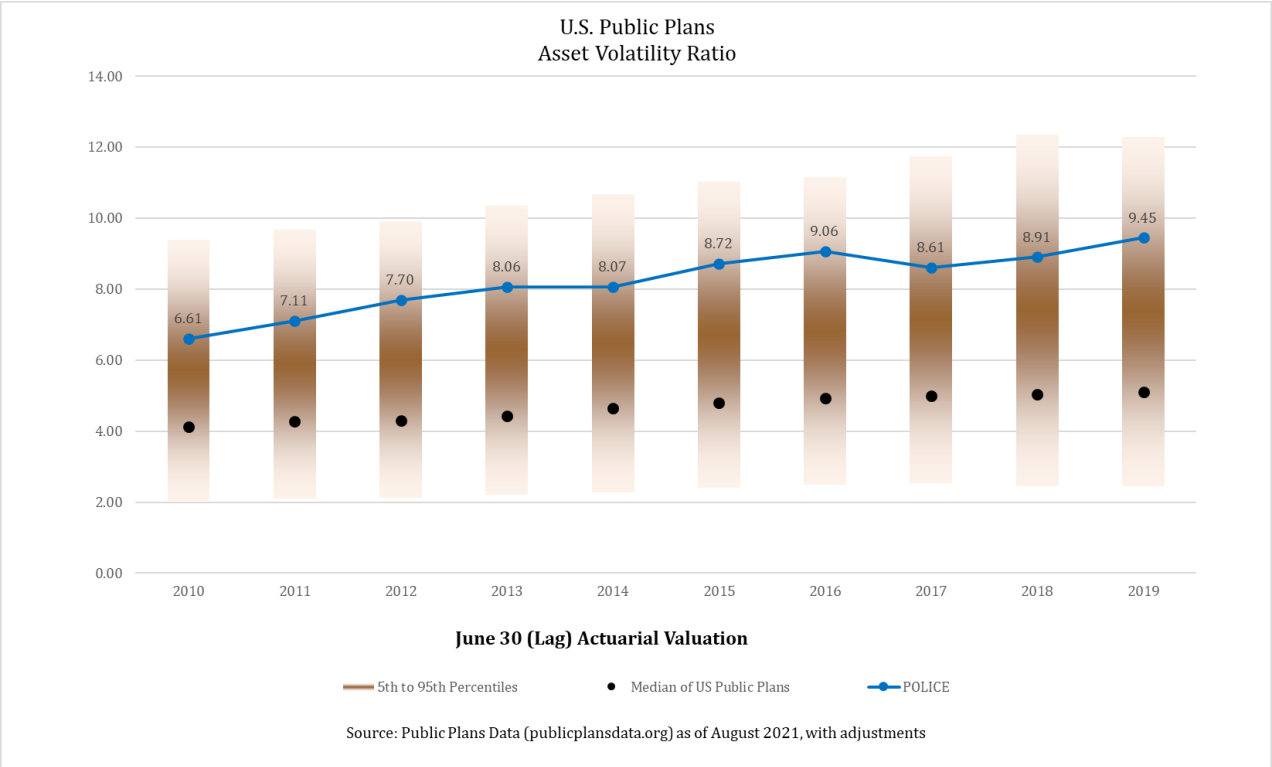
We can also consider the ratio of the Plan's retiree liability to its total liability. A new pension plan begins with this ratio at zero; as the plan matures, the ratio increases. Mature plans often have ratios above 60%. This measure is shown in the graph below for POLICE; the other New York City Retirement Systems[1] are included for comparison purposes. The ratio for POLICE has been between 55-65% for the past few years, indicating that POLICE 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 POLICE to the population of public pension systems.

[1] New York City Employees' Retirement System (NYCERS); Teachers' Retirement System (TRS); Board of Education Retirement System (BERS); New York City Fire Pension Fund (FIRE)



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 5 and 6. As shown in the tables above, for POLICE, since ratios are greater than the average, POLICE 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 or the allocation of Plan assets no longer support a long-term rate of return assumption of 7.0%, the Actuarial Interest Rate (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, Funded Ratio, and Normal Cost of the Plan are shown below:

NEW YORK CITY POLICE PENSION FUND

SENSITIVITY ANALYSIS AS OF JUNE 30, 2019

Valuation Date	June 30, 2019 (Lag)
Results at 7.0%	
1. Accrued Liability (AL)	$ 50,614,795,903
2. Actuarial Value of Assets (AVA)	40,119,424,000
3. Unfunded Accrued Liability (AVA Basis) (1. - 2.)	$ 10,495,371,903
4. Funded Ratio (AVA Basis) (2. / 1.)	79.3%
5. Normal Cost	$ 1,532,592,781
Results at 6.0%	
1. Accrued Liability (AL)	$ 57,130,804,693
2. Actuarial Value of Assets (AVA)	40,119,424,000
3. Unfunded Accrued Liability (AVA Basis) (1. - 2.)	$ 17,011,380,693
4. Funded Ratio (AVA Basis) (2. / 1.)	70.2%
5. Normal Cost	$ 1,887,508,582
Sensitivity Analysis for 1.0% Reduction in Interest Rate	
1. Increase in Accrued Liability	12.9%
2. Increase in Unfunded Accrued Liability	62.1%
3. Decrease in Funded Ratio	9.1%
4. Increase in Normal Cost	23.2%

Longevity Risk: The Risk of Higher than Assumed Mortality Improvement

POLICE 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.[1]

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.

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."[2] 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.[3] In its most recent claims report, the Comptroller reports that in FY2020, NYC settled 13,741 claims and lawsuits for $1.0 billion. On occasion, these settlements involve NYCRS. The 1996 case *Gulino v. Board of Education* awards damages to plaintiffs that in some cases include counterfactual service and salary in NYCRS. It remains a continuing risk that litigation may expand the scope of pension benefits beyond what is intended or codified in statute.

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[1] 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*.

[2] Retirement Plans Experience Committee. "Mortality Improvement Scale BB Report" 5.5 Selection of 1.0% Long-Term Rate of Mortality Improvement. *Society of Actuaries*.

[3] https://comptroller.nyc.gov/reports/annual-claims-report

Other Risk Types

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 POLICE.

Inflation Risk: The Risk of Higher than Assumed Inflation

POLICE 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. A 2018 study[1] which used data from 50 states and 230 retirement systems, found that since 2007 the shortfall between actual contributions to state pension plans and minimum actuarial funding standards was $200 billion.[2]

The New York City Retirement Systems and Pension Funds face low contribution risk. City benefits are constitutionally protected, and participating employers have historically contributed to 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 over 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

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[1] The Pew Charitable Trusts. *"The State Pension Funding Gap: 2018."*

[2] Accounting standards changed in 2014. From 2007 to 2013, the shortfall is calculated between the actuarial recommended contribution and actual employer contributions. From 2014 to 2018, the shortfall represents the gap between the net amortization benchmark and employer contributions.

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

March 29, 1940

B. Eligibility Requirements

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 Revised: April 1, 2012 to March 31, 2017 and did not elect to join Tier 3 Enhanced.

Tier 3 Enhanced: On or after April 1, 2017 and those in Tier 3 and Tier 3 Revised 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 Police force; or City service in a position of Police Surgeon classified in the non-competitive class of civil service.

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 Revised, and Tier 3 Enhanced: Basic Member Contributions – Members contribute 3.0% of salary for a maximum of 25 years.

Additional Member Contributions (AMC) – Effective April 10, 2017, Tier 3 Enhanced Plan Members are required to contribute an additional 1.0% of salary for a maximum of 25 years. Chapter 59/17 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 Revised, 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 Police 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 Police Service includes service in Uniformed Transit Police Force, Uniformed Housing Police Force, Uniformed Correction Force, Uniformed Sanitation Force, and the New York Fire Department, provided all such service immediately precedes the Uniformed Police Force service.
- **Tier 3, Tier 3 Revised, and Tier 3 Enhanced**: Police service includes service in the uniformed force of the New York Fire Department and the New York State and Local Police and Fire 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 Revised 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 Revised	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 1/60th 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 Revised, 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 1/60th 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 Revised

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 Revised, 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: ⅓ of [FS (Tier 1) or FAS (Tier 2)]

10 or more years of service: ½ 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 Revised, 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

a. Eligibility for All Tiers: Immediate.

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 Revised, and Tier 3 Enhanced

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

In addition there may be a benefit payable in accordance with General Municipal Law Section 208(f).

2. Ordinary Death Benefit

a. Eligibility

i. Tier 1: Immediate

ii. Tier 2, Tier 3, Tier 3 Revised, 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 Revised, 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 Revised 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 IRC Section 72(p).

M. Cost-of-Living Adjustments (COLA)

Annuity payments are increased annually on September 1st, 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. 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 Revised 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. Changes Since the Prior Valuation

None.

SECTION IX – CHAPTER AMENDMENTS

The Chapter amendments enacted during the past five years that had a significant impact on the June 30, 2019 (Lag) actuarial valuation results include:

- **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.

- **Chapter 179 of the Laws of 2018** (Chapter 179/18) grants a 3% COLA increase to beneficiaries receiving Special Accidental Death Benefits pursuant to GML 208-f. (Similar legislation was enacted in each of the previous years.)

- **Chapter 59 of the Laws of 2017** (Chapter 59/17), Part SSS, signed into law on April 10, 2017, changes the Accidental Disability Retirement and Ordinary Disability Retirement benefits for current Tier 3 and Tier 3 Revised members who elect to participate in the Enhanced Disability Benefits Plan. Members as of April 1, 2017 and later are mandated into the Enhanced Disability Benefits Plan.

- **Chapter 41 of the Laws of 2016** (Chapter 41/16) provides up to three years of service credit to members of public retirement systems of the State of New York for military service. Chapter 41/16 removes the requirement that such military service occur during specified periods of hostilities.

SECTION X – SUBSEQUENT EVENTS

The following legislation was adopted after the June 30, 2019 valuation date and could have a significant impact on future years' valuations:

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.

Effective March 1, 2020, **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.

Effective October 29, 2019, **Chapter 431 of the Laws of 2019** (Chapter 431/19) allows New York City Police Pension Fund (POLICE) members subject to Article 14 of the RSSL (Tier 3, Tier 3 Revised, and Tier 3 Enhanced) to purchase prior service as a cadet in the New York Police Department (NYPD) and use the appointment date as a cadet to determine the initial date of POLICE membership for plan or tier eligibility provided such purchase of service is made within five years of the effective date.

Chapter 382 of the Laws of 2019 (Chapter 382/19), **Chapter 58 of the Laws of 2020** (Chapter 58/20), and **Chapter 327 of the Laws of 2021** (Chapter 327/21) extend the 3% COLA increase to beneficiaries receiving Special Accidental Death Benefits (SADB) for Fiscal Years 2020, 2021, and 2022, respectively. Note that the June 30, 2019 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 63.

SECTION XI – ACTUARIAL ASSUMPTIONS AND METHODS

The Actuary issued a memorandum titled "Proposed Changes to Actuarial Assumptions and Methods (Revised 2021 A&M)" dated July 28, 2021. The actuarial assumptions and methods described in that report were adopted by the Board of Trustees at the September 8, 2021 Board meeting and are referred to as the "Revised 2021 A&M."

The Actuary reset the Actuarial Value of Assets (AVA) to the market value as of June 30, 2019. Beginning with the June 30, 2020 (Lag) actuarial valuation, the Actuarial Asset Valuation Method (AAVM) recognizes investment returns greater or less than expected over a period of five years. In accordance with this AAVM, Unexpected Investment Returns (UIR) are phased into the AVA at rates of 20% per year.

The post-commencement mortality improvement table was changed from MP-2018 to MP-2020. The MP-2020 table was also applied to the base mortality rates for active members and terminated vested members prior to commencement.

The assumption for the amount of member contribution balance elected by active members as a loan upon benefit commencement was changed from 90% of member balance to 25% of member balance for Tier 1 and Tier 2 members.

The actuarial assumptions and a description of the actuarial methods follow.

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

NEW YORK CITY POLICE PENSION FUND

PROBABILITIES OF SERVICE RETIREMENT
RETIREMENT WITH FULL COLA/ESCALATION
FOR THOSE ELIGIBLE FOR UNREDUCED

	Years of Service Since First Eligible	
Age	**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	45.00%	0.00%
37	45.00%	10.00%
38	45.00%	10.00%
39	45.00%	10.00%
40	45.00%	10.00%
41	45.00%	10.00%
42	45.00%	10.00%
43	45.00%	10.00%
44	45.00%	10.00%
45	45.00%	10.00%
46	45.00%	11.00%
47	45.00%	12.00%
48	45.00%	13.00%
49	45.00%	14.00%
50	45.00%	15.00%
51	45.00%	15.00%
52	45.00%	15.00%
53	45.00%	15.00%
54	45.00%	15.00%
55	45.00%	15.00%
56	45.00%	15.00%
57	45.00%	15.00%
58	45.00%	15.00%
59	45.00%	15.00%
60	45.00%	20.00%
61	45.00%	30.00%
62	45.00%[1]	50.00%[1]
63	100.00%	100.00%

[1]100% for Tier 3, Tier 3 Revised, and Tier 3 Enhanced members.

Table XI-1b
Early Service Retirement

NEW YORK CITY POLICE PENSION FUND PROBABILITIES OF EARLY SERVICE RETIREMENT FOR TIER 3, TIER 3 REVISED, 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 POLICE PENSION FUND PROBABILITIES OF TERMINATION	
Years Of Service	**Probability of Termination**
0	3.000%
1	2.250%
2	1.500%
3	1.500%
4	1.500%
5	1.500%
6	1.350%
7	1.200%
8	1.050%
9	0.900%
10	0.750%
11	0.600%
12	0.450%
13	0.380%
14	0.300%
15	0.230%
16	0.150%
17	0.150%
18	0.150%
19	0.150%
20	N/A

Table XI-3
Active Disability Rates

NEW YORK CITY POLICE 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 Revised Non-Enhanced Plan**
15	0.0360%	0.168%	0.098%	0.098%
16	0.0360%	0.168%	0.098%	0.098%
17	0.0360%	0.168%	0.098%	0.098%
18	0.0360%	0.168%	0.098%	0.098%
19	0.0360%	0.168%	0.098%	0.098%
20	0.0400%	0.180%	0.105%	0.105%
21	0.0440%	0.192%	0.112%	0.112%
22	0.0480%	0.204%	0.119%	0.119%
23	0.0520%	0.216%	0.126%	0.126%
24	0.0560%	0.228%	0.133%	0.133%
25	0.0600%	0.240%	0.140%	0.140%
26	0.0640%	0.312%	0.182%	0.182%
27	0.0680%	0.384%	0.224%	0.224%
28	0.0720%	0.456%	0.266%	0.266%
29	0.0760%	0.528%	0.308%	0.308%
30	0.0800%	0.600%	0.350%	0.350%
31	0.0840%	0.720%	0.420%	0.420%
32	0.0880%	0.840%	0.490%	0.490%
33	0.0920%	0.960%	0.560%	0.560%
34	0.0960%	1.080%	0.630%	0.630%
35	0.1000%	1.200%	0.700%	0.700%
36	0.1040%	1.260%	0.735%	0.728%
37	0.1080%	1.320%	0.770%	0.756%
38	0.1120%	1.380%	0.805%	0.784%
39	0.1160%	1.440%	0.840%	0.812%
40	0.1200%	1.500%	0.875%	0.840%
41	0.1240%	1.560%	0.910%	0.854%
42	0.1280%	1.620%	0.945%	0.868%
43	0.1320%	1.680%	0.980%	0.882%
44	0.1360%	1.740%	1.015%	0.896%
45	0.1400%	1.800%	1.050%	0.910%
46	0.1440%	1.920%	1.120%	0.938%
47	0.1480%	2.040%	1.190%	0.966%
48	0.1520%	2.160%	1.260%	0.994%
49	0.1560%	2.280%	1.330%	1.022%
50	0.1600%	2.400%	1.400%	1.050%
51	0.2000%	2.640%	1.540%	1.120%
52	0.2400%	2.880%	1.680%	1.190%
53	0.3200%	3.120%	1.820%	1.260%
54	0.4800%	3.360%	1.960%	1.330%
55	0.6400%	3.600%	2.100%	1.400%
56	0.8000%	4.080%	2.380%	1.540%
57	1.6000%	4.560%	2.660%	1.680%
58	2.4000%	5.040%	2.940%	1.820%
59	3.2000%	5.520%	3.220%	1.960%
60	4.8000%	6.000%	3.500%	2.100%
61	6.4000%	7.200%	4.200%	2.240%
62	8.0000%[1]	8.4000%[1]	4.900%[1]	2.450%[1]
63	N/A	N/A	N/A	N/A

[1]N/A for Tier 3, Tier 3 Revised, and Tier 3 Enhanced members.

Table XI-4
Active Mortality Rates

NEW YORK CITY POLICE PENSION FUND PROBABILITIES OF ACTIVE MEMBER MORTALITY			
	Ordinary Death		**Accidental Death**
Age	**Males**	**Females**	**All**
15	0.040%	0.030%	0.010%
16	0.040%	0.030%	0.010%
17	0.040%	0.030%	0.010%
18	0.040%	0.030%	0.010%
19	0.040%	0.030%	0.010%
20	0.040%	0.030%	0.010%
21	0.040%	0.030%	0.010%
22	0.040%	0.030%	0.010%
23	0.040%	0.030%	0.010%
24	0.040%	0.030%	0.010%
25	0.040%	0.030%	0.010%
26	0.040%	0.030%	0.010%
27	0.040%	0.030%	0.010%
28	0.040%	0.030%	0.010%
29	0.040%	0.030%	0.010%
30	0.040%	0.030%	0.010%
31	0.040%	0.030%	0.011%
32	0.040%	0.030%	0.012%
33	0.040%	0.030%	0.013%
34	0.040%	0.030%	0.014%
35	0.040%	0.030%	0.015%
36	0.042%	0.032%	0.016%
37	0.044%	0.034%	0.017%
38	0.046%	0.036%	0.018%
39	0.048%	0.038%	0.019%
40	0.050%	0.040%	0.020%
41	0.060%	0.046%	0.021%
42	0.070%	0.052%	0.022%
43	0.080%	0.058%	0.023%
44	0.090%	0.064%	0.024%
45	0.100%	0.070%	0.025%
46	0.110%	0.076%	0.026%
47	0.120%	0.082%	0.027%
48	0.130%	0.088%	0.028%
49	0.140%	0.094%	0.029%
50	0.150%	0.100%	0.030%
51	0.160%	0.110%	0.031%
52	0.170%	0.120%	0.032%
53	0.180%	0.130%	0.033%
54	0.190%	0.140%	0.034%
55	0.200%	0.150%	0.035%
56	0.220%	0.160%	0.036%
57	0.240%	0.170%	0.037%
58	0.260%	0.180%	0.038%
59	0.280%	0.190%	0.039%
60	0.300%	0.200%	0.040%
61	0.320%	0.220%	0.041%
62	0.340%[1]	0.240%[1]	0.0420%[1]
63	N/A	N/A	N/A

[1]Proposed probabilities are N/A for Tier 3, Tier 3 Revised, and Tier 3 Enhanced members.

Table XI-5
Service Retiree Mortality

NEW YORK CITY POLICE PENSION FUND

PROBABILITIES OF MORTALITY FOR SERVICE RETIREES
BASE TABLE

Age	Males	Females	Age	Males	Females
15	0.0100%	0.0084%	68	1.4988%	1.0632%
16	0.0135%	0.0103%	69	1.6917%	1.1644%
17	0.0181%	0.0112%	70	1.8929%	1.2629%
18	0.0217%	0.0131%	71	2.1028%	1.4563%
19	0.0240%	0.0140%	72	2.3212%	1.6586%
20	0.0251%	0.0142%	73	2.5833%	1.8689%
21	0.0268%	0.0150%	74	2.8558%	2.0889%
22	0.0284%	0.0158%	75	3.1397%	2.3314%
23	0.0301%	0.0168%	76	3.4343%	2.6045%
24	0.0315%	0.0179%	77	3.7415%	2.8700%
25	0.0327%	0.0191%	78	4.2304%	3.1787%
26	0.0342%	0.0204%	79	4.7399%	3.4795%
27	0.0354%	0.0217%	80	5.2682%	3.8105%
28	0.0371%	0.0231%	81	5.7202%	4.3289%
29	0.0394%	0.0247%	82	6.1782%	4.8678%
30	0.0427%	0.0265%	83	7.0179%	5.4288%
31	0.0492%	0.0316%	84	7.8631%	5.9122%
32	0.0556%	0.0360%	85	8.7167%	6.3661%
33	0.0616%	0.0398%	86	9.5810%	7.1650%
34	0.0669%	0.0427%	87	10.4516%	8.0050%
35	0.0724%	0.0455%	88	11.8437%	8.8541%
36	0.0755%	0.0474%	89	13.2486%	9.6498%
37	0.0779%	0.0497%	90	14.6752%	10.5687%
38	0.0808%	0.0521%	91	16.3354%	12.0267%
39	0.0845%	0.0551%	92	18.0374%	13.4340%
40	0.0901%	0.0588%	93	19.7642%	14.8636%
41	0.1003%	0.0633%	94	21.5622%	16.4543%
42	0.1106%	0.0702%	95	23.4692%	17.7952%
43	0.1212%	0.0792%	96	25.3619%	19.0707%
44	0.1323%	0.0907%	97	27.1816%	20.2419%
45	0.1439%	0.1052%	98	29.0095%	21.1759%
46	0.1563%	0.1228%	99	30.6920%	21.8544%
47	0.1693%	0.1427%	100	32.1584%	22.1859%
48	0.1827%	0.1652%	101	33.7521%	23.0680%
49	0.1964%	0.1865%	102	35.1259%	24.0803%
50	0.2104%	0.1992%	103	36.3671%	25.2770%
51	0.2802%	0.2104%	104	37.3834%	26.6309%
52	0.3506%	0.2186%	105	38.1051%	28.0912%
53	0.4209%	0.2250%	106	38.4698%	29.6244%
54	0.4903%	0.2863%	107	38.6325%	31.1943%
55	0.5297%	0.3409%	108	38.8076%	32.7579%
56	0.5857%	0.3910%	109	38.9794%	34.2712%
57	0.6387%	0.4376%	110	50.0000%	50.0000%
58	0.6875%	0.4613%	111	50.0000%	50.0000%
59	0.7316%	0.5005%	112	50.0000%	50.0000%
60	0.7720%	0.5393%	113	50.0000%	50.0000%
61	0.8439%	0.5785%	114	50.0000%	50.0000%
62	0.9155%	0.6152%	115	50.0000%	50.0000%
63	0.9888%	0.6536%	116	50.0000%	50.0000%
64	1.0644%	0.7279%	117	50.0000%	50.0000%
65	1.1433%	0.8032%	118	50.0000%	50.0000%
66	1.2263%	0.8884%	119	50.0000%	50.0000%
67	1.3135%	0.9736%	120	100.0000%	100.0000%

Table XI-6
Disabled Retiree Mortality

NEW YORK CITY POLICE PENSION FUND

PROBABILITIES OF MORTALITY FOR DISABLED RETIREES
BASE TABLE

Age	Males	Females	Age	Males	Females
15	0.0138%	0.0095%	68	1.8368%	1.2141%
16	0.0187%	0.0117%	69	2.0342%	1.3912%
17	0.0252%	0.0127%	70	2.2544%	1.5837%
18	0.0301%	0.0148%	71	2.5045%	1.7848%
19	0.0334%	0.0159%	72	2.7644%	1.9944%
20	0.0347%	0.0168%	73	3.0535%	2.2258%
21	0.0371%	0.0185%	74	3.3359%	2.4880%
22	0.0402%	0.0205%	75	3.6300%	2.7766%
23	0.0431%	0.0227%	76	4.1253%	3.0785%
24	0.0467%	0.0251%	77	4.6178%	3.3525%
25	0.0503%	0.0274%	78	5.1289%	3.6752%
26	0.0544%	0.0298%	79	5.5682%	4.1794%
27	0.0586%	0.0322%	80	6.0116%	4.7030%
28	0.0633%	0.0348%	81	6.7832%	5.2484%
29	0.0681%	0.0374%	82	7.6009%	5.7185%
30	0.0730%	0.0400%	83	8.4279%	6.1948%
31	0.0781%	0.0425%	84	9.2040%	7.0110%
32	0.0830%	0.0450%	85	10.1002%	7.8321%
33	0.0898%	0.0476%	86	11.5115%	8.6046%
34	0.0933%	0.0491%	87	12.7944%	9.3702%
35	0.0972%	0.0512%	88	14.1662%	10.2595%
36	0.1019%	0.0534%	89	15.7578%	11.5941%
37	0.1080%	0.0563%	90	17.3856%	12.9378%
38	0.1153%	0.0590%	91	19.0388%	14.3081%
39	0.1286%	0.0629%	92	20.6360%	15.3704%
40	0.1417%	0.0688%	93	22.5718%	16.4875%
41	0.1550%	0.0766%	94	24.4562%	17.6613%
42	0.1690%	0.0865%	95	26.1404%	18.7606%
43	0.1838%	0.0992%	96	28.0695%	19.7397%
44	0.1997%	0.1148%	97	29.6855%	20.6328%
45	0.2170%	0.1330%	98	30.9177%	21.2676%
46	0.2279%	0.1538%	99	32.6552%	21.8544%
47	0.2387%	0.1769%	100	33.9880%	22.1859%
48	0.2492%	0.2017%	101	34.9681%	23.0680%
49	0.3237%	0.2316%	102	35.9346%	24.0803%
50	0.3948%	0.2637%	103	36.6434%	25.2770%
51	0.4620%	0.2870%	104	37.3834%	26.6309%
52	0.5249%	0.3323%	105	38.1051%	28.0912%
53	0.5528%	0.3677%	106	38.4698%	29.6244%
54	0.5891%	0.4196%	107	38.6325%	31.1943%
55	0.6260%	0.4722%	108	38.8076%	32.7579%
56	0.6814%	0.5135%	109	38.9794%	34.2712%
57	0.7288%	0.5258%	110	50.0000%	50.0000%
58	0.7710%	0.5452%	111	50.0000%	50.0000%
59	0.8525%	0.5823%	112	50.0000%	50.0000%
60	0.9273%	0.6153%	113	50.0000%	50.0000%
61	1.0007%	0.6486%	114	50.0000%	50.0000%
62	1.0735%	0.7169%	115	50.0000%	50.0000%
63	1.1411%	0.7851%	116	50.0000%	50.0000%
64	1.2250%	0.8630%	117	50.0000%	50.0000%
65	1.3055%	0.9419%	118	50.0000%	50.0000%
66	1.4653%	1.0252%	119	50.0000%	50.0000%
67	1.6473%	1.1204%	120	100.0000%	100.0000%

Table XI-7
Beneficiary Mortality

NEW YORK CITY POLICE PENSION FUND

PROBABILITIES OF BENEFICIARY MORTALITY
BASE TABLE

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 POLICE PENSION FUND ANNUAL RATES OF MERIT AND SALARY INCREASE		
Years of Service	**Merit Increase**	**Salary Increase[1]**
0	0.00%	3.00%
1	5.00%	8.00%
2	11.00%	14.00%
3	14.00%	17.00%
4	20.00%	23.00%
5	38.00%	41.00%
6	1.60%	4.60%
7	1.80%	4.80%
8	2.00%	5.00%
9	3.60%	6.60%
10	2.30%	5.30%
11	2.20%	5.20%
12	2.10%	5.10%
13	2.00%	5.00%
14	3.30%	6.30%
15	1.70%	4.70%
16	1.60%	4.60%
17	1.50%	4.50%
18	1.40%	4.40%
19	2.70%	5.70%
20	1.20%	4.20%
21	1.00%	4.00%
22	0.90%	3.90%
23	0.80%	3.80%
24	0.70%	3.70%
25	0.60%	3.60%
26	0.50%	3.50%
27	0.50%	3.50%
28	0.50%	3.50%
29	0.50%	3.50%
30+	0.50%	3.50%

[1]Salary Increase is the General Wage Increase of 3.00% plus the Merit Increase.

Table XI-9
Overtime Assumptions

NEW YORK CITY POLICE PENSION FUND OVERTIME ASSUMPTION					
Years of Service	**All Tiers Baseline**	**Tier 1 & Tier 2 Dual Service**	**Tier 1 & Tier 2 Dual Disability**	**Tier 3, Tier 3 Revised, & Tier 3 Enhanced Dual Service**	**Tier 3, Tier 3 Revised, & Tier 3 Enhanced Dual Disability**
0-15	17.00%	21.00%	8.00%	20.00%	12.00%
16	17.00%	21.00%	9.00%	20.00%	12.00%
17	17.00%	21.00%	10.00%	20.00%	13.00%
18	17.00%	21.00%	11.00%	20.00%	13.00%
19	17.00%	21.00%	12.00%	20.00%	14.00%
20	17.00%	21.00%	12.00%	20.00%	14.00%
21	17.00%	21.00%	12.00%	20.00%	14.00%
22	17.00%	21.00%	12.00%	20.00%	14.00%
23	16.00%	20.00%	11.00%	18.00%	13.00%
24	15.00%	18.00%	10.00%	17.00%	12.00%
25	14.00%	17.00%	9.00%	16.00%	11.00%
26	13.00%	16.00%	8.00%	15.00%	10.00%
27	12.00%	15.00%	7.00%	14.00%	9.00%
28	10.00%	14.00%	6.00%	13.00%	8.00%
29	9.00%	13.00%	6.00%	12.00%	7.00%
30	8.00%	12.00%	6.00%	10.00%	6.00%
31	7.00%	10.00%	6.00%	9.00%	6.00%
32	7.00%	9.00%	6.00%	9.00%	6.00%
33	7.00%	9.00%	6.00%	9.00%	6.00%
34+	7.00%	9.00%	6.00%	9.00%	6.00%

Additional Assumptions and Methods

1. **Mortality Assumption**: Improvement scales are applied to actives, terminated vesteds, and pensioners using mortality improvement scale MP-2020. The base tables for pensioners 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:

	Adjustment Factor	
	Male	**Female**
Service Retiree	0.910	0.910
Disabled Retiree	0.876	0.876
Beneficiary	0.890	0.951

   These post-adjusted probabilities were then smoothed at certain ages to reflect internal consistency between service and disability post-commencement mortality.

2. **Marital Assumption**: All active members are assumed to be married and females are assumed to be two years younger than their male spouses.

3. **Credited Service**: Calculated in whole year increments for valuation purposes.

4. **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.

5. **Actuarial Interest Rate (AIR)**: 7.0% per annum, net of investment expenses.

6. **COLA**: Based on an assumed long-term Consumer Price Index inflation rate of 2.5% per year. 1.5% per year for Auto COLA, 2.5% per year for Escalation. For beneficiaries receiving Special Accidental Death Benefits, 3.0% COLA per year is assumed in the future.

7. **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 (Lag) actuarial valuation, the AAVM recognizes investment returns greater or less than expected over a period of five years.

   In accordance with this AAVM, the Unexpected Investment Returns (UIR) are phased into the Actuarial Value of Assets (AVA) over 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.

8. **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 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 (AVA) 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 122.

   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).

9. **Allowances for Administrative Expenses**: The Employer Contribution for a fiscal year is increased by the interest-adjusted amount of administrative expenses paid from POLICE during the second prior fiscal year.

10. **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.

11. **One-year Lag Methodology (OYLM)**: One-year Lag Methodology uses a June 30, XX-2 valuation date to determine Fiscal Year XX employer contributions.

    This methodology requires adjustments to certain components used to determine the Fiscal Year XX employer contributions as follows:

a. Normal Cost

The normal cost as of June 30, XX-2 is rolled forward with the assumed AIR of 7.0% to derive the normal cost as of December 31, XX-1.

b. UAL Payments

For determining the UAL payments for Fiscal Year XX, and to be consistent with the OYLM, the UAL as of June 30, XX-2 is adjusted by the discounted value of employer normal cost and UAL payments paid during Fiscal Year XX-1 and the discounted value of Administrative Expenses reimbursed during Fiscal Years XX-1 and XX.

SECTION XII – SUMMARY OF DEMOGRAPHIC DATA

The June 30, 2019 (Lag) and June 30, 2018 (Lag) 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, 2019 and June 30, 2018.

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)** **Active Off Payroll**	**(3)** **Deferred 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) + (9)**
Number at June 30, 2018	**36,562**	**1,940**	**491**	33,416	2,861	12,556	451	840	**50,124**	**89,117**
New Entrants	**1,735**	**67**	**0**	3	0	0	32	3	**38**	**1,840**
Rehires	**93**	**(83)**	**(2)**	(2)	0	0	0	0	**(2)**	**6**
Leaving Active Payroll	**(354)**	**354**	**0**	0	0	0	0	0	**0**	**0**
Vested Termination	**(61)**	**(5)**	**66**	0	0	0	0	0	**0**	**0**
Non-Vested Termination / Cashout	**(139)**	**(631)**	**0**	0	0	0	0	0	**0**	**(770)**
Accidental Death (from Active)	**(1)**	**0**	**0**	0	0	0	1	0	**1**	**0**
Ordinary Death (from Active)	**(21)**	**0**	**0**	0	0	0	0	0	**0**	**(21)**
Service Retirement	**(1,184)**	**(2)**	**(58)**	1,244	0	0	0	0	**1,244**	**0**
Ordinary Disability Retirement	**(35)**	**0**	**0**	0	35	0	0	0	**35**	**0**
Accidental Disability Retirement	**(194)**	**0**	**0**	0	0	194	0	0	**194**	**0**
Reclassifications	**0**	**0**	**0**	(124)	(4)	125	3	0	**0**	**0**
Death with Beneficiary	**0**	**0**	**0**	(56)	(8)	(4)	0	68	**0**	**0**
Death without Beneficiary	**0**	**0**	**0**	(515)	(132)	(206)	(7)	(40)	**(900)**	**(900)**
Off Pension Payroll	**0**	**0**	**0**	0	0	0	(5)	(2)	**(7)**	**(7)**
Net Change	**(161)**	**(300)**	**6**	550	(109)	109	24	29	**603**	**148**
Number at June 30, 2019	**36,401**	**1,640**	**497**	33,966	2,752	12,665	475	869	**50,727**	**89,265**

Graph XII-2
Headcount Summary by Status

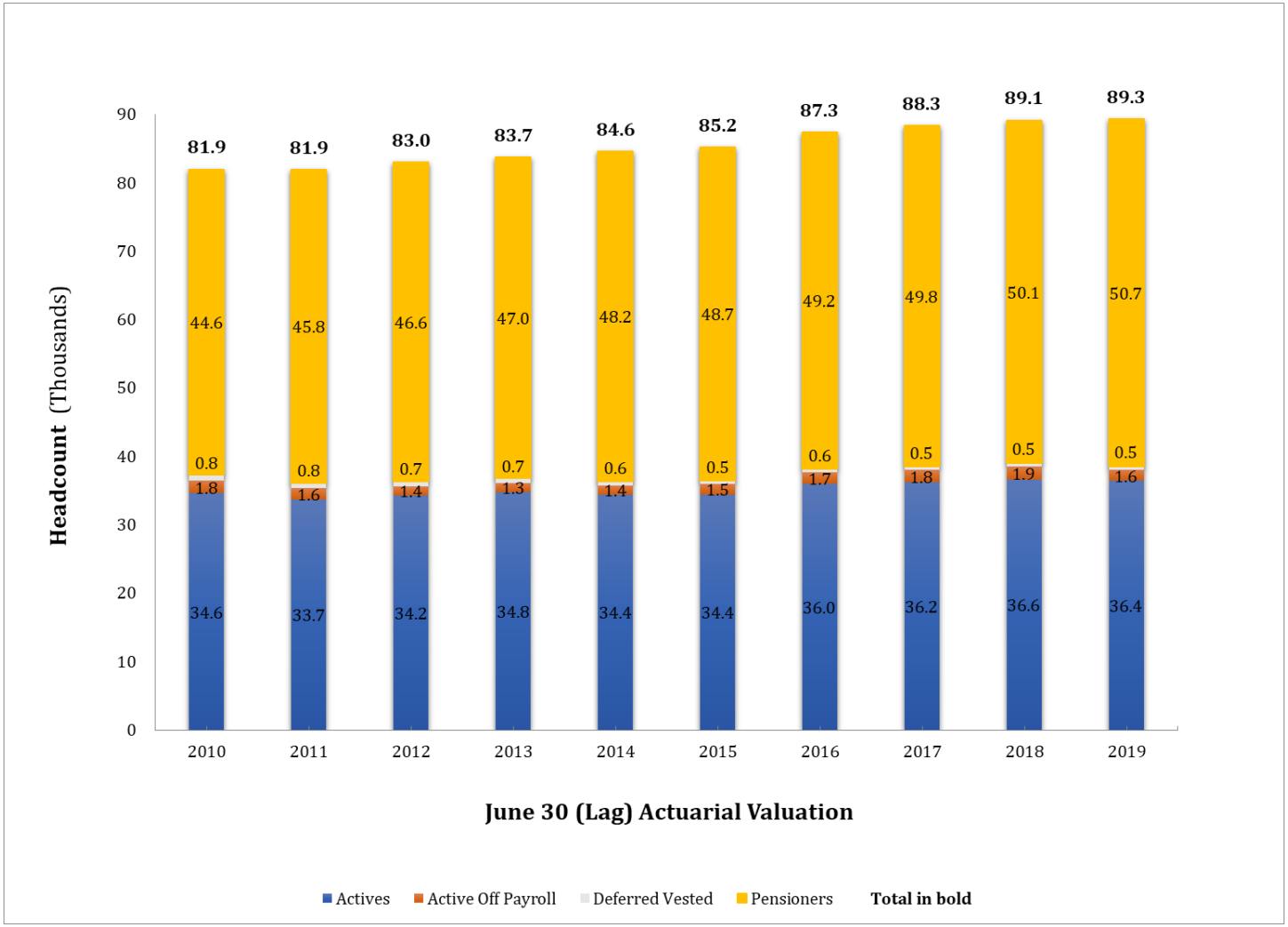

Table XII-3
Summary of Active Membership

NEW YORK CITY POLICE PENSION FUND

ACTIVE MEMBERS INCLUDED IN THE
JUNE 30, 2019 (LAG) AND THE JUNE 30, 2018 (LAG) ACTUARIAL VALUATIONS

	June 30, 2019 (Lag)	June 30, 2018 (Lag)
Number		
Males	29,829	30,042
Females	6,572	6,520
Total	36,401	36,562
Annual Salary[1]		
Males	$ 3,517,319,891	$ 3,363,262,639
Females	727,485,111	689,941,924
Total	$ 4,244,805,002	$ 4,053,204,563
Average Salary[1]		
Males	$ 117,916	$ 111,952
Females	110,695	105,819
Total Average	$ 116,612	$ 110,858
Average Age		
Males	37.8	37.7
Females	37.5	37.4
Total Average	37.8	37.7
Average Past Service		
Males	11.9	11.8
Females	10.7	10.7
Total Average	11.7	11.6

[1]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

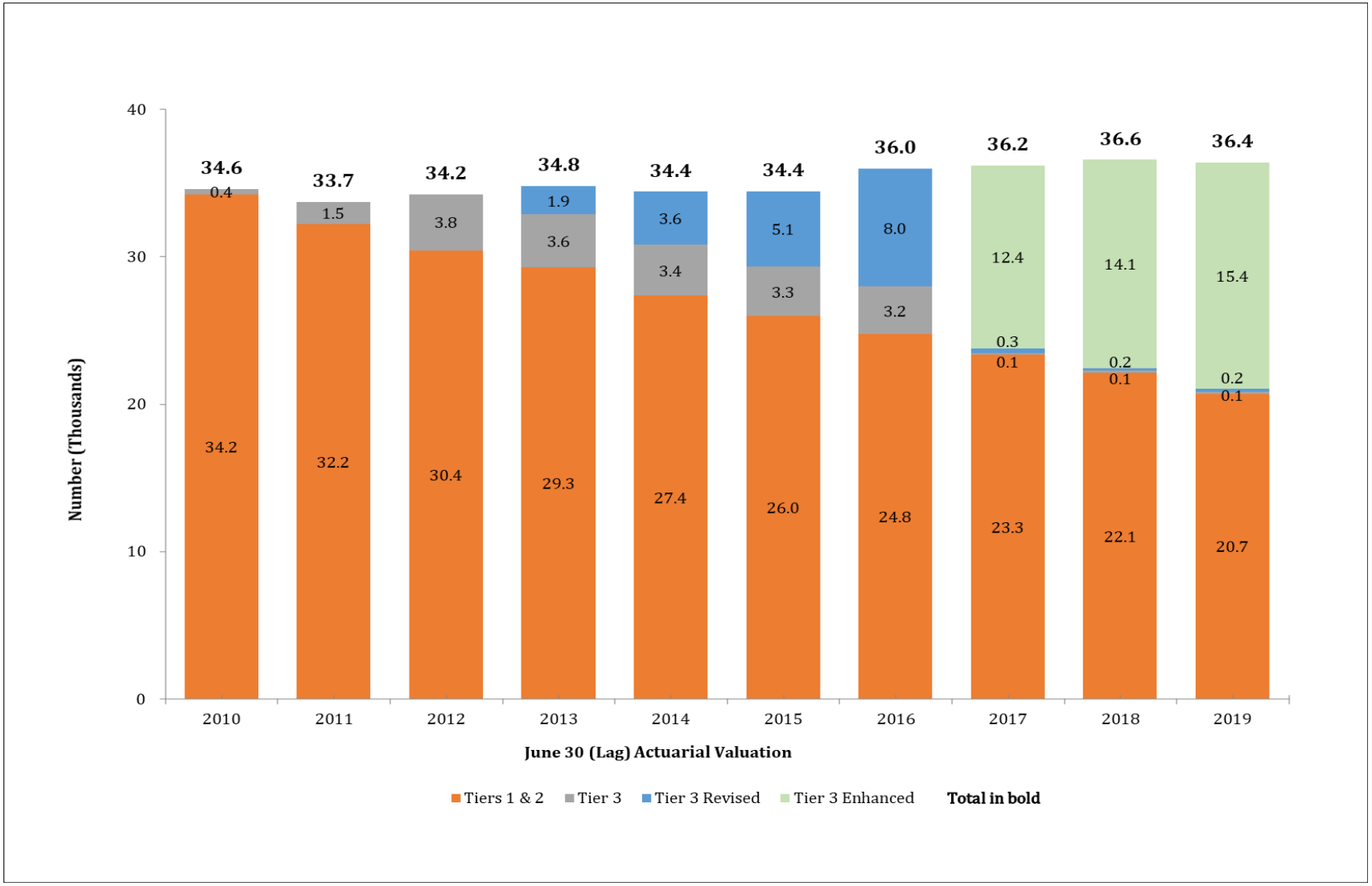

Table XII-5
Schedule of Active Member Salary Data

June 30 (Lag) Actuarial Valuation	Number	Annual Salary	Average Annual Salary	Percentage Increase/ (Decrease) In Avg. Salary
2010	34,597	3,464,096,750	100,127	9.3%
2011	33,705	3,480,066,072	103,251	3.1%
2012	34,240	3,478,153,934	101,582	(1.6%)
2013	34,775	3,607,606,894	103,741	2.1%
2014	34,402	3,618,095,284	105,171	1.4%
2015	34,435	3,564,029,659	103,500	(1.6%)
2016	35,961	3,717,425,239	103,374	(0.1%)
2017	36,165	3,968,885,246	109,744	6.2%
2018	36,562	4,053,204,563	110,858	1.0%
2019	36,401	4,244,805,002	116,612	5.2%

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, 2019

ALL TIERS: MALES

AGE \ SVC	UNDER 5	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 & UP	ALL YEARS
NUMBER:										
UNDER 20	0	0	0	0	0	0	0	0	0	**0**
20 TO 24	1,061	0	0	0	0	0	0	0	0	**1,061**
25 TO 29	3,651	810	1	0	0	0	0	0	0	**4,462**
30 TO 34	1,676	3,106	1,251	9	0	0	0	0	0	**6,042**
35 TO 39	558	1,218	3,348	1,226	8	0	0	0	0	**6,358**
40 TO 44	127	497	1,413	2,420	666	1	0	0	0	**5,124**
45 TO 49	4	60	520	1,171	1,396	561	2	0	0	**3,714**
50 TO 54	3	2	63	481	630	769	256	1	0	**2,205**
55 TO 59	0	2	2	33	151	192	201	112	0	**693**
60 TO 64	2	0	2	4	19	12	30	73	13	**155**
65 TO 69	0	1	1	1	2	2	1	0	0	**8**
70 & UP	0	0	1	3	2	0	0	0	1	**7**
TOTAL	**7,082**	**5,696**	**6,602**	**5,348**	**2,874**	**1,537**	**490**	**186**	**14**	**29,829**
SALARIES (IN THOUSANDS):										
UNDER 20	0	0	0	0	0	0	0	0	0	**0**
20 TO 24	59,861	0	0	0	0	0	0	0	0	**59,861**
25 TO 29	250,428	87,532	82	0	0	0	0	0	0	**338,041**
30 TO 34	119,597	367,671	163,540	1,144	0	0	0	0	0	**651,951**
35 TO 39	39,738	143,959	441,796	169,051	1,122	0	0	0	0	**795,667**
40 TO 44	9,585	58,271	183,704	332,951	98,718	167	0	0	0	**683,395**
45 TO 49	320	7,202	67,069	159,883	207,954	88,252	286	0	0	**530,967**
50 TO 54	429	251	8,156	64,775	90,916	117,261	41,559	171	0	**323,519**
55 TO 59	0	315	279	4,320	21,580	28,185	31,811	19,326	0	**105,817**
60 TO 64	270	0	317	644	2,732	1,565	4,375	13,211	2,462	**25,576**
65 TO 69	0	158	159	173	298	396	234	0	0	**1,418**
70 & UP	0	0	159	455	321	0	0	0	174	**1,108**
TOTAL [1]	**480,226**	**665,360**	**865,261**	**733,396**	**423,641**	**235,826**	**78,266**	**32,708**	**2,636**	**3,517,320**
AVERAGE SALARIES: [2]										
UNDER 20	0	0	0	0	0	0	0	0	0	**0**
20 TO 24	56,419	0	0	0	0	0	0	0	0	**56,419**
25 TO 29	68,591	108,065	81,658	0	0	0	0	0	0	**75,760**
30 TO 34	71,359	118,375	130,727	127,058	0	0	0	0	0	**107,903**
35 TO 39	71,214	118,193	131,958	137,888	140,287	0	0	0	0	**125,144**
40 TO 44	75,471	117,245	130,010	137,583	148,226	166,697	0	0	0	**133,371**
45 TO 49	80,017	120,037	128,980	136,535	148,964	157,312	143,176	0	0	**142,964**
50 TO 54	143,020	125,731	129,466	134,668	144,311	152,484	162,340	171,129	0	**146,720**
55 TO 59	0	157,504	139,677	130,916	142,915	146,798	158,262	172,557	0	**152,694**
60 TO 64	134,969	0	158,650	160,981	143,784	130,397	145,844	180,970	189,359	**165,004**
65 TO 69	0	157,628	158,693	173,183	148,839	198,163	234,093	0	0	**177,200**
70 & UP	0	0	158,650	151,560	160,258	0	0	0	174,334	**158,311**
TOTAL	**67,809**	**116,812**	**131,060**	**137,135**	**147,405**	**153,432**	**159,726**	**175,852**	**188,286**	**117,916**

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

[1] Total may not add up due to rounding.

[2] Average based on unrounded salary.

Table XII-6
Detailed Active Membership and Salaries as of June 30, 2019 (cont'd)

ALL TIERS: FEMALES

AGE \ SVC	UNDER 5	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 & UP	ALL YEARS
NUMBER:										
UNDER 20	0	0	0	0	0	0	0	0	0	**0**
20 TO 24	210	0	0	0	0	0	0	0	0	**210**
25 TO 29	860	143	0	0	0	0	0	0	0	**1,003**
30 TO 34	545	594	219	0	0	0	0	0	0	**1,358**
35 TO 39	222	251	753	217	0	0	0	0	0	**1,443**
40 TO 44	40	129	390	569	100	0	0	0	0	**1,228**
45 TO 49	0	14	191	337	223	46	0	0	0	**811**
50 TO 54	1	0	13	154	127	88	13	0	0	**396**
55 TO 59	1	0	0	7	30	31	26	9	0	**104**
60 TO 64	0	0	1	0	2	4	5	7	0	**19**
65 TO 69	0	0	0	0	0	0	0	0	0	**0**
70 & UP	0	0	0	0	0	0	0	0	0	**0**
TOTAL	**1,879**	**1,131**	**1,567**	**1,284**	**482**	**169**	**44**	**16**	**0**	**6,572**
SALARIES (IN THOUSANDS):										
UNDER 20	0	0	0	0	0	0	0	0	0	**0**
20 TO 24	11,708	0	0	0	0	0	0	0	0	**11,708**
25 TO 29	56,936	15,175	0	0	0	0	0	0	0	**72,111**
30 TO 34	37,430	68,737	27,650	0	0	0	0	0	0	**133,817**
35 TO 39	15,354	28,776	95,456	29,477	0	0	0	0	0	**169,062**
40 TO 44	2,970	14,667	49,416	76,693	14,958	0	0	0	0	**158,705**
45 TO 49	0	1,640	24,003	44,852	32,266	6,800	0	0	0	**109,561**
50 TO 54	126	0	1,605	20,133	18,029	12,867	1,804	0	0	**54,564**
55 TO 59	136	0	0	910	4,482	4,301	3,786	1,579	0	**15,193**
60 TO 64	0	0	158	0	289	521	677	1,119	0	**2,764**
65 TO 69	0	0	0	0	0	0	0	0	0	**0**
70 & UP	0	0	0	0	0	0	0	0	0	**0**
TOTAL [1]	**124,659**	**128,995**	**198,287**	**172,066**	**70,024**	**24,489**	**6,267**	**2,698**	**0**	**727,485**
AVERAGE SALARIES: [2]										
UNDER 20	0	0	0	0	0	0	0	0	0	**0**
20 TO 24	55,752	0	0	0	0	0	0	0	0	**55,752**
25 TO 29	66,205	106,116	0	0	0	0	0	0	0	**71,895**
30 TO 34	68,679	115,720	126,255	0	0	0	0	0	0	**98,540**
35 TO 39	69,160	114,644	126,767	135,840	0	0	0	0	0	**117,160**
40 TO 44	74,250	113,699	126,708	134,785	149,585	0	0	0	0	**129,238**
45 TO 49	0	117,157	125,669	133,093	144,688	147,819	0	0	0	**135,093**
50 TO 54	125,692	0	123,467	130,736	141,961	146,216	138,738	0	0	**137,787**
55 TO 59	135,719	0	0	130,004	149,401	138,740	145,618	175,396	0	**146,090**
60 TO 64	0	0	157,628	0	144,378	130,232	135,493	159,920	0	**145,485**
65 TO 69	0	0	0	0	0	0	0	0	0	**0**
70 & UP	0	0	0	0	0	0	0	0	0	**0**
TOTAL	**66,343**	**114,054**	**126,539**	**134,008**	**145,278**	**144,903**	**142,434**	**168,625**	**0**	**110,695**

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

[1] Total may not add up due to rounding.

[2] Average based on unrounded salary.

Table XII-6
Detailed Active Membership and Salaries as of June 30, 2019 (cont'd)

	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**
NUMBER:										
UNDER 20	0	0	0	0	0	0	0	0	0	**0**
20 TO 24	1,271	0	0	0	0	0	0	0	0	**1,271**
25 TO 29	4,511	953	1	0	0	0	0	0	0	**5,465**
30 TO 34	2,221	3,700	1,470	9	0	0	0	0	0	**7,400**
35 TO 39	780	1,469	4,101	1,443	8	0	0	0	0	**7,801**
40 TO 44	167	626	1,803	2,989	766	1	0	0	0	**6,352**
45 TO 49	4	74	711	1,508	1,619	607	2	0	0	**4,525**
50 TO 54	4	2	76	635	757	857	269	1	0	**2,601**
55 TO 59	1	2	2	40	181	223	227	121	0	**797**
60 TO 64	2	0	3	4	21	16	35	80	13	**174**
65 TO 69	0	1	1	1	2	2	1	0	0	**8**
70 & UP	0	0	1	3	2	0	0	0	1	**7**
TOTAL	**8,961**	**6,827**	**8,169**	**6,632**	**3,356**	**1,706**	**534**	**202**	**14**	**36,401**
SALARIES (IN THOUSANDS):										
UNDER 20	0	0	0	0	0	0	0	0	0	**0**
20 TO 24	71,568	0	0	0	0	0	0	0	0	**71,568**
25 TO 29	307,364	102,707	82	0	0	0	0	0	0	**410,153**
30 TO 34	157,027	436,409	191,190	1,144	0	0	0	0	0	**785,769**
35 TO 39	55,091	172,735	537,252	198,528	1,122	0	0	0	0	**964,729**
40 TO 44	12,555	72,938	233,120	409,644	113,677	167	0	0	0	**842,100**
45 TO 49	320	8,842	91,072	204,735	240,220	95,052	286	0	0	**640,528**
50 TO 54	555	251	9,761	84,908	108,945	130,128	43,363	171	0	**378,082**
55 TO 59	136	315	279	5,230	26,062	32,486	35,597	20,905	0	**121,010**
60 TO 64	270	0	475	644	3,021	2,086	5,053	14,330	2,462	**28,340**
65 TO 69	0	158	159	173	298	396	234	0	0	**1,418**
70 & UP	0	0	159	455	321	0	0	0	174	**1,108**
TOTAL [1]	**604,886**	**794,355**	**1,063,548**	**905,462**	**493,665**	**260,314**	**84,533**	**35,406**	**2,636**	**4,244,805**
AVERAGE SALARIES: [2]										
UNDER 20	0	0	0	0	0	0	0	0	0	**0**
20 TO 24	56,309	0	0	0	0	0	0	0	0	**56,309**
25 TO 29	68,137	107,772	81,658	0	0	0	0	0	0	**75,051**
30 TO 34	70,701	117,948	130,061	127,058	0	0	0	0	0	**106,185**
35 TO 39	70,630	117,587	131,005	137,580	140,287	0	0	0	0	**123,667**
40 TO 44	75,178	116,515	129,296	137,050	148,403	166,697	0	0	0	**132,572**
45 TO 49	80,017	119,492	128,090	135,766	148,375	156,593	143,176	0	0	**141,553**
50 TO 54	138,688	125,731	128,440	133,714	143,917	151,841	161,199	171,129	0	**145,360**
55 TO 59	135,719	157,504	139,677	130,756	143,990	145,678	156,814	172,769	0	**151,832**
60 TO 64	134,969	0	158,309	160,981	143,840	130,356	144,365	179,128	189,359	**162,873**
65 TO 69	0	157,628	158,693	173,183	148,839	198,163	234,093	0	0	**177,200**
70 & UP	0	0	158,650	151,560	160,258	0	0	0	174,334	**158,311**
TOTAL	**67,502**	**116,355**	**130,193**	**136,529**	**147,099**	**152,587**	**158,301**	**175,279**	**188,286**	**116,612**

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

[1] Total may not add up due to rounding.

[2] Average based on unrounded salary.

Table XII-7
Summary of Non-Pensioner Membership

		TOTAL ACTIVE MEMBERS AS OF JUNE 30, 2019					TOTAL ACTIVE MEMBERS AS OF JUNE 30, 2018				
TIER	GENDER	NUMBER	SALARY	AVG SAL	AVG AGE	AVG SVC	NUMBER	SALARY	AVG SAL	AVG AGE	AVG SVC
I	M	2	409,860	204,930	80.0	41.5	2	393,090	196,545	79.0	40.5
I	F	0	0	0	0.0	0.0	0	0	0	0.0	0.0
		2	409,860	204,930	80.0	41.5	2	393,090	196,545	79.0	40.5
II	M	17,094	2,373,451,092	138,847	43.1	17.5	18,285	2,399,087,602	131,205	42.5	16.9
II	F	3,607	477,808,102	132,467	42.8	16.3	3,856	483,895,398	125,492	42.2	15.7
		20,701	2,851,259,194	137,735	43.1	17.3	22,141	2,882,983,000	130,210	42.5	16.7
III	M	111	13,994,144	126,073	34.0	8.6	106	12,588,273	118,757	33.0	7.7
III	F	14	1,777,386	126,956	36.1	8.3	15	1,730,616	115,374	34.9	7.3
		125	15,771,530	126,172	34.3	8.6	121	14,318,889	118,338	33.3	7.6
III Revised	M	167	15,837,268	94,834	31.1	4.5	155	11,933,773	76,992	30.6	3.7
III Revised	F	35	3,151,704	90,049	32.1	4.4	32	2,580,650	80,645	31.3	3.6
		202	18,988,972	94,005	31.3	4.5	187	14,514,423	77,617	30.8	3.7
III Enhanced	M	12,455	1,113,627,527	89,412	30.7	4.4	11,494	939,259,901	81,717	30.1	3.8
III Enhanced	F	2,916	244,747,919	83,933	31.0	4.0	2,617	201,735,260	77,086	30.5	3.5
		15,371	1,358,375,446	88,373	30.7	4.3	14,111	1,140,995,161	80,859	30.2	3.8
ALL TIERS		**36,401**	**4,244,805,002**	**116,612**	**37.8**	**11.7**	**36,562**	**4,053,204,563**	**110,858**	**37.7**	**11.6**

		JUNE 30, 2019 MEMBERS ALSO PRESENT AS OF JUNE 30, 2018					JUNE 30, 2018 MEMBERS ALSO PRESENT AS OF JUNE 30, 2019				
I	M	2	409,860	204,930	80.0	41.5	2	393,090	196,545	79.0	40.5
I	F	0	0	0	0.0	0.0	0	0	0	0.0	0.0
		2	409,860	204,930	80.0	41.5	2	393,090	196,545	79.0	40.5
II	M	17,054	2,369,249,652	138,926	43.1	17.5	17,054	2,231,883,665	130,872	42.1	16.5
II	F	3,567	473,377,419	132,710	42.8	16.3	3,567	445,862,004	124,996	41.8	15.3
		20,621	2,842,627,071	137,851	43.1	17.3	20,621	2,677,745,669	129,855	42.1	16.3
III	M	105	13,172,054	125,448	34.0	8.6	105	12,466,980	118,733	33.0	7.7
III	F	14	1,777,386	126,956	36.1	8.3	14	1,608,562	114,897	35.1	7.3
		119	14,949,440	125,626	34.3	8.6	119	14,075,542	118,282	33.3	7.6
III Revised	M	141	13,411,701	95,118	31.4	4.7	141	10,812,924	76,687	30.4	3.7
III Revised	F	28	2,714,846	96,959	32.2	4.9	28	2,325,224	83,044	31.2	3.9
		169	16,126,547	95,423	31.6	4.7	169	13,138,148	77,741	30.6	3.7
III Enhanced	M	11,129	1,042,571,035	93,681	31.2	4.9	11,129	912,074,899	81,955	30.2	3.9
III Enhanced	F	2,511	222,409,452	88,574	31.5	4.5	2,511	194,211,781	77,344	30.5	3.5
		13,640	1,264,980,487	92,741	31.2	4.8	13,640	1,106,286,680	81,106	30.2	3.8
ALL TIERS		**34,551**	**4,139,093,405**	**119,797**	**38.3**	**12.3**	**34,551**	**3,811,639,129**	**110,319**	**37.3**	**11.3**

		ADDITIONS DURING THE YEAR [1]					SEPARATIONS FROM MEMBERSHIP DURING THE YEAR [1]				
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	40	4,201,440	105,036	37.4	10.7	1,231	167,203,937	135,828	48.2	22.7
II	F	40	4,430,683	110,767	38.1	11.1	289	38,033,394	131,603	46.9	20.7
		80	8,632,123	107,902	37.7	10.9	1,520	205,237,331	135,025	48.0	22.3
III	M	6	822,090	137,015	33.8	8.7	1	121,293	121,293	32.0	8.0
III	F	0	0	0	0.0	0.0	1	122,054	122,054	33.0	8.0
		6	822,090	137,015	33.8	8.7	2	243,347	121,674	32.5	8.0
III Revised	M	26	2,425,567	93,291	29.3	3.2	14	1,120,849	80,061	32.6	3.8
III Revised	F	7	436,858	62,408	31.9	2.4	4	255,426	63,857	32.3	1.8
		33	2,862,425	86,740	29.8	3.0	18	1,376,275	76,460	32.6	3.3
III Enhanced	M	1,326	71,056,492	53,587	26.2	0.6	365	27,185,002	74,479	28.7	3.0
III Enhanced	F	405	22,338,467	55,157	27.4	0.8	106	7,523,479	70,976	30.4	2.9
		1,731	93,394,959	53,954	26.5	0.6	471	34,708,481	73,691	29.1	3.0
ALL TIERS		**1,850**	**105,711,597**	**57,141**	**27.1**	**1.2**	**2,011**	**241,565,434**	**120,122**	**43.4**	**17.6**

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

[1] Separations and additions do not include members who joined after June 30, 2018 and are no longer members on June 30, 2019. Members are included as separations and additions if the tier or gender has changed.

Table XII-8
Summary of Non-Pensioner Membership as of June 30, 2019

	TIER 1		TIER 2		TIER 3		TIER 3 REVISED		TIER 3 ENHANCED		ALL TIERS	
STATUS	**NUMBER**	**SALARY[1]**	**NUMBER**	**SALARY[1]**	**NUMBER**	**SALARY[1]**	**NUMBER**	**SALARY[1]**	**NUMBER**	**SALARY[1]**	**NUMBER**	**SALARY[1]**
MALES:												
ACTIVES	2	409,860	17,094	2,373,451,092	111	13,994,144	167	15,837,268	12,455	1,113,627,527	29,829	3,517,319,891
ACTIVE OFF PAYROLL	0	0	598	35,280,603	50	2,812,068	262	12,683,277	377	22,012,623	1,287	72,788,571
VESTED	0	0	340	30,405,581	18	1,346,839	2	162,228	25	2,193,633	385	34,108,281
ALL STATUS	**2**	**409,860**	**18,032**	**2,439,137,276**	**179**	**18,153,051**	**431**	**28,682,773**	**12,857**	**1,137,833,783**	**31,501**	**3,624,216,743**
FEMALES:												
ACTIVES	0	0	3,607	477,808,102	14	1,777,386	35	3,151,704	2,916	244,747,919	6,572	727,485,111
ACTIVE OFF PAYROLL	0	0	122	7,753,474	13	707,396	81	3,600,601	137	7,372,855	353	19,434,326
VESTED	0	0	100	8,405,445	2	130,464	0	0	10	886,951	112	9,422,860
ALL STATUS	**0**	**0**	**3,829**	**493,967,021**	**29**	**2,615,246**	**116**	**6,752,305**	**3,063**	**253,007,725**	**7,037**	**756,342,297**
TOTAL:												
ACTIVES	2	409,860	20,701	2,851,259,194	125	15,771,530	202	18,988,972	15,371	1,358,375,446	36,401	4,244,805,002
ACTIVE OFF PAYROLL	0	0	720	43,034,077	63	3,519,464	343	16,283,878	514	29,385,478	1,640	92,222,897
VESTED	0	0	440	38,811,026	20	1,477,303	2	162,228	35	3,080,584	497	43,531,141
ALL STATUS	**2**	**409,860**	**21,861**	**2,933,104,297**	**208**	**20,768,297**	**547**	**35,435,078**	**15,920**	**1,390,841,508**	**38,538**	**4,380,559,040**

[1]Salary shown for Active Off Payroll and Vested members is the salary when last on payroll.

Table XII-9
Summary of Pensioner Membership

Group	June 30, 2019 (Lag)				June 30, 2018 (Lag)			
	Number	Annual Amounts Payable			Number	Annual Amounts Payable		
		Plan Benefit	Supplementation	Total		Plan Benefit	Supplementation	Total
Service Pensioners	**33,966**	1,665,692,547	78,985,082	**$ 1,744,677,629**	**33,416**	$ 1,572,586,057	$ 79,064,137	**$ 1,651,650,194**
Ordinary Disability Pensioners	**2,752**	75,742,522	16,234,385	**$ 91,976,907**	**2,861**	77,522,122	16,984,088	**$ 94,506,210**
Accidental Disability Pensioners	**12,665**	742,459,730	63,529,891	**$ 805,989,621**	**12,556**	710,599,182	63,176,422	**$ 773,775,604**
Beneficiaries of Members Killed in the Line-of-Duty	**475**	46,935,684	2,153,762	**$ 49,089,446**	**451**	42,760,944	2,111,102	**$ 44,872,046**
Other Beneficiaries	**869**	22,259,290	2,144,522	**$ 24,403,812**	**840**	20,408,591	2,155,149	**$ 22,563,740**
Total	**50,727**	**$ 2,553,089,773**	**$ 163,047,642**	**$ 2,716,137,415**	**50,124**	**$ 2,423,876,896**	**$ 163,490,898**	**$ 2,587,367,794**

Table XII-10
Distribution of Pension Benefits by Cause and Age as of June 30, 2019

	MALE			FEMALE			BOTH MALE & FEMALE		
AGE	NUMBER	BENEFITS	AVERAGE	NUMBER	BENEFITS	AVERAGE	NUMBER	BENEFITS	AVERAGE
SERVICE RETIREMENT:									
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	157	9,143,917	58,242	47	2,775,578	59,055	204	11,919,495	58,429
45 TO 49	2,287	153,391,801	67,071	529	30,198,012	57,085	2,816	183,589,813	65,195
50 TO 54	5,230	342,827,073	65,550	1,037	58,752,674	56,656	6,267	401,579,747	64,078
55 TO 59	6,471	365,549,977	56,490	1,489	74,797,757	50,234	7,960	440,347,734	55,320
60 TO 64	4,237	217,676,963	51,375	831	38,733,457	46,611	5,068	256,410,420	50,594
65 TO 69	2,202	104,960,152	47,666	286	12,052,456	42,141	2,488	117,012,608	47,031
70 TO 74	2,651	112,134,877	42,299	81	3,062,337	37,807	2,732	115,197,214	42,166
75 TO 79	3,209	119,403,786	37,209	75	2,773,649	36,982	3,284	122,177,435	37,204
80 TO 84	1,729	55,647,953	32,185	31	1,163,803	37,542	1,760	56,811,756	32,279
85 TO 89	808	23,695,593	29,326	14	466,123	33,295	822	24,161,716	29,394
90 & UP	544	14,961,144	27,502	21	508,547	24,217	565	15,469,691	27,380
TOTAL	**29,525**	**1,519,393,236**	**51,461**	**4,441**	**225,284,393**	**50,728**	**33,966**	**1,744,677,629**	**51,365**
ORDINARY DISABILITY:									
UNDER 30	0	0	0	0	0	0	0	0	0
30 TO 34	7	292,191	41,742	3	90,178	30,059	10	382,369	38,237
35 TO 39	46	1,962,802	42,670	14	551,619	39,401	60	2,514,421	41,907
40 TO 44	67	2,741,870	40,923	46	1,846,031	40,131	113	4,587,901	40,601
45 TO 49	164	6,389,454	38,960	77	2,833,321	36,796	241	9,222,775	38,269
50 TO 54	215	7,398,590	34,412	130	4,127,319	31,749	345	11,525,909	33,408
55 TO 59	192	5,872,876	30,588	117	3,181,900	27,196	309	9,054,776	29,303
60 TO 64	118	3,082,580	26,124	69	1,827,857	26,491	187	4,910,437	26,259
65 TO 69	97	3,257,639	33,584	24	597,266	24,886	121	3,854,905	31,859
70 TO 74	314	8,163,751	25,999	17	374,275	22,016	331	8,538,026	25,795
75 TO 79	417	11,398,934	27,336	12	274,740	22,895	429	11,673,674	27,211
80 TO 84	213	8,326,345	39,091	8	177,565	22,196	221	8,503,910	38,479
85 TO 89	178	8,082,009	45,405	6	205,688	34,281	184	8,287,697	45,042
90 & UP	196	8,709,063	44,434	5	211,044	42,209	201	8,920,107	44,379
TOTAL	**2,224**	**75,678,104**	**34,028**	**528**	**16,298,803**	**30,869**	**2,752**	**91,976,907**	**33,422**
ACCIDENTAL DISABILITY:									
UNDER 30	0	0	0	0	0	0	0	0	0
30 TO 34	36	2,422,666	67,296	8	513,571	64,196	44	2,936,237	66,733
35 TO 39	259	19,553,918	75,498	57	4,008,200	70,319	316	23,562,118	74,564
40 TO 44	411	32,942,861	80,153	79	5,563,053	70,418	490	38,505,914	78,583
45 TO 49	1,075	89,674,114	83,418	169	12,198,915	72,183	1,244	101,873,029	81,892
50 TO 54	1,916	154,223,950	80,493	291	20,125,347	69,159	2,207	174,349,297	78,998
55 TO 59	1,939	135,202,866	69,728	373	24,971,481	66,948	2,312	160,174,347	69,280
60 TO 64	1,193	75,916,283	63,635	173	9,911,106	57,290	1,366	85,827,389	62,831
65 TO 69	727	40,046,872	55,085	68	3,566,132	52,443	795	43,613,004	54,859
70 TO 74	1,430	66,107,224	46,229	37	1,345,721	36,371	1,467	67,452,945	45,980
75 TO 79	1,436	63,250,641	44,046	29	1,275,091	43,969	1,465	64,525,732	44,045
80 TO 84	577	25,482,895	44,164	8	310,071	38,759	585	25,792,966	44,091
85 TO 89	234	11,255,486	48,100	2	67,720	33,860	236	11,323,206	47,980
90 & UP	133	5,857,150	44,039	5	196,287	39,257	138	6,053,437	43,865
TOTAL	**11,366**	**721,936,926**	**63,517**	**1,299**	**84,052,695**	**64,706**	**12,665**	**805,989,621**	**63,639**

Table XII-10
Distribution of Pension Benefits by Cause and Age as of June 30, 2019 (cont'd)

	MALE			FEMALE			TOTAL		
AGE	**NUMBER**	**BENEFITS**	**AVERAGE**	**NUMBER**	**BENEFITS**	**AVERAGE**	**NUMBER**	**BENEFITS**	**AVERAGE**
ACCIDENTAL DEATH:									
UNDER 30	2	283,614	141,807	15	2,056,988	137,133	17	2,340,602	137,682
30 TO 34	0	0	0	1	145,364	145,364	1	145,364	145,364
35 TO 39	1	123,274	123,274	3	394,553	131,518	4	517,827	129,457
40 TO 44	0	0	0	19	2,261,217	119,011	19	2,261,217	119,011
45 TO 49	1	108,219	108,219	20	2,638,857	131,943	21	2,747,076	130,813
50 TO 54	2	251,485	125,743	61	7,390,784	121,160	63	7,642,269	121,306
55 TO 59	11	1,198,976	108,998	72	8,494,711	117,982	83	9,693,687	116,791
60 TO 64	5	435,783	87,157	49	5,726,331	116,864	54	6,162,114	114,113
65 TO 69	2	178,526	89,263	44	4,210,117	95,684	46	4,388,643	95,405
70 TO 74	2	223,038	111,519	56	5,094,569	90,974	58	5,317,607	91,683
75 TO 79	1	103,043	103,043	58	4,832,031	83,311	59	4,935,074	83,645
80 TO 84	5	259,695	51,939	15	950,325	63,355	20	1,210,020	60,501
85 TO 89	1	28,482	28,482	19	1,187,880	62,520	20	1,216,362	60,818
90 & UP	3	108,582	36,194	7	403,002	57,572	10	511,584	51,158
TOTAL	**36**	**3,302,717**	**91,742**	**439**	**45,786,729**	**104,298**	**475**	**49,089,446**	**103,346**
OTHER BENEFICIARIES:									
UNDER 30	9	421,529	46,837	8	286,906	35,863	17	708,435	41,673
30 TO 34	4	111,517	27,879	4	72,196	18,049	8	183,713	22,964
35 TO 39	0	0	0	6	199,981	33,330	6	199,981	33,330
40 TO 44	1	13,585	13,585	11	468,150	42,559	12	481,735	40,145
45 TO 49	6	321,051	53,509	16	758,050	47,378	22	1,079,101	49,050
50 TO 54	6	248,049	41,342	42	1,593,146	37,932	48	1,841,195	38,358
55 TO 59	4	125,262	31,316	57	2,252,990	39,526	61	2,378,252	38,988
60 TO 64	1	29,668	29,668	56	1,786,689	31,905	57	1,816,357	31,866
65 TO 69	2	52,833	26,417	70	1,957,896	27,970	72	2,010,729	27,927
70 TO 74	0	0	0	119	3,294,726	27,687	119	3,294,726	27,687
75 TO 79	1	19,546	19,546	130	3,512,521	27,019	131	3,532,067	26,962
80 TO 84	0	0	0	106	2,812,557	26,534	106	2,812,557	26,534
85 TO 89	0	0	0	96	2,174,559	22,652	96	2,174,559	22,652
90 & UP	0	0	0	114	1,890,405	16,583	114	1,890,405	16,583
TOTAL	**34**	**1,343,040**	**39,501**	**835**	**23,060,772**	**27,618**	**869**	**24,403,812**	**28,083**
ALL PENSIONERS AND BENEFICIARIES:									
UNDER 30	11	705,143	64,104	23	2,343,894	101,908	34	3,049,037	89,678
30 TO 34	47	2,826,374	60,136	16	821,309	51,332	63	3,647,683	57,900
35 TO 39	306	21,639,994	70,719	80	5,154,353	64,429	386	26,794,347	69,415
40 TO 44	636	44,842,233	70,507	202	12,914,029	63,931	838	57,756,262	68,922
45 TO 49	3,533	249,884,639	70,729	811	48,627,155	59,960	4,344	298,511,794	68,718
50 TO 54	7,369	504,949,147	68,523	1,561	91,989,270	58,930	8,930	596,938,417	66,846
55 TO 59	8,617	507,949,957	58,947	2,108	113,698,839	53,937	10,725	621,648,796	57,963
60 TO 64	5,554	297,141,277	53,500	1,178	57,985,440	49,224	6,732	355,126,717	52,752
65 TO 69	3,030	148,496,022	49,009	492	22,383,867	45,496	3,522	170,879,889	48,518
70 TO 74	4,397	186,628,890	42,445	310	13,171,628	42,489	4,707	199,800,518	42,448
75 TO 79	5,064	194,175,950	38,344	304	12,668,032	41,671	5,368	206,843,982	38,533
80 TO 84	2,524	89,716,888	35,546	168	5,414,321	32,228	2,692	95,131,209	35,338
85 TO 89	1,221	43,061,570	35,267	137	4,101,970	29,941	1,358	47,163,540	34,730
90 & UP	876	29,635,939	33,831	152	3,209,285	21,114	1,028	32,845,224	31,951
TOTAL	**43,185**	**2,321,654,023**	**53,761**	**7,542**	**394,483,392**	**52,305**	**50,727**	**2,716,137,415**	**53,544**

Graph XII-11
Pensioner Average Benefits

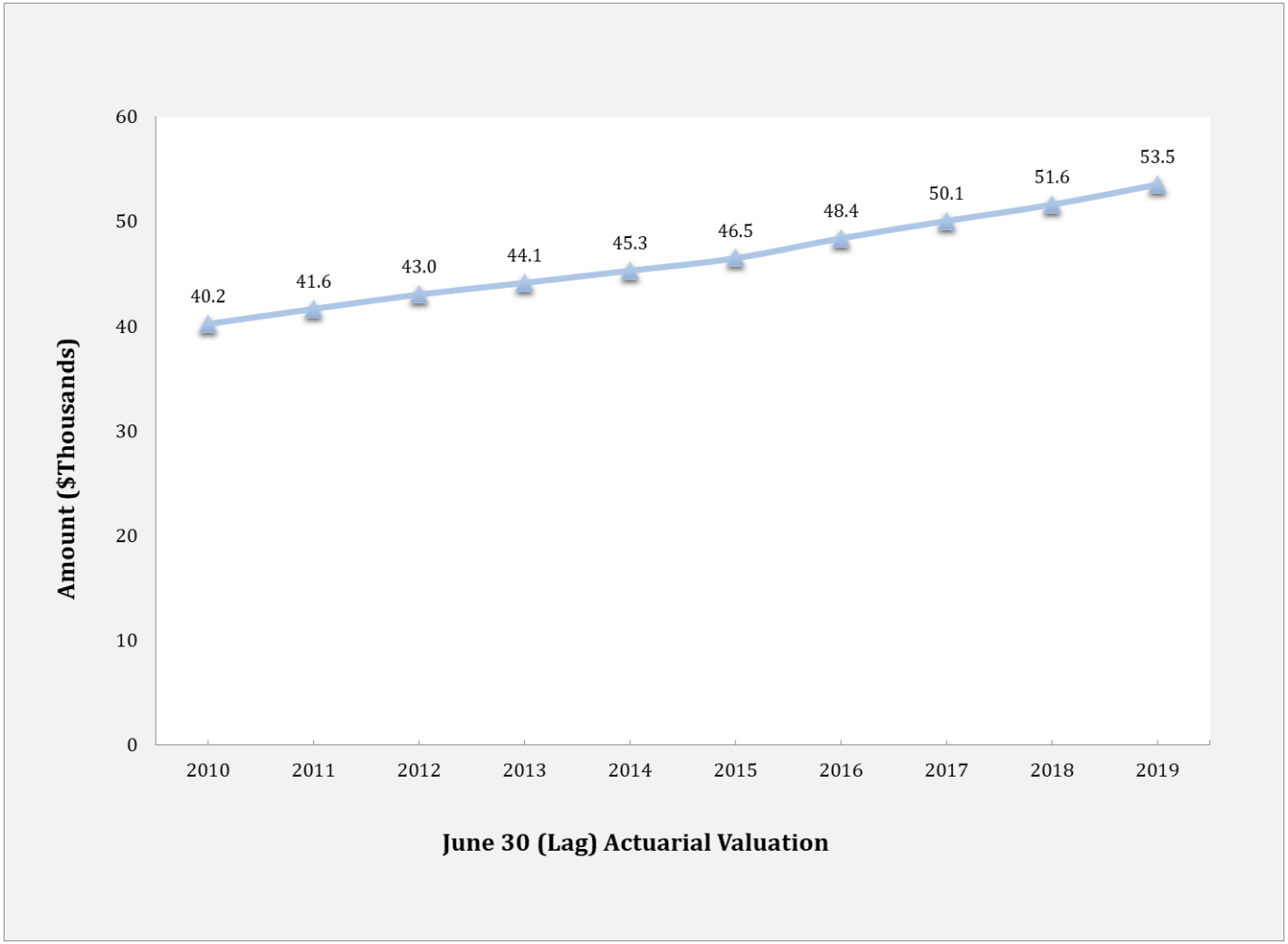

Table XII-12
Reconciliation of Pensioner and Beneficiary Data

SCHEDULE OF PENSIONERS AND BENEFICIARIES ADDED TO AND REMOVED FROM THE ROLLS								
	Added to Rolls		Removed from Rolls		End of Year Rolls			
June 30 (Lag) Actuarial Valuation	Number	Annual Allowances[1]	Number	Annual Allowances	Number	Annual Allowances[2]	% Increase in Annual Allowances	Average Annual Allowances
2010	1,355	110,403,824	1,006	29,554,813	44,634	1,794,318,731	4.7%	40,201
2011	2,142	141,323,253	1,021	30,315,285	45,755	1,905,326,699	6.2%	41,642
2012	1,893	133,158,449	1,010	32,287,109	46,638	2,006,198,039	5.3%	43,016
2013	1,346	99,488,158	1,034	33,621,831	46,950	2,072,064,366	3.3%	44,133
2014	2,220	144,660,995	958	32,759,640	48,212	2,183,965,721	5.4%	45,299
2015	1,574	117,371,844	1,083	37,069,856	48,703	2,264,267,709	3.7%	46,491
2016[3]	1,458	151,061,292	1,010	36,517,652	49,151	2,378,811,349	5.1%	48,398
2017	1,681	153,211,878	1,033	38,982,214	49,799	2,493,041,013	4.8%	50,062
2018	1,401	137,291,868	1,076	42,965,087	50,124	2,587,367,794	3.8%	51,619
2019	1,729	170,887,518	1,126	42,117,897	50,727	2,716,137,415	5.0%	53,544

[1] Amounts shown include changes due to benefit finalization, changes in benefit type (e.g. Service to Accidental Disability), COLA increases, and other changes.

[2] Allowances shown are those used in the actuarial valuation as of the Year End date and are not adjusted for anticipated changes due to finalization of benefit calculations or contract settlements.

[3] Beginning in 2016, SADB payments to beneficiaries are included.

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
AIR	Actuarial Interest Rate
AL	Accrued Liability
AMC	Additional Member Contributions
AVA	Actuarial Value of Assets
COLA	Cost-of-Living Adjustment
EAN	Entry Age Normal cost method
EIR	Expected Investment Return
FAS	Final Average Salary
FS	Final Salary
GASB	Governmental Accounting Standards Board
GASB25	Governmental Accounting Standards Board Statement No. 25
GASB67	Governmental Accounting Standards Board Statement No. 67
GASB68	Governmental Accounting Standards Board Statement No. 68
IRC	Internal Revenue Code
ITHP	Increased-Take-Home-Pay
MVA	Market Value of Assets
OYLM	One-Year Lag Methodology
POLICE	New York City Police Pension Fund
POVSF	Police Officer's Variable Supplements Fund
PSOVSF	Police Superior Officers' Variable Supplements Fund
PV	Present Value
PVFB	Present Value of Future Benefits
PVFNC	Present Value of Future Normal Costs
PVFS	Present Value of Future Salary
UAL	Unfunded Accrued Liability
UIR	Unexpected Investment Return
VSF	Variable Supplements Fund
WTC	World Trade Center