HEALTH WEALTH CAREER

METROPOLITAN TORONTO POLICE BENEFIT FUND

REPORT ON THE ACTUARIAL VALUATION FOR FUNDING PURPOSES AS AT DECEMBER 31, 2018

APRIL 2019

Financial Services Commission of Ontario Registration Number: 0351585
Canada Revenue Agency Registration Number: 0351585

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To prepare the results in this report, actuarial assumptions are used to model a single scenario from a range of possibilities for each valuation basis. The results based on that single scenario are included in this report. However, the future is uncertain and the plan's actual experience will differ from those assumptions; these differences may be significant or material. Different assumptions or scenarios within the range of possibilities may also be reasonable, and results based on those assumptions would be different. Furthermore, actuarial assumptions may be changed from one valuation to the next because of changes in regulatory and professional requirements, developments in case law, plan experience, changes in expectations about the future, and other factors.

The valuation results shown in this report also illustrate the sensitivity to one of the key actuarial assumptions, the discount rate. We note that the results presented herein rely on many assumptions, all of which are subject to uncertainty, with a broad range of possible outcomes, and the results are sensitive to all the assumptions used in the valuation.

Should the plan be wound up, the going concern funded status and solvency financial position, if different from the wind-up financial position, become irrelevant. The hypothetical wind-up financial position estimates the financial position of the plan assuming it is wound up on the valuation date. Emerging experience will affect the wind-up financial position of the plan assuming it is wound up in the future. In fact, even if the plan were wound up on the valuation date, the financial position would continue to fluctuate until the benefits are fully settled.

Decisions about benefit changes, granting new benefits, investment policy, funding policy, benefit security, and/or benefit-related issues should not be made solely on the basis of this valuation, but only after careful consideration of alternative economic, financial, demographic, and societal factors, including financial scenarios that assume future sustained investment losses.

Funding calculations reflect our understanding of the requirements of the Pension Benefits Act (Ontario), the Income Tax Act, and related regulations that are effective as of the valuation date. Mercer is not a law firm, and the analysis presented in this report is not intended to be a legal opinion. You should consider securing the advice of legal counsel with respect to any legal matters related to this report.

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SUMMARY OF RESULTS

	31.12.2018 $000'S)	31.12.2017 $000'S)
Asset Values		
Market value of assets	$483,715	$521,898
Rate of return during the year (net)	1.09%	4.40%
Going Concern Financial Position		
Actuarial value of assets	$490,964	$515,409
Going concern funding liabilities	420,823	437,821
Provision for adverse deviations	31,562	32,837
Funding excess (shortfall)	$38,579	$44,751
Hypothetical Wind-up Financial Position		
Wind-up assets	$483,471	$521,645
Wind-up liability	456,582	486,899
Wind-up excess (shortfall)	$26,889	$34,746
Transfer Ratio	106%	107%

	31.12.2018 $000'S)	31.12.2017 $000'S)
Solvency Financial Position		
Solvency assets	$483,471	$521,645
Asset smoothing adjustment	(1,931)	(18,727)
Smoothed assets	$481,540	$502,918
Solvency liability	$456,582	$486,899
Liability smoothing adjustment	8,617	6,065
Adjusted solvency liability	$465,199	$492,964
Solvency excess (shortfall)	$16,341	$9,954
Indexation Reserve Account (before upgrade)	$16,341	$9,954
Plan Membership		
Active	0	0
Suspended or disabled	0	0
Retired members in receipt of pensions	965	1,015
Surviving spouses in receipt of pensions	663	674
Total membership	1,628	1,689
Funding Requirements	**2019**	**2018**
Minimum Employer contribution	$0	$0
Maximum Employer contribution	$0	$0

SCHEDULE OF EMPLOYER CONTRIBUTIONS	2019	2020	2021
Current Service Cost	$0	$0	$0
Provision for adverse deviations in respect of the Current Service Cost	0	0	0
Unfunded Liability	0	0	0
Solvency Deficiency	0	0	0
Total	$0	$0	$0

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INTRODUCTION

TRUSTEES, METROPOLITAN TORONTO POLICE BENEFIT FUND

At the request of the Trustees of the Metropolitan Toronto Police Benefit Fund (the "Board"), we have conducted an actuarial valuation of the Metropolitan Toronto Police Benefit Fund (the "Plan"), sponsored by City of Toronto (the "Employer"), as at the valuation date, December 31, 2018. We are pleased to present the results of the valuation.

PUROPSE

The purpose of this valuation is to determine:

- The funded status of the Plan as at December 31, 2018 on going concern, hypothetical wind-up, and solvency bases;
- The minimum required funding contributions from January 1, 2019, in accordance with the *Pension Benefits Act (Ontario)*; and
- The maximum permissible funding contributions from January 1, 2019, in accordance with the *Income Tax Act ("ITA").*

The information contained in this report was prepared for the internal use of the Trustees, the Employer and for filing with the Financial Services Commission of Ontario ("FSCO") and with the Canada Revenue Agency ("CRA"), in connection with our actuarial valuation of the Plan. This report is not intended or suitable for any other purpose.

In accordance with pension benefits legislation, the next actuarial valuation of the Plan will be required as at a date not later than December 31, 2021, or as at the date of an earlier amendment to the Plan.

INDEXATION RESERVE ACCOUNT

Based on the results of this valuation, the Indexation Reserve Account has increased from $9,954,000 at December 31, 2017 to $16,341,000 at December 31, 2018.

If the Board recommends a cost-of-living adjustment (COLA) to pensions in pay of 2.22%, the estimated cost at January 1, 2019 would be $10,043,000 on a going-concern basis and $10,327,000 on a solvency basis. The Indexation Reserve Account of $16,341,000 is sufficient to provide a COLA of 2.22%. If a COLA of 2.22%is provided, the Indexation Reserve Account would reduce by $10,327,000 to $6,014,000.

For comparison, the annual rate of inflation for the period was 2.22% (based on a ratio of the Consumer Price Index determined on a 12-month average to September 2018 over the 12-month average to September 2017).

TERMS OF ENGAGEMENT

In accordance with our terms of engagement with the Trustees, our actuarial valuation of the Plan is based on the following material terms:

- It has been prepared in accordance with applicable pension legislation and actuarial standards of practice in Canada.
- As instructed by the Committee, we have not reflected a margin for adverse deviations in the going concern valuation beyond the provision for adverse deviations prescribed by the Act.
- We have reflected the Trustee's decisions for determining the solvency funding requirements, summarized as follows:
  - The same plan wind-up scenario was hypothesized for both hypothetical wind-up and solvency valuations.
  - No benefits were excluded from the solvency liabilities.
  - The solvency financial position was determined on a four year smoothed basis.

  See the Valuation Results - Solvency section of the report for more information.

EVENTS SINCE THE LAST VALUATION AT DECEMBER 31, 2017

Changes in By-law Provisions

This valuation reflects the provisions of the Plan as at December 31, 2018. The Plan has been amended since the date of the previous valuation to provide an increase to pensions. An increase of 1.85% was granted on pensions, retroactive to January 1, 2018.

The cost to provide this increase was $8,407,000 on a going-concern basis and $8,806,000 on a solvency basis.

There have been no other changes to the By-law provisions since the previous valuation as at December 31, 2017. We are not aware of any pending definitive or virtually definitive amendments

coming into effect during the period covered by this report. A summary of the main By-law provisions in effect on the valuation date is provided in Appendix F.

Pending merger into OMERS

An application has been made to FSCO to merge the Plan into the Ontario Municipal Employees Retirement System (OMERS). Following approval of FSCO, the liabilities of the Plan will be assumed by OMERS. Plan assets determined in accordance with the Pension Transfer Agreement between the City of Toronto and OMERS will be transferred to OMERS following regulatory approval. Any remaining surplus following the transfer of assets and liabilities will be dealt with in accordance with the Surplus Sharing Agreement between the City of Toronto and the Plan members.

Assumptions

We have used the same going concern valuation assumptions and methods as were used for the previous valuation, except for the following:

	CURRENT VALUATION	PREVIOUS VALUATION
Discount rate:	3.70%	3.80%

The impact of the change to the financial assumptions is a loss of $3,320,000.

A summary of the going concern methods and assumptions is provided in Appendix C.

The hypothetical wind-up and solvency assumptions have been updated to reflect market conditions at the valuation date. A summary of the hypothetical wind-up and solvency methods and assumptions is provided in Appendix D.

Regulatory Environment and Actuarial Standards

There have been no changes to the Act or the relevant regulations which impact the funding of the Plan.

SUBSEQUENT EVENTS

After checking with representatives of the Employer, to the best of our knowledge there have been no events subsequent to the valuation date which, in our opinion, would have a material impact on the results of the valuation. Our valuation reflects the financial position of the Plan as of the valuation date and does not take into account any experience after the valuation date.

IMPACT OF CASE LAW

This report has been prepared on the assumption that all claims on the Plan after the valuation date will be in respect of benefits payable to members of the Plan determined in accordance with the Plan terms and that all Plan assets are available to provide for these benefits. It is possible that

court and regulatory decisions and changes in legislation could give rise to additional entitlements to benefits under the Plan and cause the results in this report to change. By way of example, we bring your attention to the following decisions:

- The Ontario Court of Appeal's 2003 decision in *Aegon Canada Inc. and Transamerica Life Canada versus ING Canada Inc.* restricted the use of original plan surplus where two or more pension plans were merged.

- The Supreme Court of Canada's 2004 decision in *Monsanto Canada Inc. versus Superintendent of Financial Services* upheld the requirement, with retroactive effect, to distribute surplus on partial plan wind-up under the *Pension Benefits Act (Ontario).*

We are not aware of any partial plan wind-up having been declared in respect of the Plan where the Monsanto decision may apply. In preparing this actuarial valuation, we have therefore assumed that all the Plan's assets are available to cover the Plan's liabilities presented in this report.

We are not in a position to assess the impact that such decisions or changes could have on the assumption that all plan assets on the valuation date are available to provide for benefits determined in accordance with the Plan terms. If such a claim arises subsequent to the date of this report, the consequences will be dealt with in a subsequent report. We are making no representation as to likelihood of such a claim.

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VALUATION RESULTS – GOING CONCERN

FINANCIAL STATUS ($000'S)

A going concern valuation compares the relationship between the value of Plan assets and the present value of expected future benefit cash flows in respect of accrued service, assuming the Plan will be maintained indefinitely.

The results of the current valuation, compared with those from the previous valuation, are summarized as follows:

	31.12.2018	31.12.2017
Assets		
Market value of assets	$483,715	$521,898
Asset smoothing adjustment	7,249	(6,489)
Smoothed value of assets	$490,964	$515,409
Going concern funding target		
Going concern liabilities:		
• Active and disabled members	$0	$0
• Retired members' pensions	317,954	335,051
• Spouses and other survivor pensions	99,620	101,812
• Beneficiary Reserve[1]	3,249	946
• Reserve for 50% Rule Refunds	0	12
• Subtotal	420,823	437,821
Provision for adverse deviations in respect of going concern liabilities as prescribed by the Act	31,562	32,837
Total	$452,385	$470,658
Funding excess (shortfall)[2]	$ 38,579	$44,751

[1] This reserve is held for pensioners who have passed away and who may have a surviving spouse. The administrator is investigating to determine if the spouses are eligible to receive a benefit.

[2] Funding excess (shortfall) may or may not be equal to the going concern excess (unfunded liability) as described in the Act. Details of the going concern excess (unfunded liability) are provided in Appendix A.

The going concern liabilities at December 31, 2018 do not include a margin for adverse deviations beyond the provision for adverse deviations that are prescribed under the Act.

RECONCILIATION OF FINANCIAL STATUS ($000'S)

Funding excess (shortfall) as at previous valuation		$44,751
Cost of COLA increase effective January 1, 2018		(8,407)
Interest on funding excess (shortfall) at 3.80% per year, after COLA		1,701
Expected funding excess (shortfall)		$38,045
Net experience gains (losses)		
• Investment return	$115	
• Mortality	857	
Total experience gains (losses)	$972	972
Change in assumptions		(3,320)
Change in provision for adverse deviations in respect of the going concern liabilities		2,754
Net impact of other elements of gains and losses		128
Funding excess (shortfall) as at current valuation		$38,579

DISCOUNT RATE SENSITIVITY ($000'S)

The following table summarizes the effect on the going concern funding target shown in this report of using a discount rate which is 1% lower than that used in the valuation. The effect of a change in the discount rate on the provision for adverse deviations is not reflected.

SCENARIO	VALUATION BASIS	REDUCE DISCOUNT RATE BY 1%
Going concern funding liabilities	$420,823	$454,136

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VALUATION RESULTS – HYPOTHETICAL WIND-UP

FINANCIAL POSITION ($000'S)

When conducting a hypothetical wind-up valuation, we determine the relationship between the respective values of the Plan's assets and its liabilities assuming the Plan is wound up and settled on the valuation date, assuming benefits are settled in accordance with the Act and under circumstances producing the maximum wind-up liabilities on the valuation date. More details on such scenario are provided in Appendix D.

The hypothetical wind-up financial position as of the valuation date, compared with that at the previous valuation, is as follows:

	31.12.2018	31.12.2017
Assets		
Market value of assets	$483,715	$521,898
Termination expense provision	(244)	(253)
Wind-up assets	$483,471	$521,645
Present value of accrued benefits for:		
• Active and disabled members	$0	$0
• Retired members' pensions	344,185	372,150
• Spouses and other survivor pensions	108,858	113,685
• Beneficiary Reserve	3,539	1,052
• Reserve for 50% Rule Refunds	0	12
Total wind-up liability	$456,582	$486,899
Wind-up excess (shortfall)	$26,889	$34,746

WIND-UP INCREMENTAL COST TO DECEMBER 31, 2021

The wind-up incremental cost is an estimate of the present value of the projected change in the hypothetical wind-up liabilities from the valuation date until the next scheduled valuation date, adjusted for the benefit payments expected to be made in that period.

The hypothetical wind-up incremental cost determined in this valuation is $16,341,000, being the Indexation Reserve Account ("IRA") as at the valuation date. The wind-up incremental cost is expected to be the cost of the COLA's provided in the next three years from the IRA. The total wind-up incremental cost is based on the estimated cost the increase of 2.22% in 2019 being $10,327,000 and 1.29% in 2020 being $6,014,000. More information on the IRA is provided in Section 8 of this report.

DISCOUNT RATE SENSITIVITY($000'S)

The following table summarizes the effect on the hypothetical wind-up liabilities shown in this report of using a discount rate which is 1% lower than that used in the valuation:

SCENARIO	VALUATION BASIS	REDUCE DISCOUNT RATE BY 1%
Total hypothetical wind-up liability	$456,582	$495,364

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VALUATION RESULTS – SOLVENCY

OVERVIEW

The Act also requires the financial position of the Plan to be determined on a solvency basis. The financial position on a solvency basis is determined in a similar manner to the Hypothetical Wind-up Basis, except for the following:

EXCEPTIONS	REFLECTED IN VALUATION BASED ON THE TERMS OF ENGAGEMENT
The circumstance under which the Plan is assumed to be wound up could differ for the solvency and hypothetical wind-up valuations.	The same circumstances were assumed for the solvency valuation as were assumed for the hypothetical wind-up valuation.
Certain benefits can be excluded from the solvency financial position. These include: (a) any escalated adjustment (e.g. indexing), (b) certain plant closure benefits, (c) certain permanent layoff benefits, (d) special allowances other than funded special allowances, (e) consent benefits other than funded consent benefits, (f) prospective benefit increases, (g) potential early retirement window benefit values, and (h) pension benefits and ancillary benefits payable under a qualifying annuity contract.	No benefits were excluded from the solvency liabilities shown in this valuation. We have not included the allowance for future potential COLA increases that may occur after the valuation date.
The financial position on the solvency basis needs to be adjusted for any Prior Year Credit Balance.	Not applicable.
The solvency financial position can be determined by smoothing assets and the solvency discount rate over a period of up to 5 years.	Solvency assets and liabilities were smoothed over 4 years.
The benefit rate increases coming into effect after the valuation date can be reflected in the solvency valuation.	Not applicable.

FINANCIAL POSITION ($000'S)

The financial position on a solvency basis, compared with the corresponding figures from the previous valuation, is as follows:

	31.12.2018	31.12.2017
Assets		
Market value of assets	$483,715	$521,898
Face value of the letter of credit	N/A	N/A
Termination expense provision	(244)	(253)
Net assets	$483,471	$521,645
Liabilities		
Total hypothetical wind-up liabilities	$456,582	$486,899
Exclude allowance for potential future COLA	N/A	N/A
Difference in circumstances of assumed wind-up	0	0
Value of excluded benefits	0	0
Liabilities on a solvency basis	$ 456,582	$486,899
Surplus (shortfall) on a market value basis	$26,889	$34,746
Liability smoothing adjustment	($8,617)	($6,065)
Asset smoothing adjustment	($1,931)*	($18,727)**
Surplus (shortfall) on a solvency basis	$16,341	$9,954
Transfer ratio	106%	107%

* Averaging method adjustment = 75% of investment losses from 2018, ($6,463,000), plus 50% of investment gains from 2017, ($3,152,000), plus 25% of investment gains from 2016, ($5,242,000).

** Averaging method adjustment = 75% of investment gains from 2017, ($4,729,000), plus 50% of investment gains from 2016, ($10,484,000), plus 25% of investment gains from 2015, ($3,514,000).

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MINIMUM FUNDING REQUIREMENTS

The Act prescribes the minimum contributions that City of Toronto must make to the Plan. The minimum contributions in respect of a defined benefit component of a pension plan are comprised of going concern current service cost, the provision for adverse deviations in respect of the current service cost and special payments to fund any funding shortfall or solvency shortfall that exceeds the level as set out under the Act.

On the basis of the assumptions and methods described in this report, the Plan has a funding excess on a going concern basis inclusive of the provision for adverse deviations, and the transfer ratio is greater than 105%. Under these circumstances, the Act does not require the employer to contribute to the Plan until the available actuarial surplus has been applied towards the employer's current service cost. Details on the determination of the provision for adverse deviations and on the available actuarial surplus are shown in Appendix A.

Once the available actuarial surplus has been so applied, monthly employer contributions must resume. On the basis of the assumptions and methods described in this report, the rule for determining the minimum required employer monthly contributions, as well as an estimate of the employee and employer contributions, from the valuation date until the next required valuation are as follows:

	EMPLOYER'S CONTRIBUTION RULE		
Period beginning	Monthly current service cost	Provision for adverse deviation	Explicit monthly expense allowance
January 1, 2019	$0	$0	$0
January 1, 2020	$0	$0	$0
January 1, 2021	$0	$0	$0

ESTIMATED EMPLOYER'S CONTRIBUTIONS				
Period beginning	Provision for adverse deviation	Monthly current service cost and provision for adverse deviation	Available actuarial surplus applied	Minimum monthly contributions
January 1, 2019	$0	$0	$0	$0
January 1, 2020	$0	$0	$0	$0
January 1, 2021	$0	$0	$0	$0

OTHER CONSIDERATIONS

Differences Between Valuation Bases

There is no provision in the minimum funding requirements to fund the difference between the hypothetical wind-up and solvency shortfalls, if any.

In addition, although minimum funding requirements do include a requirement to fund the going concern current service cost and a provision for adverse deviations in respect of the current service cost, there is no requirement to fund the expected growth in the hypothetical wind-up or solvency liability after the valuation date, which could be greater.

Payment of Benefits

The Act imposes certain restrictions on the payment of lump sums from the Plan when the transfer ratio revealed in an actuarial valuation is less than one. If the transfer ratio shown in this report is less than one, the plan administrator should ensure that the monthly special payments are sufficient to meet the requirements of the Act to allow for the full payment of benefits, and otherwise should take the prescribed actions.

Additional restrictions are imposed when:

- The transfer ratio revealed in the most recently filed actuarial valuation is less than one and the administrator knows or 'ought to know' that the transfer ratio of the Plan has declined by 10% or more since the date the last valuation was filed; or

- The transfer ratio revealed in the most recently filed actuarial valuation is greater than or equal to one and the administrator knows or 'ought to know' that the transfer ratio of the Plan has declined to less than 0.9 since the date the last valuation was filed.

As such, the administrator should monitor the transfer ratio of the Plan and, if necessary, take the prescribed actions.

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MAXIMUM ELIGIBLE CONTRIBUTIONS

The *Income Tax Act* (the "ITA") limits the amount of employer contributions that can be remitted to the defined benefit component of a registered pension plan.

In accordance with Section 147.2 of the ITA and *Income Tax Regulation* 8516, for a plan which is underfunded on either a going concern or on a hypothetical wind-up basis, the maximum permitted contributions are equal to the employer's current service cost, including the provision for adverse deviations in respect of the current service cost and the explicit expense allowance if applicable, plus the greater of the going concern funding shortfall and hypothetical wind-up shortfall.

For a plan which is fully funded on both going concern and hypothetical wind-up bases, the employer can remit a contribution equal to the employer's current service cost, including the provision for adverse deviations in respect of the current service cost and the explicit expense allowance if applicable, as long as the surplus in the plan does not exceed a prescribed threshold. Specifically, in accordance with Section 147.2 of the ITA, for a plan which is fully funded on both going concern and hypothetical wind-up bases, the plan may not retain its registered status if the employer makes a contribution while the going concern funding excess exceeds 25% of the going concern funding target.

Notwithstanding the above, any contributions that are required to be made in accordance with pension benefits legislation are eligible contributions in accordance with Section 147.2 of the ITA and can be remitted.

SCHEDULE OF MAXIMUM CONTRIBUTIONS

The Employer is permitted to fully fund the greater of the going concern and hypothetical wind-up shortfalls; $0, as well as make current service cost contributions, which are nil.

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INDEXATION RESERVE ACCOUNT

GENERAL

In 1991 a policy was adopted by the Board that:

a. assets not required to meet specific current pension liabilities be held in an Indexation Reserve Account (IRA);

b. the IRA be limited to 30% of the going-concern liability for non-indexed benefits;

c. the IRA be built up to the maximum before any allocation of surplus be considered; and

d. minor improvements in pension benefits and increases in pensions due to cost-of-living inflation should be limited to the extent that the IRA is sufficient.

INDEXATION RESERVE ACCOUNT

The change in the Indexation Reserve Account during 2018 is outlined below.

		($000'S)
Indexation Reserve Account at December 31, 2017		**$9,954**
January 1, 2018 cost-of-living increases to pensions		($9,120)
Indexation Reserve Account at January 1, 2018		**$834**
Indexation Reserve Account at December 31, 2018		
(a) Going-concern excess (deficiency)	$38,579	
(b) Solvency excess (deficiency)	$16,341	
Indexation Reserve Account at December 31, 2018 (lesser of (a) and (b) but not less than 0)		**$16,341**

IMPACT OF PROVIDING A COLA

If the Board recommends a cost-of-living adjustment of 2.22% to pensions in pay then the impact on the Indexation Reserve Account is illustrated in the table below.

		($000'S)
Indexation Reserve Account at December 31, 2018		**$16,341**
Cost of COLA on going-concern basis	$10,043	
Cost of COLA on solvency basis	$10,327	
Charge to Indexation Reserve Account (greater of (a) and (b))		($10,327)
Indexation Reserve Account at January 1, 2019		**$6,014**

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ACTUARIAL OPINION

In our opinion, for the purposes of the valuations,

- The membership data on which the valuation is based are sufficient and reliable.
- The assumptions are appropriate*.*
- The methods employed in the valuation are appropriate.

This report has been prepared, and our opinions given, in accordance with accepted actuarial practice in Canada. It has also been prepared in accordance with the funding and solvency standards set by the *Pension Benefits Act (Ontario).*

Respectfully submitted,

Armando Fernandes
Fellow of the Canadian Institute of Actuaries
Fellow of the Society of Actuaries

May 7, 2019

Manuel Monteiro
Fellow of the Canadian Institute of Actuaries
Fellow of the Society of Actuaries

May 7, 2019

APPENDIX A
PRESCRIBED DISCLOSURE

DEFINITIONS

The Act defines a number of terms as follows:

DEFINED TERM	DESCRIPTION		RESULT
Going concern assets	Total value of assets plus the sum of the following:		$490,964,000
	(a) the present value of special payments in respect of any past service unfunded liability identified in a previously filed report		
	(b) the present value of special payments in respect of any plan amendment that increases going concern liabilities		
	(c) present value of special payments in respect of going concern unfunded liabilities identified in a previously filed report that are scheduled for payment within one year of the date of this report		
Going concern excess / (unfunded liability)	The amount by which the Going Concern Assets exceed the sum of the following:		$38,579,000
	(a) the going concern liabilities		
	(i) liabilities excluding the value of escalated adjustments	$420,823,000	
	(ii) liabilities in respect of escalated adjustments	$0	
	(b) the provision for adverse deviations in respect of the going concern liabilities excluding the value of escalated adjustments	$31,562,000	
	(c) Prior Year Credit Balance	$0	

DEFINED TERM	DESCRIPTION	RESULT
Going concern funded ratio	The ratio of: (a) Total value of assets (excluding letters of credit) less the Prior Year Credit Balance; to (b) going concern liabilities	1.09
Transfer Ratio	The ratio of: (a) Solvency Assets minus the lesser of the Prior Year Credit Balance and the minimum required employer contributions including the provision for adverse deviations until the next required valuation; to (b) the sum of the Solvency Liabilities and liabilities for benefits, other than benefits payable under qualifying annuity contracts that were excluded in calculating the Solvency Liabilities.	1.06
Solvency Ratio	The ratio of: (a) Solvency Assets related to defined benefits and ancillary benefits plus the total amount of any letters of credit minus the Prior Year Credit Balance (b) the sum of the Solvency Liabilities related to defined benefits and ancillary benefits	1.06
Prior Year Credit Balance	Accumulated excess of contributions made to the pension plan in excess of the minimum required contributions (note: only applies if the Company chooses to treat the excess contributions as a Prior Year Credit Balance).	$0
Solvency Assets	Market value of assets including accrued or receivable income and excluding the value of any qualifying annuity contracts.	$483,471,000

DEFINED TERM	DESCRIPTION	RESULT
Solvency Asset Adjustment	The sum of:	
	(a) the difference between smoothed value of assets and the market value of assets	($1,931,000)
	(b) the present value of going concern special payments required to liquidate any past service unfunded liability	$0
	(c) the present value of going concern special payments identified in December 31, 2016 valuation	$0
	(d) the present value of going concern special payments (identified in this report) that are scheduled for payment within 6 years following the valuation date	$0
	(e) the present value of any previously scheduled solvency special payments (excluding those identified in this report)	$0
	(f) the total value of all letters of credit in respect of the special payments due before the valuation date, subject to the limit of 15% of solvency liabilities	$0
		($1,931,000)
Solvency Liabilities	Liabilities determined as if the plan had been wound up on the valuation date, including liabilities for plant closure benefits or permanent layoff benefits that would be immediately payable if the employer's business were discontinued on the valuation date of the report, but, if elected by the plan sponsor, excluding liabilities for, (a) any escalated adjustment, (b) excluded plant closure benefits, (c) excluded permanent layoff benefits, (d) special allowances other than funded special allowances, (e) consent benefits other than funded consent benefits, (f) prospective benefit increases, (g) potential early retirement window benefit values, and (h) pension benefits and ancillary benefits payable under a qualifying annuity contract.	$456,582,000

DEFINED TERM	DESCRIPTION	RESULT
Solvency Liability Adjustment	The amount by which Solvency Liabilities are adjusted as a result of using a solvency valuation interest rate that is the average of market interest rates calculated over the period of time used in the determination of the smoothed value of assets.	$8,617,000
Solvency Deficiency	The amount, if any, by which the sum of:	
	(a) the Solvency Liabilities	$456,582,000
	(b) the Solvency Liability Adjustment	$8,617,000
	(c) the Prior Year Credit Balance	$0
		$ 465,199,000
	Exceeds the sum of	
	(d) the Solvency Assets net of estimated termination expenses[3]	$ 483,471,000
	(e) the Solvency Asset Adjustment	($1,931,000)
		$481,540,000
		$0
Reduced Solvency Deficiency / (Solvency Excess)	The amount, if any, by which the sum of:	
	(a) 85% of the Solvency Liabilities	$ 388,095,000
	(b) 85% of the Solvency Liability Adjustment	$ 7,324,000
	(c) the Prior Year Credit Balance	$0
		$ 395,419,000
	Exceeds the sum of	
	(d) the Solvency Assets net of estimated termination expenses[3]	$ 483,471,000
	(e) the Solvency Asset Adjustment	($1,931,000)
		$ 481,540,000
		$0

[3] In accordance with accepted actuarial practice, for purposes of determining the financial position, the market value of plan assets was adjusted for any in-transit benefit payments, contributions, and other in-transit cash flows, and reduced by a provision for estimated termination expenses payable from the Plan's assets that may reasonably be expected to be incurred in terminating the Plan and to be charged to the Plan.

PROVISION FOR ADVERSE DEVIATIONS

The provision for adverse deviations has been established in accordance with regulations taking into account the following parameters:

DEFINED AMOUNT		RESULTS
Fixed Income Component (L)	The sum of the Plan's target allocation of assets (excluding those allocated to annuity contacts and meeting the minimum rating requirement) as described in the regulations applicable at the valuation date: **Investment** — **Target** Short term notes and treasury bills — 3.0% Canadian Bonds and debentures — 72.0%	75.0%
Alternative Investment Component (M)	The sum of the Plan's target allocation of assets (excluding those allocated to annuity contacts) meeting requirements as described in the regulations applicable at the valuation date.	0.0%
Investment Component (N)	Plan's target asset allocation for mutual, pooled or segregated funds	0.0%
Investment Component Fixed Income % (P)	Portion of Investment Component (N) that is allocated to investment categories accounted for in Fixed Income Component (L)	0.0%
Investment Component Alternative Investment % (Q)	Portion of Investment Component (N) that is allocated to investment categories accounted for in Alternative Income Component (M)	0.0%
Annuity Contract Allocation (R)	Portion of Fixed Income Component (L) and Alternative Investment Component (M) that is allocated to annuity contracts that have been purchased from an insurance company	0.0%

Combined Target Asset Allocation for Fixed Income Assets (J)			
Sum of			
1.	Fixed Income Component (L)	75.0%	
2.	0.5 x Alternative Investment Component (0.5 x M)	0.00%	
3.	Investment Component x Investment Component Fixed Income % (N x P)	0.00%	
4.	0.5 x Investment Component x Investment Component Alternative Investment % (0.5 x N x Q)	0.00%	
			75.0%
Divided by			
	100% - Annuity Contract Allocation (100% - R)		100.0%
Combined Target Asset Allocation for Fixed Income Assets			**75.0%**

Combined Target Asset Allocation for Non-Fixed Income Assets (K)	
100% – Combined Target Asset for Fixed Income Assets (100% - J)	**25.00%**

Duration of going-concern liabilities at valuation date	**7.92%**
= (F - G) / (G x 0.01)	
where,	
G = going-concern liabilities at valuation date established using the discount rate determined for this valuation	$ 420,823,000
F = going-concern liabilities established using the discount rate minus 1%	$ 454,136,000

Benchmark Discount Rate (E)	
Base rate	0.50%
Effective yield from CANSIM Series V39056 (H)	2.18%
1.5% x Combined Target Asset Allocation for Fixed Income Assets (1.5% x J)	1.13%
5.0% x Combined Target Asset Allocation for Non-Fixed Income Assets (5.0% x K)	1.25%
Benchmark Discount Rate	5.06%

Provision for Adverse Deviations	
5.0% for a closed plan and 4.0% for a Plan that is not a closed plan	5.00%

i. Provision based on Combined Target Asset Allocation for Non-Fixed Income Assets				2.50%
(C) Greater of zero and the				
› Duration of going concern liabilities at valuation date			7.92%	
Multiplied by the excess of:				
» Going concern valuation gross discount rate net of active investment management fees (D), less		3.70%		
» Benchmark Discount Rate (E)		5.06%	-1.36%	0.00%
Provision for Adverse Deviations (A + B + C)				7.50%

The available actuarial surplus that may be used according to the Act is established as follows:

Available actuarial surplus			
Excess of Going-concern assets		$490,964,000	
Over Going-concern liabilities	$420,823,000		
Provision for adverse deviations in respect of the going concern liabilities	$ 31,562,000		
Prior Year Credit Balance	$0	$452,385,000	
		$ 38,579,000	(a)
Excess of Solvency assets excluding the value of any letters of credits and lesser of Prior Year Credit Balance and minimum required employer contributions, including the provision for adverse deviations until the next required valuation		$483,471,000	
Over Wind-up liabilities x 105%		$479,411,000	
		$4,060,000	(b)
The available actuarial surplus = the lesser of a) and b) above		$4,060,000	

TIMING OF NEXT REQUIRED VALUATION

In accordance with the Act the next valuation of the Plan would be required at an effective date within one year of the current valuation date if:

- The ratio of solvency assets to solvency liabilities is less than 85%.

Otherwise, the next valuation of the Plan would be required at an effective date no later than three years after the current valuation date.

Accordingly, since the ratio of solvency assets to solvency liabilities is greater than 85% as at December 31, 2018, the next valuation of the Plan will be required as of December 31, 2021.

SPECIAL PAYMENTS

As the Plan does not have a funding shortall and there is a solvency excess, no special payments are required.

PENSION BENEFITS GUARANTEE FUND (PBGF) ASSESSMENT

In accordance with subsection 47(1) (p.18) of the Regulations under the Pension Benefits Act (Ontario), the pension benefits provided by this Plan are not guaranteed by the Pension Benefits Guarantee Fund (PBGF) and are therefore exempt from the filing of PBGF assessment certificate (subsection 18(7) of the regulations) and payment of an annual PBGF assessment (section 37 of the Regulations).

APPENDIX B

PLAN ASSETS

As at December 31, 2018, the pension fund is held by CIBC Mellon and is invested in accordance with the investment policy described below.

In preparing this report, we have relied upon the assets as at December 31, 2018 without further audit including the information reported in the following statements:

- CIBC Mellon statements ($472,571,938)
- Bank Payroll account information provided by the City of Toronto ($3,632,185)
- CIBC Business Operating Account Statement provided by the City of Toronto ($144,293)
- National Bank Account Statement ($7,366,123)

Customarily, this information would not be verified by a plan's actuary. We have reviewed the information for internal consistency and we have no reason to doubt its substantial accuracy.

The going-concern assets are recorded at an "Actuarial Value" which is determined as follows:

1. The market value of total assets at the previous year-end is accumulated, together with the current year's cash flow, with interest at the valuation going-concern discount rate used in the previous valuations; and
2. The difference between the accumulation in (1) and the market value of total assets at the valuation date is spread over the current year and the three succeeding years in four equal amounts.

The value determined in accordance with the above method is $490,964,000 at December 31, 2018.

The effect of the foregoing is shown below (in $000).

ASSETS OF THE PENSION FUND AT DECEMBER 31, 2018	MARKET VALUE	ACTUARIAL VALUE
I. Cash and Equivalents		
Cash and short-term investments	11,609	11,609
II. Active Management		
Bonds	364,721	364,721
Canadian equities	22,251	22,251
Foreign equities	85,134	85,134
Subtotal	483,715	483,715
III. Smoothing Adjustment		(7,249)
Total	**483,715**	**490,964**

The currently unrecognized portion of the market value of assets will be taken into account in future years in the following amounts ($000).

2019	25% of 2016 gain	2,932	
	25% of 2017 gain	110	
	25% of 2018 loss	(3,467)	(425)
2020	25% of 2017 gain	110	
	25% of 2018 loss	(3,467)	(3,357)
2021	25% of 2018 loss	(3,467)	(3,467)
Total			**(7,249)**

Under this adopted asset valuation method, the Plan’s investment rate of return in 2018 was equal to 3.88% (net of investment management expenses).

Reconciliation of Fund Assets ($000)

		MARKET VALUE	ACTUARIAL VALUE
Value at 31.12.2017		**521,898**	**515,409**
Net amount in-transit		0	0
Adjusted Value at 31.12.2017		**521,898**	**515,409**
I. Contributions			
Employee Contributions	0		
Employer Contributions	0	0	0
II. Adjusted Investment Income		5,893	19,631
III. Pensions & Other Benefits			
Pensions for Members	30,424		
Pensions for Widows & Others	12,898		
50% Rule Refunds	0	(43,322)	(43,322)
IV. Actuarial, Legal and Other Fees			
Actuarial Fees	$ 192		
Custodial Fees	83		
Investment Management Fees	457		
Other Fees (audit, legal, etc.)	22	(754)	(754)
Value at 31.12.2018		**$483,715**	**$490,964**

We have tested the pensions paid, the lump-sums paid, and the contributions for consistency with the membership data for the Plan members who have received benefits or made contributions. The results of these tests were satisfactory.

INDEXATION RESERVE ACCOUNT

The plan administrator has adopted a statement of investment policy and procedures (October 2017). This policy is intended to provide guidelines for the managers as to the level of risk that is consistent with the Plan's investment objectives. A significant component of this investment policy is the asset mix.

The plan administrator is solely responsible for selecting the plan's investment policies, asset allocations, and individual investments.

The constraints on the asset mix and the actual asset mix at the valuation date are provided for information purposes:

	INVESTMENT POLICY			ACTUAL ASSET MIX AS AT 1.2019
	Minimum	Target	Maximum	
Canadian Equities	0%	5%	10%	4.6%
Foreign Equities	11%	20%*	29%	17.6%
Canadian Bonds	65%	72%**	85%	75.4%
Cash and cash equivalents	0%	3%	20%	2.4%
		100%		100.0%

* 12% US and 8% foreign non-US

** 72.0% short bonds

Because of the mismatch between the Plan's assets (which are invested in accordance with the above investment policy) and the Plan's liabilities (which tend to behave like long bonds) the Plan's financial position will fluctuate over time. These fluctuations could be significant and could cause the Plan to become underfunded or overfunded.

HISTORICAL FUND PERFORMANCE

Annual rates of return, net of investment expenses, for the last 20 years are provided below on both a market value and actuarial value bases.

	YEAR END MARKET VALUE	MARKET VALUE RATE OF RETURN	YEAR END ACTUARIAL VALUE	ACTUARIAL VALUE RATE OF RETURN
2018	$483,715,000	1.09%	$490,964,000	3.88%
2017	521,898,000	4.40%	515,409,000	6.74%
2016	543,400,000	7.29%	525,885,000	8.96%
2015	550,281,000	5.78%	526,126,000	9.66%
2014	565,800,000	11.78%	524,590,000	8.01%
2013	542,818,000	11.13%	522,954,000	7.50%
2012	523,880,000	7.79%	522,438,000	8.78%
2011	521,981,000	0.82%	516,059,000	2.02%

	YEAR END MARKET VALUE	MARKET VALUE RATE OF RETURN	YEAR END ACTUARIAL VALUE	ACTUARIAL VALUE RATE OF RETURN
2010	559,290,000	10.58%	545,826,000	1.75%
2009	549,657,000	16.03%	582,273,000	1.73%
2008	522,040,000	-14.47%	624,022,000	2.56%
2007	673,066,000	1.54%	665,248,000	8.71%
2006	719,666,000	10.86%	666,841,000	10.78%
2005	698,384,000	11.78%	651,137,000	5.28%
2004	675,192,000	8.53%	670,341,000	2.73%
2003	686,160,000	9.89%	718,335,000	2.56%
2002	689,130,000	-4.84%	767,318,000	2.30%
2001	793,752,000	0.97%	817,167,000	8.72%
2000	855,847,000	6.02%	818,830,000	13.30%
1999	875,285,000	7.10%	788,636,000	16.22%

HISTORICAL UPDATES TO PENSIONS IN-PAYMENT

Annual cost-of-living adjustments (COLA) for the last 32 years, applicable to pensions that have been in payment for at least one year on the effective date, are provided below. Adjustments are currently based on a ratio of the index determined on a 12 month average to September of the current year over the average to September of the prior year.

EFFECTIVE DATE	COLA UPDATE	EFFECTIVE DATE	COLA UPDATE
July 1, 1987	4.75%	January 1, 2003	2.30%
July 1, 1988	3.00%	January 1, 2004	0.00%
July 1, 1989	5.21%	January 1, 2005	0.00%
July 1, 1990	5.10%	January 1, 2006	0.00%
July 1, 1991	5.00%	January 1, 2007	0.00%
July 1, 1992	3.80%	January 1, 2008	0.00%
July 1, 1993	2.10%	January 1, 2009	0.00%
July 1, 1994	1.70%	January 1, 2010	0.00%
July 1, 1995	0.20%	January 1, 2011	0.00%
July 1, 1996	1.80%	January 1, 2012	0.00%
July 1, 1997	2.20%	January 1, 2013	0.00%
July 1, 1998	0.70%	January 1, 2014	0.00%
January 1, 1999	0.90%	January 1, 2015	0.00%
January 1, 2000	2.58%	January 1, 2016	0.00%
January 1, 2001	2.69%	January 1, 2017	1.10%
January 1, 2002	2.62%	January 1, 2018	1.85%

APPENDIX C

METHODS AND ASSUMPTIONS – GOING CONCERN

VALUATION OF ASSETS

For this valuation, we have used an adjusted market-value method to determine the smoothed value of assets. This method is described in Appendix B.

GOING CONCERN FUNDING TARGET

Over time, the real cost to the employer of a pension plan is the excess of benefits and expenses over member contributions and investment earnings. The actuarial cost method allocates this cost to annual time periods.

For purposes of the going concern valuation, we have continued to use the projected unit credit actuarial cost method. Under this method, we determine the present value of benefit cash flows expected to be paid in respect of service accrued prior to the valuation date. This is referred to as the funding target.

The funding excess or funding shortfall, as the case may be, is the difference between the market or smoothed value of assets and the funding target. A funding excess on a market value basis indicates that the current market value of assets and expected investment earnings are expected to be sufficient to meet the cash flows in respect of benefits accrued to the valuation date as well as expected expenses – assuming the plan is maintained indefinitely. A funding shortfall on a market value basis indicates the opposite – that the current market value of the assets is not expected to be sufficient to meet the plan's cash flow requirements in respect of accrued benefits, absent additional contributions.

As required under the Act, a funding shortfall and the provision for adverse deviations must be amortized over no more than 10 years through special payments beginning one year after the valuation date. A funding excess may, from an actuarial standpoint, be applied immediately to reduce required employer current service contributions unless precluded by the terms of the plan or by legislation.

The actuarial cost method used for the purposes of this valuation produces a reasonable matching of contributions with accruing benefits. Because benefits are recognized as they accrue, the actuarial cost method provides an effective funding target for a plan that is maintained indefinitely.

ACTUARIAL ASSUMPTIONS – GOING CONCERN BASIS

The present value of future benefit payment cash flows is based on economic and demographic assumptions. At each valuation we determine whether, in our opinion, the actuarial assumptions are still appropriate for the purposes of the valuation, and we revise them, if necessary. Emerging experience will result in gains or losses that will be revealed and considered in future actuarial valuations.

The table below shows the various assumptions used in the current valuation in comparison with those used in the previous valuation.

ASSUMPTION	CURRENT VALUATION	PREVIOUS VALUATION
Discount rate:	3.70%	3.80%
Explicit expenses:	$0	$0
Post-retirement pension increases:	0.00%	0.00%
Mortality rates:	125% of the rates of the 2014 Public Sector Canadian Pensioners Mortality Table (CPM2014Publ)	125% of the rates of the 2014 Public Sector Canadian Pensioners Mortality Table (CPM2014Publ)
Mortality improvements:	Fully generational using CPM Improvement Scale B (CPM-B)	Fully generational using CPM Improvement Scale B (CPM-B)
Eligible spouse at retirement:	Based on actual data	Based on actual data
Allowance for Remarriage	0.75% of pensioner liability	0.75% of pensioner liability

The assumptions are best estimates and do not include a margin for adverse deviations.

RATIONALE FOR ASSUMPTIONS

A rationale for each of the assumptions used in the current valuation is provided below.

DISCOUNT RATE

We have discounted the expected benefit payment cash flows using the expected investment return on the market value of the fund net of fees. Other bases for discounting the expected benefit payment cash flows may be appropriate, particularly for purposes other than those specifically identified in this valuation report.

Other bases for discounting the expected benefit payment cash flows may be appropriate, particularly for purposes other than those specifically identified in this valuation report.

The discount rate is comprised of the following:

- Estimated returns for each major asset class consistent with market conditions on the valuation date, the expected time horizon over which benefits are expected to be paid, and the target asset mix specified in the Plan's investment policy.
- Additional returns assumed to be achievable due to active equity management, equal to the fees related to active equity management. *We have assumed no additional return due to active equity management.*
- Implicit provision for passive investment expenses based on passive index funds available in the Canadian market for plans of this size. *We have determined an implicit investment management fee to be 0.03%.*
- Implicit provision for expenses determined as the average rate of administrative expenses paid from the fund over the last 3 years. *On this basis, we have determined an implicit expense provision of 0.07%.*

The discount rate was developed as follows:

Assumed investment return	3.80%
Additional returns for active management	0.00%
Passive management investment expense provision	(0.03%)
Implicit non-investment expense provision	(0.07%)
Net discount rate	3.70%

POST RETIREMENT PENSION INCREASES

No assumption has been made for future pension increases.

MORTALITY RATES

The assumption for the mortality rates is based on the Canadian Pensioners' Mortality (CPM) study published by the Canadian Institute of Actuaries in February 2014.

The mortality rates selected reflect plan-specific experience over the years 2005 to 2014.

There is broad consensus among actuaries and other longevity experts that mortality improvement will continue in the future, but the degree of future mortality improvement is uncertain. Two mortality improvement scales were recently published by the Canadian Institute of Actuaries (CIA) and may apply to Canadian pension valuations:

- The Canadian Pensioners Mortality (CPM) study published in February 2014 included CPM Improvement Scale B (CPM-B) which is also used for commuted value calculations.
- A report released by the Task Force on Mortality Improvement on September 20, 2017 includes an analysis of the rate of mortality improvement for the Canadian population and provides for mortality improvement scale MI-2017 to be considered for the purpose of reflecting future mortality improvement in Canadian actuarial work, while acknowledging that it might be appropriate to use alternative mortality improvement assumptions to reflect the nature of the work.

The CIA Committee on Pension Plan Financial Reporting published a revised version of the Educational Note on the Selection of Mortality Assumptions for Pension Plan Valuations on December 21, 2017. The Educational Note indicates that given the recent publication of the CPM-B and MI-2017 improvement scales and the similar data sets used in their development, it may be appropriate to use either scale in the absence of credible information to the contrary, such as the publication of a successor scale by the CIA.

For the present valuation, we have continued to use the CPM-B scale, which is a reasonable outlook for future mortality improvement.

Based on the assumption used, the life expectancy of a member age 65 at the valuation date is 21.3 years for males and 23.2 years for females.

ELIGIBLE SPOUSE

Actual status used for retirees.

- The survivor benefit assumption is based on actual data provided and an allowance for remarriage of 0.75% of the pensioner liability.
- Subject to the entitlement of the prior spouse, if any, the waiting period specified in the Plan and the requirements under the Pension Benefits Act (Ontario), a spouse acquired after retirement date may be entitled to receive the spousal pension. The Plan provides that the new spouse of a pensioner, whose former spouse at retirement has died or who was without spouse at retirement, is eligible for a survivor pension provided that the new spousal relationship, as defined in the Plan, has been in effect for a minimum of 2 years, with a pro rata share of the spousal pension for spousal relationships of less than 2 years. In order to make allowance for the possible increase in future liabilities on remarriage of a pensioner, based on remarriage rates for older adults in Canada, we have loaded the pensioner liabilities by 0.75% as an allowance for remarriage.

It has been assumed that 100% of active members are married. Female spouses are assumed to be 4 years younger than males for active members. Actual spouse age is used for pensioners.

ALLOWANCE FOR STEPPED PENSIONS

Upon the death of a pensioner whose pension has been stepped at retirement, the Plan provides a pension to the spouse whereby the survivor percentage is applied to the post-65 pre-stepped pension rather than the post-65 pension in payment. A stepped pension is a pension that has been increased before age 65 and reduced after age 65 to produce a level pension in anticipation of the OAS pension commencing from age 65.

We have performed a calculation based on the membership data supplied to estimate the spousal pension.

APPENDIX D

METHODS AND ASSUMPTIONS – HYPOTHETICAL WIND-UP AND SOLVENCY

HYPOTHETICAL WIND-UP BASIS

The Canadian Institute of Actuaries requires actuaries to report the financial position of a pension plan on the assumption that the plan is wound up on the effective date of the valuation, with benefits determined on the assumption that the pension plan has neither a surplus nor a deficit. For the purposes of the hypothetical wind-up valuation, the plan wind-up is assumed to occur in circumstances that maximize the actuarial liability.

To determine the actuarial liability on the hypothetical wind-up basis, we have valued those benefits that would have been paid had the Plan been wound up on the valuation date, with all members fully vested in their accrued benefits including benefits that would be immediately payable if the employer's business were discontinued on the valuation date, with all members fully vested in their accrued benefits. No benefits payable on plan wind-up under the above postulated scenario were excluded from our calculations.

The Standards of Practice of the Canadian Institute of Actuaries require that the scenario upon which the hypothetical wind-up valuation is based be postulated. However, there are no benefits under the plan contingent upon the circumstances of the plan wind-up or contingent upon other factors. Therefore, it was not necessary to postulate a scenario upon which the hypothetical wind-up valuation is made. No benefits payable on plan wind-up were excluded from our calculations. The plan wind-up is assumed to occur in circumstances that maximize the actuarial liability.

Upon plan wind-up, members are given options for the method of settling their benefit entitlements. The options vary by eligibility and by province of employment, but in general, involve either a lump sum transfer or an immediate or deferred pension.

The value of benefits assumed to be settled through a lump sum transfer is based on the assumptions described in Section 3500 – *Pension Commuted Values* of the Canadian Institute of Actuaries' Standards of Practice applicable for December 31, 2018.

Benefits provided as an immediate or deferred pension are assumed to be settled through the purchase of annuities based on an estimate of the cost of purchasing annuities.

We have estimated the cost of settlement through purchase of annuities in accordance with the *Canadian Institute of Actuaries Educational Note: Assumptions for Hypothetical Wind-up and Solvency Valuations with Effective Dates Between December 31, 2018 and December 30, 2019 (the "Educational Note").*

The Educational Note provides guidance on estimating the cost of annuity purchases assuming a typical group of annuitants. That is, no adjustments for sub- or super-standard mortality are considered. However, it is expected that insurers will consider plan experience and certain plan-specific characteristics when determining the mortality basis for a particular group. The Educational Note states that the actuary would be expected to make an adjustment to the regular annuity purchase assumptions where there is demonstrated substandard or super-standard mortality or where an insurer might be expected to assume so. In such cases, the actuary would be expected to make an adjustment to the mortality assumption in a manner consistent with the underlying annuity purchase basis. Given the uncertainty surrounding the actual mortality basis that would be typical of a group annuity purchase, it is reasonable to assume that there is a range of bases that can be expected not to be materially different from the actual mortality basis. Therefore, an adjustment to the regular annuity purchase assumptions would be warranted when the plan's assumed basis falls outside that range.

In this context, we have determined that an adjustment to the mortality rates used in the regular annuity purchase assumptions is appropriate.

We have not included a margin for adverse deviation in the solvency and hypothetical wind-up valuations.

ASSUMPTIONS

Assumptions for determination of the hypothetical wind-up and solvency liability are as follows:

Actuarial Assumptions – Windup and Solvency Liability

Mortality rates:	100% of the rates of the 2014 Canadian Pensioners Mortality Table (CPM2014) table with fully generational improvements using scale CPM-B
Adjustment to mortality rates:	Above mortality rates increased by 10% to reflect substandard mortality
Interest rate for benefits to be settled through annuity purchase:	3.11% per year
Allowance for re-marriage:	0.75% of pensioner liability
Post retirement cost-of-living increases	0.00%

Assumptions for determination of the solvency liability adjustment are as follows:

Actuarial Assumptions – Solvency Liability Adjustment

Mortality rates:	100% of the rates of the 2014 Canadian Pensioners Mortality Table (CPM2014) table with fully generational improvements using scale CPM-B
Adjustment to mortality rates:	Above mortality rates increased by 10% to reflect substandard mortality
Interest rate for benefits to be settled through annuity purchase:	2.875% per year
Allowance for re-marriage:	0.75% of pensioner liability
Post retirement cost-of-living increases	0.00%

We have used an average of the annuity proxy rates as at December 31, 2015 (2.63% per year), December 31, 2016 (2.91% per year), December 31, 2017 (2.90% per year) and December 31, 2018 (3.11% per year) which produces a rate of 2.875% per year (rounded to the nearest 1/8%). We have adjusted the interest rates prior to this valuation such that the annuity cost is the same at those dates, but the mortality basis being consistent with the assumptions noted above.

Other assumptions are, as follows:

Other Assumptions

Termination expenses:	$244,200 (based on $150 per pensioner/survivor and $250 per other member)

To determine the hypothetical wind-up position of the Plan, a provision has been made for estimated termination expenses payable from the Plan's assets in respect of actuarial and administration expenses that may reasonably be expected to be incurred in terminating the Plan and to be charged to the Plan.

Because the settlement of all benefits on wind-up is assumed to occur on the valuation date and is assumed to be uncontested, the provision for termination expenses does not include custodial, investment management, auditing, consulting, and legal expenses that would be incurred between the wind-up date and the settlement date or due to the terms of a wind-up being contested.

Expenses associated with the distribution of any surplus assets that might arise on an actual wind-up are also not included in the estimated termination expense provisions.

In determining the provision for termination expenses payable from the Plan's assets, we have assumed that the plan sponsor would be solvent on the wind-up date. We have also assumed, without analysis, that the Plan's terms as well as applicable legislation and court decisions would permit the relevant expenses to be paid from the Plan.

Although the termination expense assumption is a best estimate, actual fees incurred on an actual plan wind-up may differ materially from the estimates disclosed in this report.

INCREMENTAL COST

There is no incremental cost other than for ad-hoc COLA's which are limited to the sufficiency of the IRA. The incremental cost is assumed to be the lessor of the IRA and the expected COLA's until the next required actuarial valuation. The IRA is $16,341,000 as at December 31, 2018.

SOLVENCY BASIS

The value of assets used for determining the financial position of the Plan on the solvency basis includes the solvency assets plus a solvency asset adjustment.

The *solvency assets* are determined as the market value of investments held by the Plan plus any cash balances of the Plan and accrued or receivable income items.

The *solvency asset adjustment* is determined as (1) the present value at the interest rate used to calculate the solvency liability adjustment of the special payments required to eliminate any going-concern unfunded liability and pre-existing solvency deficiency that are scheduled for payment within 5 years of the valuation date, plus (2) the amount, positive or negative, by which the value of the solvency assets are adjusted as a result of applying an averaging method that stabilizes short-term fluctuations of the Plan assets.

The value of the liabilities used for determining the financial position of the Plan on the solvency basis includes the solvency liabilities plus a solvency liability adjustment.

To determine the *solvency liability*, we have valued those benefits that would have been paid had the Plan been wound up on the valuation date with all members vested in their accrued benefits.

The *solvency liability adjustment* is determined as the amount, positive or negative, by which the value of the solvency liabilities are adjusted as a result of using a solvency valuation interest rate that is the average of the market interest rates calculated over a period of 4 years (the same period used for the averaging method used to determine the solvency asset adjustment).

The difference between (1) the sum of the solvency assets and solvency asset adjustment and (2) the sum of the solvency liability and solvency liability adjustment is called the *solvency excess* or *solvency deficiency*, as the case may be.

Since all members have retired, we have assumed that all benefits will be settled through the purchase of annuities and have used a valuation interest rate for solvency purposes which, when used with the CPM 2014 mortality table, provides an estimate of group annuity purchase rates for non-indexed pensions.

The solvency position is determined in accordance with the requirements of the Act.

APPENDIX E

MEMBERSHIP DATA

ANALYSIS OF MEMBERSHIP DATA

The actuarial valuation is based on membership data as at October 31, 2018, provided by the City of Toronto.

We have applied tests for internal consistency, as well as for consistency with the data used for the previous valuation. These tests were applied to membership reconciliation, basic information (date of birth, date of hire, date of membership, gender, etc.), pensionable earnings, credited service, contributions accumulated with interest, and pensions to retirees and other members entitled to a deferred pension. Pensions to retirees were compared with corresponding amounts reported in financial statements. The results of these tests were satisfactory.

If the data supplied are not sufficient and reliable for its intended purpose, the results of our calculation may differ significantly from the results that would be obtained with such data. Although Mercer has reviewed the suitability of the data for its intended use in accordance with accepted actuarial practice in Canada, Mercer has not verified or audited any of the data or information provided.

Plan membership data are summarized below. For comparison, we have also summarized corresponding data from the previous valuation.

	31.12.2018	31.12.2017
Pensioners		
Number	965	1,015
Total annual lifetime pension	$29,836,821	$30,725,473
Total annual bridge pension	$0	$0
Average annual lifetime pension	$30,919	$30,271
Average age	78.8	78.1
Spousal Pensioners		
Number	663	674
Total annual lifetime pension	$12,684,102	$12,515,589

	31.12.2018	31.12.2017
Total annual bridge pension	$41,158	$52,882
Average annual lifetime pension	$19,131	$18,569
Average age	81.6	81.0

* Not shown for reasons of confidentiality

The membership movement for all categories of membership since the previous actuarial valuation is as follows:

	PENSIONERS	SPOUSAL PENSIONERS	TOTAL
Total at 31.12.2017	1,015	674	1,689
Pension Splits			
Exits By:			
• Retirement			
• Marriage Breakdown			
• Death – no spouse	(25)	(38)	(63)
• Death – with spouse	(25)	25	0
Data Corrections		2	2
Pension Splits			
Total at 31.12.2018	965	663	1,628

The distribution of the inactive members by age as at the valuation date is summarized as follows:

	PENSIONERS		SURVIVING SPOUSES	
Age	Number	Average Lifetime Pension	Number	Average Lifetime Pension
40 – 44				
45 – 49			2	*
50 – 54				
55 – 59			6	20,448
60 – 64			11	18,568
65 – 69	19	31,283	43	19,080
70 – 74	305	30,920	95	18,217
75 – 79	293	31,124	104	19,620
80 – 84	146	30,265	144	19,423
85 – 89	150	31,759	146	19,147
970 – 94	48	29,701	92	19,414
95 – 99	4	21,082	19	17,723
100 +			1	*
Total	965	30,919	663	19,131
Males	930	31,208	2	15,425
Females	35	23,228	661	19,143

* Not shown for reasons of confidentiality

APPENDIX F

SUMMARY OF PLAN PROVISIONS

The following is a summary of the main provisions of the Plan, contained in By-law no. 15-92, which are relevant to the actuarial valuation. For complete details reference should be made to the formal plan document.

Mercer has used and relied on the plan documents, including amendments and interpretations of plan provisions, supplied by the City of Toronto. If any plan provisions supplied are not accurate and complete, the results of any calculation may differ significantly from the results that would be obtained with accurate and complete information. Moreover, plan documents may be susceptible to different interpretations, each of which could be reasonable, and the results of estimates under each of the different interpretations could vary.

The following is a summary of the main provisions of the Plan in effect on December 31, 2018. This summary is not intended as a complete description of the Plan.

BACKGROUND	The Plan became effective January 1, 1957. Benefits are based on a set formula and are entirely paid for by the Employer.
ELIGIBILITY FOR MEMBERSHIP	Police officers hired before July 1, 1968.
EMPLOYEE CONTRIBUTIONS	There are no further employee contributions to the Plan as all remaining members have completed 35 years of service.
RETIREMENT DATES	• Normal Retirement • Age 60 • Early Retirement • Attainment of age 50, or completion of 25 years of service
DISABILITY RETIREMENT	Permitted, with full accrued pensions, if disability occurred in the line of duty; or if on total and permanent disability; or after 20 years service, on a “worn-out” basis.

NORMAL RETIREMENT PENSION	2% of employee's highest consecutive 5-year average earnings MULTIPLIED BY number of years of service up to a maximum of 35 years, MINUS (after age 65 or total disability) 0.7% of final 3 year average of YMPE MULTIPLIED BY number of years of service after 1.1.66, up to a maximum of 35 years.
PENSIONABLE EARNINGS	Base pay.
EARLY RETIREMENT PENSION	• Unreduced pensions upon completion of 25 years of service, or upon attainment of age 55. • Reduced pensions are available from age 50. The reduction is 4% per year from earlier of age 55 or completion of 25 years of service.
MAXIMUM PENSION	• All pensions are subject to the maximum limitation imposed by the Municipal Act and the Income Tax Act (ITA). Pensions accrued after 1991 are subject to the maximum pension limitations under the ITA.
MINIMUM DEATH BENEFITS	• Return of the deceased member's contributions plus interest.
SPOUSAL BENEFITS	• 66.67% of the deceased member's normal pension.
ORPHANS' PENSIONS	If there is no spouse, 66.67% of the deceased member's normal pension payable until youngest orphan reaches 21. If there is a spouse, an amount per child under age 21 where the total paid to spouse and orphans is not to exceed 100% of the deceased member's normal pension.
STEPPED UP PENSION	Upon the death of a pensioner whose pension has been stepped at retirement, the Plan provides a pension to the spouse whereby the survivor percentage is applied to the post-65 pre-stepped pension rather than the post-65 pension in payment. A stepped pension is a pension that has been increased before age 65 and reduced after age 65 to produce a level pension in anticipation of the OAS pension commencing from age 65.
OTHER PRE-RETIREMENT DEATH BENEFITS	Return of deceased member's pre-1987 contributions plus interest, plus the commuted value of the deceased member's post-1986 accrual pension, in lieu of the spouse pension.
WITHDRAWAL BENEFITS	Vested pension, or return of terminated member's pre-1987 contributions plus interest plus the commuted value of the member's post-1986 accrued pension.
EMPLOYER COST-SHARING	Upon termination, death or retirement, the member or his beneficiary is entitled to receive the excess, if any, of the member's post-1986 contributions plus interest over 50% of the commuted value of the pension earned over the same period.

Notes:

a. The Fund is subject to the provisions of the Pension Benefits Act (Ontario).

b. In the case of an officer who retires on or after the attainment age of age 50 or after the completion of 30 years of service, or because of total and permanent disability, a special benefit is paid equivalent to 1% of salary from January 1, 1980 to April 3, 1984 plus 0.5% of salary thereafter, all accumulated with interest. These Section 24 special benefits were refunded in 2001 or 2002 to existing pensioners and surviving spouses who did not take advantage of this retirement provision and are refunded to any future retirees who do not take advantage of this provision.

APPENDIX G

EMPLOYER CERTIFICATION

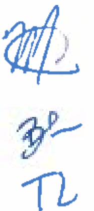
With respect to the Report on the Actuarial Valuation for Funding Purposes as at December 31, 2018 of the Metropolitan Toronto Police Benefit Fund, I hereby certify that, to the best of my knowledge and belief:

- The valuation reflects the terms of the Trustee's engagement with the actuary described in Section 2 of this report, particularly the requirement to not reflect a margin for adverse deviations in the going concern valuation beyond the provision for adverse deviations prescribed by the Act, and the Employer's decisions in regards to determining the going-concern and solvency funding requirements.
- A copy of the official plan documents and of all amendments made up to December 31, 2018 was provided to the actuary and is reflected appropriately in the summary of plan provisions contained herein.
- The asset information summarized in Appendix B is reflective of the Plan's assets.
- The membership data provided to the actuary included a complete and accurate description of every person who is entitled to benefits under the terms of the Plan for service up to October 31, 2018.
- All events subsequent to December 31, 2018 that may have an impact on the Plan have been communicated to the actuary.

May 7, 2019
Date

Signed

Andrew Flynn
Name



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