KORN FERRY®

City of Pittsburgh Policemen's Relief and Pension Fund

Actuarial Valuation as of January 1, 2019

January 2020

DRAFT

Prepared by:

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Korn Ferry, Inc.
Philadelphia

for

The City of Pittsburgh

Date: January 2020

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I. Introduction

In accordance with the City's request, we have completed an actuarial valuation of the Policemen's Relief and Pension Fund (the Plan) as of January 1, 2019. The valuation was based on personnel data as supplied by the City and on financial data as supplied by the City's auditor. The valuation results are presented in this report.

Act 205

The Pennsylvania Municipal Pension Fund Funding Standard and Recovery Act was signed into law as Act 205 of 1984. As required, we have prepared the January 1, 2019 valuation and this report thereon in accordance with the provisions of Act 205.

A copy of this report will be filed as an attachment to Form PC-201C which must be filed with the Municipal Pension Reporting Program by March 31, 2020.

Preamble

Please read the Preamble to the report very carefully. It contains important general information and concepts. It also explains how the results of the January 1, 2019 valuation, as published in this report, normally form the basis for the Plan's 2020 and 2021 Minimum Municipal Obligation (MMO).

Changes in Actuarial Assumptions and Plan Provisions Since the Last (1/1/2017) Valuation

There have been no changes in actuarial assumptions or Plan provisions since the last valuation.

Other important results and products of the January 1, 2019 valuation are presented in the Actuarial, Financial and Demographic Exhibits which make up the bulk of the report.

Certification

Assumptions used for the valuation were selected by the City based on a completed experience study through January 1, 2017. We believe the assumptions are reasonable and appropriate for this valuation.

The report was prepared under my supervision. I, Jason Fine, am a member of the American Academy of Actuaries and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

Respectfully submitted,

By: ______________________ Date: January 2020

Jason L. Fine
Enrolled Actuary No.: 17-06680

II. Preamble

The Plan

The City of Pittsburgh sponsors a defined benefit pension plan for its City Police known as the Policemen's Relief and Pension Fund. A summary of the Plan's provisions is set forth in Appendix B of this report. The Plan is subject to the funding and reporting requirements of the Pennsylvania Municipal Pension Plan Funding Standard and Recovery Act (Act 205 of 1984, or Act 205). Act 205 requires that an actuarial valuation of the Plan be performed every other year. Actuarial valuations are performed for the Plan as of January 1 of each odd-numbered year. The January 1, 2019 valuation would normally form the basis for the Plan's 2020 and 2021 Financial Requirements and the City's 2020 and 2021 Minimum Municipal Obligation (MMO).

MMO Reporting Deadline

For a particular year, the City's Chief Administrative Officer must report the Plan's Financial Requirements and the City's MMO to the City Council by the last business day in September of the year preceding the particular year in question. Thus, the Plan's Financial Requirements and the City's MMO for 2020 were required to be reported to City Council by September 30, 2019.

Financial Requirements

The Plan's 2020 Financial Requirements would normally consist of the following elements:

Normal Cost. This is the cost of benefits allocated to the year 2020 under the Plan's actuarial cost method and the methodology of Act 205. It would normally be determined by multiplying the Normal Cost Rate as determined in the 2019 valuation by an estimate of 2019 W-2 wages of Plan members.

Administrative Expenses. This is an estimate of the administrative expenses of the Plan expected to be paid from Plan assets in 2020 and would normally be determined by multiplying the Administrative Expense Rate as determined in the 2019 valuation by the estimate of 2019 W-2 wages of Plan members.

Amortization Requirement (if applicable). This would normally be determined in the 2019 valuation and is the amount required to amortize the Plan's Unfunded Actuarial Accrued Liability as of January 1, 2019 over the number of years prescribed under Act 205 as amended by Act 44 of 2009.

II. Preamble (continued)

Minimum Municipal Obligation (MMO)

The City's MMO for 2020 is set equal to the Plan's Financial Requirements for 2020 less the sum of estimated member contributions for 2020 less, if applicable, a funding adjustment equal to 10% of the Plan's surplus with regard to accrued liabilities. The actual contribution that the City would be required to make in 2020 would be the 2020 MMO less State Aid deposited in the Plan in 2020.

As shown on page 4, the City's 2020 MMO is $14,868,348, prior to reflecting the receipt of any State Aid.

Actuarially Recommended Contribution (ARC)

One of the cost components of the Minimum Municipal Obligation is an amortization payment calculated according to rules prescribed in Act 205. The minimum amortization under Act 205 reflects the utilization of provisions of Act 82 of 1998 for which the City qualified. Under those provisions, the Unfunded Actuarial Accrued Liability as of January 1, 1998 is being amortized over 40 years calculated pursuant to special procedures (described in Appendix C: Glossary). Bases for subsequent years are established according to the normal procedures of Act 205 and amortized over various periods according to the source of the change in unfunded liability such as experience gains or losses, benefit changes, and assumption changes These periods are not limited by average future service because the City qualifies for Distress Level II (funded ratio more than 50% but less than 70%) according to the requirements under Act 205.

Since the Act 82 amortization methodology does not result in an actuarially appropriate funding level, this report also presents and Actuarially Recommended Contribution (ARD) reflecting a recommended amortization payment. The ARC is based on a 30-year "fresh start" amortization payment commencing as of January 1, 2011 and additional amortization bases added thereafter according to the normal procedures of Act 205.

As shown on page 4, the City's 2020 ARC is $26,476,125, prior to reflecting the receipt of any State Aid.

III. City's Minimum Municipal Obligation (MMO) for 2020

1.	Estimated 2019 W-2 Wages of Active Members	$	85,037,279
2.	Normal Cost Rate (from Exhibit A-1)		10.4818%
3.	Administrative Expense Rate (from Exhibit A-1)		1.0081%
4.	Normal Cost for 2020: (1) x (2)	$	8,913,437
5.	Administrative Expense for 2020: (1) x (3)		857,261
6.	Amortization Requirement (from Exhibit A-5a)		9,269,143
7.	Plan's 2020 Financial Requirements: (4) + (5) + (6)	$	19,039,842
8.	Estimated 2020 Member Contributions		4,171,493
9.	Funding Adjustment		N/A
10.	City's 2020 Minimum Municipal Obligation: (7) - (8) - (9)	$	14,868,348*

City's Actuarially Recommended Contribution (ARC) for 2020

1.	City's 2020 MMO (line 10 above)		$ 14,868,348
2.	a) Actuarially Recommended Amortization Payment (Exhibit A-5b)	$20,876,920	
	b) Amortization Requirements for MMO (Exhibit A-5a)	$ 9,269,143	
3.	Difference in Amortization: (2a) – (2b)		$ 11,607,777
4.	City's Actuarially Recommended Contribution for 2020: (1) + (3)		$ 26,476,125*

As shown above, the difference between the MMO and ARC is the difference between the required amortization (MMO) and the recommended amortization (ARC).

*City's actual contribution will be equal to the MMO/ARC less the actual amount of State Aid received in 2020.

IV. Valuation Highlights

	1/1/2019	1/1/2017
Funding		
Present Value of Benefits	$ 570,127,271	$ 565,931,671
Actuarial Accrued Liability	$ 482,008,624	$ 483,208,558
Actuarial Value of Assets	$ 265,925,503	$ 261,080,152
Funding Ratio	55.17%	54.03%
Market Value of Assets	$ 264,759,897	$ 256,004,618
Demographic		
Total Active	955	929
Total Pensionable Compensation	$ 59,686,894	$ 59,351,952
Average Annual Pensionable Compensation	$ 62,499	$ 63,888
Total In-Payment Status		
Retirement	716	683
Total Retirement Benefits	$ 22,531,829	$ 20,899,804
Average Annual Benefit	$ 31,469	$ 30,600
Disabled	295	317
Total Disabled Benefits	$ 7,627,655	$ 8,047,253
Average Annual Benefit	$ 25,856	$ 25,386
Survivor	455	470
Total Survivor Benefits	$ 4,541,169	$ 4,430,719
Average Annual Benefit	$ 9,981	$ 9,427
Total Deferred	24	40
Cost Components		
Normal Cost as percentage of total payroll	10.4818%	10.5770%
Administrative Expense as percentage of total payroll	1.0081%	1.0000%
Minimum Amortization Payment for MMO	$ 9,269,143	$ 10,724,872
Actuarially Recommended Amortization Payment for ARC	$ 20,876,920	$ 20,562,701

V. Actuarial Exhibits

Exhibit A-1: Normal Cost of Plan Benefits

	Normal Cost Expressed As A	
Type of Plan Benefit	*Dollar Amount*	*% of 2018 W-2 Wages*
Retirement	$ 6,265,515	7.3309%
Disability	2,035,795	2.3819
Survivor	110,020	0.1287
Refund of Member Contributions	437,579	0.5120
Vested Terminations	109,625	0.1283
Sub Total	$ 8,958,534	10.4818%
Estimated Average Administrative Fees for 2018 and 2019	861,591	1.0081%
Grand Total	$ 9,820,125	11.4899%

NOTES:

1. The normal cost for Plan Benefits is the portion of total Plan liabilities for current active members assigned to a particular plan year in accordance with the Entry Age Actuarial Cost Method, and the actuarial assumptions described in Appendix A.
2. In accordance with Act 205 the administrative expenses of the Plan (actuarial, legal, investment, etc.) may be paid from Plan assets.
3. 2018 W-2 wages for the Plan's 955 active members as of 1/1/2019 was $85,467,612.

V. Actuarial Exhibits (continued)

Exhibit A-2: Actuarial Accrued Liability as of January 1, 2019

1.	Present Value of Benefits of Active Members		
	(a) Retirement Benefits	$	192,395,267
	(b) Disability Benefits		35,548,215
	(c) Survivor Benefits		2,132,319
	(d) Refund of Member Contributions		3,082,189*
	(e) Vested Termination		1,669,507
	(f) Total	$	234,827,497
2.	Present Value of Benefits of Deferred Vested Benefits	$	9,952,467
3.	Member Refunds Due and Unpaid	$	0
4.	Present Value of Benefits of Benefit Recipients		
	(a) Retirement Benefits	$	217,737,284
	(b) Disability Benefits		73,910,814
	(c) Surviving Spouse Benefits		33,699,209
	(d) Surviving Child Benefits		0
	(e) Other		0
	(f) Total	$	325,347,307
5.	Present Value of Other Plan Benefits	$	0
6.	Present Value of All Plan Benefits: (1.f) + (2) + (3) + (4.f) + (5)	$	570,127,271
7.	Present Value of Future Normal Costs	$	88,118,647
8.	Actuarial Accrued Liability at 1/1/2019: (6) - (7)	$	482,008,624

* The amount of accumulated active member contributions without interest as of January 1, 2019 is $44,593,513.

V. Actuarial Exhibits (continued)

Exhibit A-3: Unfunded Actuarial Liability as of January 1, 2019

As of January 1, 2019, the Plan had an Unfunded Actuarial Accrued Liability (UAAL) since the Actuarial Value of Plan Assets did not exceed the Plan's Actuarial Accrued Liability, as follows:

1.	Actuarial Accrued Liability at 1/1/2019 (Exhibit A-2)	$	482,008,624
2.	Actuarial Value of Assets at 1/1/2019 (Exhibit F-1)		265,925,503
3.	UAAL at 1/1/2019: (1) - (2)	$	216,083,121

Analysis of Change in the Plan's Unfunded Actuarial Liability from January 1, 2017 to January 1, 2019

1.	Unfunded Actuarial Accrued Liability at 1/1/2017	$ 222,128,406
2.	Normal Cost (including expenses) due 1/1/2017	9,311,743
3.	Normal Cost (including expenses) due 1/1/2018	9,744,803
4.	Net interest to 1/1/2019	35,481,827
5.	Total Expected Contributions with interest through 1/1/19	(50,170,745)
6.	Increase (decrease) due to change in assumptions	0
7.	Increase (decrease) due to Plan amendments	0
8.	Expected Unfunded Actuarial Accrued Liability at 1/1/2019	$ 226,496,034
9.	Net actuarial loss (gain) for 2017 and 2018	(10,412,913)
10.	Actual Unfunded Actuarial Accrued Liability at 1/1/2019	$ 216,083,121

V. Actuarial Exhibits (continued)

Exhibit A-4: Development of Actuarial (Gain)/Loss from January 1, 2017 – December 31, 2018

1.	(Gain)/Loss on Actuarial Value of Assets	$ 5,302,913
2.	(Gain)/Loss on Demographics	(10,538,385)
3.	(Gain)/Loss on Contributions (in excess of expected MMOs with interest)	(5,177,441)*
4.	2017/2018 Total (Gain)/Loss	(10,412,913)**

*Contribution (gain)/loss over expected ARCs was $11,519,873.
**Total loss on ARC amortization for the period was $6,284,401.

V. Actuarial Exhibits (continued)

Exhibit A-5: Costs to Amortize the Unfunded Actuarial Accrued Liability

a. Amortization of Unfunded Actuarial Accrued Liability

Source		Original Amount	Year Established	Target Year		Unamortized Balance		Annual Amortization Amount
Initial	$	131,617,548	1998	2037	$	220,823,275	$	7,746,181
Assumption Change	$	597,864	2002	2021	$	157,044	$	56,050
Investment Loss		18,838,751	2002	2032		13,298,087		1,439,110
Assumption Change	$	(4,706,925)	2003	2022	$	(1,585,158)	$	(438,814)
Investment Loss	$	26,217,850	2003	2032	$	19,159,469	$	2,073,425
Assumption Change	$	(369,251)	2005	2024	$	(172,960)	$	(34,095)
Experience Loss	$	14,390,731	2005	2019	$	1,548,079	$	1,548,079
Experience Gain	$	(542,011)	2007	2021	$	(161,641)	$	(57,692)
Assumption Change	$	(544,220)	2009	2028	$	(367,763)	$	(49,387)
Experience Loss	$	40,957,810	2009	2028	$	27,677,673	$	3,716,868
Assumption Change	$	(3,468,835)	2011	2025	$	(2,083,908)	$	(363,685)
Experience Gain	$	(124,186,299)	2011	2030	$	(94,318,826)	$	(11,220,176)
Assumption Change	$	41,759,441	2013	2027	$	30,123,487	$	4,356,960
Experience Gain	$	(11,222,672)	2013	2032	$	(9,331,049)	$	(1,009,800)
Experience Loss	$	4,893,338	2015	2034	$	4,381,623	$	439,665
Assumption Change	$	21,067,579	2017	2031	$	19,363,227	$	2,190,923
Experience Gain	$	(2,118,853)	2017	2036	$	(2,014,625)	$	(190,124)
Experience Gain	$	(10,412,913)	2019	2038	$	(10,412,913)	$	(934,345)
Total					$	216,083,121	$	9,269,143

b. Recommended Amortization for Actuarially Recommended Contribution (ARC)

The following amortization schedule was established with the January 1, 2011 actuarial valuation to develop a more appropriate amortization of the Plan's unfunded liability.

Source		Original Amount	Year Established	Target Year		Unamortized Balance		Annual Amortization Amount
Initial	$	155,241,257	2011	2040	$	139,638,090	$	12,015,797
Experience Gain	$	(3,000,313)	2013	2032	$	(2,494,596)	$	(269,964)
Assumption Change	$	41,759,441	2013	2027	$	30,123,487	$	4,356,960
Experience Loss	$	15,435,952	2015	2034	$	13,821,756	$	1,386,915
Experience Loss	$	9,830,314	2017	2036	$	9,346,756	$	882,069
Assumption Change	$	21,067,579	2017	2031	$	19,363,227	$	2,190,923
Experience Loss	$	6,284,401	2019	2038	$	6,284,401	$	314,220
Total					$	216,083,121	$	20,876,920

VI. Financial Exhibits

Exhibit F-1: Pension Plan Assets at Fair Market Value as of January 1, 2019

Asset Description		*Fair Market Value*
Investments in City of Pittsburgh Aggregated Pension Trust	$	130,159,833
Parking tax revenue receivable	$	134,600,064
Total	$	264,759,897

Note: Accounting Method is Accrual Basis

Actuarial Value of Assets as of January 1, 2019

The Actuarial Value of Assets as of January 1, 2019 is determined in accordance with the method described in Appendix A as follows:

1.	Actuarial Value of Assets at January 1, 2017	$	261,080,152
2.	Non-investment increases* during 2017 and 2018		46,352,559
3.	Non-investment decreases* during 2017 and 2018		(73,467,394)
4.	Credited interest for 2017 and 2018: .1289 x (1) + .0625 x [(2) - (3)]		31,960,186
5.	Preliminary Actuarial Value of Assets as of January 1, 2019: (1) + (2) - (3) + (4)	$	265,925,503
6.	Market Value of Assets at January 1, 2019 x .8		211,807,918
7.	Market Value of Assets at January 1, 2019 x 1.2		317,711,876
8.	Actuarial Value of Assets at January 1, 2019: (5) but not less than (6) nor more than (7)	$	265,925,503

**Includes pass-through and excludes parking-tax contributions*

VI. Financial Exhibits (continued)

Exhibit F-2: Asset Reconciliation January 1, 2017 to December 31, 2018

		Year Beginning January 1	
		2017	*2018*
1. Market Value at January 1		$ 256,004,618	$ 271,746,115
2. <u>Revenues During Year</u>			
	a) Member Contributions	$ 3,878,520	$ 4,115,620
	b) Municipal Contributions - State Aid Portion	8,774,211	8,640,444
	c) Municipal Contribution - Local Portion*	10,025,883	10,917,881
	d) Interest on Late City Contributions	0	0
	e) Parking-tax contribution	6,049,296	12,097,254
	f) Dividends and Interest	1,511,272	1,467,886
	g) Net Appreciation	22,816,583	(8,440,603)
	h) Net Realized Capital Gains	0	0
	i) Net Unrealized Capital Gains	0	0
	j) Other Revenues	0	0
	k) Adjustment	(2,095,868)	0
	l) Total Revenues	$ 50,959,897	$ 28,798,482
3. <u>Expenses During Year</u>			
	a) Benefit Payments*	$ 33,976,187	$ 34,549,041
	b) Contributions Withdrawn	441,654	394,133
	c) Administrative Costs	800,559	841,526
	d) Net Realized Capital Losses	0	0
	e) Net Unrealized Capital Losses	0	0
	f) Other Expenses	0	0
	g) Total Expenses	$ 35,218,400	$ 35,784,700
4. Market Value at December 31: (1) + (2.l) - (3.g)		$ 271,746,115	$ 264,759,897
	• Total Investment Growth During Year	$ 24,327,855	$ (6,972,717)
	• Average Assets on Deposit During Year	$ 251,711,439	$ 271,739,365
	• Approximate Annual Rate of Return	9.66%	(2.57)%

**Excludes pass-through contributions of $1,168,174 in 2017 and $1,296,120 in 2018.*

VI. Financial Exhibits (continued)

Exhibit F-3: Administrative Costs Paid from Pension Plan During 2017 and 2018

Type	*2017*	*2018*
Administrative Expense	$ 557,447	$ 558,613
Investment Expense	243,112	282,913
Total	$ 800,559	$ 841,526

VII. Demographic Exhibits

Exhibit D-1: Active Members Demographic Data as of January 1, 2019

	Number
1. Active members @ 1/1/2017	929
2. New entrants	157
3. Separations from active service	
a) Refund of contributions	63
b) Separation with deferred benefit	8
c) Separation with neither refund or deferred benefit	0
d) Disability	4
e) Death	0
f) Retirement with service retirement benefit	56
g) Total separations	131
4. Active members @ 1/1/2019: (1) + (2) - (3.g)	955

VII. Demographic Exhibits (continued)

Exhibit D-2: Benefit Recipients Demographic Data as of January 1, 2019

			Number
1.	Benefit recipients @ 1/1/2017		1,470
2.	New benefit recipients (including beneficiaries)		132
3.	Terminations		
	a)	Death	136
	b)	Other	0
	c)	Total Terminations	136
4.	Benefit recipients @ 1/1/2019: (1) + (2) - (3.c)		1,466*

*includes 455 beneficiaries and 295 disabled

Appendix A

Summary of Economic and Demographic Actuarial Assumptions and Cost Method

I. Economic Actuarial Assumptions

A. *Interest.* 7.25% per annum compounded annually

B. *Salary Scale.* 4.5% per annum compounded annually (includes inflation)

C. *Inflation.* 2.75% per annum compounded annually

D. *Social Security Benefits.* Not applicable.

E. *Workmen's Compensation.* Not applicable.

F. *Actuarial Value of Assets* as of the current valuation date is determined in accordance with (1) subject to the limitation described in (2) as follows:

(1) The Actuarial Value of Assets as of the last valuation date plus non-investment increases less non-investment decreases since the last valuation date plus interest credited at the last valuation's assumed interest rate less one-percent assuming non-investment increases and decreases occur at the mid-point between the last and current valuation date.

(2) The Actuarial Value of Assets as determined under (1) will be limited to a maximum of 120% and a minimum of 80% of the fair market value of assets as of the current valuation date.

G. *Administrative Expenses:* Administrative expenses payable from Plan assets during the year beginning on the valuation date are assumed to equal 104.5% of such expenses in the preceding year.

Appendix A (continued)

Summary of Economic and Demographic Actuarial Assumptions and Cost Method (continued)

II. Demographic Actuarial Assumptions

Mortality. RP-2000 Mortality Tables, with adjustments to reflect Pittsburgh Pension Plan mortality experience as confirmed by experience studies. The adjusted rates are based on the following:

a. *Active Participants*. RP-2000 Employee Mortality Rates projected with rates derived from the long-range demographic assumptions from the 2015 Social Security Administration's Trustee Report.
b. *Retired/Term Vested Participants*. RP-2000 Healthy Annuitant Mortality Rates adjusted by blue collar ratios, projected from 2000 with rates derived from the long-range demographic assumptions from the 2015 Social Security Administration's Trustee Report.
c. *Disability Retirees*. Same as Retired, but with ages set forward three years.
d. *Surviving Beneficiaries*. RP-2000 Healthy Annuitant Mortality Rates adjusted by ratios of female beneficiary experience to overall female RP-2000 Healthy Mortality Rates (Appendix of *RP-2000 Mortality Tables Report*), projected from 2000 with rates derived from the long-range demographic assumptions from the 2015 Social Security Administration's Trustee Report.

Sample Base Rates (Rounded):

Age	Active Male Participant	Male Regular Retiree	Male Disabled Retiree	Male Beneficiary
45	0.15%	0.18%	0.21%	0.19%
55	0.30%	0.72%	0.89%	0.82%
65	0.76%	1.66%	2.21%	1.75%
75	N/A	4.31%	5.81%	4.08%
85	N/A	11.51%	15.19%	11.62%

Age	Active Female Participant	Female Regular Retiree	Female Disabled Retiree	Female Beneficiary
45	0.11%	0.14%	0.17%	0.14%
55	0.25%	0.28%	0.44%	0.49%
65	0.58%	1.13%	1.51%	1.35%
75	N/A	3.09%	4.04%	3.03%
85	N/A	8.31%	11.33%	8.12%

Appendix A (continued)

Summary of Economic and Demographic Actuarial Assumptions and Cost Method (continued)

Disablement.

Sample Rates						
Age	Male	Female		Age	Male	Female
25	0.23%	0.18%		45	0.63%	0.87%
30	0.27%	0.25%		50	1.01%	1.17%
35	0.32%	0.36%		55	1.70%	1.50%
40	0.44%	0.59%		60	2.74%	2.10%

Duty Related Mortality. 20% of deaths in active service are assumed to be duty related.

Duty Related Disability. 50% of disabilities occurring during employment are assumed to occur in the line of duty.

Withdrawal.

Sample Rates					
	Years of Service				
Age	0-2	3	4	5	6+
20	5.10%	4.46%	3.82%	3.19%	2.55%
25	4.96%	4.34%	3.72%	3.10%	2.48%
30	4.75%	4.16%	3.56%	2.97%	2.38%
35	4.40%	3.85%	3.30%	2.75%	2.20%
40	3.28%	2.87%	2.46%	2.05%	1.64%
45	1.66%	1.45%	1.24%	1.04%	0.83%
50	0.38%	0.33%	0.28%	0.24%	0.19%
55	0.00%	0.00%	0.00%	0.00%	0.00%

Retirement Age. Percentage of employees eligible for retirement who retirement at each age:

Age	Percentage
50-51	20
52-53	12
54-59	10
60	15
61	10
62	15
63	10
64	20
65	100

Appendix A (continued)

Summary of Economic and Demographic Actuarial Assumptions and Cost Method (continued)

Marital Status. 80% of male participants and 65% of female participants are assumed to be married with female spouses assumed to be two years younger.

III. Cost Method

Liabilities and costs were determined by the Entry Age Actuarial Cost Method.

Changes in Assumptions Since the Last (1/1/2017) Valuation

None.

Appendix B

Summary of Plan Provisions as of January 1, 2019

The Summary of Plan Provisions below is included to clarify the basis of our actuarial valuation and is not meant to govern the operation of the Plan. The summary represents our understanding of the benefits provided by the Plan, based upon documentation provided by the Plan Sponsor and our understanding of the way in which the Plan Sponsor operates the Plan.

Plan Year. Twelve-month period beginning January 1 and ending December 31

Plan Established. September 1, 1935

Principal Definitions

Member. Any uniformed employee of the City of Pittsburgh Bureau of Police

Retirement Benefit Commencement Date. Assumed to be the first day of the month coincident with or next following eligibility for and election to retire; however, can elect to commence upon eligibility a date other than the first day of month.

Service Increment.

- Additional monthly benefit of $20 for each completed year of service between 20 and 25 years, plus $25 for each completed year of service in excess of 25 years

Service. Completed years of service calculated from date of hire through date of retirement or severance, plus periods of service purchased

Normal Form of Payment. Monthly pension benefit payable for life

Participation Requirements

Entry Date. Date of hire

Compensation

- Base wages and longevity pay

Average Compensation

- Compensation averaged over the 12-month period prior to retirement or severance

Appendix B (continued)

Summary of Plan Provisions (continued)

Late Retirement

Eligibility. Employment beyond normal retirement

Amount of Benefit. Normal retirement benefit based upon average compensation as calculated at actual retirement

Disability

Eligibility.

- Permanent disablement in line of duty or
- Permanent disablement (not in line of duty) after completing 10 years of service

Benefit Amount. 50% of earnings in year prior to occurrence of disablement. For members hired after December 31, 1991, the sum of the disability benefit plus the member's workers' compensation benefit shall not exceed member's regular salary at time of disablement

Benefit Commencement Date.

- First day of calendar month following determination of disablement, and
- Continuing for the duration of disability prior to normal retirement date and life thereafter

Vesting

- If member completed 20 years of service, may collect normal retirement benefit based on average compensation at termination (providing terminate member continues contribution at rate in effect at termination)
- Benefit deferred to age 50

Death Benefits

Accidental Death

- Benefit plus return of member's accumulated contributions
- Benefit is equal to 50% of member's wages at death
- Payable for 500 weeks or until surviving spouse dies or remarries
- If no surviving spouse or unmarried children, dependent parents receive payments

Appendix B (continued)

Summary of Plan Provisions (continued)

Children Benefits (No surviving spouse/or discontinued payment to surviving spouse)

- Each unmarried child under age 18 receives payments equal to 25% of payments to spouse
- Total payments to one family may not exceed 50% of member’s wages at time of death
- $60 minimum monthly payment if only one child
- If maximum amount payable, divide equally among entitled children
- Payments terminate when child reaches age 18, dies, marries
- Payments may continue indefinitely to incompetent child

Death Prior to Retirement Active service/not accidental

- If so elected, spouse paid benefit equal to 50% of pension member would have received if retired on date of death
- No election, accumulated contributions without interest paid to beneficiary or estate
- Must be married for at least two years at time of death

Death After Retirement

- If so elected, spouse paid benefit equal to 50% of pension member was receiving
- No surviving spouse, benefit may be paid to surviving children or dependent parents

Employee Contributions

- 6.0 percent of compensation plus $1 per month
- $1 per month ceases at age 65
- If surviving spouse benefit elected, add ½ percent of compensation

Changes Since Last (1/1/2017) Valuation

There have been no changes in Plan provisions since the last actuarial valuation.

Appendix C

Glossary

Accrued Benefit. The portion of the participant's retirement that is attributable to service completed before the calculation date. The calculation typically uses actual service as of the calculation date and may involve other factors such as average pay at the determination date and projected service through the retirement eligibility date.

Act 205 of 1984. Municipal Pension Plan Funding Standard and Recovery Act of December 18, 1984, P.L. 1005, No. 205. The Act control pension funding in Pennsylvania. This Act also provides for reporting of actuarial information and for a recovery program for qualifying municipalities.

Actuarial Accrued Liability. This is the plan's liability for all benefits accrued as of the valuation date. It includes the liability for all benefits currently payable to retired members (since such benefits are 100% accrued) plus the liability for benefits accrued by active members as of the valuation date, i.e., future benefit accruals, are not included.

Actuarial Assumptions. Factors used by the actuary to forecast future events. These factors include items relating to future economic conditions, the survival of the participants and their beneficiaries, and the length of employment.

Actuarial Cost Method. A means of assigning costs to periods of employment. This method is used to determine a funding level that will provide sufficient assets to pay benefits for each participant upon retirement. Act 205 specifies that the entry age normal cost method, as described in the Act, should be used for this determination.

Actuarial Experience Gain or Loss. The effect on the actuarial accrued liability of differences between events as predicted by the actuarial assumptions and those that actually occurred. This difference can increase or decrease the contribution in future years.

Actuarial Present Value. The lump sum value that is equivalent to an expected series of future payments. This value is determined by using the actuarial assumptions. An actuarial present value, as of the valuation date, represents the amount of funds that would be sufficient to provide the series of payments, if experience precisely matches the actuarial assumptions.

Actuarial Value of Assets. The value of current plan assets which is used by the actuary to evaluate the current funding status and determine future funding requirements. Under Act 205, a corridor limitation requires that this value be between 80 to 120 percent of the fair market value of the assets.

Administrative Expenses. This is an estimate of the administrative expenses that will be paid from plan assets. The average of the actual administrative expenses for the year preceding the valuation year and estimated administrative expenses for the valuation year is expressed as a percentage of active members' total payroll and this percentage is used to determine the plan's estimated administrative expense for the two years following the valuation year.

Appendix C (continued)

Glossary (continued)

Amortization Payment. The annual payment required to eventually eliminate the unfunded actuarial accrued liability according to the schedule established in Act 205.

Amortization Requirement. This is the additional contribution (i.e., in addition to the Normal Cost and Administrative Expenses) that will fund the plan's Unfunded Accrued Liability over the number of years prescribed by Act 205.

"Fresh-Start" Amortization. A process of taking the unfunded actuarial accrued liability at the valuation date and amortizing over a prescribed number of years, usually 30. This would replace the pre-existing amortization schedule and be used as the new amortization schedule going forward.

Funded Ratio. The actuarial value of assets divided by the actuarial accrued liability.

Funding Adjustment. If the plan has a surplus with regard to its Actuarial Accrued Liability, there is no Amortization Requirement. Rather, the plan's Financial Requirements are, in accordance with Act 205, reduced by an amount equal to 10% of the surplus. Note that the Funding Adjustment is equivalent to a negative Amortization Requirement. The 10% credit allowance is equivalent to amortizing the surplus over a period of approximately 17 years based on typical valuation interest rates.

General Municipal Pension System State Aid. Annually municipalities receive a portion of the insurance premium tax levied on casualty insurance companies headquartered outside of Pennsylvania. If they have paid Policefighters, they also receive a portion of the premium tax on out-of-state Police insurance companies. These taxes are distributed according to formulae contained in Act 205.

Minimum Municipal Obligation. The amount that must be contributed to a pension plan b a municipality for a given year. The calculation of this amount uses the normal cost, anticipated administrative expenses, amortization payment or funding adjustment, and anticipated employee contributions to determine a municipality's contribution requirement. General Municipal Pension System State Aid may be used to reduce the contribution.

Normal Cost. This is the portion of total plan liabilities for current active members assigned to a particular plan year. I may be thought of as the cost of benefits that will be accrued by active members during the year. The Normal Cost is expressed as a percentage of active members' total payroll in the valuation and this percentage is used to determine the Normal Cost for the two years following the valuation year.

Present Value of Plan Benefits (PVB). This is the discounted value based on the valuation interest assumption) at the valuation date of all plan benefits expected to be paid on or after the valuation date. The amount of expected benefits and date of payment for a particular individual is determined by plan provisions and the valuation assumptions with regard to salary increases, mortality (i.e., life expectancy), turnover, disability, retirement, etc., i.e., any contingency which can affect the amount and timing of future benefit payments.

Appendix C (continued)

Glossary (continued)

Unfunded Actuarial Accrued Liability. This is equal to the excess of the plan's Actuarial Accrued Liability over Valuation assets. Note that, if the Valuation Assets exceed the Actuarial Accrued Liability, the plan has a negative Unfunded Actuarial Accrued Liability, i.e., a surplus with regard to its Actuarial Accrued Liability.

Valuation Assets. This is the actuarial value of plan assets as of the valuation date. Valuation Assets are usually set equal to the fair market value of assets although assets are sometimes valued under a method that smooths the effect of market fluctuations.

Vesting. The participant's non-forfeitable right to receive a benefit, provided that the participant survives until benefit eligibility.

Appendix D

Debt Service Schedule by Plan Year Pension Bond Issue of March 10, 1998

	Date of Original Borrowing	Total Principal Borrowed	Total Principal to this Plan	Percentage to this Plan	Date of Refinancing
	3/10/1998	$255,865,000.00	$120,512,415.10	47.6%	N/A
Plan Year	Required Principal Payment	Required Interest Payment	Annual Debt Service	Premium or Discount Amortized	Principal Balance at Valuation Date
1998		$3,921,658.75	$3,921,658.75	$0	$120,512,415.10
1999	$471,000.00	7,830,011.75	8,301,011.75	0	120,512,415.10
2000	471,000.00	7,803,518.00	8,274,518.00	0	120,041,415.10
2001	471,000.00	7,776,882.95	8,247,882.95	0	119,570,415.10
2002	471,000.00	7,749,753.35	8,220,753.35	0	119,099,415.10
2003	471,000.00	7,722,411.80	8,193,411.80	0	118,628,415.10
2004	471,000.00	7,694,787.65	8,165,787.65	0	118,157,415.10
2005	1,179,855.01	7,645,426.83	8,825,281.84	0	117,686,415.10
2006	1,092,720.01	7,576,976.41	8,669,696.42	0	116,506,560.09
2007	1,158,660.01	7,508,582.50	8,667,242.51	0	115,413,840.08
2008	1,208,115.01	7,436,244.85	8,644,359.86	0	114,255,180.07
2009	1,304,670.00	7,353,582.89	8,658,252.89	0	113,047,065.06
2010	1,417,710.00	7,263,616.00	8,681,326.00	0	111,742,395.06
2011	1,521,330.00	7,171,771.00	8,693,101.00	0	110,324,685.06
2012	3,716,190.01	7,007,169.44	10,723,359.45	0	108,803,355.06
2013	5,173,935.00	6,725,837.03	11,899,772.03	0	105,087,165.05
2014	5,505,990.01	6,382,619.91	11,888,609.92	0	99,913,230.05
2015	5,988,765.01	6,009,040.37	11,997,805.38	0	94,407,240.04
2016	6,386,760.00	5,606,835.82	11,993,595.82	0	88,418,475.03
2017	8,593,395.01	5,119,980.78	13,713,375.79	0	82,031,715.03
2018	6,233,685.01	4,638,100.67	10,871,785.68	0	73,438,320.02
2019	9,434,130.01	4,124,179.63	13,558,309.64	0	67,204,635.01
2020	10,079,400.01	3,480,233.14	13,559,633.15	0	57,770,505.00
2021	10,767,060.01	2,792,299.96	13,559,359.97	0	47,691,104.99
2022	11,504,175.00	2,057,349.21	13,561,524.21	0	36,924,044.98
2023	12,290,744.99	1,272,116.86	13,562,861.85	0	25,419,869.98
2024	13,129,124.99	433,261.15	13,562,3861.4	0	13,129,124.99

Appendix E

Plan Maturity Measures

Assets are accumulated over participants' careers to pay future benefits. The natural growth of liabilities and assets is referred to as plan maturity. As the plan matures, the size of the plan grows relative to the active members' payroll and will cause changes in the assets or liabilities to have a larger effect on the Actuarially Recommended Contribution (ARC). The following table shows a history of the plan's maturity and the effect of a 1% change in plan assets or liabilities on the ARC.

Actives Per Retirees	Ratio of Assets to Payroll	Effect on ARC of a 1% Change in Assets	Ratio of Actuarial Accrued Liability to Payroll	Effect on ARC of a 1% Change in Liability
0.6	4.5	$ 240,000	8.1	$ 430,000