

# Municipal Employees' Pension Plan Actuarial Valuation as at December 31, 2017

Management Valuation

May 24, 2018

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## Executive Summary

An actuarial valuation has been prepared for the Municipal Employees' Pension Plan (the "Plan") as at December 31, 2017 to meet the requirements of a Funding Policy adopted by the Municipal Employees' Pension Commission (the "Commission") to provide a framework for the sound financial management of the Plan and to assist the Commission in its decision-making process, its development of recommendations to the Minister of Finance and its communication with stakeholders. 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 December 31, 2019.

### Summary of Principal Results

#### Defined Benefit Portion

	December 31, 2017		December 31, 2016	
	Management	Solvency	Management	Solvency
<b>Assets</b>	\$ 2,309,007,000	\$ 2,440,407,000	\$ 2,135,357,000	\$ 2,265,739,000
<b>Liabilities &amp; Reserves</b>	<u>1,990,073,000</u>	<u>2,692,010,000</u>	<u>1,938,975,000</u>	<u>2,590,080,000</u>
<b>Surplus/(Deficit)</b>	<b>\$ 318,934,000</b>	<b>\$ (251,603,000)</b>	<b>\$ 196,382,000</b>	<b>\$ (324,341,000)</b>
<b>Funded Ratio</b>	116.0%	90.7%	110.1%	87.5%

#### Overall Results – Defined Benefit Portion plus Annuities

	December 31, 2017		December 31, 2016	
	Management	Solvency	Management	Solvency
<b>Assets</b>	\$ 2,326,188,000	\$ 2,458,304,000	\$ 2,153,247,000	\$ 2,284,386,000
<b>Liabilities &amp; Reserves</b>	<u>2,004,394,000</u>	<u>2,709,929,000</u>	<u>1,954,882,000</u>	<u>2,609,984,000</u>
<b>Surplus/(Deficit)</b>	<b>\$ 321,794,000</b>	<b>\$ (251,625,000)</b>	<b>\$ 198,365,000</b>	<b>\$ (325,598,000)</b>
<b>Funded Ratio</b>	116.1%	90.7%	110.1%	87.5%

## Current Service Cost

The current service cost as a percentage of salary and as dollar amounts with effect for the first plan year following December 31, 2017, along with the previous year's current service cost from the December 31, 2016 management valuation, are as follows:

	<b>December 31, 2017</b>	<b>December 31, 2016</b>
Total current service cost	\$ 94,420,000	\$ 94,584,000
Expected member contributions	50,126,000	47,971,000
Expected employer contributions	<u>50,126,000</u>	<u>47,971,000</u>
Excess contributions / (Funding deficiency)	5,832,000	1,358,000
<b>Total estimated payroll</b>	<b>\$ 574,065,000</b>	<b>\$ 578,164,000</b>
	<b>% of payroll</b>	<b>% of payroll</b>
Total current service cost	16.4%	16.4%
Expected member contributions	8.7%	8.3%
Expected employer contributions	<u>8.7%</u>	<u>8.3%</u>
Excess contributions / (Funding deficiency)	1.0%	0.2%

## Key Assumptions

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

	December 31, 2017		December 31, 2016	
	Going Concern	Solvency	Going Concern	Solvency
<b>Discount rate</b>	5.75%	Annuity purchases: 3.10% Transfers: 2.60% for 10 years, 3.40% thereafter	5.75%	Annuity purchases: 3.20% Transfers: 2.20% for 10 years, 3.50% thereafter
<b>Inflation rate</b>	2.25%	n/a	2.25%	n/a
<b>Pensionable earnings</b>	3.00%	n/a	3.00%	n/a
<b>Mortality table</b>	Males: 115% of CPM Private Females: 100% of CPM Private	CPM Combined	Males: 115% of CPM Private Females: 100% of CPM Private	CPM Combined
<b>Retirement rates – General Members</b>	<ul style="list-style-type: none"> <li>▪ 10% if eligible to retire but less than 80 points, 20% with 80 points, remainder at age 65</li> <li>▪ 12.5% elect lump sum transfer prior to January 1, 2019</li> </ul>	n/a	<ul style="list-style-type: none"> <li>▪ 10% if eligible to retire but less than 80 points, 20% with 80 points, remainder at age 65</li> <li>▪ 12.5% elect lump sum transfer prior to January 1, 2019</li> </ul>	n/a
<b>Retirement rates – Emergency Members</b>	<ul style="list-style-type: none"> <li>▪ 50% each year between earliest unreduced date and age 65; 100% at age 65</li> <li>▪ 50% elect lump sum transfer prior to January 1, 2019</li> </ul>	n/a	<ul style="list-style-type: none"> <li>▪ 100% at earliest unreduced date</li> <li>▪ 50% elect lump sum transfer prior to January 1, 2019</li> </ul>	n/a

Respectfully submitted,



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May 24, 2018

## Section 1: Introduction

### Purpose and Terms of Engagement

We have been engaged by the Public Employees Benefits Agency and the Municipal Employees' Pension Commission, and hereafter collectively referred to as the "Commission", to conduct a management valuation of the Plan as at December 31, 2017 in accordance with the Plan's funding policy, based on the actuarial assumptions and methods summarized herein. More specifically, the purposes of the management valuation are to:

- Determine the financial position of the Plan on a best estimate going concern basis as at December 31, 2017;
- Determine the financial position of the Plan on a solvency basis as at December 31, 2017; and
- Determine the best estimate funding requirements of the Plan as at December 31, 2017.

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

While we have been engaged by the Commission to conduct this actuarial valuation, we note that the users of our work may well extend to parties external to the Commission. Out of respect for the Commission's confidentiality, however, we shall not undertake to communicate the terms of our engagement or results of our work with such other users unless so directed by the Commission.

An actuarial valuation as at December 31, 2016 was filed with the regulatory authorities. The next required valuation for regulatory filing purposes will be as at December 31, 2019.

### Summary of Changes Since the Last Valuation

The last such management valuation in respect of the Plan was performed as at December 31, 2016. Since the time of the last management valuation, we note that the retirement rates for emergency members changed from 100% to 50% at earliest unreduced age, while the remaining assumptions are unchanged.

### Information and Inputs

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

- Membership data compiled as at December 31, 2017 by the Public Employees Benefits Agency (PEBA);
- Asset data taken from the Plan's audited financial statements; and
- A copy of the act and regulations governing the Plan.

Furthermore, the actuarial assumptions and methods have been chosen to reflect our understanding of the Commission's desired funding objectives with due respect to accepted actuarial practice in Canada and the Plan's funding policy.

## 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 December 31, 2017 will result in gains or losses which will be reflected in the next actuarial valuation report; and
- 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: Management Valuation Results

### Financial Position of the Plan under Management Valuation

The management 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 best estimate actuarial assumptions and methods used for the management valuation reflect the Plan's funding objectives, as communicated by the Commission, actuarial standards of practice, and pension standards.

On the basis of the funding policy, plan provisions, membership data, best estimate assumptions and methods, and asset information described in the Appendices, the financial position of the Plan under the management valuation as at December 31, 2017 is shown in the following table. The results as at December 31, 2016 are also shown for comparison purposes.

#### Financial Position under Management Valuation

	December 31, 2017	December 31, 2016
<b>Market Value of Assets</b>	\$ 2,448,057,000	\$ 2,273,349,000
Assets smoothing adjustment	<u>(139,050,000)</u>	<u>(137,992,000)</u>
<b>Actuarial Value of Assets</b>	<b>\$ 2,309,007,000</b>	<b>\$ 2,135,357,000</b>
<b>Going Concern Liabilities</b>		
Active General members	\$ 958,440,000	\$ 955,297,000
Active Emergency	82,029,000	82,970,000
Disabled members	22,081,000	18,728,000
Retired members	710,949,000	675,090,000
Survivors	46,308,000	45,755,000
Deferred members	52,718,000	53,507,000
Pending terminations	70,292,000	69,142,000
Pending payouts	4,850,000	6,458,000
Transfer deficiency holdbacks	26,156,000	18,847,000
Former plan and AVC	<u>-</u>	<u>90,000</u>
<b>Total Liabilities</b>	<b>\$ 1,973,823,000</b>	<b>\$ 1,925,884,000</b>
<b>Reserves</b>		
Liability reserve (future disabled accruals)	<u>\$ 16,250,000</u>	<u>\$ 13,091,000</u>
<b>Total Liabilities and Reserves</b>	<b>\$ 1,990,073,000</b>	<b>\$ 1,938,975,000</b>
<b>Surplus/(Unfunded Liability)</b>	<b>\$ 318,934,000</b>	<b>\$ 196,382,000</b>
<b>Management funded ratio</b>	<b>116.0%</b>	<b>110.1%</b>

## Change in Financial Position

During the period from December 31, 2016 to December 31, 2017, the management financial position of the Plan changed from a surplus of \$196,382,000 to a surplus of \$318,934,000. The major components of this change are summarized in the following table.

### Reconciliation of the Financial Position under Management Valuation For the Period from December 31, 2016 to December 31, 2017

<b>Surplus/(Unfunded Liability) as at December 31, 2016</b>	<b>\$ 196,382,000</b>
Expected interest on surplus (unfunded liability)	<u>11,292,000</u>
<b>Expected Surplus/(Unfunded Liability) as at December 31, 2017</b>	<b>\$ 207,674,000</b>
Change in liabilities due to experience gains/(losses)	
Gain due to actuarial return on assets greater than expected	84,043,000
Gain due to salary increases less than expected	20,909,000
Gain due to contributions greater than current service cost	2,418,000
Gain on pensioner mortality experience	2,085,000
Gain due to interest on contributions less than expected	252,000
Loss on termination experience	(3,376,000)
Loss due to disability experience	(913,000)
Loss on retirement experience	(332,000)
Miscellaneous	<u>(49,000)</u>
<b>Surplus/(Unfunded Liability) as at December 31, 2017</b>	<b>\$ 312,711,000</b>
Change in emergency retirement assumption	<u>6,223,000</u>
<b>Surplus/(Unfunded Liability) as at December 31, 2017</b>	<b>\$ 318,934,000</b>

## Going Concern Valuation Sensitivity Results

In accordance with the Canadian Institute of Actuaries 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 than that used for the going concern valuation.

	Valuation Basis December 31, 2017	Based on Rate of 1% Lower	Effect	
			\$	%
<b>Management liabilities</b>	\$ 1,990,073,000	\$ 2,268,712,000	\$ 278,639,000	14.0%
<b>Current service cost</b>	\$ 94,420,000	\$ 112,546,000	\$ 18,126,000	19.2%

Note that using a discount rate 1% higher than that assumed would result in a comparable reduction in the Plan's liabilities and current service cost.

## Discount Rate Analysis

The determination of the valuation discount rate involves the analysis of 1,000 scenarios of future asset returns for every asset class in which the Plan is invested. It is understood in the actuarial community that there is a range of assumptions that could be considered to be best estimate, and this range can include results that fall between the 40<sup>th</sup> and 60<sup>th</sup> percentile of all analyzed scenarios.

Note that a discount rate at the 60<sup>th</sup> percentile implies that of the 1,000 scenarios, 600 produced a 30-year return that was below the given discount rate (i.e. 60% chance that the actual 30-year return will be less than the discount rate and 40% chance that the actual 30-year return will be greater than the discount rate). A discount rate chosen at the 60<sup>th</sup> percentile would be on the aggressive end of the Best Estimate Range, while a discount rate chosen at the 40<sup>th</sup> percentile would be on the conservative end. The discount rate of 5.75% chosen for this valuation is between the 45<sup>th</sup> and 50<sup>th</sup> percentiles.

To illustrate this, the table below provides the various discount rates that could be considered within this range.

Nominal Discount Rate	Real Discount Rate	Percentile
6.25%	4.00%	60 <sup>th</sup>
6.10%	3.85%	55 <sup>th</sup>
5.85%	3.60%	50 <sup>th</sup>
5.65%	3.40%	45 <sup>th</sup>
5.40%	3.15%	40 <sup>th</sup>

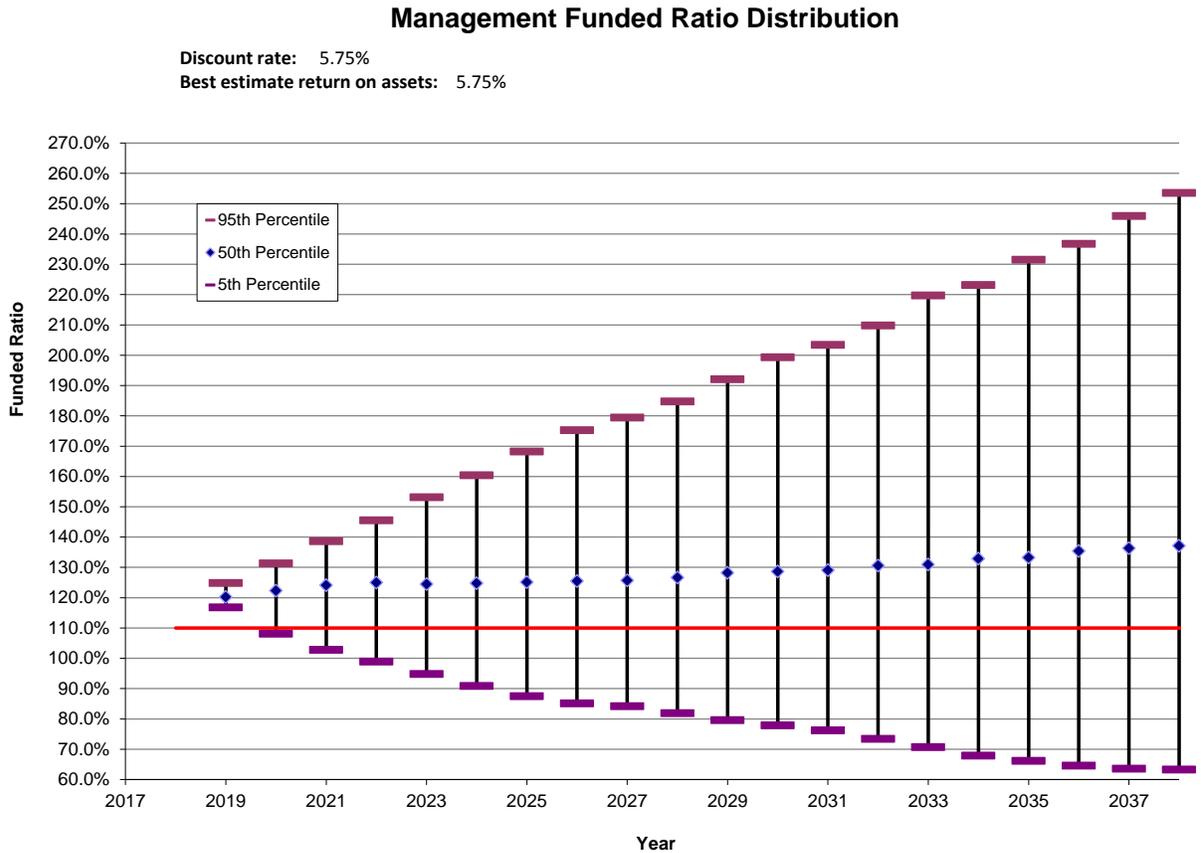
## Alternate Assumption Analysis

The following table outlines the impact of using alternate assumptions for discount rate, inflation rate and the lump sum assumption for retirement. Each scenario is independent of the others.

Management Results	Liabilities (\$000s)	Funded Status (\$000s)	Funded Ratio (%)	Current Service Cost (%)
Base Results	\$ 1,990,073	\$ 318,934	116.0%	16.45%
6.25% Discount Rate	\$ 1,874,081	\$ 434,926	123.2%	15.16%
5.40% Discount Rate	\$ 2,080,505	\$ 228,502	111.0%	17.46%
2.00% Inflation	\$ 2,038,272	\$ 270,735	113.3%	16.85%
1 year increase in life expectancy	\$ 2,017,143	\$ 291,864	114.5%	16.60%

## Financial Projections

The following graph provides a 20-year stochastic projection of the Management Funded Ratio. The funding target in the current Funding Policy is a Management Funded Ratio of 110%, which is shown in red in the graph below.



The following graph shows a 20-year stochastic projection of the Contribution Sufficiency Ratio, which is calculated as the ratio of:

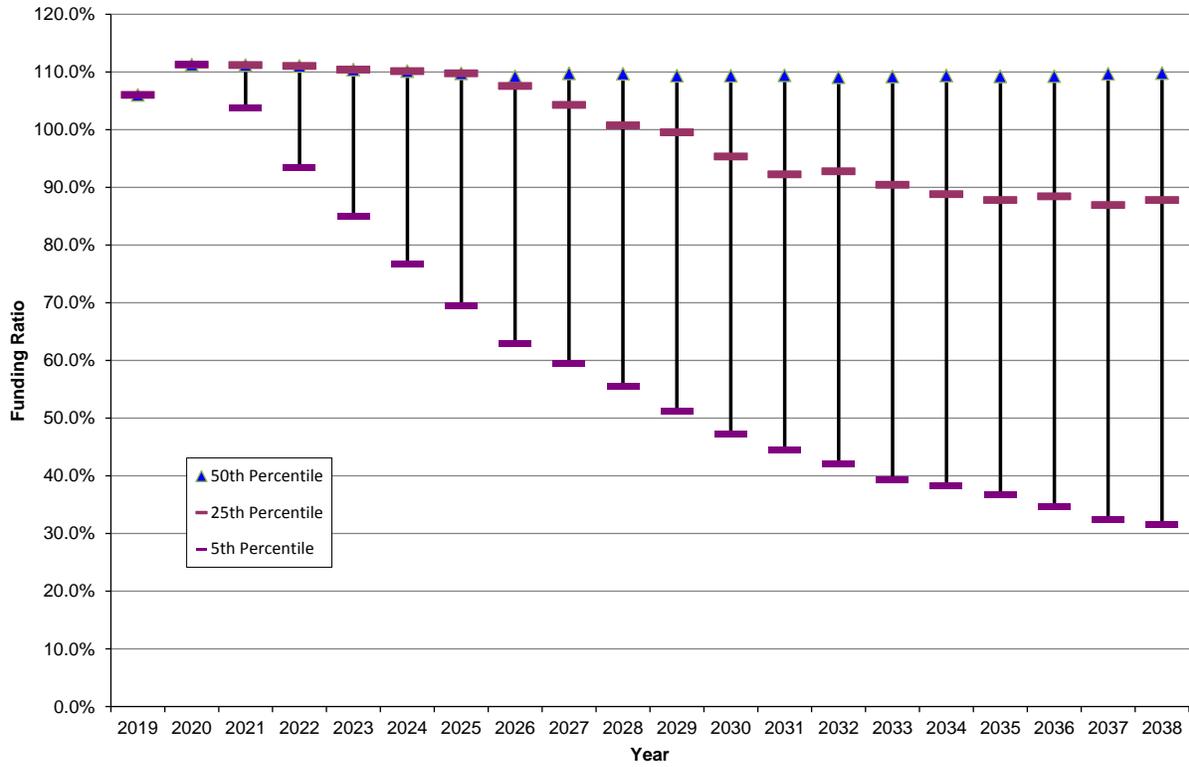
- Total employee and employer contributions; to
- Minimum regulatory funding contributions.

A minimum Contribution Sufficiency Ratio of 100% is required for the plan to meet regulatory filing requirements.

Note that the contribution increase to 9.0% for general members and 12.5% for emergency members effective July 1, 2018 is included in the graph below.

### Contribution Sufficiency Ratio Distribution

Discount rate: 5.75%  
 Best estimate return on assets: 5.75%



## 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 Plan's funding policy and is performed in accordance with requirements prescribed by *The Pension Benefits Act, 1992* (Saskatchewan) (the "Act"). 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.

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 December 31, 2017 is shown in the following table. The solvency financial position of the Plan as at December 31, 2016 is shown for comparison purposes.

#### Solvency Financial Position

	December 31, 2017	December 31, 2016
<b>Assets</b>		
Solvency assets	\$ 2,448,057,000	\$ 2,273,349,000
Estimated wind up expenses	<u>(7,650,000)</u>	<u>(7,610,000)</u>
<b>Total Assets</b>	<b>\$ 2,440,407,000</b>	<b>\$ 2,265,739,000</b>
<b>Solvency Liabilities</b>		
Active general members	\$ 1,310,862,000	\$ 1,287,037,000
Active emergency members	109,262,000	101,568,000
Disabled members	27,826,000	23,468,000
Retired members	949,009,000	892,875,000
Survivors	57,777,000	56,648,000
Deferred members	86,914,000	87,265,000
Pending terminations	119,354,000	115,824,000
Pending payouts	4,850,000	6,458,000
Transfer deficiency holdbacks	26,156,000	18,847,000
Former plan and AVC	<u>-</u>	<u>90,000</u>
<b>Total Liabilities</b>	<b>\$ 2,692,010,000</b>	<b>\$ 2,590,080,000</b>
<b>Solvency Surplus/(Deficiency)</b>	<b>\$ (251,603,000)</b>	<b>\$ (324,341,000)</b>
<b>Solvency Ratio</b>	<b>90.7%</b>	<b>87.5%</b>

## Solvency Ratio

The solvency ratio is the lesser of 1.0 or the ratio of the solvency assets (excluding wind-up expenses and present value of special payments) to the solvency liabilities (including wind-up expenses). If the solvency ratio is less than 1.0, certain conditions and restrictions, as prescribed by the Act, must be applied to the transfer of the commuted value of benefits from the Plan. Essentially, a transfer equal to the solvency ratio times the total commuted value can be made. The residual amount cannot be transferred out until either:

- (a) a special payment (over the amounts being paid in to the Plan to amortize the solvency deficiency) in the amount of the residual has been made to the Plan;
- (b) a subsequent valuation of the Plan discloses a solvency ratio of 1.0; or
- (c) five years have elapsed.

If the residual amount is less than 5% of the YMPE ( $\$55,900 \times 5\% = \$2,795.00$  for 2018) and the total of all such residual amounts is less than 5% of the market value of assets, then the above restrictions do not apply.

The solvency ratio is determined as follows:

	<b>\$</b>
Market value of assets, less wind-up expenses	2,440,407,000
Solvency liabilities	<u>2,692,010,000</u>
Ratio	0.907

Since the ratio of the solvency assets to the solvency liabilities is less than 1.0 as at December 31, 2017, the above restrictions on transfers would apply if the valuation were to be filed with the regulatory authorities.

## Solvency Valuation Sensitivity Results

In accordance with the Canadian Institute of Actuaries 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 than that used for the solvency valuation.

	<b>Valuation Basis</b>	<b>Based on Rate of</b>	<b>Effect</b>	
	<b>December 31, 2017</b>	<b>1% Lower</b>	<b>\$</b>	<b>%</b>
Solvency liabilities	\$ 2,692,010,000	\$ 3,158,147,000	\$ 466,137,000	17.3%

Note that using a discount rate 1% higher than that assumed would result in a comparable reduction in the solvency liabilities.

## Incremental Cost on a Solvency Basis

The incremental cost on a solvency basis represents the present value at December 31, 2017 of the expected aggregate change in the solvency liabilities between December 31, 2017 and the next calculation date, which is December 31, 2018. Appendix E 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, for the period from December 31, 2017 to December 31, 2018, is \$124.6 million.

Note that the incremental cost does not form part of the contribution requirements of the Plan.

## Section 4: Contribution Requirements

### Contribution Requirements in Respect of the Normal Cost

The annual going concern cost of benefits in respect of service accruing after the valuation date is known as the normal cost. The following table sets out:

- The development of the rule to determine the normal cost until the next actuarial funding recommendation is certified;
- An estimate of the normal cost for the year following the valuation date; and
- The portion of the current service cost that is to be paid by the members.

#### General Members:

	<b>2018</b>	
	<b>Before July 1</b>	<b>After June 30</b>
Best estimate current service cost	\$ 44,392,000	\$ 44,392,000
Current service cost margin	212,000	4,864,000
Expected member contributions	22,302,000	24,628,000
Expected employer contributions	<u>22,302,000</u>	<u>24,628,000</u>
Excess contributions/ (Funding deficiency)	\$ 0	\$ 0
Total pensionable earnings	\$ 273,637,000	\$ 273,637,000
	<b>% of Payroll</b>	<b>% of Payroll</b>
Best estimate current service cost	16.22%	16.22%
Current service cost margin	0.08%	1.78%
Expected member contributions	8.15%	9.00%
Expected employer contributions	<u>8.15%</u>	<u>9.00%</u>
Excess contributions/ (Funding deficiency)	0.00%	0.00%

**Emergency Members:**

	<b>2018</b>	
	<b>Before July 1</b>	<b>After June 30</b>
Best estimate current service cost	\$ 2,818,000	\$ 2,818,000
Current service cost margin	224,000	532,000
Expected member contributions	1,521,000	1,675,000
Expected employer contributions	<u>1,521,000</u>	<u>1,675,000</u>
Excess contributions/ (Funding deficiency)	\$ 0	\$ 0
 Total pensionable earnings	 \$ 13,398,000	 \$ 13,398,000
	<b>% of Payroll</b>	<b>% of Payroll</b>
Best estimate current service cost	21.03%	21.03%
Current service cost margin	1.67%	3.97%
Expected member contributions	11.35%	12.50%
Expected employer contributions	<u>11.35%</u>	<u>12.50%</u>
Excess contributions/ (Funding deficiency)	0.00%	0.00%

**Total:**

	<b>2018</b>	
	<b>Before July 1</b>	<b>After June 30</b>
Best estimate current service cost	\$ 47,210,000	\$ 47,210,000
Current service cost margin	436,000	5,396,000
Expected member contributions	23,823,000	26,303,000
Expected employer contributions	<u>23,823,000</u>	<u>26,303,000</u>
Excess contributions/ (Funding deficiency)	\$ 0	\$ 0
 Total pensionable earnings	 \$ 287,035,000	 \$ 287,035,000
	<b>% of Payroll</b>	<b>% of Payroll</b>
Best estimate current service cost	16.45%	16.45%
Current service cost margin	0.15%	1.87%
Expected member contributions	8.30%	9.16%
Expected employer contributions	<u>8.30%</u>	<u>9.16%</u>
Excess contributions/ (Funding deficiency)	0.00%	0.00%

## Contribution Requirements from Funding Policy

The funding policy for the Plan provides a minimum funding target equal to the sum of the following:

1. 100% of the current service cost; plus
2. Special payments sufficient to amortize any shortfall of the actuarial value of assets relative to 110% of the best estimate liabilities of the Plan.

The following table details the calculation of this requirement.

	<b>10% Margin</b>
Actuarial value of assets	2,309,007,000
Best Estimate Liabilities plus Margin	<u>2,189,080,000</u>
Excess/(Shortfall) in assets	119,927,000
Amortization of shortfall (as a % of payroll)	0.0%
100% of Best Estimate current service cost	<u>16.4%</u>
Total funding requirements per Funding Policy	16.4%
Actual total contribution rate for 2018	<u>17.4%</u>
<b>Excess/(Shortfall) in current contributions</b>	<b>1.0%</b>

Based on the above calculations, the plan is meeting the minimum funding requirements as provided for in the funding policy.

## Appendix A: Glossary of Terms

- The **actuarial value of assets** is the asset value used for going concern valuation purposes. In this valuation report, smoothing methods are 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 **management liabilities** are the actuarial present value of benefits earned in respect of service prior to the valuation date. The management liabilities are calculated using the best estimate going concern assumptions and methods summarized in Appendix D of this report.
- The **management financial position** is the difference between the actuarial value of assets and the management liabilities.
- **Solvency 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 plus the present value of 5 years of future special payments to be contributed to the Plan to amortize unfunded liabilities and solvency deficiencies of the Plan.
- 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. The solvency liabilities are calculated using the solvency valuation assumptions summarized in Appendix E of this report.
- The **solvency ratio** compares the solvency assets, excluding the present value of any special payments, to the solvency liabilities, including estimated wind-up expenses.
- The **solvency surplus/(deficiency)** is the difference between the solvency assets (net of estimated wind up expenses and including the present value of special payments) and the solvency liabilities.
- The **surplus/(unfunded liability)** is the difference between the actuarial value of assets and the management liabilities.
- 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. The total normal cost is calculated using the best estimate going concern valuation assumptions and methods summarized in Appendix D of this report.

## Appendix B: Assets

### Market Value of Assets – Defined Benefit Portion

The following is a summary of the composition of the Plan's assets by asset type. This has been taken from the Plan's unaudited financial statements.

	<b>December 31, 2017</b>	
	\$	%
Cash and short term	\$ 95,508,000	3.9%
Bonds	267,346,000	10.9%
Equities	890,048,000	36.4%
Private equity	99,255,000	4.0%
Infrastructure	182,628,000	7.5%
Pooled Funds	902,393,000	36.9%
Net accounts payable and receivables	10,879,000	0.4%
<b>Total Invested Assets</b>	<b>\$ 2,448,057,000</b>	<b>100.0%</b>

### Target Asset Mix

The target asset mix of the fund, upon which the December 31, 2017 discount rate assumption has been based, is provided in the following table. This has been taken from the Plan's Statement of Investment Policies and Procedures dated November 2017.

	<b>Minimum</b>	<b>Target</b>	<b>Maximum</b>
Canadian Bonds – Corporate	7.5%	11%	14.5%
Canadian Bonds – Core Plus	7.5%	11%	14.5%
Canadian Bonds – Long-term Core Plus	7.5%	11%	14.5%
Cash/Short Term	0%	2%	4%
Canadian Equities	10%	15%	20%
U.S. Equities (Large Capitalization)	2%	4%	6%
U.S. Equities (Small Capitalization)	2%	4%	6%
Non-North American Equities	2%	4%	6%
Global Equities	13%	18%	23%
Private Equity	1%	5%	8%
Infrastructure	4%	10%	13%
Real Estate	3%	5%	8%
		<b>100%</b>	

## Reconciliation of Total Market and Actuarial Value of Assets

The following table reconciles changes in the market and smoothed values of assets between January 1, 2013 and December 31, 2017 for the total fund, including annuities.

(in thousands)	2013	2014	2015	2016	2017
<b>Reported Market value at Beginning of Year</b>	1,556,437	1,677,600	1,998,088	2,129,836	2,292,360
Employee contributions	42,853	44,929	46,842	49,075	48,555
Employer contributions	42,673	44,839	46,698	49,051	48,506
Transfers-in	772	2,041	1,153	1,276	1,972
Arrears contributions	210	81	154	132	199
Interest and dividend income	53,736	55,422	75,424	83,029	76,310
Change in market value of assets	99,952	290,180	90,179	115,184	158,482
Pensions	(54,796)	(59,046)	(63,666)	(68,192)	(71,586)
Termination / death payments	(40,624)	(33,201)	(41,280)	(43,228)	(62,329)
Total expenses	<u>(23,613)</u>	<u>(24,757)</u>	<u>(23,756)</u>	<u>(23,803)</u>	<u>(26,192)</u>
<b>Reported Market Value at End of Year</b>	1,677,600	1,998,088	2,129,836	2,292,360	2,466,277
<b>Net Rate of Return – Market Value</b>	8.38%	19.13%	7.12%	8.21%	9.17%
<b>Expected Actuarial Return</b>	6.50%	6.50%	6.20%	6.00%	5.75%
<b>Investment Income Net of Expenses</b>	130,075	320,845	141,847	174,410	208,600
<b>Expected Actuarial Investment Income</b>	100,879	109,032	123,568	127,434	130,814
<b>Excess/(Shortfall)</b>	29,196	211,813	18,279	46,976	77,786
80% of current year excess/(shortfall)	23,357	169,450	14,623	37,581	62,229
60% of current year, less 1 excess/(shortfall)	65,800	17,518	127,088	10,967	28,186
40% of current year, less 2 excess/(shortfall)	(31,557)	43,866	11,679	84,725	7,312
20% of current year, less 3 excess/(shortfall)	<u>10,926</u>	<u>(15,779)</u>	<u>21,933</u>	<u>5,839</u>	<u>42,363</u>
<b>Total Asset Fluctuation Reserve</b>	<b>68,526</b>	<b>215,055</b>	<b>175,323</b>	<b>139,112</b>	<b>140,090</b>
<b>Actuarial Value at Beginning of Year</b>	1,475,539	1,609,074	1,798,279	1,954,513	2,153,247
Total contributions	85,526	89,768	93,540	98,126	97,061
Net transfers	982	2,122	1,307	1,408	2,171
Net actuarial investment income	142,447	174,315	166,333	210,620	207,624
Total benefit payments	<u>(95,420)</u>	<u>(92,247)</u>	<u>(104,946)</u>	<u>(111,420)</u>	<u>(133,915)</u>
<b>Actuarial Value at End of Year</b>	1,609,074	1,783,032	1,954,513	2,153,247	2,326,188
Corridor adjustment	-	15,247	-	-	-
<b>Actuarial Value at End of Year (after corridor)</b>	1,609,074	1,798,279	1,954,513	2,153,247	2,326,188
<b>Net Rate of Return (after corridor)</b>	9.68%	11.78%	9.28%	10.81%	9.72%
<b>% of Market Value</b>	95.92%	90.00%	91.77%	93.93%	94.32%

## Appendix C: Membership Data

### Source of Data

Data as to the membership of the Plan was compiled as at December 31, 2017 and provided by the Public Employees Benefits Agency. The relevant data required as of December 31, 2017 to carry out this valuation was extracted from these records. The data was checked for consistency with the previous valuation, general reasonableness, internal consistency and reconciled with the previous valuation's membership data. Data testing did not include an independent audit from source records to test for completeness and accuracy.

Data checks included, but were not limited to, a review of changes to annual pensions, review of salary increases, personal data (i.e. birth dates, dates of hire, etc.) from the previous valuation to this valuation, service accrual and any duplicate records. The checks were reviewed with the plan administrator and appropriate adjustments were made.

### Membership Reconciliation

	General	Emergency	Disabled	Pensioner	Survivor	Deferred	Pending	Total
<b>December 31, 2016</b>	<b>14,352</b>	<b>277</b>	<b>263</b>	<b>4,529</b>	<b>946</b>	<b>1,469</b>	<b>3,530</b>	<b>25,366</b>
New	1,467	14	8	-	-	-	230	1,719
Data Changes	-	-	-	3	-	-	-	3
To General	301	-	(48)	-	-	-	(253)	-
To Emergency	-	1	(1)	-	-	-	-	-
To LTD	(119)	-	126	-	-	-	(7)	-
To Pensioner	(250)	(1)	(9)	330	-	(31)	(38)	1
To Survivor	-	-	-	(59)	72	-	-	13
To Deferred	(44)	-	(2)	-	-	161	(115)	-
To Pending	(762)	(4)	(14)	-	-	-	780	-
Benefits ended	-	-	-	(20)	(5)	-	-	(25)
Death, no survivor	-	-	-	(47)	(64)	-	-	(111)
Paid out	<u>(737)</u>	<u>(9)</u>	<u>(24)</u>	-	-	<u>(128)</u>	<u>(561)</u>	<u>(1,459)</u>
<b>December 31, 2017</b>	<b>14,208</b>	<b>278</b>	<b>299</b>	<b>4,736</b>	<b>949</b>	<b>1,471</b>	<b>3,566</b>	<b>25,507</b>

## Membership Data – Defined Benefit Provision

### Active Members – General

	<b>December 31, 2016</b>	<b>December 31, 2017</b>
Membership	14,352	14,208
Average age	47.2 years	47.4 years
Average eligibility service	8.2 years	8.4 years
Percent female	66.4%	66.0%
Average full-time equivalent earnings	\$45,059	\$44,573
Average employee required contributions with interest	\$28,138	\$28,713

### Active Members – Emergency

	<b>December 31, 2016</b>	<b>December 31, 2017</b>
Membership	277	278
Average age	41.6 years	42.0 years
Average eligibility service	11.3 years	11.9 years
Percent female	11.6%	11.9%
Average full-time equivalent earnings	\$93,256	\$94,319
Average employee required contributions with interest	\$112,206	\$120,084

### Disabled

	<b>December 31, 2016</b>	<b>December 31, 2017</b>
Membership	263	299
Average age	53.8 years	53.5 years
Average eligibility service	9.3 years	9.3 years
Percent female	60.8%	58.5%
Average fulltime equivalent earnings	\$39,812	\$42,404

### Deferred Pensioners

	<b>December 31, 2016</b>	<b>December 31, 2017</b>
Membership	1,469	1,471
Average age	50.8 years	50.7 years
Average monthly accrued pension	\$348	\$354
Average monthly bridge	\$13	\$12
Total excess employee contributions	\$5,257,000	\$4,587,000

## Pending

	<b>December 31, 2016</b>	<b>December 31, 2017</b>
Membership	3,530	3,566
Average age	44.6 years	44.8 years
Average monthly accrued pension	\$205	\$214
Average monthly bridge	\$10	\$10
Total refund of contributions	\$2,894,000	\$2,769,000

## Pensioners

	<b>December 31, 2016</b>	<b>December 31, 2017</b>
Membership	4,529	4,736
Average age	71.1 years	71.2 years
Average monthly lifetime pension	\$1,050	\$1,060
Average monthly bridge	\$357 <sup>1</sup>	\$371 <sup>2</sup>
Average period since retirement	10.0 years	10.1 years

## Survivors

	<b>December 31, 2016</b>	<b>December 31, 2017</b>
Membership	946	949
Average age	78.2 years	77.8 years
Average monthly lifetime pension	\$508	\$520
Average monthly bridge	\$225 <sup>3</sup>	\$242 <sup>4</sup>
Average period since retirement	21.2 years	21.3 years

## Former Members with Pending Payouts

	<b>December 31, 2016</b>	<b>December 31, 2017</b>
Membership	19	26
Average pending payment amount	\$339,911	\$186,533

## Former Members with Transfer Deficiency Holdbacks

	<b>December 31, 2016</b>	<b>December 31, 2017</b>
Membership	941	1,162
Average holdback amount	\$20,029	\$22,510
Average time until payment of holdback	2.9 years	2.9 years

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<sup>1</sup> For 1,178 pensioners receiving a bridge payment.

<sup>2</sup> For 1,189 pensioners receiving a bridge payment.

<sup>3</sup> For 30 survivors receiving a bridge payment.

<sup>4</sup> For 31 survivors receiving a bridge payment.

## General Active Members – Age/Service Distribution

Age		Years of Credited Service							35 or more	Total (\$)
		Under 5 (\$)	5-9.99 (\$)	10-14.99 (\$)	15-19.99 (\$)	20-24.99 (\$)	25-29.99 (\$)	30-34.99 (\$)		
<b>Under 20</b>	Number	75	0	0	0	0	0	0	0	75
	Average Salary	31,989	0	0	0	0	0	0	0	31,989
<b>20 to 24</b>	Number	419	4	0	0	0	0	0	0	423
	Average Salary	35,851	42,436	0	0	0	0	0	0	35,914
<b>25 to 29</b>	Number	636	112	2	0	0	0	0	0	750
	Average Salary	42,261	49,972	64,747	0	0	0	0	0	43,473
<b>30 to 34</b>	Number	780	285	50	0	0	0	0	0	1,115
	Average Salary	43,470	55,913	57,186	0	0	0	0	0	47,266
<b>35 to 39</b>	Number	961	401	192	40	1	0	0	0	1,595
	Average Salary	39,477	50,521	53,977	58,578	54,193	0	0	0	44,487
<b>40 to 44</b>	Number	957	472	257	161	34	0	0	0	1,881
	Average Salary	39,271	46,217	51,575	54,967	67,237	0	0	0	44,544
<b>45 to 49</b>	Number	757	484	337	204	61	40	6	0	1,889
	Average Salary	41,987	44,298	43,793	48,462	58,634	63,846	57,489	0	44,650
<b>50 to 54</b>	Number	670	470	400	341	132	122	61	11	2,207
	Average Salary	41,367	45,700	43,273	43,170	54,034	62,106	69,326	64,334	45,705
<b>55 to 59</b>	Number	599	399	406	365	168	116	76	53	2,182
	Average Salary	42,167	45,370	43,215	42,085	48,441	53,257	67,959	67,637	45,523
<b>60 to 64</b>	Number	402	301	252	200	113	89	55	37	1,449
	Average Salary	41,430	44,256	44,908	41,531	52,014	49,518	57,922	57,866	45,003
<b>Over 64</b>	Number	200	161	94	81	26	40	16	24	642
	Average Salary	39,468	41,597	39,927	33,405	50,391	43,834	43,017	45,747	40,342
<b>TOTAL</b>	<b>Number</b>	<b>6,456</b>	<b>3,089</b>	<b>1,990</b>	<b>1,392</b>	<b>535</b>	<b>407</b>	<b>214</b>	<b>125</b>	<b>14,208</b>
	<b>Average Salary</b>	<b>40,742</b>	<b>46,881</b>	<b>45,874</b>	<b>44,665</b>	<b>53,038</b>	<b>55,207</b>	<b>63,611</b>	<b>60,251</b>	<b>44,573</b>

## Appendix D: Management 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 management 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 greater certainty: the assumptions used for this valuation have been selected as best estimate assumptions, containing no margins for adverse deviations of experience from the assumptions.

### Summary

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

	December 31, 2017	December 31, 2016
<b>Economic Assumptions</b>		
Discount rate – regular	5.75%	Same
Discount rate – lump sum transfers	3.50%	Same
Inflation rate	2.25%	Same
Increases in pensionable earnings – base	3.00%	Same
Increases in pensionable earnings – merit and promotion	Variable by service (Table A following)	Same
Increases in year's maximum pensionable earnings (“YMPE”)	3.00%	Same
Increases in maximum pension limit	In accordance with <i>Income Tax Act</i> , then 3.00%	Same
Interest on member contributions	2.25%	Same
Investment expenses	Included in discount rate	Same
Non-investment expenses	Included in discount rate	Same
Margin for adverse deviation	None	Same

	December 31, 2017	December 31, 2016
<b>Demographic Assumptions</b>		
Mortality – regular	Males: 115% of CPM Private Females: 100% of CPM Private	Same
Mortality – lump sum transfers	CPM Combined	Same
Retirement – General Members	<ul style="list-style-type: none"> <li>▪ 10% if eligible to retire but less than 80 points, 20% with 80 points, remainder at age 65</li> <li>▪ 12.5% elect lump sum transfer prior to January 1, 2019</li> </ul>	Same
Retirement – Emergency members	<ul style="list-style-type: none"> <li>▪ 50% each year between earliest unreduced date and age 65; 100% at age 65</li> <li>▪ 50% elect lump sum transfer prior to January 1, 2019</li> </ul>	<ul style="list-style-type: none"> <li>▪ 100% at earliest unreduced date</li> <li>▪ 50% elect lump sum transfer prior to January 1, 2019</li> </ul>
Termination of employment	<ul style="list-style-type: none"> <li>▪ Variable by age (Table B following)</li> <li>▪ 50% elect lump sum transfer</li> </ul>	Same
Disability	None	Same
Proportion married:		
Non-retired proportion with spouse	90% for males, 80% for females	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	None	Same
<b>Methods</b>		
Actuarial cost method	Projected unit credit	Same
Asset valuation method	5-year smoothed value with 10% corridor	Same

## Economic Assumptions

### Discount Rate

A discount rate of 5.75% has been used for this valuation. This discount rate is based on the following information:

The overall best estimate expected annual rate of return on assets is 5.75%. This is based on an assumed inflation rate of 2.25%, yielding a real rate of return on the pension fund assets of 3.50% per annum. This best-estimate rate of return on the assets was developed using best-estimate returns for each major asset class in which the pension fund is invested. In addition, certain adjustments, such as asset mix rebalancing and diversification, have been included to reflect the Plan's overall investment policy.

A specific provision has been included for investment management fees, which is made up of a component for passive management and a component for active management. PEBA has provided input on the level of expected active management fees. The assumption for active management fees anticipates an increase from historical levels due to expected changes in the investment policy.

The previous valuation used a discount rate net of investment expenses of 5.75% per annum.

For greater clarity: the following has been incorporated in the adjustments used to establish the best estimate discount rate for this valuation.

#### Development of Best Estimate Discount Rate

Expected return on assets – before expenses and adjustments			6.19%
Non-investment expenses			(0.40)%
Investment expenses			
Passive	(1)	(0.04)%	
Actively managed	(2)	<u>(0.60)%</u>	
		(1)+(2)	(0.64)%
Additional returns due to active management			0.60%
<b>Unrounded Discount Rate</b>			<b>5.75%</b>

Therefore, we have arrived at a discount rate of 5.75% per year. This assumption is best estimate and therefore contains no margins for adverse deviation.

### Inflation Rate

The inflation rate is assumed to be in the range of 2% to 3% per annum. For the purpose of this valuation a point estimate of 2.25% per year has been used. This reflects the current best estimate of future inflation considering current and future economic and financial market conditions. This assumption remains unchanged from the previous valuation.

## Increases in Pensionable Earnings

We have assumed future salary increases will be 3.00% per year, plus a merit and promotion scale that varies by service, as shown in the following Table A. The assumption reflects an assumed rate of inflation of 2.25% per year plus an allowance of 0.75% per year for the effect of productivity growth. This assumption remains unchanged from the previous valuation.

### Table A – Merit and Promotion Rates

The rates for increases in pensionable earnings due to merit and promotion used in this valuation and the previous valuation are shown in the following table:

<b>Year of service</b>	<b>General Members</b>	<b>Emergency Members</b>
≤5	2.0%	3.0%
6-10	1.5%	2.0%
11-15	1.0%	1.0%
16-20	0.5%	0.5%
>20	0.0%	0.0%

## Increases in Year's Maximum Pensionable Earnings

As the benefits paid to a member from the Plan are dependent to a small degree on the future Year's Maximum Pensionable Earnings ("YMPE"), it is necessary to make an assumption regarding the future increases in the YMPE.

The YMPE was assumed to increase up until the time the member retires, dies or terminates from active employment at 3.00% per year. This is comprised of an annual increase of 2.25% on account of inflation, plus 0.75% on account of productivity, which is consistent with historical real economic growth. This assumption remains unchanged from the previous valuation.

## Increases in the Maximum Pension Limit

Pensions are limited to the maximum limits under the *Income Tax Act*. The maximum lifetime annual pension per year of pensionable service payable under the *Income Tax Act* is \$2,914.44 in 2017 and \$2,944.44 in 2018. It is assumed that the maximum limit will increase at 3.00% per year commencing in 2018. This is comprised of an annual increase of 2.25% on account of inflation, plus 0.75% on account of productivity. This assumption remains unchanged from the previous valuation.

## Interest on Member Contributions

Effective January 1, 2015, interest is credited on member contributions at the minimum rate prescribed by the Act. We have assumed that this rate will be equal to the long-term rate of inflation of 2.25% per year. This assumption remains unchanged from the previous valuation.

## Expenses

Since the discount rate has been established net of all expenses, no explicit assumption is required for expenses. This is unchanged from the previous valuation.

## Demographic Assumptions

### Mortality

During 2014, a mortality study was performed for a number of municipal defined benefit pension plans in Saskatchewan, including MEPP. The results of the study indicated that MEPP experiences statistically different mortality than other Saskatchewan municipal plans.

The results of the study indicate that a best estimate of the current mortality of the plan members is the 2014 Canadian Pensioner Mortality (CPM) Private Sector Mortality Table, with base mortality rates adjusted as follows:

- Males: Base rates increased by 15% (i.e. 115% of base rates)
- Females: No adjustment (i.e. 100% of base rates)

In order to estimate future improvements in life expectancy, future mortality improvements have been estimated through the use of the unadjusted CPM-B projection scale, applied on a generational basis.

The previous valuation used the same mortality assumption.

For the current valuation, we have incorporated the CPM Combined Mortality Table in cases where a member is expected to receive a Commuted Value transfer upon termination or retirement instead of a monthly pension. This table is consistent with the table used for the calculation of Commuted Values effective October 1, 2015. The previous valuation used the same assumption.

Generational mortality rates depend on the year of birth of a member and vary by age. For example, the mortality rate at age 80 for a member age 70 at the valuation date (e.g. 40.28 expected deaths per 1,000 lives for males in the table below) will be higher than the mortality rate at age 80 for a member age 60 (e.g. 37.12 expected deaths per 1,000 lives for males in the table below) at the valuation date. The mortality rates decline due to projected mortality improvements over time.

Mortality rates per 1,000 lives at selected ages are as follows:

#### CPM Private Mortality per 1,000 lives – Male, increased by 15%

<b>Mortality per 1,000 lives at each future age</b>					
<b>Current age</b>	<b>80</b>	<b>85</b>	<b>90</b>	<b>95</b>	<b>100</b>
60	37.12	71.57	137.80	256.91	378.02
70	40.28	76.63	144.60	265.81	389.55
80	47.10	83.25	151.77	275.02	401.43
90	n/a	n/a	162.12	283.48	413.61

## CPM Private Mortality per 1,000 lives – Female, unadjusted

<b>Mortality per 1,000 lives at each future age</b>					
<b>Current age</b>	<b>80</b>	<b>85</b>	<b>90</b>	<b>95</b>	<b>100</b>
60	23.11	44.74	90.04	174.70	283.78
70	25.05	47.90	94.47	180.76	292.43
80	28.17	51.97	99.16	187.02	301.35
90	n/a	n/a	105.92	192.77	310.49

### Retirement

Retirement rates are typically developed taking into account the past experience of the Plan.

General active members are assumed to retire at the rate of 10% per year if eligible to retire but have not attained 80 points (age plus service), 20% per year if they have 80 points, with the remainder assumed to retire at age 65. This assumption is unchanged from the rates used in the previous valuation. For the current valuation, we have assumed that, prior to January 1, 2019, 12.5% of general active members will elect a lump sum transfer of their entitlement upon retirement and 87.5% will elect a monthly pension. For those members who elect a lump sum transfer, we have used a discount rate of 3.5% and the CPM Combined mortality table. The previous valuation included the same assumption.

Emergency active members and disabled members are assumed to retire at the rate of 50% each year between their earliest unreduced retirement date and age 65, any remaining members retiring at age 65. For the current valuation, we have assumed that, prior to January 1, 2019, 50% of emergency active members will elect a lump sum transfer of their entitlement upon retirement and 50% will elect a monthly pension. For those members who elect a lump sum transfer, we have used a discount rate of 3.5% and the CPM Combined mortality table. The previous valuation assumed that 100% of emergency active members and disabled members would retire at their earliest unreduced retirement date. The percentage assumed to elect a lump sum transfer and assumed to elect a monthly pension remains unchanged from the previous valuation.

Deferred and pending members are assumed to retire at their earliest reduced or unreduced date, with any applicable reductions. These dates and pension amounts were included in the data. This assumption is unchanged from the previous valuation.

### Termination of Employment

A member's benefit entitlement under the Plan is affected by whether the member terminates employment prior to retirement for reasons other than death. In order to account for this in the calculation of the actuarial liability, an assumption regarding the probability that a member will terminate employment for reasons other than death has been made.

The termination rates are summarized in Table B on the following page. Note that termination rates for emergency members are assumed to be 75% of those for general active members. Disabled members are assumed not to terminate membership prior to retirement.

## Table B – Termination Rates

Sample rates used in this valuation and the previous valuation are shown in the following table:

<b>Age</b>	<b>General Members</b>	<b>Emergency Members</b>
20	20.5%	15.4%
25	15.5%	11.6%
30	10.5%	7.9%
35	6.5%	4.9%
40	4.8%	3.6%
45	4.3%	3.2%
50	3.2%	2.4%
55	1.2%	0.9%
>57	0.0%	0.0%

In addition, we have assumed that, upon termination, 50% of members will elect a deferred retirement benefit and 50% will elect a lump sum transfer. For those members electing a transfer, we have assumed a discount rate of 3.5% and the CPM Combined mortality table will be used to determine such values.

The termination rates and proportion electing a lump sum transfer are unchanged from the previous valuation.

### Disability

If an active Plan member becomes disabled, contributory service continues to accrue until unreduced pension commencement age, but employee contributions are waived. Since this benefit is substantially the same as the benefit that accrues to an active member, no assumption has been made for future disabilities.

For those members that are currently disabled, we have assumed that members will continue to earn full credited service each year in the future until retirement at the earliest unreduced age. The liability associated with the future service accrual for disabled members has been held as a liability reserve.

The same assumption was used in the previous valuation.

### 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. It has been assumed that 90% of male members and 80% of female members will have a spouse at retirement, and males are assumed to be 3 years older than females. This assumption remains unchanged from the previous valuation.

## 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 accrued benefit 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 current service cost) is expressed as a percentage of the expected value of participating payroll for that 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 pre retirement 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 pension 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.

### Asset Valuation Method

The actuarial value of assets (AVA) methodology shown in Appendix A was used in accordance with the funding policy, with the goal of moderating fluctuations in contribution rates. The method used tracks the market value of assets, and would approach market value if rates of return matched assumptions. The method chosen does not deviate materially from market value, and additionally, we have set a corridor for the method to produce actuarial values within plus or minus 10% of market value should the method produce an AVA outside of this range. The method does not have undue influence on investment transactions, (i.e., sale of an asset will not have an impact on the AVA). A 5-year period of averaging was chosen, which is within the typical range of an economic cycle. There is no bias in the method, as we believe there is an equal probability of the AVA being higher or lower than the market value of assets.

## Appendix E: Solvency Assumptions and Methods

### Valuation Assumptions

	December 31, 2017	December 31, 2016
<b>Economic Assumptions</b>		
Discount Rate		
Transfer value basis	2.60% for 10 years; 3.40% thereafter	2.20% for 10 years; 3.50% thereafter
Annuity purchase basis	3.10%	3.20%
<b>Demographic Assumptions</b>		
Post-retirement mortality rates	2014 Canadian Pensioner Mortality Combined Table with CPM-B projection scale	Same
Withdrawal rates	Not Applicable	Same
Retirement age		
Active and disabled members	Age that produces the highest lump-sum value	Same
Deferred vested members	Age that produces the highest lump-sum value	Same
Retired members and beneficiaries	Not applicable	Same
Termination of employment	Terminate with full vesting	Same
Marital status		
Non-retired spousal proportion	90% for males, 80% for females	Same
Non-retired spousal age differential	Males three years older	Same
Retired members	Actual marital status and ages are used	Same
<b>Other</b>		
Wind up expenses	\$300 per member	No change
Actuarial cost method	Unit credit	No change
Asset valuation method	Market value of assets adjusted to reflect in-transit items as of the valuation date	No change
<b>Solvency Incremental Normal Cost</b>		
Increases in pensionable earnings	3.00% + merit and promotion	Same
Increases in YMPE	3.00%	Same
Increases in maximum pension limit	In accordance with <i>Income Tax Act</i> , then 3.00%	Same
Inflation Rate	2.25%	Same

Based on the Canadian Institute of Actuaries' 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, which is unchanged from the previous valuation:

	<b>Percent of Liability Assumed to be Settled By Purchase of Annuities</b>	<b>Percent of Liability Assumed to be Settled By Lump-Sum Transfer</b>
Members not currently receiving a pension		
Less than age 53.5	0%	100%
At least age 53.5	100%	0%
Members currently receiving a pension	100%	0%

### 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 amount to \$300 per member. This assumption is unchanged from the previous valuation.

### Actuarial Cost Methods

Unit credit (accrued benefit) cost method as prescribed.

### Asset Valuation Method Considerations

Assets for solvency purposes have been determined using market value.

### Incremental Cost on a Solvency Basis

The incremental cost on a solvency basis represents the present value, at the calculation date (time 0), of the expected aggregate change in the solvency 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 Canadian Institute of Actuaries' Committee on Pension Plan Financial Reporting to provide guidance for actuaries on the calculation of this 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
- A projected hypothetical wind up or solvency 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 hypothetical wind up or solvency 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 best estimate assumptions used in the management valuation.
- The assumptions used to calculate the projected liability at time t are consistent with the assumptions for the solvency 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 and assumed new entrants over the period between time 0 and time t are considered in calculating the incremental cost.

## Appendix F: Summary of Plan Provisions

The following is a summary of the main provisions of the Plan which are relevant to the valuation, including expected changes to contribution rates and retirement portability provisions, in accordance with a recommendation made by the Commission to the Minister of Finance. For complete details, reference should be made to the official Plan documents.

### Effective Date

The effective date of the Plan is November 1, 1973.

### Eligibility

Permanent employees, who are employees employed on an ongoing basis (full-time, part-time and seasonal) join the Plan on the date they become an employee.

Non-permanent employees may join the Plan on the date of hire and must join the Plan if the employee works at least 700 hours in two consecutive years. Once an employee has joined the Plan, he/she remains a member even if the hours of work reduce to less than 700 hours in a year.

Plan members who move from one participating employer to another, must immediately participate with the second employer regardless of the terms of employment with the second employer.

Emergency members are those designated by their employers.

### Normal Retirement

The normal retirement date for members is the first day of the month immediately following the attainment of age 65. The normal retirement date for emergency workers is the first day of the month immediately following the attainment of age 60.

### Early Retirement Date

#### General Members

General members can retire any time after satisfying the rule of 80 (age plus years of continuous service = 80 or more) with an unreduced pension. They can also retire after having attained age 55 with a minimum of 15 years of continuous service but in that event, the pension is reduced by 3% for each year prior to the date when the member would satisfy the rule of 80 assuming service had continued, or would reach normal retirement age, if earlier.

## Emergency Members

Emergency members can retire with an unreduced pension at any time after satisfying any of:

- age 55,
- rule of 75, or
- 25 years of continuous service.

They can also retire after age 45 on satisfying the rule of 70 but in that event, the pension in respect of service after 1991 is reduced by 3% for each year prior to the date when the member would satisfy the rule of 75 assuming that service had continued, or would reach normal retirement age, if earlier. The pension in respect of service prior to 1992 is not reduced for early retirement.

## Employee Contributions

Effective January 1, 2013, general members contribute 8.15% and emergency members 11.35% of earnings. Earnings include regular remuneration and commissions, but exclude overtime pay and bonuses.

Effective July 1, 2018, general member contributions will increase to 9.00% and emergency member contributions will increase to 12.50% of earnings.

Effective January 1, 2015, the interest rate credited on member contributions is minimum rate prescribed by the Act.

## Employer Contributions

The participating employers shall contribute to the Plan such amounts equal to the required employee contributions.

## Amount of Pension

Upon retirement, a member is entitled to a retirement benefit based on the member's highest average salary and contributory service, where the highest average salary is the total salary of the member during the three years of highest salary divided by three, as follows:

1. For benefits payable before age 65:  
All members are entitled to a pension of 2% of the highest average salary multiplied by the number of years or contributory service.
2. For benefits payable on and after age 65:
  - a) General members with a date of entry on or after January 1, 1993:
    - Are entitled to a pension of 1.5% of the highest average salary multiplied by the number of years of contributory service excluding the years 2001 to 2005; plus
    - A pension of 1.8% of the highest average salary multiplied by the number of years of contributory service between January 1, 2001 and December 31, 2005.
  - b) Emergency members with a date of entry on or after January 1, 1993:
    - Are entitled to a pension of 1.7% of the highest average salary multiplied by the number of years of contributory service, excluding the years 2001 to 2005; plus

- A pension of 2% of the highest average salary multiplied by the number of years of contributory service between January 1, 2001 and December 31, 2005.
- c) General members with a date of entry prior to January 1, 1993:
- With respect to service prior to January 1, 1990 and service between January 1, 2001 and December 31, 2005, are entitled to a pension for each year of contributory service equal to the greater of:
    - (i) 1.3% times the highest average salary not in excess of the three year average YMPE plus 2% times the highest average salary in excess of the three year average YMPE, and
    - (ii) 1.8% times the highest average salary.
  - With respect to service on or after January 1, 1990, but excluding years 2001 to 2005, are entitled to a pension for each year of contributory service equal to the greater of:
    - (i) 1.3% times the highest average salary not in excess of the three year average YMPE plus 2% times the highest average salary in excess of the three year average YMPE, and
    - (ii) 1.5% times the highest average salary.
- d) Emergency members with a date of entry prior to January 1, 1993:
- With respect to service prior to January 1, 1990 and service between January 1, 2001 and December 31, 2005 are entitled to a pension for each year of contributory service equal to 2% times the highest average salary:
  - With respect to service on or after January 1, 1990, but excluding years of 2001 to 2005, are entitled to a pension for each year of contributory service equal to the greater of:
    - (i) 1.3% times the highest average salary not in excess of the three year average YMPE plus 2% times the highest average salary in excess of the three year average YMPE, and
    - (ii) 1.7% of the highest average salary.

Prior to January 1, 2019, retiring members may elect to transfer the commuted value of their monthly retirement pension out of the Plan. On or after January 1, 2019, members eligible for retirement will be required to receive a monthly pension from the plan.

## Pre-Retirement Death Benefits

Upon the death of a member prior to retirement, an amount equal to the sum of the member's additional contribution account, the member's annuity and annuity surplus account, the employer additional contribution account and the employer annuity account, plus the commuted value of the defined benefit pension is paid to the member's spouse, beneficiary or estate. The spouse also has the option to receive a monthly lifetime pension based on the total value of the death benefit.

## Post-Retirement Death Benefits

If a retired member who has a spouse at retirement dies, 100% of the pension payable to the member is guaranteed to be paid for five years from the retired member's date of retirement. After the guaranteed payments are made, 60% of the pension to which the retired member was entitled shall be paid to the surviving spouse for life. In the event of death of both the retired member and retired member's spouse, the 60% allowance will be payable to the designated dependents named at retirement (up to age 18).

If the member does not have a spouse at retirement, a single life annuity with a guarantee period of 15 years is payable.

Optional forms of pension are provided on an actuarial equivalent basis.

## Termination Benefits

An employee who has been a member of the Plan or employed by an employer participating in the Plan for a continuous period of at least 2 years, on termination of employment prior to retirement, would receive an immediate or deferred pension. For members terminating prior to January 1, 2019, an employee may elect to receive a lump sum that does not exceed one half of the member's accumulated contributions with interest as at December 31, 1993 in lieu of part of the member's pension.

Upon termination, the pension benefit may be commuted.

## Indexation Benefits

For pensions in respect of service accrued before 1999, and subject to there being funds available to provide it, the Plan provides for future indexation equivalent to the lesser of 2% per year or the increase in the Saskatchewan Consumer Price Index (CPI) with the excess of 2% over the increases in the CPI carried forward on a cumulative basis. Indexing on post-1998 benefits may also be provided if funds permit, but this is a decision of the Commission and does not happen automatically. The 2% increase for benefits in respect of pre-1999 service was paid at January 1, 2007 and 2008 – no increase was provided for benefits in respect of post-1998 service at these times.

The Commission cancelled the automatic provision of 2% indexing on pre-1999 benefits effective June 1, 2009.

## Disability

A member who is totally and permanently disabled and who has been away from work for a 2 year period may, on application, continue to accrue credited service without employee or employer contribution. In this event, the salary on which the pension is based will be increased from the date of disability based on the increase in the average Canadian salaries and wages. The waiver will cease on the member's unreduced retirement date.

## Appendix G: Summary of Funding Policy

The following is a summary of the provisions of the Plan's funding policy, effective November 17, 2017, which are relevant to the valuation. For complete details, reference should be made to the official funding policy document.

### Valuations

The funding policy requires the preparation of the following three valuations:

- Management valuation
- Solvency valuation
- Filing valuation

### Management Valuation

The management valuation is the primary source of information upon which the Commission will base its decisions or recommendations regarding contribution rates and additional benefits. The management valuation shall be prepared annually using best estimate economic and demographic assumptions.

The management valuation shall include reserves for accruals for disabled members equal to the present value of all future accruals for presently disabled members.

The actuarial value of assets will be determined using a smoothing method over no more than 5 years and the actuarial value of assets will be limited to not more than 110% nor less than 90% of the market value of assets.

The discount rate used for the management valuation shall be best estimate and shall include a provision for future investment management and administration expenses.

### Solvency Valuation

The solvency valuation provides a minimum funding target for the Plan and shall be prepared in accordance with requirements of *The Pension Benefits Act, 1992* (Saskatchewan).

The market value of assets on an accrual basis will be used to determine the solvency financial position.

### Filing Valuation

The filing valuation is required to be prepared at least triennially to comply with the requirements of *The Pension Benefits Act, 1992* (Saskatchewan) and the *Income Tax Act*. The filing valuation shall be filed with the Financial and Consumer Affairs Authority of Saskatchewan and the Canada Revenue Agency with respect to the decisions or recommendations of the Commission with respect to contribution rates and benefits.

## Appendix H: Administrator Certification

With respect to the Municipal Employees' Pension Plan, forming part of the actuarial report as at December 31, 2017, I hereby certify that, to the best of my knowledge and belief:

- The asset data contained in Appendix B of this report is complete and accurate;
- The membership data summarized in Appendix C of this report form a complete and accurate description of 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 summary of the Plan provisions contained in Appendix F is an accurate summary of the current Plan provisions; and
- The actuary has been notified of all relevant events subsequent to the valuation measurement date.

Date May 24, 2018

Signed  \_\_\_\_\_

Name Kevin Sockett

Title Manager, Municipal Employees' Pension Plan

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