City of Rockville Pension Plan

Actuarial Valuation as of July 1, 2018 to Determine the City's Contribution for the Fiscal Year Ending June 30, 2020

Bolton

Submitted by:

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Bolton
Employee Benefits, Actuarial & Investment Consulting

November 13, 2018

Retirement Board
City of Rockville, City Hall
111 Maryland Avenue
Rockville, MD 20850

Re: City of Rockville Pension Plan

Dear Members of the Board:

The following sets forth the actuarial valuation of the City of Rockville Pension Plan as of July 1, 2018. Section 1 of the report provides a summary while Sections 2 through 6 contain the development of the City's contribution for the 2020 fiscal year along with a summary of the census and asset data, plan provisions, assumptions and actuarial methods. Section 7 provides a glossary of many of the terms used in this report. The appendices of the report provide information on plan funding as well as a 10-year projection of benefit payments.

We are available to answer any questions on the material in this report or to provide explanations or further details as appropriate. The undersigned credentialed actuary meets the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained in this report. We are not aware of any direct or material indirect financial interest or relationship, including investments or other services that could create a conflict of interest, which would impair the objectivity of our work.

Respectfully submitted,

James Ritchie

James E. Ritchie, ASA, EA, FCA, MAAA

Section I. Executive Summary

Background

Bolton has prepared the following report that sets forth the actuarial valuation of the City of Rockville Pension Plan (the Plan) as of July 1, 2018. Please note that some columns may not add due to rounding.

Actuarially Determined Contributions (ADC)

The actuarially determined contribution (ADC) decreased this year as a nominal amount and as a percentage of payroll. The level dollar amortization method used results in an expected decrease in the contribution as a percentage of payroll. The plan also experienced a gain on assets that contributed to the decrease in contribution.

	FY2018	FY2019	FY2020
Total ADC	$3,899,591	$3,675,598	$3,592,613
Estimated Payroll	$39,007,476	$37,730,610	$39,732,048
Percent of Total Payroll	10.00%	9.74%	9.04%

The FY2020 contribution of $3,592,613 is assumed to be paid by October 1, 2019. Details of the determination of the City's contribution for FY2020 are shown in Section 2 of this report. The City's contributions for FY2018 was calculated in the report prepared by Hay Group dated March 13, 2017.

Funding Measures

Funding Measures		7/1/2017	7/1/2018		Percent Change
1. Actuarial Accrued Liability					
a. Active	$	59,170,400	65,669,756	$	10.98%
b. Retired/Disabled		48,890,173	49,409,835		1.06%
c. Terminated Vested/Refunds Owed		4,253,502	3,775,710		-11.23%
d. Total	**$**	**112,314,075**	**118,855,301**	**$**	**5.82%**
2. Actuarial Value of Assets	$	95,407,926	101,999,637	$	6.91%
3. Plan Funded Ratio (2 / 1.d.)		84.9%	85.8%		
4. Market Value of Assets	$	95,321,836	102,043,279	$	7.05%
5. Funded Ratio if Market Value of Assets was Used (4 / 1.d.)		84.9%	85.9%		

Section I. Executive Summary

Risk Measures

The primary risk that a plan sponsor incurs from a defined benefit plan is the risk of substantial increases in annual contributions. These increases occur most frequently due to variation in the investment returns. This valuation reflects the smoothing of asset returns, which reduces the risk of large year-by-year contribution changes, but does not ultimately reduce the risk inherent in a defined benefit plan. The following table shows three commonly used measures of the relative riskiness of a pension plan, relative to the plan sponsor and the employee groups covered by the plan. Additional information is shown in Appendix 3.

Risk Measure	FY2016	FY2017	FY2018	Conservative Measures
Retiree Liability as a Percent of Total Liability	40%	44%	42%	<50%
Assets to Payroll	2.4	2.6	2.7	<5
Liabilities to Payroll	3.0	3.1	3.0	<5
Benefit Payments to Contributions	1.1	1.3	1.1	1-3

As shown in the table, the Plan continues to be relatively "low risk".

Experience Analysis

The following factors affected the City's contribution as a percentage of payroll:

- Investment returns during FY2018 were about $0.6 million higher than expected. A portion of this gain is reflected in this valuation with the remaining portions to be reflected in future valuations.
- The plan uses a level amortization method for the unfunded liability. This method results in an expected contribution that decreases as a percentage of payroll over time.

Changes in Method, Assumptions, and Plan Amendments

This valuation reflects the following changes in assumptions and methods:

- The form of payment assumption was changed to better reflect actual experience. This change had a very small impact on the liability.
- A slight change was made to the entry age normal funding method as it relates to transferred or purchased service. The new method reflects service transfers and purchases as a loss on liabilities. The old method allocated this loss over the future working lifetime of the participant. The net result was an increase in the accrued liability and a decrease in the normal cost, resulting in a slight decrease in the contribution.

There were no changes in the Plan provisions reflected in this valuation.

Section I. Executive Summary

Projection of Expected Benefit Payments

The projection of expected benefit payments is shown in Appendix 2.

Sources of Information

The July 1, 2018 participant data and market value of assets were provided by or at the direction of the City of Rockville. While we have reviewed this data for consistency and completeness, we have not audited this data.

Actuarial Certification

This actuarial valuation sets forth our calculation of an estimate of the liabilities of the City of Rockville Pension Plan, together with a comparison of these liabilities with the value of the Plan assets, as submitted by the City of Rockville (the City). This calculation and comparison with assets is applicable for the valuation date only. The future is uncertain, and the Plan may become better funded or more poorly funded in the future. This valuation does not provide any guarantee that the Plan will be able to provide the promised benefits in the future.

This is a deterministic valuation in that it is based on a single set of assumptions. This set of assumptions is one possible basis for our calculations. Other assumptions may be equally valid. The future is uncertain and the Plan's actual experience will differ from those assumptions; these differences may be significant or material because these results are very sensitive to the assumptions made and, in some cases, to the interaction between the assumptions. We may consider that some factors are not material to the valuation of the Plan and may not provide a specific assumption for those factors. The Plan may have used other assumptions in the past. We will likely consider changes in assumptions at a future date.

Different assumptions or scenarios within the range of possibilities may also be reasonable and results based on those assumptions would be different. As a result of the uncertainty inherent in a forward looking projection over a very long period of time, no one projection is uniquely "correct" and many alternative projections of the future could also be regarded as reasonable. Two different actuaries could, quite reasonably, arrive at different results based on the same data and different views of the future. A "sensitivity analysis" shows the degree to which results would be different if you substitute alternative assumptions within the range of possibilities for those utilized in this report. We have not been engaged to perform such a sensitivity analysis and thus the results of such an analysis are not included in this report. At the City's request, Bolton is available to perform such a sensitivity analysis.

The City is responsible for selecting the Plan's funding policy, actuarial valuation methods, asset valuation methods, and assumptions. The policies, methods and assumptions used in this valuation are those that have been so prescribed and are described in this report. The City is solely responsible for communicating to Bolton any changes required thereto.

The City could reasonably ask how the valuation would change if we used a different assumption set or if Plan experience exhibited variations from our assumptions. This report does not contain such an analysis. That type of analysis would be a separate assignment.

Section I. Executive Summary

Actuarial Certification

In addition, decisions regarding benefit improvements, benefit changes, the Plan's investment policy, and similar issues should not be based on this valuation. These are complex issues and other factors should be considered when making such decisions. These other factors might include the anticipated vitality of the local economy and future growth expectations, as well as other economic and financial factors.

The cost of this Plan is determined by the benefits promised by the Plan, the Plan's participant population, the investment experience of the Plan and many other factors. An actuarial valuation is a budgeting tool for the City. It does not affect the cost of the Plan. Different funding methods provide for different timing of contributions to the Plan. As the experience of the Plan evolves, it is normal for the level of contributions to the Plan to change. If a contribution is not made for a particular year, either by deliberate choice or because of an error in a calculation, that contribution can be made in later years. We will not be responsible for contributions that are made at a future time rather than an earlier time. The Plan sponsor is responsible for funding the cost of the Plan.

We make every effort to ensure that our calculations are accurately performed. These calculations are complex. Despite our best efforts, we may make a mistake. We reserve the right to correct any potential errors by amending the results of this report or by including the corrections in a future valuation report.

Because modeling all aspects of a situation is not possible or practical, we may use summary information, estimates, or simplifications of calculations to facilitate the modeling of future events in an efficient and cost-effective manner. We may also exclude factors or data that are immaterial in our judgment. Use of such simplifying techniques does not, in our judgment, affect the reasonableness of valuation results for the Plan.

This report is based on Plan provisions, census data, and asset data submitted by the City. We have relied on this information for purposes of preparing this report, but have not performed an audit. The accuracy of the results presented in this report is dependent upon the accuracy and completeness of the underlying information. The Plan sponsor is solely responsible for the validity and completeness of this information.

The Retirement Board is solely responsible for selecting the Plan's investment policies, asset allocations and individual investments. Bolton's actuaries have not provided any investment advice to the Board.

The information in this report was prepared for the internal use of the City and its auditors in connection with our actuarial valuations of the Plan. It is neither intended nor necessarily suitable for other purposes. Bolton is not responsible for the consequences of any other use or the reliance upon this report by any other party.

Section I. Executive Summary

Actuarial Certification

The only purpose of this report is to:

- Provide the recommended employer contribution for the 2020 fiscal year
- Provide estimated employer contributions for the Plan and the City's matching Thrift Plan contributions for the 2020-2025 fiscal years
- Estimate the adequacy of the assets required by Principal Financial Group for the Benefit Index
- Provide the estimated cost of providing a 1% COLA to current retirees and beneficiaries

This report may not be used for any other purpose; Bolton is not responsible for the consequences of any unauthorized use.

The calculation of actuarial liabilities for valuation purposes is based on a current estimate of future benefit payments. The calculation includes a computation of the "present value" of those estimated future benefit payments using an assumed discount rate; the higher the discount rate assumption, the lower the estimated liability will be. For purposes of estimating the liabilities (future and accrued) in this report, you selected an assumption based on the expected long-term rate of return on Plan investments. Using a lower discount rate assumption, such as a rate based on long-term bond yields, could substantially increase the estimated present value of future and accrued liabilities.

Because valuations are a snapshot in time and are based on estimates and assumptions that are not precise and will differ from actual experience, contribution calculations are inherently imprecise. There is no uniquely "correct" level of contributions for the coming Plan year.

This report provides certain financial calculations for use by the City's auditor. These values have been computed in accordance with our understanding of Generally Accepted Actuarial Principles and Practices and fairly reflect the actuarial position of the Plan. The various actuarial assumptions and methods which have been used are, in our opinion, appropriate for the purposes of this report.

The report is conditioned on the assumption of an ongoing Plan and is not meant to present the actuarial position of the Plan in the case of Plan termination. Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: Plan experience differing from that anticipated by the economic or demographic assumptions, changes in economic or demographic assumptions, increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period or additional cost or contribution requirements based on the Plan's funded status), and changes in Plan provisions or applicable law.

The City should notify Bolton promptly after receipt of this report if the City disagrees with anything contained in the report or is aware of any information that would affect the results of the report that has not been communicated to Bolton or incorporated therein. The report will be deemed final and acceptable to the City unless the City promptly provides such notice to Bolton

Section I. Executive Summary

Actuarial Certification

The undersigned credentialed actuary meets the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein. He is currently compliant with the Continuing Professional Development Requirement of the Society of Actuaries. We are not aware of any direct or material indirect financial interest or relationship, including investments or other services, which could create a conflict of interest that would impair the objectivity of our work.

I am available to answer any questions on the material in this report to provide explanations or further details as appropriate.

Jim Ritchie, ASA, EA, FCA, MAAA

Section II. Determination of City Contributions

Projected Unfunded Liability

Below is a summary of the projected unfunded liability for the following plan year.

Projected Unfunded Liability		7/1/2018
1. Actuarial Accrued Liability		
a. Active Participants	$	65,669,756
b. Vested Terminated Participants and Nonvested Terminated Participants Due a Refund of Contributions		3,775,710
c. Retired/Disabled Participants and Beneficiaries		49,409,835
d. Total	$	118,855,301
2. Actuarial Asset Value		101,999,637
3. Unfunded Liability as of July 1, 2018 (1.d. - 2.)	$	16,855,664
4. Funded Ratio (2. ÷ 1.d.)		85.8%
5. Expected Unfunded Liability Payments for FY19	$	1,682,532
6. Projected Unfunded Liability as of July 1, 2019 (3. – 5.) * 1.07	$	16,235,251

Section II. Determination of City Contributions

Schedule of Amortization Bases

Below is a schedule of the amortization bases as of July 1, 2019.

Description	Date Established	Remaining Years		Amount to be Amortized		Payment / (Credit)
Initial Unfunded Actuarial Liability	7/1/2014	13.25	$	15,728,102	$	1,738,090
Actuarial (Gain)/Loss	7/1/2015	15	$	(3,678,632)	$	(377,471)
Actuarial (Gain)/Loss	7/1/2016	16	$	55,773	$	5,518
Actuarial (Gain)/Loss	7/1/2017	17	$	7,596,023	$	727,125
Conversion from Prior Actuary	7/1/2018	19	$	(4,438,941)	$	(401,384)
Assumption Change	7/1/2018	19	$	3,529,698	$	319,167
Actuarial (Gain)/Loss	7/1/2018	19	$	(3,633,058)	$	(328,513)
Actuarial (Gain)/Loss	7/1/2019	20	$	(907,550)	$	(80,062)
Assumption/Funding Method Change	7/1/2019	20	$	1,983,836	$	175,010
Totals			**$**	**16,235,251**	**$**	**1,777,480**

The July 1, 2019 amortization payment of $1,777,480 is sufficient to cover the interest on the plan's unfunded liability. The effective amortization period for the plan's unfunded liability is 13.452 years.

Development of City Contributions

The breakdown of the Actuarially Determined Contribution (ADC) into normal cost and amortization payment is illustrated below.

Actuarially Determined Contribution		7/1/2017		7/1/2018
1. Total Normal Cost	$	2,575,497	$	2,466,161
2. Employee Normal Cost		724,358		784,331
3. Employer Normal Cost (1. - 2.)	$	1,851,139	$	1,681,830
4. Projected Normal Cost	$	1,897,417	$	1,723,876
5. Amortization Amount		1,682,532		1,777,480
6. Expected Expenses		34,000		31,000
7. Interest		61,649		60,257
8. Actuarially Determined Contribution	$	3,675,598	$	3,592,613
9. Estimated Payroll		37,730,610		39,732,048
10. Actuarially Determined Contribution as a Percentage of Payroll		9.74%		9.04%

Section II. Determination of City Contributions

Development of City Contributions

The breakdown of the Actuarially Determined Contribution (ADC) into normal cost and amortization payment by group is illustrated below.

Actuarially Determined Contribution	Total	Police	Admin/Union
1. Total Normal Cost	$ 2,466,161	$ 578,219	$ 1,887,942
2. Employee Normal Cost	784,331	424,963	359,368
3. Employer Normal Cost (1. - 2.)	$ 1,681,830	$ 153,256	$ 1,528,574
4. Projected Normal Cost	$ 1,723,876	$ 157,087	$ 1,566,789
5. Amortization Amount	1,777,480	161,972	1,615,508
6. Expected Expenses	31,000	2,825	28,175
7. Interest	60,257	5,491	54,766
8. Actuarially Determined Contribution	$ 3,592,613	$ 327,375	$ 3,265,238
9. Actuarially Determined Contribution as a Percentage of Payroll	9.04%	6.09%	9.50%

Funding Projections

The following table, displayed in millions of dollars, shows the estimated ADC for FY2020 to FY2025. The projections reflect data as of July 1, 2018 and an expected return on assets of 7.00%.

Any deviation in assumptions, census demographics, or asset performance would impact these results.

	FY2020	FY2021	FY2022	FY2023	FY2024	FY2025
1. Accrued Liability	$ 118.86	$ 123.74	$ 128.65	$ 133.44	$ 138.18	$ 142.80
2. Actuarial Value of Assets	102.00	107.48	113.15	119.62	125.44	131.05
3. Unfunded Liability (1. - 2.)	$ 16.86	$ 16.26	$ 15.50	$ 13.82	$ 12.75	$ 11.74
4. Funded Ratio	85.8%	86.9%	87.9%	89.6%	90.8%	91.8%
5. Projected Payroll	$ 39.73	$ 40.73	$ 41.74	$ 42.79	$ 43.86	$ 44.95
6. Actuarially Determined Contribution	$ 3.59	$ 3.71	$ 3.76	$ 3.73	$ 3.77	$ 3.82
7. Actuarially Determined Contribution as a Percentage of Payroll	9.04%	9.10%	9.01%	8.73%	8.60%	8.50%

Section II. Determination of City Contributions

Supplemental Employee Contribution Projections

As documented in the provisions of the Plan, the City of Rockville maintains the right to enforce a Supplemental Employee Contribution as it pertains to the defined benefit portion of the pension plan. Specifically, as of any July 1, if the City contribution to the Defined Benefit Option of the plan made on behalf of employees exceeds 6.50% of the earnings of the employees, then the City reserves the right to impose a Supplemental Employee Contribution for the following fiscal year.

This supplemental Employee Contribution can be no more than 50% of the excess of the City contribution over 6.50% of earnings for employees. Such a contribution would be treated as a contribution to the Defined Benefit Option.

The following table displayed in millions of dollars shows the derivation of the Maximum Supplemental Employee Contribution for Administrative and Union employees. The projections reflect data as of July 1, 2018 and an expected return on assets of 7.00%.

Any deviation in assumptions, census demographics, or asset performance would impact these results.

Administrative and Union Employees	**FY2020**	**FY2021**	**FY2022**	**FY2023**	**FY2024**	**FY2025**
1. Admin Compensation	$ 29.40	$ 30.14	$ 30.89	$ 31.67	$ 32.46	$ 33.27
2. Union Compensation	4.96	5.08	5.21	5.34	5.47	5.61
3. Total Compensation	**$ 34.36**	**$ 35.22**	**$ 36.10**	**$ 37.00**	**$ 37.93**	**$ 38.87**
4. Admin and Union ADC	$ 3.27	$ 3.37	$ 3.42	$ 3.39	$ 3.43	$ 3.47
5. ADC as a Percentage of Payroll	9.50%	9.57%	9.47%	9.17%	9.04%	8.93%
6. Excess Over 6.5%	3.00%	3.07%	2.97%	2.67%	2.54%	2.43%
7. 50% of Excess	1.50%	1.54%	1.49%	1.34%	1.27%	1.22%
8. Maximum Supplemental Employee Contribution	$ 0.52	$ 0.54	$ 0.54	$ 0.50	$ 0.48	$ 0.47

Section II. Determination of City Contributions

Supplemental Employee Contribution Projections

The following table displayed in millions of dollars shows the derivation of the Maximum Supplemental Employee Contribution for Police employees. The projections reflect data as of July 1, 2018 and an expected return on assets of 7.00%.

Any deviation in assumptions, census demographics, or asset performance would impact these results.

Police	FY2020	FY2021	FY2022	FY2023	FY2024	FY2025
1. Police Compensation	$ 5.37	$ 5.51	$ 5.64	$ 5.79	$ 5.93	$ 6.08
2. Police ADC	$ 0.33	$ 0.34	$ 0.34	$ 0.34	$ 0.34	$ 0.35
3. ADC as a Percentage of Payroll	6.09%	6.13%	6.07%	5.88%	5.79%	5.73%
4. Excess Over 6.5%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
5. 50% of Excess	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
6. Maximum Supplemental Employee Contribution	$ -	$ -	$ -	$ -	$ -	$ -

Employer Thrift Plan Matching Contributions

For both Union and Administrative Personnel enrolled in the Thrift Plan, employees make an irrevocable election when hired to contribute 1%, 2%, 3%, 4%, or 5% of earnings to the Thrift Plan. For each $1.00 contributed by a member, the City of Rockville contributes $0.50 to the Plan.

	FY2020	FY2021	FY2022	FY2023	FY2024
1. Total Thrift Plan Pay Only	$ 29.90	$ 30.64	$ 31.41	$ 32.20	$ 33.00
2. Employee Contribution to Thrift Plan	$ 1.50	$ 1.53	$ 1.57	$ 1.61	$ 1.65
3. City Matching Contribution to Thrift Plan	$ 0.75	$ 0.77	$ 0.79	$ 0.81	$ 0.83

Section III. Valuation of Assets

Reconciliation of Assets

Below is a reconciliation of assets (unaudited) from July 1, 2016 through June 30, 2018.

		FY2017		FY2018
1. Beginning of Year Assets	$	87,410,036	$	95,321,836
2. Additions				
a. Employer Contributions	$	3,473,255	$	3,899,592
b. Employee Contributions		756,187		783,669
c. Increase/(Decrease) in Market Value of Investments		9,378,222		7,287,735
d. Total Receipts	**$**	**13,607,664**	**$**	**11,970,996**
3. Deductions				
a. Benefit Payments	$	5,664,043	$	5,219,512
b. Administrative Expenses		31,821		30,041
c. Total Disbursements	**$**	**5,695,864**	**$**	**5,249,553**
4. Net Increase (2.d. – 3.c.)	$	7,911,800	$	6,721,443
5. Net Assets (1. + 4.)	$	95,321,836	$	102,043,279
6. Rate of Return Net of Investment Fees (2I / [A + B – I] Method)		10.8%		7.7%

Asset Allocation

The table below shows the amount of funds invested in each account as of June 30, 2018.

Invested Assets as of June 30, 2018		
Accounts		**Balance**
Principal Financial Group		
Bond and Mortgage	$	10,133,188
Large Cap S&P 500 Index	$	18,330,516
Diversified Intl	$	19,875,256
Total – Principal Financial Group	**$**	**48,338,960**
Prudential and Other		
Real Assets	$	6,586,691
Invesco - Equities	$	11,218,506
PRISA - Real Estate	$	13,931,613
Black Rock	$	9,339,711
GE - Equities	$	11,770,018
Prudential - Money Market	$	857,780
Total - Non Principal Financial Group	**$**	**53,704,319**
Total - All Accounts	**$**	**102,043,279**

Section III. Valuation of Assets

Calculation of Actuarial Asset Value

The actuarial asset value as of July 1, 2018 is determined by spreading the asset gain or loss for each year over a five-year period. The asset gain or loss is the amount by which the actual asset return differs from the expected asset return.

Total							**7/1/2018**
1.	Market Value of Assets					$	102,043,279
2.	Spreading of Investment (Gain)/Loss						
	BOY	EOY		(Gain)/Loss	% Deferred		Amount Deferred
	2017	2018	$	(634,691)	80%	$	(507,753)
	2016	2017		(3,309,976)	60%		(1,985,986)
	2015	2016		4,360,959	40%		1,744,384
	2014	2015		3,528,567	20%		705,713
	a.	**Total Deferred**					**(43,642)**
3.	Actuarial Value of Assets (1 + 2.a.)					$	101,999,637

Recognition of Deferred Asset Gains and Losses

The table below shows the years (2019 to 2022) in which the net deferred asset gains and losses will be recognized.

FYE		**(Gain)/Loss**		**2019**		**2020**		**2021**		**2022**
2015	$	3,528,567	$	705,713						
2016	$	4,360,959	$	872,192	$	872,192				
2017	$	(3,309,976)	$	(661,995)	$	(661,995)	$	(661,995)		
2018	$	(634,691)	$	(126,938)	$	(126,938)	$	(126,938)	$	(126,938)
Total			**$**	**788,972**	**$**	**83,259**	**$**	**(788,933)**	**$**	**(126,938)**

Section III. Valuation of Assets

Historical Investment Returns

The following table represents the investment returns for each of the last 10 fiscal years. Also presented are the compound interest returns for the last 1 through 10 years.

Fiscal Year Ended	Approximate Rate of Return Market Value	Level Compounded Annual Return Over Last "n" Years "n"	Market Value
2018	7.7%	1	7.7%
2017	10.8%	2	9.2%
2016	1.4%	3	6.6%
2015	2.9%	4	5.6%
2014	16.4%	5	7.7%
2013	11.3%	6	8.3%
2012	0.4%	7	7.1%
2011	26.1%	8	9.3%
2010	11.7%	9	9.6%
2009	-23.8%	10	5.7%

Section IV. Participant Information

Participant Summary

The following table summarizes the counts, ages and benefit information for plan participants used in this valuation.

	July 1, 2017	July 1, 2018
1. Actives		
a. Number	505	515
b. Average Age	46.09	46.36
c. Average Service	11.85	12.06
d. Average Salary	$ 72,860	$ 75,268
2. Service Retirements and Beneficiaries		
a. Number	263	268
b. Average Age	70.63	70.74
c. Total Annual Benefits	**$ 4,879,587**	**$ 5,031,444**
3. Vested Terminations		
a. Number	57	52
b. Average Age	52.47	52.13
c. Total Annual Benefits	**$ 572,748**	**$ 520,341**
4. Terminated Participants Owed a Refund of Contributions		
a. Number	31	26
b. Total refunds owed	**$ 74,458**	**$ 85,192**

Section IV. Participant Information

Active Age/Service Distribution Including Compensation

Shown below is the distribution of active Administrative Defined Benefit participants based on age and service. The compensation shown is the average projected pay for the plan year beginning July 1, 2018.

	Years of Service as of 07/01/2018							
	0-4	5-9	10-14	15-19	20-24	25-29	30 & Up	Total
Under 25	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
25 - 29	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
30 - 34	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
35 - 39	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
40 - 44	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
45 - 49	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
50 - 54	-	-	-	-	-	-	1	1
	-	-	-	-	-	-	94,807	94,807
55 - 59	-	-	-	-	-	-	6	6
	-	-	-	-	-	-	97,059	97,059
60 - 64	-	-	-	-	-	-	2	2
	-	-	-	-	-	-	92,557	92,557
65 & Up	-	-	-	-	-	-	3	3
	-	-	-	-	-	-	103,359	103,359
Totals	**-**	**-**	**-**	**-**	**-**	**-**	**12**	**12**
	-	**-**	**-**	**-**	**-**	**-**	**97,696**	**97,696**

Averages	
Age	60.58
Service	37.11

Section IV. Participant Information

Active Age/Service Distribution Including Compensation

Shown below is the distribution of active Administrative Thrift participants based on age and service. The compensation shown is the average projected pay for the plan year beginning July 1, 2018.

	Years of Service as of 07/01/2018							
	0-4	5-9	10-14	15-19	20-24	25-29	30 & Up	Total
Under 25	9	-	-	-	-	-	-	9
	31,192	-	-	-	-	-	-	31,192
25 - 29	12	4	-	-	-	-	-	16
	46,247	56,829	-	-	-	-	-	48,892
30 - 34	20	10	4	-	-	-	-	34
	61,963	77,258	75,879	-	-	-	-	68,099
35 - 39	18	10	15	2	-	-	-	45
	68,511	69,253	84,064	62,767	-	-	-	73,605
40 - 44	10	10	6	7	3	-	-	36
	96,952	79,193	79,737	87,943	76,720	-	-	85,712
45 - 49	11	9	7	3	4	3	-	37
	80,388	85,635	106,553	86,443	75,806	91,310	-	87,496
50 - 54	7	4	17	14	7	10	2	61
	79,657	91,951	76,838	94,407	121,446	95,971	123,416	91,967
55 - 59	17	7	7	7	6	7	7	58
	80,297	85,231	76,911	94,874	86,275	103,613	112,462	89,557
60 - 64	6	1	2	7	4	6	2	28
	94,272	93,423	110,558	70,958	76,322	112,855	94,965	91,044
65 & Up	2	3	2	4	2	1	-	14
	120,868	55,445	76,509	79,927	67,474	131,952	-	81,978
Totals	**112**	**58**	**60**	**44**	**26**	**27**	**11**	**338**
	70,463	**77,228**	**83,459**	**86,425**	**90,054**	**102,519**	**111,272**	**81,405**

Averages	
Age	47.20
Service	11.48

Section IV. Participant Information

Active Age/Service Distribution Including Compensation

Shown below is the distribution of active Police participants based on age and service. The compensation shown is the average projected pay for the plan year beginning July 1, 2018.

	Years of Service as of 07/01/2018							
	0-4	**5-9**	**10-14**	**15-19**	**20-24**	**25-29**	**30 & Up**	**Total**
Under 25	1	-	-	-	-	-	-	1
	62,534	-	-	-	-	-	-	62,534
25 - 29	6	1	-	-	-	-	-	7
	57,113	73,581	-	-	-	-	-	59,466
30 - 34	5	4	3	-	-	-	-	12
	58,449	77,960	84,191	-	-	-	-	71,388
35 - 39	1	3	1	-	-	-	-	5
	54,596	75,721	86,629	-	-	-	-	73,678
40 - 44	4	1	4	5	2	-	-	16
	71,045	86,387	68,168	85,276	97,358	-	-	79,021
45 - 49	-	1	2	3	4	-	-	10
	-	81,483	95,555	95,244	102,596	-	-	96,871
50 - 54	-	-	-	1	-	4	2	7
	-	-	-	119,238	-	119,084	133,915	123,344
55 - 59	-	-	-	1	-	-	1	2
	-	-	-	55,343	-	-	119,393	87,368
60 - 64	-	-	-	-	-	-	2	2
	-	-	-	-	-	-	133,135	133,135
65 & Up	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
Totals	**17**	**10**	**10**	**10**	**6**	**4**	**5**	**62**
	60,954	**78,046**	**80,299**	**88,669**	**100,850**	**119,084**	**130,698**	**84,537**

Averages	
Age	41.40
Service	13.21

Section IV. Participant Information

Active Age/Service Distribution Including Compensation

Shown below is the distribution of active Union Thrift participants based on age and service. The compensation shown is the average projected pay for the plan year beginning July 1, 2018.

	Years of Service as of 07/01/2018							
	0-4	5-9	10-14	15-19	20-24	25-29	30 & Up	Total
Under 25	4	-	-	-	-	-	-	4
	34,674	-	-	-	-	-	-	34,674
25 - 29	8	2	-	-	-	-	-	10
	34,852	44,282	-	-	-	-	-	36,738
30 - 34	5	2	-	-	-	-	-	7
	40,246	40,024	-	-	-	-	-	40,183
35 - 39	10	3	2	2	1	-	-	18
	39,480	41,358	45,918	56,695	68,557	-	-	44,036
40 - 44	5	-	5	1	1	-	-	12
	45,513	-	52,933	58,408	58,438	-	-	50,798
45 - 49	4	1	-	-	-	-	-	5
	47,677	46,792	-	-	-	-	-	47,500
50 - 54	7	2	3	8	-	2	1	23
	32,683	47,347	58,048	57,281	-	64,409	63,984	49,942
55 - 59	-	3	3	4	3	3	3	19
	-	48,803	51,068	56,121	50,854	43,171	64,729	52,650
60 - 64	-	-	2	1	-	1	-	4
	-	-	52,294	54,789	-	55,714	-	53,773
65 & Up	-	-	-	1	-	-	-	1
	-	-	-	43,328	-	-	-	43,328
Totals	**43**	**13**	**15**	**17**	**5**	**6**	**4**	**103**
	38,618	**44,660**	**52,563**	**56,068**	**55,911**	**52,341**	**64,543**	**46,937**

Averages	
Age	44.95
Service	10.37

Section IV. Participant Information

Active Age/Service Distribution Including Compensation

Shown below is the distribution of all active participants based on age and service. The compensation shown is the average projected pay for the plan year beginning July 1, 2018.

	Years of Service as of 07/01/2018							
	0-4	**5-9**	**10-14**	**15-19**	**20-24**	**25-29**	**30 & Up**	**Total**
Under 25	14	-	-	-	-	-	-	14
	34,425	-	-	-	-	-	-	34,425
25 - 29	26	7	-	-	-	-	-	33
	45,248	55,637	-	-	-	-	-	47,452
30 - 34	30	16	7	-	-	-	-	53
	57,758	72,779	79,442	-	-	-	-	65,156
35 - 39	29	16	18	4	1	-	-	68
	58,020	65,235	79,968	59,731	68,557	-	-	65,783
40 - 44	19	11	15	13	6	-	-	64
	77,961	79,847	67,717	84,684	80,552	-	-	77,493
45 - 49	15	11	9	6	8	3	-	52
	71,666	81,726	104,109	90,843	89,201	91,310	-	85,453
50 - 54	14	6	20	23	7	16	6	92
	56,170	77,083	74,019	82,573	121,446	97,804	112,242	83,879
55 - 59	17	10	10	12	9	10	17	85
	80,297	74,303	69,158	78,662	74,468	85,481	99,010	81,786
60 - 64	6	1	4	8	4	7	6	36
	94,272	93,423	81,426	68,937	76,322	104,692	106,886	89,325
65 & Up	2	3	2	5	2	1	3	18
	120,868	55,445	76,509	72,607	67,474	131,952	103,359	83,394
Totals	**172**	**81**	**85**	**71**	**37**	**37**	**32**	**515**
	61,562	**72,102**	**77,635**	**79,472**	**87,191**	**96,173**	**103,375**	**75,268**

Averages	
Age	46.36
Service	12.06

Section IV. Participant Information

Participant Reconciliation

Shown below is the reconciliation of participants between the prior and current valuation date.

	Police	Admin DB	Admin TP	Union DB	Union TP	Total
1. Active						
Count on 7/1/2017	58	12	333	-	102	505
New Entrants	8	-	24	-	13	45
Plan to Plan Transfer	-	-	2	-	(2)	-
Non-Vested Termination	(1)	-	(4)	-	-	(5)
Vested Termination	-	-	(3)	-	(2)	(5)
Retired	(1)	-	(3)	-	(1)	(5)
Death	-	-	(1)	-	-	(1)
Paid Out	(2)	-	(11)	-	(7)	(20)
Adjustment	-	-	1	-	-	1
Count on 7/1/2018	62	12	338	-	103	515
2. Terminated Non-Vested, Owed Refund						
Count on 7/1/2017	1	-	28	-	2	31
Non-Vested Termination	1	-	4	-	-	5
Return to Active Status	-	-	-	-	-	-
Paid Out	-	-	(10)	-	-	(10)
Count on 7/1/2018	2	-	22	-	2	26
3. Terminated Vested						
Count on 7/1/2017	2	2	38	-	15	57
Vested Termination	-	-	3	-	2	5
Paid Out	-	-	(1)	-	-	(1)
Retired	-	(1)	(4)	-	(1)	(6)
Death	-	-	-	-	-	-
Adjustments	-	-	(3)	-	-	(3)
Count on 7/1/2018	2	1	33	-	16	52
4. Retiree						
Count on 7/1/2017	10	95	107	12	19	243
Retired	1	1	7	-	2	11
Death	-	(5)	(3)	(1)	-	(9)
Count on 7/1/2018	11	91	111	11	21	245
5. Beneficiary						
Count on 7/1/2017	1	9	6	2	2	20
New Beneficiary	-	2	2	-	-	4
Death	-	-	(1)	-	-	(1)
Count on 7/1/2018	1	11	7	2	2	23

Section IV. Participant Information

Inactive Participant Distribution

Shown below is the monthly benefits of retirees and beneficiaries by age for Administrative participants.

Age as of July 1, 2018	Number	Average Annual Pension	Total Annual Pension
<55	5	8,161	40,806
55 - 59	19	16,895	321,001
60 - 64	41	22,252	912,319
65 - 69	52	22,086	1,148,452
70 - 74	41	20,550	842,545
75 - 79	27	19,455	525,295
80 - 84	19	12,318	234,035
85+	16	14,429	230,858
	220	19,342	4,255,311

Shown below is the monthly benefits of retirees and beneficiaries by age for Police participants.

Age as of July 1, 2018	Number	Average Annual Pension	Total Annual Pension
<55	3	39,994	119,983
55 - 59	2	59,015	118,030
60 - 64	5	37,343	186,713
65 - 69	1	31,044	31,044
70 - 74	-	-	-
75 - 79	1	21,817	21,817
80 - 84	-	-	-
85+	-	-	-
	12	39,799	477,587

Section IV. Participant Information

Inactive Participant Distribution

Shown below is the monthly benefits of retirees and beneficiaries by age for Union participants.

Age as of July 1, 2018	Number	Average Annual Pension	Total Annual Pension
<55	2	3,337	6,674
55 - 59	3	4,732	14,196
60 - 64	10	10,788	107,882
65 - 69	8	6,110	48,879
70 - 74	4	11,394	45,576
75 - 79	4	7,219	28,876
80 - 84	4	8,832	35,329
85+	1	11,135	11,135
	36	8,293	298,546

Shown below is the monthly benefits retirees and beneficiaries by age for all participants.

Age as of July 1, 2017	Number	Average Annual Pension	Total Annual Pension
<55	10	16,746	167,462
55 - 59	24	18,885	453,228
60 - 64	56	21,552	1,206,913
65 - 69	61	20,137	1,228,376
70 - 74	45	19,736	888,121
75 - 79	32	18,000	575,989
80 - 84	23	11,711	269,364
85+	17	14,235	241,993
	268	18,774	5,031,444

Section V. Summary of Plan Provisions

Effective Date
July 1, 1969.

Plan Year
July 1 – June 30.

Eligibility
Defined Benefit Option
Administrative personnel hired prior to April 15, 1986 and Union employees hired prior to December 2, 1986, who elected not to transfer to the Thrift Plan, are eligible to participate in the Defined Benefit Option. All Police employees are eligible for the Defined Benefit Option only.

Thrift Plan Option
Administrative personnel hired on or after April 15, 1986 and Union employees hired on or after December 2, 1986 are eligible to participate in the Thrift Plan Option. Administrative personnel hired prior to April 15, 1986 and Union employees hired prior to December 2, 1986, who elected to transfer from the Defined Benefit Option, are eligible to participate in the Thrift Plan Option.

Normal Form
Life annuity with 10 years certain. Other forms are actuarial equivalent.

Normal Retirement Date
Administrative Personnel and Union Employees

Hired prior to July 1, 2011
First of the month coincident with or immediately following attainment of age 60.

Hired after June 30, 2011
First of the month coincident with or immediately following the later of:

a. Attainment of age 65
b. The completion of 10 years of Credited Service

Administrative Personnel and Union Employees Defined Benefit Option
First of the month coincident with or immediately following attainment of age 60.

Police Employees
First of the month coincident with or immediately following the earlier of:

a. Attainment of age 60
b. The completion of 25 years of Credited Service

Normal Retirement Benefit
Defined Benefit Option

Administrative Personnel
1.8% of Final Average Earnings multiplied by Credited Service prior to April 1, 1996, plus 2.0% of Final Average Earnings multiplied by Credited Service on or after April 1, 1996

Section V. Summary of Plan Provisions

Normal Retirement Benefit

Defined Benefit Option

Union Employees

1.8% of Final Average Earnings multiplied by Credited Service

Police Employees

The lesser of (a) and (b):

a. 2% of Final Average Earnings multiplied by Credited Service prior to April 1, 2004, plus 2.25% of Final Average Earnings multiplied by Credited Service on or after April 1, 2004
b. 67.5% of Final Average Earnings

Thrift Plan Option

Administrative Personnel

1.0% of Final Average Earnings multiplied by Credited Service prior to April 1, 1996, plus 1.2% of Final Average Earnings multiplied by Credited Service on or after April 1, 1996, plus the member's Thrift Plan Option vested account balance.

Union Employees

1.0% of Final Average Earnings multiplied by Credited Service, plus the member's Thrift Plan Option vested account balance.

Final Average Earnings

Administrative Personnel and Union Employees

Average annual Earnings during the 36 consecutive months of the last 120 months of employment with the City which produce the highest average.

Police Employees

Average annual Earnings during the final 60 months of employment with the City.

Earnings is base salary or wage excluding overtime, commissions, bonuses, etc.

Early Retirement Date

First of the month coincident with or immediately following the later of:

Hired prior to July 1, 2011

a. Attainment of age 50
b. The completion of 10 years of Credited Service

Hired after June 30, 2011

a. Attainment of age 58
b. The completion of 10 years of Credited Service

Section V. Summary of Plan Provisions

Early Retirement Benefit
The accrued benefit reduced by:

Administrative Personnel and Union Employees

Hired prior to July 1, 2011
0.25% for each month that the benefit commencement precedes the normal retirement date.

Hired after June 30, 2011
0.375% for each month that the benefit commencement precedes the normal retirement date.

Police Employees
0.6% for each month during the first 60 months and 0.3% for each month during the next 60 months that the benefit commencement precedes the normal retirement date.

Late Retirement
A participant who defers retirement until after normal retirement date will receive the accrued benefit as of the late retirement date

Termination Benefits
Deferred Vested Benefit
Participants who have completed at least 10 years of Credited Service are entitled to a benefit that can commence at early retirement date, equal to the accrued benefit at termination.

Termination Benefit
Participants (not available in the Thrift Option Plan) who terminate prior to early or normal retirement date and before completion of 10 years of Credited Service are entitled to a lump sum payment equal to the member's vested account balance. The vested account balance is equal to the employee contributions with interest, plus a portion the City's contributions with interest according to the following schedule:

Years of Credited Service	Vested Percentage
Less than 5	0%
5	50%
6	60%
7	70%
8	80%
9	90%
10 and over	100%

City contributions are deemed to be 150% of the employee's contributions plus interest.

Section V. Summary of Plan Provisions

Preretirement Death Benefit Eligibilty

Qualified married participant with 10 years of Credited Service.

Preretirement Death Benefit Benefit

Annuity calculated as if participant had terminated employment on the date of death, survived to earliest retirement age, elected a 50% Joint and Survivor Annuity, and died the next day. The beneficiaries of employees who die before becoming vested, will receive the employee's contributions with interest, plus the vested portion of the City's contributions with interest.

Employee Contributions

Defined Benefit Option

Administrative Personnel

5.2% of Earnings.

Police Employees

8.5% of Earnings.

Accumulated contributions are credited with interest of 6% per annum.

Thrift Plan Option

Administrative Personnel

1% of Earnings contributed to the Defined Benefit portion, plus an irrevocable election to contribute 1%, 2%, 3%, 4%, or 5% of Earnings contributed to the Thrift Plan portion.

Union Employees

An irrevocable election to contribute 1%, 2%, 3%, 4%, or 5% of Earnings contributed to the Thrift Plan, with no employee contribution toward the Defined Benefit portion.

Accumulated contributions are credited in accordance with the terms of the investment contract.

Employer Contributions

The City contributions to the plan:

a. The remaining cost of the Defined Benefit Option based on the actuarial valuation
b. $0.50 for every $1.00 contributed by members of the Thrift Plan Option

Section V. Summary of Plan Provisions

Actuarial Equivalence

Mortality: RP-2000 Combined Table projected to 2005 using Scale AA.
Interest: 7.5%.

Thrift plan account balance that are annuitized are through the purchase of an annuity at market rates and not a liability of the defined benefit plan.

Credited Service

An employee will receive Credited Service for each full year of continuous service. From the date of Plan entrance to the date of retirement or termination, a fractional year of service is credited based on the completed service rounded to the nearest whole month. Participants are eligible to receive Credited Service provided required contributions have been made to the Plan.

Cost of Living Adjustment

Post Retirement increases are made only on an ad hoc basis. The last Cost of Living increase was effective January 1, 2008.

Optional Forms

50%, $66^2/_3$%, or 100% Joint and Survivor, with a 10 year certain period. Police may elect to receive a single sum equal to 2.5 times the balance of employee contributions with interest, in lieu of the monthly retirement benefit.

Changes in Plan Provisions Since Prior Valuation

None.

Section VI. Actuarial Methods and Assumptions

Actuarial Cost Method

The actuarial valuation is completed on the basis of the Entry Age Normal cost method calculated on an individual basis with level percentage of pay normal cost. Past service liability is allocated from the imputed date of hire, taking into account transferred and purchased service.

Amortization Method

Any actuarial gains and losses resulting from actual plan experience either more or less favorable than anticipated on the basis of the actuarial assumptions and asset valuation method will result in direct adjustments of the unfunded actuarial accrued liability. Changes in the unfunded actuarial accrued liability are amortized as individual bases based on the source of the change. Changes due to gains or losses, assumption or method changes are amortized over closed periods of 20 years. All bases are amortized as level future payments.

Asset Method

Five year smoothed asset value. Investment returns above or below the assumed rate of return are recognized at a rate of 20% per year over five years.

Investment Return

7.00%, compounded annually, net of investment expenses. This assumption is based on the plan's investment policy and the long-term expectation of each investment class, based upon the recommendations of the plan's investment advisor. Details of the investment policy and long-term expectations are available in the plan's financial statements.

Administrative Expenses

Total administrative expenses for the fiscal year are assumed to be the average of the administrative expenses for the prior two years, rounded to the nearest $1,000.

Salary Increases

Sample salary increases are as follows:

Age	Administrative	Union	Police
20	6.75%	6.00%	6.00%
24	6.25%	6.00%	11.00%
25	6.25%	6.00%	6.50%
29	6.25%	6.00%	12.50%
30	6.25%	6.00%	4.75%
35	4.75%	6.00%	4.75%
40+	4.75%	4.75%	4.75%

Salary increases are based on a combination of rates determined based on the 2015 experience study, cost of living increases, and step increases. Rates shown above are reduced by 3.00% for Police members with 20 or more years of service and 2.75% for Union members with 20 or more years of service.

Section VI. Actuarial Methods and Assumptions

Cost of Living Increase in Benefits

No expected benefit increase is assumed in future years.

Inflation

2.5%, compounded annually. This assumption is based on 20 to 30 year historical returns on CPI-U and anticipated future expected returns reviewing the difference between Treasury bonds and TIPS.

Mortality

Pre-Retirement

The RP-2014 Total Dataset mortality table projected generationally using scale MP-2017. *Adopted in 2017.*

Post Retirement

For Healthy Participants: The RP-2014 Total Dataset mortality table projected generationally using scale MP-2017. *Adopted in 2017.*

For Disabled Participants: The RP-2014 Disabled Retiree mortality table projected generationally using scale MP-2017. *Adopted in 2017.*

Projection to the year of the valuation is assumed to be current mortality experience. The generational projection beyond the year of the valuation is assumed to account for future mortality improvements. The mortality assumption is based on a standard blue-collar mortality table with the initial projection scale produced with the table.

The mortality assumption is based on studies conducted by the Society of Actuaries for pension plans.

Termination of Employment

Sample termination rates are as follows:

Years of Service	Police	Administrative and Union
0	20.0%	17.0%
1	20.0%	13.0%
5	4.0%	9.0%
10	1.0%	4.0%
15	1.0%	3.5%
25	0.0%	2.5%

This assumption is based on a 2015 experience study conducted by Hay Group and experience with similarly situated plans.

Section VI. Actuarial Methods and Assumptions

Retirement Rates

Sample retirement rates are as follows:

Age	Police	Administrative and Union
50	10.0%	2.5%
55	20.0%	5.0%
60	50.0%	20.0%
65	100.0%	25.0%
70	100.0%	100.0%

This assumption is based on a 2015 experience study conducted by Hay Group and experience with similarly situated plans.

Disability Rates

Sample disability rates are as follows:

Age	Male	Female
20	N/A	N/A
25	0.02%	0.04%
30	0.06%	0.09%
35	0.11%	0.14%
40	0.17%	0.19%
45	0.30%	0.30%
50	0.42%	0.45%
55	0.55%	0.57%
60	N/A	N/A

This assumption is based on a 2015 experience study conducted by Hay Group and experience with similarly situated plans.

Marital Status

75% assumed to be married with wives 3 years younger than husbands.

This assumption is based on marital percentage of similarly situated plans.

Non-Vested Terminations

We value non-vested terminations based on the amount of their vested account balance, which is assumed to be paid on the valuation date.

Form of Payment

The form of payment assumption is as follows:

Optional Form	Assumption
10 Certain & Continuous	45%
Joint & 50% Survivor with 10 C&C	20%
Joint & 100% Survivor with 10 C&C	35%

This assumption is based on actual forms of benefit payments elected under this plan.

Changes in Methods/Assumptions Since Prior Valuation

- The form of payment assumption was changed to better reflect actual experience of the plan.
- The Entry Age method was changed to allocate past service from imputed date of hire determined from actual benefit service, including transfer and purchased service. The previous method allocated past service from date of hire with the City of Rockville.

Section VII. Glossary

Actuarial Accrued Liability (AAL)

The difference between the Actuarial Present Value of Future Benefits and the Actuarial Present Value of Future Normal Costs or the portion of the present value of future benefits allocated to service before the valuation date in accordance with the actuarial cost method. Represents the present value of benefits expected to be paid from the plan in the future allocated to service prior to the date of the measurement.

Actuarial Asset Valuation Method

The method of determining the value of the assets as of a given date, used by the actuary for valuation purposes. This may be the market or fair value of plan assets or a smoothed value in order to reduce the year-to-year volatility of calculated results, such as the funded ratio and the actuarially determined contribution (ADC).

Actuarial Cost Method

A procedure for allocating the Actuarial Present Value of Future Benefits and the actuarial Present Value of Future Normal costs and the Actuarial Accrued Liability. Also known as the “funding method”. Examples of actuarial cost methods include Aggregate, Entry Age Normal, Projected Unit Credit, and Pay-as-you-go.

Actuarial Present Value of Future Benefits (APVFB)

The Actuarial Present Value of amounts which are expected to be paid at various future times to active members, retired members, beneficiaries receiving benefits, and inactive, nonretired members entitled to either a refund or a future retirement benefit. Expressed another way, it is the value that would have to be invested on the valuation date so that the amount invested plus investment earnings would provide sufficient assets to pay all projected benefits and expenses when due.

Aggregate Cost Method

An actuarial cost method that spreads the cost of all future benefits in excess of plan assets as a level percentage of future salary or service. The actuarial accrued liability is set to the value of assets in this method.

Annual Determined Contributions of the Employer(s) (ADC)

The employer’s periodic determined contributions to a pension plan, calculated in accordance with the assumptions and methods used by the plan actuary. The ADC replaced the actuarially required contribution (ARC), with the replacement of GASB 27 with GASB 68.

Cost-of-Living Adjustment (COLA)

An annual increase in the amount of a retired participant’s benefit intended to adjust the benefit for inflation.

Covered Group

Plan members included in actuarial valuation.

Section VII. Glossary

Demographic Assumption
Assumptions regarding the future population of pension participants, including retirement, termination, disability and mortality assumptions.

Economic Assumption
Assumptions regarding future economic factors, including COLA, salary improvement, change in average wages, changes in Social Security benefits and investment returns.

Employer's Contributions
Contributions made in relation to the actuarially determined contributions of the employer (ADC). An employer has made a contribution in relation to the ADC if the employer has (a) made payments of benefits directly to or on behalf of a retiree or beneficiary, (b) made premium payments to an insurer, or (c) irrevocably transferred assets to a trust, or an equivalent arrangement, in which plan assets are dedicated to providing benefits to retirees and their beneficiaries in accordance with the terms of the plan and are legally protected from creditors of the employer(s) or plan administrator.

Entry Age Normal (EAN) Cost Method
An actuarial cost method that spreads the cost for each individual's expected benefits over their career, either as a level percentage of pay or service. The actuarial accrued liability is the accumulated value of all past normal cost, and the unfunded accrued liability (surplus) is the excess of the AAL over the value of assets.

Expenses
Plan expenses paid by the plan are divided into administrative and investment related expenses.

Funded Ratio
The actuarial value of assets expressed as a percentage of the plan's actuarial accrued liability.

GASB
Government Accounting Standards Board.

GASB No. 25 and GASB No. 27
These are the government accounting standards that set the accounting rules for public retirement systems and the employers that sponsor or contribute to them. Statement No. 27 sets the accounting rules for the employers that sponsor or contribute to public retirement systems while Statement No. 25 sets the rules for the systems themselves.

GASB No. 67 and GASB No. 68
These are the government standards that replace GASB 25 and 27. They are effective for plan years beginning after June 14, 2013 and employer fiscal years beginning after June 14, 2014.

Investment Return Assumption or Investment Rate of Return (Discount Rate)
The rate used to adjust a series of future payments to reflect the time value of money.

Section VII. Glossary

Level Percentage of Projected Payroll Amortization Method

Amortization payments are calculated so that they are a constant percentage of the projected payroll of active plan members over a given number of years. The dollar amount of the payments generally will increase over time as payroll increases due to inflation; in dollars adjusted for inflation, the payments can be expected to remain level.

Normal Cost or Normal Actuarial Cost

That portion of the Actuarial Present Value of pension plan benefits and expenses which is allocated to a valuation year by the Actuarial Cost Method.

Payroll Growth Rate

An actuarial assumption with respect to future increases in total covered payroll attributable to inflation; used in applying the level percentage of projected payroll amortization method.

Plan Liabilities

Obligations payable by the plan at the reporting date, including, primarily, benefits and refunds due and payable to plan members and beneficiaries, and accrued investment and administrative expenses. Plan liabilities do not include actuarial accrued liabilities for benefits that are not due and payable at the reporting date.

Plan Members

The individuals covered by the terms of a Pension or OPEB plan. The plan membership generally includes employees in active service, terminated employees who have accumulated benefits but are not yet receiving them, and retired employees and beneficiaries currently receiving benefits.

Projected Unit Credit (PUC) Funding Method

An actuarial cost method that spreads the employee's benefit over their career, as a level percentage of service. The normal cost is the present value of the portion of the benefit assigned to the current year. The actuarial accrued liability is the accumulated value of all past normal cost, and the unfunded accrued liability (surplus) is the excess of the AAL over the value of assets.

Post-Employment

The period between termination of employment and retirement as well as the period after retirement.

Salary Improvement

An actuarial assumption regarding the increase in employees' salaries, reflecting cost-of-living, merit and longevity increases.

Section VII. Glossary

Select and Ultimate Rates

Actuarial assumptions that contemplate different rates for successive years. Instead of a single assumed rate with respect to, for example, the investment return assumption, the actuary may apply different rates for the early years of a projection and a single rate for all subsequent years. For example, if an actuary applies an assumed investment return of 8 percent for year 2000, 7.5 percent for 2001, and 7 percent for 2002 and thereafter, then 8 percent and 7.5 percent are select rates, and 7 percent is the ultimate rate.

Unfunded Actuarial Accrued Liabilities

The excess of the present value of prospective pension benefits, as of the date of a pension plan valuation, over the sum of (1) the actuarial value of the assets of the plan and (2) the present value of future normal costs determined by any of several actuarial cost methods. For plans that define an accrued liability, this amount equals the excess of the accrued liability over plan assets.

Vested Plan Benefits

All benefits to which current participants have a vested right based on pay and service through the valuation date. A participant has a vested right to a benefit if he/she would still be eligible to receive that benefit if employment terminated on the valuation date.

Appendix 1

Summary of Funding Progress

Valuation Date	(1) Actuarial Value of Assets	(2) Actuarial Accrued Liability	(3) Percentage Funded (1) / (2)	(4) Unfunded Actuarial Accrued Liability (2) - (1)	(5) Annual Covered Payroll	(6) Unfunded Actuarial Accrued Liability as a Percentage of Covered Payroll (4) / (5)
4/1/2009	$59,550,874	$79,275,687	75.1%	$19,724,813	$33,863,526	58.2%
4/1/2010	$60,360,919	$79,794,044	75.6%	$19,433,125	$33,384,756	58.2%
4/1/2011	$62,039,361	$88,577,844	70.0%	$26,538,483	$33,212,310	79.9%
4/1/2012	$70,144,539	$92,843,559	75.6%	$22,699,020	$34,557,409	65.7%
4/1/2013	$78,490,190	$97,275,430	80.7%	$18,785,240	$34,875,678	53.9%
7/1/2014	$86,925,136	$101,027,990	86.0%	$14,102,854	$35,318,946	39.9%
7/1/2015	$91,600,681	$105,318,300	87.0%	$13,717,619	$34,861,650	39.3%
7/1/2016	$95,584,743	$116,842,174	81.8%	$21,257,431	$34,187,757	62.2%
7/1/2017	$95,407,926	$112,314,075	84.9%	$16,906,149	$36,810,351	45.9%
7/1/2018	$101,999,637	$118,855,301	85.8%	$16,855,664	$38,762,974	43.5%

Effective with the 2017 valuation, the Annual Covered Payroll is the expected payroll for the plan year beginning on the valuation date.

Analysis of the dollar amounts of net assets available for benefits, actuarial accrued liability, and unfunded actuarial accrued liability in isolation can be misleading. Expressing the net assets available for benefits as a percentage of the actuarial accrued liability provides one indication of funding status on a going-concern basis. Analysis of this percentage over time indicates whether the plan is becoming financially stronger or weaker. Generally, the greater this percentage, the stronger the plan. Trends in unfunded actuarial accrued liability and annual covered payroll are both affected by inflation. Expressing the unfunded actuarial accrued liability as a percentage of annual covered payroll approximately adjusts for the effects of inflation and aids analysis of the City of Rockville’s progress made in accumulating sufficient assets to pay benefits when due. Generally, the smaller this percentage, the stronger the plan.

Appendix 1

Summary of Contributions

Year Ended June 30	Actuarially Determined Contribution	Percentage Contributed
2010	$2,511,751	100.0%
2011	$3,478,242	100.0%
2012	$3,563,104	100.0%
2013	$4,255,153	100.0%
2014	$5,218,589	100.0%
2015	$4,024,603	100.0%
2016	$3,575,462	100.0%
2017	$3,473,255	100.0%
2018	$3,899,592	100.0%

The information presented in the required supplementary schedules was determined as part of the actuarial valuations at the dates indicated. Additional information as of the latest actuarial valuation follows.

Actuarial cost method	Entry Age Normal cost method, applied on an individual basis
Amortization method	Level dollar
Remaining amortization period	Remaining periods range from 13.25 to 20 years
Asset valuation method	5-year smoothed method
Actuarial assumptions:	
Investment rate of return	7.00%, net of investment expenses
Projected salary increase	Rates vary by age and group

Appendix 2

Benefit Payment Projection

The following table shows the estimated benefit payments from July 1, 2018 through June 30, 2028 based on existing members of the plan.

Fiscal Year	Benefits
2019	5,865,000
2020	6,239,000
2021	6,758,000
2022	7,185,000
2023	7,703,000
2024	8,127,000
2025	8,587,000
2026	8,973,000
2027	9,467,000
2028	9,834,000

Appendix 3

Risk Metrics

The City contributions will vary over time based on the experience of the plan's investments and participants. As the value of the plan's assets and liabilities increase relative to the participant payroll, there is a greater risk of large changes to the City's contribution expressed as a percentage of participant payroll.

The Asset Volatility Ratio (AVR) is equal to the market value of assets (MVA) divided by payroll. A higher AVR implies that the plan is exposed to greater contribution volatility. The current AVR of 2.7 indicates that a 1.0% asset gain/loss can be related to about 2.7% of the annual payroll. The plan currently amortizes asset gains/losses over a period of 20 years. This would result in a change in the City's contribution of about 0.2% of payroll for each 1.0% change in market assets.

The Liability Volatility Ratio (LVR) is equal to the Actuarial Accrued Liability (AAL) divided by payroll. A higher LVR implies that the plan is exposed to greater contribution volatility due to changes in liability measurements. The current LVR of 3.0 indicates that a 1.0% liability gain/loss can be related to about 3.0% of the annual payroll. The plan currently amortizes liability gains/losses over a period of 20 years. This would result in a change in the City's contribution of about 0.2% of payroll for each 1.0% change in AAL. As the plan approaches a 100% funded level, the AVR will converge to the LVR.

	2016	2017	2018
AVR	2.4	2.6	2.7
LVR	3.0	3.1	3.0

Appendix 4

Estimated Cost of a 1% Cost of Living Increase (COLA)

Providing a one-time cost of living increase of 1% to retirees and beneficiaries as of July 1, 2019 is expected to increase the actuarial accrued liability by $554,867.

Effect of 1% Cost of Living Increase	Increase in Actuarial Accrued Liability	
Admin and Union Participants	$	472,591
Police Participants		82,276
Total	**$**	**554,867**

Appendix 5

Benefit Index Option

As of June 30, 2018 there was a group of 61 retirees and beneficiaries under the Benefit Index Option with Principal Financial Group. The City of Rockville is required to maintain a minimum level of assets with Principal Financial Group; otherwise these employees will be annuitized at current market costs. The benefits due to these retirees are paid from the Principal Financial Group accounts.

If the Benefit Index Option retirees had been converted to annuities on June 30, 2018, the liability would increase from $6.77 million to $8.95 million. The increase is mainly due to the low interest rate environment in the annuity market, reflected for purposes of this calculation by using a discount rate of 2.53%. This rate is the immediate rate used under ERISA Section 4044 for the month of July 2018 and is an increase from last year's rate of 2.44%. It is meant to approximate an annuity purchase rate.

Principal Financial Group requires that the funds exceed the annuitized value of the retiree benefits. We understand that they determine the amount needed to cover the Benefits Index retirees throught a two-step formula. First, they increase the annuitized liability by 10%. Next, they take into consideration the volatility of the asset classes and come come up with a weighted volatility factor that is used to increase the amount of funds needed to cover retiree payments.

On June 30, 2018, the funds with Principal Financial Group were invested in the following manner and with the following assumed volatility factors:

Fund Name		Balance	Volatility Factor
Bond and Mortgage	$	10,133,188	.95
Large Cap S&P 500 Index	$	18,330,516	.75
Diversified Intl	$	19,875,256	.60
Total	**$**	**48,338,960**	**.7303**

The weighted average volatility factor is divided into the increased annuitized liability to derive the benefit Index as of a particular date. As of June 30, 2018, the Benefits Index equaled approximately $13.48 million (i.e. $8.95 x 1.1 / 0.7303). With approximately $48.3 million invested with Principal Financial Group, the Benefit Index is covered.

It is important to note that volatility factors have a significant impact on the high level of assets required to be held by Principal Financial Group. If all of the assets were invested in the Bond and Mortgage, which has the least volatility, then the Benefit Index would decrease from $13.48 million required to $10.36 million required.