Proprietary and Confidential

Actuarial Valuation as at January 1, 2017 for The Hamilton Street Railway Company Pension Plan (1994)

Canada Revenue Agency Registration Number: 0253344

Provincial Registration Number: 0253344

October 2017

AON
Empower Results®

Table of Contents

Executive Summary 3

Section 1: Introduction 7

Section 2: Going Concern Valuation Results 9

Section 3: Solvency Valuation Results 12

Section 4: Hypothetical Wind Up Valuation Results 16

Section 5: Contribution Requirements 18

Section 6: Actuarial Certificate 21

Appendix A: Assets 23

Appendix B: Membership Data 26

Appendix C: Going Concern Assumptions and Methods 31

Appendix D: Solvency and Hypothetical Wind Up Assumptions and Methods 38

Appendix E: Summary of Plan Provisions 44

Appendix F: History of Plan 48

Appendix G: Glossary of Terms 50

Appendix H: Administrator Certification 54

Executive Summary

An actuarial valuation has been prepared for The Hamilton Street Railway Company Pension Plan (1994) (the "Plan") as at January 1, 2017 for the primary purpose of establishing a funding range in accordance with legislative requirements for the Plan until the next actuarial valuation is performed. This section provides an overview of the important results and the key valuation assumptions which have had a bearing on these results. The next actuarial valuation for the purposes of developing funding requirements should be performed no later than as at January 1, 2020.

Summary of Principal Results

Financial Position

January 1, 2017	Going Concern	Solvency	Hypothetical Wind Up
Assets	$ 193,491,200	$ 193,291,200[1]	$ 193,291,200[1]
Liabilities	214,681,400	219,410,700	318,997,500
Financial position	$ (21,190,200)	$ (26,119,500)	$ (125,706,300)
Adjustments[2]	-	20,969,500	-
Surplus/(Unfunded Liability)	**$ (21,190,200)**	**$ (5,150,000)**	**$ (125,706,300)**

January 1, 2014	Going Concern	Solvency	Hypothetical Wind Up
Assets	$ 174,393,600	$ 174,193,600[1]	$ 174,193,600[1]
Liabilities	192,605,100	196,854,100	279,653,100
Financial position	$ (18,211,500)	$ (22,660,500)	$ (105,459,500)
Adjustments[2]	-	10,593,100	-
Surplus/(Unfunded Liability)	**$ (18,211,500)**	**$ (12,067,400)**	**$ (105,459,500)**

[1] Net of estimated wind up expenses
[2] Adjustments include prior year credit balance, and all solvency liability and solvency asset adjustments, where applicable

Legislative Ratios

	January 1, 2017	January 1, 2014
Solvency ratio	0.88	0.89
Transfer ratio	0.61	0.62

Minimum Contribution Requirements

Considering the funding and solvency status of the Plan, the minimum Company contributions for the period from January 1, 2017 to January 1, 2020 in accordance with legislative requirements, are as follows:

	Jan 1, 2017 to Dec 31, 2017	Jan 1, 2018 to Dec 31, 2018	Jan 1, 2019 to Dec 31, 2019
Company normal cost	$ -	$ 80,100	$ 160,900
Special payments toward amortizing unfunded liability	4,774,800	6,339,600	6,339,600
Adjustments	-	-	-
Minimum Required Company Contribution	**$ 4,774,800**	**$ 6,419,700**	**$ 6,500,500**

The Company normal cost shown above consists of any non-funded pension increases due to indexation occurring at the start of 2018 and 2019.

Key Assumptions

The principal assumptions to which the valuation results are most sensitive are outlined in the following table.

January 1, 2017	Going Concern	Solvency/ Hypothetical Wind Up
Discount rate	4.50% per year	**Solvency** Annuity purchases: 3.08% per year Transfers: 2.30% per year for 10 years, 3.70% per year thereafter **Hypothetical Wind Up** Annuity purchases: -0.09% per year Transfers: 1.30% per year for 10 years, 1.60% per year thereafter
Inflation rate	2.25% per year	Not applicable
Indexing rate	1.50% per year	Not applicable
Pensionable earnings	3.25% per year	Not applicable
Mortality table	110% of 2014 Canadian Pensioner Mortality Table (“CPM2014PUB”) with generational improvements using CPM Scale B2D (“CPM-B”)	2014 Canadian Pensioner Mortality Table (“CPM2014”) with generational improvements using CPM Scale B2D (“CPM-B”)
Retirement rates	50% of members retire at the earliest unreduced retirement age and 50% at age 62.	Age that produces the highest lump-sum value

January 1, 2014	Going Concern	Solvency/ Hypothetical Wind Up
Discount rate	5.75% per year	**Solvency** Annuity purchases: 3.82% per year Transfers: 3.10% per year for 10 years, 4.60% per year thereafter **Hypothetical Wind Up** Annuity purchases: 0.15% per year Transfers: 1.70% per year for 10 years, 2.30% per year thereafter
Inflation rate	2.25% per year	Not applicable
Indexing rate	1.50% per year	Not applicable
Pensionable earnings increase	3.25% per year	Not applicable
Mortality table	110% of 2014 Canadian Pensioner Mortality Table (“CPM2014PUB”) with generational improvements using CPM Scale B2D (“CPM-B”)	1994 Uninsured Pensioner Mortality Table with fully generational projection Scale AA (sex-distinct rates)
Retirement rates	50% of members retire at the earliest unreduced retirement age and 50% at age 62.	Age that produces the highest lump-sum value

Section 1: Introduction

Purpose and Terms of Engagement

We have been engaged by Corporation of the City of Hamilton, and hereafter referred to as the City, to conduct an actuarial valuation of the Plan, registered in Ontario, as at January 1, 2017 for the general purpose of determining the minimum and maximum funding contributions required by pension standards, based on the actuarial assumptions and methods summarized herein. Specifically, the purposes of the valuation are to:

- Determine the financial position of the Plan on a going concern basis as at January 1, 2017;
- Determine the financial position of the Plan as at January 1, 2017 on a solvency and hypothetical wind up basis;
- Determine the funding requirements of the Plan as at January 1, 2017 with consideration of the 2016 multi-jurisdictional agreement; and
- Provide the necessary actuarial certification required under the *Pension Benefits Act (Ontario)* (the "*Act*") and the *Income Tax Act.*

The results of this report may not be appropriate for accounting purposes or any other purposes not listed above.

The next required valuation will be as at January 1, 2020.

Summary of Changes Since the Last Valuation

The last such actuarial valuation in respect of the Plan was performed as at January 1, 2014. Since the time of the last valuation, we note that the following events have occurred:

- There were post-retirement pension increases of 1.80% effective January 1, 2015, 1.16% effective January 1, 2016 and 1.45% effective January 1, 2017. These increases have been reflected in the results presented in this valuation report.
- The Canadian Institute of Actuaries ("CIA") made revisions to the guidance for assumptions for hypothetical wind up and solvency valuations effective December 31, 2015. The key changes to the guidance are to use CPM2014 with generational improvements using CPM-B to determine the annuity purchase liabilities.

Company Information and Inputs

In order to prepare our valuation, we have relied upon the following information:

- A copy of the previous valuation report as at January 1, 2014;
- A copy of the Statement of Investment Policies and Procedures for the City;
- A copy of the funding policy for the City;
- Membership data compiled as at January 1, 2017 by the City;
- Asset data taken from the Plan's audited financial statements; and
- A copy of the latest Plan text and amendments up to and including January 1, 2017.

Furthermore, our actuarial assumptions and methods have been chosen to reflect our understanding of the City's desired funding objectives with due respect to accepted actuarial practice and regulatory constraints. In particular, this valuation report reflects the City's instruction to fund 66.67% of the cost of future post-retirement indexing. The full cost thereof is also shown for informational purposes only and for the valuation of the wind-up position of the Plan.

As a result of a Settlement Agreement dated March 12, 2009, the Plan was amended to include a conditional increase to the joint and survivor normal form of pension to 66 2/3% from 50%. The benefit improvement is conditional upon an actuarial report being filed that discloses a plan surplus on either a going concern, solvency or wind-up basis. All HSR Plan members who were employees on December 31, 2008 would be entitled to this benefit improvement when it comes into effect, if they continue to be entitled to a pension from the plan. For the purposes of this report, the conditional benefit improvement has not been reflected in the results that have been reported.

Subsequent Events

As of the date of this report, we have not been made aware of any subsequent events which would have an effect on the results of this valuation. However, the following points should be noted in this regard:

- Actual experience deviating from expected after January 1, 2017 will result in gains or losses which will be reflected in the next actuarial valuation report.
- Any non-funded pension increases due to indexation that occurs until the next valuation should be included in the normal cost contributions. The amount would be equal to the percentage increase in excess of 1.5% multiplied by the total expected pensions payable in the year of the increase.
- To the best of our knowledge, the results contained in this report are based on the regulatory and legal environment in effect at the date of this report and do not take into consideration any potential changes that may be currently under review. To the extent that actual changes in the regulatory and legal environment transpire, any financial impact on the Plan as a result of such changes will be reflected in future valuations.

Section 2: Going Concern Valuation Results

Going Concern Financial Position of the Plan

The going concern valuation provides an assessment of the Plan's financial position at the valuation date on the premise that the Plan continues on into the future indefinitely.

The selection of the applicable actuarial assumptions and methods reflect the Plan's funding objectives, as communicated by the City, actuarial standards of practice, and pension standards.

On the basis of the Plan provisions, membership data, going concern assumptions and methods, and asset information described in the Appendices, the going concern financial position of the Plan as at January 1, 2017 is shown in the following table. The results as at January 1, 2014 are also shown for comparison purposes.

Going Concern Financial Position

	January 1, 2017	January 1, 2014
Actuarial Value of Assets	**$ 193,491,200**	**$ 174,393,600**
Going Concern Liabilities		
Active members	$ 73,380,900	$ 73,163,000
Deferred vested members	1,118,100	1,128,100
Retirees	140,182,400	118,314,000
Total Liabilities	**$ 214,681,400**	**$ 192,605,100**
Going Concern Position	**$ (21,190,200)**	**$ (18,211,500)**
Prior year credit balance	-	-
Surplus/(Unfunded Liability)	**$ (21,190,200)**	**$ (18,211,500)**
Funded Ratio	**0.90**	**0.91**

The above going concern financial position reflects the City's instruction to limit pre-funding of the cost of post-retirement indexing. The above liabilities would increase to $232,457,600 with full pre-funding, assuming inflation of 2.25% per annum. This would result in an increased unfunded liability to $38,966,400, reflecting an 8.3% increase in liabilities. These full funding results are shown for disclosure purposes only.

Change in Financial Position

The major components of the change in the Surplus/(Unfunded Liability) for the period from January 1, 2014 to January 1, 2017 are summarized in the following table.

Surplus/(Unfunded Liability) as at January 1, 2014	**$**	**(18,211,500)**
Expected interest on Surplus/(Unfunded Liability)	$	(3,325,600)
Company special payments in inter-valuation period with interest		11,885,900
Surplus/(Unfunded Liability) as at January 1, 2017	**$**	**(9,651,200)**
Change in liabilities due to experience gains/(losses)		
Gain/(loss) from investment earnings greater/lower than expected	$	10,881,900
Gain/(loss) due to salary increases lower/greater than expected		1,511,000
Gain/(loss) due to indexation experience		111,200
Gain/(loss) due to retirement experience		3,348,000
Gain/(loss) due to mortality experience		187,600
Gain/(loss) due to termination experience		57,600
Net gain/(loss) due to other experience and miscellaneous items		(477,600)
Surplus/(Unfunded Liability) After Experience Gains/(Losses) as at January 1, 2017	**$**	**5,968,500**
Gain/(Loss) on programming changes	$	1,788,000
Change due to discount rate		(28,946,700)
Surplus/(Unfunded Liability) as at January 1, 2017	**$**	**(21,190,200)**

Discussion of Changes in Assumptions

Effective December 31, 2016, the nominal discount rate has been changed from 5.75% per year to 4.50% per year. This change increased the going concern liabilities by $28,946,700.

Plan Amendments

There were no Plan amendments during the last three years that had a bearing on the results of this valuation.

Going Concern Valuation Sensitivity Results

In accordance with the CIA Standards of Practice specific to pension plans, the table below presents the sensitivity of the going concern liabilities and the total normal cost of using a discount rate 1% lower and 1% higher than that used for the going concern valuation.

			Effect		
January 1, 2017				**$**	**%**
Going concern liabilities	$	214,681,400			
Going concern liabilities (discount rate – 1%)	$	243,782,800	$	29,101,400	13.6%
Going concern liabilities (discount rate + 1%)	$	190,971,700	$	(23,709,700)	(11.0)%
Normal cost	$	-			
Normal cost (discount rate – 1%)	$	-	$	-	N/A
Normal cost (discount rate + 1%)	$	-	$	-	N/A

Section 3: Solvency Valuation Results

Solvency Financial Position of the Plan

The solvency valuation is a financial assessment of the Plan that is required by the *Act* and is performed in accordance with requirements prescribed by that legislation. It is intended to provide an assessment of the Plan's financial position at the valuation date on the premise that certain obligations as prescribed by the *Act* are settled on the valuation date for all members. The liabilities must be calculated based on a postulated scenario that maximizes liabilities on wind up of the Plan. Contingent benefits are included in the liabilities that would be payable under the postulated scenario, unless permitted to be omitted under the definition of solvency liabilities under the Regulations to the *Act.* All assumptions for the solvency valuation are listed in Appendix D.

On the basis of the Plan provisions, membership data, solvency assumptions and methods and asset information described in the Appendices, as well as the requirements of the *Act*, the solvency financial position of the Plan as at January 1, 2017 is shown in the following table. The solvency financial position of the Plan as at January 1, 2014 is shown for comparison purposes.

Solvency Financial Position

	January 1, 2017	January 1, 2014
Assets		
Solvency assets	$ 193,491,200	$ 174,393,600
Estimated wind up expenses	(200,000)	(200,000)
Total Assets	**$ 193,291,200**	**$ 174,193,600**
Solvency Liabilities		
Active members	$ 76,398,200	$ 78,032,000
Deferred Vested members	1,256,400	1,392,100
Retirees	141,756,100	117,430,000
Total Liabilities	**$ 219,410,700**	**$ 196,854,100**
Solvency Position	**$ (26,119,500)**	**$ (22,660,500)**
Prior year credit balance	-	-
Present value of special payments	20,969,500	10,593,100
Solvency liability adjustment	-	-
Solvency Surplus/(Deficiency)	**$ (5,150,000)**	**$ (12,067,400)**
Solvency ratio	0.88	0.89

Solvency Concerns

A report indicates solvency concerns under the *Act* if the ratio of the solvency assets to solvency liabilities is less than 0.85.

Where a report indicates solvency concerns, the effective date of the next valuation that needs to be filed under the *Act* is one year from the valuation date of the valuation that gave rise to the solvency concerns.

Since the ratio of solvency assets to solvency liabilities ($193,491,200/ $219,410,700) is equal to 0.88, this report does not indicate solvency concerns.

Solvency Asset Adjustment

The present value of scheduled special payments for solvency valuation purposes has been calculated by discounting the annual special payments to be remitted up to the end of their amortization period (to a maximum of six years, except for streams established under temporary funding relief options 3, 5,7, and/or 8) , at the weighted solvency discount rate of 3.00% per year compounded monthly in arrears determined proportionately by the solvency discount rates used to determine the solvency liabilities.

Nature of Deficiency	Effective Date	End Date	Annual Special Payment	Present Value as of January 1, 2017
Going concern	January 1, 2009	December 31, 2023	$ 273,600	$ 1,502,400
Going concern	January 1, 2010	December 31, 2024	$ 142,800	784,200
Going concern	January 1, 2011	December 31, 2025	$ 800,400	4,395,200
Going concern	January 1, 2015	December 31, 2029	$ 831,600	4,566,500
Going concern	January 1, 2018[1]	December 31, 2032	$ 422,400	1,903,800
Solvency	January 1, 2015	December 31, 2019	$ 2,726,400	7,817,400
Present Value of Special Payments				**$ 20,969,500**

[1] In accordance with Regulation, the City has decided to defer new going concern and solvency special payments established as at January 1, 2017 by 12 months

Solvency Valuation Sensitivity Results

In accordance with the CIA Standards of Practice specific to pension plans, the table below presents the sensitivity of the solvency liabilities to using a discount rate of 1% lower and 1% higher than that used for the solvency valuation.

		Effect	
January 1, 2017		**$**	**%**
Solvency liabilities	$ 219,410,700		
Solvency liabilities (discount rate – 1%)	$ 248,116,000	$ 28,705,300	13.1%
Solvency liabilities (discount rate + 1%)	$ 196,005,900	$ (23,404,800)	(10.7)%

Incremental Cost on a Solvency Basis

The incremental cost on a solvency basis represents the present value at January 1, 2017 of the expected aggregate change in the solvency liabilities between January 1, 2017 and the next calculation date, that is, January 1, 2020. Appendix D gives more details on the calculation methodology and on assumptions.

Based on this methodology and on these assumptions, the incremental cost on a solvency basis can be found in the following table.

	Jan 1, 2017 to Dec 31, 2017	**Jan 1, 2018 to Dec 31, 2018**	**Jan 1, 2019 to Dec 31, 2019**
Incremental cost on a solvency basis	$ 4,605,000	$ 3,511,000	$ 4,027,000

Pension Benefits Guarantee Fund (“PBGF”)

A PBGF assessment is not required under Article 47(1) of Regulation 909 of the *Act*.

Section 4: Hypothetical Wind Up Valuation Results

Hypothetical Wind Up Financial Position of the Plan

A hypothetical wind up valuation is performed to determine the financial position of the Plan as at the valuation date on a wind up basis, reflecting market settlement rates as of the valuation date. Unlike the solvency valuation, all benefits are included that would be payable under the postulated scenario that would maximize benefits. The hypothetical wind up valuation is determined using benefit entitlements on the assumption that the Plan has neither a surplus nor a deficit. Contingent benefits are included in the liabilities that would be payable under the postulated scenario. Assets are set equal to market value net of estimated wind up expenses. All assumptions for the hypothetical wind up valuation are listed in Appendix D.

On the basis of Plan provisions, membership data, hypothetical wind up assumptions and methods, and asset information described in the Appendices, as well as the requirements of the *Act*, the hypothetical wind up financial position of the Plan as at January 1, 2017 is shown in the following table. The hypothetical wind up financial position of the Plan as at January 1, 2014 is shown for comparison purposes.

Hypothetical Wind Up Financial Position

	January 1, 2017	January 1, 2014
Assets		
Hypothetical wind up assets	$ 193,491,200	$ 174,393,600
Estimated wind up expenses	(200,000)	(200,000)
Total Assets	**$ 193,291,200**	**$ 174,193,600**
Hypothetical Wind Up Liabilities		
Active members	$ 115,284,600	$ 100,191,700
Deferred vested members	2,149,200	3,455,100
Retirees	201,563,700	176,006,300
Total Liabilities	**$ 318,997,500**	**$ 279,653,100**
Hypothetical Wind Up Surplus/(Deficiency)	**$ (125,706,300)**	**$ (105,459,500)**

Transfer Ratio

The transfer ratio is determined as follows:

			January 1, 2017	January 1, 2014
(1)	Hypothetical wind up assets		$ 193,491,200	$ 174,393,600
	Prior year credit balance	(A)	$ -	$ -
	Total company normal cost and required special payments until next mandated valuation	(B)	$ 17,695,000	$ 11,334,000
(2)	Asset adjustment	Lesser of (A) and (B)	$ -	$ -
(3)	Hypothetical wind up liabilities		$ 318,997,500	$ 279,653,100
Transfer Ratio [(1)-(2)] / (3)			**0.61**	**0.62**

Section 5: Contribution Requirements

Contribution Requirements in Respect of the Normal Cost

Active members no longer accrue further credited service, and as such, there are no current service contributions required, except that the unfunded portion of actual pension increases due to indexation in 2018 and 2019 are to be included as part of the current service cost for those years.

Development of Special Payments

The following table summarizes previously established amortization schedules of special payments before adjustment to reflect any gains or losses due to the going concern and solvency valuation results.

Nature of Deficiency	Effective Date	End Date	Annual Special Payment
Going concern	January 1, 2009	December 31, 2023	$ 273,600
Going concern	January 1, 2010	December 31, 2024	142,800
Going concern	January 1, 2011	December 31, 2025	800,400
Going concern	January 1, 2015[1]	December 31, 2029	831,600
Solvency	January 1, 2015[1]	December 31, 2019	2,726,400
			$ 4,774,800

The following table summarizes the amortization schedules of special payments after adjustment to reflect any gains or losses due to the going concern and solvency valuation results. In accordance with Regulation, the City has decided to defer all new going concern and solvency special payments established as at January 1, 2017 by 12 months. The following table summarizes the amortization schedules of special payments after the aforementioned adjustments.

				Present Value as of January 1, 2017	
Nature of Deficiency	Effective Date	Revised End Date	Revised Annual Special Payment	For Going Concern Valuation[2]	For Solvency Valuation[3]
Going concern	January 1, 2009	December 31, 2023	$ 273,600	$ 1,645,200	$ 1,502,400
Going concern	January 1, 2010	December 31, 2024	142,800	961,200	784,200
Going concern	January 1, 2011	December 31, 2025	800,400	5,937,000	4,395,200
Going concern	January 1, 2015	December 31, 2029	831,600	8,217,000	4,566,500
Going concern	January 1, 2018[4]	December 31, 2032	422,400	4,429,800	1,903,800
Solvency	January 1, 2015	December 31, 2019	2,726,400	n/a	7,817,400
Solvency	January 1, 2018[4]	December 31, 2022	1,142,400	n/a	5,150,000
			$ 6,339,600	$ 21,190,200	$ 26,119,500

[1] In accordance with Regulation, the City decided to defer new going concern and solvency special payments established as at January 1, 2014 by 12 months
[2] The values in this table were developed using the going concern interest rate of 4.50% per year compounded monthly in arrears
[3] The values in this table were developed using the weighted average solvency interest rate of 3.00% per year compounded monthly in arrears
[4] In accordance with Regulation, the City decided to defer new going concern and solvency special payments established as at January 1, 2017 by 12 months

Prior Year Credit Balance (“PYCB”)

The City has elected not to track or apply any PYCB to reduce the special payments.

Excess Surplus

The *Income Tax Act* requires that any excess surplus first be applied to reduce or eliminate the company contribution requirements. Excess surplus is defined in Section 147.2(2)(d) of the *Income Tax Act*, as the portion of surplus (if any) that exceeds 25% of the going concern liabilities.

There is no excess surplus as at the Valuation Date.

Development of Minimum Required Company Contribution

The table below presents the development of the minimum required company contribution for each of the plan years covered by this report.

	Jan 1, 2017 to Dec 31, 2017	**Jan 1, 2018 to Dec 31, 2018**	**Jan 1, 2019 to Dec 31, 2019**
City normal cost	$ -	$ 80,100	$ 160,900
Special payments toward amortizing unfunded liability	2,048,400	2,470,800	2,470,800
Special payments toward amortizing solvency deficiency	2,726,400	3,868,800	3,868,800
Required application of excess surplus	-	-	-
Permitted application of surplus	-	-	-
Minimum Required Company Contribution	**$ 4,774,800**	**$ 6,419,700**	**$ 6,500,500**

The City normal cost for 2018 and 2019 includes the assumed annual pension increases of 0.75% (over and above the 1.5% accounted for in the going concern liabilities) as at January 1, 2018 and January 1, 2019.

Development of Maximum Deductible Company Contribution

The table below presents the development of the maximum deductible company contribution for each of the plan years covered by this report.

The maximum deductible company contribution presented in the table below for a given plan year is calculated assuming that the City makes the maximum deductible company contribution in the first plan year covered by this report.

	Jan 1, 2017 to Dec 31, 2017	Jan 1, 2018 to Dec 31, 2018	Jan 1, 2019 to Dec 31, 2019
Company normal cost	$ -	$ -	$ -
Greater of the unfunded liability and the hypothetical wind up deficiency	125,706,300[1]	-	-
Required application of excess surplus	-	-	-
Maximum Deductible Company Contribution	**$ 125,706,300**	**$ -**	**$ -**

If the City wishes to make the maximum deductible company contribution, it is advisable to contact the Plan's actuary before making such contribution to ensure that the contribution will be permissible and deductible and that any regulatory requirements are considered.

[1] Includes the full cost of plan indexing so we are ignoring the normal cost funding of the short term indexing

Section 6: Actuarial Certificate

Actuarial Opinion, Advice and Certification for The Hamilton Street Railway Company Pension Plan (1994)

Canada Revenue Agency Registration Number: 0253344
Provincial Registration Number: 0253344

Opinion

This actuarial certification forms an integral part of the actuarial valuation report for the Plan as at January 1, 2017. I confirm that I have prepared an actuarial valuation of the Plan as at January 1, 2017 for the purposes outlined in the Introduction section to this report and consequently:

My advice on funding is the following:

- The City should contribute the amounts within the range of minimum and maximum contribution amounts as outlined in Section 5 of this report, in accordance with legislative requirements.
- The next actuarial valuation for the purpose of developing funding requirements should be performed no later than as at January 1, 2020.

I hereby certify that, in my opinion:

- The contribution range as outlined in this report is expected to be sufficient to satisfy the Plan's funding requirements.
- The company contribution range outlined in this report qualifies as eligible contributions under Section 147.2(2) of the *Income Tax Act.*
- The pre-1990 maximum pension restrictions in Subsection 8504(6) of the Regulations to the *Income Tax Act* do not apply to any members of the Plan
- For the purposes of the valuation:
  - The data on which this valuation is based are sufficient and reliable;
  - The assumptions used are appropriate; and
  - The actuarial cost methods and the asset valuation methods used are appropriate.
- This report and its associated work have been prepared, and my opinion given, in accordance with accepted actuarial practice in Canada and in compliance with the requirements outlined in subparagraphs 147.2(2)(a)(iii) and (iv) of the *Income Tax Act*.

- Notwithstanding the above certifications, emerging experience differing from the assumptions will result in gains or losses that will be revealed in subsequent valuations.

Mark Pearson, FCIA, FSA
Senior Consultant

Aon
225 King Street West, Suite 1600
Toronto, Ontario M5V 3M2

October 2017

Appendix A: Assets

Asset Data

The Plan’s assets are held in a master trust arrangement with RBC Investor Services Trust and are managed by a number of different investment managers. This type of arrangement governs only the investment of the assets deposited into the trust fund and in no way “guarantees” the benefits provided under the Plan or the costs of providing such benefits. The asset information presented in this report is based on the financial statements of the pension fund prepared by KPMG LLP.

Tests of the sufficiency and reliability of the asset data were performed and the results were satisfactory. The tests included:

- A reconciliation of actual cash flow with expected cash flow from the previous actuarial report; and
- A reconciliation of any anticipated benefit payments (for retirees, terminated or deceased employees) against the financial statements of the pension fund for confirmation of payments.

Adjusted Market Value of Assets

The following is a summary of the composition of the Plan's assets by asset type as reported in the Plan’s audited financial statements as at January 1, 2017. For comparison purposes, the composition at the previous valuation date of January 1, 2014 is also shown.

	January 1, 2017		January 1, 2014	
	$	**%**	**$**	**%**
Cash and equivalent	$ 1,781,661	1.0%	$ 2,125,148	1.2%
Canadian fixed income	83,582,168	43.2%	56,148,770	32.2%
Canadian equities	60,066,127	31.0%	59,587,240	34.2%
Foreign equities	48,061,258	24.8%	56,532,456	32.4%
Total Invested Assets	**$ 193,491,214**	**100.0%**	**$ 174,393,614**	**100.0%**

Target Asset Mix

The target asset mix of the Plan is contained in the Plan's Statement of Investment Policies and Procedures, dated September 2016. The Plan is currently on a glide path based on the funded ratio on a wind-up basis. As the funded ratio increases, the target mix changes in increments with an increase to fixed income and a corresponding decrease to return seeking equities. The below is the current target asset mix based on the wind-up results:

	Target
Fixed income	40.0%
Canadian equities	30.0%
Foreign equities	30.0%
Cash	0.0%
	100.0%

Reconciliation of Changes in Adjusted Market Value of Assets

The table below reconciles changes in the adjusted market value of assets between January 1, 2014 and January 1, 2017.

	Jan 1, 2014 to Dec 31, 2014	Jan 1, 2015 to Dec 31, 2015	Jan 1, 2016 to Dec 31, 2016
Adjusted Market Value of Assets, Beginning of Plan Year	**$ 174,393,614**	**$ 185,422,911**	**$ 183,944,432**
Contributions During Plan Year			
Employee contributions	$ 3,462	$ -	$ -
Employer normal cost	-	-	-
Employer special payments	1,388,400	5,020,296	4,874,148
Total	**$ 1,391,862**	**$ 5,020,296**	**$ 4,874,148**
Benefit Payments During Plan Year			
Non-retired members[1]	$ (482,801)	$ (477,292)	$ (68,125)
Retired members	(9,978,808)	(10,226,568)	(10,495,534)
Total	**$ (10,461,609)**	**$ (10,703,860)**	**$ (10,563,659)**
Transfers During Plan Year			
Into plan	$ -	$ -	$ -
Out of plan	(270,538)	(109,751)	(717,511)
Total	**$ (270,538)**	**$ (109,751)**	**$ (717,511)**
Fees/Expenses			
Investment fees/expenses	$ (639,563)	$ (525,954)	$ (556,832)
Non-investment fees/expenses	(250,299)	(197,111)	(207,291)
Total	**$ (889,862)**	**$ (723,065)**	**$ (764,123)**
Investment Income	**$ 21,259,444**	**$ 5,037,901**	**$ 16,717,927**
Adjusted Market Value of Assets, End of Plan Year	**$ 185,422,911**	**$ 183,944,432**	**$ 193,491,214**
Rate of return, net of fees/expenses	12.0%	2.4%	8.8%

Development of Actuarial Value of Assets

The actuarial value of assets is equal to the adjusted market value of assets.

[1] Includes members who have terminated employment or died

Appendix B: Membership Data

Source of Data

This valuation was based on member data provided by the Company as of January 1, 2017. Tests of the sufficiency and reliability of the member data were performed and the results were satisfactory. The tests included:

- A reconciliation of membership status against the membership status at the last valuation. This test was performed to ensure that all members were accounted for. A summary of this reconciliation follows on the next page;
- A reconciliation of birth, hire, and participation dates against the corresponding dates provided for the last valuation to ensure consistency of data;
- A reconciliation of credited service against the corresponding amount provided for the last valuation to ensure that no member accrued any credited service from January 1, 2014;
- A reconciliation of pensionable earnings against the corresponding amounts provided for the last valuation to identify any unusual increases or decreases;
- A reconciliation of accrued benefits against the corresponding amounts provided for the last valuation to identify any unusual benefit accruals;
- A reconciliation of any stated benefit payments in 2014, 2015 and 2016 (for retired, terminated or deceased employees) against the financial statements of the pension fund for confirmation of the payments; and
- A reconciliation of inactive member benefit amounts against the corresponding amounts provided for the last valuation to ensure consistency of data.

A copy of the administrator certification certifying the accuracy and completeness of the member data (and the Plan provisions summarized in this report) is included in Appendix G of this report.

Membership Summary

The table below reconciles the number of members as of January 1, 2017 with the number of members as of January 1, 2014 and the changes due to experience in the period.

	Active	Deferred Vested	Retirees	Total
As at January 1, 2014	**448**	**28**	**570**	**1,046**
New members	0	0	0	0
Paid out	0	(4)	0	(4)
Terminations	(2)	2	0	0
Deaths	(3)	(1)	(59)	(63)
Retired	(54)	0	54	0
New spouses	(1)	0	34	33
Transferred	0	0	0	0
Data corrections	0	1	0	1
As at January 1, 2017	**388**	**26**	**599**	**1,013**

Active and Disabled Members

	January 1, 2017	January 1, 2014
Number	388	448
Average age	52.8	51.3
Average pensionable service	10.5	11.9
Average earnings	$ 66,849	$ 63,296
Proportion female	24.2%	22.8%

Deferred Pensions

	January 1, 2017	January 1, 2014
Number	26	28
Average age	54.2	50.4
Average deferred pension	$ 3,714[1]	$ 5,064
Proportion female	42.3%	42.9%

Retired Members and Beneficiaries

	January 1, 2017	January 1, 2014
Number	599	570
Average age	75.5	74.4
Average annual lifetime pension	$ 17,319	$ 16,490
Average annual bridge pension	$ 535	$ 793
Proportion female	31.6%	29.3%

[1] The average deferred pension excludes one member who is only entitled to a refund of their contributions with interest.

Active/Disabled Membership Distribution

The following table provides a detailed summary of the active/disabled membership at the valuation date by years of credited service and by age group. For privacy reasons, average pensionable earnings is not shown for groups with 2 or less members.

Age	< 5	5–10	10–15	15–20	20–25	25–30	>=30	Total
<35	3							3
	$ 61,532							$ 61,532
35–40	16	2						18
	$ 66,556	*						$ 67,067
40–45	23	19						42
	$ 64,792	$ 66,421						$ 65,529
45–50	28	27	3	2				60
	$ 66,993	$ 65,844	$ 80,032	*				$ 67,039
50–55	38	27	4	20	18			107
	$ 66,262	$ 66,056	$ 70,462	$ 65,865	$ 72,398			$ 67,325
55–60	16	21	6	23	21	2		89
	$ 63,704	$ 66,123	$ 65,050	$ 68,254	$ 69,701	*		$ 66,940
60–65	8	14	5	9	9	8		53
	$ 63,851	$ 63,161	$ 64,046	$ 76,143	$ 63,301	$ 65,959		$ 65,999
>=65	1	2	1	1	4	4	3	16
	*	*	*	*	$ 73,051	$ 75,943	$ 64,334	$ 69,470
Total								
Count	133	112	19	55	52	14	3	388
Average Salary	$ 65,531	$ 65,778	$ 68,942	$ 68,462	$ 69,784	$ 68,389	$ 64,334	$ 66,849

* Omitted for privacy reasons

Deferred Vested/Retired Membership Distribution

The following table provides a detailed summary of the deferred vested/retired membership at the valuation date by age group.

Age	Deferred Vested Members	Retired Members and Beneficiaries
< 50	6	
	$ 2,105	
50–55	8	
	$ 2,668	
55–60	8	17
	$ 5,071	$ 24,327
60–65	2	47
	$ *	$ 22,293
65–70		125
		$ 22,579
70–75	2	121
	$ *	$ 18,731
75–80		95
		$ 15,588
>=80		194
		$ 12,076
Total		
Count	26	599
Average lifetime pension	$ 3,714[1]	$ 17,319

* Omitted for privacy reasons

[1] The average deferred pension excludes one member who is only entitled to a refund of their contributions with interest.

Appendix C: Going Concern Assumptions and Methods

Assumptions and Methods

A member's entitlements under a pension plan are generally funded during the period over which service is accrued by the member. The cost of each member's benefits is allocated in some fashion over the member's service. An actuarial valuation provides an assessment of the extent to which allocations relating to periods prior to a valuation date (often referred to as the actuarial liabilities) are covered by the plan's assets.

The going concern valuation provides an assessment of a pension plan on the premise that the plan continues on into the future indefinitely based on assumptions in respect of future events upon which a plan's benefits are contingent and methods that effectively determine the way in which a plan's costs will be allocated over the members' service. The true cost of a plan, however, will emerge only as experience develops, investment earnings are received, and benefit payments are made.

This appendix summarizes the going concern assumptions and methods that have been used for the going concern valuation of the Plan at the valuation date. The going concern assumptions and methods have been chosen to reflect our understanding of the Plan's funding objectives with due respect to accepted actuarial practice and regulatory constraints. For purposes of this valuation, the going concern methods and assumptions were reviewed and changes as indicated were made.

The actuarial assumptions and methods used in the current and previous valuations are summarized below and described on the following pages.

	January 1, 2017	January 1, 2014
Economic Assumptions		
Discount rate	4.50% per year	5.75% per year
Inflation rate	2.25% per year	Same
Increases in pensionable earnings	3.25% per year	Same
Increases in year's maximum pensionable earnings ("YMPE")	2.75% per year	Same
Increases in maximum pension limit	$2,914.44 in 2017; then 2.75% per year	$2,770.00 in 2014; then 2.75% per year
Post-retirement indexing rate	1.50% per year	Same
All expenses	Taken into account in the discount rate assumption	Same
Margin for adverse deviation	Included above	Same
Demographic Assumptions		
Mortality table	2014 Canadian Pensioners Mortality Table – Scale B (110% of Public)	Same
Retirement rates	50% of members retire at the earliest unreduced retirement age and 50% at age 62.	Same
Termination rates	Not relevant	Same
Disability rates	Not relevant	Same
Proportion married		
Non-retired proportion with spouse	85% with opposite-sex spouse	Same
Non-retired spousal age differential	Males three years older	Same
Retired members	Actual marital status and ages are used	Same
Margin for adverse deviation	Included above	Same
Methods		
Actuarial cost method	Projected unit credit	Same
Asset valuation method	Market value of assets adjusted to reflect contributions, benefit payments, transfers and fees/expenses in transit as of the valuation date	Same

Justification of Actuarial Assumptions and Methods

Margins for Adverse Deviations

Margins for conservatism or provisions for adverse deviation have been built into the going concern assumptions where appropriate.

The margins have been chosen so as to balance the need for financial security for existing Plan members against overly conservative contribution requirements that potentially result in intergenerational inequity among members and unnecessary financial strain on the Plan sponsor.

The actuary has discussed the Plan's experience with the Company and compared it to the expected experience. This review indicates that there is a need for use of margins for adverse deviations. The margins for adverse deviations incorporated in the assumptions reflect this review and the Company's desire to maintain safety cushions. The actuary has discussed with the Company the implications of incorporating margins for adverse deviations and the Company is fully cognizant and supports incorporating margins for adverse deviations.

A margin for adverse deviations of 0.30% has been reflected in the interest rate assumption.

Economic Assumptions

Discount Rate

The overall expected return (“best-estimate”) was developed using best-estimate returns for each major asset class in which the pension fund is invested. A Monte Carlo simulation is performed where the portfolio returns are projected assuming annual rebalancing. Expected plan cash flows are projected for a maximum of 30 years reflecting the plan’s time horizon and discounted using the simulated returns. The internal rate of return is then calculated for each scenario and the average is used to develop an overall best-estimate rate of return for the entire pension fund. Gains from rebalancing and diversification are implicit to this return.

In determining the expected return, we have taken into account the current target asset mix of 60% equities / 40% fixed income (including all details of asset categories) as well as the City’s policy of intending to increase the investment in bonds and decrease the investment in equities as the funded position of the plan improves. Based on an estimated projection of the financial position of the plan, we have assumed that the plan’s investment will be 58% equities / 42% fixed income in three years and 54% equities / 46% fixed income in seven years and have reflected this projected change in asset mix in the expected return.

The above determined rate of return has been established based on the City’s investment policy and its funding policy (whether formal or informal) and objectives. There may be some barriers to achieving this return such as inflation higher than expected, asset returns lower than expected, and assets and liabilities that are mismatched. We have derived a going concern discount rate which reflects the City’s investment policy combined with a margin for adverse deviation so as to account for the variables mentioned above. The following table lays out the adjustments that have been made to the overall expected rate of return in order to arrive at our going concern discount rate assumption:

Development of Discount Rate

Overall expected return				5.20%
Non-investment expenses				(0.20)%
Investment expenses				
Passive	(1)	(0.07)%		
Actively managed	(2)	(0.20)%		
			(1)+(2)	(0.27)%
Additional returns due to active management				0.20%
Margin for adverse deviations				(0.30)%
Unrounded Discount Rate				**4.63%**
Rounded Discount Rate				**4.50%**

Inflation Rate

The inflation rate is assumed to be 2.25% per year. This reflects our best estimate of future inflation considering current economic and financial market conditions.

Increases in Pensionable Earnings

The assumption for increases in pensionable earnings reflects the assumed rate of inflation, plus allowances for the effect of productivity growth and individual merit.

Increases in YMPE

As the benefits paid to a member from the Plan are dependent on the future YMPE, it is necessary to make an assumption regarding the future increases in the YMPE.

The assumed increase in the YMPE reflects the assumed rate of inflation plus the productivity increase assumption.

Increases in the Maximum Pension Limit

Pensions are limited to the maximum limits under the *Income Tax Act*. The *Income Tax Act* specifies both a dollar limit, and in addition pensions cannot exceed 2% of indexed highest average compensation per year of credited service. The assumed increase in the dollar limit reflects the assumed rate of inflation plus the productivity increase assumption.

Interest on Member Contributions

Interest is credited on member contributions with the rate credited by chartered banks on five-year personal fixed term deposits. The assumption for interest on member contributions reflects our expected increase in these rates, and is consistent with historical rates.

Expenses

Since the discount rate has been established net of all/investment expenses, no explicit assumption is required for all/investment expenses.

Demographic Assumptions

Mortality

During 2014, the CIA completed a study of Canadian pensioner mortality levels and trends. The 2014 study published mortality rates split by sector and included Public, Private and Combined tables, as well as possible pension size adjustment factors. A generational projection scale, CPM-B, was also developed to allow for improvements in mortality after 2014. The continued use of this mortality table and projection scale are considered reasonable.

We have adjusted the base rates of the table by 110% to account for the size of the pensions members are receiving.

Retirement

Retirement rates are typically developed taking into account the past experience of the Plan. Accordingly, the rates of retirement have been developed as our expectation of the best-estimate rates of retirement based on the Plan provisions and our experience with other similar plans.

Termination of Employment

No allowance has been made for termination of employment prior to retirement on the basis that the impact of including such an assumption would not have a material impact on the valuation results.

Proportion of Members with Spouses and Spousal Age Differential

These assumptions are relevant to the valuation of benefits since there is a subsidized joint and survivor benefit available for members with a spouse. The proportion of members who will have a spouse is based on broad population statistics. The spousal age difference was based on broad population statistics.

Other

Actuarial Cost Method

An actuarial cost method is a technique used to allocate in a systematic and consistent manner the expected cost of a pension plan over the years of service during which Plan members earn benefits under the Plan. By funding the cost of a pension plan in an orderly and rational manner, the security of benefits provided under the terms of the Plan in respect of service that has already been rendered is significantly enhanced.

The projected unit credit actuarial cost method has been used for this valuation. Under this method, the actuarial present value of benefits in respect of service prior to the valuation date, but based on pensionable earnings projected to retirement, is compared with the actuarial asset value, revealing either a surplus or an unfunded actuarial liability.

With respect to service after the valuation date, the expected value of benefits for service in the year following the valuation date (i.e., the normal cost) net of any required employee contributions is expressed as a percentage of the expected value of participating payroll for that year. The employer normal cost contributions are determined each year by applying this percentage to the actual participating payroll for the year.

When calculating the actuarial present value of benefits at the valuation date, the present value of all retirement, withdrawal and preretirement death benefits are included. For each member, the retirement, withdrawal and preretirement death benefits for a particular period of service are first projected each year into the future taking into account future vesting, early retirement entitlements and minimum pension/value entitlements. These projected benefits for each future year are then capitalized, multiplied by the probability of the member leaving the Plan in that year and discounted with interest and survivorship to the valuation date. The actuarial present value of benefits for the particular period of service is then determined by summing the present values of these projected benefits.

The pattern of future contributions necessary to pre fund future benefit accruals for any one particular individual will increase gradually as a percentage of their pensionable earnings as the individual approaches retirement. For a stable population (i.e., one where the demographics of the group remain constant from year to year), the normal cost will remain relatively level as a percentage of payroll. The projected unit credit actuarial cost method therefore allocates contributions among different periods in an orderly and rational manner for a stable population group.

In the event of future adverse experience, contributions in addition to the normal cost calculated under the projected unit credit actuarial cost method may be required to ensure that the Plan's assets are adequate to provide the benefits. Conversely, favourable experience may generate surplus which may serve to reduce future contribution requirements.

Asset Valuation Method

Market value, adjusted by in-transit cash flows was used as the actuarial value of assets for this valuation. Asset-smoothing techniques are often used to reduce volatility in the City's contribution requirements. However, since this Plan's contributions are primarily being driven by the solvency valuation, we deemed it unnecessary to use an asset-smoothing technique for the going concern valuation.

Appendix D: Solvency and Hypothetical Wind Up Assumptions and Methods

Valuation Assumptions

	January 1, 2017	January 1, 2014
Economic Assumptions		
Discount rate for Solvency		
Transfer value basis — Active, disabled, suspended and deferred members not retirement eligible	2.30% per year for 10 years; 3.70% per year thereafter	3.10% per year for 10 years; 4.60% per year thereafter
Annuity purchase basis — All retired members, survivors and beneficiaries	3.08% per year	3.82% per year
Duration used to determine annuity purchase basis	10.63	9.70
Discount rate for Hypothetical Wind Up		
Transfer value basis — Active, disabled, suspended and deferred members not retirement eligible	1.30% per year for 10 years; 1.60% per year thereafter	1.70% per year for 10 years; 2.30% per year thereafter
Annuity purchase basis — All retired members, survivors and beneficiaries	-0.09% per year	0.15% per year
Income Tax Act dollar limit	$2,914.44 per year	$2,770.00 per year
Blended rate used to determine solvency special payments	3.00% per year	3.53% per year

	January 1, 2017	January 1, 2014
Demographic Assumptions		
Mortality table	CPM2014 with generational improvements using Scale CPM-B[1] (sex-distinct rates)	1994 Uninsured Pensioner Mortality Table with fully generational projection Scale AA (sex-distinct rates)
Withdrawal rates	Not Applicable	Same
Retirement age	Age that produces the highest lump-sum value	Same
Termination of employment	Terminate with full vesting	Same
Marital status		
Non-retired spousal proportion	85% with spouses	Same
Non-retired spousal age differential	Males three years older than female spouses	Same
Retired members	Actual marital status and ages are used	Same
Other		
Wind up expenses	$200,000	Same
Actuarial cost method	Unit credit	Same
Asset valuation method	Market value of assets adjusted to reflect contributions, benefit payments, transfers and fees/expenses in transit as of the valuation date	Same
Incremental Cost		
The assumptions for the expected benefit payments and decrement probabilities, service accruals, and projected changes in benefits and/or pensionable earnings	Same as going concern	Same

[1] No preretirement mortality was applied

Based on the CIA's Guidance and information such as pension legislation, Plan provisions and Plan experience, we have made the following assumptions regarding how the Plan's benefits would be settled on Plan wind up:

	Percent of Liability Assumed to be Settled By Purchase of Annuities	**Percent of Liability Assumed to be Settled By Lump-Sum Transfer**
Active Members		
Not retirement eligible	0%	100%
Retirement eligible	100%	0%
Deferred Vested Members		
Not retirement eligible	0%	100%
Retirement eligible	100%	0%
Retired Members and Beneficiaries	100%	0%

Postulated Scenario

The postulated scenario is the assumption of immediate termination of employment for the active group at the valuation date. Therefore, no allowance for future salary increases or demographic experience are reflected.

Benefits Valued

	Solvency Valuation	**Hypothetical Wind Up Valuation**
Vesting	We have treated all accrued benefits as vested on Plan wind up.	We have treated all accrued benefits as vested on Plan wind up.
Grow-in Benefits	Grow-in to early retirement and other benefits were included	Grow-in to early retirement and other benefits were included
Exclusions	Post-retirement indexing was excluded from the valuation	No Plan benefits were excluded from the valuation
Post-valuation Date Benefit Increases	None were assumed	None were assumed
Indexing	Excluded from the valuation	Included from the valuation

Justification for Valuation Assumptions

The development of the discount rates is shown below.

Solvency lump-sum discount rate for 10 years	= V122542[1] + 90 bps = 1.43% + 0.90% **= 2.33% (rounded to 2.30%) per year**
Solvency lump-sum discount rate thereafter	= V122544[1] + 0.5 x (V122544[1] – V122542[1]) + 90 bps = 2.34% + 0.5 x (2.34% – 1.43%) + 0.90% **= 3.69% (rounded to 3.70%) per year**
Solvency annuity purchase discount rate	= V39062 + Duration Adjustment = 2.21% + 0.87% **= 3.08% per year**

We have set the aforementioned assumptions based on guidance prepared by the CIA Committee on Pension Plan Financial Reporting (“PPFRC”) in the Educational Note Assumptions for Hypothetical Wind Up and Solvency Valuations with Effective Dates Between December 31, 2016 and December 30, 2017 (“CIA Guidance”) released on March 1, 2017

For benefit entitlements that are expected to be settled by lump-sum transfer, we based the assumptions on Section 3500 (Pension Commuted Values) of the CIA Standards of Practice, using rates corresponding to a valuation date of January 1, 2017.

For benefit entitlements that are expected to be settled by purchase of annuities, we based the assumptions on information compiled by the PPFRC from insurance companies active in the group annuity market as described in the educational note.

Mortality Table

The derivation of the discount rate above is in conjunction with CPM2014 in accordance with the CIA Guidance

Preretirement Mortality

We have made no allowance for preretirement mortality. The impact of including such an assumption would not have a material impact on the valuation, since the value of the death benefit is approximately equal to the value of the accrued pension.

Pensionable Earnings

To estimate active and disabled members’ best average earnings, we have used actual historical member earnings.

[1] CANSIM Series (annualized)

Assumptions Not Needed

The following are not relevant to the solvency or hypothetical wind up valuation:

- Increases in pensionable earnings;
- Termination of employment rates;
- Increases in CPP and OAS benefits;
- Increases in *Income Tax Act* maximum pension limit; and
- Disability rates.

Estimated Wind Up Expenses

Plan wind up expenses would normally include such items as fees related to preparation of the actuarial wind up report, fees imposed by a pension supervisory authority, legal fees, administration, custodial and investment management expenses. We have assumed these fees would be $200,000.

Calculation of Special Solvency Payments

To calculate the special payments necessary to liquidate the Solvency deficiency we used a weighted average of the unsmoothed discount rates based on the relative proportions of benefit entitlements that are expected to be settled by purchase of annuities and lump-sum transfer.

Unisex Assumption

The liabilities are valued on a sex-distinct basis. The determination of the unisex percentage used in the payment of commuted values to non-Quebec members eligible for portability is based on the proportion of non-Quebec active and deferred vested liabilities for males and females. As such, the determination of commuted value liabilities on a sex-distinct basis in the solvency/hypothetical wind-up valuation is appropriate.

Actuarial Cost Methods

Unit credit (accrued benefit) cost method as prescribed.

Asset Valuation Method Considerations

For the purpose of the solvency valuation, assets were valued at market value, adjusted by in-transit cash flows.

Incremental Cost

The incremental cost represents the present value, at the calculation date (time 0), of the expected aggregate change in the liabilities between time 0 and the next calculation date (time t), adjusted upwards for expected benefit payments between time 0 and time t.

An educational note was published in December 2010 by the CIA Committee on PPFRC to provide guidance for actuaries on the calculation of this new information.

The calculation methodology can be summarized as follows:

- The present value at time 0 of expected benefit payments between time 0 and time t, discounted to time 0,

  plus

- Projected liabilities at time t, discounted to time 0, allowing for, if applicable to the pension plan being valued:
  - expected decrements and related changes in membership status between time 0 and time t,
  - accrual of service to time t,
  - expected changes in benefits to time t,
  - a projection of pensionable earnings to time t,

  minus

- The liabilities at time 0.

The projection calculations take into account the following assumptions and additional considerations:

- The assumptions for the expected benefit payments and decrement probabilities, service accruals, and projected changes in benefits and/or pensionable earnings would be consistent with the assumptions used in the pension plan’s going concern valuation.
- The assumptions used to calculate the projected liability at time t are consistent with the assumptions for the liabilities at time 0, assuming that interest rates remain at the levels applicable at time 0, that the select period is reset at time t for interest rate assumptions that are select and ultimate and that the Standards of Practice for the calculation of commuted values and the guidance for estimated annuity purchase costs in effect at time 0 remain in effect at time t.
  - Active and inactive Plan members as of time 0 are considered in calculating the incremental cost.

Appendix E: Summary of Plan Provisions

This funding valuation was based on Plan design information provided by the City as of January 1, 2017. The following is a summary of the main provisions of the Plan.

Effective Date

July 1, 1980 (Prior plans, running continuously, applied before this date).

Eligibility

Prior to January 1, 2009, full time employees must join on completion of six months of continuous service.

Part time employees are eligible to join after two years of service, provided, they have either:

- Earnings of at least 35% of the Canada Pension Plan (CPP) Year's Maximum Pensionable Earnings (YMPE), or
- 700 hours of employment

in each of two consecutive calendar years immediately prior to joining the Pension Plan.

Effective January 1, 2009, the Plan has been closed to new members.

Retirement

Normal Retirement Date

Age 65.

Unreduced Retirement Date

Members may retire with no reduction in accrued pension following attainment of age plus service (including OMERS service) totalling 85 years, but not earlier than age 55.

Early Retirement Date

Members may retire after their 55th birthday. In this case, the pension will be reduced as per the table below:

Age at Retirement	Adjustment Between Age Reached and Initial Date of Unreduced Retirement
Active member	1/2% for each month (up to 60 months) preceding the earlier of the date the member's age reaches 65, or the member's age plus service* reaches 85. Plus 1/3% for each month (greater than 60 but less than 120 months) preceding the earlier of the date the member's age reaches 65, or the member's age plus service* reaches 85.
Member entitled to a deferred pension	Actuarial equivalent of the deferred pension payable at age 65

* including OMERS service

Credited Pension

Normal Retirement Pension

Members receive a pension equal to 1.5% of average pensionable earnings up to the average Year's Maximum Pensionable Earnings (YMPE) as established under the Canada Pension Plan, plus 2% of the excess, multiplied by years of credited service. The “average pensionable earnings” are defined as the average of best five years’ earnings. The average YMPE is the average of the YMPE for the last thirty-six months of the Plan membership.

In the event that pensions accrued under the prior plan exceed the pension accrued under this Plan for service prior to July 1, 1980, then the pension is increased accordingly.

Credited service includes an additional six months of past service for all active members as at January 1, 2009, subject to satisfying certain employment continuation requirements.

Active members accrue no credited service under this Plan with respect to service on and after January 1, 2009.

Bridge Benefit

A bridge benefit is payable on early retirement in the amount of $18.00 per month per year of employment service up to January 1, 2009 to a maximum of 30 years of employment service, reduced by the early retirement reduction as described above. The bridge benefit stops at age 65 or death, if earlier, and is fully indexed.

Normal Form of Pension

The normal form of Pension Benefit is payable for life with a five year guarantee. A 50% continuation is provided to a surviving spouse. The spouse is defined to be the spouse as of the date of death or retirement subject to only one spouse having entitlements and the spouse at retirement taking precedence if more than one spouse would otherwise exist. If the age difference between the member and the spouse is greater than five years, the pension is actuarially reduced.

Indexing

Effective January 1, 2009, pension benefits payable following retirement and surviving spouse pensions are to be increased at the same rate provided under OMERS (100% of inflation up to a maximum of 6% each year) for both lifetime and bridge pensions in payment on and after January 1, 2009.

Benefits Paid Following Termination of Employment

The member may elect to receive a cash settlement as specified in the Plan rules, or a deferred pension (subject to provincial legislation regarding locking-in requirements).

For current active members, all pre-1987 entitlements are 100% vested. For members with at least 2 years of membership, all entitlements are 100% vested.

Death Benefits Prior to Retirement

In the event of death in service, a member's beneficiary will receive a return of contributions according to the description in the Plan rules, or a spousal pension equal to 50% of the member's accrued entitlement. The “50% rule” for post 1986 accruals applies.

Death Benefits After Retirement

Optional forms of pension are available on an actuarially equivalent basis to the normal form of pension.

50% Rule (Excess Contributions)

Upon a member's termination of service or death after two years of membership in the Plan, or retirement, the employer must fund at least 50% of the value of any benefits resulting from years of credited service after January 1, 1987.

Contributions

Prior to 2003, a member contributed 7.5% of earnings less contributions which are made to the Canada Pension Plan. However, for calendar years 1999-2002 the employees were not required to contribute because by Plan terms employee contributions cannot occur without equal City contributions. Effective January 1, 2009, members are neither required nor permitted to make contributions to the Plan.

A copy of a letter from the City certifying the accuracy and completeness of the Plan provisions summarized in this report is included in Appendix H of this report.

Appendix F: History of Plan

Predecessor plans were established with effect from July 1, 1980, which succeeded plans originally established in the mid-to-late 1940s. The current Plan dates from January 1, 1994 when two predecessor plans were merged.

Prior to July 1, 1980, pension benefits were provided through group annuity policies with the Prudential Assurance Company Limited. Benefits with respect to service during this period together with these group annuity policies were transferred to this Plan. These annuities were placed on a paid-up basis. Most of the insured benefits were provided through participating annuities; the rest were provided through non-participating annuities. The participating annuities were credited with bonuses as established by Prudential from time to time.

In September 1986, except for pensions in the course of payment and certain deferred vested members, these group annuities were cashed out, with the proceeds being added to the invested assets of the Plan.

At the prior plan's inception, annuity contracts were purchased by the Plan when a member retired. Assets and liabilities in respect of such purchased annuities are excluded from this report. With effect from June 1986, new retirees were paid out of the fund on a monthly basis. For administrative reasons, since January 1988 pension payments are now made by the City of Hamilton (and were formerly made by the Region of Hamilton-Wentworth) subject to reimbursement by the Plan. Such actions are merely flow-through transactions, with no financial consequences whatsoever to the Plan. In fact, such actions save the Plan any costs of cheque issuance, etc., and as such, have a beneficial effect on the Plan.

Early Retirement windows have been effected at several dates under predecessor plans between 1991 and 1993 inclusive.

Effective January 1, 1999 the Plan was amended as follows:

A. The early retirement reduction is equal to

    a. the lesser of

        i. ½ % for each month (up to 60 months) by which age is less than age 65, and
        ii. ½ % for each month (up to 60 months) by which age plus service is less than 85 years,

    plus

    b. the lesser of

        i. ⅓% for each month (in excess of 60 months, but not in excess of 120 months) by which age is less than age 65, and
        ii. ⅓% for each month (in excess of 60 months, but not in excess of 120 months) by which age plus service is less than 85 years.

B. A bridging benefit is payable on early retirement in the amount of $18.00 per month per year of employment service, to a maximum of 30 years of employment service (accrued to December 31, 2008), reduced by the early retirement reduction as described above.

C. Indexing on May 1, 1999, May 1, 2000 and May 1, 2001 will be based on the greater of the current formula or 1% for all pensioners and beneficiaries who are paid from the Plan.

D. During 1999 and 2000 members are not required to contribute. During 2001 members were scheduled to contribute 1% of pensionable earnings with a minimum equal employer contribution. Employer contributions during 1999-2001 will equal member contributions, contingent upon the amounts being within amount required and permitted by applicable authorities. Since Employer contributions cannot occur due to restrictions in the *Income Tax Act,* no employee contributions will occur in 2001, with further review scheduled thereafter.

Effective May 1, 2002 the Plan was amended to provide that indexing on May 1, 2002 will be based on the greater of the current formula or 1% for all pensioners and beneficiaries who are paid from the Plan.

Effective January 1, 2003, the Plan was amended to reflect agreement (as per the current Collective Bargaining Agreement, effective April 1, 1998) which provides that contributions by members and the City shall be equal annually, unless member contributions are constrained by the Income Tax Act.

Effective January 1, 2009, the Plan was amended to provide the following:

- Post-retirement indexation that mirrors the indexation provided under OMERS (100% of inflation up to a maximum of 6% each year);
- No future service accruals;
- Six months additional credited service, subject to certain employment continuation requirements;
- OMERS service used for eligibility for certain benefits;
- An increase in the joint and survivor normal form of pension to 66 2/3% from 50%; conditional upon an actuarial report being filed that discloses a plan surplus. All HSR Plan members who were employees on December 31, 2008 would be entitled to this benefit improvement when it comes into effect if they continue to draw a pension from the plan.

Appendix G: Glossary of Terms

- The **actuarial value of assets** is the asset value used for going concern valuation purposes. Smoothing methods are sometimes used to smooth investment gains and losses over a certain period.
- The **estimated wind up expenses** is an estimate of the administrative and other expenses expected to be charged against the pension fund if the Plan were to terminate on the valuation date.
- The **going concern liabilities** are the actuarial present value of benefits earned in respect of service prior to the valuation date. The actuary may choose to omit indexing liabilities (i.e., "escalated adjustments") from the going concern liabilities as per Section 11(1) of the *Act*. However, if escalated adjustments are omitted from the going concern liabilities, the amount of payment of an escalated adjustment that is made from the pension fund, to the extent that it has not been funded, must be included in the normal cost pursuant to Section 11(2) of the Regulation to the *Act*. The going concern liabilities are calculated using the going concern assumptions and methods summarized in Appendix C of this report.
- The **going concern position** is the difference between the actuarial value of assets and the going concern liabilities. Escalated adjustments may be omitted from the determination of the surplus/(unfunded liability) pursuant to Section 11(3) of the Regulation to the *Act*.
- The **maximum deductible company contribution** refers to an eligible contribution pursuant to Section 147.2(2) of the *Income Tax Act*. Under Subsection 8502(b) of the Regulations to the *Income Tax Act*, each Company contribution made after January 1, 1991 in respect of a defined benefit provision of a registered pension plan must be such eligible contribution.

  In a company's fiscal year, the following contributions are eligible under Section 147.2(2) of the *Income Tax Act*.

  – The company normal cost, eligible under Section 147.2(2) subject to certification by the actuary and approval by the Canada Revenue Agency; plus

  – Special payments eligible under Section 147.2(2) up to the amount of the unfunded liability, the solvency deficiency, or the hypothetical wind up deficiency, whichever is greater, subject to certification by the actuary and approval by the Canada Revenue Agency; less

  – Required application of excess surplus.

  The company normal cost and special payments for this Plan will be deductible under Section 147.2(2) of the *Income Tax Act*, subject to the approval of the Canada Revenue Agency.

  Note that contributions to a plan are still permissible and deductible if there is an excess surplus, providing there is simultaneously a solvency or hypothetical wind up deficiency in the Plan or the contributions are required as minimum contributions under provincial or federal *Act* legislation, pursuant to Subsections 8516(2) and (3) of the Regulations to the Income *Tax Act*.

One restriction under the *Income Tax Act* is that if there is an excess surplus, and a solvency or hypothetical wind up deficiency, the maximum deductible contribution is restricted to the full amount of the deficiency without allowance for interest or any other contributions such as company normal cost and/or transfer deficiency payments.

In order to be deductible in a given fiscal year, company contributions must be made not later than 120 days after the end of the fiscal year.

- The **minimum required company contribution** for each plan year is equal to:
  - The company normal cost; plus
  - Special payments toward amortizing any unfunded liability over 15 years beginning no later than 12 months from the date on which the unfunded liability was established; plus
  - Special payments toward amortizing any solvency deficiency over five years beginning no later than 12 months (24 months if the company elected temporary funding relief option 8) from the date on which the solvency deficiency was established (this period of years may be longer if the company has elected temporary funding relief options 3, 5 and/or 7); less
  - Required application of excess surplus; less
  - Permitted application of surplus; less
  - Permitted application of PYCB.

  In order to satisfy the requirements of the *Act* and its Regulations, contributions to the fund must be made in accordance with the following rules:
  - Required member contributions (if any) must be remitted to the pension fund within 30 days following the month in which the contributions were received from the member or deducted from his or her remuneration.
  - Company normal cost contributions must be remitted to the pension fund within 30 days after the end of the month for which the contributions are payable.
  - Special payments must be remitted to the pension fund in the month for which they are payable.
- The **prior year credit balance** is
  - The PYCB stated in the last report in respect of the Plan under the Regulation; plus
  - The total amount of contributions made to the Plan by the Company after the valuation date of the last report in respect of the Plan and before the valuation date for the report being prepared; less
  - The total minimum amount of contributions required to have been made after the valuation date of the last report in respect of the Plan and before the valuation date for the report being prepared, if the contributions had been calculated without reference to any PYCB.

  The Company may choose to set the PYCB between nil and the amount as calculated above, but may not recapture the amount forfeited at any time.
- **Solvency/Hypothetical wind up assets** are the market value of pension fund assets adjusted to reflect contributions, benefit payments, transfers and fees/expenses in-transit at the valuation date.

- The **solvency asset adjustment** is an adjustment that may be made to the solvency assets to reflect:
  - The impact of using an averaging method that stabilizes short-term fluctuations in the market value of the Plan's assets calculated over a period of not more than five years; plus
  - The present value of any remaining special payments required to liquidate any unfunded liability (for service not previously recognized for benefit determination purposes) established after December 31, 1987; plus
  - The present value of any remaining special payments other than those above that are scheduled for payment within six years after the valuation date. This period of years may be longer if the Company has elected temporary funding relief options 3, 5, 7 and/or 8.
- The **solvency liabilities** are the actuarial present value of benefits earned in respect of service prior to the valuation date determined as if the Plan were wound up on the valuation date and taking into account Section 74 of the *Act* (i.e., grow-in). In calculating the solvency liabilities, which includes plant closure benefits or permanent layoff benefits that would be immediately payable if the Plan sponsor's business was discontinued on the valuation date, the *Act* and its Regulations permit the exclusion of the following benefits:
  - Any escalated adjustments;
  - "Excluded plant closure benefits" that the City elected on November 26, 1992 to exclude;
  - "Excluded permanent layoff benefits" that the City elected on November 26, 1992 to exclude;
  - Special allowances other than those where the member has met all age and service eligibility requirements;
  - Consent benefits other than those where the member has met all eligibility requirements except the consent of the employer, or in the case of a jointly sponsored pension plan, the consent of the employer or the administrator;
  - Prospective benefit increases;
  - Potential early retirement window benefit values; and
  - Pension and ancillary benefits payable under a qualifying annuity contract.

  The solvency liabilities are determined using benefit entitlements on the assumption that the Plan has neither a surplus nor a deficit. The solvency liabilities are calculated using the solvency valuation assumptions summarized in Appendix D of this report.
- The **solvency liability adjustment** is an adjustment that may be made to the solvency liabilities to reflect the impact of using a solvency valuation discount rate for discounting the liability that is the average of market discount rates calculated over the same period of time as that used in the calculation of the solvency asset adjustment.
- The **solvency position** is the difference between the solvency assets (net of estimated wind up expenses) and the solvency liabilities.
- The **solvency ratio** compares the solvency assets to the solvency liabilities for purposes of Subsections 14(2) and (3) of the Regulations of the *Act* to determine the latest effective date of the next required valuation.
- The **solvency surplus/(deficiency)** is the solvency position, increased by the solvency asset adjustment and the solvency liability adjustment, then decreased by the PYCB.

- The **special payments** are payments required to liquidate the unfunded liability and/or solvency deficiency:
  - The going concern special payments are payments required to liquidate the unfunded liability, with interest at the going concern valuation discount rate, by equal monthly instalments over a period of 15 years beginning no later than 12 months from the valuation date of the report in which the going concern unfunded liability was determined.
  - The solvency special payments are payments required to liquidate the solvency deficiency, with interest at the solvency valuation discount rate, by equal monthly instalments over a period of five years beginning no later than 12 months (24 months if the company elected temporary funding relief option 8) from the valuation date of the report in which the solvency deficiency was determined. This period of years may be longer if the company has elected temporary funding relief options 3, 5 and/or 7.
- The **surplus/(unfunded liability)** is the difference between the actuarial value of assets and the sum of the going concern liabilities and the PYCB.
- The **total normal cost** is the actuarial present value of benefits expected to be earned in respect of service for each year starting on the valuation date. Required member contributions (if any) are deducted from the total normal cost to determine the company normal cost. The total normal cost is calculated using the going concern valuation assumptions and methods summarized in Appendix C of this report.
- The **transfer ratio** compares the solvency assets, minus the lesser of the PYCB and the required company contributions until the next required valuation (before application of the PYCB), to the solvency liabilities plus the liability of any excluded benefits (except for pension benefits and ancillary benefits payable under a qualifying annuity contract). If the transfer ratio is less than 1.00, lump-sum transfers from the pension fund under Section 42 of the *Act* are limited to the commuted value of the member's pension multiplied by the transfer ratio. The administrator may transfer the entire commuted value if:
  - The administrator is satisfied that an amount equal to the transfer deficiency has been remitted to the pension fund; or
  - The aggregate of transfer deficiencies for all transfers made since the last valuation date does not exceed 5% of the Plan's assets at that time.

  In June 2009, Subsection 19 of the Regulations of the *Act* was amended and Policy T800-402 was released. The Policy imposes additional restrictions for payment of commuted values under certain circumstances.

Appendix H: Administrator Certification

With respect to The Hamilton Street Railway Company Pension Plan (1994), forming part of the actuarial report as at January 1, 2017, I hereby certify that, to the best of my knowledge and belief:

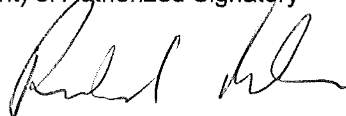
- The asset data provided or made available to the actuary is complete and accurate;
- The membership data and subsequent query answers provided or made available to the actuary are complete and accurate for all persons who are entitled to benefits under the terms of the Plan in respect of service up to the date of the valuation;
- The Plan provisions provided or made available to the actuary are complete and accurate;
- The actuary has been notified of all relevant events subsequent to the valuation measurement date; and
- The terms of engagement contained in Section 1 of this report are accurate and reflect the plan administrator's direction.

Richard Male

Name (print) of Authorized Signatory

Director Finance Services, Taxation & Corporate Controller

Title



Signature

Oct 24, 2017

Date

About Aon Hewitt

Aon Hewitt empowers organizations and individuals to secure a better future through innovative talent, retirement and health solutions. We advise, design and execute a wide range of solutions that enable clients to cultivate talent to drive organizational and personal performance and growth, navigate retirement risk while providing new levels of financial security, and redefine health solutions for greater choice, affordability and wellness. Aon Hewitt is the global leader in human resource solutions, with over 35,000 professionals in 90 countries serving more than 20,000 clients worldwide across 100+ solutions. For more information on Aon Hewitt, please visit aonhewitt.com.

About Aon

Aon plc (NYSE:AON) is a leading global provider of risk management, insurance and reinsurance brokerage, and human resources solutions and outsourcing services. Through its more than 72,000 colleagues worldwide, Aon unites to empower results for clients in over 120 countries via innovative and effective risk and people solutions and through industry-leading global resources and technical expertise. Aon has been named repeatedly as the world's best broker, best insurance intermediary, reinsurance intermediary, captives manager and best employee benefits consulting firm by multiple industry sources. Visit aon.com for more information on Aon and aon.com/manchesterunited to learn about Aon's global and principle partnership with Manchester United.

© 2017 Aon Hewitt Inc. All Rights Reserved.

This document contains confidential information and trade secrets protected by copyrights owned by Aon Hewitt. The document is intended to remain strictly confidential and to be used only for your internal needs and only for the purpose for which it was initially created by Aon Hewitt. No part of this document may be disclosed to any third party or reproduced by any means without the prior written consent of Aon Hewitt.